Santa Clara Valley Water District
Board of Directors Meeting

Teleconference Zoom Meeting

11:00 AM CLOSED SESSION AND 1:00 PM REGULAR MEETING
AGENDA

Tuesday, August 11, 2020
11:00 AM

District Mission: Provide Silicon Valley safe, clean water for a healthy life, environment and economy.

DISTRICT BOARD OF DIRECTORS

Nai Hsueh, Chair, District 5
Tony Estremera, Vice Chair, District 6
John L Varela, District 1
Barbara Keegan, District 2
Richard P. Santos, District 3
Linda J. LeZotte, District 4
Gary Kremen, District 7

All public records relating to an open session item on this agenda, which are not exempt from disclosure pursuant to the California Public Records Act, that are distributed to a majority of the legislative body will be available for public inspection at the Office of the Clerk of the Board at the Santa Clara Valley Water District Headquarters Building, 5700 Almaden Expressway, San Jose, CA 95118, at the same time that the public records are distributed or made available to the legislative body. Santa Clara Valley Water District will make reasonable efforts to accommodate persons with disabilities wishing to attend Board of Directors' meeting. Please advise the Clerk of the Board Office of any special needs by calling (408) 265-2600.

RICK L. CALLENDER, ESQ.
Chief Executive Officer

MICHELE L KING, CMC
Clerk of the Board
(408) 265-2600
Fax (408) 266-0271
www.valleywater.org

Note: The finalized Board Agenda, exception items and supplemental items will be posted prior to the meeting in accordance with the Brown Act.

Santa Clara Valley Water District
Board of Directors

11:00 AM CLOSED SESSION AND 1:00 PM REGULAR MEETING AGENDA

Tuesday, August 11, 2020	11:00 AM	Teleconference Zoom Meeting

IMPORTANT NOTICES

This meeting is being held in accordance with the Brown Act as currently in effect under the State Emergency Services Act, the Governor's Emergency Declaration related to COVID-19, and the Governor's Executive Order N-29-20 issued on March 17, 2020 that allows attendance by members of the Board of Directors, District staff, and the public to participate and conduct the meeting by teleconference, videoconference, or both.

Members of the public wishing to address the Board during a video conferenced meeting on an item not listed on the agenda, or any item listed on the agenda, should use the "Raise Hand" or "Chat" tools located in Zoom meeting link listed on the agenda. Speakers will be acknowledged by the Board Chair in the order requests are received and granted speaking access to address the Board.

Santa Clara Valley Water District (District), in complying with the Americans with Disabilities Act (ADA), requests individuals who require special accommodations to access and/or participate in District Board meetings to please contact the Clerk of the Board's office at (408) 630-2711, at least 3 business days before the scheduled District Board meeting to ensure that the District may assist you.

This agenda has been prepared as required by the applicable laws of the State of California, including but not limited to, Government Code Sections 54950 et. seq. and has not been prepared with a view to informing an investment decision in any of Valley Water's bonds, notes or other obligations. Any projections, plans or other forward-looking statements included in the information in this agenda are subject to a variety of uncertainties that could cause any actual plans or results to differ materially from any such statement. The information herein is not intended to be used by investors or potential investors in considering the purchase or sale of Valley Water's bonds, notes or other obligations and investors and potential investors should rely only on information filed by the District on the Municipal Securities Rulemaking Board's Electronic Municipal Market Access System for municipal securities disclosures and Valley Water's Investor Relations website, maintained on the World Wide Web at https://emma.msrb.org/ and https://www.valleywater.org/how-we-operate/financebudget/investor-relations, respectively.

Join Zoom Meeting:
https://valleywater.zoom.us/j/96766899382
Meeting ID: 967 668 99382
Join by Phone:
1 (669) 900-9128, 96766899382#

1. CALL TO ORDER:

1.1. Roll Call.

2. TIME CERTAIN:

11:00 AM

Notice to the Public: The Board of Directors meets in Closed Session in accordance with the Ralph M. Brown Act. Following the conclusion of Closed Session discussion, the Board will return for the remaining items on the regular meeting agenda.

2.1. CLOSED SESSION 20-0600
CONFERENCE WITH LEGAL COUNSEL-EXISTING LITIGATION
Pursuant to Government Code §54956.9(d)(1);
Great Oaks v. SCVWD
Master Complaint, {Inverse Condemnation; Declaratory Relief; Writ of Mandate; Claim for Refund}
Case No. 2011-1-CV-205462, and related cases

1:00 PM

Rejoin Zoom Meeting:
https://valleywater.zoom.us/j/96766899382
Meeting ID: 967 668 99382
Join by Phone:
1 (669) 900-9128, 96766899382#

2.2. District Counsel Report on Closed Session.

2.3. Pledge of Allegiance/National Anthem.

2.4. Orders of the Day.
A. Approximate Discussion Time (Board); and
B. Adjustments to the Order of Agenda Items.

2.5. Time Open for Public Comment on any Item not on the Agenda.

Notice to the public: Members of the public who wish to address the Board on any item not listed on the agenda should access the "Raise Hand" or "Chat" tools located in Zoom meeting link listed on the agenda. Speakers will be acknowledged by the Board Chair in order requests are received and granted speaking access to address the Board. Speakers comments should be limited to three minutes or as set by the Chair. The law does not permit Board action on, or extended discussion of, any item not on the agenda except under special circumstances. If Board action is requested, the matter may be placed on a future agenda. All comments that require a response will be referred to staff for a reply in writing. The Board may take action on any item of business appearing on the posted agenda.

2.6. California Proposition 15, Tax on Commercial and Industrial Properties for Education and Local Government Funding Initiative Presentation by Santa Clara County Assessor Larry Stone. 20-0566

Recommendation: Receive information on California Proposition 15, Tax on Commercial and Industrial Properties for Education and Local Government Funding Initiative presentation by Santa Clara County Assessor Larry Stone.

Manager: Rachael Gibson, 408-630-2884

Est. Staff Time: 15 Minutes

2.7. Receive and Discuss Information Regarding Pension Liability and the Potential Use of Pension Obligation Bonds. (Continued from July 28, 2020) 20-0680

Recommendation: Receive and discuss information regarding pension liability and the potential use of pension obligation bonds and provide staff with further direction as necessary.

Manager: Darin Taylor, 408-630-3068

Attachments: Attachment 1: PowerPoint

Est. Staff Time: 30 Minutes

2.8. Approve the Revised Fiscal Year 2020-2021 Santa Clara Valley Water District Investment Policy and Approve an Update Executive Limitations Policy EL 4.7, Financial Management. (Continued from July 28, 2020) 20-0681

Recommendation:

A. Approve the Revised Fiscal Year 2020-2021 Santa Clara Valley Water District Investment Policy;
B. Approve an update to Executive Limitation Policy EL-4.7, Financial Management; and
C. Provide additional direction to staff as necessary.

Manager: Darin Taylor, 408-630-3068

Attachments:
Attachment 1: Revised Investment Policy
Attachment 2: Powerpoint
Attachment 3: Sample ESG Evaluation Report for Deutsche Bank

Est. Staff Time: 10 Minutes

2.9. Receive Information and Authorize Staff to Proceed with Negotiation and Execution of Bank Line(s) of Credit with Aggregate Stated Amount Not to Exceed $200 Million. (Continued from July 28, 2020) 20-0682

Recommendation:

A. Receive information regarding bank line(s) of credit solicitation; and
B. Authorize staff to proceed with negotiation and execution of bank line(s) of credit with aggregate stated amount not to exceed $200 Million.

Manager: Darin Taylor, 408-630-3068

Attachments:
Attachment 1: PowerPoint
Attachment 2: Revised Bank Proposals
Attachment 3: MUFG ESG Response
Attachment 4: JPM ESG Response
Attachment 5: US Bank ESG Response
Attachment 6: UBS ESG Response
Attachment 7: Bank of America ESG Response

Est. Staff Time: 10 Minutes

3. CONSENT CALENDAR: (3.1 - 3.5) (Est. Time: 5 Minutes)

Notice to the public: There is no separate discussion of individual consent calendar items. Recommended actions are voted on in one motion. If an item is approved on the consent vote, the specific action recommended by staff is adopted. Items listed in this section of the agenda are considered to be routine by the Board, or delegated to the Board Appointed Officers (BAOs) yet required by law or contract to be Board approved (EL-7.10). Any item may be removed for separate consideration at the request of a Board member. Whenever a resolution is on the consent calendar, a roll call vote will be taken on the entire calendar. Members of the public wishing to address the Board on any consent items should complete a Speaker Card and present it to the Clerk of the Board.

3.1. Adopt Plans and Specifications and Authorize Advertisement for Bids for the Central and Parallel East Pipelines Inspection and Rehabilitation Project, Project No. 95084002, Contract No. C0661 (San Jose and Unincorporated Santa Clara County), (Districts 1, 2, 4, 6, and 7). 20-0493

Recommendation:

A. Find that the Central and Parallel East Pipelines Inspection and Rehabilitation Project is substantially complex and requires a construction contract retention of 10 percent;
B. Adopt Plans and Specifications and Authorize Advertisement for Bids for Construction of the Central and Parallel East Pipelines Inspection and Rehabilitation Project per the Notice to Bidders; and
C. Authorize the Designated Engineer to issue addenda, as necessary, during the bidding process.

Manager: Heath McMahon, 408-630-3126

Attachments:
Attachment 1: Notice to Bidders
Attachment 2: Project Delivery Process Chart
Attachment 3: Site Map
Attachment 4: Plans
Attachment 5: Specifications

3.2. Approve Amendment No. 2 to Agreement A4139F with Governmental Advocates, Inc., for State Lobbying Services, to Increase the Fee by $109,200 for a Total Revised Fee Not-to-Exceed $336,700 and Extend the Agreement Term to September 30, 2021. 20-0628

Recommendation: Approve Amendment No. 2 to Agreement A4139F with Governmental Advocates, Inc., for State Lobbying Services, to increase the fee by $109,200 for a total revised Fee Not-to-Exceed $336,700, and extend the Agreement term to September 30, 2021.

Manager: Donald Rocha, 408-630-2338

Attachments: Attachment 1: Amendment No. 2

3.3. Notice of Completion of Contract and Acceptance of Work for the Vasona Pump Station Fence and Gate Replacement Project Phase 1, AAA Fence Company, Inc., Contractor, Project No. 92764009, Contract No. 0654 (Los Gatos) (District 7). 20-0571

Recommendation:

A. Accept the work as complete for Vasona Pump Station Fence and Gate Replacement Project Phase 1, Project No. 92764009, Contract No. C0654; and

B. Direct the Clerk of the Board to sign the Notice of Completion of Contract and Acceptance of Work and submit for recording to the County of Santa Clara Office of the Clerk-Recorder.

Manager: Heath McMahon, 408-630-3126

Attachments:
Attachment 1: Notice of Completion and Acceptance of Work
Attachment 2: Construction Contract Acceptance
Attachment 3: Project Completion Letter
Attachment 4: Construction Photos
Attachment 5: Project Delivery Process Chart

3.4. Receive Semi-Annual Lobbyist Report of Individuals Engaged in Compensated Lobbying Activities Aimed at Influencing District Decisions, in Accordance With District Ordinance No. 10-01. 20-0599

Recommendation: Receive the Semi-Annual Lobbyist Report of Individuals Engaged in Compensated Lobbying Activities for the period January 1, 2020 through June 30, 2020.

Manager: Michele King, 408-630-2711

Attachments: Attachment 1: Lobbyist Report

3.5. Accept the CEO Bulletin for the Weeks of July 17-30, 2020. 20-0631

Recommendation: Accept the CEO Bulletin.

Manager: Rick Callender, 408-630-2017

Attachments: Attachment 1: 073020 CEO Bulletin

REGULAR AGENDA:

4. BOARD OF DIRECTORS:

4.1. Receive Overview of Valley Water's Current Budget Processes and Consider the Benefits and Drawbacks Associated with Biennial Budgeting. 20-0502

Recommendation:

A. Review Valley Water's current annual budget process in relation to a biennial budget process in order to identify the benefits and drawbacks associated with each; and
B. Direct staff to implement a rolling biennial budget process to be updated annually after implementation of, and demonstrated stability of, the Infor Enterprise Resource Planning system.

Manager: Darin Taylor, 408-630-3068

Attachments: Attachment 1: PowerPoint

Est. Staff Time: 15 Minutes

4.2. Approve Amendment No. 3 to Agreement No. A4071A with TAP International, Inc. for Board Independent Auditing Services Increasing the Not-to-Exceed Fee by $250,000, for a Total Revised Fee of $1,255,000. 20-0636

Recommendation: Approve Amendment No. 3 to Agreement No. A4071A with TAP International, Inc. for Board Independent Auditing Services, increasing the not-to-exceed Fee by $250,000, for a revised total fee of $1,255,000.

Manager: Darin Taylor, 408-630-3068

Attachments: Attachment 1: Amendment No. 3

Est. Staff Time: 10 Minutes

4.3. Approve Fiscal Year 2020-2021 Board Work Plan. 20-0638

Recommendation:

A. Review and approve the Fiscal Year 2020-2021 Board Work Plan; and
B. Discuss outreach plans, and provide additional direction, if necessary, to staff on how the Plan should be distributed.

Manager: Michele King, 408-630-2711

Attachments: Attachment1: FY21 Board Work Plan

Est. Staff Time: 5 Minutes

4.4. Fiscal Year 2021 Board Policy Planning Calendar. 20-0658

Recommendation: Review and approve the Fiscal Year 2021 Board Policy Planning Calendar.

Manager: Michele King, 408-630-2711

Attachments: Attachment 1: FY21 Board Calendar

Est. Staff Time: 5 Minutes

4.5. Proposed Future Board Member Agenda Items.

4.6. Board Committee Reports.

5. WATER UTILITY ENTERPRISE:

5.1. Update on 2020 Water Supply Conditions and Initial 2021 Outlook Scenarios. 20-0562

Recommendation: Receive, review, and discuss information on water supply conditions.

Manager: Aaron Baker, 408-630-2135

Attachments: Attachment 1: PowerPoint

Attachment 2: July 2020 Water Tracker Report

Est. Staff Time: 5 Minutes

5.2. Update on Per- and Polyfluoroalkyl Substances (PFAS). 20-0601

Recommendation: Receive information on Per- and Polyfluoroalkyl Substances (PFAS).

Manager: Aaron Baker, 408-630-2135

Attachments: Attachment 1: SJWC Customer Notifications
Attachment 2: PFAS Fact Sheet
Attachment 3: PowerPoint

Est. Staff Time: 10 Minutes

6. WATERSHEDS:

7. EXTERNAL AFFAIRS:

8. CHIEF EXECUTIVE OFFICER:

8.1. Update on COVID-19 Response.

8.2. CEO and Chiefs' Report.

9. ADMINISTRATION:

10. DISTRICT COUNSEL:

11. ADJOURN:

11.1. Board Member Reports/Announcements.

11.2. Clerk Review and Clarification of Board Requests.

11.3. Adjourn to Regular Meeting at 6:00 p.m., on Tuesday, August 25, 2020, to be called to order in compliance with the State Emergency Services Act, the Governor's Emergency Declaration related to COVID-19, and the Governor's Executive Order N-29-20.

Santa Clara Valley Water District

File No.: 20-0600

Agenda Date: 8/11/2020
Item No.: 2.1.

NON-EXHIBIT/CLOSED SESSION ITEM

SUBJECT:

CLOSED SESSION
CONFERENCE WITH LEGAL COUNSEL-EXISTING LITIGATION
Pursuant to Government Code §54956.9(d)(1);
Great Oaks v. SCVWD
Master Complaint, {Inverse Condemnation; Declaratory Relief; Writ of Mandate; Claim for Refund}
Case No. 2011-1-CV-205462, and related cases

Santa Clara Valley Water District

File No.: 20-0566

Agenda Date: 8/11/2020
Item No.: 2.6.

BOARD AGENDA MEMORANDUM

SUBJECT:
California Proposition 15, Tax on Commercial and Industrial Properties for Education and Local Government Funding Initiative Presentation by Santa Clara County Assessor Larry Stone.

RECOMMENDATION:
Receive information on California Proposition 15, Tax on Commercial and Industrial Properties for Education and Local Government Funding Initiative presentation by Santa Clara County Assessor Larry Stone.

SUMMARY:
Santa Clara County Assessor Larry Stone contacted Valley Water requesting to present on California Proposition 15. The proposition would increase funding for K-12 public schools, community colleges, and local governments by requiring commercial and industrial real property be taxed based on current market value. According to the California Legislative Analyst (LAO), this initiative exempts residential properties, agricultural properties, and owners of commercial and industrial properties with a combined value of $3 million or less. The increased funding will supplement existing school funding guarantees. Additionally, this initiative exempts small businesses from personal property tax and for other businesses, exempts $500,000 worth of personal property. The LAO and Director of Finance's summary on the fiscal impact to state and local governments will result in a net increase in annual property tax revenues of $7.5 billion to $12 billion in most years, depending on the strength of real estate markets. After backfilling state income tax losses related to the measure and paying for county administrative costs, the remaining $6.5 billion to $11.5 billion would be allocated to schools (40 percent) and other local governments (60 percent). As a result, it is expected that Valley Water would see increased annual revenue should Proposition 15 pass by a vote of the electorate, as detailed below.

Impacts on Valley Water

As Valley Water is funded in part by revenues raised through property taxes, mainly for flood protection operations, changes to the property tax funding formula would have a significant impact. A report by the "Yes on Prop 15" campaign conducted by Blue Sky Consulting indicates an estimated increase of $19,431,000 in FY 2021-2022 in property tax revenues. However, staff has not conducted its own analysis of the impacts of Proposition 15 and cannot confirm those numbers.

According to the “No on Prop 15” campaign, a study by Berkeley Research Group, LLC (BRG) “Taxing Commercial and Industrial Property at Full Market Value: An Economic Impact Assessment,” increases in property taxes would reduce new business formation, personal income, industrial output, and employment.

Staff will provide a full analysis of Proposition 15 at a later date with a recommended position from the Board.

FINANCIAL IMPACT:
There is no financial impact associated with this item.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonable foreseeable indirect physical change in the environment.

ATTACHMENTS:
None.

UNCLASSIFIED MANAGER:
Rachael Gibson, 408-630-2884

Santa Clara Valley Water District

File No.: 20-0680

Agenda Date: 8/11/2020
Item No.: 2.7.

BOARD AGENDA MEMORANDUM

SUBJECT:
Receive and Discuss Information Regarding Pension Liability and the Potential Use of Pension Obligation Bonds. (Continued from July 28, 2020)

RECOMMENDATION:
Receive and discuss information regarding pension liability and the potential use of pension obligation bonds and provide staff with further direction as necessary.

SUMMARY:
At its regular meeting on May 12, 2020, the Board of Directors of the Santa Clara Valley Water District (Valley Water) requested staff to provide information regarding Valley Water's pension liability and the potential use of Pension Obligation Bonds (POBs) as a mechanism to fund all or a portion of Valley Water's unfunded accrued pension liability. In response to the Board's request, Finance staff, along with Valley Water's municipal advisor (Public Resources Advisory Group) and bond counsel (Stradling Yocca Carlson & Rauth), will review and discuss information regarding pension liability and financing scenarios with the Board.

FINANCIAL IMPACT:
There is no financial impact related to this report.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: PowerPoint

UNCLASSIFIED MANAGER:
Darin Taylor, 408-630-3068

Valley Water

Clean Water • Healthy Environment • Flood Protection

<u>Disclaimer</u>: Certain information contained herein, including projections and estimates prepared by Valley Water, is based on information provided by CalPERS. Information that CalPERS provides to Valley Water is based on CalPERS' estimates and assumptions of future events. Valley Water has not independently verified information provided by CalPERS. Information, estimates, and expressions of opinion prepared by Valley Water contained herein are also based on certain assumptions and are subject to a variety of uncertainties that could cause any actual results to be materially different. Notwithstanding any information contained herein, Valley Water continues to rely upon information provided by CalPERS when preparing its audited financial statements and for other purposes regarding pension and other post-employment benefits related matters.

Pension Obligations and Unfunded Liability Financing Scenarios

July 28, 2020

Valley Water

Agenda

1. ***Valley Water Pension Plan***
2. *Pension Obligation Bond (POB) Scenario Analysis*
3. *Pension Obligation Bond (POB) Commentaries*
4. *Summary Q&A and References*

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Valley Water Pension Plan

- Valley Water offers employer defined benefit pension plan administered by California Public Employees Retirement System (CalPERS)

- CalPERS acts as common investment and administrative agent for participating member employers

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Valley Water Pension Benefits

- Eligible public employees and beneficiaries receive:
  - Service retirement benefits
  - Disability benefits
  - Annual cost of living adjustments
  - Death benefits

- Benefit provisions under the Plan are established by State statute and Valley Water resolution

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Valley Water Required Pension Contributions

- Required funding contributions for the Plan are determined by CalPERS actuary annually and are effective each July 1

- Total minimum required annual employer contribution comprised of two components:
  - Normal Cost
  - Amortized portion of Unfunded Accrued Liability (UAL)

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Valley Water Required Pension Contributions

Normal Cost

- Annual cost of service accrual for the upcoming fiscal year for active employees

Unfunded Accrued Liability (UAL)

- Excess of the total actuarial accrued liability over the market value of plan assets
- UAL changes over time to reflect changes in market value and actuarial assumptions

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Valley Water Required Pension Contributions

	Fiscal Year 2018-19	Fiscal Year 2019-20	Fiscal Year 2020-21
Normal Cost	$ 8,975,975	$ 9,640,016	$ 10,613,211
UAL Contribution (Prepayment)	13,163,082	15,251,637	16,773,331
Total	$ 22,139,057	$ 24,891,653	$ 27,386,542

- **Normal Cost paid bi-weekly per payroll schedule - no option to prepay**
- **Annual UAL required contribution is prepaid in July each year to take advantage of discount at the actuarily-assumed discount rate**

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Valley Water Unfunded Accrued Liability

	Fiscal Year 2018-19	Fiscal Year 2019-20	Fiscal Year 2020-21
Unfunded Accrued Liability	$ 247,765,798	$ 252,441,342	$ 254,697,360

- **Reflects liability as of the first day of each fiscal year (July 1), as determined by actuary**

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Valley Water Required Pension Contributions determined by Actuarial Analysis

- Determination of both normal cost and annually amortized UAL requires complex actuarial calculations
- Calculations based on a set of actuarial assumptions
- Demographic assumptions
  - Mortality, disability, retirements
- Economic assumptions
  - Discount (investment) rate, salary growth, inflation

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Key Actuarial Economic Assumptions

Fiscal Year 2020-21 Plan Contribution Assumptions

- Discount (investment) rate = 7.00%*
- Payroll growth rate = 2.75%

* *Revised discount rate: phased-in from 7.50% (FY18 and prior), 7.375% (FY19), and 7.25% (FY20)*

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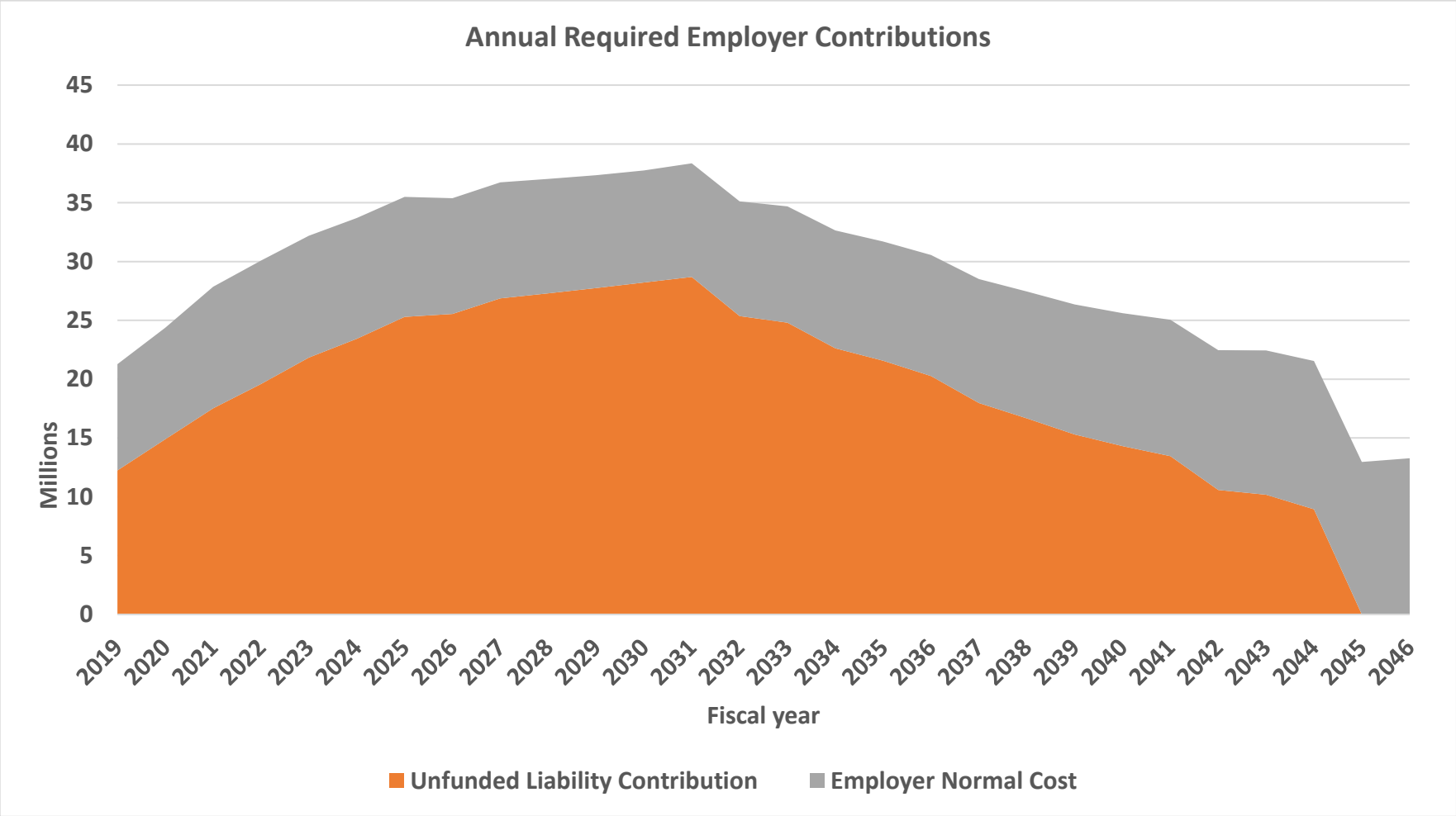
Valley Water Required Pension Contributions



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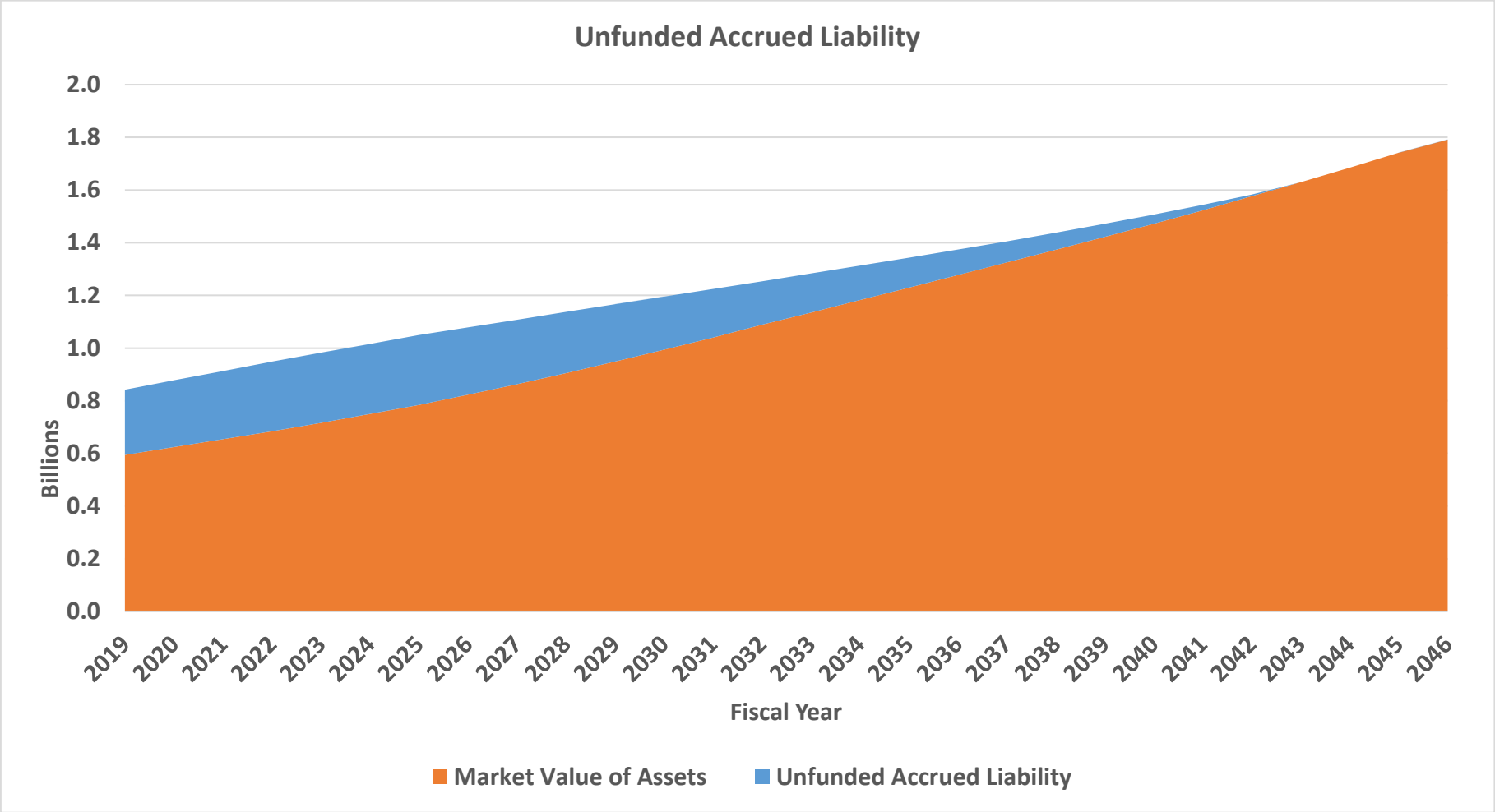
Valley Water Unfunded Accrued Liability



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Actuarial Assumptions vs. Performance

- Changes in UAL year-to-year are due to differences (gains or losses) between actual experience and the actuarial assumptions used to calculate prior years' required contributions

- Employer contributions inevitably fluctuate, <u>especially due to ups and downs in investment returns</u>

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How CalPERS Investment Gains/Losses are Amortized

- New UAL amortization policy adopted by CalPERS Board of Administration effective FY 2020-21
  - Shortens period over which actuarial gains and losses are amortized from 30 years to 20 years
  - No longer 5-year ramp-down (only 5-year ramp-up) on investment gains/losses

- Can result in short-term increases to required employer contributions, but not expected to increase long-term cost of plan

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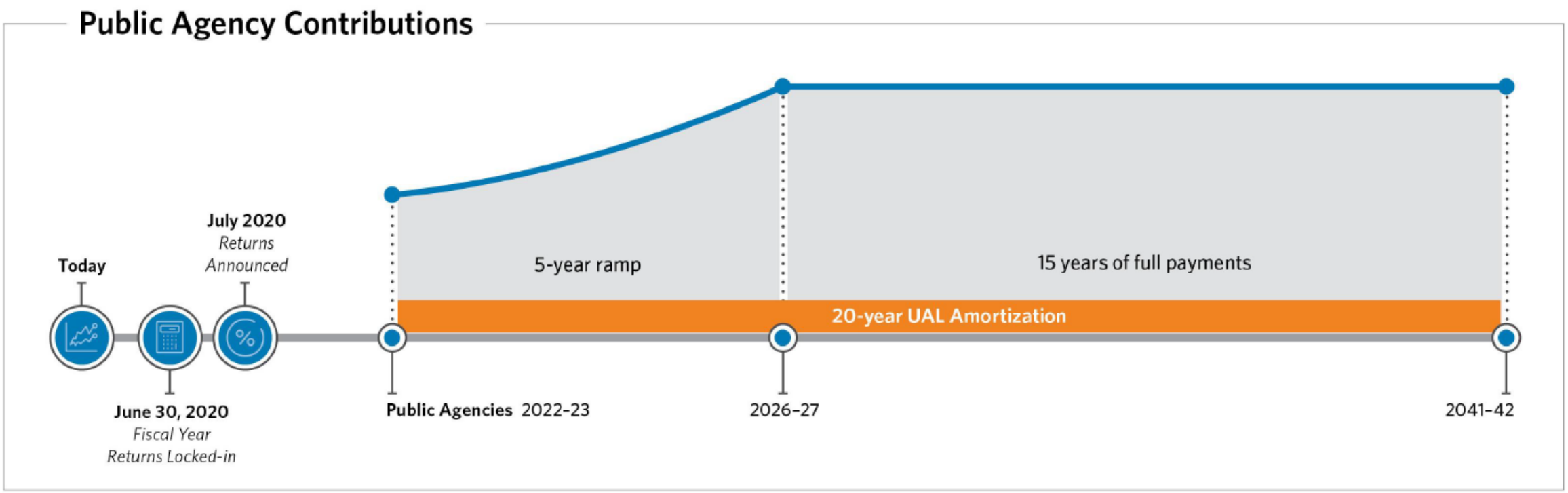
How CalPERS Investment Gains/Losses are Amortized



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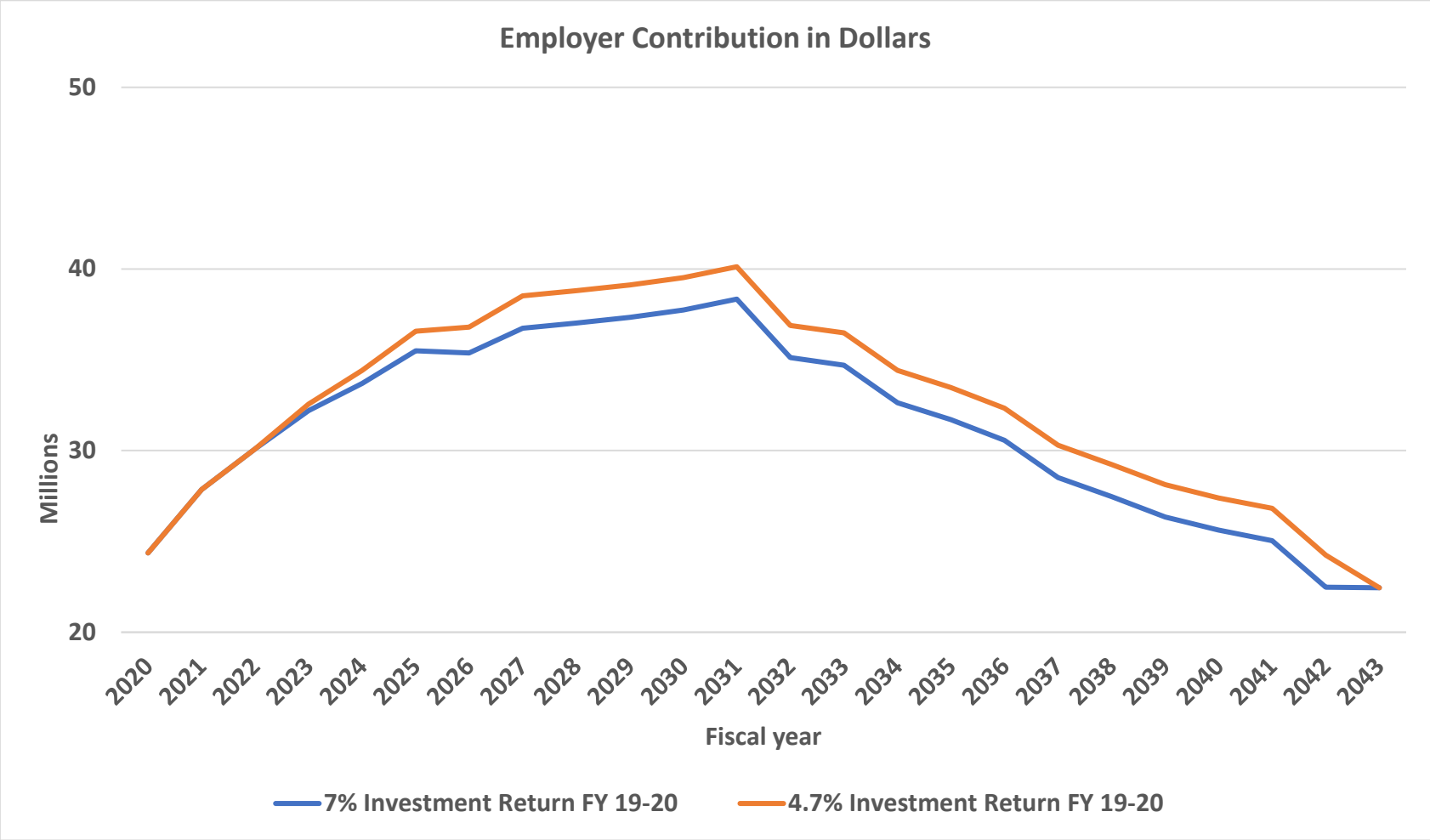
FY 20 CalPERS Investment Return



- **CalPERS actual return for FY 20 was 4.7%**
- **$350K impact in FY 23 ramping up to $1.8M in FY 27**

Note: The impact analysis above assumes CalPERS returns match their assumed rate of 7% per year for subsequent Plan Years

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Options to Improve Funded Status

	Fiscal Year 2018-19	Fiscal Year 2019-20	Fiscal Year 2020-21
Discounted Prepayment	$ 13,163,082	$ 15,251,637	$ 16,773,331
Additional Employer Funding	3,000,000	3,000,000	3,000,000
Additional Employee Funding	500,000	1,051,000	1,661,955
Actual Annual UAL Payment	$ 16,663,082	$ 19,302,637	$ 21,435,286

- **Continue to:**
  - **Pay minimum required annual UAL payment, and**
  - **Further paydown UAL with additional budgeted funds ($3M OPEB redirect) and employee contributions**

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Options to Improve Funded Status

- Other options include:
  - Increase employer contributions
  - Increase contribution from employees
  - Reduce permanent staffing levels over time (contract services)
  - Pension Obligation Bonds (POBs)

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Agenda

1. *Valley Water Pension Plan*
2. ***Pension Obligation Bond (POB) Scenario Analysis***
3. *Pension Obligation Bond (POB) Commentaries*
4. *Summary Q&A and References*

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Pension Obligation Bonds

- Taxable bonds that some state and local governments issue to pay unfunded portion of pension liabilities
- May result in future savings if bond proceeds invested in the pension fund achieve greater return than costs of the bonds
- May lead to increased costs from both debt service requirements and unmet unfunded pension liabilities if targeted rate of return is not achieved

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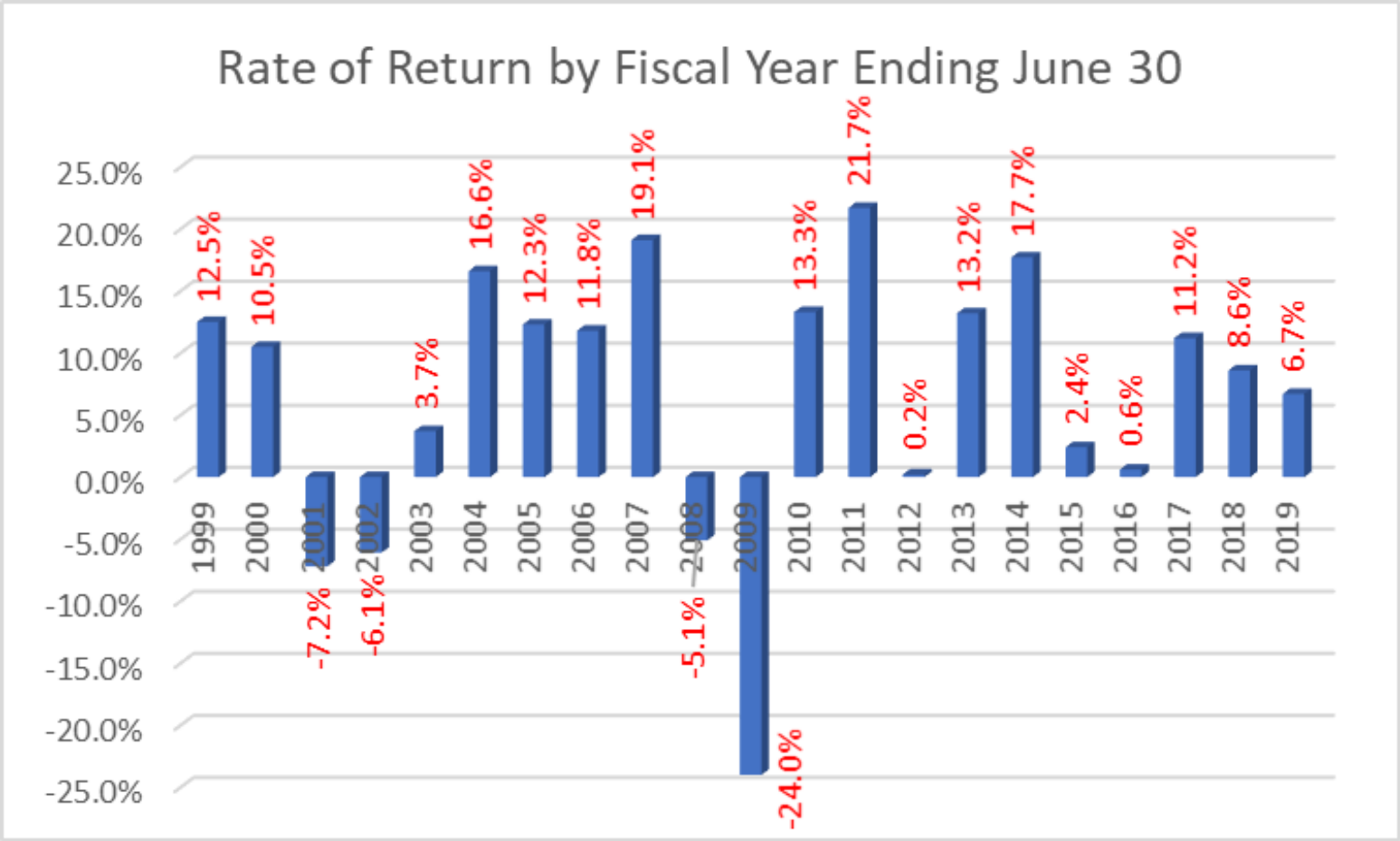
CalPERS Investments

Annual Rates of Return

Historical annual returns of the Public Employees' Retirement Fund in 1999-2019 ranges from -24.0% to +21.7%



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CalPERS Investments

Compound Annual Growth Rates

Public Employees' Retirement Fund

Total Investment Returns as of 6/30/2019 (for FYs ending 6/30)

1 year.....6.7%

3 years.....8.8%

5 years.....5.8%

10 years.....9.1%

20 years.....5.8%

30 years.....8.1%

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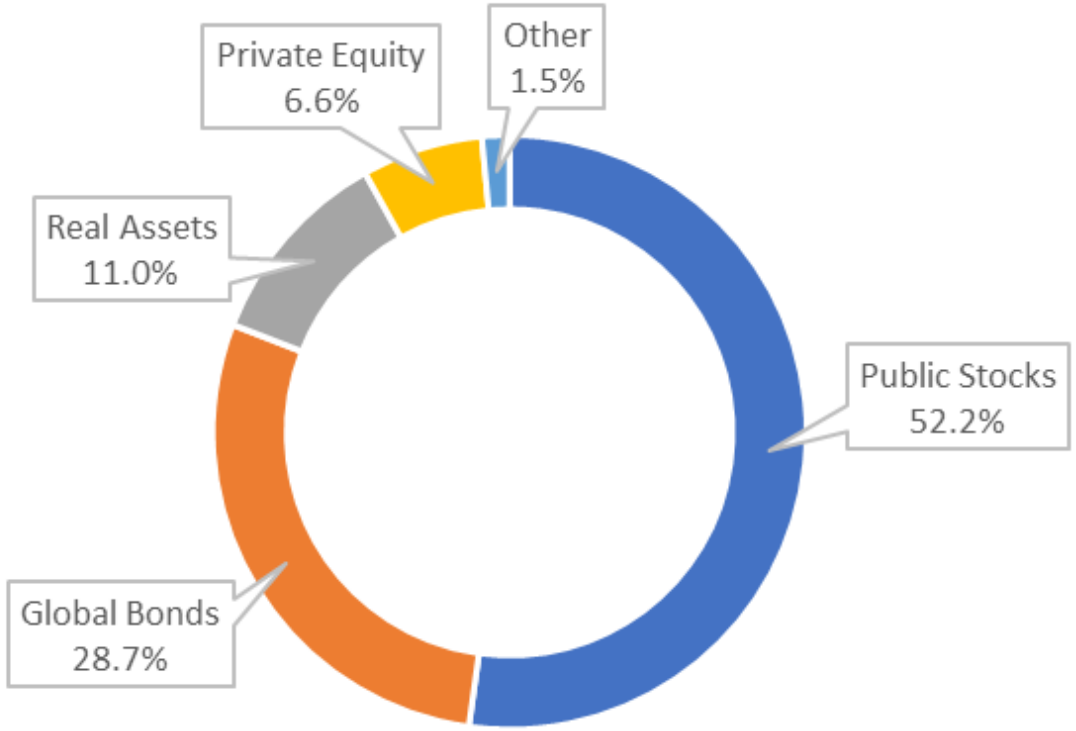
CalPERS Investments

Asset Allocation as of 12/31/2019

Public Employees' Retirement Fund



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POB Analysis

Assumptions

- **July 2019 CALPERS annual valuation report**
  - **$254.7 million Unfunded Accrued Liability (UAL)**
  - **7% assumed actuarial rate of return**
  - **Fixed term amortization of 30 years (28 years remaining)**

- **Taxable bond market interest rates as of 7/6/2020**
  - **POBs are issued to fund 100% of UAL plus issuance costs**
  - **30-year repayment period**
  - **All-in True Interest Cost of 3.17%**

- **Assumed future investment rates of return for illustrative purposes only**

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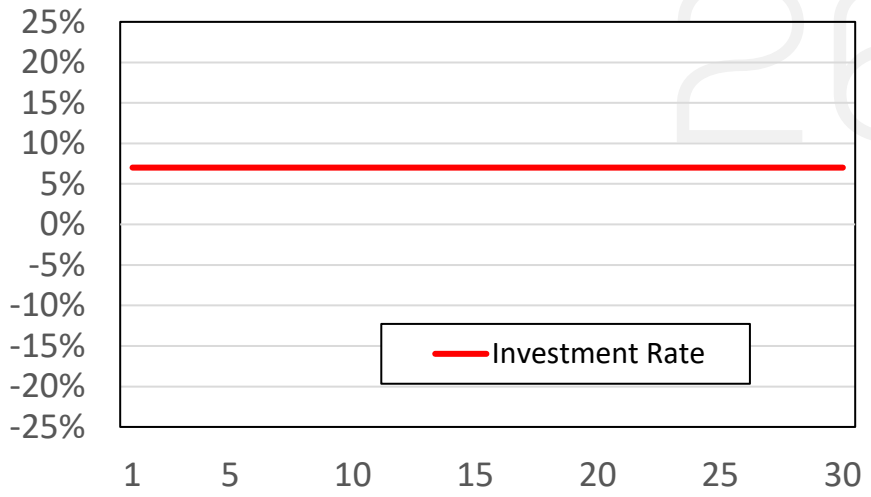
POB Analysis

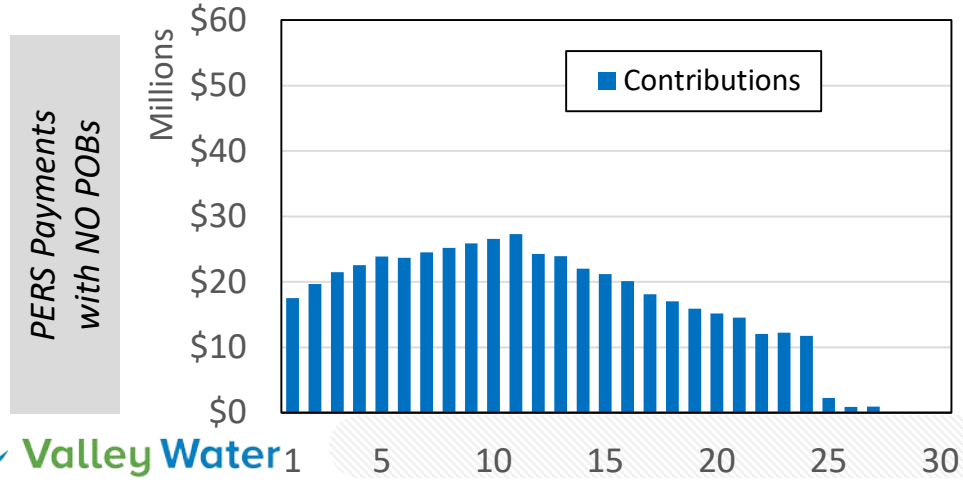
If CalPERS earns 7%/year over 30 years, issuing POBs to fund UAL may result in $132M savings

Investment Assumption (Constant 7%)



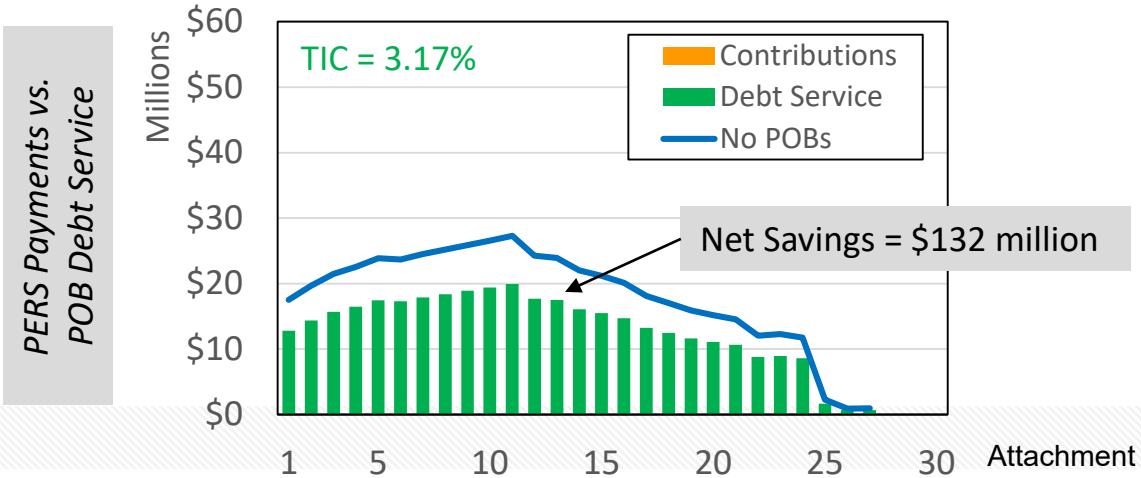
NO POBs

- Contributions in years 1-28
- Portfolio rate of return 7.00%



WITH POBs

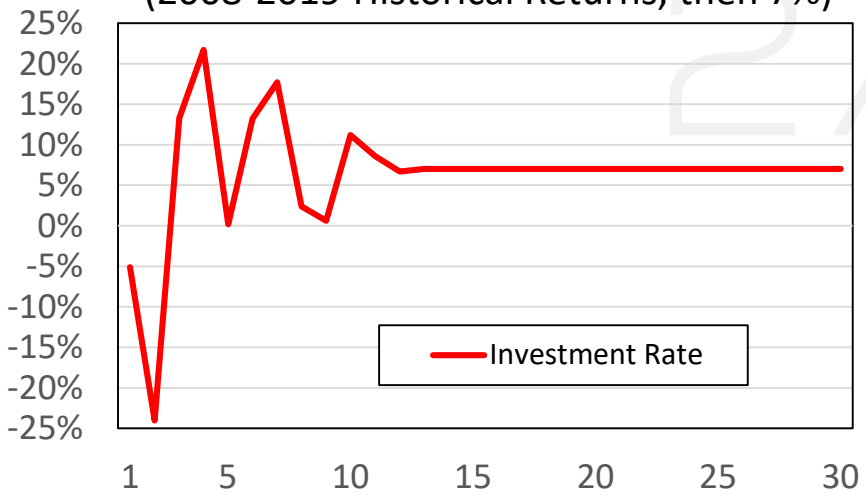
- POB contribution in year 0
- No additional contributions
- Portfolio rate of return 7.00%



POB Analysis

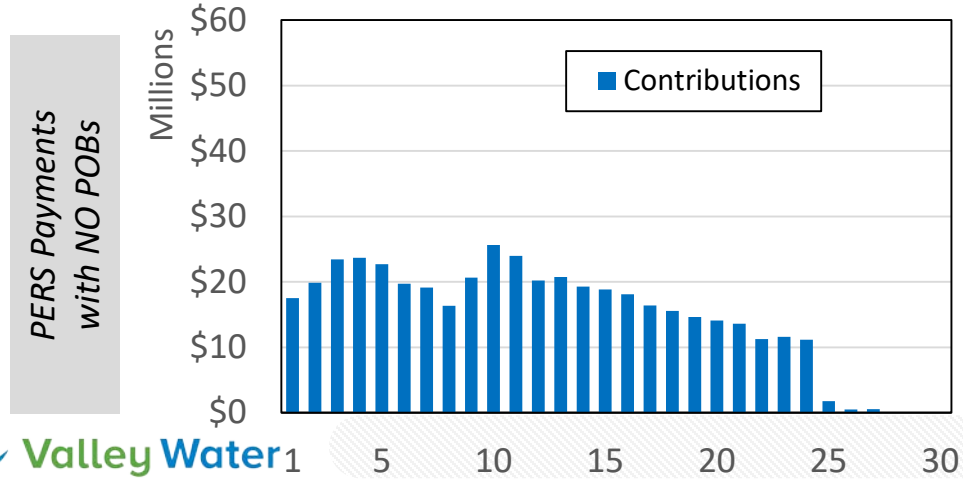
If CalPERS experiences 2008-2019 historical returns then 7%/year thereafter, issuing POBs may result in $45M higher costs over 30 years

Investment Assumption
(2008-2019 Historical Returns, then 7%)



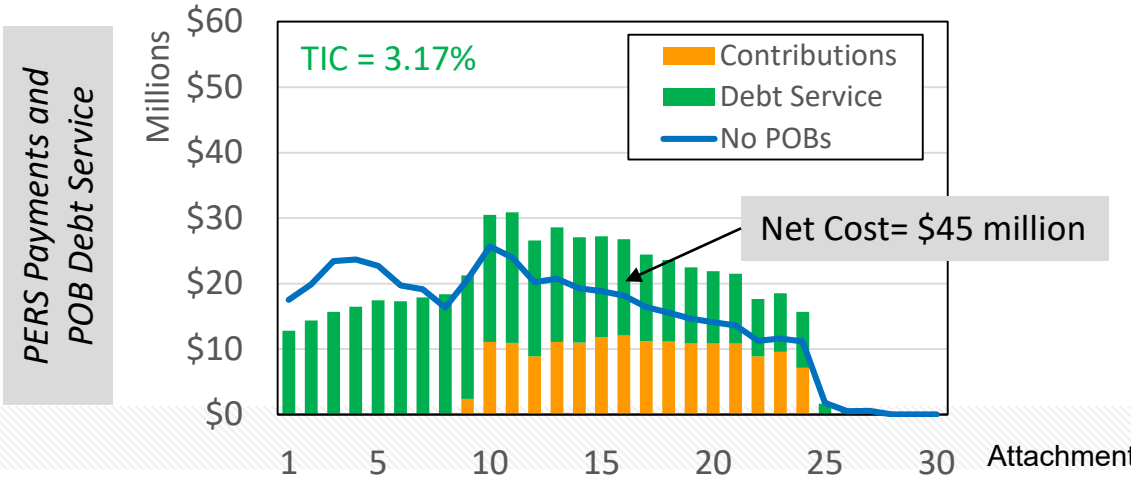
NO POBs

- Contributions in years 1-28
- Portfolio rate of return 7.15%



WITH POBs

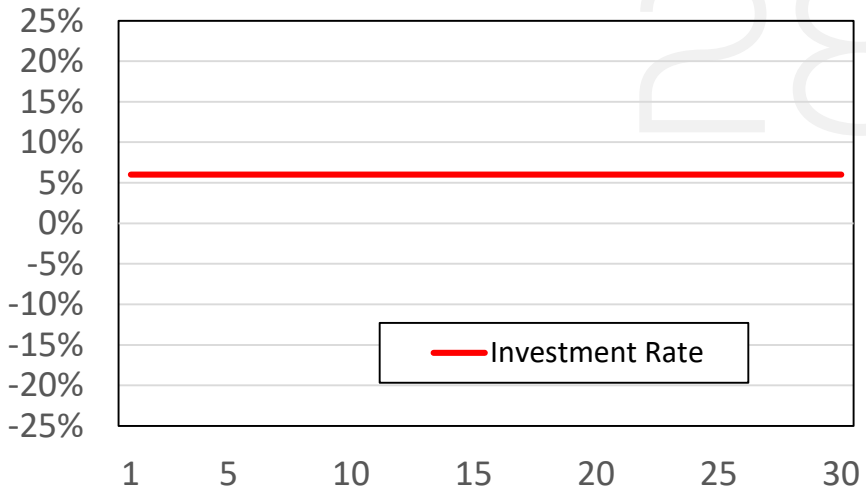
- POB contribution in year 0
- Additional contributions in years 9-28
- Portfolio rate of return 6.14%



POB Analysis

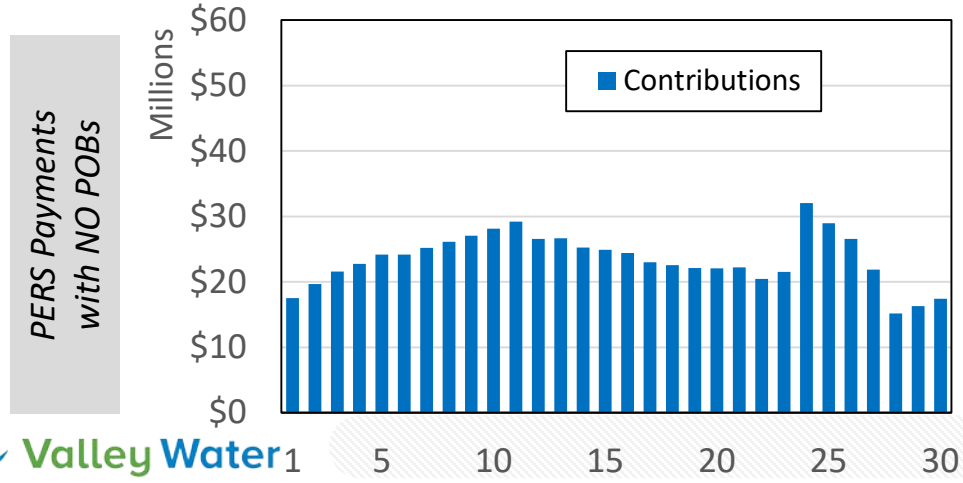
If CalPERS earns 6%/year over 30 years, issuing POBs to fund UAL may result in $66M savings

Investment Assumption (Constant 6%)



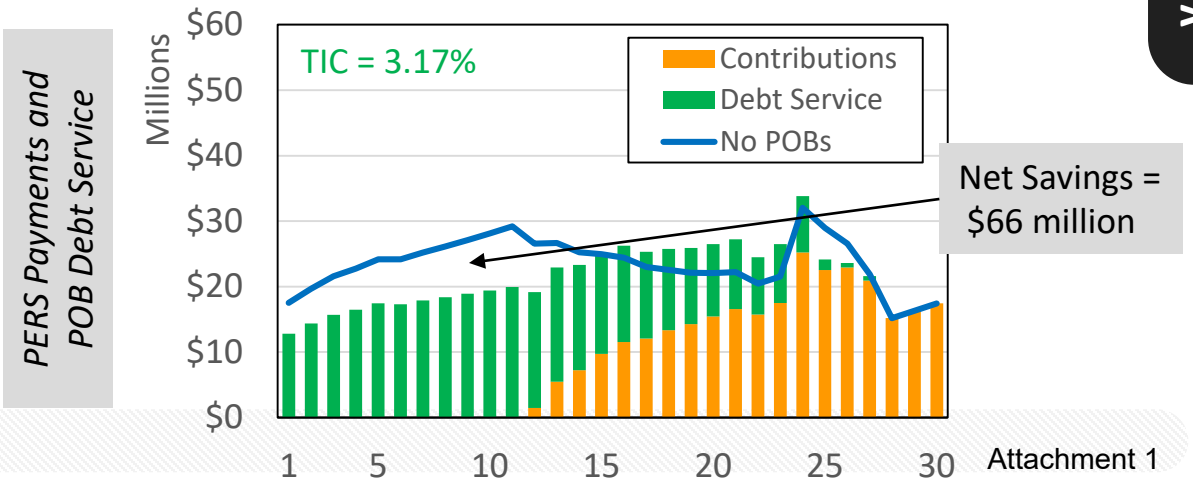
NO POBs

- Contributions in years 1-30
- Portfolio rate of return 6.00%



WITH POBs

- POB contribution in year 0
- Additional contributions in years 11-30
- Portfolio rate of return 6.00%



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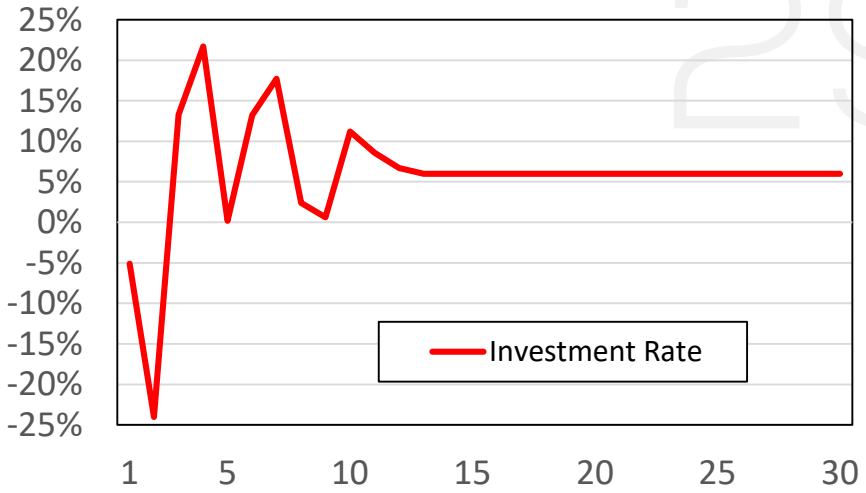
POB Analysis

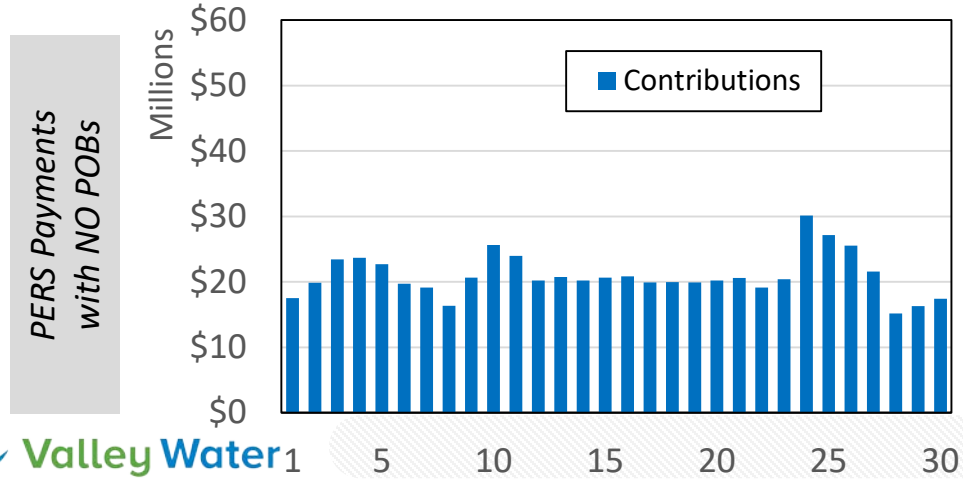
If CalPERS experiences 2008-2019 historical returns then 6%/year thereafter, issuing POBs may result in $45M higher costs over 30 years

Investment Assumption
(2008-2019 Historical Returns, then 6%)



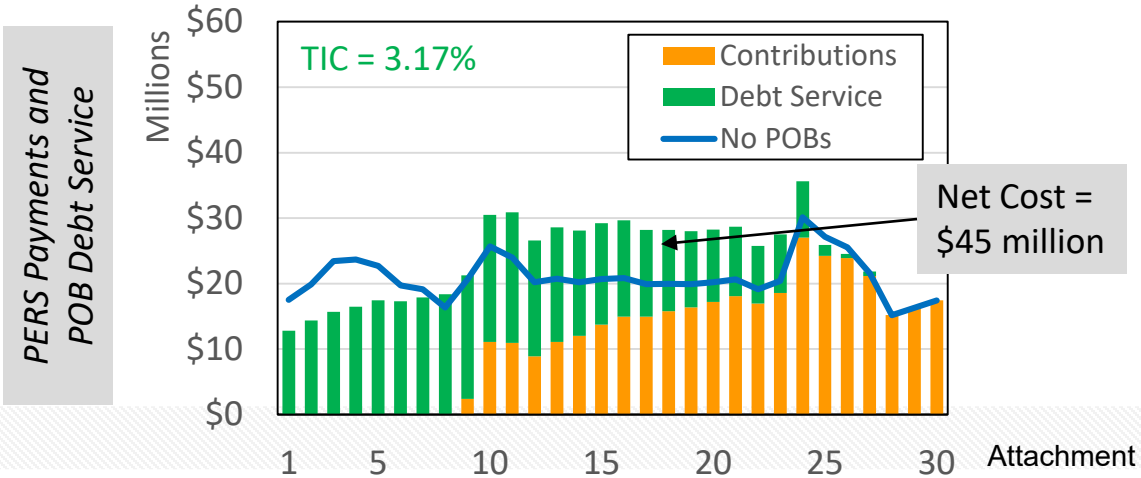
NO POBs

- Contributions in years 1-30
- Portfolio rate of return 6.33%



WITH POBs

- POB contribution in year 0
- Additional contributions in years 9-30
- Portfolio rate of return 5.61%



Agenda

1. *Valley Water Pension Plan*
2. *Pension Obligation Bond (POB) Scenario Analysis*
3. ***Pension Obligation Bond (POB) Commentaries***
4. *Summary Q&A and References*

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POB Commentaries

Government Finance Officers Association (GFOA) Advisory

The GFOA recommends that state and local governments do not issue POBs for the following reasons:

1. Invested POB proceeds might fail to earn more than the interest rate owed over the term of the bonds, leading to increased overall liabilities for the government
2. POBs carry considerable risk
3. Increases jurisdictions bonded debt burden and uses up debt capacity
4. Rating agencies may not view proposed issuance of POBs as credit positive, particularly if not part of a more comprehensive plan to address pension funding shortfalls

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POB Commentaries

Government Finance Officers Association (GFOA) Advisory (cont'd)

The GFOA recommends that state and local governments do not issue POBs for the following reasons:

5. Invested POB proceeds might fail to earn more than the interest rate owed over the term of the bonds, leading to increased overall liabilities for the government

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POB Commentaries

Rating Agencies

Moody's Investors Service

- **Issuance of POBs is neutral at best and usually negative for a government's credit quality**
- Currently low market interest rates and prospect of investing after a stock market correction may increase appeal of POBs, but governments would need to accept higher exposure to investment market volatility and higher long-term pension costs
- Same low interest rates that benefit governments as POB borrowers work against them and their pension systems as investors
- POBs increase issuer's exposure to market timing risk

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POB Commentaries

Rating Agencies

Fitch Ratings

- **Views the impact of POBs on an issuer's credit quality to range from neutral to negative in most situations**
- POBs always carry timing and investment risk
- Issuing POBs during what (in retrospect) turns out to have been a cyclical market high reduces the likelihood of achieving savings relative to simply making full actuarial pension contributions over time
- POBs may affect a government's overall liability burden and financial flexibility and add investment risks

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POB Commentaries

Rating Agencies

S&P Global Ratings

- **Views POB issuance in environments of financial distress or as a mechanism for short-term budget relief as a negative credit factor**
- In certain cases, POBs can be an affordable tool to lower unfunded pension liabilities, but along with issuance of POBs comes risk
- POB issuance potentially introduces risk to an issuer's debt and liability profile from a credit standpoint
- Poor market returns in the initial years of investment will hurt a POB's profitability for many years

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Agenda

1. *Valley Water Pension Plan*
2. *Pension Obligation Bond (POB) Scenario Analysis*
3. *Pension Obligation Bond (POB) Commentaries*
4. ***Summary Q&A and References***

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Summary Q&A

Question #1

Why do government agencies issue POBs?

Answer: Agencies issue POBs with the expectation that all or a portion of its UAL can be paid down at a lower total than the cost of making annual contributions to the UAL without the use of POBs. Agencies with budget pressures often issue POBs to provide near-term budgetary relief and defer costs.

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Summary Q&A

Question #2

If Valley Water contributes 100% of unfunded pension liability today, will there will be zero future liability?

Answer: Future liability may continue to increase as a result of many different factors, such as decreased investment returns, changes in future pension benefits, and changes in actuarial assumptions.

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Summary Q&A

Question #3

Because interest rates are very low right now, shouldn't issuing Pension Obligation Bonds (POBs) to fund Valley Water's unfunded actuarial liability (UAL) result in savings in the long term?

Answer: This is a risk vs. return question. Issuing POBs today at historically low rates does not guarantee long-term savings due to many factors, particularly the potential for future decreases in investment returns. Based on our mathematical model, funding UAL assuming 2008-2019 historical returns with 6% or 7% return over all remaining years would result in $45 million in higher long-term expenses with POBs than without, for example.

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Summary Q&A

Question #4

Will funding 100% of the unfunded pension liability with POBs improve Valley Water's credit ratings?

Answer: Rating agencies view the impact of the issuance of POBs as credit neutral at best, and at worst is seen as a credit negative.

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Reference List

Actuarial Valuation as of June 30, 2018 for the Miscellaneous Plan of the Santa Clara Valley Water District, Required Contributions for Fiscal Year July 1, 2020 - June 30, 2021. CalPERS, July 2019.

"CalPERS Trust Level Quarterly Update – Performance & Risk. Public Employees' Retirement Fund (PERF) as of December 31, 2019." *CalPERS*, www.calpers.ca.gov/page/investments/asset-classes/trust-level-portfolio-management/investment-fund-values. Accessed 1 June 2020.

"Investment & Pension Funding, Facts at a Glance for Fiscal Year 2018-19." *CalPERS*, www.calpers.ca.gov/page/about/organization/facts-at-a-glance. Accessed 1 June 2020.

Low interest rates do not insulate governments from pension bond risks (Sector In-Depth). Moody's Investors Service, 24 Apr. 2020.

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"Pension Obligation Bonds (Advisory)." *Government Finance Officers Association*, Jan. 2015, www.gfoa.org/pension-obligation-bonds. Accessed 1 June 2020.

Pension Obligation Bonds' Credit Impact on U.S. State and Local Government Issuers. S&P Global Ratings, 6 Dec. 2017.

Pension Obligation Bonds – Weighing Benefits and Costs (Comment). Fitch Ratings, 31 Mar. 2015.

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QUESTIONS

Valley Water

Clean Water • Healthy Environment • Flood Protection

Santa Clara Valley Water District

File No.: 20-0681

Agenda Date: 8/11/2020
Item No.: 2.8.

BOARD AGENDA MEMORANDUM

SUBJECT:
Approve the Revised Fiscal Year 2020-2021 Santa Clara Valley Water District Investment Policy and Approve an Update Executive Limitations Policy EL 4.7, Financial Management. (Continued from July 28, 2020)

RECOMMENDATION:

A. Approve the Revised Fiscal Year 2020-2021 Santa Clara Valley Water District Investment Policy;
B. Approve an update to Executive Limitation Policy EL-4.7, Financial Management; and
C. Provide additional direction to staff as necessary.

SUMMARY:
Executive Summary
Staff recommends that the FY 2020-21 Investment Policy be amended as follows:

3.5.1 California Bank Investments

Keeping investments to local banks, within the Bay Area, to keep money at home and jobs local; invest only in banks with below $10 billion in assets; and keep a minimum of 4% of liquid cash in banks with up to $10 billion in assets and 1% in banks with up to $2 billion in assets for a limit of 5 years (short term) at the discretion of the treasurer; such investments may be in the form of collateralized deposits, FDIC/NCUA insured CDs, CDARS, or any other legally allowable deposits.

7.13.3 Prohibited Banks

No investments will be made in any banks who do not have an Environmental, Social and Governance (ESG) ranking at or better than the “Average/Medium” category by at least one of the professional ESG research companies such as Sustainalytics, or other equivalent rankings published by other ESG research firms. Small and local banks/credit unions located within the nine Bay Area counties with total assets at or below $10 billion are exempt from this provision.

To ensure consistency in implementing the ESG policy related to banking and financial management, staff also recommends that Executive Limitation 4.7 Financial Management be updated to include the

following new section:

E.L. 4.7.7
Valley Water shall not do business with banks who do not have an ESG ranking at or better than the "Average/Medium" category by at least one of the professional ESG research companies such as Sustainalytics, or other equivalent rankings published by other ESG research firms. Small and local banks/credit unions located within the nine Bay Area counties with total assets at or below $10 billion are exempt from this provision.

Board approval of the above amendments to the FY 2020-21 Investment Policy and Executive Limitation will establish a clear, objective, legally valid and transparent policy to guide Valley Water's investment and business activities in the banking sector.

Background
On May 12, 2020, the Santa Clara Valley Water District Board (Board) adopted the Fiscal Year 2020-21 Investment Policy in compliance with California Government Code (Government Code) Sections 53607 and 53608. As part of the approval, the Board provided feedback regarding three key issues summarized below and directed staff to return with additional information and recommendations to address the Board's concerns.

May 12, 2020 Board Feedback:
1. Do not invest in banks and financial institutions that support human rights violation, such as recent cases involving Bank of America and Wells Fargo Bank that are funding companies that have extractive human rights violations; follow the Global Sullivan Principles to avoid investing in companies that support environmental and human capital violations
2. Add a provision to invest up to 1% of the portfolio in smaller banks and credit unions that have equal to or less than $2 billion in total assets, and 4% of the portfolio in small banks with a maximum of $10 billion in total assets.
3. Add the Certificate of Deposit Account Registry Service (CDARS) program to increase local bank investments

Furthermore, on June 23, 2020, the Board provided additional feedback as follows: (1) update the Investment Policy to state that Valley Water shall invest a minimum of 1% of the portfolio in smaller banks/credit unions that have up to $2 billion in total assets, and a minimum of 4% of the portfolio in banks/credit unions with up to $10 billion in total assets. The total investments in banks/credit union shall not exceed the maximum limit pursuant to the California Government Code (currently 30%, as amended); and (2) the Board directed staff to conduct additional research on developing a method to evaluate the Environmental, Social, and Governance (ESG) policies for the Investment portfolio, including investments in the banking sector.

Staff researched each of the above issues raised by the Board and summarized the findings and recommendations in the corresponding sections below. The recommended changes to the Investment Policy are incorporated in Attachment 1 and delineated with red font text to highlight the

changes for Board consideration. The Powerpoint presentation provided in Attachment 2 highlights the recommended changes as well as a high-level summary of the ESG evaluation criteria that is examined by professional research firms to establish an objective and transparent ESG policy to incorporate into Valley Water's Investment Policy.

Analysis

1. Investment Prohibition Against Banks that Violate Human Rights and Environment

Directors Santos and Kremen both referenced the Sullivan Principles in the May 12, 2020 and June 23, 2020 board meetings. The Sullivan Principles are the names of two corporate codes of conduct developed by the African-American preacher Rev. Leon Sullivan, promoting corporate social responsibility. The original Sullivan principles were developed in 1977 to apply economic pressure on South Africa in protest of its system of apartheid. The new global Sullivan principles were jointly unveiled in 1999 by Rev. Sullivan and United Nations (UN) Secretary General Kofi Annan. The new and expanded corporate code of conduct, as opposed to the originals' specific focus on South African apartheid, were designed to increase the active participation of corporations in the advancement of human rights and social justice at the international level. In 2011, the UN updated its guidance on these matters with the "UN Guiding Principles on Business and Human Rights"[1] which are guidelines for States and companies to prevent, address and remedy human rights abuses committed in business operations.

There are several professional ESG research firms that provide ESG rankings for various business sectors. BankTrack covers the 50 large international banks and evaluates the ESG rankings against the UN Guiding Principles (BankTrack's Human Rights Benchmarking Report[2]). BankTrack published the third edition of the report on May 6, 2020 which evaluated 50 of the latest private sector commercial banks globally against a set of 14 criteria based on the UN Guiding Principles. The criteria examine four aspects of banks' implementation of the Guiding Principles: their policy commitment, human rights due diligence process, reporting on human rights and their approach to access to remedy. Professional ESG research firms such as Sustainalytics and MSCI, among others, provide broader and more in-depth ESG rankings for over 10,000 public and private companies across all business sectors, including both U.S. and international banks. Given that each professional research firm utilizes its own proprietary ESG ranking methodology, staff recommends that the Board consider the following update to the Investment Policy to establish a transparent policy in determining which banks to prohibit in the Valley Water investment portfolio.

7.13.3 Prohibited Banks

No investments will be made in any banks who do not have an ESG ranking at or better than the "Average/Medium" category by at least one of the professional ESG research companies such as Sustainalytics, or other equivalent rankings published by other ESG research firms. Small and local banks/credit unions located within the nine Bay Area counties with total assets at or below $10 billion are exempt from this provision.

The estimated annual ESG research subscription fee is between $15,000 to $35,000, depending on the level of research and analysis Valley Water subscribes. This cost estimate is based on the fee quote from Sustainalytics[3], which provides ESG ratings for over 10,000 public and private

companies, including most banks in the United States. A sample Sustainalytics report for Deutsche bank is provided in Attachment 3, which provides an example of a bank that would be prohibited from the Valley Water investment portfolio due to the ESG rating that is worse than the medium risk level.

2. Invest in small/local banks and credit unions located in the Bay Area

In Fiscal Year 2017-18 the Board directed staff to add section 3.5 California Certificates of Deposit to the Investment Policy to invest 5% of the portfolio in local banks with total assets up to $10 billion. To meet the Board's direction, staff downloaded the list of banks and credit unions located in the nine Bay Area Counties that meet the criteria from the Federal Deposit Insurance Corporation (FDIC) and National Credit Union Administration (NCUA). A list of 90 banks and credit unions was prepared by staff, and attention was focused on banks and credit unions located in the Counties of Santa Clara, Alameda, San Mateo and San Francisco. To-date the District investment portfolio has over $27 million or approximately 5% of the portfolio in these small local banks, of which $5.9 million or approximately 1% is invested in the following small banks and credit unions with under $2 billion in total assets: Alliance Credit Union (total assets $552 million), Bank of San Francisco (total assets $397 million), Community Bank of the Bay (total assets $494 million), and Meriwest Credit Union (total assets $1.8 billion).

Given the Board's direction to specify investments in small local banks, staff recommends amending the Investment Policy as follows (change highlighted in red):

3.5 California Bank Investments

To the extent permitted by California Government Code, while meeting Valley Water's investment objectives for safety, liquidity and yield, Valley Water encourages investing in Certificates of Deposit issued by California based banks, up to the Federal Deposit Insurance Corporation limit at the time of such investment which is currently set at $250,000, and up to 30% of the portfolio, as amended

3.5.1 Keeping investments to local banks, within the Bay Area, to keep money at home and jobs local; invest only in banks with below $10 billion in assets; and keep a minimum of 4% of liquid cash in banks with up to $10 billion in assets and 1% in banks with up to $2 billion in assets for a limit of 5 years (short term) at the discretion of the treasurer; such investments may be in the form of collateralized deposits, FDIC/NCUA insured CDs, CDARS, or any other legally allowable deposits.

3. Add CDARs to increase investments in local banks

In 2018 as part of staff's ongoing efforts to meet the Board's direction to invest in local banks, staff researched extensively on whether the Certificate of Deposit Account Registry Service (CDARS) (www.cdars.com <http://www.cdars.com>) would be an appropriate tool for Valley Water to utilize to increase our investments in CDs. Staff held several conference calls with the Promontory Interfinancial Network (Promontory) that developed the CDARs platform to learn about this platform

and assess whether it would meet Valley Water's business needs. CDARs acts as an intermediary to aggregate CD offerings from the thousands of banks that are members of the CDAR network. To allow additional flexibility in utilizing the CDARs program, staff proposes to amend the Investment Policy, section 3.5.1, to allow the use of CDARS program (see above). This is consistent with the California Government Code (Government Code) Sections 53607 and 53608.

Footnotes:

1. <https://www.business-humanrights.org/en/un-guiding-principles>
2. <https://www.banktrack.org/campaign/banks_and_human_rights>
3. <https://www.sustainalytics.com/>

FINANCIAL IMPACT:
The cost for subscribing to professional ESG research is estimated between $15,000 to $35,000 per fiscal year, to be funded by FY 2019-20 budget savings in the Finance division (project no. 60221003); no budget adjustment is necessary for FY 2020-21.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have the potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: Revised Investment Policy
Attachment 2: PowerPoint
Attachment 3: Sample ESG Evaluation Report for Deutsche Bank

UNCLASSIFIED MANAGER:
Darin Taylor, 408-630-3068

SANTA CLARA VALLEY WATER DISTRICT
REVISED BOARD INVESTMENT POLICY

July 1, 2020

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SANTA CLARA VALLEY WATER DISTRICT
REVISED BOARD INVESTMENT POLICY

JULY 1, 2020

1.0 POLICY

It is the policy of Santa Clara Valley Water District (Valley Water) that public funds not needed for the immediate necessities of Valley Water should, to the extent reasonably possible, be prudently invested or deposited consistent with applicable law to produce revenue for Valley Water.

The District Treasurer-Chief Financial Officer and his designee, the Treasury and Debt Officer, manages Valley Water's investment portfolio under the prudent person standard, which states that:

Investments shall be made with judgment and care, under circumstances then prevailing, which persons of prudence, discretion and intelligence exercise in the management of their own affairs, not for speculation, but for investment, considering the probable safety of their capital as well as the probable income to be derived.

2.0 SCOPE

The Investment Policy applies to Valley Water's pooled investment fund, which encompasses all monies under the direct oversight of the District Treasurer. Included in the investment pool are the Valley Water General Fund, the Safe, Clean Water Fund, the Watershed Funds, the Water Utility Enterprise Fund, the Equipment Service Fund, the Risk Insurance Fund, and debt proceeds with special consideration given to specific provisions contained in the indentures for each issuance. The employees' retirement, other postemployment benefit, and deferred compensation funds are not included nor are the Guaranteed Investment Contracts or any other debt proceeds that are invested following instructions in the debt documents.

A glossary containing key terms used in this document is included in Exhibit A.

3.0 OBJECTIVES

Valley Water will invest funds under the prudent person standard as described in Section 1, and within the specific parameters of safety, liquidity, and yield, in order of highest to lowest priority:

3.1 Safety

Safety of principal is the foremost objective of the investment program. Investments of Valley Water will be undertaken in a manner that seeks to ensure the preservation of capital. Valley Water seeks to mitigate credit risk by requiring that all investments be in obligations whose senior long-term debt rating is rated by at least two of the three national rating agencies. The required ratings must be at least Aa3 by Moody's Investor Services, AA- by Standard & Poor's rating

agency, or AA- by Fitch Ratings Service. This excludes funds placed with the Local Agency Investment Fund (LAIF) and Federal Deposit Insurance Corporation (FDIC) or National Credit Union Administration (NCUA) protected investments in banks or credit unions. In addition, Commercial Paper investments will also carry short-term ratings by at least two of the three national rating agencies of P-1 by Moody's Investor Services, A-1 by Standard & Poor's, or F-1 by Fitch. Risk related to adverse changes in interest rates is alleviated by maturity and instrument diversification. Please refer to Exhibit B for a summary of credit rating scales.

3.2 Liquidity

In order to ensure adequate liquidity, the average life of the investment portfolio of Valley Water shall be maintained at approximately two and one half (2.5) years, but may be adjusted from time-to-time to meet ongoing cash flow needs of the portfolio.

3.3 Return on Investment

Valley Water's investment portfolio shall be designed with the objective of attaining the greatest yield to maturity consistent with the preservation of capital and the maintenance of adequate liquidity.

3.4 Socially Responsible Investment

In addition to the investment objectives of safety, liquidity, and yield, Valley Water encourages investing in corporate securities, banking institutions and state agencies that meet the ESG factors. Valley Water shall use best efforts to follow the ESG Guiding Principles and utilize the Investment Evaluation Scorecard to evaluate and approve such investments to ensure compliance with the ESG factors (Appendix 1).

3.4.1 The ESG factor shall include considerations for local California based businesses.

3.5 California Bank Investments

To the extent permitted by California Government Code, while meeting Valley Water's investment objectives for safety, liquidity and yield, Valley Water encourages investing in Certificates of Deposit issued by California based banks, up to the Federal Deposit Insurance Corporation limit at the time of such investment which is currently set at $250,000, and up to 30% of the portfolio, as amended

3.5.1 Keeping investments to local banks, within the Bay Area, to keep money at home and jobs local; invest only in banks with below $10 billion in assets; and keep a minimum of 4% of liquid cash in banks with $10 billion in assets and 1% in banks with $2 billion in assets for a limited of 5 years (short term) at the discretion of the treasurer; such investments may be in the form of collateralized deposits, FDIC/NCUA insured CDs, CDARS, or any other legally allowable deposits.

4.0 DELEGATION OF INVESTMENT AUTHORITY

California Government Code Section 53607 provides the authority for the legislative body of the local agency to delegate for one-year periods to the Treasurer of the local agency the full responsibility to invest or reinvest local agency funds. Furthermore, Government Code Section 53608 requires the Board to delegate the authority to deposit funds for safekeeping with a federal or state association (as defined by Section 5102 of the Financial Code), a trust company or state or national bank located within this state or with the Federal Reserve Bank of San Francisco or any branch thereof within this state, or with any Federal Reserve bank or with any state or national bank locate in any city designated as a reserve city by the Board of Governors of the Federal Reserve System.

4.1 Board of Directors

The Board of Directors delegates to the District Treasurer-Chief Financial Officer, who will be designated by the Chief Executive Officer (or any acting or interim of such position), or his or her designee, the authority to invest, or deposit for safekeeping, as far as possible, all money belonging to, or in the custody of, Valley Water pursuant to the Title 5, Division 2, Part 1, Chapter 4, Article 1 Investment of Surplus (53600 – 53610) and Article 2 Deposit of Funds (53630-53686) of the California Government Code ("Government Code") and as directed by the policies of the Board.

4.2 District Treasurer

The District Treasurer delegates the execution of daily investment transactions to the Treasury and Debt Officer. Under the direction of the Chief Financial Officer (CFO), the Treasury and Debt Officer will invest funds pursuant to the quarterly investment strategy approved by the Investment Committee and within the parameters established by the Investment Policy.

4.3 Treasury and Debt Officer

The CFO delegates the execution of daily investment transactions to the designated support staff when the Treasury and Debt Officer is absent.

4.4 Investment Committee

The Investment Committee meets once quarterly to review cash management performance and the Investment Policy and to map out the investment strategy for the coming quarter. The Investment Committee is comprised of the District Treasurer/CFO, District Counsel or his/her designee, the Financial Services Unit Manager, the Treasury/Debt Officer, and treasury support staff, if any.

5.0 ETHICS AND CONFLICTS OF INTEREST

The District Treasurer and any other Valley Water staff member or contract employee having influence over the investment decision process will refrain from personal business activity that could conflict with proper execution of the investment program or which could impair the ability to make impartial investment decisions. Further, the District Treasurer and any other Valley Water staff member or contract employee will

refrain from making, participating in making, or in any way using their official position to influence a Valley Water investment decision in which they know or have reason to know they have a disqualifying conflict of interest as described in the Political Reform Act and the Fair Political Practices Commission Guidelines implementing the Act.

6.0 AUTHORIZED FINANCIAL INTERMEDIARIES

The Treasury and Debt Officer will maintain a list of broker/dealers authorized to provide investment services. These may include primary dealers or regional dealers. All broker/dealers who desire to become qualified broker/dealers for investment transactions must participate in the Broker/Dealer selection process managed by the Treasury and Debt Officer that takes place at least once every three years. The participating broker/dealers must provide all the documentation, and complete all other requirements specified in the Broker/Dealers selection criteria.

Selection of broker/dealers authorized to engage in transactions with Valley Water shall be at the sole discretion of Valley Water. Minimum assets of the company will be $5 million. The Treasury and Debt Officer and CFO will conduct an annual review of the financial condition of qualified broker/dealers.

7.0 AUTHORIZED INVESTMENTS, MATURITIES, ISSUER AND PORTFOLIO LIMITS

Valley Water shall comply with Code[1], as amended from time to time, and invest in the authorized securities described in this section. Where this section specifies a percentage limitation for a particular category of investment, that percentage is applicable only at the date of purchase. Where this section does not specify a limitation on the remaining maturity, no investment shall be made in any security that at the time of the investment has a term remaining to maturity in excess of five (5) years. The five-year limitation may be waived provided that the legislative body has granted express authority to make that investment either specifically or as a part of an investment program approved by the legislative body no less than three (3) months prior to the investment.

7.1 U.S. Government

United States Treasury Bills, Notes, and Bonds or those obligations for which the faith and credit of the United States are pledged for the payment of principal and interest.

	Valley Water Policy	Government Code
Maturity Limit	5 years	5 years
Portfolio Limit	None Specified	None Specified
Issuer Limit	None Specified	None Specified
Minimum Credit Rating	See Section 3.1—Safety	None Specified

[1] Refer to California Debt and Investment Advisory Commission Update for 2019, for details regarding state law changes effective as of January 1, 2019, CDIAC 19.01. http://www.treasurer.ca.gov/cdiac/LAIG/guideline.pdf

7.2 U.S. Agencies

Obligations issued by the following federal-related institutions and government-sponsored entities where the implied and moral support of the U.S. Government is pledged for the payment of principal and interest. They may be either bullet (non-callable) or callable issues:

Federal National Mortgage Association
Federal Farm Credit Banks
Federal Home Loan Bank
Federal Agricultural Mortgage Corporation of America
Federal Home Loan Mortgage Corporation
Tennessee Valley Authority

	Valley Water Policy	Government Code
Maturity Limit	5 years	5 years
Portfolio Limit	None Specified	None Specified
Issuer Limit	None Specified	None Specified
Minimum Credit Rating	See Section 3.1—Safety	None Specified

7.3 Bankers Acceptances

Bills of exchange or time drafts drawn on and accepted by a commercial bank, otherwise known as Bankers Acceptances, which are eligible for purchase by the Federal Reserve System.

	Valley Water Policy	Government Code
Maturity Limit	180 days	180 days
Portfolio Limit	40%	40%
Issuer Limit	12%**	30%
Minimum Credit Rating	See Section 3.1—Safety	None Specified

Issuer Limit of 12% is defined as **4.8% of the total portfolio book value (12% issuer limit x 40% portfolio limit = 4.8%) for each issuer.

7.4 Commercial Paper

Commercial Paper (CP) issued by corporations that are organized and operating within the United States and having total assets in excess of US $500 million. Purchases of eligible Commercial Paper may not exceed 10 percent of the issuer's outstanding Commercial Paper program.

	Valley Water Policy	Government Code
Maturity Limit	90 days	270 days
Portfolio Limit	15%	25%
Issuer Limit	12%** of portfolio limit and 10% of the issuer's CP outstanding	May not exceed 10% of the issuer's CP outstanding.
Minimum Credit Rating (at least 2 ratings)	A-1 (short-term)/ AA- (long-term, if available) or equivalent	A-1 (short-term)/ A (long-term, if available) or equivalent

Issuer Limit of 12% is defined as **1.8% of the total portfolio book value (12% issuer limit x 15% portfolio limit = 1.8%) for each parent company.

7.5 Negotiable Certificates of Deposit

Negotiable Certificates of Deposit issued by a nationally or state-chartered bank, a savings association or a federal association (as defined by Section 5102 of the Financial Code), a state or federal credit union, or by a state-licensed branch of a foreign bank.

	Valley Water Policy	Government Code
Maturity Limit	5 years	5 years
Portfolio Limit	30%	30%
Issuer Limit	12%**	None Specified
Minimum Credit Rating (at least 2 ratings), or FDIC/NCUA insured	AA- (long-term) or equivalent	None Specified

Issuer Limit of 12% is defined as **3.6% of the total portfolio book value (12% issuer limit x 30% portfolio limit = 3.6%) for each issuer.

7.6 Time Certificates of Deposit

Per Section 53601.8 of the Government Code, a local agency that has the authority under law to invest funds, at its discretion, may invest a portion of its surplus funds in deposits at a commercial bank, savings bank, savings and loan association, or credit union that uses a private sector entity that assists in the placement of deposits under certain conditions, including FDIC and NCUA insurance.

	Valley Water Policy	Government Code
Maturity Limit	5 years	5 years
Portfolio Limit	5%	30%
Issuer Limit	Current FDIC/NCUA Insurance Limit ($250,000) and FDIC/NCUA membership	Current FDIC/NCUA Insurance Limit ($250,000) and FDIC/NCUA membership
Minimum Credit Rating	'Satisfactory' Community Reinvestment Act (CRA)	None Specified

7.7 Repurchase Agreements

Repurchase Agreements as defined by the purchase of securities (approved under Sections 1 and 2 of this document) by Valley Water pursuant to an agreement whereby the seller will repurchase the securities on a specified date at a specified price. Valley Water requires delivery of the purchased securities to Valley Water's custody bank via book-entry prior to payment for such securities. All Repurchase Agreements will operate under the industry-standard Public Securities Association Master Repurchase Agreement which must be executed prior to the transaction. Valley Water requires that purchased securities exceed the cash value of the transaction by a minimum of 2 percent to protect against adverse price movements. All collateral relating to outstanding repurchase agreements will be priced daily to ensure the maintenance of 102 percent collateralization. Collateral is limited to those securities listed in Section 7.1 and 7.2.

	Valley Water Policy	**Government Code**
Maturity Limit	30 days	1 year
Portfolio Limit	None Specified	None Specified
Issuer Limit	None Specified	None Specified
Minimum Credit Rating	See Section 3.1—Safety	None Specified

7.8 Medium-Term Notes

Corporate Medium-Term Notes issued by corporations organized and operating in the United States or by depository institutions licensed by the United States and operating within the United States.

	Valley Water Policy	**Government Code**
Maturity Limit	5 years	5 years
Portfolio Limit	15%	30%
Issuer Limit	12%**	None Specified
Minimum Credit Rating (at least 2 ratings)	AA- (long-term) or equivalent	A or equivalent

Issuer Limit of 12% is defined as **1.8% of the total portfolio book value (12% issuer limit x 15% portfolio limit = 1.8%) for each parent company.

7.9 Municipal Obligations

Municipal obligations issued by a municipality within the State of California, including obligations payable solely out of the revenues from a revenue-producing property owned, controlled, or operated by the local agency. This may include Bonds, notes, warrants, or other evidences of indebtedness of a local agency within this state, including bonds payable solely out of the revenues from a revenue-producing property owned, controlled, or operated by the local agency, or by a department, board, agency, or authority of the local agency.

Registered treasury notes or bonds of the State of California or any of the other 49 states, including bonds payable solely out of the revenues from a revenue producing property owned, controlled or operated by the state or by a department, board, agency or authority of the state.

	Valley Water Policy	Government Code
Maturity Limit	5 years	5 years
Portfolio Limit	15%	None Specified
Issuer Limit	12%**	None Specified
Minimum Credit Rating (at least 2 ratings)	AA- or equivalent	None Specified

Issuer Limit of 12% is defined as **1.8% of the total portfolio book value (12% issuer limit x 15% portfolio limit = 1.8%) for each issuer.

7.10 Local Agency Investment Fund (LAIF)

Valley Water may place funds with LAIF up to the maximum allowable amount as stipulated by LAIF and amended from time to time. LAIF is managed by the State of California Treasurer's Office with the objective of realizing the maximum return consistent with safe and prudent treasury management. Currently LAIF will accept no more than $65 million of an agency's unrestricted funds while placing no constraints on funds relating to unspent bond proceeds.

7.11 Mutual Funds

Mutual funds invested in U.S. Government securities which strive to maintain a price of $1.00 per share (Government money market funds) with a minimum of $500 million in total portfolio value and a rating by at least two rating agencies of Aaa by Moody's and AAA by Standard & Poor's or Fitch. Investment in such funds shall not exceed 10% of Valley Water's total portfolio book value.

	Valley Water Policy	Government Code
Maturity Limit	Not Applicable	Not Applicable
Portfolio Limit	10%	20%
Issuer Limit	10%	10%
Minimum Credit Rating (at least 2 ratings)	Aaa/AAA	Aaa/AAA

7.12 Supranational Obligations

United States dollar denominated senior unsecured unsubordinated obligations issued or unconditionally guaranteed by the International Bank for Reconstruction and Development (IBRD), International Finance Corporation (IFC), or Inter-American Development Bank (IADB), with a maximum remaining maturity of five years or less, and eligible for purchase and sale within the United States. Investments under this subdivision shall be rated "AA" or better by two or more national credit rating agencies and shall not exceed 15 percent of Valley Water's total portfolio book value.

	Valley Water Policy	Government Code
Maturity Limit	5 Years	5 Years
Portfolio Limit	15%	30%
Issuer Limit	12%**	--
Minimum Credit Rating (at least 2 ratings)	Aa/AA	Aa/AA

Issuer Limit of 12% is defined as **1.8% of the total portfolio book value (12% issuer limit x 15% portfolio limit = 1.8%) for each issuer.

7.13 Prohibited Investments

7.13.1 Prohibited Investments

Include securities not listed in this section 7, as well as inverse floaters, range notes, interest only strips derived from a pool of mortgages and any security that could result in zero interest accrual if held to maturity, as specified in Section 53601.6 of the California Government Code.

7.13.2 Climate Divestment Investment Restriction

No investments will be made in the top 200 fossil fuel companies that control most of the world's oil, coal and natural gas supplies. See Exhibit C for the list of the 200 companies as defined by the organization, "350.org."

7.13.3 Prohibited Banks

No investments will be made in any banks who do not have an ESG ranking at or better than the "Average/Medium" category, by at least one of the professional ESG research companies such as Sustainalytics, or other equivalent rankings published by other ESG research firms. Small and local banks/credit unions located within the nine Bay Area counties with total assets at or below $10 billion are exempt from this provision.

7.14 Investment Sales Prior to Maturity

While the overall investment management philosophy of the portfolio is based on a passive approach focusing on matching investment maturities with anticipated liabilities in the future, sales of outstanding investment positions prior to maturity are permitted so long as a yield enhancement on the total transaction is achieved. Specifically, the reinvestment proceeds from the sale of an investment position must earn an income flow whose present value is greater than the present value of the sold position considering any capital losses and foregone interest income. In addition, investment positions may be sold if funds are needed for unanticipated expenditures, or if a corporate and bank obligation is downgraded (see section 7.15 below).

Before an investment position can be sold, an analysis must be made showing the benefit of the sale to Valley Water and the impact the sale will have on the investment portfolio. The sales must be reviewed by Valley Water's Investment

Committee. A sale will only be initiated after receiving guidance from the committee members and authorization by the District Treasurer.

7.15 Downgrade Provisions

Pursuant to Valley Water's investment policy, the minimum credit criteria for the purchase of municipal, corporate and bank obligations is a rating by two of the three major rating agencies of Aa3 by Moody's Investor Services, AA- by Standard & Poor's Credit Rating Agency and Fitch at the time the investment is purchased. If an outstanding investment is downgraded such that it is below the minimum credit criteria after purchase date, a credit analysis will be performed within two business days and a recommendation made to the Investment Committee on whether the investment will be held or sold. Such a review will give consideration to the time to maturity remaining on the life of the security, specific discussions with Fitch, Standard & Poor's and/or Moody's Investor Services, and credit analysis by staff.

7.16 Dropped Rating

Pursuant to Valley Water's investment policy, the minimum credit criteria for the purchase of municipal, corporate and bank obligations is a rating by two of the three major rating agencies of Aa3 by Moody's Investor Services and AA- by Standard & Poor's Credit Rating Agency, and Fitch at the time the investment is purchased. If the rating on an outstanding investment is no longer reported by the rating agency for any reason, and the other rating(s) remain the same as at the time of purchase, the investment will remain in the portfolio. If the other rating(s) are downgraded, section 7.15 downgrade provisions will be followed. An analysis of the dropped rating will be initiated to determine the cause of dropped rating, and the findings will be reported to the investment committee within two business days.

8.0 COLLATERAL

As required by Government Code Section 53652, all deposits must be secured at all times with eligible securities pursuant to Government Code Sections 53656 and 53657. Valley Water further restricts collateralization as follows:

8.1 Repurchase Agreements

All transactions will be collateralized only by Government and Agency securities defined in Sections 7.1 and 7.2 of the Investment Policy at a level equal to, or greater than, 102 percent of the principal cash value of the investment principal. All transactions will be executed on a delivery versus payment basis and will be safekept by Valley Water's Custodial Agent. All collateral on outstanding repurchase agreements will be priced daily.

8.2 Time Certificates of Deposits

Pursuant to Government Code Section 53653, a Treasurer may, at his/her discretion, waive security requirements for such portion of deposits that are insured pursuant to federal law, investments in Time CDs may not exceed the

current FDIC protected amount. As such, the Treasurer waives the security required by Government Code Section 53652 as long as the depository maintains FDIC insurance for public deposits.

8.3 Uninvested Balances

From time to time, Valley Water may leave funds uninvested in its checking account in order to meet anticipated disbursements. Valley Water requires that the depository holding such funds be fully collateralized pursuant to Government Code Section 53652. Eligible securities held as collateral shall have a market value in excess of the total amount of all deposits of a depository as follows:

- Government securities at least 10 percent in excess
- Mortgage backed securities at least 50 percent in excess
- Letters of credit at least 5 percent in excess

9.0 SAFEKEEPING AND CUSTODY

All security transactions entered into by Valley Water will be executed on a delivery versus payment basis and evidenced by safekeeping receipts from Valley Water's custodial agent. The only exception will be investments with the LAIF, nonnegotiable Time CDs, and money market accounts.

10.0 DIVERSIFICATION

In an effort to reduce portfolio risk and volatility while maintaining market average rates, Valley Water will diversify its investments with respect to instrument type, issuer, and maturity.

10.1 Instrument Type

To diversify Valley Water's portfolio by type, it should contain a variety of authorized investment instruments. California Government Code Sections 53601 et seq. and 53635 et seq. limit the maximum amount of some of the authorized investment instruments as a percentage of the total investment portfolio. Valley Water has added additional percentage restrictions on some of the instruments as outlined in section 7 above.

10.2 Maximum Maturities

California Government Code Sections 53601 et seq. and 53635 et seq. state that except as specifically limited in the code sections, no investment shall be made in a security that at the time of investment has more than five (5) years to maturity, unless the Board has given express authority to do so no less than three months prior to the purchase of such security. Valley Water has further limited the maximum maturities on some investment securities as outlined in section 7 above. LAIF and authorized mutual funds have no specific maturity date and are, therefore, exempt from the five year limit.

10.3 Maximum Issuer Limits

There is no maximum issuer limit for U.S. Treasury obligations, permitted Federal Agency obligations, LAIF, and collateralized Repurchase Agreements outlined in Section 7 above. For all other investment instruments, certain maximum issuer limits are applicable as outlined in section 7 above. Furthermore, as stipulated in Section 7.6 above, no more than the amount insured by the FDIC, which is currently $250,000 per account, may be invested in the issuer of nonnegotiable Time CDs.

11.0 INTERNAL CONTROLS

A system of internal controls will be maintained to ensure compliance with federal and state regulations in addition to ensuring prudent cash management and proper segregation of duties.

11.1 Investment Committee

Quarterly review of cash management activity and compliance to the Investment Policy is performed by the Investment Committee through a review of investment status reports supplied to the Investment Committee by the Treasury and Debt Officer.

11.2 Treasurer Review

The CFO or his/her designate shall perform daily, weekly and monthly reviews of investment transactions executed by the Treasury and Debt Officer to ensure compliance to all applicable regulations, policies, procedures, and guidelines. In the CFO's absence, the Treasury and Debt Officer will perform the review.

11.3 Annual Audit

Valley Water's portfolio is included in the annual review of Valley Water's financial management program by an independent outside audit firm.

11.4 Investment Policy Compliance Checklist

On a monthly basis, accounting staff reviews the investment portfolio to verify its compliance with the Government Code and the Investment Policy. A report is prepared stating that the portfolio is in compliance, or which items are out of compliance.

12.0 PERFORMANCE REPORTING

The investment portfolio will be designed to obtain a market average rate of return during budgetary and economic cycles, taking into careful consideration Valley Water's risk tolerance and liquidity requirements.

12.1 The Benchmark

Valley Water will strive to maintain a yield within 15 basis points (0.15%) of the 2-year floating average of the twenty-four month Treasury-note rate.

13.0 REPORTING

The District Treasurer will ensure that investment reporting is performed in order to provide a monitoring system designed to demonstrate compliance to all applicable laws, policies, procedures, and guidelines.

13.1 Weekly Reports

The Treasury and Debt Officer will provide daily reports of Valley Water's cash position and detailed reports of the investment transactions in the portfolio on a weekly basis to the CFO. This report shall include a list of all purchases, sells, exchanges and maturities for the week being reported.

13.2 Monthly Reports

The Treasury and Debt Officer will provide detailed reports of the investment transactions in the portfolio on a monthly basis to the Board of Directors as required by California Government Code Section 53607. This report shall include a list of all purchases, sells, exchanges and maturities for the month being reported.

13.3 Quarterly Reports

The District Treasurer will provide detailed investment reports of the portfolio on a quarterly basis to the Board of Directors pursuant to California Government Code Section 53646. This report shall include type of investment, issuer, date of maturity, par, dollar amount, and market value including source of the valuation. In addition, this report shall also include a statement denoting the ability to meet the agency's expenditure requirements for the next six (6) months. The quarterly report will also include information on all debt funds held by the trustee, in guaranteed investment contracts (GIC), or with any other agent of Valley Water.

13.4 Annual Report

The Investment Policy will be presented to the Board at a public meeting on an annual basis.

14.0 STATEMENT OF DERIVATIVES INVESTMENT GUIDELINE

Valley Water will not invest funds in derivative products based on the following definition of a derivative:

A derivative is a security or a financial arrangement whose value is linked to, or derived from, some underlying index or benchmark. Such examples are floating rate notes whose interest payments may fluctuate in an inverse or a linear relationship to the established benchmark and interest rate swaps. Furthermore, Valley Water will not place funds in securities whose coupons rise or fall based on whether the issuer exercises the call option. This does not include repurchase agreements which are specifically authorized under Section 7.7 of the Investment Policy.

15.0 OTHER PROCEDURES

Valley Water treasury group has compiled an Investment Manual, approved by the Valley Water Investment Committee, which consolidates pertinent procedures related to the cash management function in a single reference manual. Included in this manual is a step-by-step description of the investment process and how investments are identified, chosen, executed, and recorded. Section 2 of this manual gives detailed instructions on completing the daily cash analysis; Section 3 explains preparation procedures for planning to invest; Section 4 details the types of authorized investments; Section 5 explains the process by which the chosen investment transaction is executed and includes delivery and safekeeping instructions; Section 6 lists the accounting procedures for investments; and Section 7 details internal control procedures. Also included in the appendix is a summary of government legislation pertaining to government investing, the Valley Water Investment Policy, and a glossary of key terms.

APPENDIX 1
Environmental, Social, Governance Factors

GUIDING PRINCIPLES

When evaluating potential investments in corporate and financial institution securities, the Investment Committee shall follow the guiding principles:

Negative Screens

No investments shall be made in companies significantly involved in the production or sale of fossil fuels, tobacco, and other products that are environmentally harmful. Furthermore, to the extent possible while maintaining adequate safety, liquidity and yield of the portfolio, no investments shall be made in companies with a demonstrated record of the following:

- poor practices with respect to environmental regulation, greenhouse gas emissions, toxins, hazardous waste or environment justice
- human rights abuse, violations of international law, and/or materially or otherwise supporting repressive regimes
- endangering rural people's access to the land, water and other resources on which their livelihoods depend
- violating labor laws, abusing or otherwise mistreating workers and/or preventing or impeding unionization
- discrimination based on sexual orientation, gender, race, ethnicity, age or disability
- practices which have significant negative effects on affected communities, particularly those with minority or low-income residents
- restriction of access to affordable medicine in the developing world

Positive Screens

To the extent possible while maintaining adequate safety, liquidity and yield of the portfolio, investments shall be made in companies involved in the production of renewable energy and organic food, local food and sustainable agriculture and generally, invest in companies and investments that demonstrate commitment to:

- environmental sustainability, including reducing greenhouse gas emissions and sustainable forestry
- community development and/or investment, particularly in communities with minority or low-income residents
- diversity in hiring, executives and boards with respect to sexual orientation, gender, race, ethnicity
- living wages for all employees and collective bargaining

- transparency and accountability in corporate governance

ENVIRONMENTAL, SOCIAL, GOVERNANCE (ESG) FACTORS

ENVIRONMENTAL	
Category	**Considerations**
Climate change & pollution	Does the company have a stated commitment to emissions reduction? What is the firm doing to combat climate change? Does the firm participate in carbon crediting/offset programs? Has the company been cited for excessive pollution? Does the company have an emissions reduction program?
Energy efficiency & waste management	Has the firm employed energy efficient design or retrofits in its buildings? Does the firm participate in E-Waste recycling programs? Do the operations require heavy use of chemicals?
Water use & management	Where does the company get its water? Have they installed smart filling stations and efficient fixtures? Does the company operate in water-stressed areas?
Land use & management	Are company facilities designed to minimize damage to the surrounding habitat? Does the company actively participate in greening or reforestation efforts? Does the company encourage alternative methods of transportation to and from work; if so, does building design facilitate these methods?
SOCIAL	
Category	**Considerations**
Stakeholder relations	Are customers treated as key stakeholders in the company? Do minority shareholders have an outlet to voice opinions regarding company operations? Are fair labor standards enforced? Do workers have representation in order to bring concerns to management?
Value chain management	Does the firm's supply chain reflect adequate working conditions and respect for human rights? Does the company hold suppliers to stated ethical and moral standards? Does the company have any outstanding litigation over its products; are the products generally safe? Are suppliers practicing sustainable production methods?
Community Impact	Is the firm engaged with local non-profits to combat social issues in the community? Does the company donate a share of profits to advocate for impact issues? Does the company make an effort to hire and promote employees from the surrounding community?

Local/California business?	In what city is the firm located? Is the business located in the San Jose-San Francisco Metropolitan Statistical Area? Is the business located in California?
CORPORATE GOVERNANCE	
Category	**Considerations**
Diversity	Are the workplace and board comprised of people from diverse backgrounds and ethnicities? Does the board have a roughly equal number of men and women?
Compensation	What is the ratio of executive pay to worker pay? Is executive compensation based on identifiable metrics? Are employees receiving equal pay for equal work?
Accountability & audit quality	Does the company employ a large number of special purpose vehicles and other off-balance sheet entities? Does the audit clearly stake risks to which the firm is exposed?
Cyber/Information Security	Does the company have a stated cyber/information security policy? Has the company been hacked in the last 3 years? What corrections/improvements have been made to prevent future hacks?
Transparency	Are internal discussions about the company kept hidden, or does the company routinely publish information for public consumption? Are the firm's financials easily understood? Is the firm readily accessible and do they respond to requests for comment?

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EXHIBIT A
Glossary of Key Terms

AGENCIES: Federal agency securities and/or Government-sponsored enterprises.

BANKERS' ACCEPTANCE (BA): A draft or bill or exchange accepted by a bank or trust company. The accepting institution guarantees payment of the bill, as well as the issuer.

BOOK VALUE: The value at which a security is carried on the financial records of its owner. This value may be the original cost of acquisition of the security or original cost adjusted by amortization of a premium or accretion of a discount. The book value may differ from the security's current market value.

BENCHMARK: A comparative base for measuring the performance or risk tolerance of the investment portfolio. A benchmark should represent a close correlation to the level of risk and the average duration of the portfolio's investments.

BROKER: A broker brings buyers and sellers together for a commission.

CERTIFICATE OF DEPOSIT (CD): A time deposit with a specific maturity evidenced by a Certificate. Large-denomination CD's are typically negotiable.

COLLATERAL: Securities, evidence of deposit or other property, which a borrower pledges to secure repayment of a loan. Also refers to securities pledged by a bank to secure deposits of public monies.

DELIVERY VERSUS PAYMENT: There are two methods of delivery of securities: delivery versus payment and delivery versus receipt. Delivery versus payment is delivery of securities with an exchange of money for the securities. Delivery versus receipt is delivery of securities with an exchange of a signed receipt for the securities.

DERIVATIVES: (1) Financial instruments whose return profile is linked to, or derived from, the movement of one or more underlying index or security, and may include a leveraging factor; or (2) financial contracts based upon notional amounts whose value is derived from an underlying index or security (interest rates, foreign exchange rates, equities or commodities).

DISCOUNT: The difference between the cost price of a security and its maturity when quoted at lower than face value. A security selling below original offering price shortly after its sale also is considered to be at a discount.

DISCOUNT SECURITIES: Non-interest bearing money market instruments that are issued a discount and redeemed at maturity for full face value, *e.g.,* U.S. Treasury Bills.

DIVERSIFICATION: Dividing investment funds among a variety of securities offering independent returns.

FEDERAL CREDIT AGENCIES: Agencies of the Federal government set up to supply credit to various classes of institutions and individuals, *e.g.*, S&L's, small business firms, students, farmers, farm cooperatives, and exporters.

FEDERAL DEPOSIT INSURANCE CORPORATION (FDIC): A federal agency that insures bank deposits, currently up to $250,000 per deposit.

FEDERAL FUNDS RATE: The rate of interest at which Fed funds are traded. This rate is currently pegged by the Federal Reserve through open-market operations.

FEDERAL HOME LOAN BANKS (FHLB): Government sponsored wholesale banks (currently 12 regional banks), which lend funds and provide correspondent banking services to member commercial banks, thrift institutions, credit unions and insurance companies. The mission of the FHLBs is to liquefy the housing related assets of its members who must purchase stock in their district Bank.

FEDERAL NATIONAL MORTGAGE ASSOCIATION (FNMA): FNMA, like GNMA was chartered under the Federal National Mortgage Association Act in 1938. FNMA is a federal corporation working under the auspices of the Department of Housing and Urban Development (HUD). It is the largest single provider of residential mortgage funds in the United States. Fannie Mae, as the corporation is called, is a private stockholder-owned corporation. The corporation's purchases include a variety of adjustable mortgages and second loans, in addition to fixed-rate mortgages. FNMA's securities are also highly liquid and are widely accepted. FNMA assumes and guarantees that all security holders will receive timely payment of principal and interest.

FEDERAL OPEN MARKET COMMITTEE (FOMC): Consists of seven members of the Federal Reserve Board and five of the twelve Federal Reserve Bank Presidents. The President of the New York Federal Reserve Bank is a permanent member, while the other Presidents serve on a rotating basis. The Committee periodically meets to set Federal Reserve guidelines regarding purchases and sales of Government Securities in the open market as a means of influencing the volume of bank credit and money.

LIQUIDITY: A liquid asset is one that can be converted easily and rapidly into cash without a substantial loss of value. In the money market, a security is said to be liquid if the spread between bid and asked prices is narrow and reasonable size can be done at those quotes.

MARKET VALUE: The price at which a security is trading and could presumably be purchased or sold.

MASTER REPURCHASE AGREEMENT: A written contract covering all future transactions between the parties to repurchase—reverse repurchase agreements that establishes each party's rights in the transactions. A master agreement will often specify, among other things, the right of the buyer-lender to liquidate the underlying securities in the event of default by the seller borrower.

MATURITY: The date upon which the principal or stated value of an investment becomes due and payable.

MONEY MARKET: The market in which short-term debt instruments (bills, commercial paper, bankers' acceptances, etc.) are issued and traded.

NATIONAL CREDIT UNION ADMINSTRATION: An independent federal agency that insures credit union deposits, currently up to $250,000 per deposit.

PRIMARY DEALER: A group of government securities dealers who submit daily reports of market activity and positions and monthly financial statements to the Federal Reserve Bank of New York and are subject to its informal oversight. Primary dealers include Securities and Exchange Commission (SEC)-registered securities broker-dealers, banks, and a few unregulated firms.

REPURCHASE AGREEMENT (RP OR REPO): A holder of securities sells these securities to an investor with an agreement to repurchase them at a fixed price on a fixed date. The security "buyer" in effect lends the "seller" money for the period of the agreement, and the terms of the agreement are structured to compensate him for this. Dealers use RP extensively to finance their positions. Exception: When the Fed is said to be doing RP, it is lending money that is, increasing bank reserves.

SAFEKEEPING: A service to customers rendered by banks for a fee whereby securities and valuables of all types and descriptions are held in the bank's vaults for protection.

SECONDARY MARKET: A market made for the purchase and sale of outstanding issues following the initial distribution.

SECURITIES & EXCHANGE COMMISSION: Agency created by Congress to protect investors in securities transactions by administering securities legislation.

SEC RULE 15C3-1: See Uniform Net Capital Rule.

TREASURY BILLS: A non-interest bearing discount security issued by the U.S. Treasury to finance the national debt. Most bills are issued to mature in three months, six months, or one year.

TREASURY BONDS: Long-term coupon-bearing U.S. Treasury securities issued as direct obligations of the U.S. Government and having initial maturities of more than 10 years.

TREASURY NOTES: Medium-term coupon-bearing U.S. Treasury securities issued as direct obligations of the U.S. Government and having initial maturities from two to 10 years.

UNIFORM NET CAPITAL RULE: Securities and Exchange Commission requirement that member firms as well as nonmember broker-dealers in securities maintain a maximum ratio of Indebtedness to Liquid Capital of 15 to 1; also called net capital rule and net capital ratio. Indebtedness is defined as all money owed to a firm, including margin loans and commitments to purchase securities, one reason new public issues are spread among members of underwriting syndicates. Liquid Capital is defined as cash and assets easily converted into cash.

YIELD: The rate of annual income return on an investment, expressed as a percentage.
(a) INCOME YIELD is obtained by dividing the current dollar income by the current market price

for the security. (b) NET YIELD or YIELD TO MATURITY is the current income yield minus any premium above par or plus any discount from par in purchase price, with the adjustment spread over the period from the date of purchase to the date of maturity of the bond.

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EXHIBIT B
Credit Rating Summary

SHORT-TERM CREDIT RATING DEFINITIONS

Moody's Rating	Moody's Definition	S&P Rating	S&P Definition	Fitch Rating	Fitch Ratings Definition
P-1	P-1 Issuers (or supporting institutions) rated Prime-1 have a superior ability to repay short-term debt obligations.	**SP-1**	Strong capacity to pay principal and interest. An issue determined to possess a very strong capacity to pay debt service is given a plus (+) designation.	**F1**	Highest credit quality. Indicates the strongest capacity for timely payment of financial commitments.
MIG-1	MIG-1—This designation denotes superior credit quality. Excellent protection is afforded by established cash flows, highly reliable liquidity support, or demonstrated broad-based access to the market for refinancing.	**A-1**	Degree of safety regarding timely payment is strong. Those issues determined to possess extremely strong safety characteristics are denoted by a plus (+) sign.		
VMIG-1	VMIG-1—This designation denotes superior credit quality. Excellent protection is afforded by the superior short-term credit strength of the liquidity provider and structural and legal protections that ensure the timely payment of purchase price upon demand.				
P-2	P-2 Issuers (or supporting institutions) rated Prime-2 have a strong ability to repay short-term debt obligations.	**SP-2**	Satisfactory capacity to pay principal and interest, with some vulnerability to adverse financial and economic changes over the term of the notes.	**F2**	Good credit quality. A satisfactory capacity for timely payment of financial

Moody's Rating	Moody's Definition	S&P Rating	S&P Definition	Fitch Rating	Fitch Ratings Definition
MIG-2 **VMIG-2**	MIG-2—This designation denotes strong credit quality. Margins of protection are ample, although not as large as in the preceding group. VMIG-2—This designation denotes strong credit quality. Good protection is afforded by the strong short-term credit strength of the liquidity provider and structural and legal protections that ensure the timely payment of purchase price upon demand.	**A-2**	Capacity for timely payment on issues with this designation is satisfactory. However, the relative degree of safety is not as high as for issues designated 'A-1.'		commitments, but the margin of safety is not as great as in the case of the higher ratings.
P-3 **MIG-3** **VMIG-3**	P-3 Issuers (or supporting institutions) rated Prime-3 have an acceptable ability to repay short-term obligations. MIG-3—This designation denotes acceptable credit quality. Liquidity and cash-flow protection may be narrow, and market access for refinancing is likely to be less well-established. VMIG-3—This designation denotes acceptable credit quality. Adequate protection is afforded by the satisfactory short-term credit strength of the liquidity provider and structural and legal protections that ensure the timely payment of purchase price upon demand.	**SP-3** **A-3**	Speculative capacity to pay principal and interest. Issues carrying this designation have an adequate capacity for timely payment. However, they are more vulnerable to the adverse effects of changes in circumstances than obligations carrying the higher designations.	**F3**	Fair credit quality. The capacity for timely payment of financial commitments is adequate; however, near-term adverse changes could result in a reduction to noninvestment grade.

Moody's Rating	Moody's Definition	S&P Rating	S&P Definition	Fitch Rating	Fitch Ratings Definition
NP **Speculative Grade (SG)**	Issuers (or supporting institutions) rated Not Prime do not fall within any of the Prime rating categories. MIG-SG S This designation denotes speculative-grade credit quality. Debt instruments in this category may lack sufficient margins of protection. VMIG-SG This designation denotes speculative-grade credit quality. Demand features rated in this category may be supported by a liquidity provider that does not have an investment grade short-term rating or may lack the structural and/or legal protections necessary to ensure the timely payment of purchase price upon demand.	**B**	Only speculative capacity for timely payment.	**B**	Speculative. Minimal capacity for timely payment of financial commitments, plus vulnerability to near term adverse changes in financial and economic conditions.
		C	Doubtful capacity for payment.	**C**	High default risk. Default is a real possibility. Capacity for meeting financial commitments is solely reliant upon a sustained, favorable business and economic environment.
		D	Default.	**D**	Default. Denotes actual or imminent payment default.

LONG-TERM CREDIT RATINGS

Moody's Rating	Moody's Definition	S&P Rating	S&P Definition	Fitch Rating	Fitch Ratings Definition
Aaa1 **Aaa2** **Aaa3**	Obligations rated Aaa are judged to be of the highest quality, subject to the lowest level of credit risk.	**AAA+** **AAA** **AAA-**	An obligation rated 'AAA' has the highest rating assigned by Standard & Poor's. The obligor's capacity to meet its financial commitment on the obligation is extremely strong.	**AAA+** **AAA** **AAA-**	**Highest credit quality.** 'AAA' ratings denote the lowest expectation of credit risk. They are assigned only in cases of exceptionally strong capacity for payment of financial commitments. This capacity is highly unlikely to be adversely affected by foreseeable events.
Aa1 **Aa2** **Aa3**	Obligations rated Aa are judged to be of high quality and are subject to very low credit risk.	**AA+** **AA** **AA-**	An obligation rated 'AA' differs from the highest-rated obligations only to a small degree. The obligor's capacity to meet its financial commitment on the obligation is very strong.	**AA+** **AA** **AA-**	**Very high credit quality.** 'AA' ratings denote expectations of very low credit risk. They indicate very strong capacity for payment of financial commitments. This capacity is not significantly vulnerable to foreseeable events.
A1 **A2** **A3**	Obligations rated A are judged to be upper-medium grade and are subject to low credit risk.	**A+** **A** **A-**	An obligation rated 'A' is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligations in higher-rated categories. However, the obligor's capacity to meet its financial commitment on the obligation is still strong.	**A+** **A** **A-**	**High credit quality.** 'A' ratings denote expectations of low credit risk. The capacity for payment of financial commitments is considered strong. This capacity may, nevertheless, be more vulnerable to adverse business or economic conditions than is the case for higher ratings.

Moody's Rating	Moody's Definition	S&P Rating	S&P Definition	Fitch Rating	Fitch Ratings Definition
Baa1 **Baa2** **Baa3**	Obligations rated Baa are judged to be medium-grade and subject to moderate credit risk and as such may possess certain speculative characteristics.	**BBB+** **BBB** **BBB-**	An obligation rated 'BBB' exhibits adequate protection parameters. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitment on the obligation.	**BBB+** **BBB** **BBB-**	**Good credit quality.** 'BBB' ratings indicate that expectations of credit risk are currently low. The capacity for payment of financial commitments is considered adequate but adverse business or economic conditions are more likely to impair this capacity.
Ba1 **Ba2** **Ba3**	Obligations rated Ba are judged to be speculative and are subject to substantial credit risk.	**BB+** **BB** **BB-**	An obligation rated 'BB' is less vulnerable to nonpayment than other speculative issues. However, it faces major ongoing uncertainties or exposure to adverse business, financial, or economic conditions, which could lead to the obligor's inadequate capacity to meet its financial commitment on the obligation.	**BB+** **BB** **BB-**	**Speculative.** 'BB' ratings indicate an elevated vulnerability to credit risk, particularly in the event of adverse changes in business or economic conditions over time; however, business or financial alternatives may be available to allow financial commitments to be met.
B1 **B2** **B3**	Obligations rated B are considered speculative and are subject to high credit risk.	**B+** **B** **B-**	An obligation rated 'B' is more vulnerable to nonpayment than obligations rated 'BB,' but the obligor currently has the capacity to meet its financial commitment on the obligation. Adverse business, financial, or economic conditions will likely impair the obligor's capacity or willingness to meet its financial commitment on the obligation.	**B+** **B** **B-**	**Highly speculative.** 'B' ratings indicate that material credit risk is present

Moody's Rating	Moody's Definition	S&P Rating	S&P Definition	Fitch Rating	Fitch Ratings Definition
Caa1 **Caa2** **Caa3**	Obligations rated Caa are judged to be speculative of poor standing and are subject to very high credit risk.	**CCC+** **CCC** **CCC-**	An obligation rated 'CCC' is currently vulnerable to nonpayment, and is dependent upon favorable business, financial, and economic conditions for the obligor to meet its financial commitment on the obligation. In the event of adverse business, financial, or economic conditions, the obligor is not likely to have the capacity to meet its financial commitment on the obligation.	**CCC+** **CCC** **CCC-**	**Substantial credit risk.** 'CCC' ratings indicate that substantial credit risk is present.
Ca1 **Ca2** **Ca3**	Obligations rated Ca are highly speculative and are likely in, or very near, default, with some prospect of recovery of principal and interest.	**CC+** **CC** **CC-**	An obligation rated 'CC' is currently highly vulnerable to nonpayment.	**CC+** **CC** **CC-**	**Very high levels of credit risk.** 'CC' ratings indicate very high levels of credit risk
C1 **C2** **C3**	Obligations rated C are the lowest rated and are typically in default, with little prospect for recovery of principal or interest.	**C+** **C** **C-**	A 'C' rating is assigned to obligations that are currently highly vulnerable to nonpayment, obligations that have payment arrearages allowed by the terms of the documents, or obligations of an issuer that is the subject of a bankruptcy petition or similar action which have not experienced a payment default. Among others, the 'C' rating may be assigned to subordinated debt, preferred stock or other obligations on which cash payments have been suspended in accordance with the instrument's terms or when preferred stock is the subject of a distressed exchange offer, whereby some or all of the issue is either repurchased for an amount of cash or replaced by other instruments having a total value that is less than par.	**C+** **C** **C-**	**Exceptionally high levels of credit risk.** 'C' indicates exceptionally high levels of credit risk.

Moody's Rating	Moody's Definition	S&P Rating	S&P Definition	Fitch Rating	Fitch Ratings Definition
		D+ **D** **D-**	An obligation rated 'D' is in payment default. The 'D' rating category is used when payments on an obligation are not made on the date due even if the applicable grace period has not expired, unless Standard & Poor's believes that such payments will be made during such grace period. The 'D' rating also will be used upon the filing of a bankruptcy petition or the taking of similar action if payments on an obligation are jeopardized. An obligation's rating is lowered to 'D' upon completion of a distressed exchange offer, whereby some or all of the issue is either repurchased for an amount of cash or replaced by other instruments having a total value that is less than par.	**D**	**Default**. Indicates a default. Default generally is defined as one of the following: • Failure to make payment of principal and/or interest under the contractual terms of the rated obligation; • The distressed exchange of an obligation, where creditors were offered securities with diminished structural or economic terms compared with the existing obligation to avoid a probable payment default.

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EXHIBIT C
Top 200 Listed Companies by Estimated Carbon Reserves

Rank	Coal Companies	Coal Gt CO_2	Rank	Oil and Gas Companies	Oil Gt CO_2	Gas Gt CO_2	Total O&G Gt CO_2
1	Coal India	32.039	**1**	Gazprom	7.046	36.844	43.889
2	Shaanxi Coal Industry	28.885	**2**	Rosneft	11.536	5.939	17.475
3	Adani Enterprises	25.311	**3**	PetroChina	3.363	4.309	7.671
4	China Shenhua Energy	22.305	**4**	ExxonMobil	3.956	3.079	7.035
5	Inner Mongolia Yitai Coal	14.849	**5**	BP	4.309	2.364	6.672
6	Yanzhou Coal Mining	10.633	**6**	Lukoil	5.285	1.280	6.565
7	China Coal Energy	9.492	**7**	Royal Dutch Shell	2.112	2.209	4.322
8	Public Power	9.339	**8**	Chevron	2.473	1.567	4.040
9	Exxaro Resources	8.928	**9**	Petrobras	3.516	0.508	4.023
10	Glencore	8.369	**10**	Novatek	0.550	3.377	3.927
11	Peabody Energy	7.998	**11**	Total	2.076	1.798	3.873
12	Bukit Asam	7.844	**12**	Tatneft	2.618	0.063	2.681
13	BHP Billiton	7.310	**13**	ENI	1.439	1.217	2.656
14	Foresight Energy	6.759	**14**	ONGC	1.518	0.796	2.314
15	Lu'an Environmental Energy	6.443	**15**	ConocoPhillips	1.236	0.830	2.065
16	BUMI Resources	5.499	**16**	Statoil	1.018	0.798	1.816
17	Shanxi Xishan Coal and Electricity	5.416	**17**	CNOOC	0.983	0.439	1.422
18	Mechel	5.308	**18**	Inpex	0.908	0.328	1.236
19	Mitsubishi	5.128	**19**	Canadian Natural Resources	0.873	0.322	1.195
20	China Coal Xinji Energy	4.873	**20**	Sinopec	0.657	0.391	1.048
21	Raspadskaya OAO	3.968	**21**	Bashneft	1.007	0.000	1.007
22	Alliance Resource Partners	3.893	**22**	Occidental	0.706	0.206	0.912

Rank	Coal Companies	Coal Gt CO_2	Rank	Oil and Gas Companies	Oil Gt CO_2	Gas Gt CO_2	Total O&G Gt CO_2
23	Arch Coal	3.878	**23**	EOG Resources	0.621	0.181	0.802
24	Anglo American	3.592	**24**	Repsol	0.247	0.550	0.797
25	DaTong Coal Industry	3.508	**25**	Antero Resources	0.281	0.513	0.794
26	China Cinda Asset Management	3.316	**26**	Suncor Energy	0.732	0.002	0.733
27	EVRAZ	3.189	**27**	EQT	0.055	0.672	0.727
28	Vale	3.179	**28**	Imperial Oil	0.617	0.020	0.637
29	Rio Tinto	2.710	**29**	Range Resources	0.203	0.429	0.632
30	Severstal	2.661	**30**	Marathon Oil	0.495	0.133	0.628
31	Tata Steel	2.643	**31**	Ecopetrol	0.460	0.167	0.627
32	Westmoreland Coal	2.529	**32**	Anadarko Petroleum	0.374	0.241	0.615
33	Jastrzębska Spółka Węglowa	2.516	**33**	Devon Energy	0.304	0.307	0.611
34	Resource Generation	2.441	**34**	BASF	0.205	0.384	0.589
35	Teck Resources	2.376	**35**	Chesapeake Energy	0.225	0.354	0.579
36	United RUSAL	2.233	**36**	Noble Energy	0.207	0.289	0.497
37	Adaro Energy	2.200	**37**	Apache	0.330	0.156	0.486
38	AGL Energy	2.144	**38**	Continental Resources	0.272	0.207	0.479
39	Shanghai Datun Energy Resources	2.032	**39**	Cabot Oil & Gas	0.020	0.451	0.471
40	Yang Quan Coal	2.023	**40**	BHP Billiton	0.195	0.262	0.458
41	Shanxi Lanhua Sci-Tech	1.959	**41**	Hess	0.327	0.092	0.419
42	Whitehaven Coal	1.946	**42**	YPF	0.235	0.159	0.395
43	Kuzbasskaya Toplivnaya	1.890	**43**	OMV	0.266	0.123	0.389
44	Cloud Peak Energy	1.886	**44**	Cenovus Energy	0.351	0.033	0.385
45	CONSOL Energy	1.807	**45**	Woodside Petroleum	0.042	0.318	0.360
46	South32	1.712	**46**	CONSOL Energy	0.019	0.318	0.337
47	New Hope	1.635	**47**	KazMunaiGas EP	0.290	0.026	0.316

Rank	Coal Companies	Coal Gt CO_2	Rank	Oil and Gas Companies	Oil Gt CO_2	Gas Gt CO_2	Total O&G Gt CO_2
48	Yancoal Australia	1.622	**48**	Southwestern Energy	0.019	0.265	0.284
49	NACCO Industries	1.459	**49**	Encana	0.091	0.192	0.283
50	Huolinhe Coal	1.387	**50**	Concho Resources	0.181	0.095	0.277
51	ITOCHU	1.361	**51**	Husky Energy	0.168	0.107	0.275
52	Beijing Haohua Energy Resource	1.317	**52**	Seven Generations Energy	0.158	0.113	0.271
53	NLC India	1.296	**53**	Pioneer Natural Resources	0.199	0.069	0.268
54	Novolipetsk Steel	1.236	**54**	Tourmaline Oil	0.044	0.222	0.265
55	Indika Inti Corpindo	1.182	**55**	SK Innovation	0.263	0.000	0.263
56	Datang International Power Generation	1.147	**56**	QEP Resources	0.119	0.139	0.258
57	Coal of Africa	1.137	**57**	PTT	0.072	0.184	0.256
58	Golden Energy Mines	1.112	**58**	Murphy Oil	0.153	0.102	0.255
59	Jindal Steel & Power	1.033	**59**	Whiting Petroleum	0.198	0.039	0.237
60	Mitsui	0.998	**60**	Sasol	0.157	0.073	0.230
61	Banpu	0.950	**61**	Aker BP	0.224	0.000	0.224
62	Berau Coal Energy	0.942	**62**	California Resources	0.186	0.034	0.220
63	Wesfarmers	0.832	**63**	Crescent Point Energy	0.202	0.018	0.220
64	Up Energy Development	0.826	**64**	Rice Energy	0.000	0.218	0.218
65	Kangaroo Resources	0.794	**65**	Linn Energy	0.071	0.125	0.197
66	Shanxi Meijin Energy	0.784	**66**	Newfield Exploration	0.108	0.074	0.183
67	Mongolian Mining	0.767	**67**	MEG Energy	0.178	0.000	0.178
68	Jizhong Energy	0.742	**68**	Lundin	0.167	0.006	0.173
69	Allete	0.723	**69**	Mitsui	0.063	0.107	0.170
70	Aspire Mining	0.670	**70**	Birchcliff Energy	0.027	0.137	0.164
71	ArcelorMittal	0.640	**71**	Cimarex Energy	0.084	0.080	0.164
72	Hallador Energy	0.599	**72**	EP Energy	0.120	0.040	0.160

Rank	Coal Companies	Coal Gt CO_2	Rank	Oil and Gas Companies	Oil Gt CO_2	Gas Gt CO_2	Total O&G Gt CO_2
73	Vedanta	0.599	**73**	Maersk	0.153	0.000	0.153
74	LG International	0.595	**74**	Santos	0.016	0.133	0.149
75	Rhino Resource Partners	0.560	**75**	Oil India	0.096	0.049	0.145
76	Ramaco Resources	0.555	**76**	Ultra Petroleum	0.013	0.127	0.140
77	Lubelski Węgiel Bogdanka	0.554	**77**	Oil Search	0.022	0.117	0.140
78	CLP Holdings	0.552	**78**	SM Energy	0.075	0.061	0.135
79	Bayan Resources	0.529	**79**	ENGIE	0.033	0.096	0.130
80	Steel Authority of India	0.515	**80**	Painted Pony Petroleum	0.014	0.115	0.129
81	Vimetco	0.512	**81**	WPX Energy	0.088	0.040	0.128
82	Indo Tambangraya Megah (Banpu)	0.508	**82**	ARC Resources	0.045	0.083	0.128
83	Black Hills	0.495	**83**	JX Holdings	0.059	0.068	0.128
84	Monnet Ispat & Energy	0.492	**84**	Gulfport Energy	0.008	0.118	0.126
85	Kinetic Mines and Energy	0.463	**85**	Oasis Petroleum	0.100	0.022	0.123
86	Feishang Anthracite Resources	0.463	**86**	Polish Oil & Gas	0.031	0.091	0.122
87	FirstEnergy	0.463	**87**	PDC Energy	0.075	0.045	0.120
88	Sasol	0.456	**88**	Energen	0.100	0.019	0.119
89	Prairie Mining	0.428	**89**	Peyto E&D	0.009	0.110	0.119
90	Tata Power	0.424	**90**	MOL	0.072	0.047	0.119
91	American Energy	0.415	**91**	Oando	0.051	0.064	0.114
92	Coal Energy	0.414	**92**	Galp Energia	0.099	0.013	0.112
93	Agritrade Resources	0.414	**93**	Denbury Resources	0.105	0.002	0.107
94	Beijing Jingneng Thermal Power	0.411	**94**	National Fuel Gas	0.012	0.091	0.104
95	African Rainbow Minerals	0.400	**95**	Centrica	0.029	0.069	0.098
96	Huadian Power International	0.397	**96**	TAQA	0.051	0.046	0.097
97	Golden Eagle Energy	0.386	**97**	Premier Oil	0.077	0.020	0.097

Rank	Coal Companies	Coal Gt CO_2	Rank	Oil and Gas Companies	Oil Gt CO_2	Gas Gt CO_2	Total O&G Gt CO_2
98	JSW Energy	0.369	**98**	Great Eastern	0.000	0.094	0.094
99	Wollongong Coal	0.353	**99**	Japex	0.042	0.051	0.093
100	TBEA Co	0.329	**100**	DNO International	0.093	0.000	0.093

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Valley Water

Clean Water • Healthy Environment • Flood Protection

FY 2020-21 Investment Policy, Executive Limitation, and ESG Policy

Presented by: **Charlene Sun**, Treasury and Debt Officer

Valley Water

Recommendation

Approve the Revised Fiscal Year 2020-2021 Investment Policy and update Executive Limitation 4.7 Financial Management:

3.5.1 California Bank Investments

Keeping investments to local banks, within the Bay Area, to keep money at home and jobs local; invest only in banks with below $10 billion in assets; and keep a minimum of 4% of liquid cash in banks with up to $10 billion in assets and 1% in banks with up to $2 billion in assets for a limit of 5 years (short term) at the discretion of the treasurer; such investments may be in the form of collateralized deposits, FDIC/NCUA insured CDs, CDARS, or any other legally allowable deposits.

7.13.3 Prohibited Banks

No investments will be made in any banks who do not have an ESG ranking at or better than the "Average/Medium" category by at least one of the professional ESG research companies such as Sustainalytics, or other equivalent rankings published by other ESG research firms. Small and local banks/credit unions located within the nine Bay Area counties with total assets at or below $10 billion are exempt from this provision.

E.L. 4.7.7: Valley Water shall not do business with banks who do not have an ESG ranking at or better than the "Average/Medium" category by at least one of the professional ESG research companies such as Sustainalytics, or other equivalent rankings published by other ESG research firms. Small and local banks/credit unions located within the nine Bay Area counties with total assets at or below $10 billion are exempt from this provision.

Environmental, Social, Governance (ESG) Evaluation Criteria

- Professional ESG research firms use proprietary data collection and evaluation criteria to assign ESG ratings
- "Average or Medium" ESG rating signals that the company has implemented ESG policies and management practices that result in a medium level of ESG risk exposure.
- Sample ESG criteria:

ESG Criteria	Description
Corporate Governance	Factors evaluated include: Board and executive management quality and integrity, structure, ownership and shareholder rights, compensation, audit and financial reporting and stakeholder governance
Business Ethics	Factors evaluated include: money laundering policy, bribery & corruption policy, business ethics and compliance to law, whistleblower policy, lobbying and political expenses, accounting and taxation policies, anti-competitive practices, and sanctions against the company

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ESG) Evaluation Criteria - continued

ESG Criteria	Description
Product Governance	Factors evaluated include: socially responsible product design and marketing practices, cybersecurity policies, quality and safety practices, fair billing and post sale responsibility to customers and stakeholders
Data Privacy and Security	Factors evaluated include: data governance practices and policies regarding the collection, use and management of protected customer data
ESG Integration - Financials	Factors evaluated include: environmental/social/carbon/human rights impact of products, financial inclusion, credit and loan standards, responsible investment program, sustainable financial initiatives and responsible asset management
Human Capital	Factors evaluated include: management of human capital, labor relations, non-discriminatory policies, working conditions, employee training, minimum wage/compensation policies, collective bargaining, gender equality and diversity programs
Resilience	Factors evaluated include: financial management policies and practices that promotes compliance with regulatory capital requirements, solvency, operational resilience, leverage and financial flexibility

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Sample ESG Rating – Prohibit Investments in Deutsche Bank

SUSTAINALYTICS ESG RISK RATING REPORT

Date **Apr 27, 2020**

Deutsche Bank AG

Diversified Banks | Germany | ETR:DBK

33.2 High Risk

Negl	Low	Med	High	Severe
0-10	10-20	20-30	30-40	40+

Attribution Analysis

ESG Risk Rating

	Top Material Issues	Score	Negl 0-2	Low 2 - 4	Med 4 - 6	High 6 - 8	Severe 8+
	1 Corporate Governance	4.3			▼		
4	2 Business Ethics	9.8					▼
3	3 Product Governance	5.6			▼		
	4 Data Privacy and Security	4.4			▼		
	5 ESG Integration - Financials	4.1			▼		
	6 Human Capital	2.6		▼			

Valley Water

△ = Significant event

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QUESTIONS

Valley Water

Clean Water • Healthy Environment • Flood Protection

Deutsche Bank AG

Diversified Banks | Germany | ETR:DBK

33.2 High Risk

Negl	Low	Med	High	Severe
0-10	10-20	20-30	30-40	40+

Rating Overview

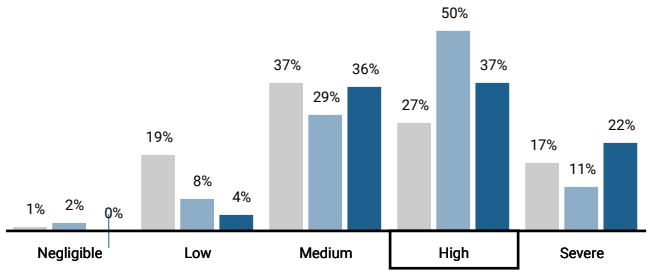
The company is at high risk of experiencing material financial impacts from ESG factors, due to its medium exposure and average management of material ESG issues. Despite its management policies and programmes, the company has experienced a high level of controversies.

Momentum Score: +0.3

Stable

The company's risk score has not changed significantly in the past year, and its risk category has remained stable.

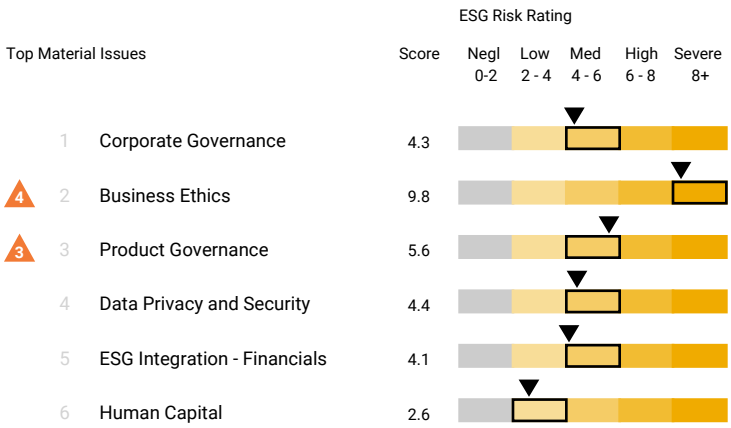
ESG Risk Rating Distribution

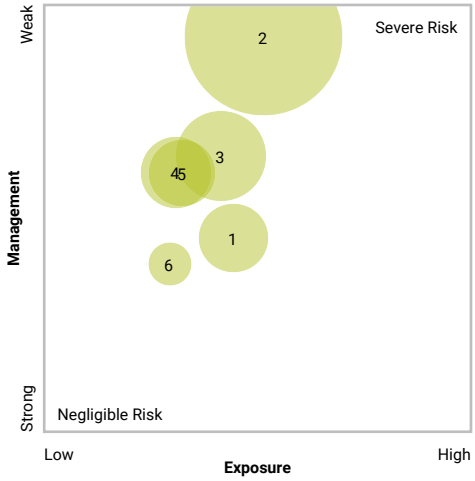


Relative Performance

	Rank (1st = lowest risk)	Percentile (1st = lowest risk)
Global Universe	**8177** out of 12232	**67th**
Banks (Industry Group)	**548** out of 927	**59th**
Diversified Banks (Subindustry)	**210** out of 374	**56th**

Attribution Analysis

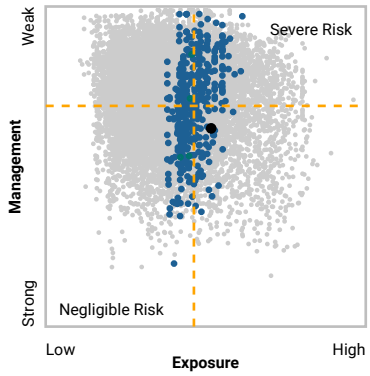




△ = Significant event

○ Circle size = Contribution to ESG Risk Rating

Risk Analysis



- Global Universe
- Diversified Banks (Subindustry)
- Deutsche Bank AG
- Peers
- SubIndustryAvg.

Peers (Market cap $16.8 - $19.0bn)	ESG Risk Rating	Exposure	Management
1. Skandinaviska Enskilda Banken AB	23.2 Medium	42.1 Medium	47.1 Average
2. Banco Santander (Brasil) S.A.	24.8 Medium	44.8 Medium	46.7 Average
3. State Bank of India	32.7 High	45.1 Medium	28.7 Average
4. Deutsche Bank AG	33.2 High	51.7 Medium	38.1 Average
5. National Bank of Kuwait SAK	39.2 High	45.6 Medium	15.0 Weak

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Deutsche Bank AG

Diversified Banks | Germany | ETR:DBK

33.2 High Risk

Negl	Low	Med	High	Severe
0-10	10-20	20-30	30-40	40+

Exposure Score

51.7 Medium

Low	Medium	High
0-35	35-55	55+

SubIndustry

Beta = 1.08

Deutsche Bank's size, range of products and operations, which employ over 97,000 staff around the globe, expose the company to considerable risks. As a key competitor in banking and financial markets, the company must ensure that its product offerings not only attract and retain customers through appropriate marketing and selling strategies, but also meet strict regulatory standards across various jurisdictions. Regulatory scrutiny of ethical compliance within the industry is also high, and can result in costly legal fees and fines, as well as reputational damage if not managed properly. Lastly, the company has the opportunity to integrate ESG considerations into its business, in order to meet the growing demand for such products and practices. Failure to do so, though, could increase reputational and, in some cases, regulatory risks.

The company's overall exposure is medium and is moderately above subindustry average. Business Ethics, Product Governance and ESG Integration -Financials are notable material ESG issues.

Management Score

38.1 Average

Strong	Average	Weak
100-50	50-25	25-0

Deutsche Bank has focused on realigning and consolidating its business lines to improve efficiency and profitability. It has also settled a number of its misconduct cases, particularly some of its high-profile and costly ones related to rate manipulation and mirror trades. Given the level of scrutiny by regulators and the media, though, the company must continue to manage its business ethics risks. In terms of Product Governance and ESG Integration, the company has put in place policies to strengthen its management, such as its Product Code and Product Principles, Code of Values and it has control groups and the Regional Reputational Risk Committee review financing decisions. Despite these measures, Deutsche Bank has been implicated in controversies related to anti-competitive practices, mis-selling of products and financing controversial industries, indicating room for improvement.

The company's overall management of material ESG issues is average.

Attribution Details

Issue Name	Contribution to ESG Risk Rating	Subindustry Exposure	Company Exposure	Manageable Risk Factor	Management Score	Management Weight	ESG Risk Rating	Risk Category
Corporate Governance	12.8%	9.0	9.0	100%	52.7	18.5 %	4.3	
4 Business Ethics	29.7%	8.0	10.4	95%	5.6	20.3 %	9.8	
3 Product Governance	16.8%	8.0	8.4	100%	33.5	17.3 %	5.6	
Data Privacy and Security	13.3%	6.0	6.3	80%	37.4	10.4 %	4.4	
ESG Integration -Financials	12.4%	6.0	6.6	100%	37.5	13.6 %	4.1	
Human Capital	8.0%	6.0	6.0	95%	58.9	11.7 %	2.6	
Resilience	7.0%	5.0	5.0	80%	67.1	8.2 %	2.3	
Overall	**100.0%**	**48.0**	**51.7**	**94.0 %**	**38.1**	**100.0%**	**33.2**	**High**

△ =Significant event

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Deutsche Bank AG

Diversified Banks | Germany | ETR:DBK

33.2 High Risk

Negl	Low	Med	High	Severe
0-10	10-20	20-30	30-40	40+

Risk Details

Exposure

Company Exposure	51.7	The company's sensitivity or vulnerability to ESG risks.

Management

Manageable Risk	48.6	Material ESG risk that can be influenced and managed through suitable policies, programmes and initiatives.
Managed Risk	18.5	Material ESG risk that has been managed by a company through suitable policies, programmes or initiatives.
Management Gap	30.1	Measures the difference between material ESG risk that could be managed by the company and what the company is managing.
Unmanageable Risk	3.1	Material ESG risk inherent in the products or services of a company and/or the nature of a company's business, which cannot be managed by the company.

ESG Risk Rating

Overall Unmanaged Risk	33.2	Material ESG risk that has not been managed by a company, and includes two types of risk: unmanageable risk, as well as risks that could be managed by a company through suitable initiatives but which may not yet be managed.

Momentum Details

ESG Risk Rating Momentum Score: +0.3

Stable

The company's risk score has not changed significantly in the past year, and its risk category has remained stable.

	Negligible	Low	Medium	High	Severe
	0-10	10-20	20-30	30-40	40+
2020				33.2 (+0.3)	
2019				32.9	

Exposure Momentum Score: -4.1

Improved

The company's exposure score has decreased in the past year, and its exposure category has improved.

	Low	Medium	High
	0-35	35-55	55+
2020		51.7 (-4.1)	
2019			55.8

Management Momentum Score: -5.7

Stable

The company's management score has decreased in the past year, but its management category has remained stable.

	Strong	Average	Weak
	100-50	50-25	25-0
2020		38.1 (-5.7)	
2019		43.8	

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Corporate Governance

Contribution 12.8 %

Corporate Governance represents foundational structures for the management of ESG risks.

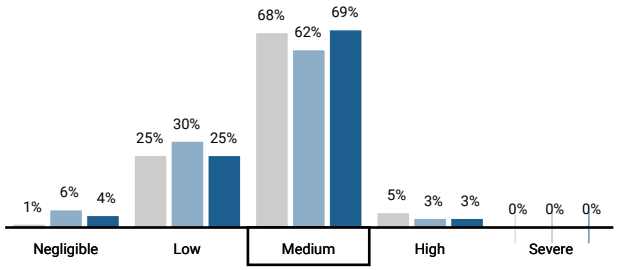
Rating Overview

4.3 Medium Risk

Negl	Low	Med	High	Severe
0-2	2-4	4-6	6-8	8+

In consideration of its high exposure and average management, we view the company to have medium unmanaged risk attributable to its corporate governance.

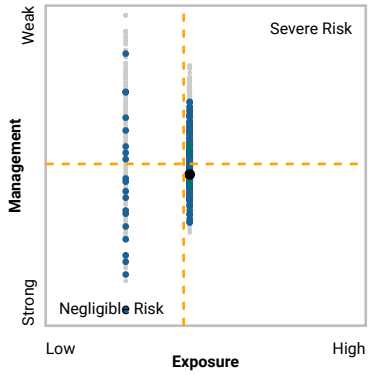
ESG Risk Rating Distribution



Relative Performance

	Rank (1st = lowest risk)	Percentile (1st = lowest risk)
Global Universe	**1597** out of 4252	**38th**
Banks (Industry Group)	**171** out of 361	**48th**
Diversified Banks (Subindustry)	**86** out of 222	**39th**

Risk Analysis



- Global Universe
- Diversified Banks (Subindustry)
- Deutsche Bank AG
- Peers
- SubIndustryAvg.

Peers (Market cap $16.8 - 19bn)	ESG Risk Rating	Exposure	Management
1. Banco Santander (Brasil) S.A.	4.0 Low	9.0 High	55.7 Strong
2. Deutsche Bank AG	4.3 Medium	9.0 High	52.7 Average
3. Skandinaviska Enskilda Banken AB	4.3 Medium	9.0 High	51.7 Average
4. State Bank of India	4.9 Medium	9.0 High	45.5 Average
5. ORIX Corp.	5.1 Medium	9.0 High	43.6 Average

Exposure		
Company Exposure	9.0	The company's sensitivity or vulnerability to ESG risks.
Management		
Manageable Risk	9.0	Material ESG risk that can be influenced and managed through suitable policies, programmes and initiatives.
Managed Risk	4.7	Material ESG risk that has been managed by a company through suitable policies, programmes or initiatives.
Management Gap	4.3	Measures the difference between material ESG risk that could be managed by the company and what the company is managing.
Unmanageable Risk	0.0	Material ESG risk inherent in the products or services of a company and/or the nature of a company's business, which cannot be managed by the company.
ESG Risk Rating		
Issue Unmanaged Risk	4.3	Material ESG risk that has not been managed by a company, and includes two types of risk: unmanageable risk, as well as risks that could be managed by a company through suitable initiatives but which may not yet be managed.

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Corporate Governance

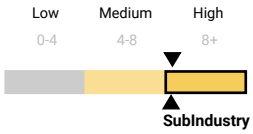
Contribution 12.8 %

Corporate Governance represents foundational structures for the management of ESG risks.

Risk Analysis

Exposure

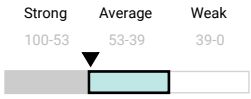
9.0 High



The quality and integrity of the company's board and management and its remuneration systems are identified as the highest weighted governance areas of focus. The company is publicly traded, which leads to heightened scrutiny of its governance practices and increases the importance of governance structures, practices and behaviour. This translates into high exposure to baseline Corporate Governance risk.

Management

52.7 Average



The company is noted for showing particular strength in its audit and financial performance systems, its board structure and its stakeholder governance. On the other hand, it is noted for weakness in the quality and integrity of its board/management. It has average management of its 2 other governance pillars. Overall, we rate the company's corporate governance management as average.

Corporate Governance Pillars

Pillar	Score	Weight	Weighted Score
Board/Management Quality & Integrity	26.0	25.0%	6.5
Board Structure	72.0	18.0%	13.0
Ownership & Shareholder Rights	56.0	19.0%	10.6
Remuneration	53.0	22.0%	11.7
Audit & Financial Reporting	77.0	8.0%	6.2
Stakeholder Governance	60.0	8.0%	4.8
Totals		**100.0%**	**52.7**

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Business Ethics

Contribution 29.7 %

Business Ethics focuses on the management of ethical considerations applicable to most or all sectors, such as taxation and accounting, anti-competitive practices and intellectual property issues.

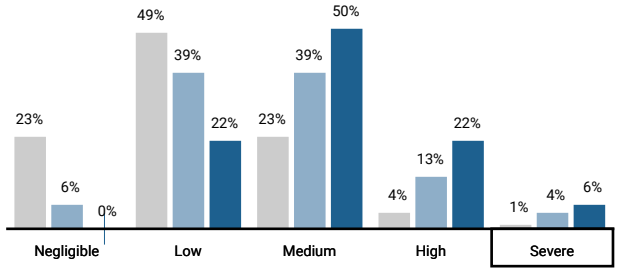
Rating Overview

9.8 Severe Risk

Negl	Low	Med	High	Severe
0-2	2-4	4-6	6-8	8+

Considering its high exposure and below average management of Business Ethics, we view the company to be at severe risk for the issue.

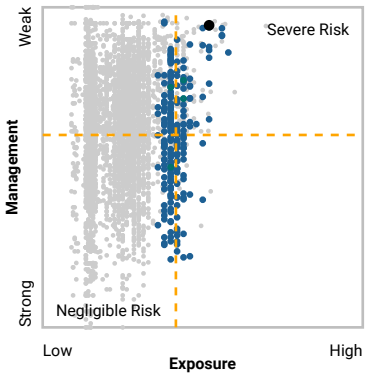
ESG Risk Rating Distribution



Relative Performance

	Rank (1st = lowest risk)	Percentile (1st = lowest risk)
Global Universe	**3865** out of 3876	**100th**
Banks (Industry Group)	**357** out of 361	**99th**
Diversified Banks (Subindustry)	**218** out of 222	**98th**

Risk Analysis



- Global Universe
- Diversified Banks (Subindustry)
- Deutsche Bank AG
- Peers
- SubIndustryAvg.

Peers (Market cap $16.8 - 19.0)	ESG Risk Rating	Exposure	Management
1. Skandinaviska Enskilda Banken AB	4.2 Medium	8.0 High	49.9 Average
2. ORIX Corp.	6.1 High	8.0 High	25.0 Average
3. Banco Santander (Brasil) S.A.	6.4 High	8.8 High	28.5 Average
4. State Bank of India	6.9 High	8.8 High	22.8 Weak
5. Deutsche Bank AG	9.8 Severe	10.4 High	5.6 Weak

Risk Details

Exposure		
Company Exposure	10.4	The company's sensitivity or vulnerability to ESG risks.
Management		
Manageable Risk	9.9	Material ESG risk that can be influenced and managed through suitable policies, programmes and initiatives.
Managed Risk	0.6	Material ESG risk that has been managed by a company through suitable policies, programmes or initiatives.
Management Gap	9.3	Measures the difference between material ESG risk that could be managed by the company and what the company is managing.
Unmanageable Risk	0.5	Material ESG risk inherent in the products or services of a company and/or the nature of a company's business, which cannot be managed by the company.
ESG Risk Rating		
Issue Unmanaged Risk	9.8	Material ESG risk that has not been managed by a company, and includes two types of risk: unmanageable risk, as well as risks that could be managed by a company through suitable initiatives but which may not yet be managed.

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Business Ethics

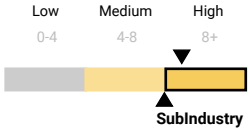
Contribution 29.7 %

Business Ethics focuses on the management of ethical considerations applicable to most or all sectors, such as taxation and accounting, anti-competitive practices and intellectual property issues.

Exposure Overview

Exposure

10.4 High



Regulatory scrutiny in the financial industry is high, and banks have received record fines for ethical infractions. Companies have been implicated in rate and market manipulation and have been criticized for enabling tax evasion and avoidance for clients, sanctions violations and money-laundering. Deutsche Bank has been implicated in significant controversies related to ethical misconduct, which keeps it under tight media scrutiny.

Exposure Analysis

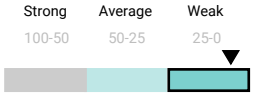
Subindustry Issue Exposure	8.0
Issue Beta	**1.30**
Company Issue Exposure	10.4

Beta Indicators	Beta Signal
Accounting and Taxation	0.03
Lobbying and Public Policy	0.00
Sanctions	0.00
Anti-Competitive Practices	0.03
Bribery and Corruption	0.02
Business Ethics	0.12
Operating Performance	0.03
Solvency - Banking	0.02
Asset Performance - Banking	-0.02
Financial Flexibility - Banking	-0.03
Qualitative Overlay	0.00
Subindustry Correction Factor	0.00
Exceptional Event Adjustment	0.13
Total Beta Signal	0.30
Baseline	1.00
Issue Beta	**1.30**

Management Overview

Management Score

5.6 Weak



Deutsche Bank reports that a key objective in 2017 was to strengthen its Anti-Financial Crime division and, therefore, has increased its staff in that department by 60%. It has also continued to implement an extended screening programme to enhance its effectiveness and efficiency. The company discloses a whistleblower programme that enables anonymous reporting and discloses the number of reports filed and processed annually; however, it does not specify the type of misconduct reported or the remedial measures taken. Deutsche Bank has improved its policies related to ethics and it has settled several misconduct cases, such as selling Residential Mortgage Backed Securities and Russian mirror trades, and some with large financial impacts (Euribor and Libor rate manipulation). Nonetheless, the financial and reputational impact of these issues keep the company's risk on the issue high.
The company has above average preparedness measures to address Business Ethics issues and has been implicated in major controversies related to the issue. In our view, the company's management of the issue is below average.

Management Indicators	Raw Score Weight | Weighted Score
Money Laundering Policy	**100** 1.0% | 1.0
Bribery & Corruption Programmes	**75** 1.5% | 1.1
Business Ethics Programme	**75** 2.3% | 1.7
Compliance Programme	**75** 1.5% | 1.1
Bribery & Corruption Policy	**25** 1.0% | 0.3
Whistleblower Programmes	**25** 1.8% | 0.4
Lobbying and Political Expenses	**0** 0.5% | 0.0
Political Involvement Policy	**0** 0.5% | 0.0
4 Business Ethics	**Category 4** 40.9% | 0.0
3 Accounting and Taxation	**Category 3** 20.5% | 0.0
3 Anti-Competitive Practices	**Category 3** 20.5% | 0.0
2 Bribery and Corruption	**Category 2** 8.2% | 0.0
0 Lobbying and Public Policy	**Category 0** 0.0% | 0.0
0 Sanctions	**Category 0** 0.0% | 0.0
Weighted Sum	**5.6**

△ = Event indicator

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Product Governance

Contribution 16.8 %

Product Governance focuses on how companies manage responsibilities to their clients. Emphasis is put on quality management systems, marketing practices, fair billing and post-sales responsibility.

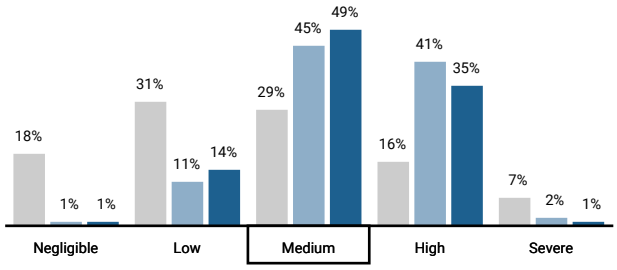
Rating Overview

5.6 Medium Risk

Negl	Low	Med	High	Severe
0-2	2-4	4-6	6-8	8+

Considering its high exposure and average management of Product Governance, we view the company to be at medium risk for the issue.

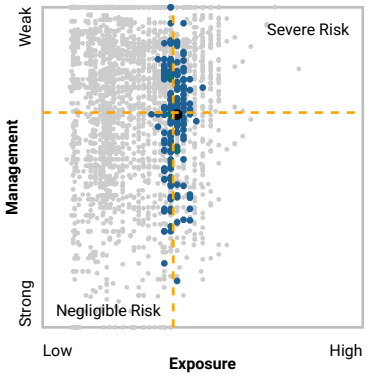
ESG Risk Rating Distribution



Relative Performance

	Rank (1st = lowest risk)	Percentile (1st = lowest risk)
Global Universe	**2380** out of 3298	**72nd**
Banks (Industry Group)	**137** out of 333	**42nd**
Diversified Banks (Subindustry)	**107** out of 222	**48th**

Risk Analysis



- Global Universe
- Diversified Banks (Subindustry)
- Deutsche Bank AG
- Peers
- SubIndustryAvg.

Peers (Market cap $16.8 - 19.0)	ESG Risk Rating	Exposure	Management
1. Banco Santander (Brasil) S.A.	4.6 Medium	8.4 High	44.9 Average
2. Skandinaviska Enskilda Banken AB	5.3 Medium	8.0 High	33.5 Average
3. Deutsche Bank AG	5.6 Medium	8.4 High	33.5 Average
4. State Bank of India	5.6 Medium	8.4 High	33.2 Average
5. ORIX Corp.	6.2 High	8.0 High	22.2 Weak

Risk Details

Exposure		
Company Exposure	8.4	The company's sensitivity or vulnerability to ESG risks.
Management		
Manageable Risk	8.4	Material ESG risk that can be influenced and managed through suitable policies, programmes and initiatives.
Managed Risk	2.8	Material ESG risk that has been managed by a company through suitable policies, programmes or initiatives.
Management Gap	5.6	Measures the difference between material ESG risk that could be managed by the company and what the company is managing.
Unmanageable Risk	0.0	Material ESG risk inherent in the products or services of a company and/or the nature of a company's business, which cannot be managed by the company.
ESG Risk Rating		
Issue Unmanaged Risk	5.6	Material ESG risk that has not been managed by a company, and includes two types of risk: unmanageable risk, as well as risks that could be managed by a company through suitable initiatives but which may not yet be managed.

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Product Governance

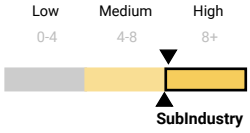
Contribution 16.8 %

Product Governance focuses on how companies manage responsibilities to their clients. Emphasis is put on quality management systems, marketing practices, fair billing and post-sales responsibility.

Exposure Overview

Exposure

8.4 High



Deutsche Bank has been restructuring and consolidating its business lines, particularly its private and commercial banking business in its home market through its merger with Deutsche Postbank. While the changes aim to strengthen the company's market positioning, the banking and financial services industry remains competitive, leaving room for potential mis-selling and marketing of products to clients.

Exposure Analysis

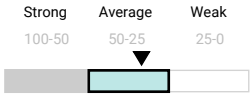
Subindustry Issue Exposure	8.0
Issue Beta	**1.05**
Company Issue Exposure	8.4

Beta Indicators	Beta Signal
Access to Basic Services	0.00
Marketing Practices	0.00
Quality and Safety	0.03
Operating Performance	0.03
Solvency - Banking	0.02
Asset Performance - Banking	-0.02
Financial Flexibility - Banking	-0.03
Headquarters Location	-0.03
Sales Location	0.05
Qualitative Overlay	0.00
Subindustry Correction Factor	0.00
Exceptional Event Adjustment	0.00
Total Beta Signal	0.05
Baseline	1.00
Issue Beta	**1.05**

Management Overview

Management Score

33.5 Average



Deutsche Bank has been involved in high-profile customer-related investigations and lawsuits, mostly over mortgage-backed securities, market manipulation, and the mis-selling of unsuitable structured notes. In response to these issues, the company has implemented a Product Code and Product Principles. Deutsche Bank states that it is committed to providing only products and services that create value for clients and shareholders by meeting clients' needs, and has put a New Product Approval (NPA) process in place to adhere to this commitment. Furthermore, the bank has a Code of Values for its Private and Business Clients division, which puts forward product principles to ensure client satisfaction.
The company has average preparedness measures to address Product Governance issues and has been implicated in major controversies related to the issue. In our view, the company's management of the issue is average.

Management Indicators	Raw Score Weight | Weighted Score
Responsible Product Offering	**75** 33.8% | 25.3
Cybersecurity Programme	**39** 15.0% | 5.9
Responsible Marketing Policy	**9** 26.3% | 2.4
3 Quality and Safety	**Category 3** 25.0% | 0.0
0 Access to Basic Services	**Category 0** 0.0% | 0.0
0 Marketing Practices	**Category 0** 0.0% | 0.0
Weighted Sum	**33.5**

△ = Event indicator

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Data Privacy and Security

Contribution 13.3 %

Data Privacy and Security focuses on data governance practices, including how companies collect, use, manage and protect data.

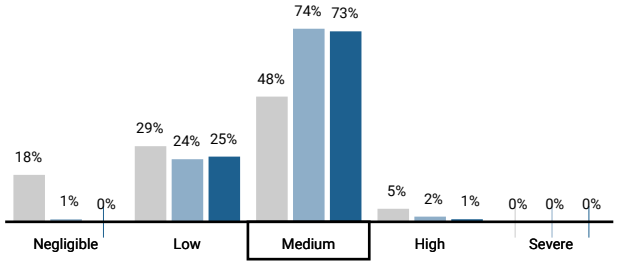
Rating Overview

4.4 Medium Risk

Negl	Low	Med	High	Severe
0-2	2-4	4-6	6-8	8+

Considering its medium exposure and average management of Data Privacy and Security, we view the company to be at medium risk for the issue.

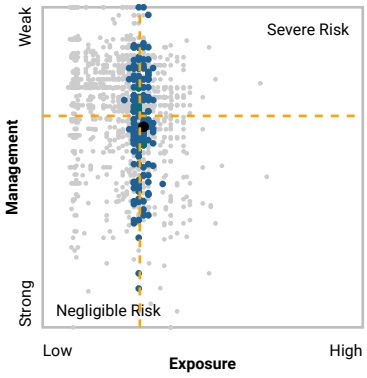
ESG Risk Rating Distribution



Relative Performance

	Rank (1st = lowest risk)	Percentile (1st = lowest risk)
Global Universe	**1021** out of 1734	**59th**
Banks (Industry Group)	**142** out of 333	**43rd**
Diversified Banks (Subindustry)	**103** out of 222	**47th**

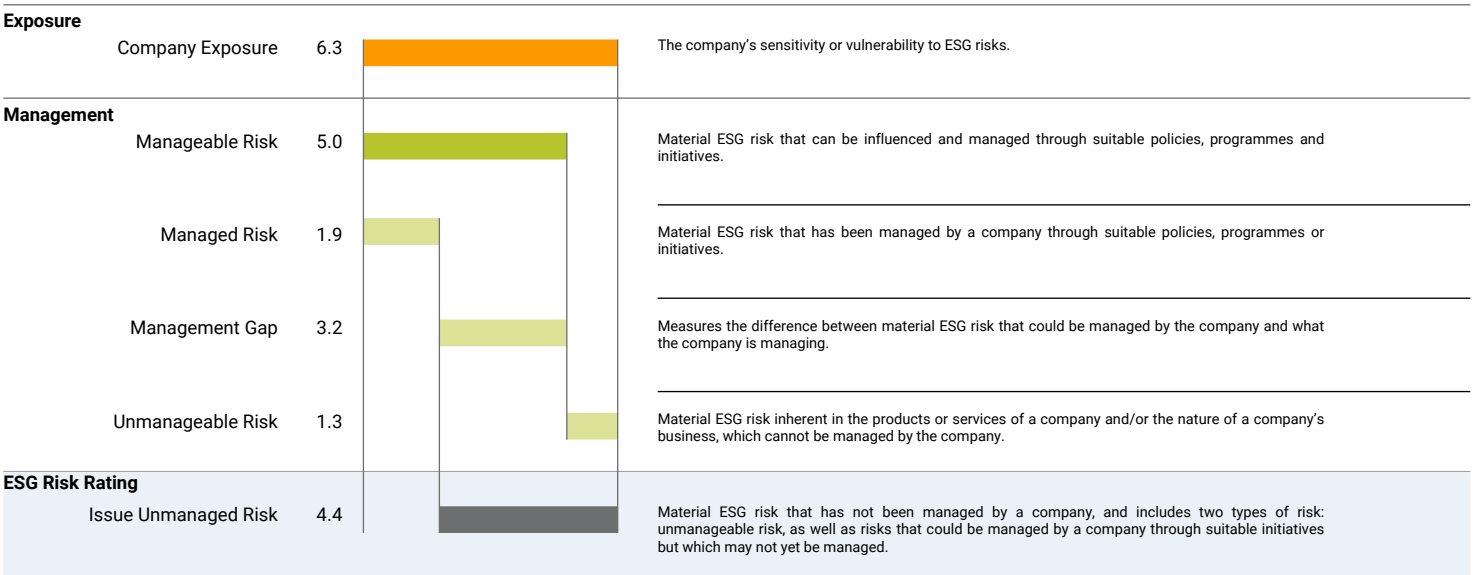
Risk Analysis



- Global Universe
- Diversified Banks (Subindustry)
- Deutsche Bank AG
- Peers
- SubIndustryAvg.

Peers (Market cap $16.8 - 19.0)	ESG Risk Rating	Exposure	Management
1. Banco Santander (Brasil) S.A.	4.1 Medium	6.3 Medium	43.1 Average
2. Deutsche Bank AG	4.4 Medium	6.3 Medium	37.4 Average
3. Skandinaviska Enskilda Banken AB	4.5 Medium	6.0 Medium	31.5 Average
4. ORIX Corp.	4.5 Medium	6.0 Medium	31.5 Average
5. State Bank of India	4.8 Medium	6.0 Medium	25.3 Average

Risk Details



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Data Privacy and Security

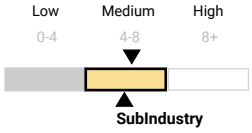
Contribution 13.3 %

Data Privacy and Security focuses on data governance practices, including how companies collect, use, manage and protect data.

Exposure Overview

Exposure

6.3 Medium



The financial industry is the one of the most regulated sectors for cybersecurity due to its high exposure to cyberattacks. The frequency of data breaches is estimated to have increased by as much as 300% since 2010, with the financial sector experiencing the third-highest frequency of breaches and the second-highest number of confirmed data losses. Data breaches can cause service disruptions, trigger lawsuits and forensic investigations, incur expenses related to repairing or removing threats from data systems, damage reputation and shake customer confidence. Large numbers of retail and business customers may be affected. In addition to personally identifiable information, intellectual property, financial data and other highly sensitive information can be stolen. Overall, the financial industry's management of data security is relatively weak compared to best practice. Cyber expertise is poorly represented at the board level (only 6% of bank directors of the world's largest banks have cyber expertise), and management systems that extend to top executives are uncommon. Additionally, company disclosure on cyber risk management is generally weak, omitting details on strategy and management systems. Banks must navigate rapidly evolving regulations on customer data privacy as well as cybersecurity; for example, regulators are considering implementing financial penalties for data breaches. Best practice includes detailed disclosures of management systems and high-level oversight. In an environment of rising data privacy and security risks, strong data privacy management will be increasingly critical for operational success.The company's exposure to Data Privacy and Security issues is medium and similar to subindustry average.

Beta Indicators	Beta Signal
Data Privacy and Security	0.02
Operating Performance	0.03
Solvency - Banking	0.02
Asset Performance - Banking	-0.02
Financial Flexibility - Banking	-0.03
Headquarters Location	-0.03
Sales Location	0.05
Qualitative Overlay	0.00
Subindustry Correction Factor	0.00
Exceptional Event Adjustment	0.00
Total Beta Signal	0.05
Baseline	1.00
Issue Beta	**1.05**

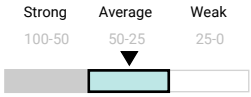
Exposure Analysis

Subindustry Issue Exposure	6.0
Issue Beta	**1.05**
Company Issue Exposure	6.3

Management Overview

Management Score

37.4 Average



The company has average preparedness measures to address Data Privacy and Security issues and has been implicated in minor controversies related to the issue. In our view, the company's management of the issue is average.

Management Indicators	Raw Score Weight | Weighted Score
Data Privacy & Security Policy	**50** 9.0% | 4.5
Data Privacy Programme	**50** 36.0% | 18.0
Cybersecurity Programme	**39** 36.0% | 14.0
Data Request Management	**9** 9.0% | 0.8
2 Data Privacy and Security	**Category 2** 10.0% | 0.0
Weighted Sum	**37.4**

△ = Event indicator

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ESG Integration - Financials

Contribution 12.4 %

ESG Integration - Financials includes all ESG integration activities by financial institutions that are either driven by financial downside risk considerations or by business opportunities.

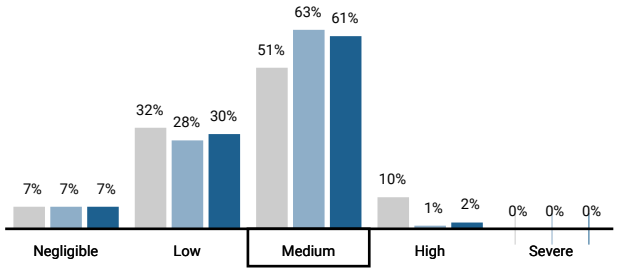
Rating Overview

4.1 Medium Risk

Negl	Low	Med	High	Severe
0-2	2-4	4-6	6-8	8+

Considering its medium exposure and average management of ESG Integration -Financials, we view the company to be at medium risk for the issue.

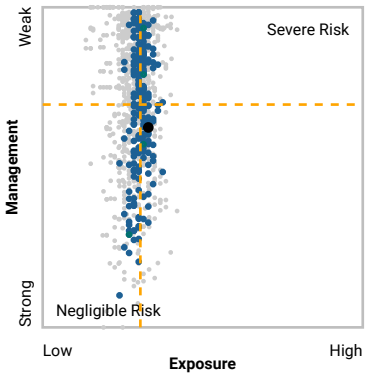
ESG Risk Rating Distribution



Relative Performance

	Rank (1st = lowest risk)	Percentile (1st = lowest risk)
Global Universe	**438** out of 1046	**42nd**
Banks (Industry Group)	**137** out of 360	**39th**
Diversified Banks (Subindustry)	**89** out of 222	**40th**

Risk Analysis



- Global Universe
- Diversified Banks (Subindustry)
- Deutsche Bank AG
- Peers
- SubIndustryAvg.

Peers (Market cap $16.8 - 19.0)	ESG Risk Rating	Exposure	Management
1. Skandinaviska Enskilda Banken AB	1.6 Negligible	5.4 Medium	71.0 Strong
2. Banco Santander (Brasil) S.A.	3.6 Low	6.3 Medium	42.8 Average
3. Deutsche Bank AG	4.1 Medium	6.6 Medium	37.5 Average
4. ORIX Corp.	5.0 Medium	6.3 Medium	21.0 Weak
5. State Bank of India	5.9 Medium	6.3 Medium	6.5 Weak

Risk Details

Exposure		
Company Exposure	6.6	The company's sensitivity or vulnerability to ESG risks.
Management		
Manageable Risk	6.6	Material ESG risk that can be influenced and managed through suitable policies, programmes and initiatives.
Managed Risk	2.5	Material ESG risk that has been managed by a company through suitable policies, programmes or initiatives.
Management Gap	4.1	Measures the difference between material ESG risk that could be managed by the company and what the company is managing.
Unmanageable Risk	0.0	Material ESG risk inherent in the products or services of a company and/or the nature of a company's business, which cannot be managed by the company.
ESG Risk Rating		
Issue Unmanaged Risk	4.1	Material ESG risk that has not been managed by a company, and includes two types of risk: unmanageable risk, as well as risks that could be managed by a company through suitable initiatives but which may not yet be managed.

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ESG Integration - Financials

Contribution 12.4 %

ESG Integration - Financials includes all ESG integration activities by financial institutions that are either driven by financial downside risk considerations or by business opportunities.

Exposure Overview

Exposure

6.6 Medium

Low (0-4) | Medium (4-8) | High (8+)

SubIndustry

Integrating ESG considerations into business practices offers an opportunity to meet consumer demand for more responsible investment options. Companies that do not have adequate ESG guidelines to assess the companies they finance may be exposed to reputational damage through negative media exposure and NGO criticism for financing controversial projects. Furthermore, financing controversial industries could potentially increase repayment or default risks, if an investee company loses its social licence to operate or is subject to regulatory hurdles or taxes.

Exposure Analysis

Subindustry Issue Exposure	6.0
Issue Beta	**1.10**
Company Issue Exposure	6.6

Beta Indicators	Beta Signal
Environmental Impact of Products	0.02
Social Impact of Products	0.02
Carbon Impact of Products	0.02
Society - Human Rights	0.01
Operating Performance	0.03
Solvency - Banking	0.02
Asset Performance - Banking	-0.02
Financial Flexibility - Banking	-0.03
Headquarters Location	-0.03
Sales Location	0.05
Responsible Asset Portfolio	0.00
Qualitative Overlay	0.00
Subindustry Correction Factor	0.00
Exceptional Event Adjustment	0.00
Total Beta Signal	0.10
Baseline	1.00
Issue Beta	**1.10**

Management Overview

Management Score

37.5 Average

Strong (100-50) | Average (50-25) | Weak (25-0)

Deutsche Bank is a UNEPFI signatory and has strong responsible investment and corporate finance programmes. In its Environmental and Social Policy Framework, Deutsche Bank defines a number of sectors and activities as having high potential for significant environmental and social impacts, including agriculture and forestry, chemicals, infrastructure projects in certain countries, metals and mining, oil and gas (including hydraulic fracturing and exploration in the Arctic) and utilities. The framework puts forward criteria for mandatory referral to Control Groups and/or the Regional Reputational Risk Committee. The company has, however, been criticized over the past few years for its financing of large controversial oil pipelines, deforestation and fossil fuels.
The company has above average preparedness measures to address ESG Integration -Financials issues and has been implicated in major controversies related to the issue. In our view, the company's management of the issue is average.

Management Indicators	Raw Score Weight | Weighted Score
Financial Inclusion	**100** 4.9% | 4.9
PRI Signatory	**100** 1.6% | 1.6
UNEPFI Signatory	**100** 1.6% | 1.6
Credit & Loan Standards	**80** 9.8% | 7.8
Corporate Finance - ESG Integration	**75** 9.8% | 7.3
Responsible Investment Programme	**75** 9.8% | 7.3
Sustainable Financial Initiatives	**50** 4.9% | 2.4
Responsible Asset Management	**40** 11.4% | 4.6
Equator Principles Signatory	**0** 4.9% | 0.0
Responsible Investment Policy	**0** 6.5% | 0.0
Carbon Impact of Products	**Category 2** 10.0% | 0.0
Environmental Impact of Products	**Category 2** 10.0% | 0.0
Social Impact of Products	**Category 2** 10.0% | 0.0
Society - Human Rights	**Category 1** 5.0% | 0.0
Weighted Sum	**37.5**

△ = Event indicator

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Human Capital

Contribution 8.0 %

Human Capital focuses on the management of risks related to scarcity of skilled labour as well as labour relations, such as non-discrimination, working hours and minimum wages.

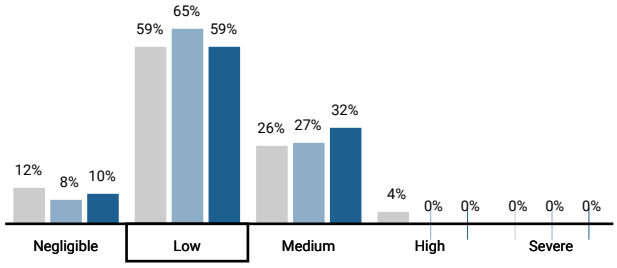
Rating Overview

2.6 Low Risk

Negl	Low	Med	High	Severe
0-2	2-4	4-6	6-8	8+

Considering its medium exposure and above average management of Human Capital, we view the company to be at low risk for the issue.

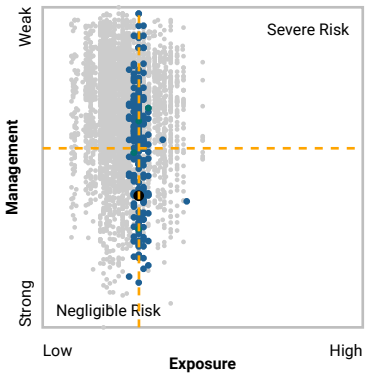
ESG Risk Rating Distribution



Relative Performance

	Rank (1st = lowest risk)	Percentile (1st = lowest risk)
Global Universe	**1115** out of 4057	**28th**
Banks (Industry Group)	**74** out of 360	**21st**
Diversified Banks (Subindustry)	**48** out of 221	**22nd**

Risk Analysis



- Global Universe
- Diversified Banks (Subindustry)
- Deutsche Bank AG
- Peers
- SubIndustryAvg.

Peers (Market cap $16.8 - 19.0)	ESG Risk Rating	Exposure	Management
1. Banco Santander (Brasil) S.A.	2.0 Low	6.0 Medium	69.3 Strong
2. Deutsche Bank AG	2.6 Low	6.0 Medium	58.9 Strong
3. Skandinaviska Enskilda Banken AB	3.2 Low	5.7 Medium	45.4 Average
4. ORIX Corp.	4.0 Low	6.0 Medium	35.6 Average
5. State Bank of India	4.6 Medium	6.6 Medium	31.5 Average

Risk Details

Exposure		
Company Exposure	6.0	The company's sensitivity or vulnerability to ESG risks.
Management		
Manageable Risk	5.7	Material ESG risk that can be influenced and managed through suitable policies, programmes and initiatives.
Managed Risk	3.4	Material ESG risk that has been managed by a company through suitable policies, programmes or initiatives.
Management Gap	2.3	Measures the difference between material ESG risk that could be managed by the company and what the company is managing.
Unmanageable Risk	0.3	Material ESG risk inherent in the products or services of a company and/or the nature of a company's business, which cannot be managed by the company.
ESG Risk Rating		
Issue Unmanaged Risk	2.6	Material ESG risk that has not been managed by a company, and includes two types of risk: unmanageable risk, as well as risks that could be managed by a company through suitable initiatives but which may not yet be managed.

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Human Capital

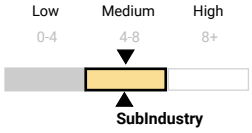
Contribution 8.0 %

Human Capital focuses on the management of risks related to scarcity of skilled labour as well as labour relations, such as non-discrimination, working hours and minimum wages.

Exposure Overview

Exposure

6.0 Medium



A bank's success depends on recruiting and retaining a workforce that supports strategic growth, drives innovation, supports a complex array of products and fosters consumer loyalty. Banks that are unable to effectively manage their employees may face obstacles, such as understaffing, skill deficits, high training costs, compliance failures and operational inefficiencies. There is evidence that banks are increasingly facing difficulty in retaining and attracting top talent. For example, junior banking salaries have increased by as much as 20% at some firms in an attempt to compete with private equity firms, technology companies and start-ups. Additionally, banks face pressure from shifting attitudes regarding the need to increase levels of diversity to better reflect the general population. Improving diversity and limiting discrimination may contribute to increased employee satisfaction, reduced turnover and may be viewed positively by customers and business partners alike. Regulatory scrutiny on these issues is expected to increase and may put pressure on all financial services companies, increasing the risk of litigation and regulatory penalties. For example, the US and the UK have gender pay parity disclosure requirements that should come into force in 2017 and 2018, respectively, while other countries already require that companies hire a certain percentage of people with disabilities. Overall, past reliance on salary as an incentive is gradually decreasing and being replaced with more nuanced expectations that banks will invest in their employees, provide more work-life balance, offer clear channels for employees to make complaints, advance employees' careers and provide clear feedback on employee performance. Considering that personnel costs can represent as much as half of all costs, a bank's ability to effectively manage its employees is a key determinant of its long-term success.The company's exposure to Human Capital issues is medium and similar to subindustry average.

Beta Indicators	Beta Signal
Labour Relations	0.02
Operating Performance	0.03
Solvency - Banking	0.02
Asset Performance - Banking	-0.02
Financial Flexibility - Banking	-0.03
Qualitative Overlay	0.00
Subindustry Correction Factor	0.00
Exceptional Event Adjustment	0.00
Total Beta Signal	0.00
Baseline	1.00
Issue Beta	**1.00**

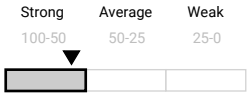
Exposure Analysis

Subindustry Issue Exposure	6.0
Issue Beta	**1.00**
Company Issue Exposure	6.0

Management Overview

Management Score

58.9 Strong



The company has above average preparedness measures to address Human Capital issues and has been implicated in minor controversies related to the issue. In our view, the company's management of the issue is above average.

Management Indicators	Raw Score Weight | Weighted Score
Discrimination Policy	**100** 13.5% | 13.5
Diversity Programmes	**100** 20.3% | 20.3
Human Capital Development	**75** 24.8% | 18.6
Gender Pay Equality Programme	**29** 9.0% | 2.6
Collective Bargaining Agreements	**25** 4.5% | 1.1
Freedom of Association Policy	**25** 4.5% | 1.1
Employee Training	**19** 4.5% | 0.9
Gender Pay Disclosure	**19** 4.5% | 0.9
Employee Turnover Rate	**0** 4.5% | 0.0
2 Labour Relations	**Category 2** 10.0% | 0.0
Weighted Sum	**58.9**

△ = Event indicator

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Resilience

Contribution 7.0 %

Resilience focuses on the financial stability and the management of related risks in the financial services industry, with emphasis on compliance with capital requirements.

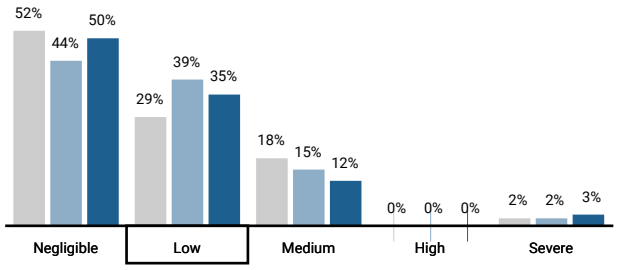
Rating Overview

2.3 Low Risk

Negl	Low	Med	High	Severe
0-2	2-4	4-6	6-8	8+

Considering its medium exposure and above average management of Resilience, we view the company to be at low risk for the issue.

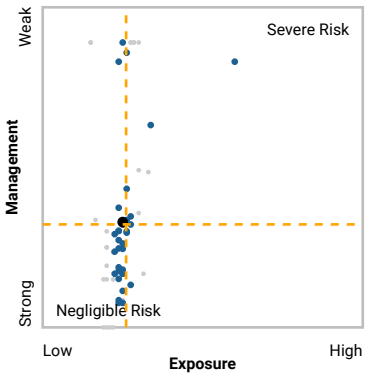
ESG Risk Rating Distribution



Relative Performance

	Rank (1st = lowest risk)	Percentile (1st = lowest risk)
Global Universe	**40** out of 62	**64th**
Banks (Industry Group)	**25** out of 41	**60th**
Diversified Banks (Subindustry)	**24** out of 34	**70th**

Risk Analysis



- Global Universe
- Diversified Banks (Subindustry)
- Deutsche Bank AG
- Peers
- SubIndustryAvg.

Peers (Market cap $16.8 - 19.0)	ESG Risk Rating	Exposure	Management
1. Skandinaviska Enskilda Banken AB			
2. Banco Santander (Brasil) S.A.			
3. ORIX Corp.			
4. State Bank of India			
5. Deutsche Bank AG	2.3 Low	5.0 Medium	67.1 Strong

Risk Details

Exposure

Company Exposure	5.0	The company's sensitivity or vulnerability to ESG risks.

Management

Manageable Risk	4.0	Material ESG risk that can be influenced and managed through suitable policies, programmes and initiatives.
Managed Risk	2.7	Material ESG risk that has been managed by a company through suitable policies, programmes or initiatives.
Management Gap	1.3	Measures the difference between material ESG risk that could be managed by the company and what the company is managing.
Unmanageable Risk	1.0	Material ESG risk inherent in the products or services of a company and/or the nature of a company's business, which cannot be managed by the company.

ESG Risk Rating

Issue Unmanaged Risk	2.3	Material ESG risk that has not been managed by a company, and includes two types of risk: unmanageable risk, as well as risks that could be managed by a company through suitable initiatives but which may not yet be managed.

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Resilience

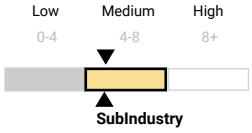
Contribution 7.0 %

Resilience focuses on the financial stability and the management of related risks in the financial services industry, with emphasis on compliance with capital requirements.

Exposure Overview

Exposure

5.0 Medium



Resilience represents the ability of Diversified Banks to withstand negative shocks arising from changes in economic conditions. The 2008 financial crisis revealed the vulnerability of the financial sector to deficiencies in risk management as well as the dependency of national economies on "too big to fail" institutions. Financial institutions profited from taking excessive risks, while downside risks and losses were borne by the public; billions of dollars of public funds have been used to rescue distressed institutions. At the height of the financial crisis, banks with more conservative business models (such as Canadian and Australian banks) generally fared better than their less conservative counterparts. In response to the crisis. governments and regulatory bodies worldwide have enhanced global capital and liquidity standards under Basel III. The international Financial Stability Board (FSB) considers twenty-two Diversified Banks to be global systemically important banks (G-SIBs), which must adhere to more stringent regulations. Other regulatory frameworks include the Dodd-Frank Act, passed in 2010, which affects financial regulation in the US and imposes further restrictions. Additionally, in 2014, the FSB defined a global standard for minimum amounts of Total Loss Absorbency Capacity (TLAC) to be held by G-SIBs, which go beyond the Capital Adequacy Ration requirements. Certain recurring control measures, such as stress tests and resolution plans ("living wills"), are increasingly emphasized to reduce potential future government bailouts. In addition to demonstrating that they can meet standards for excess Common Equity Tier 1 capital (CET1), banks must also show that their controls and risk governance are in order. Consequences for control failures and risk management deficiencies include significant fines and restrictions on operating activities. Regulation will continue to be a key driver of resilience standards going forward.The company's exposure to Resilience issues is medium and similar to subindustry average.

Beta Indicators	Beta Signal
Resilience	0.02
Operating Performance	0.03
Solvency - Banking	0.02
Asset Performance - Banking	-0.02
Financial Flexibility - Banking	-0.03
Qualitative Overlay	0.00
Subindustry Correction Factor	0.00
Exceptional Event Adjustment	0.00
Total Beta Signal	0.00
Baseline	1.00
Issue Beta	**1.00**

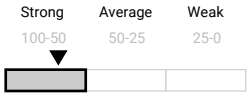
Exposure Analysis

Subindustry Issue Exposure	5.0
Issue Beta	**1.00**
Company Issue Exposure	5.0

Management Overview

Management Score

67.1 Strong



The company has above average preparedness measures to address Resilience issues and has been implicated in minor controversies related to the issue. In our view, the company's management of the issue is above average.

Management Indicators	Raw Score Weight | Weighted Score
Systemic Risk Management	**100** 20.3% | 20.3
Systemic Risk Reporting	**100** 20.3% | 20.3
Asset Quality	**75** 6.8% | 5.1
Tier 1 Capital Buffer	**66** 22.5% | 14.9
Leverage Ratio	**33** 20.3% | 6.7
2 Resilience	**Category 2** 10.0% | 0.0
Weighted Sum	**67.1**

△ = Event indicator

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Appendix

Management Details

Corporate Governance

Board/Management Quality & Integrity

26 Laggard

Raw Score

The following indicators reflect on the quality and integrity of the company's board/management:

• **Board experience**: The board displays adequate board and/or executive experience in the financial sector;
• **Director Track Record**: Chairman Paul Achleitner is linked to controversies through his service at Daimler AG; and
• **Governance Controversies**: There appear to be shortcomings in the board's discharge of its oversight responsibilities, in light of the significant controversies faced by the company.

Indicators	Score
Board Experience	80
Director Track Record	50
Board Capture	70
Related Party Transactions	30
Director Stock Ownership	20
Executive/Board Misconduct	50
Business Practices Controversies	0
Governance Controversies	0
Shareholder Engagement and Responsiveness	50

Board Structure

72 Outperformer

Raw Score

We note the following indicators which reflect on the board's overall structure:
• **Board leadership:** The board is headed by an independent chairman;
• **Board tenure**: No long-tenured directors serve on the board, and the lender has adopted both a retirement age and term limits for directors; and
• **Risk oversight:** There are concerns with respect to the company's risk oversight function, stemming from the significant controversies it faces.

Indicators	Score
Board Leadership	70
Board Tenure	90
Board Independence	70
Nominating Committee Effectiveness	30
Director Disclosure	100
Voting Structures	70
Directors not Elected by Shareholders	30
Risk Oversight	90
Board Diversity	70

Ownership & Shareholder Rights

56 Average Performer

Raw Score

We emphasize three indicators under this pillar:
• **Classified Board & Director Removal:** Deutsche Bank has established a staggered board of directors;
• **Proportionality -One Share/One Vote:** The bank has adopted the one share-one vote principle; and
• **Ownership structure:** Deutsche Bank is widely held, its largest shareholder being BlackRock, Inc, holding a stake of approximately 5%.

Indicators	Score
Director Appointment & Removal	30
Proportionality - One Share/One Vote	60
Ownership Structure	50
Capital Issuance Risks	60
Shareholder Action	60
Poison Pill & Takeover Defences	80
Supermajority Provisions	50

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Appendix

Management Details

Remuneration

53 Average Performer

Raw Score

The following indicators stand out in the assessment of the company's compensation policies and practices:

• **Pay controversies**: Deutsche Bank's FY 2018 remuneration-related decisions drew criticism in the media and are perceived to have led to the significant shareholder opposition encountered by the bank at its 2019 AGM;
• **Pay for failure:** In connection with his termination on April 8, 2018, former CEO John Cryan received a severance package amounting to EUR 8,674,000, approximately 2.7 times higher than his total remuneration for the previous fiscal year; and
• **Pay for Performance:** The bank's remuneration policies and practices raise moderate concerns regarding the pay and performance alignment.

Indicators	Score
Remuneration Disclosure	80
Remuneration Committee Effectiveness	60
Say on Pay	60
Pay Controversies	20
STI Performance Metrics	40
LTI Performance Metrics	70
Pay Magnitude	30
Pay for Performance	60
Pay for Failure	30
CEO Termination Scenarios	80
Internal Pay Equity	60
Clawback Policy	70

Audit & Financial Reporting

77 Leader

Raw Score

The indicators below reflect on the company's audit and financial reporting:
• **Audit committee structure**: The company has established a fully independent audit committee, in line with German market practice;
• **Audit committee effectiveness**: The company's audit committee, whose members showcase financial expertise and industry experience, met seven times during FY 2018; and
• **Audit Rotation Policy**: Deutsche Bank has adopted a rotation policy for its auditor pursuant to the requirements of Regulation (EU) No. 537/2014.

Indicators	Score
Audit Committee Structure	70
Audit Committee Effectiveness	90
Auditor Fees	100
Audit Rotation Policy	70
Auditor Change	50
Reporting Irregularities	50

Stakeholder Governance

60 Outperformer

Raw Score

In reviewing the company's practices regarding ESG stakeholder governance, points of attention for Deutsche Bank AG are: ESG Governance, Discrimination Policy and GHG Reduction Programme.
• ESG Governance: A board member or a board committee is responsible for overseeing ESG issues
• Discrimination Policy: The company has a strong policy
• GHG Reduction Programme: The company has a strong programme

Indicators	Score
ESG Governance	100
ESG Reporting Standards	75
Verification of ESG Reporting	75
Global Compact Signatory	100
ESG Performance Targets	25
Political Involvement Policy	0
Lobbying and Political Expenses	0
Bribery & Corruption Policy	25
Environmental Policy	0
Whistleblower Programmes	25
Tax Disclosure	100
Discrimination Policy	100
Scope of Social Supplier Standards	75
GHG Reduction Programme	100
Green Procurement Policy	40

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Appendix

Exposure Details

Business Ethics

EA.E.2 - Accounting and Taxation

0.03
Beta Signal

The company is involved in significant-level controversies of this type, signaling higher exposure to this issue.

EA.E.23 - Lobbying and Public Policy

0.00
Beta Signal

The company is not involved in any controversies of this type.

EA.E.30 - Sanctions

0.00
Beta Signal

The company is not involved in any controversies of this type.

EA.E.4 - Anti-Competitive Practices

0.03
Beta Signal

The company is involved in significant-level controversies of this type, signaling higher exposure to this issue.

EA.E.6 - Bribery and Corruption

0.02
Beta Signal

The company is involved in moderate-level controversies of this type, signaling higher exposure to this issue.

EA.E.7 - Business Ethics

0.12
Beta Signal

The company is involved in high-level controversies of this type, signaling higher exposure to this issue.

EA.F.1 - Operating Performance

0.03
Beta Signal

The company has a very weak net income margin.

Average Net Income Margin (2016-2018): -1.93%
Subindustry Median (2016-2018): 14.67%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.5 - Solvency - Banking

0.02
Beta Signal

The company has a weak Tier 1 capital ratio.

Tier 1 Capital Ratio (2018-2016): 14.47%
Subindustry Median (2018-2016): 15.97%
Source: Morningstar, October 2019. All Rights Reserved.

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Appendix

Exposure Details

EA.F.6 - Asset Performance - Banking

- 0.02

Beta Signal

The company has a strong non-performing asset ratio.

Non-Performing Assets (2018-2016): 0.44%
Subindustry Median (2018-2016): 0.66%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.7 - Financial Flexibility - Banking

- 0.03

Beta Signal

The company has a very strong loan-to-deposit ratio.

Loan to Deposit Ratio (2018-2016): 0.73
Subindustry Median (2018-2016): 0.85
Source: Morningstar, October 2019. All Rights Reserved.

EA.S.1 - Qualitative Overlay

0.00

Beta Signal

The analyst did not apply a qualitative overlay.

EA.S.2 - Subindustry Correction Factor

0.00

Beta Signal

EA.S.3 - Exceptional Event Adjustment

0.13

Beta Signal

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Appendix

Management Details

G.1.1 - Bribery & Corruption Policy

25	1.00%	0.3
Raw Score	Weight	Weighted Score

The company has a weak policy or a general statement addressing the issue

Criteria

- [x] Prohibition of bribery
- [ ] Definition of bribery or corruption
- [x] Definition of conflicts of interest and commitment to minimize these
- [ ] Definition and prohibition of facilitation payments
- [ ] Guidelines of what is considered acceptable behaviour
- [ ] There is no evidence of a formal policy but the company has a general statement addressing the issue

Sources

Deutsche Bank Conflicts of Interest Policy July 2017

Deutsche Bank, Code of Business Conduct and Ethics, November 2017

G.1.1.1 - Bribery & Corruption Programmes

75	1.50%	1.1
Raw Score	Weight	Weighted Score

The company has a strong programme

Criteria

- [x] Managerial responsibility for bribery and corruption
- [x] Regular bribery and corruption risk assessments
- [ ] Operating guidelines addressing record keeping, approval procedures and appropriate behaviour
- [ ] Annual signoff of the policy on bribery and corruption by employees
- [x] Regular training on bribery and corruption
- [ ] Internal monitoring system to detect corruption
- [ ] Mechanisms for employees to consult on ethical issues

Sources

Deutsche Bank Non-Financial Report 2017

Deutsche Bank, Code of Business Conduct and Ethics, November 2017

G.1.2 - Whistleblower Programmes

25	1.75%	0.4
Raw Score	Weight	Weighted Score

The company has a weak programme

Criteria

- [x] Proactively communicated to employees
- [ ] Available to suppliers, customers and other third parties
- [ ] An independent, reporting hotline available 24/7
- [x] Possibility for anonymous reporting and reports are treated confidentially
- [x] Non-retaliation policy
- [ ] Structures in place to process whistleblower reports
- [ ] Disclosure on the number of reports received, the types of misconduct and measures taken
- [ ] Available in local languages

Sources

Deutsche Bank, Code of Business Conduct and Ethics, November 2017

Deutsche Bank, Corporate Website, Compliance, www.db.com; accessed 26 September 2018

G.1.2.1 - Business Ethics Programme

75	2.25%	1.7
Raw Score	Weight	Weighted Score

The company has a strong programme

Deutsche Bank reports that a key objective in 2017 was to strengthen its Anti-Financial Crime division and therefore increased the number of staff in that department by 60% during the year (excl. Postbank). The bank also continued to roll out an extended screening program during the year, which is reported to serve as the basis for further enhancement with regards to screening effectiveness and efficiency.

Criteria

- [x] Commitment to address major business ethics risks
- [x] Board responsibility for business ethics issues
- [ ] Managerial responsibility for business ethics
- [ ] Ethical risk assessments
- [x] Operating guidelines
- [x] Annual training of employees on the Code of Conduct
- [x] Measures to deter non-compliance and reduce exposure to unethical opportunities
- [x] Incident investigation and corrective actions

Sources

Deutsche Bank Conflicts of Interest Policy July 2017

Deutsche Bank Non-Financial Report 2017

Deutsche Bank, Code of Business Conduct and Ethics, November 2017

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Appendix

Management Details

G.1.4.1 - Money Laundering Policy

100	1.00%	1.0
Raw Score	Weight	Weighted Score

The company has a strong policy on money laundering

Sources

Deutsche Bank Corporate Website, Know your customer (KYC) / Anti-Money-Laundering (AML) / Patriot Act, www.db.com; accessed 26 September 2018

Deutsche Bank Excerpt of Globally Applicable AML and AFC Standard March 2017

Deutsche Bank, General Statement on Observance of Anti-Money Laundering Requirements, February 2018

G.1.4.2 - Compliance Programme

75	1.50%	1.1
Raw Score	Weight	Weighted Score

The company has a strong programme

Criteria

- [x] Managerial responsibility for compliance
- [x] Customer due diligence related to illegal activities before starting a relationship
- [x] Enhanced customer due diligence for clients operating in high risk countries
- [ ] Operating guidelines for reporting suspicious transactions
- [x] Training for employees on anti-money laundering and terrorist financing
- [ ] Training on avoiding tax evasion facilitation
- [x] Training on international sanctions compliance
- [x] Monitoring existing business relationships
- [ ] Incident investigation and corrective actions
- [ ] Reporting of irregularities

Sources

Deutsche Bank Non-Financial Report 2017

Deutsche Bank, Code of Business Conduct and Ethics, November 2017

Deutsche Bank, Corporate Website, Compliance, www.db.com; accessed 26 September 2018

G.3.1 - Political Involvement Policy

0	0.50%	0.0
Raw Score	Weight	Weighted Score

Based on available evidence, the company does not have a policy

Deutsche Bank states it seeks to work in a spirit of partnership with external stakeholders, including political decision-makers and the wider communities they represent. There is no evidence of a political involvement policy.

Criteria

- [ ] Prohibits political involvement of any kind on the company's behalf
- [ ] Partially prohibits political involvement
- [ ] Approved by senior management
- [ ] Commits the company to disclose political donations and/or lobbying expenditures

Sources

Deutsche Bank, Code of Business Conduct and Ethics, November 2017

G.3.2 - Lobbying and Political Expenses

0	0.50%	0.0
Raw Score	Weight	Weighted Score

In the last three years, the company made more than USD 0.5 million in political contributions or political spending

According to the EU Transparency Register, Deutsche Bank spent EUR 2,744,000 (approx. USD 3.2 million) in annual costs related to activities covered by the register in 2017. This may include salaries paid to employees located in Brussels.

In the US, Deutsche Bank spent the following amounts over the past three years:
2017: USD 600,000
2016: USD 600,000
2015: USD 600,000

Sources

Center for Responsive Politics, Open Secrets, www.opensecrets.org; accessed 24 September 2018

European Parliament Transparency Register, http://ec.europa.eu/transparencyregister; accessed 24 September 2018

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Appendix

Management Details

Business Ethics Events

Category 4 Event - High

Outlook - Negative

Summary

Our outlook for this rating is negative. We do not anticipate an upgrade of the rating in the next 12 months based on the following reasons:

Seen as one of the contributors to the financial crisis, Deutsche Bank is subject to tighter regulatory conditions, which may increase the frequency of investigations and therewith the reputational and legal risks for the company.

While an increasing number of legal investigations by regulatory institutions, referring to issues that happened multiple years ago, have come to an end in the past two years, new investigations continue to emerge.

For those cases where Deutsche Bank agreed on a settlement, such as misconduct related to selling Residential Mortgage Backed Securities (RMBS) and the Russian mirror trades (both officially settled with particular regulators in January 2017), the formal comments provided by regulator's indicate that ethical management and controls are still ineffective.

The bank has in the meantime settled some cases with large financial impact, such as Euribor, forex and Libor rate manipulation. These settlements have reduced financial and reputational insecurity. However, the record fines attached to these settlements have had significant reputational and financial impacts on the company, keeping the bank in the spotlight of the media.

If investigations are closed and litigations are settled regarding the bank's high-profile cases, then Sustainalytics will reassess its rating for Business Ethics.

Assessment

In 2017, Deutsche Bank settled for USD 628 mn with the NY Department of Financials Services and UK FCA on money laundering mirror trades from Russia and was issued a USD 41 mn fine in 2018 by the U.S. Fed for its failures for complying with anti-money laundering laws. The bank has also settled several investor lawsuits regarding its alleged involvement in Libor manipulations. While Deutsche Bank has reached multiple settlements and has been closing down large legal investigations in the past years, it is still facing multiple investigations/lawsuits, including its involvement in the money laundering scandal at Danske Bank's Estonian branch and its connection to the businessman involved in the alleged misappropriation of funds from 1MDB. In March 2019, Deutsche Bank was accused of having been part of the Troika Laundromat, a financial network with 75 shell companies set up by a Russian investment bank, and having laundered more than USD 889 million between 2003 and 2017. In March 2020, lawsuits have been filed by shareholders claiming financial and accounting irregularities and failure to comply with IRS regulations, naming specific current and former executives for failures in management that have led to the bank's finances being impaired and left its long-term survival in doubt. These cases combined with governmental authorities continuing to criticize the bank's failure to improve AML and compliance controls, indicate that the bank's ethical management is still ineffective.

Sustainalytics assesses this controversy as a Category 4 due to the company's high involvement in benchmark rates manipulations and significant money laundering allegations in several jurisdictions, which pose significant legal risks to the company. Although business ethics-related controversies are common in the industry, Deutsche Bank's level of involvement is above industry peers, demonstrated with the most recent record payment to settle the allegation that it manipulated benchmark rates. While the top management of Deutsche Bank has committed to structurally enhance its ethical management and close down pending legal investigations, the ongoing investigations and released details on cases that were settled in the past two years, still imply high risks for stakeholders such as clients, shareholders and civil society as a whole.

Incident History

Locations: New York, NY, USA, Germany, England, UK, Illinois, USA, Australia, Denmark, Frankfurt, Germany, Dubai -United Arab Emirates, Italy, Mexico, United States, New York, NY 10003, USA, Malaysia, South Africa, Great Britain, Switzerland, Manhattan, New York, NY, USA, Milan, Metropolitan City of Milan, Italy, Florida, USA, Lithuania, Brussels, Belgium, New York, USA, Chicago, IL, USA, Singapore, Cyprus, Washington, DC, USA, London, UK, United Kingdom, Canada, Russia, Milan, Italy, Netherlands, Panama, Brazil, Nevada, USA

Tags: Business Ethics -Other, Insider Trading

NY court dismisses Putnam Bank lawsuit over Libor manipulation
Law360 - 26 March 2020

Update: Settlement in NY investors' lawsuit over Libor rigging
Law360 - 03 March 2020

Update: NY court sentences former directors to home confinement
Reuters UK - 24 October 2019

Update: Hawaii Sheet Metal Workers lawsuit over alleged Libor manipulation
Class Action Reporter - 03 May 2019

Update: Putnam Bank files lawsuit in New York alleging Libor rigging
The Sunday Telegraph (London) - 20 January 2019

Update: Manhattan court rules that former directors engaged in Libor scheme
Reuters UK - 17 October 2018

Update: Settlement with private investors regarding LIBOR manipulation charges
Channel NewsAsia - 27 February 2018

Update: Appeals Court reinstates Charles Schwab lawsuit over Libor rigging
Toronto Star Online - 23 February 2018

Update: Settlement with US states regarding LIBOR manipulation charges
New York Times - 25 October 2017

Update: Bank agrees to settle allegations of manipulating Libor
Reuters UK - 12 October 2017

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SeeNews Banking - 17 August 2017

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United States Department of Justice - 28 March 2017

Update: Dutch foundation representing institutional investors brings Libor
nrc.nl - 22 September 2016

Update: Former bank trader Gavin Black pleads not guilty to Libor manipulation
CNBC - 08 September 2016

Update: Former New York manager pleads guilty to Libor rigging
4 Traders - 22 June 2016

Update: DOJ charges two former senior traders for LIBOR manipulation
New York Times - 02 June 2016

Update: US appeals court revives Libor antitrust lawsuit
DutchNews - 21 May 2016

Update: German regulator BaFin ends probe into Libor manipulation
Reuters UK - 25 February 2016

Update: Former senior trader pleads guilty to manipulating Libor in NY federal
Reuters - 09 October 2015

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Law360 - Appellate - 21 September 2015

Update: US Department of Labor tentatively rejects request to manage pension
Bloomberg - 27 August 2015

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Bloomberg - 04 August 2015

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Bloomberg - 10 July 2015

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Wall Street Journal - 23 April 2015

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Bloomberg Law - 10 March 2020

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Reuters India - 02 March 2020

Update: Company officials report suspicious transaction to US regulator
New York Times - 31 October 2019

Update: Internal audit uncovers lapse in anti-money laundering controls
Forbes India - 10 June 2019

Update: Software glitch could have prevented suspicious transaction reporting
Financial Times - 22 May 2019

Update: Employees instructed to exempt Russian clients from AML restrictions
Governance, Risk & Compliance Monitor Worldwide - 19 April 2019

Update: BaFin orders measures to prevent money laundering and terrorism
Financial Times - 24 September 2018

Update: Internal report finds failure in identification of clients and wealth source
Reuters UK - 03 August 2018

Update: Manhattan District Judge dismisses investor lawsuit claiming deficiencies
Reuters UK - 28 June 2017

NY shareholder lawsuit over claims of irregularities
Bloomberg Law - 10 March 2020

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ABC News - 30 May 2017

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CNBC - 30 January 2017

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Times of Malta - 06 October 2016

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Reuters UK - 14 June 2016

Update: Russian chief operating officer to resign amid allegations of money
Bloomberg - 01 June 2016

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Update: UK FCA finds issues in bank's anti-money laundering procedures
Bloomberg - 01 May 2016

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Bloomberg - 14 April 2016

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4 Traders - 07 April 2016

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Bloomberg - 16 December 2015

Update: DOJ and DFS expand money laundering probe to consider sanctions
Reuters - 26 October 2015

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Bloomberg - 16 October 2015

Update: Bank reported to cut majority of Russian operations
The Wall Street Journal - 14 September 2015

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Bloomberg - 21 August 2015

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Bloomberg - 03 August 2015

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Bloomberg - 13 July 2015

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Reuters - 05 June 2015

Company processed transaction for Jho Low
International Investment - 10 March 2020

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Morningstar.com - 10 July 2019

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Gulf News - 17 September 2018

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Reuters UK - 12 April 2016

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FinanceFeeds - 19 February 2020

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Reuters UK - 06 June 2019

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United States Department of Justice - 25 July 2018

Update: US CFTC fines bank over spoofing and manipulation
Australian Financial Review - 27 January 2018

Update: Trader pleads guilty to spoofing market orders for metals
Zero Hedge - 02 June 2017

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HF Implode - 03 December 2016

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Reuters UK - 17 October 2016

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Reuters UK - 13 April 2016

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Reuters - 26 February 2016

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Reuters UK - 25 February 2016

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The New Daily - 01 June 2018

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DFSA - 19 December 2019

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Yahoo! Finance - 03 July 2019

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Financial Times - 15 May 2019

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Reuters - 10 December 2018

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BBC - 29 November 2018

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Reuters - 06 September 2019

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Reuters UK - 19 June 2019

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Reuters - 22 May 2019

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Bloomberg - 22 May 2019

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CNBC - 19 May 2019

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Reuters - 30 April 2019

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Nasdaq - 16 April 2019

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SNL Financial - 24 January 2019

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The Guardian - 20 July 2017

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Bloomberg - 08 December 2016

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Bloomberg - 15 October 2019

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Reuters - 30 September 2019

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Reuters India - 14 November 2018

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MarketScreener.com - 25 September 2019

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Swiss Info - 31 October 2017

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Reuters UK - 07 November 2018

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International Business Times - 09 January 2018

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Bloomberg - 18 November 2016

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Bloomberg - 14 January 2016

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Reuters - 11 January 2016

Update: Brazilian investigators probe banks used in Odebrecht's money laundering
Bloomberg - 16 September 2015

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Appendix

Management Details

Accounting and Taxation Events

Category 3 Event - Significant

Outlook - Neutral

Summary

The outlook for this event is neutral. Sustainalytics does not anticipate a change of its assessment in the next 12 months for the following reasons:

Should the investigation move to focus on the company directly, we will consider downgrading the company.

If the investigations warrant no further liability to the company itself, we will consider upgrading the company's rating on this issue.

Assessment

Investigations into 80 former and current employees at Deutsche Bank were announced in July 2019 regarding the ongoing cum-ex scandal in Germany. The cum-ex scandal involved the sale of borrowed shares just before a company was due to pay a dividend. This allowed investors to claim a refund on a dividend tax that was paid only once. Although the company has denied any direct involvement in cum-ex transactions, it is alleged that Deutsche Bank was well aware of the transactions and knowingly took on clients who did nothing but such deals. Deutsche Bank paid a EUR 4 million fine for their involvement in the cum-ex deals in 2018 and the company reported in its annual report in 2019 that five former board members were under investigation and the bank itself may face seizures and fines in relation to the cum-ex deals.

Sustainalytics assesses this controversy as a Category 3 as accounting and tax evasion has a high negative impact on stakeholders. Although the allegations have not been proven and the focus of the investigation is on former and current employees, Deutsche Bank may be under tighter scrutiny by regulators going forward. The cum-ex scandal is potentially far-reaching, including former and current bank employees. The cum-ex transactions are reported to have cost German taxpayers more the EUR 10 billion.

Incident History

Locations: Germany, London, UK, Cologne, Germany, Frankfurt, Germany, India, New York, NY, USA, United States

Tags: Taxes avoidance/evasion, Accounting Irregularities and Accounting Fraud

Company discloses former board members part of cum-ex probe
Bloomberg BNA - 20 March 2020

- **Update: Head of investment unit to step down**
  Morningstar.com - 06 July 2019
- **Update: Cologne criminal investigation over cum-ex tax transactions**
  Reuters UK - 06 June 2019
- **Update: M.M. Warburg lawsuit over failure to withhold taxes for cum-ex trades**
  Finance Magnates - 10 January 2019
- **Update: Correctiv investigation finds involvement in cum-ex transactions**
  Reuters - 04 January 2019
- **Update: Settlement with Frankfurt prosecutors over cum-ex transactions**
  Bloomberg - 04 December 2018
- **Update: NGO report reveals losses to EU countries due to cum-ex trades**
  EUobserver - 18 October 2018
- **Update: German Court ruled that banks cannot be reimbursed for cum/ex trades**
  Hessisches Finanzgericht - 17 March 2017
- **Update: Journalists reveal dividend sale tax avoidance scheme in Germany**
  Finanzen.net - 03 May 2016
- **Update: German prosecutors raid headquarters in connection to cum-ex tax fraud**
  Bloomberg - 10 June 2015

Former London trader charged over carbon credits VAT scheme
Business Breaking News - 07 August 2019

- **Update: Seven former managers guilty of tax evasion on carbon-emissions trading**
  Bloomberg - 13 June 2016
- **Update: Eight employees charged for illegal bonuses in CO2 trading scheme**
  Bloomberg - 25 July 2015
- **Update: Former employees face prosecution in carbon tax trade scheme**
  Reuters - 17 April 2015

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Management Details

Former London trader charged over carbon credits VAT scheme
Business Breaking News - 07 August 2019

Update: Fraud probe European carbon trading
Süddeutsche Zeitung - 01 December 2012

RBI fine for non-compliance with asset, KYC and AML norms
Financial Express - 14 November 2018

NY court certifies investors' lawsuit over allegations of being misled
Robbins Geller Rudman & Dowd LLP - 03 October 2018

Update: Shareholders' lawsuit claiming Securities Exchange Act violation
Investment Weekly News - 09 July 2011

Oxfam report documents banks' activities in tax havens
Oxfam America - 27 March 2017

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Appendix

Management Details

Anti-Competitive Practices Events

Category 3 Event - Significant

Outlook - Neutral

Summary

The outlook for this event is neutral. Sustainalytics does not anticipate a change of its assessment in the 12 months for the following considerations:

While the bank has come to several settlements for previous alleged anti-competitive practices, the bank continues to be involved in new class action lawsuits in several U.S. states for the same misconduct.

The Public School Teachers Pension and Retirement Fund filed a class action lawsuit against the bank in November 2015, alleging that Deutsche Bank colluded to prevent new competition in the USD interest rate swaps, which is still ongoing and increases the risk for Deutsche Bank to incur further fines.

If the bank is able to settle the current class action lawsuits in the U.S. and is not involved in new instances of anti-competitive behavior, Sustainalytics will consider an upgrade.

Assessment

Deutsche Bank is involved in a number of antitrust lawsuits including, among others, facing class action lawsuits related to alleged collusion of fixing bond prices and colluding to keep the TeraExchange platform out of the U.S. credit default swap market.. While the bank has settled several litigations and paid fines for anti-competitive practices in several jurisdictions over the past several years, the bank still faces open cases, primarily in the U.S. As settlements or fines for misconduct tend to be significant in the U.S., the fact that the bank has pending lawsuits in the U.S. puts it at higher risk of increased legal costs. In November 2015, the Public School Teachers Pension and Retirement Fund of Chicago filed a class action lawsuit against a number of banks, including Deutsche Bank, for allegedly conspiring to limit competition in the USD interest rate swaps. This case still appears to be ongoing. Further, several states, including Maryland, Pennsylvania, Oklahoma, and New York have filed lawsuits in 2019 against several banks, including Deutsche Bank, for conspiring to fix prices on USD 485 mn bonds issued by Fannie Mae and Freddie Mac.

Sustainalytics assesses this controversy as a Category 3. This assessment is shaped by a combination of our estimated impact on stakeholders and the risk posed to the company. The frequency and scale of the allegations against the company are significant. Investigations and legal actions are expected to continue, exacerbating the company's legal risks.

Incident History

Locations: New York, NY, USA, Portugal, Oklahoma, USA, Baltimore, MD, USA, Pennsylvania, USA, Japan, United States

Tags: Anti-competitive Practices

Manhattan lawsuit over conspiracy to fix prices in corporate bond market
Channel NewsAsia - 21 April 2020

Settlement over NY bonds price fixing lawsuit
Mortgage Servicing News - 12 September 2019

- **Update: NY court allows investors' price-fixing lawsuit to continue**
  Reuters UK - 04 September 2019
- **Update: Oklahoma pension fund lawsuit over collusion to fix bond prices**
  Law360 - 08 April 2019
- **Update: Baltimore files lawsuit over alleged collusion to fix bond prices**
  WBAL - 04 April 2019
- **Update: Pennsylvania files lawsuit alleging collusion to fix bond prices**
  American Banker - 25 March 2019

Portugal's competition authority fine over anti-competitive practices
Reuters UK - 09 September 2019

trueEx lawsuit claims antitrust practices in interest swaps market
Law360 - 14 June 2018

- **Update: US court partially upholds antitrust claims related to the derivatives**
  Reuters - 04 August 2017
- **Update: Online trading startups filed lawsuit for interest rate swaps collusion**
  Bloomberg - 14 April 2016
- **Update: Company accused of interest rate-swap fixing**
  Reuters - 25 November 2015

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Appendix

Management Details

Japanese regulator finds bank's traders engaged in bond price fixing
Sharenet - 29 March 2018

Tera Group lawsuit claims banks conspired to keep it out of the CDS market
Reuters - 08 June 2017

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Appendix

Management Details

Bribery and Corruption Events

Category 2 Event - Moderate

Incident History

Locations: Hong Kong, China, Russia, Netherlands

Tags: Bribery and Corruption

HK SFC permanent ban following bribery conviction
Hong Kong Standard Finance - 14 November 2019

Media investigation finds company offered gifts to Chinese officials
The New York Times - 15 October 2019

Update: SEC settlement over improper hiring practices allegations
Financial Times - 22 August 2019

Update: US regulators and internal investigations into Russian hiring practices
EthiXbase - 01 June 2018

Settlement over bribery allegations in derivatives trading lawsuit
Law360 - 12 July 2019

Update: Vestia files lawsuit over bribery allegations
Bloomberg-Quint - 08 May 2019

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Appendix

Exposure Details

Product Governance

EA.E.1 - Access to Basic Services

0.00
Beta Signal

The company is not involved in any controversies of this type.

EA.E.24 - Marketing Practices

0.00
Beta Signal

The company is not involved in any controversies of this type.

EA.E.28 - Quality and Safety

0.03
Beta Signal

The company is involved in significant-level controversies of this type, signaling higher exposure to this issue.

EA.F.1 - Operating Performance

0.03
Beta Signal

The company has a very weak net income margin.

Average Net Income Margin (2016-2018): -1.93%
Subindustry Median (2016-2018): 14.67%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.5 - Solvency - Banking

0.02
Beta Signal

The company has a weak Tier 1 capital ratio.

Tier 1 Capital Ratio (2018-2016): 14.47%
Subindustry Median (2018-2016): 15.97%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.6 - Asset Performance - Banking

- 0.02
Beta Signal

The company has a strong non-performing asset ratio.

Non-Performing Assets (2018-2016): 0.44%
Subindustry Median (2018-2016): 0.66%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.7 - Financial Flexibility - Banking

- 0.03
Beta Signal

The company has a very strong loan-to-deposit ratio.

Loan to Deposit Ratio (2018-2016): 0.73
Subindustry Median (2018-2016): 0.85
Source: Morningstar, October 2019. All Rights Reserved.

EA.G.1 - Headquarters Location

- 0.03
Beta Signal

The location of the company's headquarters indicates slightly lower exposure to this issue.

Germany: Lower exposure
Source: Sustainalytics Country Risk Rating, May 2019.

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Appendix

Exposure Details

EA.G.3 - Sales Location

0.05

Beta Signal

The location of the company's sales indicates slightly higher exposure to this issue.

United Kingdom: 14% (Higher exposure)
Europe, Middle East and Africa (EMEA): 13% (Slightly higher exposure)
Germany: 38% (Higher exposure)
Asia Pacific: 12% (Average exposure)
United States of America: 21% (Slightly higher exposure)
Source: Sustainalytics Country Risk Rating, May 2019.
Morningstar, October 2019. All Rights Reserved.

EA.S.1 - Qualitative Overlay

0.00

Beta Signal

The analyst did not apply a qualitative overlay.

EA.S.2 - Subindustry Correction Factor

0.00

Beta Signal

EA.S.3 - Exceptional Event Adjustment

0.00

Beta Signal

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Appendix

Management Details

S.3.1.1 - Responsible Marketing Policy

9	26.25%	2.4
Raw Score	Weight	Weighted Score

This indicator score has been imputed while we complete the relevant research

S.3.1.3.3 - Cybersecurity Programme

39	15.00%	5.9
Raw Score	Weight	Weighted Score

This indicator score has been imputed while we complete the relevant research

Criteria

- [ ] Management system certified to ISO 27001 standards
- [ ] Governance structures in place for cybersecurity management
- [ ] Operational measures to monitor and respond to data breaches and cyberattacks
- [ ] Regular internal security audits or vulnerability assessments or penetration testing of the company's systems, products and practices affecting user data
- [ ] Regular external security audits or vulnerability assessments of the company's systems, products and practices affecting user data
- [ ] Regular employee training on cybersecurity issues

G.1.3.8 - Responsible Product Offering

75	33.75%	25.3
Raw Score	Weight	Weighted Score

The company has a strong programme

Deutsche Bank states that it is committed to providing only products and services that create value for clients and shareholders through meeting the clients' needs, and has put New Product Approval (NPA) processes in place to control for adherence to this commitment. Furthermore, the bank has a Code of Values for its Private and Business Clients division, which puts forward product principles to ensure client satisfaction.

Criteria

- [x] Policy commitment on responsible products and services
- [ ] Managerial responsibility for responsible product offering
- [x] Impact and risk assessment incorporated into product development
- [x] Regular training on responsible product offering and marketing
- [x] Provision to share risk information
- [x] Continuous monitoring of social impact and risks of current products and/or services
- [x] Objectives to improve customer satisfaction
- [x] Mechanisms to receive and investigate complaints and implement corrective action
- [ ] Reporting on product and/or service quality

Sources

Deutsche Bank Corporate Website, Client Satisfaction, www.db.com; accessed 26 September 2018

Deutsche Bank Non-Financial Report 2017

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Appendix

Management Details

Quality and Safety Events

Category 3 Event - Significant

Outlook - Neutral

Summary

The outlook for this event is neutral. Sustainalytics does not anticipate a change of its assessment in the next 12 months for the following considerations:

Deutsche Bank has settled some of its high-profile lawsuits. Considering the number and scope of ongoing lawsuits against the bank, however, the risk of additional fines is ongoing. This reduces the chances of an upgrade. While the bank has been involved in a number of new lawsuits, it has not been involved in new high-profile cases, such as the RMBS case, that would suggest it faces a high financial risk as a result of significant fines and settlements.

While the company's management initiated activities to induce internal changes in terms of risk behaviour , Deutsche is still facing legal consequences for historical misconduct. A positive development may only occur over the long-term.

If the bank is able to close remaining legacy issues and if the bank is not implicated in new incidents of misconduct in its business dealings, Sustainalytics will reassess its rating for Quality and Safety.

Assessment

Deutsche Bank is involved in a large number of customer-related investigations and lawsuits, related to, among others, mortgage-backed securities, alleged misleading statements in the Uber IPO, for which the bank was an underwriter, and for discriminatory practices in foreclosure proceedings. While the bank has been able to close many of the open litigations related to its role in RMBS in the past several years, new investigations have continued to emerge for issues that have been ongoing since as early as 2012. Although no investigations are currently ongoing, the severity of the misconduct and the level of scrutiny imposed by several authorities in various jurisdictions suggests that further investigations or lawsuits could arise in the future. Outside of its dealings in RMBS, the bank has been implicated for various other issues spanning alleged breaches of contract, overcharging clients, payment system issues, and fictitious transactions.

Sustainalytics assesses this event as Category 3. While the company settled some of its product-and customer-related lawsuits, the bank continues to face significant litigation risks as settlements continue to occur. Furthermore, the recurrence of involvement in these cases highlights a significant impact on customers, which poses further reputational risks to the company.

Incident History

Locations: California, USA, Germany, New York, NY, USA, England, UK, Illinois, USA, United Kingdom, Brazil, United States, Sydney NSW, Australia, Poland, Angola, New South Wales, Australia, Florida, USA, Hong Kong, New Orleans, LA, USA, New York, USA, Spain, Maryland, USA, Australia, Italy, Texas, USA, Mexico, Panama, Austria

Tags: Services Quality and Safety, Product Quality and Safety, Customer Management

California class-action lawsuit over predatory loan scheme
Law360 - 13 April 2020

Company unable to access CHAPS for three hours
Reuters India - 02 March 2020

Update: Company confirms payment system problems to UK regulator
Risk Universe - 13 November 2019

Company reaches settlement over mortgage backed securities
Law360 - 27 February 2020

Update: US DoJ settlement with former head of subprime trading over RMBS
Law360 - 14 November 2019

Update: Bank discloses lawsuits over RMBS dismissed
Class Action Reporter - 15 May 2019

Update: DOJ files complaint against former executive misrepresenting loans
United States Department of Justice - 11 September 2017

Update: Settlement with the state of Maryland regarding mortgage-backed
Law360 - 02 June 2017

Update: SEC will not take action regarding mortgage-bond trade losses
Bloomberg - 05 May 2017

Update: US District Judge does not certify class action over MBS trustee role
New York Times - 21 March 2017

Update: DoJ to probe traders' role in mis-selling of MBS
New York Times - 08 February 2017

Update: Bank cuts bonuses following USD 7.2 billion settlement with US DOJ
Reuters - 18 January 2017

Update: FDIC lawsuit over MBS sold to two failed banks proceeds
Hagens Berman - 18 January 2017

Update: Bank admits it misled investors in the sale of RMBS in DOJ settlement
Bloomberg - 17 January 2017

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Appendix

Management Details

Company reaches settlement over mortgage backed securities
Law360 - 27 February 2020

Update: USD 7.2 billion settlement with US authorities over MBS mis-selling
Forbes.com - 23 December 2016

Update: CEO fails to reach settlement with US DOJ over MBS
TheStar.com.my - 09 October 2016

Update: Deutsche Bank unit settles 2013 lawsuit with HSBS regarding RMBS
Law360 - 05 October 2016

Update: Settlement discussions with DOJ for sale of RMBS
Bloomberg - 15 September 2016

Update: Provisions for SEC settlement regarding RMBS misrepresentation
Bloomberg - 09 June 2016

Update: FDIC settlement for Countrywide RMBS misrepresentations
Reuters - 02 June 2016

Update: US SEC investigation into possible inflation of MBS value
Fortune - 23 May 2016

Update: FDIC lawsuit implicating toxic MBS in Colonial BancGroup collapse will
Reuters - 19 May 2016

Update: Royal Park Investments lawsuit over MBS trustee role
Reuters - 03 February 2016

Update: Settlement with the Commonwealth of Virginia
Law360 - Tax - 22 January 2016

Update: Several lawsuits over trustee role dismissed
Law360 - Banking - 19 January 2016

Update: Commerzbank files lawsuit over MBS trustee role
Reuters - 24 December 2015

Update: US FDIC lawsuit for toxic mortgages sold to Guaranty Bank
CNBC - 10 August 2015

Update: Omnicare class action dismissed
Law360 - 28 July 2015

English High Court lawsuit over breach of aluminum purchase contract
Law360 - 25 February 2020

Settlement in Illinois borrowers' lawsuit over illegal robocalls
Law360 - 27 November 2019

Illinois Court decides foreclosure discrimination lawsuit can continue
Cook County Record - 15 November 2019

Update: US housing organizations file lawsuit over housing discrimination
4 Traders - 01 February 2018

Update: NFHA claims to have new evidence of housing discrimination
National Mortgage Professional Magazine - 26 July 2017

Uber shareholder files California lawsuit over misleading IPO statements
Class Action Reporter - 25 September 2019

Brazilian regulator fine over investment fund administration irregularities
CVM Brazil - 18 June 2019

Company to pay back fees overcharged to clients
Morningstar.com - 11 March 2019

Former FX trader sentenced over fictitious transactions
LeapRate - 12 February 2019

Update: Former trader pleads guilty to using position dishonestly
Australian Financial Review - 05 August 2018

Update: ASIC brings 85 charges against former trader for false entries
Australian Financial Review - 07 February 2018

Update: Australian financial services watchdog bans former trader for false
Financial Standard - 29 September 2016

Investors lawsuit over fund's failure to disclose risks
Class Action Reporter - 30 January 2019

Polish regulator fine for abusive clauses in model contracts
UOKiK - 23 January 2019

USD 12.5 billion lawsuit over 2001 failed property deal
Handelsblatt - 22 January 2019

Lawsuit claiming government officials bribed and Cobalt investors misled
GlobalInvestigationsReview.com - 15 June 2017

Update: Settlement in class action claiming officials bribed and investors misled
GlobalInvestigationsReview.com - 12 October 2018

Investigation delays sale of British insurer Abbey Life
Reuters UK - 03 June 2016

Update: FCA closes exit fees investigation without enforcement action
Citywire - 19 September 2018

Update: UK regulator probes six insurers over exit fees
Investors Hub - 03 March 2016

New York DFS fine over unsafe forex trading practices
Reuters Canada - 20 June 2018

Update: Axiom lawsuit over Autobahn platform unsafe practices proceeds
Reuters - 26 July 2017

Update: Investor lawsuit over unsafe practice on FX Autobahn platform
Reuters - 18 January 2016

Jewish Trust claims bank withheld USD 3 billion from Wertheim heirs
Bloomberg - 19 January 2017

Update: Florida District Court dismisses USD 3 billion lawsuit by Jewish Trust
Bloomberg-Quint - 15 December 2017

Customer lawsuit over pound-to-US dollar currency swaps transaction
European Supermarket Magazine - 03 November 2017

Royal Park Investments lawsuit claims bank used trust funds for legal fees
Law360 - 04 August 2017

FINRA fine for market access rule violations
Advisor.ca - 27 July 2017

Class action claiming Snap underwriters liable for IPO misleading statements
The Register - 10 July 2017

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Management Details

Spanish consumer groups file lawsuits over loan formalization costs
El Confidencial - 28 June 2017

Update: Spanish Supreme Court annuls costs of formalizing loans for borrowers
estrelladigital.es - 23 December 2016

NY Judge denies dismissal of lawsuit related to Enron accounting fraud
Law360 - 31 March 2017

Banks agree to settle lawsuit regarding misleading NovaStar securities
Yahoo! Finance - 15 March 2017

Update: Investor class action claims misleading statements about NovaStar
Reuters India - 04 November 2016

Court rules against bank in dispute over credit default swaps
Law360 - 24 January 2017

Update: Breach-of-contract dispute over credit default swaps
Law360 - 10 February 2016

SunEdison creditor lawsuit against lenders
Bloomberg - 21 October 2016

PLX shareholder lawsuit claims bank rigged the firm's sale
Morningstar.com - 17 August 2016

Manhattan judge allows Belmont lawsuit over concealed risks to proceed
Reuters UK - 25 July 2016

Italian investigation into 2011 sale of government bonds
Reuters UK - 06 May 2016

Texas asset management firm files lawsuit over swap contract
Law360 - Banking - 25 March 2016

Construction company in Mexico files criminal complaint for "breach of trust"
Reuters UK - 28 January 2016

Internal probe into subprime auto securitizations
Bloomberg - 15 January 2016

City of Pforzheim files lawsuit over bad advice
Bloomberg - 21 October 2015

Panama casino files lawsuit over frozen accounts amid foreclosure
Bloomberg - 02 June 2015

Prosecutor's investigation over Volksbanken debt
Reuters - 02 April 2015

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Appendix

Exposure Details

Data Privacy and Security

EA.E.27 - Data Privacy and Security

0.02

Beta Signal

The company is involved in moderate-level controversies of this type, signaling higher exposure to this issue.

EA.F.1 - Operating Performance

0.03

Beta Signal

The company has a very weak net income margin.

Average Net Income Margin (2016-2018): -1.93%
Subindustry Median (2016-2018): 14.67%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.5 - Solvency - Banking

0.02

Beta Signal

The company has a weak Tier 1 capital ratio.

Tier 1 Capital Ratio (2018-2016): 14.47%
Subindustry Median (2018-2016): 15.97%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.6 - Asset Performance - Banking

- 0.02

Beta Signal

The company has a strong non-performing asset ratio.

Non-Performing Assets (2018-2016): 0.44%
Subindustry Median (2018-2016): 0.66%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.7 - Financial Flexibility - Banking

- 0.03

Beta Signal

The company has a very strong loan-to-deposit ratio.

Loan to Deposit Ratio (2018-2016): 0.73
Subindustry Median (2018-2016): 0.85
Source: Morningstar, October 2019. All Rights Reserved.

EA.G.1 - Headquarters Location

- 0.03

Beta Signal

The location of the company's headquarters indicates slightly lower exposure to this issue.

Germany: Lower exposure
Source: Sustainalytics Country Risk Rating, May 2019.

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Appendix

Exposure Details

EA.G.3 - Sales Location

0.05

Beta Signal

The location of the company's sales indicates slightly higher exposure to this issue.

United Kingdom: 14% (Higher exposure)
Europe, Middle East and Africa (EMEA): 13% (Slightly higher exposure)
Germany: 38% (Higher exposure)
Asia Pacific: 12% (Average exposure)
United States of America: 21% (Slightly higher exposure)
Source: Sustainalytics Country Risk Rating, May 2019.
Morningstar, October 2019. All Rights Reserved.

EA.S.1 - Qualitative Overlay

0.00

Beta Signal

The analyst did not apply a qualitative overlay.

EA.S.2 - Subindustry Correction Factor

0.00

Beta Signal

EA.S.3 - Exceptional Event Adjustment

0.00

Beta Signal

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Appendix

Management Details

S.3.1.3 - Data Privacy & Security Policy

50	9.00%	4.5
Raw Score	Weight	Weighted Score

The company has an adequate policy

Deutsche Bank states that all data, whether directly or indirectly related to a natural person, are protected by national and international regulations, and has published a Privacy Notice relating to information collected through the website.

Criteria

- [ ] Commitment to notify data subjects in a timely manner in case of policy changes or data breach
- [ ] Commitment to implement leading data protection standards
- [ ] Commitment to obtain user data through lawful and transparent means, with explicit consent of the data subject where required
- [ ] Commitment to collect and process user data that is limited to the stated purpose
- [ ] Clear terms involving the collection, use, sharing and retention of user data including data transferred to third parties
- [ ] Commitment to require third parties with whom the data is shared to comply with the company's policy
- [ ] The company has a formal policy but it applies to less than 50% of the operations
- [ ] There is a statement addressing the issue but it does not qualify as a policy as per Sustainalytics guidelines

Sources

Deutsche Bank Corporate Website, Privacy Notice, www.db.com; accessed 24 September 2018

S.3.1.3.1 - Data Privacy Programme

50	36.00%	18.0
Raw Score	Weight	Weighted Score

The company has an adequate programme

Criteria

- [x] Governance structures in place for privacy management
- [x] Regular employee training on data privacy management
- [x] Data subjects can access their accounts to erase, rectify, complete or amend personal information
- [x] Clear and accessible mechanisms for data subjects to raise concerns about data privacy
- [ ] Regular privacy risk assessments or audits on the company's technologies and practices affecting user data

Sources

Deutsche Bank Corporate Website, Privacy Notice, www.db.com; accessed 24 September 2018

Deutsche Bank Non-Financial Report 2017

S.3.1.3.2 - Data Request Management

9	9.00%	0.8
Raw Score	Weight	Weighted Score

This indicator score has been imputed while we complete the relevant research

Criteria

- [ ] Policy commitment to respect human rights in data management
- [ ] Managerial responsibility for government data requests oversight
- [ ] Regular human rights risk assessments linked to data privacy
- [ ] Notification of data subjects in case of data sharing under legal requirements
- [ ] Incident investigation and corrective action
- [ ] Remedy for victims of human rights violations as a result of the company's data sharing practices
- [ ] Disclosure of process for evaluating and responding to law enforcement or government data requests
- [ ] Regular reporting on compliance with any government data requests

S.3.1.3.3 - Cybersecurity Programme

39	36.00%	14.0
Raw Score	Weight	Weighted Score

This indicator score has been imputed while we complete the relevant research

Criteria

- [ ] Management system certified to ISO 27001 standards
- [ ] Governance structures in place for cybersecurity management
- [ ] Operational measures to monitor and respond to data breaches and cyberattacks
- [ ] Regular internal security audits or vulnerability assessments or penetration testing of the company's systems, products and practices affecting user data
- [ ] Regular external security audits or vulnerability assessments of the company's systems, products and practices affecting user data
- [ ] Regular employee training on cybersecurity issues

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Appendix

Management Details

Data Privacy and Security Events

Category 2 Event - Moderate

Incident History

Locations: Germany, United States

Tags: Data Privacy and Security

Company accidentally sends clients' transaction data to Amazon
Reuters India - 16 January 2020

Wall Street Journal reports hacking campaign potentially affected company data
Morningstar.com - 31 December 2019

Internal probe over compromised data after failing to deactivate accounts
Yahoo! Finance - 28 July 2019

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Appendix

Exposure Details

ESG Integration - Financials

EA.E.17 - Environmental Impact of Products

0.02
Beta Signal

The company is involved in moderate-level controversies of this type, signaling higher exposure to this issue.

EA.E.32 - Social Impact of Products

0.02
Beta Signal

The company is involved in moderate-level controversies of this type, signaling higher exposure to this issue.

EA.E.46 - Carbon Impact of Products

0.02
Beta Signal

The company is involved in moderate-level controversies of this type, signaling higher exposure to this issue.

EA.E.48 - Society - Human Rights

0.01
Beta Signal

The company is involved in low-level controversies of this type, signaling higher exposure to this issue.

EA.F.1 - Operating Performance

0.03
Beta Signal

The company has a very weak net income margin.

Average Net Income Margin (2016-2018): -1.93%
Subindustry Median (2016-2018): 14.67%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.5 - Solvency - Banking

0.02
Beta Signal

The company has a weak Tier 1 capital ratio.

Tier 1 Capital Ratio (2018-2016): 14.47%
Subindustry Median (2018-2016): 15.97%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.6 - Asset Performance - Banking

- 0.02
Beta Signal

The company has a strong non-performing asset ratio.

Non-Performing Assets (2018-2016): 0.44%
Subindustry Median (2018-2016): 0.66%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.7 - Financial Flexibility - Banking

- 0.03
Beta Signal

The company has a very strong loan-to-deposit ratio.

Loan to Deposit Ratio (2018-2016): 0.73
Subindustry Median (2018-2016): 0.85
Source: Morningstar, October 2019. All Rights Reserved.

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Appendix

Exposure Details

EA.G.1 - Headquarters Location

- 0.03

Beta Signal

The location of the company's headquarters indicates slightly lower exposure to this issue.

Germany: Lower exposure
Source: Sustainalytics Country Risk Rating, May 2019.

EA.G.3 - Sales Location

0.05

Beta Signal

The location of the company's sales indicates slightly higher exposure to this issue.

United Kingdom: 14% (Higher exposure)
Europe, Middle East and Africa (EMEA): 13% (Slightly higher exposure)
Germany: 38% (Higher exposure)
Asia Pacific: 12% (Average exposure)
United States of America: 21% (Slightly higher exposure)
Source: Sustainalytics Country Risk Rating, May 2019.
Morningstar, October 2019. All Rights Reserved.

EA.P.5 - Responsible Asset Portfolio

0.00

Beta Signal

The company's proportion of responsibly managed investments indicates average exposure to this issue.

For 2017, Deutsche Bank reported EUR 10.6 bn in ESG and sustainable assets under management, representing 1.5% of total assets under management (amounting to EUR 700 bn). In addition, the bank manages EUR 9.4 billion of real estate investments in certified green-labeled buildings and managed seven sustainable and impact funds with a combined volume of EUR 355 mn.

Sources

Deutsche Bank Non-Financial Report 2017

EA.S.1 - Qualitative Overlay

0.00

Beta Signal

The analyst did not apply a qualitative overlay.

EA.S.2 - Subindustry Correction Factor

0.00

Beta Signal

EA.S.3 - Exceptional Event Adjustment

0.00

Beta Signal

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Appendix

Management Details

E.3.1.10 - Credit & Loan Standards

80	9.75%	7.8
Raw Score	Weight	Weighted Score

The company has detailed and specific standards for a variety of industries

In its Environmental and Social Policy Framework, Deutsche Bank defines a number of sectors and activities as having high potential for significant environmental and social impacts, including agriculture and forestry, chemicals, infrastructure projects in certain countries, metals and mining, oil and gas (including hydraulic fracturing and exploration in the Arctic), utilities. The framework puts forward criteria for mandatory referral to Control Groups and/or the Regional Reputational Risk Committee. Furthermore, specific industry sector environmental and social guidelines include Dos and Don'ts. However, the bank does not exclude any industry from financing for sustainability reasons.

Sources

Deutsche Bank Non-Financial Report 2017

Deutsche Bank, Environmental and Social Policy Framework, May 2018

E.3.1.11 - Responsible Asset Management

40	11.38%	4.6
Raw Score	Weight	Weighted Score

Between 1.00% and 4.99% of assets under management can be categorized as "responsible investment"

For 2017, Deutsche Bank reported EUR 10.6 bn in ESG and sustainable assets under management, representing 1.5% of total assets under management (amounting to EUR 700 bn). In addition, the bank manages EUR 9.4 billion of real estate investments in certified green-labeled buildings and managed seven sustainable and impact funds with a combined volume of EUR 355 mn.

Sources

Deutsche Bank Non-Financial Report 2017

E.3.1.15 - Sustainable Financial Initiatives

50	4.88%	2.4
Raw Score	Weight	Weighted Score

The company has an adequate programme

Deutsche Bank has established centers of competence for the issuance of green bond and the financing of renewable energy, and to offer these products and services to its clients. During 2017, the bank arranged approximately EUR 2.2 billion in project finance for renewable energy projects, and supported clients to issue more about EUR 10 billion in green bonds. Furthermore, Deutsche Bank managed seven sustainable and impact funds with a combined volume of EU 355 million. Deutsche Bank is a signatory to thee Green Bond Principles, and a member of the Energy Efficiency Financial Institutions Group (EEFIG), the Institutional Investments Group on Climate Change (IIGCC), and the Investor Network on Climate Risk (INCR). However, the company does not report on the group-wide targets for increasing exposure to sustainability related activities, and deadlines or time frames for achieving these.

Sources

Deutsche Bank Non-Financial Report 2017

S.4.2.3 - Financial Inclusion

100	4.88%	4.9
Raw Score	Weight	Weighted Score

The company has a strong programme

Deutsche Bank has a number of initiatives to promote the financial inclusion of disadvantaged people. First, Deutsche Bank manages impact investment funds with a focus on microfinance (Microfinance funds, Global Commercial Microfinance Consortium II, Microcredit Development Fund), consisting of senior and subordinated debt financing for microfinance institutions and banks in the developing world with the aim to increase access to high quality financial services. Deutsche Bank reports that it has provided financing amounting to USD 1.67 bn to micro-borrowers since 1997 and was one of the architects of the Smart Campaign, which aims to embed client protection practices within the microfinance industry. Second, the bank has an enterprise program ("Made for Good") to support disadvantaged or micro-entrepreneurs and to help grow enterprises that tackle urgent social and environmental challenges. For its Made for Good enterprise program, Deutsche Bank has set the goal to reach a total of 20,000 enterprises by 2020. In 2017, this programme supported 11,754 social enterprises in 33 countries and reached 214,000 people. In addition, Deutsche Bank has a number of programmes to build more inclusive communities and to tackle social marginalization through cultural programmes, investments, donations, and volunteering. For instance, Deutsche Bank employees take part in the Financial Literacy initiative as voluntary instructors.

Sources

Deutsche Bank Corporate Website, Financial Literacy Initiative, www.db.com; accessed 26 September 2018

Deutsche Bank Corporate Website, Microfinance and Social Impact Investment, www. db.com; accessed 26 September 2018

Deutsche Bank Non-Financial Report 2017

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Appendix

Management Details

G.1.3.1 - PRI Signatory

100	1.63%	1.6
Raw Score	Weight	Weighted Score

The company or its main investment management divisions signed the UN Principles for Responsible Investment

Deutsche AM Investment GmbH is signatory to the UN Principles for Responsible Investment (PRI).

Sources

Deutsche Bank Non-Financial Report 2017

UNEP FI website, www.unepfi.org; accessed 14 September 2018

G.1.3.2 - Responsible Investment Policy

0	6.50%	0.0
Raw Score	Weight	Weighted Score

Based on available evidence, the company does not have a policy

As part of the Bank's global Reputational Risk Framework, Deutsche Bank discloses a regularly updated Environmental and Social Policy Framework. While Deutsche Bank states that it builds its ES risk management approach in relation to its own operations and business relationships with its clients across corporate finance, including project finance, trade finance, and investment banking builds on this policy framework, the bank also points out that its asset management division, Deutsche Asset Management, may follow own (and prevailing) policies in relation to environmental and social matters in order to preserve and fulfil its independent fiduciary obligations. Deutsche Asset Management has published a Responsible Investment Statement in January 2017, in which it puts forward its view that the integration of Environmental Social Governance (ESG) factors and active ownership activities are an important part of its fiduciary duty, states that it incorporates ESG factors into its investment analysis, outlines its belief that active stewardship plays an important role. However, there is no evidence of clear commitments to responsible investment in terms specific to exclusions, best-in-class selection and engagement with investees based on ESG criteria.

Criteria

- [ ] Commitment to exclusion based on the companies' activities
- [ ] Commitment to integrate ESG factors or select best-in-class companies according to ESG factors
- [ ] Commitment to engage with companies on ESG issues

Sources

Deutsche Asset Management, Responsible Investment Statement, January 2017

Deutsche Bank, Environmental and Social Policy Framework, May 2018

G.1.3.3 - UNEPFI Signatory

100	1.63%	1.6
Raw Score	Weight	Weighted Score

The company is a signatory to the UNEP Finance Initiative

Deutsche Bank has been a signatory to the UNEP FI since May 1992.

Sources

UNEP FI website, www.unepfi.org; accessed 14 September 2018

G.1.3.5 - Equator Principles Signatory

0	4.88%	0.0
Raw Score	Weight	Weighted Score

The company is not a signatory to the Equator Principles

Sources

Equator Principles website, www.equator-principles.com; accessed 14 September 2018

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Appendix

Management Details

G.1.3.6 - Responsible Investment Programme

75	9.75%	7.3
Raw Score	Weight	Weighted Score

The company has a strong programme

Criteria

- [x] Managerial responsibility for responsible investment
- [ ] Requirements for investment managers to integrate ESG issues into investment strategies
- [x] Prior ESG risk assessment of investment
- [x] Continuous monitoring of ESG risks
- [x] Active ownership
- [x] Investment exclusions based on ESG factors
- [x] Best-in-class investments based on ESG factors
- [x] Other initiatives to promote responsible investment
- [x] Reporting on RI implementation and performance
- [ ] Objectives and targets related to responsible investment

Sources

Deutsche Asset Management, UN PRI Transparency Report, 2017

Deutsche Bank, Corporate Website, Sustainable Investments, www.db.com; accessed 28 September 2018

Deutsche Bank, Media Release, ESG data in company research, 4 May 2018

G.1.3.7 - Corporate Finance - ESG Integration

75	9.75%	7.3
Raw Score	Weight	Weighted Score

The company has a strong programme

Criteria

- [ ] Managerial responsibility
- [x] Environmental and social risk assessment and categorization
- [x] Enhanced due diligence or avoidance of high-risk industries
- [x] Training of relationship managers on ESG risk identification
- [x] Monitoring of environmental and social risks
- [x] Regular internal audits of the company's programme
- [x] Client engagement on ESG issues
- [ ] Engagement with transaction stakeholders
- [ ] Reporting of high-risk loans as percentage of total portfolio

Sources

Deutsche Bank, Environmental and Social Policy Framework, May 2018

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Appendix

Management Details

Carbon Impact of Products Events

Category 2 Event - Moderate

Incident History

Locations: Germany, Texas, USA, Philippines

Tags: Carbon Impact of Products

"Fool's Gold" report for financing coal power utility companies
Bank Track - 21 May 2019

Banking on climate change 2019 report on fossil fuel financing
Swiss Info - 21 March 2019

Scrutiny over relationship with German RWE
Bank Track - 04 January 2019

120 civil societies launch "Fossil Banks, No Thanks!" campaign
BankTrack - 16 October 2018

"TOTALly irresponsible in ultra-deep waters" 2018 NGO report
BankTrack - 23 August 2018

Banking on climate change 2018 report on fossil fuel financing
Sierra Club - 27 March 2018

"Banks vs. the Paris Agreement" 2017 report
BankTrack - 11 December 2017

"Investors vs. the Paris Agreement" 2017 report
Urgewald - 11 December 2017

Banking on climate change 2017 report on fossil fuel financing
The Guardian - 21 June 2017

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Appendix

Management Details

Environmental Impact of Products Events

Category 2 Event - Moderate

Incident History

Locations: United States, Brazil, Montana, USA, Nebraska, USA, Malaysia, Canada, West Virginia, USA, Minnesota, USA

Tags: Environmental impact of products

BankTrack scrutiny for Keystone XL pipeline financial relationship
BankTrack - 06 April 2020

Update: US President issues new permit, allowing construction to resume
Morningstar.com - 29 March 2019

Update: Montana court overturns permit for Keystone XL pipeline
Reuters Africa - 09 November 2018

Update: Nebraska Public Service Commission grants route for Keystone XL
Japan Times - 21 November 2017

Update: NGOs take legal action against US State Department for Keystone XL
mazaskatalks.org - 24 May 2017

Update: Scrutiny for financing Keystone XL tar sands pipeline
BankTrack - 24 March 2017

NGO report over JBS financial relationship
BankTrack - 24 September 2019

Amazon Watch report on Amazon deforestation related to Bunge
Good-StockInvest.com - 30 April 2019

Amazon Watch report on Amazon deforestation related to Cargill
Good-StockInvest.com - 30 April 2019

NGO report "Towards responsible and inclusive financing of the palm oil sector"
Profundo - 15 November 2017

Scrutiny for financing company behind Energy East pipeline
mazaskatalks.org - 09 May 2017

Update: TransCanada cancels plans to build Energy East pipeline
Wisconsin Gazette - 05 October 2017

Forest & Finance 2017 updated database on tropical deforestation
Forest & Finance Briefing - 07 June 2017

Scrutiny for Mountain Valley Pipeline project in West Virginia
ThinkProgress - 22 May 2017

Scrutiny for financing company behind Line 3 pipeline
mazaskatalks.org - 09 May 2017

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Appendix

Management Details

Social Impact of Products Events

Category 2 Event - Moderate

Incident History

Locations: United States, Argentina, Germany, Spain, Indonesia, Canada, Virginia, USA, North Dakota, USA, Mozambique, Louisiana, USA, Central Kalimantan, Indonesia, Africa, Pakistan, Malaysia, Sarawak, Malaysia, China

Tags: Social impact of products

Columbia court orders full impact statement on DAPL impacts
Bloomberg Law - 25 March 2020

Update: NGO report estimates FIs incurred USD 4.4 billion in losses
desmogblog.com - 04 December 2018

Update: Native American tribe file lawsuit over North Dakota road closure
Intercontinental Cry - 01 November 2018

Update: Louisiana Court revokes Bayou Bridge permit
Reuters UK - 24 February 2018

Update: Louisiana residents and NGOs scrutiny for Bayou Bridge pipeline
mazaskatalks.org - 09 May 2017

Update: UN rapporteur contends improper consultation and use of force at DAPL
Financial Times - 07 March 2017

Update: US President issues executive order to ease DAPL permits
DutchNews - 24 January 2017

Update: US ACE denies permit to build DAPL under Missouri River
San Francisco Bay Area Independent Media Center - 01 December 2016

Update: UN investigates alleged human rights abuses at DAPL protest
Rabble.ca - 31 October 2016

Update: Scrutiny for financing North Dakota Access pipeline
4 Traders - 06 September 2016

NGO scrutiny over financial relationship with Vaca Muerta Shale Basin
Common Dreams - 18 March 2020

BankTrack report over UN human rights requirements implementation failures
BankTrack - 26 November 2019

Bank named in "Dirty Profits 7" report
BankTrack - 23 May 2019

RSPO terminates Indofood's membership
Rainforest Action Network - 01 March 2019

Update: Scrutiny for financing company accused of labor abuses in Indonesia
BankTrack - 24 April 2017

Scrutiny for involvement with TransCanada's Coastal GasLink pipeline project
BankTrack - 30 January 2019

US Court of Appeals halts construction over improper wildlife permits
EcoWatch - 11 December 2018

Update: Scrutiny for financing Atlantic Coast Pipeline in US
BankTrack - 18 April 2018

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Management Details

Canadian Court cites failure to consider aboriginal concerns
Reuters UK - 30 August 2018

Update: Financial institutions cancel USD 4.2 billion Kinder Morgan credit
BankTrack - 03 July 2018

Update: Trans Mountain expansion halted amid opposition and delays
24/7 Wall St - 09 April 2018

Update: British Columbia seeks intervener status in case against Trans Mountain
The Vancouver Sun - 22 August 2017

Update: Scrutiny for financing company behind Trans Mountain pipeline
mazaskatalks.org - 09 May 2017

Scrutiny for shareholding in Anadarko Petroleum
Facing Finance - 28 August 2018

Greenpeace report criticizes Wilmar and Gama for deforestation in Indonesia
Greenpeace Southeast Asia - 26 June 2018

Update: NGO criticism over police violence at Wilmar palm oil plantation
farmlandgrab.org - 20 December 2017

Update: Fern's "Financing land grabs and deforestation" report
FERN.org - 27 July 2016

"Don't Bank on the Bomb" 2018 report
Don't Bank on the Bomb - 07 March 2018

Facing Finance's "Rauchfrei investieren" report
Facing Finance - 31 December 2017

Funding of Vitol, a company accused of producing low-quality fuels
BankTrack - 07 June 2017

Bank will finance China's OBOR infrastructure initiative
Economic Times - 31 May 2017

Funding of Trafigura, a company scrutinized for producing low-quality fuels
BankTrack - 23 May 2017

Scrutiny for financing weapons manufacturer Rheinmetall
Facing Finance - 04 May 2017

Scrutiny for financing company involved in labor abuses in Malaysia and Papua
BankTrack - 24 April 2017

Financial link to Sarawak government in Malaysia
Swedwatch - 07 March 2017

Worldwide Investments in Cluster Munitions 2016 report
stopexplosiveinvestments - 16 June 2016

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Appendix

Management Details

Society - Human Rights Events

Category 1 Event - Low

Incident History

New York Comptroller investigates link to terrorist organization
Jerusalem Post - 30 September 2017

Locations: New York, NY, USA

Tags: Involvement With Entities Violating Human Rights

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Appendix

Exposure Details

Human Capital

EA.E.22 - Labour Relations

0.02

Beta Signal

The company is involved in moderate-level controversies of this type, signaling higher exposure to this issue.

EA.F.1 - Operating Performance

0.03

Beta Signal

The company has a very weak net income margin.

Average Net Income Margin (2016-2018): -1.93%
Subindustry Median (2016-2018): 14.67%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.5 - Solvency - Banking

0.02

Beta Signal

The company has a weak Tier 1 capital ratio.

Tier 1 Capital Ratio (2018-2016): 14.47%
Subindustry Median (2018-2016): 15.97%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.6 - Asset Performance - Banking

- 0.02

Beta Signal

The company has a strong non-performing asset ratio.

Non-Performing Assets (2018-2016): 0.44%
Subindustry Median (2018-2016): 0.66%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.7 - Financial Flexibility - Banking

- 0.03

Beta Signal

The company has a very strong loan-to-deposit ratio.

Loan to Deposit Ratio (2018-2016): 0.73
Subindustry Median (2018-2016): 0.85
Source: Morningstar, October 2019. All Rights Reserved.

EA.S.1 - Qualitative Overlay

0.00

Beta Signal

The analyst did not apply a qualitative overlay.

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Appendix

Exposure Details

EA.S.2 - Subindustry Correction Factor

0.00

Beta Signal

EA.S.3 - Exceptional Event Adjustment

0.00

Beta Signal

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Appendix

Management Details

S.1.1 - Freedom of Association Policy

25	4.50%	1.1
Raw Score	Weight	Weighted Score

The company has a weak policy on freedom of association

Deutsche Bank states on its website that it respects the right of freedom of association and collective bargaining, based on the global principles of the UN Global Compact and the standards of the International Labour Organization (ILO). However, the company does not disclose a formal policy on freedom of association.

Sources

Deutsche Bank Corporate Website, Labour Rights, www.db.com; accessed 17 September 2018

S.1.2 - Discrimination Policy

100	13.50%	13.5
Raw Score	Weight	Weighted Score

The company has a strong policy

Criteria

- [x] List of the types of discrimination the company is committed to eliminate
- [x] Commitment to ensure equal opportunity
- [x] Reference to the ILO conventions

Sources

Deutsche Bank, Code of Business Conduct and Ethics, November 2017

S.1.3 - Diversity Programmes

100	20.25%	20.3
Raw Score	Weight	Weighted Score

The company has a strong programme

Deutsche Bank has taken several initiatives to promote diversity and inclusion. In addition to being signatory to a range of diversity charters, Deutsche Bank made a voluntary declaration alongside other DAX-30 companies to substantially increase the representation of women, and has also become one of the first companies to adopt the United Nations Standards of Conduct for Business to tackle discrimination against lesbian, gay, bi, trans and intersex (LGBTI) people in 2017. The bank has voluntary, cross-divisional employee resource groups (ERGs) to accelerate the advancement of employees from traditionally underrepresented groups, allies who support those groups, and people who share a common purpose, interest or background.

Criteria

- [ ] Managerial or board level responsibility for diversity initiatives
- [x] Targeted recruitment
- [x] Training and guidance regarding diversity
- [x] Diversity initiatives that go beyond legal compliance
- [x] Employee affinity groups, diversity councils, or networking groups
- [ ] Mentorship programmes
- [x] Initiatives supporting a diverse workforce
- [x] Diversity monitoring or audits

Sources

Deutsche Bank Corporate Website, Diversity and Inclusion, www.db.com; accessed 14 September 2018

Deutsche Bank Human Resources Report 2017

Deutsche Bank Non-Financial Report 2017

S.1.3.1 - Gender Pay Equality Programme

29	9.00%	2.6
Raw Score	Weight	Weighted Score

This indicator score has been imputed while we complete the relevant research

Criteria

- [ ] Commitment to gender pay equality
- [ ] Global gender pay gap audit or compensation review
- [ ] Initiatives to close the gender pay gap
- [ ] Monitoring and measurement
- [ ] Quantitative targets and deadlines

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Appendix

Management Details

S.1.3.2 - Gender Pay Disclosure

19	4.50%	0.9
Raw Score	Weight	Weighted Score

This indicator score has been imputed while we complete the relevant research

Criteria

- [ ] Disclosure of the company's global mean (average) raw gender pay gap
- [ ] Disclosure of the company's global median raw gender pay gap
- [ ] Disclosure of ratio of basic salary and remuneration of women to men for specific employment categories (level or function)

S.1.4 - Collective Bargaining Agreements

25	4.50%	1.1
Raw Score	Weight	Weighted Score

Disclosure is insufficient to determine the percentage of the company's employees that are covered by collective bargaining agreements

S.1.5 - Employee Turnover Rate

0	4.50%	0.0
Raw Score	Weight	Weighted Score

The company's employee turnover rate is high

In 2017, Deutsche Bank's total staff turnover rate was 12.0%, and the voluntary staff turnover rate was 7.8%.

Sources

Deutsche Bank Human Resources Report 2017

S.1.5.2 - Human Capital Development

75	24.75%	18.6
Raw Score	Weight	Weighted Score

The company has a strong programme

Criteria

- [x] Initiatives for talent recruitment
- [x] Initiatives for talent development
- [x] Initiatives for talent retention
- [x] Regular formal performance reviews for all permanent employees aligned with career development
- [ ] Quantitative targets related to human capital development
- [x] Formal mechanisms to promote an open feedback culture
- [x] Reporting on human capital development metrics
- [ ] Reporting on human capital risk assessment

Sources

Deutsche Bank Human Resources Report 2017

S.1.6.1 - Employee Training

19	4.50%	0.9
Raw Score	Weight	Weighted Score

This indicator score has been imputed while we complete the relevant research

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Appendix

Management Details

Labour Relations Events

Category 2 Event - Moderate

Incident History

Locations: New York, NY, USA, United Kingdom, Singapore, Hong Kong, United States

Tags: Discrimination & Harassment, Labour Relations

Program manager lawsuit claiming dismissal over discrimination complaints
HR Dive - 21 March 2019

Settlement reached in lawsuit alleging ERISA violations
Law360 - 15 August 2018

Update: NY court partly grants summary judgment in ERISA lawsuit
PlanSponsor - 11 June 2018

Update: Class certification granted to lawsuit claiming ERISA violations
PLANSPONSOR.com - 07 September 2017

Former employee lawsuit over unpaid bonuses in UK court
Emirates-Business.ae - 26 April 2018

Former Asia co-head files lawsuit claiming wrongful dismissal
La Repubblica - 07 September 2016

Former Hong Kong executive files wrongful dismissal lawsuit
Bloomberg - 22 June 2016

Lawsuit over alleged unjust firing
Bloomberg - 23 September 2015

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Appendix

Exposure Details

Resilience

EA.E.29 - Resilience

0.02

Beta Signal

The company is involved in moderate-level controversies of this type, signaling higher exposure to this issue.

EA.F.1 - Operating Performance

0.03

Beta Signal

The company has a very weak net income margin.

Average Net Income Margin (2016-2018): -1.93%
Subindustry Median (2016-2018): 14.67%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.5 - Solvency - Banking

0.02

Beta Signal

The company has a weak Tier 1 capital ratio.

Tier 1 Capital Ratio (2018-2016): 14.47%
Subindustry Median (2018-2016): 15.97%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.6 - Asset Performance - Banking

- 0.02

Beta Signal

The company has a strong non-performing asset ratio.

Non-Performing Assets (2018-2016): 0.44%
Subindustry Median (2018-2016): 0.66%
Source: Morningstar, October 2019. All Rights Reserved.

EA.F.7 - Financial Flexibility - Banking

- 0.03

Beta Signal

The company has a very strong loan-to-deposit ratio.

Loan to Deposit Ratio (2018-2016): 0.73
Subindustry Median (2018-2016): 0.85
Source: Morningstar, October 2019. All Rights Reserved.

EA.S.1 - Qualitative Overlay

0.00

Beta Signal

The analyst did not apply a qualitative overlay.

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Appendix

Exposure Details

EA.S.2 - Subindustry Correction Factor

0.00

Beta Signal

EA.S.3 - Exceptional Event Adjustment

0.00

Beta Signal

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Appendix

Management Details

S.4.4.1 - Systemic Risk Management

100	20.25%	20.3
Raw Score	Weight	Weighted Score

Systemic risk management is very strong

Criteria

- [x] Board responsibility for risk management
- [x] Centralized risk management office
- [x] Clawback provisions linked to risk management
- [ ] Clawback provisions linked to all variable executive pay components
- [ ] Clawback provisions timeframe of at least three years
- [x] Variable executive compensation capped at 200% of fixed salary
- [x] Variable compensation payout timeframe of at least five years
- [x] Performance-based variable compensation
- [x] Employee risk training and awareness
- [x] Internal audit of risk management system

Sources

Deutsche Bank Annual Financial Statements and Management Report of Deutsche Bank AG 2017

S.4.4.2 - Systemic Risk Reporting

100	20.25%	20.3
Raw Score	Weight	Weighted Score

The company has a very strong systemic risk reporting

Criteria

- [x] Reporting adheres to best practices
- [x] Reporting on management of changing risk environment
- [x] Reporting on capital planning
- [x] Reporting on liquidity planning
- [x] Reporting on market risks
- [x] Reporting on credit risks

Sources

Deutsche Bank Annual Financial Statements and Management Report of Deutsche Bank AG 2017

S.4.4.3 - Tier 1 Capital Buffer

66	22.50%	14.9
Raw Score	Weight	Weighted Score

The company's core Tier 1 capitalization is strong

Deutsche Bank's fully loaded CET 1 ratio of 14.0% exceeds the minimum requirement of 9% by 5%.

Sources

Deutsche Bank Annual Financial Statements and Management Report of Deutsche Bank AG 2017

S.4.4.5 - Leverage Ratio

33	20.25%	6.7
Raw Score	Weight	Weighted Score

The company's leverage ratio is adequate

Deutsche Bank's leverage ratio of 3.8% exceeds the minimum requirement of 3% by less than 1%.

Sources

Deutsche Bank Annual Financial Statements and Management Report of Deutsche Bank AG 2017

S.4.4.8 - Asset Quality

75	6.75%	5.1
Raw Score	Weight	Weighted Score

The company's non-performing asset level is moderate

In 2017, non-performing assets represented 0.5% of Deutsche Bank's total assets.

Sources

Deutsche Bank Annual Financial Statements and Management Report of Deutsche Bank AG 2017

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Appendix

Management Details

Resilience Events

Category 2 Event - Moderate

Incident History

Locations: Germany, United States

Tags: Resilience

Company announces 18,000 job cuts as part of restructuring
Reuters - 07 July 2019

- **Update: US Federal Reserve investigation into bad bank plan**
  Financial Times - 24 June 2019
- **Update: Deutsche Bank announces restructuring to create a bad bank**
  Forbes.com - 17 June 2019
- **Update: EBA's 2018 stress test results show weak performance**
  Reuters UK - 02 November 2018
- **Update: ECB asks Deutsche Bank for costs of winding down investment bank**
  Financial Times - 16 April 2018
- **Update: Deutsche Bank to post 2017 net loss**
  Seeking Alpha - 05 January 2018
- **Update: Deutsche Bank successfully raised USD 8.5 from shareholders**
  Washington Post - 07 April 2017
- **Update: Plans to raise USD 8.5 billion in reorganization**
  Bloomberg - 05 March 2017
- **Update: ECB lowers CET 1 capital ratio requirement for 2017**
  Il Sole 24 Ore - 27 December 2016
- **Update: Bank allegedly received stress test concessions from ECB**
  New York Post - 10 October 2016
- **Update: Shareholder concerns regarding capital raising strategy**
  Financial Times - 15 September 2016
- **Update: ECB 2016 stress test reveal weak performance**
  Business Times Singapore - 30 July 2016
- **Update: Bank reports annual loss**
  Business Times Singapore - 21 January 2016

US Federal Reserve lifts restriction after the bank passes stress test
Reuters UK - 27 June 2019

- **Update: US regulators grant additional year for submission of living will**
  Reuters - 30 August 2018
- **Update: US unit fails second part of 2018 Fed stress test**
  New York Times - 28 June 2018
- **Update: US regulators add US subsidiary to federal problem bank list**
  Financial Times - 31 May 2018
- **Update: US unit passes US FED 2017 stress test**
  Yahoo! Canada - 22 June 2017
- **Update: 2016 US Federal Reserve stress test failure**
  American Banker - 29 June 2016
- **Update: US Federal Reserve 2015 stress test failure**
  Wall Street Journal - 02 March 2015

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Deutsche Bank AG

Diversified Banks | Germany | ETR:DBK

GLOSSARY OF TERMS

Beta (Beta, β)
A factor that assesses the degree to which a company's exposure deviates from its subindustry's exposure on a material ESG issue. It is used to derive a company-specific issue exposure score for a material ESG issue. It ranges from 0 to 10, with 0 indicating no exposure, 1 indicating the subindustry average, and 10 indicating exposure that is ten times the subindustry average.

Corporate Governance Pillar
A pillar provides a signal about a company's management of a specific Corporate Governance issue.

ESG Risk Category
Companies' ESG Risk Rating scores are assigned to five ESG risk categories in the ESG Risk Rating:

- **Negligible risk**: enterprise value is considered to have a negligible risk of material financial impacts driven by ESG factors
- **Low risk**: enterprise value is considered to have a low risk of material financial impacts driven by ESG factors
- **Medium risk**: enterprise value is considered to have a medium risk of material financial impacts driven by ESG factors
- **High risk**: enterprise value is considered to have a high risk of material financial impacts driven by ESG factors
- **Severe risk**: enterprise value is considered to have a severe risk of material financial impacts driven by ESG factors

Note that because ESG risks materialize at an unknown time in the future and depend on a variety of unpredictable conditions, no predictions on financial or share price impacts, or on the time horizon of such impacts, are intended or implied by these risk categories.

ESG Risk Rating Score (Unmanaged Risk Score)
The company's final score in the ESG Risk Rating; it applies the concept of risk decomposition to derive the level of unmanaged risk for a company.

Event Category
Sustainalytics categorizes events that have resulted in negative ESG impacts into five event categories: Category 1 (low impact); Category 2 (moderate impact); Category 3 (significant impact); Category 4 (high impact); and Category 5 (severe impact).

Event Indicator
An indicator that provides a signal about a potential failure of management through involvement in controversies.

Excess Exposure
The difference between the company's exposure and its subindustry exposure.

Exposure
A company or subindustry's sensitivity or vulnerability to ESG risks.

Idiosyncratic Issue
An issue that was not deemed material at the subindustry level during the consultation process but becomes a material ESG issue for a company based on the occurrence of a Category 4 or 5 event.

Manageable Risk
Material ESG risk that can be influenced and managed through suitable policies, programmes and initiatives.

Managed Risk
Material ESG Risk that has been managed by a company through suitable policies, programmes and initiatives.

Management
A company's handling of ESG risks.

Management Gap
Refers to the difference between what a company has managed and what a company could possibly manage. It indicates how far the company's performance is from best practice.

Management Indicator
An indicator that provides a signal about a company's management of an ESG issue through policies, programmes or quantitative performance.

Material ESG Issue
A core building block of the ESG Risk Rating. An ESG issue is considered to be material within the rating if it is likely to have a significant effect on the enterprise value of a typical company within a given subindustry.

Subindustry
Subindustries are defined as part of Sustainalytics' own classification system.

Unmanageable Risk
Material ESG Risk inherent from the intrinsic nature of the products or services of a company and/or the nature of a company's business, which cannot be managed by the company if the company continues to offer the same type of products or services and remains in the same line of business.

Unmanaged Risk
Material ESG risk that has not been managed by a company, and includes two types of risk: unmanageable risk, as well as risks that could be managed by a company through suitable initiatives, but which may not yet be managed (management gap).

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Santa Clara Valley Water District

File No.: 20-0682

Agenda Date: 8/11/2020
Item No.: 2.9.

BOARD AGENDA MEMORANDUM

SUBJECT:
Receive Information and Authorize Staff to Proceed with Negotiation and Execution of Bank Line(s) of Credit with Aggregate Stated Amount Not to Exceed $200 Million. (Continued from July 28, 2020)

RECOMMENDATION:

A. Receive information regarding bank line(s) of credit solicitation; and
B. Authorize staff to proceed with negotiation and execution of bank line(s) of credit with aggregate stated amount not to exceed $200 Million.

SUMMARY:
Executive Summary

On April 28, 2020, the Santa Clara Valley Water District's (Valley Water) Board of Directors authorized staff to proceed with issuing a request for proposal (RFP) for bank line(s) of credit up to $200 million to provide backup liquidity for Valley Water's capital improvement program and general financing needs in light of the ongoing economic uncertainties related to the COVID19 pandemic (Resolution 20-11). The results of the RFP were presented to the Board at its meeting on June 9, 2020 where the Board directed staff to conduct additional research regarding the environmental, social and governance (ESG) policies of each of the five banks (MUFG Union Bank, JPMorgan Chase, US Bank, UBS and Bank of America) who responded to the RFP and return to the Board to present this additional analysis.

Staff evaluated the ESG ratings provided by professional ESG research firms and recommends that the Board consider the "Average/Medium" ratings that each bank received from the ESG research firms be the basis of eligibility for the bank line(s) of credit RFP (see Attachment 1 for ESG evaluation criteria). From a business terms and pricing perspective, the most favorable proposal was submitted by MUFG.

Staff requests Board approval to proceed with negotiations and execution of bank line(s) of credit for an amount up to $180 million provided by a lead bank and an additional $20 million syndicated loan reserved for small local banks, for a total bank line(s) of credit amount not to exceed $200 million. Staff recommends that the order of negotiations follow the pricing and terms ranking as outlined in Table 2 below. For example, should negotiations with MUFG, the highest ranked bank, be unsuccessful, staff would begin negotiations with the next highest ranked bank, JPMorgan, and move

to the next highest ranked bank until a successful line of credit is negotiated with a lead bank. After a lead bank is selected, staff would work with the lead bank to develop a small local bank/credit union loan syndication program for $20 million.

Analysis

Staff conducted research and reached out to each bank to obtain additional information regarding each bank's ESG policies and practices. Staff also invited the banks to review the June 9, 2020 board agenda memorandum and the recorded meeting and enquired whether the banks would like to submit any updates to their fee proposals and business terms in light of the information provided in the board meeting. The ESG information and business terms for each bank are summarized in Tables 1 and 2 below. The revised summary of key business terms proposed by the banks are provided in Attachment 2. The details of each bank's ESG response are provided in Attachments 3 - 7.

Staff recommends that the Board consider all five banks to be eligible for doing business with Valley Water from an ESG ranking perspective as they each received at least an "Average/Medium" ranking from one of the three professional ESG research firms. A summary of the typical ESG evaluation criteria is provided in Attachment 1.

Table 1 - ESG Rankings

	MUFG Union Bank	**JPMorgan Chase Bank**	**US Bank**	**UBS AG, Stamford Branch**	**Bank of America**
1. Sustainalytics ESG Risk	Medium	Medium	Medium	High	Medium
2. MSCI ESG Rating	Average	Average	Average	Average	Average
3. Corporate ESG Policy	Attach 3 p10 - 11 and 14 - 28	Attach 4 p1 links	Attach 5 P1 - 6	Attach 6 p3 - 4 and p6 - 242	Attach 7 P9 - 56
4. Santa Clara County # Employees	117	902	297	47	536
5. Bay Area # Employees	1,099	2,700	1,306	262	6,075

From a cost and business terms perspective, MUFG offers the most favorable fees and business terms. As demonstrated in Table 2 Line 4, the maximum annual undrawn fee proposed by MUFG for a $180 million line of credit is $860,000 lower than JP Morgan's proposal. US Bank, UBS and Bank of America each offered lower line of credit principal amounts; therefore Line 4 is not applicable to these three banks. UBS and Bank of America offered a one-year term only, which is not as favorable as the two- to three-year terms offered by MUFG and JP Morgan.

US Bank amended the offer to $75 million maximum amount for a 1.5 to 2.5 year term, hence US Bank's ranking was updated to third place, ahead of UBS. In terms of potential early termination fee, MUFG does not impose a fee if Valley Water chooses to terminate the line of credit after one full year of contract term, whereas JP Morgan requires that the undrawn fee for the remaining contract term be paid to the bank with an early termination. This means that if Valley Water signs a three-year contract and terminates after year one, MUFG would not charge an early termination fee whereas JP Morgan would charge an early termination fee for the remaining two years term at $1.4 million per year for a total of $2.8 million termination fee. Note that JP Morgan's range of estimated costs per $50 million line of credit provided in Table 2 Line 3 has been updated to a range of $0.41 million to $1.23 million to reflect the 0.75% index floor rate submitted by the bank as part of their business terms update after reviewing the June 9, 2020 board agenda memorandum. The index floor rate has the effect of increasing the draw fee for the line of credit. MUFG is the only bank that did not required an index floor fee. For further details of the fees and business terms, please refer to Supplemental Attachment 2.

Staff has reached out to the five banks to request extensions for the pricing proposals to accommodate the July 28, 2020 board meeting. Four of the banks have agreed to extend the proposals, except UBS, whose proposal expired on June 10, 2020.

Table 2 - Fee Proposal and Business Terms
$ Millions (M)

	MUFG Union Bank	**JPMorgan Chase Bank**	**US Bank**	**UBS AG, Stamford Branch**	**Bank of America**
Business Terms Rankings	**1**	**2**	**3**	**4**	**5**
1. Max Principal	$180	$180	$75	$50	$75
2. Tenor	2 or 3 years	1, 2 or 3 years	1.5 or 2.5 years	1 year	1 year
3. Estimated Annual Cost per $50M Credit*	$0.17-$1.22	$0.41 - $1.23	$0.24 - $1.10	$0.36 - $0.96	$0.38 - $1.18
4. Undrawn Fee for $180M Principal **	$0.54	$1.4	N.A (max principal $75M)	N.A (max principal $50M)	N.A (max principal $75M)
5. Updated Terms	No change; proposal extended to 7/28/20	See updates in Attach 2; proposal extended to 7/28/20	See updates in Attach 6; proposal extended to 7/28/20	Proposal expired 6/10/20	No change; proposal extended to 7/28/20

*Estimated annual cost per $50M credit is calculated based on several key assumptions, including the assumed index rates (SIFMA, 1M-LIBOR, 3M-LIBOR) as of May 22, 2020, and whether the facility will be drawn on a tax-exempt vs. taxable basis (range shown

demonstrates zero draw vs. $50M draw for each of the banks). Actual annual costs will change pending the principal amount, future index rates and the utilization of the credit facility.

**Undrawn fee for $180 million principal demonstrates the total undrawn fee paid to maintain up to $180 million line of credit for an entire year. Line 4 of Table 2 is not applicable (N.A.) for US Bank, UBS and Bank of America as these banks offer maximum credit of $75/$50/$75 million respectively.

Small/Local Financial Institution Participation

Staff requested each of the banks to respond to the option of acting as a lead bank to provide syndicated loan participation by small local banks/credit unions, and any other ideas the bank may have to encourage participation. Each of the bank's responses is summarized in Table 3 below.

Table 3 - Response to Loan Syndication

MUFG	MUFG will provide up to $180 million line of credit and act as lead bank for an additional $20 million syndicated loan to a local bank partner designated by Valley Water. The fee paid to both MUFG and the local partner must be the same to avoid bank regulatory issues, subject to additional bank counsel fees and administrative fees.
JPMorgan	JPMorgan is willing to provide $180 million of credit and to act as lead bank in syndicating an additional $20 million. All banks in the syndication would need to receive the same terms as JPMorgan, subject to negotiations.
US Bank	U.S. Bank is willing to enter into a syndicated Facility as Agent Bank, subject to further negotiations.
UBS	UBS would use its best efforts to consider acting as a lead bank to offer an additional $20 million syndicated loan to small and local banks/credit unions, subject to legal review and negotiations, as well as additional bank counsel fees.
Bank of America	Bank of America is willing to act as a lead arranger with other financing partners, on the basis of several, but not joint liability, subject to parity pricing, covenants, events of defaults and remedies amongst the Lenders, and a fee approximately 0.05% of the total arranged commitment amount and estimated legal fees of $75,000 plus $10,000 per additional bank (assuming common bank counsel).

With the Board's approval for staff to proceed with the selection of the lead bank, staff will work with the selected bank to develop a syndicated loan for small and local banks/credit unions participation of up to $20 million line of credit capacity.

FINANCIAL IMPACT:
Funding for the bank fees are included in the Fiscal Year 2020-2021 Budget for the following projects:

26993001 Tax-Exempt Commercial Paper (Fund 26 Safe, Clean Water Program)
95993007 Tax-Exempt Commercial Paper (Fund 61 Water Utility)

95993008 Taxable Commercial Paper (Fund 61 Water Utility)

Staff will make best efforts to manage banking fees within the adopted FY 2021 budget for debt service, but if the annual banking fees exceed $1 million, staff may need to return to the Board with a budget adjustment in mid FY 2021.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonably foreseeable indirect physical change in the environment

ATTACHMENTS:
Attachment 1: PowerPoint
Attachment 2: Revised Bank Proposals
Attachment 3: MUFG ESG Response
Attachment 4: JPM ESG Response
Attachment 5: US Bank ESG Response
Attachment 6: UBS ESG Response
Attachment 7: Bank of America ESG Response

UNCLASSIFIED MANAGER:
Darin Taylor, 408-630-3068

Valley Water

Clean Water • Healthy Environment • Flood Protection

Bank Line(s) of Credit and ESG Evaluation

Presented by: **Charlene Sun**, Treasury and Debt Officer

Valley Water

Recommendation

A. Receive information regarding bank line(s) of credit solicitation; and

B. Authorize Staff to Proceed with Negotiation and Execution of Bank Line(s) of Credit with Aggregate Stated Amount Not To Exceed $200 Million

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Environmental, Social, Governance (ESG) Evaluation Criteria

- Professional ESG research firms use proprietary data collection and evaluation criteria to assign ESG ratings
- "Average or Medium" ESG rating signals that the company has implemented ESG policies and management practices that result in a medium level of ESG risk exposure.
- Sample ESG criteria:

ESG Criteria	Description
Corporate Governance	Factors evaluated include: Board and executive management quality and integrity, structure, ownership and shareholder rights, compensation, audit and financial reporting and stakeholder governance
Business Ethics	Factors evaluated include: money laundering policy, bribery & corruption policy, business ethics and compliance to law, whistleblower policy, lobbying and political expenses, accounting and taxation policies, anti-competitive practices, and sanctions against the company

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ESG) Evaluation Criteria - continued

ESG Criteria	Description
Product Governance	Factors evaluated include: socially responsible product design and marketing practices, cybersecurity policies, quality and safety practices, fair billing and post sale responsibility to customers and stakeholders
Data Privacy and Security	Factors evaluated include: data governance practices and policies regarding the collection, use and management of protected customer data
ESG Integration - Financials	Factors evaluated include: environmental/social/carbon/human rights impact of products, financial inclusion, credit and loan standards, responsible investment program, sustainable financial initiatives and responsible asset management
Human Capital	Factors evaluated include: management of human capital, labor relations, non-discriminatory policies, working conditions, employee training, minimum wage/compensation policies, collective bargaining, gender equality and diversity programs
Resilience	Factors evaluated include: financial management policies and practices that promotes compliance with regulatory capital requirements, solvency, operational resilience, leverage and financial flexibility

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Summary

- All five banks have ESG ratings of “Average/Medium”
- Staff requests Board approval to proceed with negotiations for $180 million line of credit with a Lead Bank
  - Lead Bank negotiation starting with MUFG, highest ranked firm for pricing/terms, move to next highest if needed
  - Work with Lead Bank to develop $20 million syndicated loan reserved for small local banks

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QUESTIONS

Valley Water

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Attachment 2 - Revised Bank Proposals Summary

Note: Cells with yellow highlights denote updates from the 6/9/2020 Board Agenda Memorandum, Supplemental Attachment 1

	Staff Ranking	**1**	**2**	**3**	**4**	**4**
	Bank	**MUFG**	**JPMorgan**	**U.S. Bank**	**UBS**	**Bank of America**
1	**Long- / Short-Term Ratings**					
	Fitch	A/F1 (negative)	AA/F1+ (negative)	AA-/F1+	AA-/F1+	AA-/F1+ (stable)
	Moody's	A2/P-1 (negative)	Aa2/P-1 (stable)	A1/P-1	Aa3/P-1	Aa2/P-1 (stable)
	S&P	A/A-1 (stable)	A+/A-1 (stable)	AA-/A-1+	A+/A-1	A+/A-1 (stable)
2	**Credit Amount**	**$180,000,000**	**$180,000,000**	**$75,000,000**	**$50,000,000**	**$75,000,000**
3	**Unutilized Fee %**	0.300%	0.75% / 0.775% / 0.80%	0.4%/0.45%	0.600%	0.650%
4	**Tax-exempt rate**					
	Index	81% of 1M-LIBOR	80% of 1M-LIBOR	85% of 1M-LIBOR	3M-LIBOR	SIFMA
	1 year (364-days)	NA	1.500%	1.300%	1.300%	1.500%
	2 years	1.850%	1.550%	1.450%	NA	NA
	3 years	2.250%	1.600%	NA	NA	NA
5	**Taxable rate**					
	Index	1M-LIBOR	1M-LIBOR	1M-LIBOR	3M-LIBOR	1M-LIBOR
	1 year (364-days)	NA	1.800%	1.550%	1.300%	1.500%
	2 years	1.850%	1.850%	1.700%	NA	NA
	3 years	2.250%	1.900%	NA	NA	NA
6	**Index Floor**	Not requested	0.750%	0.500%	0.500%	0.750%
7	**Base Rate**	Greater of (1) Prime +2.0%; (ii) Fed Funds Rate +4.0%; and (iii) 7.5%	The highest of (i) JPMorgan's Prime Rate plus 1.50% p.a.; (ii) the Federal Funds Rate plus 2.00% p.a.; or (iii) 7.50% p.a.	Greater of (1) Prime +1.0%; (ii) Fed Funds Rate +2.0%; and (iii) 7.5%	Greater of (1) Prime +1.0%; (ii) Fed Funds Rate +2.0%; and (iii) 7.5%	Greater of (1) Prime +1.00%; (ii) Fed Funds Rate +2.00%; and (iii) 7.0%
8	**Bank/Advance Rate**					
	Days 1 - 30	Base Rate	Days 1-180: Base Rate	Base Rate	Base Rate	not applicable
	Days 30 - 60	Base Rate + 1.0%		Base Rate	Base Rate	
	Days 60 - 90	Base Rate + 1.0%		Base Rate	Base Rate	
	Days 90 - 180	Base Rate + 1.0%		Base Rate + 1.0%	Base Rate	
	Days 181+	Base Rate + 1.0%	Days 181+: Base Rate plus 1.00% p.a.	Base Rate + 2.0%	Base Rate + 1.0%	
	Days 365+				Base Rate + 2.0%	
9	**Default Rate**	Base Rate + 2.0%	Base Rate plus 3.00% p.a.	Base Rate + 4.0%	Base Rate + 3.0%	Base Rate + 5.0%
10	**Failure to Close Fee**	Not specified	$7,500 if mandated and before deilivery of 1st draft	Not specified	Not specified	Not specified
11	**Terminination Fees**	During 1st year	Balance of Untilized Fee for remaining term	During first 6 months for the 1.5 year tenor or 1st year for the 2.5 year tenor	During 1st 6 months Advances are subject to termination costs	None
12	**Extension**	No greater than 180 days and no less than 90 days prior to the expiration date	A renewal request may be made in writing by no more than 120 days prior to the expiration date of the facility	No earlier than 120 days prior to the expiration date	Not less the 60 days prior to the expiration date (renewal for one year)	Not specified
13	**Term Out Period**	5 years	5 years	3 years or when Parity Debt, Certificates of Participation or other debt is issued	2 years Begins no later than advance	None
14	**Downgrade Provisions Credit Rating Levels**	Unutilized fee and Spread increases are cumulative for each level of downgrade	Increases to the initial unutilized fee rate / applicable spread, respectively	Increases to the initial unutilized fee rate / applicable spread, respectively	Commitment fee increases are cumulative for each level of downgrade	Unutilized fee and Spread increases are cumulative for each level of downgrade
1	**AA+**	0.000%	0.00% / 0.00%	0.00% / 0.00%	0.000%	0.000%
2	**AA**	0.000%	0.10% / 0.20%	0.05% / 0.05%	0.000%	0.200%
3	**AA-**	0.050%	0.20% / 0.40%	0.10% / 0.10%	0.000%	0.200%
4	**A+**	0.050%	0.30% / 0.60%	0.25% / 0.25%	0.100%	0.200%
5	**A**	0.100%	0.40% / 0.80%	0.35% / 0.35%	0.100%	0.200%
6	**A-**	0.200%	0.50% / 1.00%	0.45% / 0.45%	0.000%	0.200%
7	**BBB+**	1.000%	0.60% / 1.20%	0.60% / 0.60%	0.200%	0.200%
8	**BBB**	0.500%	0.70% / 1.40%		0.250%	0.200%
9	**BBB-**	1.500%	0.80 / 1.60%		0.250%	0.200%
	Below BBB-	Ratings withdrawal or suspension increase to lowest level (below BBB-), or Event of Default +1.50%	In the event the rating assigned by Moody's, S&P, or Fitch is withdrawn, suspended or otherwise unavailable, (i) the unutilized fee rate shall be increased immediately, without notice, by an additional 1.00% p.a. and (ii) the interest rate on advances shall increase to the Default Rate.	If one or more of the ratings on Parity Debt are withdrawn or suspended for credit related reasons, or any such rating shall be reduced below BBB+/Baa1 or upon the occurrence of any other event of default under the Agreement, the Unused Fee shall increase by an additional 3.00% from the Unused Fee corresponding to Level 7. Advances shall bear interest at the Default Rate.	Ratings withdrawal, suspension or reduction below BBB- , or Event of Default 3.00%	Ratings withdrawal or suspension, or Event of Default +1.50%

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Supplemental Environmental, Social and Governance information prepared for The Santa Clara Valley Water District

June 12, 2020

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June 12, 2020

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Re: **Supplemental ESG Information for Santa Clara Valley Water District**

Charlene and Ed,

MUFG Union Bank is pleased to supply the enclosed supplementary information requested by the District. We are proud of our ESG achievements, and senior management has deliberately focused this entire global financial institution on environmentally and socially responsible action.

Attached are several documents that make clear MUFG Union Bank's firm policies to address climate change, increase Diversity and Inclusivity, and act for social good around the world.

First is a short presentation documenting the concrete steps taken to realize these global goals. Please note slide 3 of Section 1 details the "MSCI ESG Index" rankings, which include large financial institutions that participate in Public Finance Revolving Lines of Credit (RLC), such as solicited by the Water District.

Section 2 is a profile of MUFG Union Bank's presence in the Nine-County Bay Area community. I attended the Board Meeting by phone on Tuesday and understand the District's desire to work with local entities to support the area workforce. I would respectfully submit that MUFG Union Bank is both the most economic provider of the RLC and a local bank heavily invested in the community.

Section 3 contains our most recent annual Corporate Social Responsibility ("CSR") Report, which is a detailed profile of our investments in local communities and the ways we "give back" everywhere we work. Note that the CSR report is dated March 31, 2019, so its statistics are somewhat dated. The 2020 annual update's publication has been delayed by the global pandemic.

Last, included as Section 4, is a press release from 2019 that lays out the specifics of our worldwide Sustainable Finance framework for the ongoing re-balancing away from fossil fuels and towards renewable energy sources (in addition to prohibiting Palm Oil Plantation and cluster-munition financings). This was a great vote of confidence from our senior leaders to all of our global governmental and corporate partners, but also to the MUFG Union Bank employees in California and around the world.

On the following page are direct answers to your inquiries earlier this week. Please let me know if you have any questions or would like additional information.

Nicholas Boyle
Managing Director – Public Finance
MUFG Union Bank, N.A.

1. What is the Bank's response to Banktrak's rankings (attached)? Have you or do you plan on implementing any changes to address the issues raised by Banktrak?

   MUFG is in the midst of an ongoing transformation to become a top-ranked ESG provider of financial services. For a number of reasons, we'd like to refer the District to the "MSCI ESG Ratings" for financial institutions (See Section 1, page 3). There MUFG is in the middle of the pack because we are on a journey to re-shape our lending portfolio to match all the ethics and values summarized by ESG. MUFG has been in business for 350 years; MUFG Union Bank has been a San Francisco-headquartered bank for 150 years. We take the long view, and addressing climate change, Inclusion and Diversity, and local community re-investment is the long view.

   The BankTrack Human Rights ranking seems to rely heavily on information voluntarily provided to the Netherlands-based organization, and its criteria necessarily favor those banks with limited business lines. For example, Rabobank limits its lending to agriculture and food production outside of the Netherlands. Thus a Human Rights Due Diligence process for food production corporations in the United States (the only domestic business to which Rabobank lends) is applied to a sector already geographically and intrinsically free of such violations. MUFG, on the other hand, conducts Enhanced Due Diligence whenever necessary to spot ethical violations across approximately 50 business lines supporting nearly every major business sector in the United States.
   There is one glaring example that points to this potentially tilted playing field: The Royal Bank of Canada. BankTrack ranks it among the lowest performing Human Rights institutions in the world. Having competed against and known reputable bank officials with RBC for years, it boggles the mind that this could be an accurate reflection of the largest Canadian Bank's Human Rights record. We suspect that BankTrack simply doesn't have RBC's information, while they may have a surfeit of information from the top two banks – both headquartered in the Netherlands.

   MSCI, on the other hand, is a statistically rigorous provider of Indexes to an array of businesses and industry sectors. Based in New York City, MSCI transparently discloses their criteria and bases their entire existence on the validity and reliability of their data. We have provided a link to their website in Section 1.

2. What is the Bank's response to Bloomberg's rankings (attached)? Have you or do you plan on implementing any changes to address the issues raised by Bloomberg?

   The Bloomberg ranking appears to be a translation of an in-Country Japanese financial institution assessment. Some of the banks listed are smaller entities focused on sub-regions within Japan. We have no insight into the inputs, but would only note that the # of employees listed for MUFG -- +/- 2400 – is extremely off the mark for the Bank, which is the largest bank in Japan.

3. Are there any other ESG information the bank wishes to provide? For example, how many branches/employees does the bank have in Santa Clara County and the 9 Bay area counties? Does the Bank have any social responsibility (corporate policies) policies that can be shared with the Board?

   Please see the aforementioned MSCI Index in Section 1 (page 3). For the retail branch and employee count information in the Nine-County Bay Area, please see Section 2. And please see Section 3 for our most recent CSR Report.

4. Will the bank consider offering Valley Water credit up to $180million, and, act as a lead bank to offer an additional $20 million syndicated loan to small and local banks/credit unions? The syndication agreement would be between the lead bank and the local banks. The pricing for the local banks is subject to discussion, and may be higher than pricing for the lead bank given the District board's desire to incentivize small local banks participation. If not, does the bank have other ideas/mechanisms to involve small local banks participation in the line of credit business?

   MUFG Union Bank is agreeable to providing the face amount of $200,000,000, and then partnering with another Bank as a $20,000,000 "participant" designated by the District. Participations are an efficient way for the District to manage a two-bank solution because MUFG Union Bank is the only touchpoint for District staff. In this structure, the participant would risk participate in $20MM of the exposure held by MUFG and be paid a pro rata fee through a bilateral agreement between the participant and MUFG Union Bank. It is not market practice, however, to have a higher price paid to the participant bank than paid to the "fronting" bank (and could raise regulatory issues).
   If the District wished to set up a separate facility directly with the second Bank, it could achieve the goal of paying that Bank more, but that would also incur an additional Bank Counsel Fee, as well as the internal administrative costs of managing the two facilities on an ongoing basis.

   We'd also like to take this opportunity to suggest why the District has had difficulty finding a small local bank to provide an RLC. It comes down to cost: Offering RLCs and liquidity has become the most minutely regulated product set in the banking sphere. The capital requirements imposed by the Bank of International Settlements (Basel III) have made all the largest banks better capitalized, but a perhaps-unintended effect is the required provision of expensive "buffer assets" and "liquidity premiums" to each and every RLC. We'd suggest, therefore, that very small local banks may be willing but financially unable to sell an RLC to the District.

5. Will the bank consider revising the fee proposal after reviewing the 6/9 Staff Report summarizing the results of the RFP? If so, please submit your revised fee proposals along with the information requested here by 10 am on June 15, 2020.

   We're very pleased to be an ongoing partner with the District's as full-banking and CP credit/liquidity provider. We will decline the opportunity to revise our fee proposal, since we believe we are the most compelling economic and socially responsible proposer to the District.

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Section 1 ESG Overview

ESG Overview

June 2020

Sustainable Finance

MUFG is aligning core businesses to key external standards such as Green Loan Principles, Green Bond Principles, and Social Bond Principles.

Environment

MUFG serves businesses contributing to the mitigation of and adaptation to climate change – including renewable energy, improving energy efficiency, green buildings, and sustainable agriculture – through arranging sustainability-linked loans, project finance for renewable energy, and underwriting and distribution of green bonds..

Society

We partner with clients contributing to the development of startups, job creation, and poverty alleviation, including those that:

- Contribute to revitalizing local communities
- Provide fundamental services (e.g. public transport, water infrastructure, and airports) and essential services such as hospitals, schools, and local law enforcement

MUFG serves these clients through our Emerging Industrial Technology Support Program and the MUFG Regional Revitalization Fund.

Sustainable finance goals

MUFG aims to provide a cumulative **20 trillion yen** in Sustainable Finance by 2030.

- Of this, 8 trillion yen is for environment projects between FY2019 and FY2030 to help build a sustainable society and attain the Sustainable Development Goals (SDGs) through our client services.
- This goal builds on a decade of MUFG being ranked in the top tier of global lending for clean energy.
- In 2019 MUFG Americas achieved its USD 25 billion, five-year Environmental Finance goal, one year ahead of schedule.

MSCI ESG Ratings, June 2020[1]

Financial Institutions	MSCI Grades
UBS Bank	AA
Mizuho	A
PNC	A
SMFG	A
Citigroup	BBB
MUFG Union Bank	BBB
Bank of America	BB
Fifth Third	BB
JPMC	BB
US Bank	BB
Wells Fargo	CCC

1) MSCI ESG Ratings, June 2020. See: https://www.msci.com/esg-ratings

Environmental and Social Policy Framework

MUFG's Environmental and Social Policy Framework outlines specific risk management measures that the bank is taking as a steward of environmentally sustainable products and services.

MUFG has committed to:

Not providing financing for new coal-fired power generation projects, and gradually reducing the balance of MUFG's exposure to coal-fired power generation projects

Confirming as Restricted Sectors subject to enhanced due diligence: Forestry, palm oil, coal-fired power, thermal coal mining, oil sands, Arctic oil and gas development, and large hydropower generation

Commitment to clean energy and the environment

MUFG has led and participated in a number of key initiatives to support a greener world.

The Equator Principles

Supporting environmental and social risk management of customers developing large-scale projects through promoting and providing leadership for an international framework based on World Bank standards – the Equator Principles

Leverage our financing function

Contributing to the development of projects that do not use fossil resources and the dissemination of renewable energy, while also committing to disclose and manage climate change risks in our overall loan portfolio through the Taskforce on Climate-related Financial Disclosures

Promote consulting services related to climate change

Bringing our knowledge as a top global advisor on the Kyoto Protocol Clean Development Mechanism and its financial functions, to actively promote initiatives under the Joint Crediting Mechanism, and leveraging our accreditation by the UN Green Climate Fund on behalf of clients

Environmentally-conscientious products and services

Working behind the scenes to reduce environmental impacts by providing products and services to customers who aim to be environmentally conscious

Reduce the environmental impacts of our business activities

Actively seeking to reduce environmental burdens related to our own business activities – including reducing greenhouse gas emissions and purchasing electricity produced by renewable energy for our own use

Support environmental education and preservation

Helping to preserve UNESCO World Heritage Sites and provide opportunities to learn about sustainability

Section 2 Bay-Area Presence

MUFG Union Bank Bay-Area Presence

Branches and Employees in the Nine-County Bay Area

County	Number of Branches	Number of Employees[1]
Alameda	7	171
Contra Costa	7	193
Marin	5	22
Napa	0	0
San Francisco	5	551
San Mateo	7	31
Santa Clara	16	117
Solano	1	7
Sonoma	1	7
Total	**49**	**1,099**

1) In addition to the full-time employees listed above, MUFG Union Bank employs approximately 31 part-time and contracted consultants in the Bay Area.

Note: MUFG has ~180,000 employees globally and a total of ~13,700 employees in the United States. The Bank employs ~7,400 Californians.

Section 3

Corporate Social Responsibility Annual Report, 2019

MUFG IN THE AMERICAS

2018 CORPORATE SOCIAL RESPONSIBILITY (CSR) REPORT

April 1, 2018–March 31, 2019

Building a vibrant future

MUFG UnionBank

A message from our leadership

Throughout 2018, MUFG continued to strengthen communities across the Americas with strategic investments in the key areas of affordable housing, economic development, youth development, environmental sustainability, and inclusion and diversity. Our initiatives, programs, and partnerships aim to drive lasting change and improve economic, social, and environmental well-being. Amid a rapidly changing world, our commitment to our communities remains steadfast and is at the heart of who we are, working as a responsible corporate citizen to help uplift the communities and the people we serve.

Steve Cummings
Regional Executive for the Americas
Mitsubishi UFJ Financial Group, Inc.

Julius Robinson
Head of CSR for the Americas
MUFG Union Bank, N.A.

Our business

Total assets in the Americas: **$339.7 billion**

351 retail and commercial branches

24 wholesale locations in 8 countries

22 PurePoint Financial centers

19,622 staff members in the Americas

MUFG Americas Regional Executive Steve Cummings speaks to a group of students at Baruch College, of the City University of New York, where MUFG funded scholarships for entrepreneurship students. The Chronicle of Higher Education has ranked Baruch #1 in the United States for four years in a row in helping students move out of poverty.

Steve volunteered as part of MUFG Gives Back, an annual month-long global campaign that provides opportunities for MUFG employees to serve their communities.

On the cover: MUFG Marketing Officer Mario Martinez (left) congratulates Ja'Doni Lewis (middle) and Christian Tolbert (right) on their participation in the inaugural Youth Entrepreneurial Challenge in Los Angeles. The Challenge offered local high school students an opportunity to pitch their business ideas before a panel of judges, which included successful entrepreneurs.

2018 CSR highlights (calendar year 2018 except as noted)

$41 billion
in total commitments under our 5-year Community Service Action Plan

$19 million
in donations supporting nonprofit organizations in targeted sectors

48,213 volunteer hours
for 1,387 local organizations

$1.07 billion
in loans to small businesses and farms

$234 million
of discretionary spending to minority-, women-, and veteran-owned business enterprises

$1.95 billion
in loans and investments to support affordable housing, both single- and multi-family

$380 million
in economic development equity investments

Ranked #1
Global Clean Energy Lead Arranger, Bloomberg New Energy Finance

2018 Global Green Loans Bookrunner, Bloomberg

$11.1 billion
in environmentally sustainable finance

325 internship program graduates
from our five student-run high school branches since 2011

34% reduction
in absolute greenhouse gas emissions (fiscal year 2018)

Commitment to Inclusion & Diversity
Listed in 2019 Bloomberg Gender-Equality Index for 3rd consecutive year

Perfect score on HRC Corporate Equality Index for 6th consecutive year

SMALL BUSINESS

Supporting the engines of prosperous communities

Making up 99 percent of the private sector, small businesses are the economic engines of our communities. MUFG has a longstanding commitment to ensuring that local businesses have access to the resources they need to start, grow, and thrive.

To advance this priority, MUFG provided a three-year grant totaling $300,000 to PeopleFund, a community development financial institution, to open and operate the MUFG Union Bank Women's Business Assistance Center in Dallas in 2016. The funds covered operational set-up of the center and development of training courses and workshops, as well as other technical assistance to women-owned businesses in the Dallas-Fort Worth area. The center provides a comfortable and collaborative co-working space as well as business advisory services. In 2018, MUFG provided a $1-million CSR loan to the center to enable more women to access capital.

Since the center opened, it has helped hundreds of women shape their ideas into businesses, scale and grow their start-ups, secure capital, and improve their financial position.

MUFG executives Bobbie Salgado (second from the right) and Sylvia Castillo (second from the left) and community leaders from PeopleFund celebrated the grand opening of the MUFG Union Bank Women's Business Assistance Center in Dallas, Texas. By investing in PeopleFund, MUFG is helping local women entrepreneurs reach their goals. In the Dallas-Fort Worth area, one-fourth of the half a million small businesses are owned by women.

MUFG executives, San Diego elected officials, business leaders, and aspiring entrepreneurs celebrate the announcement of a three-year MUFG grant totaling $300,000 to the new CONNECT ALL @ the Jacobs Center business accelerator, which will boost early stage companies in the city's most underserved communities.

At the ribbon-cutting ceremony of the new center, MUFG executives led by Head of CSR for the Americas Julius Robinson (third from left) and MUB Foundation COO Kathy Patoff (third from right), joined San Diego Mayor Kevin Faulconer (fourth from right) and other special guests, as well as the first group of 13 local start-ups being supported by the incubator.

ENVIRONMENTAL SUSTAINABILITY

Protecting our environment for the future

In 2018, MUFG once again took the top spot as Global Lead Arranger for financing clean-energy and energy-smart technologies. The ranking, released as part of Bloomberg's annual New Energy Finance league table, places MUFG as No. 1 for the third consecutive year among private-sector banks. MUFG provided $3.9 billion in financing for 59 clean energy projects. MUFG also was the top arranger of global green loans in 2018, up from its previously ranked spot of No. 5, according to Bloomberg.

These commitments are part of our parent company's global mission to advance goals that protect the environment. In May 2019, MUFG made a commitment to achieve a cumulative total of JP¥20 trillion (approximately $180 billion) in sustainable finance between FY2019 and FY2030 to help build a sustainable society and meet the United Nations' Sustainable Development Goals through the provision of financial services to its clients. Forty percent of this amount is specifically for the environment.

We also revised our global Environmental and Social Policy Framework to tighten our policy on certain projects, including no longer financing new coal-fired power plants, limiting certain coal-mining projects, and requiring international certifications for selected forestry and agribusiness clients.

MUFG helped finance the 115-MW Parque Eólico El Arrayán project, the largest wind energy farm in Chile. The wind farm produces power to meet the electricity needs of approximately 200,000 homes a year.

LONG-TERM VIEW

Integrating financial education into the fabric of communities

MUFG has long invested in empowering young people with financial education.

In 2018, the student-run branches at Crenshaw and Lincoln high schools in Los Angeles celebrated their five-year anniversaries. The branches are part of an innovative and multifaceted MUFG program to teach students about finance, teamwork, and leadership. Today, there are branches across five California high schools, with 325 students completing internships and 36 interns starting their careers at MUFG since the program's inception. MUFG also is extending the successful program with the first college student-run branch at Laney College in Oakland, California.

Student bankers also give back to their communities by organizing financial education workshops for students and parents at their respective schools and coordinating food drives during the Thanksgiving season.

Branch manager Matthew Martin (seated) offers real-life bank training and instruction at the McLane High School branch in Fresno, California. Martin is a former McLane student and former intern of the branch, which opened in 2011 as MUFG's first student-run branch.

MUFG GIVES BACK

100+ events honoring the seventh annual global month of service

MUFG Brasil team members and their families volunteered at a local nursing home to help bring some joy by spending time with those who live there and to revitalize the space with painting and gardening. MUFG Brazil also earned the company's global CSR Award of the Year for the seventh consecutive year, honoring the team's incredible contributions to local communities in the country. The recognition was especially significant as MUFG celebrated 100 years since the opening of its doors in Brazil in 1919.

In Toronto, a group of MUFG volunteers packed 1,200 pounds of frozen chicken for Second Harvest, the largest food rescue charity in Canada. The nonprofit organization distributes donated food to more than 370 social service agencies in Ontario, Canada. It helps nourish people, providing 34,000 meals a day through food banks, school meal programs, and homeless shelters.

EQUAL HOUSING LENDER

MUFG

UnionBank®

For more information visit our websites at www.mufgamericas.com, www.unionbank.com, and www.mufg.jp/english.

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Section 4

Press Release: Sustainable Finance

Mitsubishi UFJ Financial Group, Inc. (MUFG)

MUFG Sets Sustainable Finance Goals and Revises Environmental and Social Policy Framework

Tokyo, 15 May 2019 --- MUFG pursues its management vision as part of our mission as a financial institution to develop lasting relationships from a long-term perspective with both our clients and society to achieve shared sustainable growth. As part of this mission, we are advancing initiatives with goals including protecting the global environment and promoting human rights.

With a view to further strengthening our undertakings with relation to the environment, society, and governance, commonly known as ESG, we recently established Sustainable Finance Goals and revised the MUFG Environmental and Social Policy Framework. This change will take effect on July 1, 2019.

1. Summary

(1) Setting of Sustainable Finance Goals

MUFG aims to provide a cumulative total of 20 trillion yen in Sustainable Finance (of this, 8 trillion yen is for the area of environment) between FY2019 and FY2030 to help build a sustainable society and attain the Sustainable Development Goals (SDGs) through the provision of financial services to its clients.

(2) Revision of the MUFG Environmental and Social Policy Framework

MUFG has revised the MUFG Environmental and Social Policy Framework in response to the international community's plea for climate change actions and reflecting various stakeholders' opinions and ideas on environmental and social issues. The details of the revisions are explained below.

(i) MUFG will not provide financing for new coal-fired power generation projects once the revised Framework takes effect. This is anticipated to gradually reduce the balance of MUFG's exposure to coal-fired power generation projects in the medium- and long-term. MUFG will take a cautious approach to projects regarding which financial assessment has been ongoing since before the revision to the Framework.

(ii) Forestry, palm oil, and mining (coal) will be newly added to "Restricted Transactions." Recognizing their potential negative impact on the environment and society, MUFG will include in its consideration of financing for these sectors confirmation of the relevant client's implementation status concerning environmental and social measures. For instance, such measures may include internationally recognized certification or an action plan to obtain such certification.

(iii) In its asset management business, MUFG has established a separate policy* concerning environmental and social initiatives, and it will handle transactions pursuant to this policy.

* "MUFG AM Responsible Investment Policy" (https://www.mufg.jp/english/csr/policy/)

We will periodically review the content of the MUFG Environmental and Social Policy Framework in accordance with changes in business activities and the business environment, and will work to improve and refine them.

2. Definition of Sustainable Finance

The term "Sustainable Finance" refers to the provision of finance for the following businesses (including loans, equity investment in funds, arrangement of project finance and syndicated loans, underwriting of equities and bonds, and financial advisory services) with reference to the relevant external standards (e.g. the Green Loan Principles, Green Bond Principles, and Social Bond Principles).

(i) Environmental area

- Businesses contributing to the adaptation to and moderation of climate change, including renewable energy, energy efficiency improvement, and green buildings
  (e.g. arrangement of loans and project finance for renewable energy projects, underwriting and distribution of green bonds)

(ii) Social area

- Businesses contributing to the development of startups, job creation, and poverty alleviation
- Businesses contributing to the energizing of local communities and regional revitalization
- Fundamental service businesses, including those involved in basic infrastructure such as public transport, waterworks, and airports, and essential services such as hospitals, schools and police
  (e.g. Emerging Industrial Technology Support Program, loans for regional revitalization projects such as MUFG Regional Revitalization Fund, arrangement of loans and project finance for public infrastructure, underwriting and distribution of social bonds).

3. MUFG Environmental and Social Policy Framework

1. Introduction

The international community, aiming at achieving the Sustainable Development Goals (SDGs) and Paris Agreement on climate change, is working towards the protection of the global environment, which is fundamental to the existence of humanity and all living creatures, and the realization of a sustainable society.

As a global provider of financial services, Mitsubishi UFJ Financial Group (hereinafter, MUFG) defines its mission as being committed on a long-term basis to developing lasting relationships with both our clients and society, and promoting shared and sustainable growth for a better world.

In addition, through the financial services we provide we are actively working towards finding solutions to environmental and social issues which also contribute to our sustainable business growth and enhancement of our corporate value.

MUFG recognizes that the environmental and social risks arising from the business activities of each group company are important to our business and require managing appropriately. This Environmental and Social Policy Framework (hereinafter, Framework) has been developed based on the “MUFG Environmental Policy Statement” and “MUFG Human Rights Policy Statement” which establish the basis for our policies for management of environmental and human rights issues respectively. The opinions and perspectives of various stakeholders were taken into consideration in the development of the Framework.

The Framework outlines the approach that MUFG takes in responding appropriately to environmental and social issues in our business activities and contributing to sustainable environmental and social development. Through the adoption of this approach, we expect to contribute to the realization of a sustainable environment and society.

To promote understanding and cooperation regarding our approach, the contents of this Framework is communicated to clients in all of our group companies.

2. Governance

The MUFG Corporate Vision guides the way in which we carry out our business activities. To realize our Corporate Vision, the MUFG Principles of Ethics and Conduct standards have been established which apply to executives and employees of all group companies and guide their everyday decisions and actions. The Framework is based on our Corporate Vision and Principles of Ethics and Conduct.

(1) Positioning of the Environmental and Social Policy Framework

The Framework is based on the “MUFG Environmental Policy Statement” and “MUFG Human Rights Policy Statement” and is structured to enable the appropriate identification and management of environmental and social risks associated with our business operations. The Framework is aligned with the MUFG reputational risk management framework to avoid negative impacts to MUFG corporate value.

(2) Governance and Management System

The CSR committee, which reports to the Executive Committee, is responsible for developing appropriate responses to the environmental and social issues relevant to our business.

Individual transactions with significant environmental and social risks or impacts that have the potential to negative impact on the corporate value of MUFG are assessed for reputational risk, as necessary. Transactions are evaluated with the involvement of executive management, taking into consideration the potential transaction related reputational risks.

(3) Role of Business Group

Business Groups are responsible for performing environmental and social due diligence to assess the potential environmental and social issues associated with the products and services to be provided. The assessment includes information collected from approaches such as interviews with clients. In implementing environmental and social due diligence, Business Groups consult with the relevant department responsible for management of environmental and social risks.

(4) Management of the Environmental and Social Policy Framework

The Framework was discussed by the CSR Committee and approved by the Executive Committee. The CSR Committee regularly reviews the need to update the Framework and makes amendments as necessary to reflect changes in our business activities and the business environment.

3. Applicable Products and Services

Products and services provided to clients by each group company include the extension of credit and the underwriting of bonds and stocks (hereinafter, financing). We recognize that the provision of financing may potentially contribute to environmental and social impacts as well as an increase in associated risks.

The Framework applies to new finance in all countries / regions for corporate clients of MUFG's core subsidiaries; MUFG Bank, Mitsubishi UFJ Trust and Banking, and Mitsubishi UFJ Securities Holdings (hereinafter referred to as "Core Subsidiaries"). The Framework is integrated into the internal procedures and standards of each Core Subsidiary.

MUFG Bank also conducts environmental and social due diligence of large-scale projects based on the Equator Principles adopted in 2005.

We also acknowledge the importance of considering environmental and social impacts in our asset management business. At the same time, we recognize the importance of preserving and fulfilling our independent fiduciary duties in line with interests of our clients. For this reason, we have established a separate responsible investment policy for this business.

4. Applicable Transactions

The Framework provides a guideline allowing us to confirm whether corporate clients receiving financing from each Core Subsidiary are fulfilling their social responsibility by demonstrating appropriate consideration of environmental and

social issues based on applicable legislation and international best practice.
Taking into consideration the nature and severity of associated environmental and social risks or impacts, MUFG has identified transactions which are "Prohibited from Financing" and where "Financing is Restricted".

(1) Prohibited Transactions

The transactions listed below are considered as having significant environmental and social risks or impacts. In cases where each Core Subsidiary is aware of the environmental and social risks or impacts, financing is not provided.

A) Illegal transactions and transactions for illegal purposes
B) Transactions which violate public order and good morals
C) Transactions that negatively impact wetlands designated under the Ramsar Convention
D) Transactions that negatively impact UNESCO designated World Heritage Sites
E) Transactions violating the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington Convention)1
[1 Taking into consideration country specific considerations]
F) Transactions involving the use of child labor or forced labor

(2) Restricted Transactions

Restricted transactions consist of cross-sector items and sector specific items.
For transactions where the conditions listed below may exist, the potential that environmental and social risks or impacts may exist is considered to be high and clients are expected to implement the appropriate environmental and social measures. When each Core Subsidiary is considering providing financing for these transactions, the identification and assessment process for environmental and social risks or impacts will be used to confirm the client's approach to managing environmental and social issues.
If the environmental and social management approach of client's is not considered sufficient relative to the level of the potential risks or impacts, financing will not be provided.

(i) Cross-sectoral items

A) Impact on Indigenous Peoples Communities
B) Land expropriation leading to involuntary resettlement
C) Impact on High Conservation Value areas

(ii) Sector specific items

A) Coal Fired Power Generation Sector

Protection of the environment, in particular actions which contribute towards combatting climate change and supporting development of more sustainable sources of power, is one of the most important issues for MUFG in fulfilling its social mission.
We support international initiatives that are aiming to reach the objectives set by the Paris Agreement and actively provide financing to renewable energy businesses, such as solar and wind power generation, to promote sustainable

growth and support the transition to a low-carbon future through our business activities.

MUFG will not provide financing to new coal fired power generation projects. Exceptions may be considered where we will take into consideration the energy policies and circumstances of the host countries, international standards such as the OECD Arrangement on Officially Supported Export Credits, and the use of other available technologies when deciding whether to provide financing.

We also support the adoption of advanced technologies for high efficiency power generation and Carbon Dioxide Capture and Storage (CCS) technologies which contribute to a reduction in the emission of greenhouse gases.

B) Cluster Munitions Manufacturing Sector

Civilian populations have been greatly affected by cluster munitions as they release many bomblets over a wide area and because of their indiscriminate effect. As a result, their use has generated significant humanitarian concerns internationally.

In light of the inhumane nature of cluster munitions, Core Subsidiaries prohibit the provision of financing to any company that manufactures cluster munitions.

C) Forestry Sector

Forests provide habitats for various wildlife species. Therefore, they have significant value for biodiversity conservation and protection, as well as serving as important sources of timber for paper, pulp, and other products that support regional economies. Forests additionally play a significant role in mitigating climate change by absorbing and storing carbon dioxide. MUFG recognizes that uncontrolled, large-scale deforestation has severe and negative impacts on the global environment.

When we consider implementing financing for logging businesses, including the development and management of forest plantations, we assess the status of such client's consideration for environmental and social impacts.

We request our clients to certify the relevant operations according to internationally recognized certification organizations such as Forest Stewardship Council ("FSC") and Programme for the Endorsement of Forest Certification Schemes ("PEFC"), when providing finance to the subject business activities mentioned above, in countries other than High Income OECD countries. We will request our clients to submit action plans to achieve certification when relevant operations are not certified.

D) Palm Oil Sector

Palm oil is used to make products which are essential for everyday life, such as cooking oils, detergents, paints, etc. Increases in palm oil consumption have facilitated economic growth in many countries. On the other hand, development of palm oil plantations may entail deforestation of natural forests and slash-and-burn agriculture, which could lead to habitat degradation and conflicts with local communities. As a result, MUFG recognizes that the palm oil plantation business can have severe and negative impacts on the global environment if not managed

responsibly.

When considering transactions which fund business activities developing and managing palm oil plantations we assess the status of such client's consideration for environmental and social impacts.

We encourage clients to become members of the Roundtable on Sustainable Palm Oil ("RSPO"), and request them to certify relevant operations according to recognized certification organizations such as RSPO, when providing finance to the subject business activities mentioned above. We will request clients to submit action plans to achieve certification when relevant operations are not certified.

E) Mining Sector (Coal)

MUFG recognizes that coal mining operations, if not managed responsibly, can have negative social and environmental impacts, including death and injuries from mine collapse, human rights abuse, and impacts on local biodiversity from toxic mine waste. Moreover, coal burning in power generation emits relatively large amounts of greenhouse gases compared to other energy sources. We recognize that the development of new coal mines to supply thermal coal for power generation projects could result in an increase in greenhouse gas emissions in the future.

When considering whether to provide finance to the development of new coal mines we assess the status of such client's consideration for environmental and social impacts. The assessment includes how the client addresses the impacts of the development on local ecosystems, relationships with local residents, and occupational safety and health issues.

We will not provide any financing to coal mining projects using the mountaintop removal (MTR) method which has severe and negative impacts on the natural environment.

5. Identification and assessment process for environmental and social risks or impacts

A due diligence process to identify and assess the environmental and social risks or impacts associated with transactions has been introduced.

(1) Standard Due Diligence

Standard due diligence is implemented by the department in the relevant business division of each Core Subsidiary responsible for communications with the client. The decision regarding categorization of the transaction as a "Prohibited Transaction" or "Restricted Transaction" is made based on available public information and information provided by the client.

(2) Enhanced Due Diligence

Transactions categorized as "Restricted Transactions" are subject to enhanced due diligence in addition to standard due diligence, if necessary. This is implemented by the department responsible for management of environmental and social risks in each Core Subsidiary. Decisions on financing are made following assessment of

the findings of the enhanced due diligence.

(3) Financing Reputational Risk Management Approach

Transactions assessed as having the potential to have significant negative impacts on the corporate value of MUFG are evaluated with the involvement of executive management.

6. Training

(1) Corporate Training and Education

Training on environmental and social issues is provided to relevant employees of each Core Subsidiary. The objective of the training is to enhance the understanding of global initiatives to environmental and social issues, as well as the process of confirming the client's approach towards management of environment and social issues. The training also aims at the spread of ideas supporting the Framework, and the environmental and social due diligence process.

Specialized training, with the objective of advancing the implementation of the Framework, is provided in divisions responsible for management of environmental and social risks.

(2) Stakeholder Engagement

Implementation of the Framework includes constructive dialogue with various stakeholders. This dialogue is intended to help identify appropriately environmental and social risks or impacts to which MUFG is to respond and provides information relevant to discussions on revisions to the Framework to increase its effectiveness.

[Disclaimer]

No agency or contractual relationships between MUFG or each of the other group companies and other parties arise from the disclosure and implementation of the Framework. MUFG and other group companies assume no legal obligation, liability or responsibility as a result of such disclosure and implementation.

- End -

About MUFG

Mitsubishi UFJ Financial Group, Inc. (MUFG) is one of the world's leading financial groups. Headquartered in Tokyo and with over 360 years of history, MUFG has a global network with around 3,000 locations in more than 50 countries. The Group has over 180,000 employees and offers services including commercial banking, trust banking, securities, credit cards, consumer finance, asset management, and leasing. The Group aims to "be the world's most trusted financial group" through close collaboration among our operating companies and flexibly respond to all of the financial needs of our customers, serving society, and fostering shared and sustainable growth for a better world. MUFG's shares trade on the Tokyo, Nagoya, and New York stock exchanges. For more information, visit https://www.mufg.jp/english.

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June 15, 2020

Charlene Sun
Treasury and Debt Officer
Santa Clara Valley Water District
csun@valleywater.org

Ed Soong
Municipal Advisor
Public Resources Advisory Group
esoong@pragadvisors.com

Ms. Sun and Mr. Soong:

On behalf of JPMorgan Chase Bank, National Association ("JPMorgan"), I am pleased to submit the following responses to the Santa Clara Valley Water District's (the "District") request for additional information, dated June 10, 2020.

1) **What is the Bank's response to Banktrak's rankings (attached)? Have you or do you plan on implementing any changes to address the issues raised by Banktrak?**

   We have no official response to the Banktrak rankings provided, other than to note that of the banks that responded to the District's RFP, JPMorgan was ranked in the highest category. For information on the ongoing social responsibility initiatives of the Bank's parent company, JPMorgan Chase & Co., please see use this link: https://institute.jpmorganchase.com/impact. Please also see comments made by JPMorgan Chase & Co.'s CEO in his annual letters to shareholders over the years: https://www.jpmorganchase.com/corporate/investor-relations/annual-report-proxy.htm. We would be happy to respond to specific questions the District has about any programs described in these links.

2) **What is the Bank's response to Bloomberg's rankings (attached)? Have you or do you plan on implementing any changes to address the issues raised by Bloomberg?**

   We have no response to the Bloomberg rankings provided.

3) **Are there any other ESG information the bank wishes to provide? For example, how many branches/employees does the bank have in Santa Clara County and the 9 Bay area counties? Does the Bank have any social responsibility (corporate policies) policies that can be shared with the Board?**

   Please see the links provided in our response to question 1 above. JPMorgan has 57 branches and 902 resident employees in Santa Clara County. JPMorgan has 148 branches and 2,700 resident employees in the San Francisco-Oakland-Hayward MSA.

4) **Will the bank consider offering Valley Water credit up to $180million, and, act as a lead bank to offer an additional $20 million syndicated loan to small and local banks/credit unions? The syndication agreement would be between the lead bank and the local banks. The pricing for the local banks is subject to discussion, and may be higher than pricing for the lead bank given the District board's desire to incentivize small local banks participation. If not, does the bank have other ideas/mechanisms to involve small local banks participation in the line of credit business?**

   JPMorgan is willing to provide $180 million of credit to the District and to act as lead bank in syndicating an additional $20 million. All banks in the syndication would need to receive the same terms as JPMorgan.

5) **Will the bank consider revising the fee proposal after reviewing the 6/9 Staff Report summarizing the results of the RFP? If so, please submit your revised fee proposals along with the information requested here by 10 am on June 15, 2020.**

JPMorgan will not revise its fee proposal.

JPMorgan has reviewed Attachment 1 – Bank Proposals Summary of the 6/9 Staff Report. To facilitate the comparison of bank proposals, we have provided the following additional terms and conditions consistent with the form of Attachment 1 – Bank Proposals Summary.

Long- / Short-Term Ratings:	Fitch: AA / F1+ (Negative) Moody's: Aa2 / P-1 (Stable) S&P" A+ / A-1 (Stable)
Credit Amount:	$200,000,000
Unutilized Fee %	1-year: 0.750% p.a. 2-year: 0.775% p.a. 3-year: 0.800% p.a.
Tax-exempt rate:	Index: 80% of 1-month LIBOR + 1-year: 1.500% p.a. 2-year: 1.550% p.a. 3-year: 1.600% p.a.
Taxable rate:	Index: 100% of 1-month LIBOR + 1-year: 1.800% p.a. 2-year: 1.850% p.a. 3-year: 1.900% p.a.
Index Floor:	0.75% p.a.
Base Rate:	The highest of (i) JPMorgan's Prime Rate plus 1.50% p.a.; (ii) the Federal Funds Rate plus 2.00% p.a.; or (iii) 7.50% p.a.
Bank / Advance Rate:	Days 1-180: Base Rate Days 181+: Base Rate plus 1.00% p.a.
Default Rate:	Base Rate plus 3.00% p.a.
Failure to Close Fee:	$7,500 if mandated and before delivery of 1st draft of the credit agreement
Termination Fee:	Balance of unutilized fee for the remaining term
Extension:	A renewal request may be made in writing by no more than 120 days prior to the expiration date of the facility
Term Out Period:	5 years
Downgrade Provisions	Increases to the initial unutilized fee rate / applicable spread, respectively: AA+ / Aa1: 0.00% / 0.00% AA / Aa2: 0.10% / 0.20% AA- / Aa3: 0.20% / 0.40% A+ / A1: 0.30% / 0.60%

A / A2: 0.40% / 0.80%
A- / A3: 0.50% / 1.00%
BBB+ / Baa1: 0.60% / 1.20%
BBB / Baa2: 0.70% / 1.40%
BBB- / Baa3: 0.80 / 1.60%

In the event the rating assigned by Moody's, S&P, or Fitch is withdrawn, suspended or otherwise unavailable, (i) the unutilized fee rate shall be increased immediately, without notice, by an additional 1.00% p.a. and (ii) the interest rate on advances shall increase to the Default Rate.

Please note that the terms included in this response are subject to final credit approval. Nothing expressed or implied herein constitutes a commitment by JPMorgan or any of its affiliates to lend or provide any financial services; such obligations would arise only under separate written agreements mutually acceptable to the District and JPMorgan.

Please contact me if you have any questions or comments regarding this response. Thank you for your consideration.

Best regards,

James G. Millard
Executive Director
Public Finance Credit Origination
383 Madison Avenue, Floor 03
New York, NY 10179
Phone: 212-270–2198
E-mail: james.g.millardf@jpmorgan.com

cc: Tim Self, JPMorgan Chase Bank, National Association
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Will Frymann, J.P. Morgan Securities LLC
Shawn Laljit, JPMorgan Chase Bank, National Association

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Responses for Santa Clara Valley Water District:

1. **Can the Bank provide commentary regarding adherence to the principles outlined in the attached report from Banktrak's even though US Bank was not ranked (attached)?**

   We believe our sincere, dedicated focus on ethics, diversity and inclusion is in line with the guiding principles on business and human rights, although we are not specifically a part of the Banktrak benchmarking. We draw strength from diversity. Our One U.S. Bank approach to diversity, equity and inclusion (DEI) is unique. We bring together all stakeholders through a four-pillar strategy encompassing customers, communities, employees and suppliers. Inclusive, equitable actions and diverse perspectives are essential to maintaining our best-in-class culture of ethics and integrity. All of this is made possible by our employees. We support employees at all levels of the organization with tools, resources and opportunities to practice inclusive behavior, because it is the right thing to do.

   To affirm our assertion, please see our information provided below regarding U.S. Bank's CRA rating, EEOC information for the bank, state of California and Bay Area Counties, Social Responsibility Report, bank debt ratings and financial reports.

   Drawing strength from diversity is a core value at U.S. Bank. Our Chief Advocacy officer at U.S. Bank, Ismat Aziz leads our policy, training and commitment to human rights. In fact, the Human Rights Campaign Foundation named U.S. Bank a Best Place to Work for LGBTQ Equality for 12th year in a row. U.S. Bank received a perfect score of 100 on the 2019 Corporate Equality Index (CEI), the nation's premier benchmarking survey and report on corporate policies and practices related to LGBTQ workplace equality, administered by the Human Rights Campaign (HRC) Foundation. U.S. Bank was named alongside over 560 major U.S. businesses that also earned top marks this year.

   https://www.usbank.com/newsroom/news/us-bank-earns-top-marks-in-2019-corporate-equality-index.html

   Additionally, U.S. Bank has been named to DiversityInc's Top 50 Companies for Diversity list. Since 2001, the list has recognized companies for their exceptional commitment to diversity and inclusion. The list has evolved significantly since its inception, reflecting how rapidly companies are adapting diversity and inclusion strategies. In addition to ranking 46 on the overall Top 50 List, U.S. Bank ranked number 6 on the Top 14 List for Employee Resource Groups, 9 on the Top 15 List for Philanthropy, and named one of the Top 36 Companies for LGBT Employees.

   U.S. Bank is pleased to provide reporting information for public inspection under the Community Reinvestment Act (CRA). We are proud of our overall

"Outstanding" CRA Rating with respect to the Lending, Investment, and Service Tests as of examination date October 16, 2017. We also have an "Outstanding" CRA Rating in the State of California.

https://www.usbank.com/about-us-bank/community/community-reinvestment-act/cra-performance-evaluation.html

2. **What is the Bank's response to Bloomberg's rankings (attached)? Have you or do you plan on implementing any changes to address the issues raised by Bloomberg?**

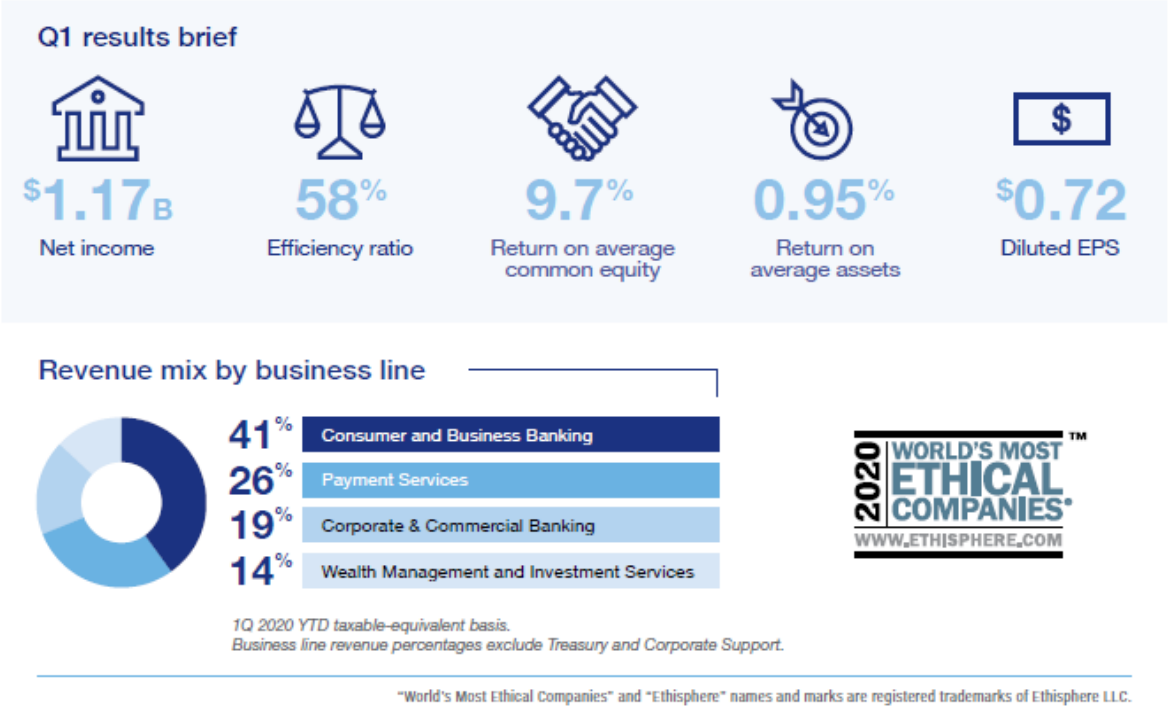
There are no issues raised by Bloomberg's rankings report for U.S. Bank. Founded in 1863, U.S. Bank is a Minneapolis-based financial institution whose parent company is U.S. Bancorp. We are the fifth largest commercial bank in the United States with assets of $543 billion, providing a comprehensive line of banking, investment, mortgage, trust and payment services products to consumers, businesses, government, and institutions through our 2,790 banking offices in 26 states.

For additional financial information regarding U.S. Bank, please find a link our annual report:

https://ir.usbank.com/

Also attached is our most recent quarterly report:

https://sharepoint.usbank.com/teams/OC/Shared%20Documents/Corporate%20Profile/CorporateProfile.pdf



U.S. Bank is one of the strongest financial institution in the world with the best debt ratings as follows:

Long-Term Senior Debt Ratings

Holding Company: Peer Group	Moody's		S&P		Fitch		DBRS	
	Rating	Outlook	Rating	Outlook	Rating	Outlook	Rating	Outlook
1 U.S. Bancorp	A1	s	A+	s	AA-	on	AA	s
2 JPMorgan Chase & Co.	A2	s	A-	s	AA-	on	AAL	s
3 Wells Fargo & Co.	A2	s	A-	on	A+	on	AAL	s
4 Bank of America Corp.	A2	s	A-	s	A+	s	AH	s
5 Truist Financial Corp.	A3	s	A-	s	A+	on	AH	op
6 PNC Financial Services	A3	s	A-	s	A+	s	AH	s
7 Fifth Third Bancorp	Baa1	s	BBB+	s	A-	on	A	s
8 KeyCorp	Baa1	s	BBB+	s	A-	on	A	s
9 Regions Financial Corp.	Baa2	s	BBB+	s	BBB+	s	AL	s
10 Citizens Financial Group, Inc.	NR	NR	BBB+	s	BBB+	s	AL	s

Long-Term Bank Deposits

Bank Level: Peer Group	Moody's		S&P*		Fitch		DBRS	
	Rating	Outlook	Rating	Outlook	Rating	Outlook	Rating	Outlook
1 U.S. Bank NA	Aa1	s	AA-	s	AA	on	AAH	s
2 Wells Fargo Bank NA	Aa1	s	A+	s	AA	on	AA	s
3 JPMorgan Chase NA	Aa1	s	A+	s	AA+	on	AA	s
4 Truist Bank	Aa2	s	A	s	AA-	on	AAL	op
5 PNC Bank NA	Aa2	s	A	s	AA-	s	AAL	s
6 Bank of America NA	Aa2	s	A+	s	AA	s	AAL	s
7 Fifth Third NA	Aa3	s	A-	s	A	on	AH	s
8 KeyBank NA	Aa3	s	A-	s	A	on	AH	s
9 Citizens Bank NA	A1	s	A-	s	A-	s	A	s
10 Regions Bank	A2	s	A-	s	A-	s	A	s

Accurate as of April 28, 2020
*S&P does not provide a deposit rating; the long-term issuer credit rating is shown

The senior unsecured debt ratings established for U.S. Bancorp by Moody's, Standard and Poor's, Fitch, and Dominion Bond Rating Service reflect the rating agencies' recognition of the strong, consistent financial performance of the company and the quality of the balance sheet.

Below is U.S. Bank's EEOC information for the State of California and the Bay Area Counties as of 03.31.20:

Location	Total Employees	Male	Female	Minority
All U.S. Bank				
U.S. Bank All Employees	**68,807**	29,106	39,701	21,606
State				
California	**6,348**	2,762	3,586	3,810
County				
Alameda	**218**	88	130	151
Contra Costa	**175**	77	98	94
Marin	**36**	21	15	20
Napa	**18**	3	15	13
San Francisco	**349**	205	144	230
San Mateo	**131**	53	78	96
Santa Clara	**297**	145	152	208
Solano	**41**	12	29	26
Sonoma	**41**	23	18	18

JOB CATEGORIES	NUMBER OF EMPLOYEES – ALL U.S. Bank						
	TOTAL	MALE	FEMALE		TOTAL MINORITY	VETERAN	DISABLED
Exec/Senior Managers	2,941	2,020	921		345	41	29
First/Mid Managers	9,612	4,779	4,833		2,138	211	149
Professionals	22,248	11,573	10,675		5,841	559	517
Sales Workers	11,845	5,076	6,769		4,360	155	275
Clerical/Admin Support	22,161	5,658	16,503		8,922	256	831
TOTALS	68,807	29,106	39,701		21,606	1,222	1,801

3. **Are there any other ESG information the bank wishes to provide? For example, how many branches/employees does the bank have in Santa Clara County and the 9 Bay area counties? Does the Bank have any social responsibility (corporate policies) policies that can be shared with the Board?**

U.S. Bank has 2 branches in the City of Santa Clara. Our closest branch to the Santa Clara Valley Water District offices is our Santa Clara branch located just .20 of a mile away at:

2730 Homestead Rd
Santa Clara, CA, 95051-5353

We have attached a list of our 124 branches located in the nine counties that touch San Francisco Bay area in the following counties as of 06.11.20:

- Alameda
- Contra Costa
- Marin
- Napa
- San Francisco
- San Mateo
- Santa Clara
- Solano
- Sonoma

USB Branches - CA SFBay Area 061120.xls

U.S. Bank is proud to offer the District our Corporate Social Responsibility Report for your review. Our Chief Social Responsibility Officer is Reba Dominski.

At U.S. Bank, we are operating from a position of strength, anchored by our strong ethical culture, which has resulted in being named one of the World's Most Ethical Companies by Ethisphere Institute for the sixth consecutive year. Our unified giving and engagement strategy, Community Possible, focuses on closing the gaps between people and possibility in the areas of Work, Home and Play. Our approach also includes Environmental, Social and Governance (ESG) reporting, to share how we are approaching business risks and opportunities. Following our materiality assessment with Ceres, we have identified five key priority areas for U.S. Bank: data security and privacy, ethical conduct, fair and responsible products and services, human capital management and climate impact. We have established working groups focusing on strategy, disclosure and environmental and social risk management, and will work hard to make forward progress. We are also working to establish external goals to engage,

inspire and guide our work. We know we do not have all of the answers and we will continue to work with, and through, our partners, using data and insights to guide our strategy while remembering that behind every data point, is a heartbeat.

https://www.usbank.com/annual-report/2019/responsibility.html

UBS

UBS Response to Additional Questions - Request for Proposals: Revolving Line of Credit – Santa Clara Valley Water District

June 15, 2020

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Appendix:

Exhibit A – UBS Environmental and Social Risk Policy

Exhibit B – UBS in society Constitutional Document

Exhibit C – UBS Code of Conduct and Ethics

Exhibit D – UBS Climate Strategy

Exhibit E – UBS Climate Factsheet

Exhibit F – UBS Diversity and Inclusion Impact Report

Exhibit G – UBS Sustainability Report 2019

A. Board Questions

1. What is the Bank's response to Banktrak's rankings (attached)? Have you or do you plan on implementing any changes to address the issues raised by Banktrak?

Below please find information relating to UBS's social risk and environmental framework.

UBS Comprehensive Environmental and Social Risk Framework

The UBS Comprehensive Environmental and Social Risk Framework:

- governs client and supplier relationships and applies firm-wide to all activities;
- meets the highest industry standards as confirmed by external auditors and recognized by environmental, social, governance ratings; and
- is deeply rooted in our culture, management practices and control principles, overseen at Group Executive Board-level.

We use an environmental and social risk policy framework (Exhibit A) to identify and manage potential adverse effects on the environment and human rights, as well as the associated environmental and social risks our clients' and our own assets are exposed to. Our comprehensive standards are aligned with the UBS in Society program; they govern client and supplier relationships and are enforced firm-wide.

Definition

Environmental and social risks are broadly defined as the possibility that UBS supports clients, or sources from suppliers, who cause or contribute to severe environmental damage or human rights infringements. Environmental and social risks can also arise if UBS's operational activities and its employees (or contractors working on behalf of UBS) fail to operate within relevant environmental and human rights regulations. Environmental and social risks may result in adverse financial and reputation impacts for UBS.

UBS in Society. UBS's goal is to be the financial provider of choice for clients wishing to mobilize capital towards the United Nation's Sustainable Development Goals ("SDGs") and the orderly transition to a low carbon economy (the Paris Agreement). The attached UBS in society Constitutional Document (Exhibit B) defines the principles and responsibilities for promoting this commitment systematically across all relevant businesses and for implementing the ethical standards defined in the UBS Code of Conduct and Ethics (Exhibit C) that govern UBS's interaction with society and the environment.

2. What is the Bank's response to Bloomberg's rankings (attached)? Have you or do you plan on implementing any changes to address the issues raised by Bloomberg?

Climate Strategy. UBS aspires to drive positive change in society and the environment for future generations. Our climate strategy underlines our commitment to the Sustainable Development Goals on climate action and on affordable and clean energy as well as the Paris Agreement. These key UBS commitments are embedded in the United Nations ("UN")-backed Principles for Responsible Banking ("PRB"). This global framework specifies the role of banks in supporting a sustainable future and scaling up their contribution to the achievement of both the SDGs and the Paris Agreement. UBS became a founding signatory of the PRB in September 2019. Attached, we have provided our Climate Strategy document (Exhibit D) and Climate Factsheet (Exhibit E).

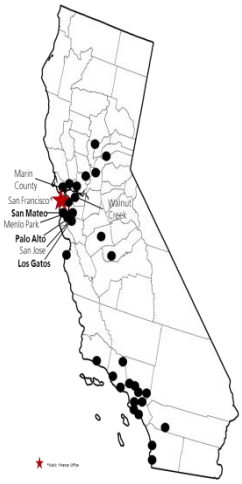
3. Are there any other ESG information the bank wishes to provide? For example, how many branches/employees does the bank have in Santa Clara County and the 9 Bay area counties? Does the Bank have any social responsibility (corporate policies) policies that can be shared with the Board?

UBS Bay Area Presence. As shown in the chart and table below, UBS has nine branches in the nine Bay area counties with 262 Financial Advisors. This includes three branches in Santa Clara County, Palo Alto, Los Gatos and San Jose. In Santa Clara County, UBS has 47 Financial Advisors.

UBS Offices in 9 Bay Area Counties

UBS Branch	FAs
San Jose*	24
Palo Alto*	13
Los Gatos*	10
San Francisco	119
Walnut Creek	45
Menlo Park	16
San Mateo	15
Mill Valley	11
Napa	9
Total	**262**

*Branches located in Santa Clara County



Diversity. Attached you will find UBS's inaugural ***Diversity & Inclusion (D&I) Impact Report*** (Exhibit F) for the Americas region. In the attachment, we provide information on where we are as a company, and where we aspire to be in the future. The report details our D&I priority areas of focus, our strategic goals and our approach to achieving them in the region, with a particular emphasis on the United States.

Sustainability. Our concept of sustainability is guided by the United Nations (UN) Sustainable Development Goals, which bring together the enormous societal and environmental challenges the world faces. We recognize that it is important to understand these challenges as well as the opportunities arising from them, to consider their relevance to UBS and to identify potential actions our firm may need to take.

As a founding signatory of the UN-backed Principles for Responsible Banking, UBS has committed to aligning our business strategy to be consistent with and contribute to society's goals. By doing so, we pledged to strategically align our business with the SDGs and the Paris Agreement on Climate Change. A detailed discussion of sustainability at UBS based on Global Reporting Initiative ("GRI") standards is attached in the UBS Sustainability Report 2019 (Exhibit G).

4. Will the bank consider offering Valley Water credit up to $180 million, and, act as a lead bank to offer an additional $20 million syndicated loan to small and local banks/credit unions? The syndication agreement would be between the lead bank and the local banks. The pricing for the local banks is subject to discussion, and may be higher than pricing for the lead bank given the District board's desire to incentivize small local banks participation. If not, does the bank have other ideas/mechanisms to involve small local banks participation in the line of credit business?

Pursuant to the Term Sheet dated May 22, 2020, UBS AG, Stamford Branch is offering a revolving line of credit of $50 million. Subject to negotiation of terms, UBS would use its best efforts to consider acting as a lead bank to offer an additional $20 million syndicated loan to small and local banks/credit unions. Any syndication activity would increase bank counsel fees. Any syndication would be subject to full credit review and approval, due diligence and negotiation of satisfactory agreements.

5. Will the bank consider extending the term to 2 years with renewal options? Are there any other changes the Bank would offer after reviewing the 6/9 Staff Report summarizing the results of the RFP? If so, please submit your revised fee proposals along with the information requested here by 10 am on June 15, 2020.

Pursuant to the Term Sheet dated May 22, 2020, UBS AG, Stamford Branch is offering a 1 year revolving line of credit. The Bank is not offering term of 2 years with review options.

There are no additional changes that the Bank is offering after reviewing the 6/9 Staff Report.

B. Appendix

Exhibit A.

UBS

Environmental and social risk policy framework

Comprehensive, highest industry standards, deeply rooted in our culture

Our comprehensive environmental and social risk framework is deeply rooted in our culture, and

- governs client and supplier relationships and applies firm-wide to all activities
- meets the highest industry standards as recognized by environmental, social, governance ratings
- is integrated in management practices and control principles and overseen at the most senior level of our firm.

This framework is aligned with our **UBS in society** organization that covers all the activities and capabilities related to sustainable finance (including sustainable investing), philanthropy, environmental, climate and human rights policies governing client and supplier relationships, our environmental footprint, human resources as well as community investment.

Introduction

We live in a world that is more interconnected, more interdependent and more interactive than ever before. Rapid technological advances in particular continue to have a profound effect on the economic, political, cultural, environmental and social landscape. These advances have changed the way we think and act. They have altered the way we do business. They have transformed the products and services we consume, and reshaped the perceptions of the world around us. While this has brought with it significant benefits and opportunities, it has also created far greater awareness of the challenges we all face.

As a global company, and the largest truly global wealth manager to high net worth and ultra high net worth clients, UBS is in a unique position to help address these challenges, both together with our clients and through our own efforts.
Our principles and standards clearly define how we want to do things at UBS. They apply to all aspects of our business and the ways in which we engage with our stakeholders. Our Code of Conduct and Ethics documents our corporate responsibility. Our work in key societal areas such as protecting the environment and respecting human rights are part of this. Living up to our societal responsibilities contributes to the wider goal of sustainable development. As a global firm we take responsibility to lead the debate on important societal topics, contribute to the setting of standards and collaborate in and beyond our industry.

Managing environmental and social risks is a key component of our corporate responsibility. We apply an environmental and social risk policy framework to all our activities. This helps us identify and manage potential adverse impacts to the environment and to human rights, as well as the associated risks affecting our clients and us. We have set standards in product development, investments, financing and for supply chain management decisions. We have identified certain controversial activities we will not engage in, or will only engage in under stringent criteria. As part of this process, we engage with clients and suppliers to better understand their processes and policies and to explore how any environmental and social risks may be mitigated.
The foundation of UBS's environmental and social risk policy framework is established in the Code of Conduct and Ethics of UBS and the **UBS in society** constitutional document.

Our focus

Our industry is playing an active role in addressing global issues such as human rights and the protection of our environment. Climate change impacts ecosystems, societies, and economies worldwide, and we support clients achieving their goals in support of the transition to a low-carbon economy. Growing environmental and human rights concerns have resulted in a fast-changing regulatory and competitive landscape which is affecting our firm, our suppliers and our clients. In response to these emerging risks and opportunities, we are shaping appropriate solutions and commitments.

Over twenty-five years ago, UBS was one of the first financial institutions to sign the United Nations (UN) Environment Programme's "Statement by Financial Institutions on the Environment and Sustainable Development." We were also among the first companies to endorse the UN Global Compact, we were an original signatory of the CDP, and our Asset Management (AM) business is an Investment Manager signatory to the Principles for Responsible Investment.

In 2019, we became a founding signatory of the UN Principles for Responsible Banking. The Principles constitute a comprehensive framework for the integration of sustainability across banks. They define accountabilities and require each bank to set, publish and work toward ambitious targets.

In 2000, our firm was a founding member of the Wolfsberg Group of banks, which was originally set up to promote good practice in combatting money laundering. In 2011, the firm was a driving force behind the establishment of the Thun Group of Banks, which has in the meantime published two discussion papers that seek to establish a framework to facilitate the identification of the key challenges and best

practice examples for the banking sector's implementation of the UN Guiding Principles on Business and Human Rights (UNGPs). We are a member of the Roundtable on Sustainable Palm Oil (RSPO), and joined its complaints panel in 2014. Also in 2014, we endorsed the Banking Environment Initiative's and Consumer Goods Forum's "Soft Commodities" Compact, which reconfirms our commitment to developing and implementing responsible business standards.

Progress made in implementing **UBS in society** is reported as part of UBS's annual reporting. This reporting is reviewed and assured externally according to the requirements of the Global Reporting Initiative's (GRI) Sustainability Reporting Guideline. UBS is certified according to ISO 14001, the international environmental management standard.

Refer to the "Driving change in business" section of the Sustainability Report 2019 for an overview of external commitments and memberships

Climate change

Climate change is one of the most significant challenges of our time. The world's key environmental and social challenges – such as population growth, energy security, loss of biodiversity and access to drinking water and food – are all closely intertwined with climate change. This makes the transition to a low-carbon economy vital. We support this transition through our comprehensive climate strategy, focusing on four pillars:

- Protecting our own assets: We have reduced carbon-related assets on our balance sheet to 0.8% or USD 1.9 billion as of 31 December 2019, down from 1.6% at the end of 2018 and 2.8% at the end of 2017. In 2019 we also revised our standards in the energy and utilities sector and further embedded climate-related risk into our standard risk management framework.
- Protecting our clients' assets: We support our clients' efforts to assess, manage and protect them from climate-related risks by offering innovative products and services in investment, financing and research. We also actively engage on climate topics with companies that we invest in.
- Mobilizing private and institutional capital: We mobilize private and institutional capital towards investments facilitating climate change mitigation and adaptation and in supporting the transition to a low-carbon economy as corporate advisor, and/or with our lending capacity.
- Reducing our direct climate impact: We have committed to using 100% renewable electricity by mid-2020. This will reduce our firm's GHG footprint by 75% compared with 2004 levels.

We publicly support international, collaborative action against climate change. Our Chairman is a signatory to the European Financial Services Round Table's statement in support of a strong, ambitious response to climate change. Our Group CEO is a member of the Alliance of CEO Climate Leaders, an informal network of CEOs convened by the World Economic Forum and committed to climate action. Our Head Sustainable Equity Team within AM is a member of the Task Force on Climate-related Financial Disclosures (TCFD).

Find our Climate strategy under www.ubs.com/climate

Forests and biodiversity

Deforestation and forest degradation can cause biodiversity to decline. As approximately 80% of the world's documented species are found in tropical rainforests, deforestation will impact global biodiversity. Deforestation is, in fact, second only to the energy sector as a source of global greenhouse gas emissions and accounts for up to 20% of emissions, more than the entire global transport sector.

It is further estimated that more than 50% of tropical deforestation is due to the production of soy, palm oil, timber and beef. In human terms, millions of people rely directly on forests (small-scale agriculture, hunting and gathering, and harvesting forest products such as rubber). Yet, deforestation continues to cause severe societal problems, sometimes leading to violent conflict.

Recognizing these risks, we:

- became member of the RSPO in 2012
- endorsed the Banking Environment Initiative's and Consumer Goods Forum's "Soft Commodities" Compact. In doing so, we aim to support the transformation of soft commodity supply chains by expecting producers to be committed to achieving full certification according to applicable sustainability certification schemes, such as the RSPO. We acknowledge that land acquired without adequate consultation, compensation, and consideration of customary land rights (commonly referred to as land grabbing), can significantly impact local communities: often smallholders who primarily rely on subsistence farming to sustain their livelihood.
- have identified and will not engage in certain activities that contribute to deforestation and its related impacts (sections Controversial Activities – Where UBS will not do business and Areas of Concern – Where UBS will only do business under stringent criteria).

Human rights

UBS is committed to respecting and promoting human rights in all our business activities. We believe this is a responsible approach underlining our desire to reduce as far as possible potentially negative impacts on society. Our commitment in this important area is long standing. In July 2000, UBS was one of 43 companies that pledged to adhere to the Global Compact.

The principles of the Global Compact, today the largest corporate responsibility initiative globally, stem from the Universal Declaration of Human Rights, the International Labor Organization's Declaration on Fundamental Principles and Rights at Work, the Rio Declaration on Environment and Development and the UN Convention Against Corruption. The United Nations took a significant step in 2011 by endorsing the UNGPs. At this point, UBS together with other banks formed the Thun Group of Banks to jointly consider these developments and conclusions and to share experiences and ideas regarding the implementation of the UNGPs. To this end, the Thun Group of Banks has published two discussion papers that seek to establish a framework to facilitate the identification of the key challenges and best practice examples for the banking sector's implementation of the UNGPs.

Both discussion papers were also intended to inform other pertinent initiatives, in the specific case of the second the OECD's proactive agenda on Responsible Business Conduct, which released in 2019 its guidance on due diligence for Responsible Business Conduct in General Corporate Lending and Securities Underwriting. UBS is a member of the Advisory Group to the OECD's project.

Recognizing these risks, we:
- established a UBS Position on human rights in 2006. In 2013, we revised the firm's Environmental and Social Risk Framework to formalize accountability for human rights issues.
- stipulated that we will not engage in commercial activities that make use of child labor and forced labor, or that infringe the rights of indigenous peoples (see section Controversial Activities – Where UBS will not do business).
- will continue our work internally, and externally with the Thun Group of Banks and the OECD, to understand how best to implement the UNGPs across our operations.

Our standards

UBS has set standards in product development, investments, financing and supply chain management decisions, which include the stipulation of controversial activities and other areas of concern UBS will not engage in, or will only engage in under stringent criteria.

Controversial Activities – Where UBS will not do business

UBS will not knowingly provide financial or advisory services to clients whose primary business activity, or where the proposed transaction, is associated with severe environmental or social damage to or through use of:
- **World heritage** sites as classified by UNESCO;
- **Wetlands** on the "Ramsar list";
- **Endangered species** of wild flora and fauna listed in "Appendix 1" of the Convention on International Trade in Endangered Species;
- **High conservation value forests** as defined by the six categories of the Forestry Stewardship Council (FSC);
- **Illegal fire:** uncontrolled and/or illegal use of fire for land clearance;
- **Illegal logging** including purchase of illegal harvested timber (logs or roundwood);
- **Child labor** according to "ILO-conventions 138" (minimum age) and 182 (worst forms);
- **Forced labor** according to ILO-convention 29; and
- **Indigenous peoples' rights** in accordance with "IFC Performance Standard 7".

The same standards apply when UBS purchases goods or services from suppliers.

In addition, UBS does not directly or indirectly finance the development, production or purchase of controversial weapons of such companies determined to fall within the "Swiss Federal Act on War Materials."

On the topic of cluster munitions and anti-personnel mines: UBS does not provide credit facilities to, nor conduct capital market transactions for, companies that are involved in the development, production or purchase of cluster munitions and anti-personnel mines. UBS does not include securities of affected companies in its actively managed retail and institutional funds and in discretionary mandates. UBS draws upon external expertise to decide whether a company is subject to the restrictions imposed by Swiss law.

Areas of Concern – Where UBS will only do business under stringent criteria

Specific guidelines and assessment criteria apply to transactions with corporate clients engaged in the areas of concern listed below. The guidelines and assessment criteria apply to loans, trade finance, direct investments in real estate and infrastructure, securities and loan underwriting transactions, and investment banking advisory assignments.

Transactions in the areas listed below trigger an enhanced due diligence and approval process. In addition to the assessment of regulatory compliance, adherence to UBS's controversial activities standards, past and present environmental and human rights performance, as well as concerns of stakeholder groups, these transactions require an assessment of the following criteria:

Soft commodities

- **Palm oil:** Companies must be a member of the RSPO and not subject to any unresolved public criticism from the RSPO. Companies must further have some level of mill or plantation certification and be publicly committed to achieving full certification (evidence must be available). Company must also be committed to "No Deforestation, No Peat and No Exploitation" (NDPE).
- **Soy:** Companies producing soy in markets at high risk of tropical deforestation must be a member of the Roundtable on Responsible Soy (RTRS) and not subject to any unresolved public criticism from the RTRS. Companies must further be publicly committed to achieving full certification (evidence must be available).
- **Timber:** Companies producing timber in markets at high risk of tropical deforestation must seek to achieve full certification of their production according to the Forest Stewardship Council (FSC) or a national scheme endorsed against the 2010 Programme for the Endorsement of Forest Certification (PEFC) meta standard for timber products. Company must also have fire prevention, monitoring and suppression measures in place.
- **Fish and seafood:** Companies producing, processing or trading fish and seafood must provide credible evidence of no illegal, unreported and unregulated fishing in their own production and supply chain.

Power Generation

- **Coal-fired power plants (CFPP):** We do not provide project-level finance for new coal-fired power plants globally and only support financing transactions of existing coal-fired operators (>30% coal reliance) who have a transition strategy in place that aligns with a pathway under the Paris Agreement, or the transaction is related to renewable energy.

- **Large dams:** Transactions directly related to large dams include an assessment against the recommendations made by the World Commission on Dams (WCD) and the International Hydropower Association Sustainability Assessment Protocol.
- **Nuclear power:** Transactions directly related to the construction of new, or the upgrading of existing nuclear power plants include an assessment on whether the country of domicile of the client / operation has ratified the Treaty on the Non-Proliferation of Nuclear Weapons.

Extractives

- **Arctic oil and oil sands:** We do not provide financing where the stated use of proceeds is for new offshore oil projects in the Arctic or greenfield[1] oil sands projects, and only provide financing to companies, which have significant reserves or production in arctic oil and/or oil sands (>30% of reserves or production), where the stated use of proceeds is related to renewable energy or conventional oil & gas assets.
- **Coal mining:** We do not provide financing where the stated use of proceeds is for greenfield[1] thermal coal mines and do not provide financing to coal mining companies engaged in mountain top removal operations. We continue to severely restrict lending and capital raising to the coal mining sector.
- **Liquefied Natural Gas (LNG):** Transactions directly related to LNG infrastructure assets are subject to enhanced ESR due diligence considering relevant factors such as management of methane leaks, and the company's past and present environmental and social performance.
- **Ultra-deepwater drilling:** Transactions directly related to ultra-deepwater drilling assets are subject to enhanced ESR due diligence considering relevant factors such as environmental impact analysis, spill prevention and response plans, and the company's past and present environmental and social performance
- **Hydraulic fracturing:** Transactions with companies that practice hydraulic fracturing in environmentally and socially sensitive areas are assessed against their commitment to and certification of voluntary standards, such as the American Petroleum Institute's documents and standards for hydraulic fracturing.
- **Precious metals:** Transactions directly related to precious metals assets that have a controversial environmental and social risk track record are assessed against the client's commitment to and certification of voluntary standards, such as the International Council on Mining & Metals' (ICMM) International Cyanide Management Code (ICMC).
- **Diamonds:** Transactions with companies that mine and trade rough diamonds are assessed on the client's commitment to and certification of voluntary standards, such as the ICMC, and rough diamonds must be certified under the Kimberley Process.

Our processes and governance

UBS applies an environmental and social risk framework to all transactions, products, services and activities such as lending, capital raising, advisory services or investments that involve a party associated with environmentally or socially sensitive activities. The framework seeks to identify and manage potential adverse impacts to the environment and to human rights, as well as the financial and reputation risks of being associated with them.

Integration in risk, compliance and operations processes

Procedures and tools for the identification, assessment and monitoring of environmental and social risks are applied and integrated into standard risk, compliance and operations processes.

- **Client onboarding:** Potential clients are assessed for environmental and social risks associated with their business activities as part of UBS's Know Your Client compliance processes.
- **Transaction due diligence:** Environmental and social risks are identified and assessed as part of standard transaction due diligence and decision-making processes in all business divisions and relevant product lines.
- **Product development and investment decision processes:** New financial products and services are reviewed before their launch in order to assess their compatibility and consistency with UBS's environmental and human rights standards. Environmental and social risks are also considered in investment decision processes and when exercising ownership rights like proxy voting and engagement with the management of investee entities.
- **Own operations:** Our operational activities and employees, or contractors working on UBS premises, are assessed for compliance with relevant environmental, health and safety, and labor rights regulations.
- **Supply chain management:** Environmental and social risks are assessed when selecting and dealing with suppliers. UBS also evaluates goods and services that pose potential environmental, labor and human rights risks during lifecycle (production, usage, and disposal) as part of its purchasing processes.
- **Portfolio review:** At portfolio level, we regularly review sensitive sectors and activities prone to bearing environmental and social risks. We assess client exposure and revenue in such sectors and attempt to benchmark the portfolio quality against regional and/or sector averages. Such portfolio reviews give us an accurate aggregated exposure profile and an enhanced insight into our transaction and client onboarding processes. Based on the outcome of these reviews, we can explore ways to improve the future portfolio profile along a range of risk parameters.

Clients, transactions or suppliers potentially in breach of UBS's position, or otherwise subject to significant environmental and human rights controversies, are identified as part of UBS's standard risk and compliance processes. Advanced data analytics on companies associated with such risks is integrated into the web-based compliance tool used by our staff before they enter into a client or supplier relationship, or a transaction. The systematic nature of this tool significantly enhances our ability to identify potential risk. In 2019, 1,889 referrals were assessed by our environmental and social risk unit, of which 82 were rejected or not pursued, 299 were approved with qualifications and 32 were pending.

[1] Greenfield means a new mine / well or an expansion of an existing mine / well which results in a material increase in existing production capacity.

Environmental and social risk assessments

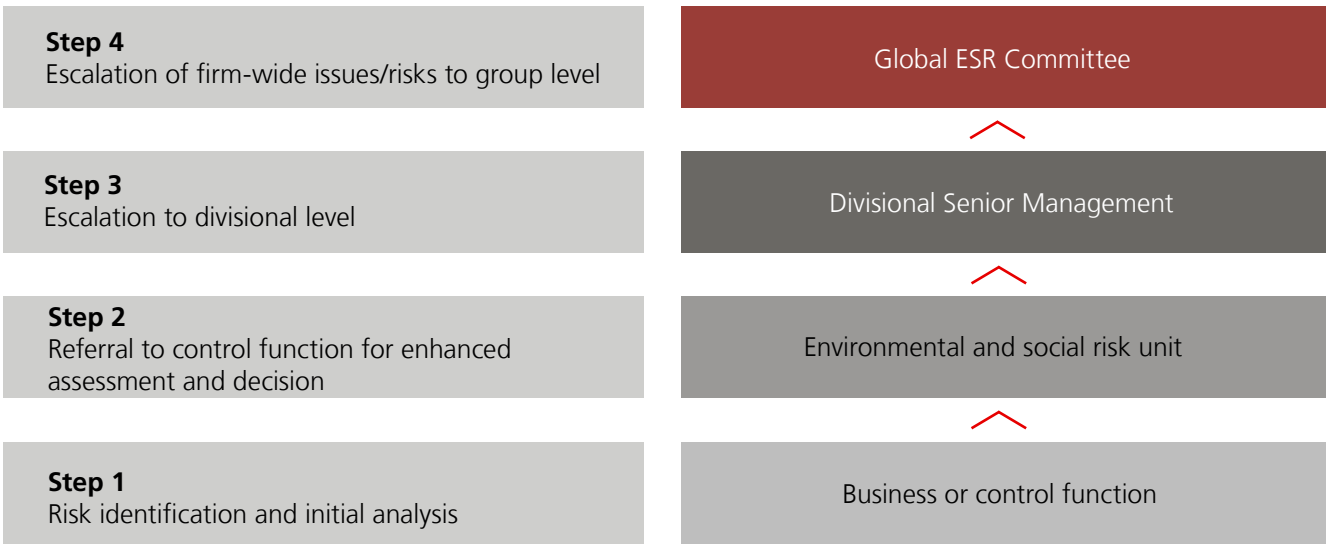
	For the year ended			% change from
	31.12.19	31.12.18	31.12.17	31.12.18
Cases referred for assessment[1]	**1,889**	2,114	2,170	(11)
by region				
Americas	**248**	288	305	(14)
Asia Pacific	**479**	718	604	(33)
Europe, Middle East and Africa (excluding Switzerland)	**282**	293	253	(4)
Switzerland	**880**	815	1,008	8
by business division				
Global Wealth Management[2]	**199**	426	507	(53)
Personal & Corporate Banking	**801**	684	795	17
Asset Management	**4**	7	7	(43)
Investment Bank	**849**	980	852	(13)
Corporate Center[3]	**36**	17	9	112
by sector				
Agribusiness[4]	**197**	277	291	(29)
Chemicals	**61**	91	87	(33)
Financial[5]	**722**	589	617	23
Infrastructure	**82**	109	53	(25)
Metals and mining	**200**	249	233	(20)
Oil and gas	**150**	187	207	(20)
Technology[6]	**105**	164	140	(36)
Transport	**40**	51	53	(22)
Utilities	**108**	176	191	(39)
Other[7]	**224**	221	298	1
by outcome[8]				
approved[9]	**1,476**	1,648	1,679	(10)
approved with qualifications[10]	**299**	358	397	(16)
rejected or not further pursued[11]	**82**	108	94	(24)
pending[12]	**32**	0	0	

[1] Transactions and client onboarding requests referred to the environmental and social risk (ESR) function. [2] Wealth Management and Wealth Management Americas reported as Global Wealth Management from 2018. Therefore, 2017 numbers were restated. [3] Relates to procurement / sourcing of products and services. [4] Includes, e.g., companies producing or processing fish and seafood, forestry products, biofuels, food and beverage. [5] Includes, e.g., banks, commodity traders, investments and equity firms. [6] Includes technology and telecom companies. [7] Includes, e.g., aerospace and defense, general industrials, retail and wholesale (from 2017). [8] "By outcome" 2019 data is from 22.1.2020 [9] Client / transaction / supplier subject to an ESR assessment and considered in compliance with UBS's ESR framework. [10] Client / transaction / supplier subject to an ESR assessment and approved with qualifications. Qualifications may include ring-fencing of certain assets, conditions towards client / supplier or internal recommendations. [11] Client / transaction / supplier subject to an ESR assessment and rejected or not further pursued. [12] Decision pending. Pending cases 2018 have been closed and reallocated to the other outcome categories.

Escalation and approval processes

Where business or control functions responsible for identifying and assessing environmental and social risks as part of due diligence processes determine the existence of potential material risks, they refer the client, supplier or transaction to a specialized environmental and social risk unit for enhanced due diligence. If identified risks are believed to pose potentially significant environmental or social risks, they are rejected by the risk unit or are escalated according to the firm's reputation risk escalation process.

Environmental and social risk escalation process



Governance and oversight

In view of the many environmental and social challenges globally, these topics will continue to increase in relevance for banks. These developments therefore require regular and critical assessment of our policies and practices, based on an accurate monitoring and analysis of societal topics of potential relevance to UBS.

This process is the responsibility of a committee at Group Executive Board-level, the Global Environmental and Social Risk Committee, which sets the overall risk appetite for the firm and resolves and policy matters relating to environmental and social risks and their associated reputation risks.

It is chaired by the Group Chief Risk Officer, who is responsible for the development and implementation of principles and appropriate independent control frameworks for environmental and social risks within UBS.

All corporate responsibility and sustainability developments at UBS are monitored and reviewed by the UBS Corporate Culture and Responsibility Committee, a Board of Directors' committee of UBS Group AG. The Committee supports the Board in its duties to safeguard and advance UBS's reputation for responsible corporate conduct. In this capacity it reviews and monitors the implementation of UBS's ESR framework.

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Exhibit B.

UBS in society Constitutional Document

UBS's goal is to be the financial provider of choice for clients wishing to mobilize capital towards the United Nation's Sustainable Development Goals (SDGs) and the orderly transition to a low carbon economy (the Paris Agreement). This document defines the principles and responsibilities for promoting this commitment systematically across all relevant businesses and for implementing the ethical standards defined in the UBS Code of Conduct and Ethics that govern UBS's interaction with society and the environment.

Key Principles

We implement our vision across four pillars: in finance, in philanthropy, in communities and in business:

- We play an important role in the allocation of capital and strive to support our clients with innovative products and services that address societal concerns and drive change for the better (in finance and in philanthropy)
- We want to make a positive impact across the geographical areas in which we operate to support the development of prosperous and healthy societies (in communities)
- We regard clear principles as necessary, collaboration as essential, and a strong corporate culture as paramount to address the ambitious SDGs and the Paris Agreement (in business)

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1. Our Commitment

UBS's goal is to be the financial provider of choice for clients wishing to mobilize capital towards the achievement of the United Nation's Sustainable Development Goals (SDGs) and the orderly transition to a low carbon economy (the Paris Agreement). We work towards this goal by integrating sustainability into our mainstream offerings, through new and innovative financial products with a positive effect on the environment and society, and by advising clients on their philanthropy. And it is through the management of environmental and social risks, the management of our environmental footprint and our sustainability disclosure that we continue to set standards in the industry.

Our cross divisional organization, UBS in society, focuses our firm on this direction. UBS in society is committed to making UBS a force for driving positive change in society and the environment for future generations. It will do so by focusing our firm on creating long term positive impact for clients, employees, investors and society. Our ambition is to be:

- A leader in sustainable finance across all client segments
- A recognized innovator and thought leader in philanthropy[1]
- An industry leader for sustainable business practices
- An employer of choice

UBS in society covers all the activities and capabilities related to sustainable finance (including sustainable investing), philanthropy, environmental, climate and human rights policies governing client and supplier relationships, our environmental footprint, human resources as well as community investment. It is through this cross divisional organization that UBS leverages its expertise across all of these areas to drive sustainable performance.

We intend to make sustainable performance the standard across our firm and part of every client conversation. This means that we will focus on the long term and work to provide appropriate returns to all of our stakeholders in a responsible manner. In addition, we are transparent about our targets and progress wherever possible to demonstrate our commitment.

2. Scope

The document defines the principles, governance and controls for implementing this commitment. It outlines how UBS is becoming a force for driving positive change – in finance, in philanthropy, in communities and in our business. Our banking activities, in-house operations, supply chain management and community interactions are subject to, and must be conducted in compliance with this commitment.

[1] Includes client and corporate donations (section 3.2 and 3.3)

3. Principles

The following principles outline how UBS in society promotes the implementation of its commitment to make UBS a force for driving positive change in society and the environment for future generations, across four areas; in finance, in philanthropy, in communities and in our business.

3.1. In finance

We're reshaping the landscape of sustainable finance by using thought leadership, innovation and partnerships to support clients in their sustainability efforts. For:

- **Private investors:** We're helping clients invest in companies that use their resources wisely and deliver reliable, long-term results. It's important to us that our clients can invest in what they care about, make the difference they desire and still get the returns they are looking for.
- **Institutional investors:** We're transforming the business of asset management and taking a long-term perspective by establishing sustainable and impact investing as core components across our offering and solutions.
- **Corporate organizations:** We're offering in-depth research, innovative products and expert advice to organizations who would like to consider environmental, societal and governance criteria in their financing and investing decisions.
- **Swiss businesses:** We're creating programs to help Swiss companies prepare for the new, low-carbon economy.

3.2. In philanthropy

We're partnering with clients and others for good, by offering expert advice, carefully selected programs from UBS Optimus Foundation, and innovative social financing mechanisms, so that our clients can make meaningful and measureable impact:

- **UBS Optimus Foundation:** We're making a measureable improvement in the lives of world's most vulnerable children. From getting more girls into school, to using solar power to improve maternal health we're bringing our clients, partners and extensive network together to support SDG-focused initiatives with the potential to be transformative, scalable and sustainable. We do this through evidence based grant making and innovative social finance, finding the most effective ways to use capital to drive social change.
- **Philanthropy advisors:** We're dedicated to making the philanthropic vision of our clients come to life. From helping them understand where they can begin, to how they can give in the most effective way, our advice is supported by in-depth research. We offer access to a global philanthropist network and insight experiences through our Philanthropy Forums and visits to the foundation's programs.

3.3. In communities

We recognize that UBS's long-term success depends on the health and prosperity of the communities of which we are part.

Our Community Affairs programs represent the firm's investment in communities. Our programs seek to overcome disadvantage through long-term investment in education and entrepreneurship. We provide UBS resources (both financial and employee volunteering) to drive change and create a positive impact. Our approach is to build sustainable and successful partnerships with non-profit organizations and social enterprises to ensure that our contributions have a lasting impact.

Our Community Affairs framework is global in scope and delivers both community and business impact in each of the regions in which we operate. Regional execution of the global strategy ensures we are effectively aligning our programs to address local community issues and support business priorities.

3.4. In our business

We're leading by example in that we challenge ourselves and our peers to raise the bar and be open about the impact our actions have on society and the environment. Our focus is on:

- **Environmental and social risk:** We apply an environmental and social risk (ESR) framework to identify and manage potential adverse impacts to the environment, the climate and to human rights as well as the associated environmental and social risks our clients' and our own assets are exposed to. UBS's comprehensive ESR standards are aligned with UBS in society, govern client and supplier relationships, and are enforced firm-wide and applied to all activities.
- **Environmental footprint:** We set quantitative targets to reduce group-wide greenhouse gas emissions and the environmental impact of our operations. Environmental programs include investments in sustainable real estate and efficient information technology, energy and water efficiency, paper and waste reduction and recycling, the use of environmentally friendly products (such as renewable energy or recycled paper), business travel and employee commuting. UBS aims to reduce negative environmental and social impacts of goods and services it purchases and engages with suppliers to promote responsible practices.
- **Human resources:** Our employees are crucial to our business success. We seek to attract, develop and retain talented people at all levels with diverse background and skills to effectively advise our clients, deliver innovative solutions, manage risk, navigate evolving regulatory requirements, and drive change. We also focus on increasing awareness of UBS in society amongst our employees by integrating sustainability topics in our employee lifecycle activities.
- **Corporate responsibility:** We report openly and transparently about our firm's environmental, social, governance (ESG) performance, including UBS in society, and seek to maintain open dialogue and active communications with our stakeholders.

4. Responsibilities and Structure

The **Corporate Culture and Responsibility Committee (CCRC)**[2] supports the UBS Board of Directors in its duties to safeguard and advance the Group's reputation for responsible and sustainable conduct. It approves and monitors UBS in society's overall strategy and annual objectives, reviews that the UBS in society constitutional document is relevant and up to date, and oversees the program's annual management review (see section 5).

The **Group CEO**[3] supervises the execution of the UBS in society strategy and annual objectives. The Group CEO also informs the Group Executive Board (GEB) and Corporate Culture and Responsibility Committee (CCRC) about UBS in society updates as appropriate.

The **Head UBS in society** is UBS's senior level representative for environmental and sustainability issues. He or she is nominated by the Group CEO, chairs the UBS in society Steering Committee, is a member of the Global Environmental Social Risk Committee, and is a permanent guest to the CCRC. He or she develops the UBS in society strategy, leads in its execution, and submits annual objectives to the Group CEO. On behalf of the Group CEO, he or she proposes the UBS in society strategy and annual objectives to the CCRC for approval. He or she is supported by the UBS in society Executive Committee (EC)[4] in this effort.

The **UBS in society Steering Committee (SC)**[5] ensures firm-wide execution of the UBS in society strategy across business divisions, functions and regions. The Committee is chaired by the Head UBS in society and is composed of divisional, regional, and Group COO EC members as well as UBS in society EC members. SC members are nominated by their respective GEB member and/or the Head UBS in society, and are responsible to define and implement the sustainability strategy of their BA/Function (and to allocate resources accordingly) in-line with the UBS in society strategy. SC members ensure their objectives and plans are signed off by their GEB member/ECs.

The **Global Environmental & Social Risk Committee**[6] defines an ESR framework and independent controls that align UBS's environmental and social risk appetite with that of UBS in society. It is chaired by the Group Chief Risk Officer, who is responsible for the development and implementation of principles and appropriate independent control frameworks for environmental and social risks within UBS.

The **Business Divisions** are responsible for developing, providing resources to, and executing the UBS in society annual objectives in their respective division as they relate to client relationships, product development, investment management, distribution and risk management, predominantly in the areas of sustainable finance and client philanthropy.

The **Regions** are responsible for providing resources to, and executing Community Affairs objectives in their region through their respective regional Community Affairs teams. The Community Affairs objectives are aligned with the global framework of UBS in society.

The **Corporate Center** functions are responsible for developing, providing resources to, and executing UBS in society annual objectives as they relate to risk control, sustainability regulation, employee training and development, in-house environmental and supply chain management, and communications.

[2] Responsibilities and authority of the CCRC are defined in Annex C of the Organization Regulations of UBS Group AG

[3] As set out in the Corporate Center Business Regulations

[4] As set out in the UBS in society Executive Committee Terms of Reference

[5] As set out in the UBS in society Steering Committee Terms of Reference

[6] As set out in the Global Environmental and Social Risk Committee Terms of Reference

5. Reporting and Controls

Our commitment is implemented through a firm-wide management system steered by defined measurable objectives. Their achievement is reviewed on a semi-annual basis by the Head of UBS in society, and on an annual basis by the Corporate Culture and Responsibility Committee.

Progress made in implementing UBS in society's strategy, commitment, and objectives is reported as part of UBS's annual reporting. This reporting is reviewed and assured externally according to the requirements of the Global Reporting Initiative's (GRI) sustainability reporting guideline. We also regularly report on the implementation of our climate strategy and follow the recommendations provided by the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) and externally verify our greenhouse gas reporting according to ISO 14064.

UBS is certified according to ISO 14001 and ISO 50001 international environmental and energy management standards. These certificates attest that UBS's environmental management system is an appropriate tool for evaluating compliance with the relevant environmental regulations, achieving self-defined environmental objectives, and maintaining continual improvement of environmental performance.

The implementation of our commitment and principles, as laid out in this document, is a process of continual improvement.

Standard Information

The Sustainable Development Goals (SDGs)

In September 2015, with the support of 193 nations, the United Nations launched the 2030 Agenda for Sustainable Development to end poverty, combat climate change, and fight injustice. Seventeen Sustainable Development Goals (SDGs) went into effect in January 2016 to address global socio economic imbalances threatening the lives of people living in developing economies and the future of generations to come.

The Paris Agreement

The Paris Agreement is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC) signed in 2016. As of March 2019, 195 countries had signed committing to keep the long-term global average temperature increase to well below 2 °C above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 °C above pre-industrial levels, recognizing that this would substantially reduce the risks and impacts of climate change. It also aims to increase the ability of parties to adapt to the adverse impacts of climate change, and make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

Climate strategy

UBS considers an orderly transition to a low-carbon economy as vital. Orderly means that emissions are reduced in a measured way to meet climate goals, starting now[7]. We support this transition through our comprehensive climate strategy. We are determined to protect our clients, and our own assets from climate-related risks in the context of uncertain policy and technology developments, mobilize private and institutional capital to finance the transition and reduce our own direct climate impact.

Environmental and social risk (ESR)

Environmental and social risks are broadly defined as the risk that UBS supports clients, or sources from suppliers, who cause or contribute to severe environmental damage or human rights infringements. Environmental and social risks can also arise if UBS's operational activities and its employees (or contractors working on behalf of UBS) fail to operate within relevant environmental and human rights regulations. Environmental and social risks (including human rights and climate-related risks) may result in adverse financial and reputational impacts for UBS.

Sustainable Investments (SI)

Sustainable investing is an approach that seeks to incorporate environmental, social and governance (ESG) considerations into investment decisions. SI strategies seek to 1) achieve a positive environmental or social impact, and/or 2) align investments with an investor's values regarding ESG topics, while aiming to improve the portfolio risk and return characteristics.

Sustainable Finance

Sustainable finance refers to any form of financial service that integrates environmental, social and governance (ESG) criteria into the business or investment decisions for the lasting benefit of both clients and society at large.

[7] NGFS - A call for action , Climate change as a source of financial risk, First comprehensive report, 2019.

Exhibit C.

UBS

The way we do business

Our Code of Conduct and Ethics

Our Code of Conduct and Ethics

In this Code, the Board of Directors and the Group Executive Board set out the principles and practices that define our ethical standards and the way we do business.

By following it, we will foster a culture where responsible behavior is ingrained in a way that protects our people, our reputation, and our ability to create lasting value for our shareholders. The Code sets the standards that help us to make that happen.

It is based on three Principles: client focus, which is about building relationships that create long-term value, focusing on investment returns and anticipating and managing conflicts of interest; excellence in everything from our products and services to how we collaborate across the firm to deliver the best of what UBS has to offer; and sustainable performance, which is about working continuously to strengthen our reputation as a rock-solid firm that is committed to sustainable business practices for all our stakeholders and provides consistent returns for shareholders.

It is essential that we all follow these Principles. In short, if we do business in the right way, we will be a better business, an even more successful one, and one that we can all be proud about.

Every year, the Board of Directors and Group Executive Board conduct a review of our Code. In this way, we

ensure that key developments of pertinence to our clients, employees and other key stakeholders are reflected in the Code. Following our 2020 review, we have revised the Code, with key updates reinforcing the critical importance we attach to our firm's culture, our focus on clients and employees, our commitment to sustainability, and the need to be scrupulous in the way we use confidential data and information.

The Code applies to everything and everyone

Our Code is owned by each UBS employee and sets out the principles and standards we have defined for ourselves. It covers our dealings with clients, counterparties, shareholders, regulators and business partners – and each other. And it is the basis for all of our policies, guidelines and procedures. Collectively, we have the responsibility to maintain the UBS culture of ethical behavior and accountability.

Ignorance of the Code is no excuse

As part of our governance framework, and training programs everyone at UBS learns about the standards in the Code and how to apply them. Not knowing the Code is no excuse for violating it.

Our Boards are fully behind the Code – and need the whole bank to be behind it, too

The Code has the full backing of the Board of Directors and Group Executive Board. Every one of us needs to make sure that our day-to-day actions and decisions follow the standards set out here. Above all, we must put the interests of our clients, shareholders and UBS first.

Of course, the Code cannot describe every possible situation. If you find yourself dealing with something unexpected, apply these ethical standards in your judgment and seek guidance or help.

Thank you for your support.

Axel A. Weber
Chairman of the Board of Directors

Sergio P. Ermotti
Group Chief Executive Officer

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Creating the right culture and conduct

Culture

At UBS, we maintain a culture based on high standards of ethical behavior and accountability. We believe that the right strategy and culture drive strong performance. The three keys to success – our Pillars, Principles and Behaviors – embody the foundation of our strategy and culture. They define what we stand for both as a firm and individually and they define the way we think, work and act at UBS.

We don't just follow the laws, rules and regulations in everything we do. We do what is right. We don't just ask ourselves whether what we're doing is legal, but whether it fits with our three UBS Behaviors: Collaboration, Challenge and Integrity, and with our long-term strategy.

Fair dealing and fair and effective competition

We act in the interest of fair and effective competition and respect all the laws, rules and regulations that are designed to create a level playing field for all – including antitrust and competition laws.

We don't stretch, distort or try to hide the facts or the truth. Nor do we use information we are not meant to have to our own advantage.

We act fairly, honestly and in good faith with everyone we deal with: our clients, business partners, competitors, suppliers, the public and each other.

Client relationships

We look after our clients for the long term, winning their loyalty by earning their trust.

We try to anticipate what our clients are going to need. We go out of our way to give them an exceptional service. We make sure our products and services are adequate for our clients and are sold in a way that is not detrimental to their interests. And we treat them fairly, and with the same courtesy and respect, however large or small they may be.

Conflicts of interest

We put our clients' best interests before our own – and UBS's interests before our personal interests. We never let UBS's or our personal interests influence our advice to a client, or our dealings with them.

We hold ourselves accountable to identify and manage potential conflicts of interest, including perceived conflicts. As soon as we identify any such conflicts, we raise them immediately with our line manager or with control functions.

Behaving responsibly

Diversity and equal opportunity

We believe that people from different backgrounds, with different thoughts and opinions, make us a stronger business. They bring us valuable new ideas, approaches and experiences.

Regardless of their status, everyone has the same chance to get ahead at UBS – whatever their ethnicity, gender, nationality, age, ability, sexual orientation or religion. And we work to create a culture where everyone feels that they are welcome, respected and that they are a valuable part of our team – whatever part of UBS they work in.

We do not tolerate any kind of discrimination, bullying or harassment. And we encourage each other to speak up and report any concerns, without fear of reprisals.

Performance and professionalism

Our professionalism, integrity and pursuit of excellence are how we create value for our clients and shareholders. Therefore our compensation system is designed to reward long-term value creation by balancing performance and prudent risk-taking with a focus on conduct and sound risk management practices.

We know that our business is only as strong as our people, so we work hard to create a working environment where talent can thrive and reach its full potential.

Protecting our assets and resources

We keep UBS's assets secure – from sensitive, confidential information about our clients, business, plans and people to our intellectual property, systems and equipment, as well as documents, information and other materials belonging to others that are entrusted or made available to us. This includes the efficient use of UBS's financial resources for investments, expenditures, and procurement. That means making sure that these assets and resources are handled properly and used in line with relevant laws, rules and regulations and doing what we can to prevent them from being lost, stolen, damaged or misused. We retain data to fulfill regulatory retention and legal hold obligations.

We will not use such assets or resources for non-UBS business or for our own personal advantage.

Health and safety

We never do anything that might put people in danger or harm them in any way – whether they're clients, colleagues, partners, competitors, visitors or anyone else.

We keep our workplaces safe by following health and safety rules. Doing this makes sure we have safe and healthy working conditions in which our dignity is respected.

Laws, rules and regulations

Obeying the law

We obey the laws, rules and regulations where we live, work and do business – as well as our own governance framework, documents and policies.

And we cooperate with our regulators, being open and transparent in our dealings with them.

Cross-border business

When we are working across borders, we obey all pertinent laws, rules and regulations – both at home and abroad.

If we are selling to, buying from, visiting or dealing with clients from outside our home country, it is our job to understand both the laws, rules, and regulations that apply, as well as our own policies – and follow them.

Fighting crime

We have a duty to contribute to the integrity of the financial system, as well as our own business.

So we do whatever we can to combat money laundering, corruption and terrorist financing – including adhering to global sanctions in line with our policies and with jurisdictional authorities.

Money laundering

We have rigorous systems in place and hold ourselves accountable to detect, stop and report any suspected money laundering.

Corruption

We have zero tolerance for corruption or any kind of bribery, including so-called "facilitation payments". We don't offer or accept improper gifts or payments in the course of our business.

Tax matters

We follow all the laws, rules, regulations and treaties around tax that apply to us, all over the world – not just to the letter, but in their true spirit. We pay and report all taxes due. We report information relating to our own tax position and that of our clients and employees as required.

We will not help or advise our clients or any other party avoid either paying the tax that they owe or reporting their income and gains, nor will we support any transactions where we know or shall presume that the tax outcome is dependent on unrealistic assumptions or the hiding of facts.

We will also not contract with third parties that provide services for or on our behalf, where those acts help others to avoid taxes owed.

Sharing, using and storing information

Client confidentiality

Our clients trust us to keep the information they've shared with us safe and secure and only use it in the ways we've agreed with them.

We follow the highest standards of information security to keep information we hold on clients confidential and to protect legitimate client privacy rights. We have strict data security standards and procedures designed to prevent data being tampered with, seen or used by the wrong people, stolen, lost or destroyed.

We do not share our clients' details with anyone outside of UBS, unless we have their permission to do so – or where we have a legal duty to share it with the relevant authorities. And even within UBS, we will only share client details with those colleagues who we believe need to see it to better serve that client.

Appropriate use of data and information

We approach the use of data and information, including client information, from an ethical perspective, assessing what is the right thing do, beyond what laws, rules or regulations say we must do. We use data and information to enhance the service we provide to clients, or to make UBS more resilient and operationally sound.

Our principles and standards guide us in how we use data and information and develop and deploy technological solutions. We are accountable, robust and transparent in how we operate. We consider the societal impacts. And we do not use data and information in ways that could harm our clients, employees, the public, or the markets.

Reporting and information sharing

When we share or report anything, especially financial information – to either the public or our regulators – we take great care to make sure it is accurate, up to date and as easy to understand as it can be (and in line with any legal or regulatory requirements and best practice).

We maintain an internal control framework that is designed to support the preparation and fair representation of consolidated financial statements in accordance with International Financial Reporting Standards (IFRS) and that are free from material misstatement.

Based on their audit work, our independent external auditors express an opinion on our internal controls over financial reporting as well as on the financial statements themselves. Our internal audit function provides support to our external auditors in discharging their responsibilities, and also assesses the adherence to our strategy and the effectiveness of our governance, risk management and control processes.

Inside information

We never use inside information (material information that is not public) to do anything other than for what it was given to us in the first place.

Having made every effort to ascertain whether information is inside information, we only ever share such information on a need-to-know basis. That applies to people inside and outside UBS, in line with our internal procedures, as well as any relevant laws, rules and regulations.

Society and the environment

Integrating financial and societal performance

We integrate financial and societal performance for the mutual benefit of our clients and our firm.

We are constantly looking for better ways to do business in an environmentally sound and socially responsible manner.

That includes monitoring, managing and reducing any negative impact we might have on the environment and on human rights. It means managing social and environmental risks that our clients' and our own assets are exposed to. And it means looking for sustainable investment opportunities, for ourselves and our clients.

Investing in our communities

We look for ways to contribute to the well-being of our local communities – by supporting charitable and non-profit activities financially and non-financially, including through our volunteering efforts.

Violating the Code

Disciplinary procedures

Anyone who breaks the rules (whether it is our Code, UBS policies or laws, rules and regulations) will face consequences – from reprimands and warnings to dismissal.

This includes not only the person who broke the rules, but also their line manager and anyone who knew about it but did not report it.

Where a violation amounts to criminal behavior, we will not hesitate to bring it to the attention of the relevant authorities.

Upholding the Code

We live up to this Code at all times, with no exceptions.

UBS will not accept any justification or excuse for breaking the Code, whatever the reason – whether for profit, convenience or competitive advantage or because a client or someone else asked for it.

Changes to the Code

The Code defines the way we do business. It is reviewed regularly to make sure it reflects our principles and standards and is consistent with the law. Whenever there's a change, an announcement goes to every employee.

Affirmation process

Each of us declares that we have read and affirmed our awareness of the Code, as part of our annual affirmation process.

Speak Up

We immediately report any potential violations of laws, rules, regulations, policies, professional standards and the principles of the Code to our line manager or local investigations officer. We can also report them confidentially or anonymously using the whistleblowing procedures published on the intranet site goto/speakup.

Any form of retaliation against whistleblowers is unacceptable.

And UBS expects its line managers to escalate and report any violations of laws, rules, regulations, policies, professional standards and the principles of the Code.

Questions about the Code

Any questions about any part of this Code, or what it means in practice, should go to the Group General Counsel or the Group Chief Compliance and Governance Officer.

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Exhibit D.

UBS

Our climate strategy

Taking action towards a low-carbon future

Climate action – a snapshot

Nearly five years have passed since the adoption of the Paris Agreement on Climate Change (the Paris Agreement). Collective progress towards achieving the goals of the Paris Agreement will be assessed in a global stocktake in 2023, acknowledging the 2 °C benchmark and the more recent 1.5 °C limit in global warming urged by the Intergovernmental Panel on Climate Change (IPCC) in its 2018 special report. Achieving the Paris Agreement goals demands unprecedented levels of investment. In terms of the current state of climate action, there is a recognized climate finance gap as well as a Sustainable Development Goals (SDGs) investment gap – to meet the low-carbon transition targets. At the same time, we see a clear investor appetite for directing capital toward a low-carbon future. To support in scaling up collective action, UBS assists private and institutional clients in their desire to invest in accordance with their social and environmental objectives, thus helping to close the gap.

We aspire to drive positive change in society and the environment for future generations. Our climate strategy underlines our commitment to the SDGs on climate action and on affordable and clean energy as well as the Paris Agreement. These key UBS commitments are embedded in the United Nations (UN)-backed Principles for Responsible Banking (PRB). This global framework specifies the role of banks in supporting a sustainable future and scaling up their contribution to the achievement of both the SDGs and the Paris Agreement. UBS became a founding signatory of the PRB in September 2019.

We regularly report on the implementation of our climate strategy and follow the recommendations provided by the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD). The recommendations call on companies to disclose the impacts of climate change on their businesses. This will allow investors and financial institutions to make better investment decisions with a common set of data to assess the climate-related risks and opportunities of specific companies. We are committed to aligning our climate disclosure within the five-year pathway outlined by the TCFD (until end of 2022) and to collaborating within the industry to close gaps.

We publicly support international, collaborative action against climate change. Our Chairman is a signatory to the European Financial Services Round Table's statement in support of a strong, ambitious response to climate change. Our Group CEO is a member of the Alliance of CEO Climate Leaders, an informal network of CEOs convened by the World Economic Forum and committed to climate action. Our Head Sustainable Equity Team within UBS Asset Management (AM) is a member of the TCFD.

Our climate-related achievements have been recognized by external experts. For the fifth year running, UBS has been named the best performer in the Diversified Financial Services and Capital Markets Industry of the Dow Jones Sustainability Indices (DJSI), the most widely recognized corporate sustainability rating. CDP, which runs a global disclosure system that enables companies, cities, states and regions to measure and manage their environmental impacts, has awarded UBS with Leadership status and a A- rating on climate change. In 2019, ShareAction, an international organization focused on advancing responsible investment, awarded UBS as the best performing asset manager in climate proxy voting in its report, "Voting matters – Are asset managers using their proxy votes for climate action?"

Climate-related highlights

- Our climate strategy underlines our commitment to the SDGs on climate action and on affordable and clean energy and supports an orderly transition to a low-carbon economy, as defined by the Paris Agreement.
- Our exposure to carbon-related assets on our banking balance sheet is low, at 0.8% or USD 1.9 billion as of 31 December 2019, decreasing further from 1.6% at the end of 2018 and 2.8% at the end of 2017.
- Our climate-related sustainable investments increased to USD 108 billion in 2019 from USD 87.5 billion in 2018.
- We actively engaged on climate topics with 50 oil & gas and utilities companies, and voted on 44 climate-related shareholder resolutions.
- We reduced our firm's greenhouse gas (GHG) footprint by 71% by 2019 compared with 2004 levels. We were awarded top ratings and rankings by external experts; climate industry group leader (Dow Jones Sustainability Indices); Climate A- rating (CDP) and best performing asset manager in proxy voting (ShareAction, 2019).

Climate governance

As embedded in the Organization Regulations of UBS Group AG, the Board of Directors' (BoD) Corporate Culture and Responsibility Committee (CCRC) oversees our climate strategy. Within the parameters set by the CCRC, the *UBS in society* Steering Committee ensures firm-wide execution of the climate strategy while our firm's climate-related risk appetite is set by the Global Environmental & Social Risk (ESR) Committee. In joint meetings, the CCRC and the BoD's Risk Committee regularly and critically review the assessments and steps taken by these management bodies towards executing our climate strategy. The CCRC approves UBS's annual climate-related objectives and oversees the progressive alignment of our climate disclosure with the TCFD recommendations. These annual plans and objectives are managed as part of our ISO 14001-certified environmental management system (EMS) with defined management accountabilities across the firm. The EMS helps us to systematically reduce environmental risks, seize market opportunities and continuously improve our environmental and climate performance and resource efficiency.

Refer to the "Sustainability governance" graph in the Sustainability Report 2019

Climate strategy

As one of the world's largest managers of private and institutional wealth, we play an active role in shaping a sustainable future. As with the SDGs, we aim to be a leading financial provider in enabling investors to mobilize private and institutional capital to climate change mitigation and adaptation while supporting the transition to a low-carbon economy. At UBS we see a clear investor appetite for directing capital in climate solutions. We address this by continuously developing our offering in sustainable finance and actively engaging with clients. Our climate strategy supports our clients and our firm preparing for success in an increasingly carbon-constrained world.

We support this goal through our innovative financial product offering and advisory, as well as through embedding climate risk in our firm-wide risk management framework and in our own operations. Our climate strategy focuses on four pillars:

- Protecting our own assets: We seek to protect our assets by limiting our risk appetite for carbon-related assets and by estimating our firm's vulnerability to climate-related risks using scenario-based stress testing approaches and other forward-looking portfolio analyses. We have reduced carbon-related assets on our balance sheet to 0.8% or USD 1.9 billion as of 31 December 2019, down from 1.6% at the end of 2018 and 2.8% at the end of 2017.
- Protecting our clients' assets: We support our clients' efforts to assess, manage and protect them from climate-related risks by offering innovative products and services in investment, financing and research. We actively engage on climate topics with companies that we invest in; AM has implemented an engagement program with 50 companies from oil and gas and utilities sectors and we voted on 44 climate-related shareholder resolutions during 2019.
- Mobilizing private and institutional capital: We mobilize private and institutional capital towards investments facilitating climate change mitigation and adaptation and in supporting the transition to a low-carbon economy as corporate advisor, and/or with our lending capacity. In 2019, our climate-related sustainable investments rose to USD 108 billion from USD 87.5 billion at the end of 2018, and the deal value in equity and debt capital market services, and in financial advisory services, related to climate change mitigation and adaptation, rose to USD 87.2 billion, from USD 56.5 billion in 2018.
- Reducing our direct climate impact: We continue to reduce our greenhouse gas (GHG) emissions and increase the firm's share in renewable energy. We have committed to using 100% renewable electricity by mid-2020. This will reduce our firm's GHG footprint by 75% compared with 2004 levels. At the end of 2019, we had reduced our GHG emissions by 71% compared to baseline year 2004.

Refer to the "Our focus on ESG" sub-section of the Sustainability Report 2019 for more information on our sustainable investments

Refer to the "In-house environmental management" section of the Sustainability Report 2019 for more information

Climate risk management

The physical and transition risks of climate change contribute to a structural change affecting banks and the financial sector at large. In order to protect our own and our clients' assets from climate-related risks, we continue to drive the integration of climate-related risk into our standard risk management framework. This framework involves procedures and tools for identifying, assessing and monitoring environmental and social risks in our standard risk,

compliance and operations processes. These include client onboarding, transaction due diligence, product development and investment decision processes, own operations, supply chain management and portfolio reviews. These processes are geared toward identifying clients, transactions or suppliers potentially in breach of our standards or otherwise subject to significant environmental and human rights controversies, including climate change.

In 2019, we embedded climate risk into our risk taxonomy and operational risk appetite statement, further reduced our exposure to carbon-related assets and, more broadly, to climate-sensitive sectors. We also refined our ability to estimate the firm's vulnerability to climate-related risks using forward-looking scenario-based approaches, and revised our standards in the energy and utilities sectors.

Refer to the "Climate-related standards in the energy and utilities sectors" table below
Refer to "Scenario analysis" further below

Climate-related standards in the energy and utilities sectors		
Coal	**Coal-fired power plants**	Not providing project-level finance to new coal-fired power plants globally. Only supporting financing to transactions of existing coal-fired operators (>30% coal reliance) who have a transition strategy in place that aligns with a pathway under the Paris Agreement, or the transaction is related to renewable energy.
	Coal mining	**New:** Not providing financing where the stated use of proceeds is for greenfield[1] thermal coal mines. Continuing to severely restrict lending and capital raising to the coal mining sector.
	Mountaintop removal (MTR)	Not providing financing to coal mining companies engaged in MTR operations.
Oil and gas	**Arctic oil and oil sands**	**New:** Not providing financing where the stated use of proceeds is for new offshore oil projects in the Arctic or greenfield[1] oil sands projects. **New:** Only provide financing to companies which have significant reserves or production in arctic oil and/or oil sands (>30% of reserves or production) where the stated use of proceeds is related to renewable energy or conventional oil & gas assets.
	Liquefied natural gas (LNG) and ultra-deepwater drilling	**New:** Transactions directly related to LNG infrastructure assets are subject to enhanced Environmental & Social Risk (ESR) due diligence considering relevant factors such as management of methane leaks, and the company's past and present environmental and social performance. **New:** Transactions directly related to ultra-deepwater drilling assets are subject to enhanced ESR due diligence considering relevant factors such as environmental impact analysis, spill prevention and response plans, and the company's past and present environmental and social performance.

1 Greenfield means a new mine / well or an expansion of an existing mine / well which results in a material increase in existing production capacity.

Scenario analysis

We have been using scenario-based approaches since 2014 to assess our exposure to physical and transition risks associated with climate change. We have performed both top-down balance sheet stress testing (across the firm), as well as targeted, bottom-up analysis of specific sector exposures in short, mid-, and long-term horizons. The table below summarizes the UBS scenario assessments performed to date.

Scenario assessments

	Assessment	Year	Scenarios used	Outcomes
In-house scenario analysis	**Top-down**			
	UBS climate stress test to assess UBS's vulnerability (balance sheet, operational income and physical assets) to climate change.	2014	Climate scenario developed in-house	Moderate financial impact in line with other stress scenarios, such as those that foresee an oil shock.
	Bottom-up			
	Assessment on exposure of loan portfolios secured by real estate to climate-related hazards.	2015	Climate scenario developed in-house	Low financial impact due to insurance coverage and loan maturity profile.
	Assessment on impacts of changing oil, gas and coal prices on oil, gas and electric utilities credit portfolios.	2015	Climate scenario developed in-house	Low financial impact due to high quality and maturity profile of portfolio.
Industry collaboration	Drought stress test (Natural Capital Finance Alliance tool) on UBS's energy portfolio.	2017	Based on historic academic precipitation observations	No significant production impact from drought.
	UNEP FI TCFD pilot project for banks: standardizing climate risk identification and translating climate risks into credit impacts. Testing in 2019 focused on our power utilities credit portfolio, work on other sectors continues in 2020.	2018 – 2020	Integrated Assessment Modelling Consortium (IAMC)	No significant credit loss from transition risks in 1.5 and 2 degree scenarios, nor from physical risks in 2 and 4 degree scenarios.
	Paris Agreement Capital Transition Assessment (PACTA): testing alignment of corporate lending portfolios with Paris Agreement benchmarks.	2019 – 2020	• IEA[1] • B2DS[2] • SDS[3] • NPS[4] • CPS[5]	Low lending exposure to high-carbon sectors.

1 International Energy Agency (IEA), World Energy Outlook 2 Beyond 2 Degrees Scenario 3 Sustainable Development Scenario
4 New Policies Scenario 5 Current Policies Scenario

Our initial (2014) top-down approach consisted of a scenario-based stress test to assess UBS's balance sheet vulnerability across the firm. Leveraging our existing firm-wide top-down stress testing methodology, we developed a climate change scenario (which assumes that severe weather events result in governments around the world agreeing to implement carbon pricing mechanisms to assess the impact on financial assets, operational income and physical assets). The scenario anticipated that these mechanisms will prompt a shift away from coal and other fossil fuels to cleaner alternatives and adversely impact markets and gross domestic product. Our subsequent (2015) bottom-up analyses of oil and gas utilities as well as electric utilities loan portfolios consisted of a forward-looking analysis to assess impacts of a long-term low fossil fuel price scenario resulting from policies promoting greater use of renewables, enhancing efficiency standards and limiting emissions. We calculated the impact this scenario would have on company probability of default and aggregated company-level results at the portfolio level to assess changes to expected loss. We also assessed the vulnerability of loan portfolios secured by real estate in Switzerland and the US to physical risk by mapping the location of collateral in over 6,000 postal code areas against Swiss Re's CatNet tool, which aggregates a large dataset of observed natural hazards such as wildfire, river and pluvial flooding and tropical cyclones.

From both top-down and bottom-up approaches, our internal stress tests suggested no immediate threat to UBS's balance sheet. However, we identified methodological challenges ranging from the suitability of climate scenarios for banking risk modelling to data availability. To address these challenges, 16 banks, including UBS, the UN Environment Programme Finance Initiative (UNEP FI), the Integrated Assessment Modelling Consortium (IAMC), and risk consultancies Oliver Wyman and Acclimatise began a collaboration of several years in 2018. The objective is to develop analytical tools that help banks define and disclose climate-related risks and opportunities as envisioned by the TCFD. This includes developing and further refining scenario-based stress-testing methodologies. Now in its second phase, the UNEP FI TCFD working group for banks has grown to 35 banks and has expanded the development of these analytical tools to include a range of possible scenarios, further advancement on scenario-based stress testing methodologies, and standardization between institutions on what defines climate-sensitive activities. These advancements aim for banks to more robustly identify and disclose exposure to climate-related risks and opportunities.

In addition to the UNEP FI TCFD working group, UBS is one of the pilot banks testing the Paris Agreement Capital Transition Assessment (PACTA). In the context of the PACTA pilot, we studied the alignment of select climate-sensitive sectors in our corporate credit portfolio with Paris Agreement benchmarks. The methodology provides an assessment of a bank's credit-financed activities in relation to the global shift to a low-carbon economy. For example, the assessment showed that the fuel mix in UBS' s power utilities credit portfolio, according to the PACTA methodology, is significantly less carbon intensive than the global corporate economy, as of 2019 (see "PACTA methodology for power generation" further below). However, the limitations of the outputs from this assessment are very similar to the other pilots and we will continue to work on improving methodology, data availability and scenario applicability.

Both pilots promote industry learning and provide guidance for disclosing climate-related risks and opportunities in line with TCFD recommendations. Overall, the results of the 2019 climate risk pilots have confirmed findings from our previous pilot stress tests on climate, which started in 2014: we have so far not identified significant climate-related financial risk on our balance sheet. We explain this by UBS's relatively small lending book in climate-sensitive-sectors (see "UBS corporate lending to climate-sensitive sectors 2019" further below) and availability of insurance where we have relevant exposures to such sectors (e.g., Swiss mortgage lending book).

Protecting our clients' assets

We help our clients assess, manage and protect their assets from climate-related risks by offering innovative products and services in investment, financing and research. AM has developed a suite of products allowing clients to identify the carbon intensity of their investments and/or to align them with the Paris Agreement: In 2017, AM together with the New Employment Savings Trust launched a strategy called *Climate Aware* with an aim to do more than manage investments based on carbon foot-printing. In 2018, AM followed its successful UK *Climate Aware* rules-based fund with an Irish-based fund that is available for international investors outside of the UK. The portfolio is oriented towards companies that are better prepared for a low-carbon future while reducing exposure to, rather than excluding, companies with higher carbon risk, in order to pursue strategic engagement with these companies. The strategy involves not only a reduction of the CO_2 footprint of the portfolio but also an innovative approach to aligning the portfolio with the 2 °C carbon reduction scenario.

Finally, AM empowers equity portfolio managers to examine the carbon footprint of their portfolios and compare the relative carbon footprints of their company holdings to that of the benchmark.

Engagement

On behalf of clients, AM engages with companies it invests in to discuss approaches to mitigating climate-related risk. AM also actively votes on shareholder resolutions to improve transparency and disclosure around climate-related reporting. Specifically in the context of its *Climate Aware* fund, AM has implemented an engagement program with 50 oil and gas companies as well as utilities companies underweighted in the fund. Communication with these companies aims at improving their disclosure and performance alignment with the TCFD recommendations. Engagement also makes it possible to share the results of the quantitative and qualitative assessments included in the fund methodology with investee companies. This allows for the verification of company performance with additional information collected before and after meetings. It also means AM can collect feedback, explicitly communicate objectives for change in corporate practices and further enhance the model used to inform the under- / overweights in the strategy.

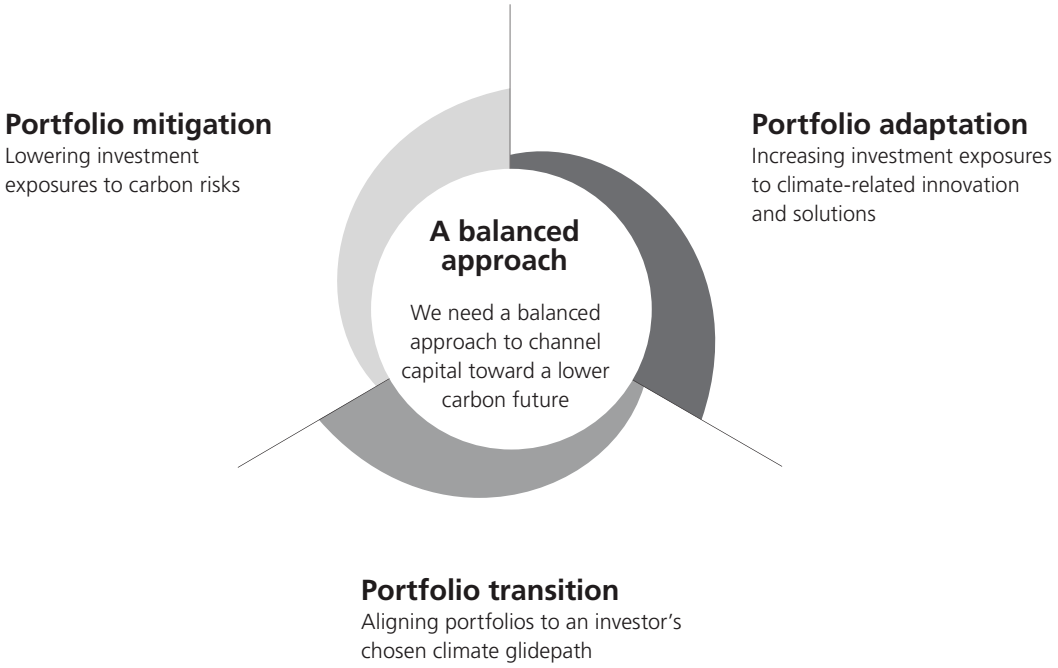
AM is also involved in Climate Action 100+, a collaborative engagement initiative launched in December 2017. Its aim is to engage with high-level greenhouse gas emitters, and other companies across the global economy, that have significant opportunities to drive the clean energy transition and help achieve the goals of the Paris Agreement. It has the support of 320 investors, representing more than USD 33 trillion of assets under management (at end of 2019). AM is directly involved in 30 coalitions of investors (at the end of 2019) within Climate Action 100+ and leads seven of the company dialogues across regions. Whether AM is a lead or participating investor, it is an active member of these coalitions, providing feedback on the climate change performance of companies, the discussion agenda, engagement goals and the progress of these dialogues.

Opportunities

We mobilize private and institutional capital for investments that facilitate climate change mitigation and adaptation. UBS supports the orderly transition to a low-carbon economy as corporate advisor, and/or with its lending capacity. As we outlined in our 2020 white paper for the World Economic Forum annual meeting, "Becoming climate aware: Mobilizing capital to help meet climate change goals", we have formulated a *Climate Aware* framework which helps investors align their portfolios towards a climate-smart future. The framework is built on the methodology which underlies UBS-AM's *Climate Aware* strategy. The main characteristics of the framework are:

- Portfolio mitigation: Lowering investment exposures to carbon risk
- Portfolio adaptation: Increasing investment exposure to climate-related innovation and solutions
- Portfolio transition: Aligning portfolios to an investor's chosen climate glidepath

A Climate Aware framework for investors



Portfolio mitigation

Based on our experience, maintaining a balance between required investment returns and minimizing climate risks works most effectively when investors integrate climate change considerations into a diversified portfolio. Similar to ESG integration, this is an important element in understanding the specific effects of climate change. As TCFD has highlighted, these can be viewed as regulatory, market, technology and physical risks. How they play out at the level of markets, industry sectors and individual issuers depends on an interplay of:

– regulation;
– commercial considerations;
– impact of technology on business models, revenues, costs and capital requirements.

Integrating these three aspects puts the focus on the most material issues relating to the reduction of emissions generated by the most carbon-intensive sectors. It also leads to a deeper and more investment-relevant understanding of the physical risks.

Portfolio adaptation

Investing for a low-carbon future hinges on the ability to invest in, and fund, new technologies and solutions. The key investing areas relate to GHG emissions reduction, energy transition, and energy efficiency. They include companies that manufacture and deploy these technologies as well as the infrastructure and services that make these achievable at scale. There are variety of developments in business structure, asset ownership, supply chains and delivery models that may be deployed as part of the climate change transition. It is also important to recognize that there are different kinds of investors that are better-placed for certain kinds of investments. Venture capital, private equity, real estate, public equity and public fixed income all have different appetites for technology risk.

Portfolio transition

It is important for investors to understand the difference between where they are now and the possibilities of the climate transition. Scenario analysis is emerging as a response to the uncertainties of climate change. Engagement, meanwhile, provides an opportunity for investors to encourage good corporate practice and, together with voting, keep management accountable for the actions needed to keep pace with the climate transition. It also allows investors to understand the investment dynamics in individual sectors and countries and determine the overall direction of travel. By applying the tools of scenario analysis and engagement, investors are better able to manage the transition to a climate-smart future.

AM is also a member of the Institutional Investors Group on Climate Change (IIGCC) Climate Action 100+ European Advisory Group, which advocates for the world's transition to a low-carbon economy.

Our other business divisions also translate this strategic thinking on climate into concrete products and services.

UBS offers 100% sustainable discretionary mandates and asset allocation funds based on an innovative dedicated Sustainable Investing Strategic Asset Allocation for private clients in Global Wealth Management (GWM) and Personal & Corporate Banking (P&C). These include an explicit allocation to strategies that aim at mitigating climate change, such as green bonds and thematic investments, but also others that contribute indirectly to climate change mitigation such as Multilateral Development Bank bonds, ESG leaders and ESG improvers. GWM developed a new advisory solution that includes an explicit climate change dimension, allowing clients to tilt their portfolios towards the issues they care about. Ultimately our goal in developing new products and services is to ensure that all material risks and opportunities are addressed, and to allow clients to select sustainable investments aligned to their interests while receiving financial returns in line with traditional investment approaches.

GWM integrates sustainability assessments, focusing on the sustainability intentionality of fund managers, into all fund and ETF onboardings. We have set a target of directing USD 5 billion of client assets by the end of 2021 into new impact investments contributing to the SDGs. These investments include a significant climate component. GWM's mutual fund and ETF offering includes climate-focused investment strategies, comprising those focused on clean / alternative energy.

We participated in launching, and have an ongoing partnership with, Align17, an independent, third-party digital marketplace. Align17 stands out in connecting a wider range of public, institutional, and private wealth investors with SDG-related investment opportunities. These opportunities are available to qualifying UBS clients and often serve to finance climate-related projects.

Our AM and GWM businesses have in place a comprehensive approach to address environmental, social and corporate governance factors across investment disciplines. For example, sustainability themes are embedded in GWM's equity research processes, while AM's Real Estate and Private Markets has developed a Responsible Investment Strategy to enhance investment performance of mandates for direct and indirect real estate and infrastructure investments. The 2019 GRESB (formerly Global Real Estate Sustainability Benchmark) awarded 15 out of 20 of AM's submitted real estate and infrastructure funds 5-star ratings with the remaining funds achieving a 4-star rating.

Our Investment Bank provides capital-raising and strategic advisory services globally to companies that make a positive contribution to climate change mitigation and adaptation, including those in the solar, wind, hydro, energy efficiency, waste and biofuels, and transport sectors. In 2019, the deal value in equity or debt capital market services, and of financial advisory services, related to climate change mitigation and adaptation, rose to USD 87.2 billion, from USD 56.5 billion in 2018.

We strive to be the preferred strategic financial partner relating to Switzerland's Energy Strategy 2050. In 2019, P&C supported 12 strategic transactions in support of the strategy. The UBS Clean Energy Infrastructure Switzerland strategy offers institutional investors unprecedented access to a diversified portfolio of Swiss Infrastructure facilities and renewable energy companies. Due to clients' demand, a successor strategy was launched in September 2017. In our P&C business we have also integrated Sustainable Investing Advisory into the strategic dialogue with our institutional clients.

To support philanthropists entering the climate space, UBS Optimus Foundation and the Climate Leadership Initiative (CLI) have developed four principles for effective climate philanthropy. CLI was created by six of the top climate donors this year with the express goal of making it easier for new philanthropists to learn, become connected to peers and experts and join the fight.

The four principles are Understand Climate Solutions and Impact; Collaborate and Take Action Swiftly; Be Prepared to Stick With It; Marshall All Your Resources.

Climate-related metrics

In 2019, we have again significantly reduced the share of our carbon-related assets to 0.8%, down from 1.6% in 2018 (and 2.8% in 2017). More broadly, our share of exposure to climate-sensitive sectors has reduced in 2019 to 15.5% from 19.6% in 2018 (% of total gross banking exposure across IB and P&C).

Climate-related sustainable investments increased to USD 108 billion, up from USD 87.5 billion in the previous year. At the end of 2019, we had reduced our GHG emissions by 71% compared to baseline year 2004.

Climate-related metrics 2019

	For the year ended			% change from
	31.12.19	31.12.18	31.12.17	31.12.18
Risk management				
Identified significant climate-related financial risk on balance sheet[1]	None	None	None	
Carbon-related assets (USD bn)[2]	1.9	3.2	5.8	(41)
Proportion of total banking products exposure, gross (%)	*0.8*	*1.6*	*2.8*	
Total exposure to climate-sensitive sectors (USD bn)[3]	37.6	38.6	42.6	(3)
Proportion of total banking products exposure, gross (%)	*15.5*	*19.6*	*20.5*	
Weighted carbon intensity of the Climate Aware equities strategy (in tons CO_2e per million of USD revenue) [4]	74.8	95.6	117.5	(22)
Compared to benchmark (FTSE Developed World Index) (%)	*(56.0)*	*(55.7)*	*(44.0)*	
Number of climate-related shareholder resolutions voted upon	44	43	34	2
Proportion of supported climate-related shareholder resolutions (%)[5]	*81.8*	*88.0*	*82.0*	
Opportunities				
Climate-related sustainable investments (USD bn)[6]	108.0	87.5	74.0	23
Proportion of UBS clients' total invested assets (%)	*3.0*	*2.8*	*2.3*	
Total deal value in equity or debt capital market services related to climate change mitigation and adaptation (CCMA)[7] (USD bn)	52.7	31.6	44.3	67
Total deal value of financial advisory services related to CCMA (USD bn)	34.5	24.9	5.5	39
Number of strategic transactions in support of Switzerland's Energy Strategy 2050	12	8	4	50
Own operations				
GHG footprint (kilotons CO_2e)[8]	104	132	148	(21)
Percentage change from baseline 2004 (Target: -75% by 2020) (%)	*(71.2)*	*(63.4)*	*(59.0)*	

1 Methodologies for climate-related financial risk are emerging and may change over time, as described earlier under Scenario Analysis. 2 Carbon-related assets exposures are adjusted from previous years' versions to align with IFRS 9: Banking products across Investment Bank and Personal & Corporate Banking. IFRS 9 gross exposure including other financial assets at amortized cost, but excluding cash, receivables from securities financing transactions, cash collateral receivables on derivative instruments, financial assets at FVOCI, irrevocable committed prolongation of existing loans and unconditionally revocable committed credit lines and forward starting reverse repurchase and securities borrowing agreements. As recommended by the TCFD, carbon-related assets are defined as assets tied to the energy and utilities sectors (Global Industry Classification Standard). Non-carbon-related assets, such as renewables, water utilities, and nuclear power are excluded. For grid utilities, the national grid mix is applied. 3 Gross banking products across Investment Bank and Personal & Corporate Banking (IFRS 9). Climate-sensitive sectors defined as inventory of activities with higher vulnerability to transition and physical climate risks, for more see in-text description. 4 Year-on-year decrease of carbon intensity is mainly driven by higher carbon targets of the investment strategy. Carbon intensity is based on scope 1 and 2 CO_2 emissions of investee companies, which often rely on third-party estimates. 5 On all proposals that we supported, we voted against the recommendation provided by the issuer. 6 Invested assets of products such as sustainably managed properties and infrastructure, and renewable energy. 7 Refer to "Calculating and reporting on climate change-related financing and advisory activities" in the Appendix of this document. 8 GHG footprint equals gross GHG emissions minus GHG reductions from renewable energy and GHG offsets (gross GHG emissions include: direct GHG emissions by UBS; indirect GHG emissions associated with the generation of imported / purchased electricity (grid average emission factor), heat or steam and other indirect GHG emissions associated with business travel, paper consumption and waste disposal). A breakdown of our GHG emissions (scope 1, 2, 3) is available in the in-house environmental section of the UBS Sustainability Report 2019.

UBS corporate lending to climate-sensitive sectors 2019

UBS is leading an effort, with UNEP FI and peer banks, to define an inventory of climate-sensitive activities based on TCFD, regulators' and rating agencies' climate risk definitions. The current inventory is summarized in the table below at the sector level.

UBS corporate lending to climate-sensitive sectors 2019

banking products across Personal & Corporate Banking and the Investment Bank	As of 31.12.19	
USD million, except where indicated	Gross exposure[2]	Share of total exposure to all sectors (%)
Climate-sensitive sector [1]		
Aerospace and defence [3]	2,115	0.9
Automotive	449	0.2
Chemicals	1,052	0.4
Constructions and materials [4]	3,993	1.6
Food and beverage [5]	2,460	1.0
Industrial Materials [6]	345	0.1
Machinery and equipment [7]	2,576	1.1
Mining [8]	3,000	1.2
Oil and gas [9]	1,415	0.6
Plastic and rubber	356	0.1
Primary materials [10]	332	0.1
Real estate [11]	15,031	6.2
Transportation [12]	3,272	1.3
Utilities [13]	1,186	0.5
Total exposure to climate-sensitive sectors	37,582	15.5
Total exposure to all sectors	242,565	100.0

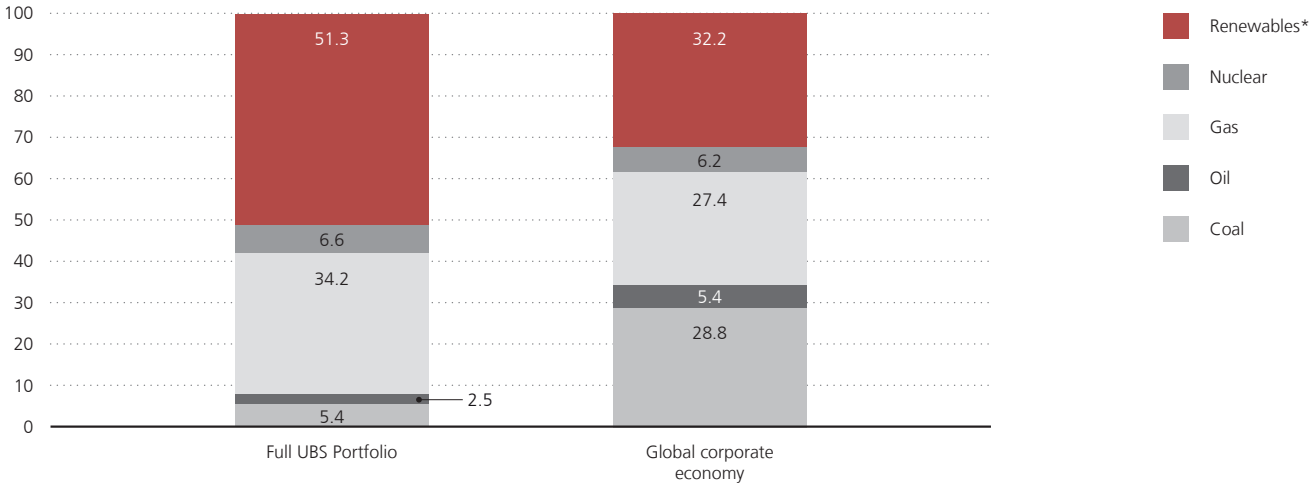
1 Climate-sensitive sectors defined as inventory of activities with higher vulnerability to transition and physical climate risks, for more see in-text description. **2** Banking products across the Investment Bank and Personal and Corporate banking divisions. IFRS 9 gross exposure including other financial assets at amortized cost, but excluding cash, receivables from securities financing transactions, cash collateral receivables on derivative instruments, financial assets at FVOCI, irrevocable committed prolongation of existing loans and unconditionally revocable committed credit lines and forward starting reverse repurchase and securities borrowing agreements. **3** Of which air transport: USD 1.9 billion **4** Of which construction: USD 3.2 billion, mfg. concrete / cement: USD 0.4 billion **5** Of which food / grain traders / wholesalers: USD 1.4 billion, mfg. food / bev: USD 1.1 billion **6** Of which mfg. iron / steel: USD 0.2 billion, mfg. pulp / paper: USD 0.06 billion **7** Of which mfg. metal products: USD 0.7 billion **8** Of which metal ore traders USD 2.7 billion, coal mining: USD 0.02 billion **9** Of which upstream extraction: USD 1.1 billion, integrated O&G: USD 0.2 billion **10** Of which agriculture-related: USD 0.2 billion, forestry / wood: USD 0.02 billion **11** Of which development / selling real estate: USD 14 billion, agencies: USD 0.8 billion. In addition UBS has loans and advances to customers backed by residential real estate totaling USD 155 billion across Global Wealth Management and Personal & Corporate Banking **12** Of which shipping: USD 0.5 billion, mfg. trains: USD 0.8 billion, logistics / post: USD 0.5 billion **13** Of which prod. / dist. electricity: USD 0.8 billion (for a closer look at the carbon exposure of UBS's power utilities portfolio, see PACTA graph below), refuse / recycling: USD 0.2 billion, water collection / purification: USD 0.01 billion

PACTA methodology for power generation:
UBS corporate lending portfolio technology mix of production against global corporate economy

In 2019 we further assessed select climate-sensitive sectors using the PACTA methodology. Results on power sector show that the technology mix of UBS' s power sector corporate lending portfolio is significantly less carbon intensive than the global corporate economy, as of 2019[1].

UBS corporate lending portfolio technology mix of production against global corporate economy

Capacity distribution across technologies
In %



* Renewables, including solar, wind, hydro, biofuels and others.

1 Across the Investment Bank and Personal & Corporate Banking, banking products only. As of 30.9.19, includes clients who are classified as power utilities. The methodology is driven by the 2° Investing Initiative's PACTA pilot.

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Exhibit E.

UBS

One planet, one future.

Only by working together can we safeguard our future.

What are the challenges of climate change?

Global warming has increased sharply through the use of fossil fuels, deforestation and livestock farming. The consequences are a significant burden on the environment and our natural resources. But if we are all prepared to take ambitious measures, we can protect the climate together.

Why are we getting involved?

We are taking responsibility for future generations and want to be part of the solution. The needs of our clients have also changed. That's why we're supporting investors and companies that want to help bring about a more climate-friendly economy.

As a financial services provider

Because we are stronger together

108 billion

US dollars in climate-related investments by our clients (e.g., in the Swiss energy transition).

3+ billion

US dollars of wealth in our "Climate Aware" strategy (e.g., investments by Swiss pension funds in line with the Paris Agreement).

25

Issues of green and sustainable bonds (e.g., first green bond for an energy and infrastructure company listed on the Swiss stock exchange).

12

Strategic transactions for public utilities to adapt to the Swiss Energy Strategy 2050.

As a company

Because we take responsibility

166

Pages of transparency. Our annual sustainability report is industry-leading, comprehensive and follows internationally recognized disclosure standards.

41%

Drop in financing of companies in carbon-intensive sectors since 2018 (our exposure to carbon-related assets on our banking balance sheet is low, at 0.8%).

0

Financing of new coal-fired power plant projects, offshore oil projects in the Arctic, greenfield projects for coal mines or oil sands mining.

49

Oil, gas and utilities companies at the heart of our Climate Aware engagement program (results: e.g., linking of management rewards with CO_2 reduction targets).

71%

Reduction in our own greenhouse gas footprint since 2004. We are well on track to reach the target of 75% for 2020.

100%

Electricity from renewable sources in Switzerland since 2007 (worldwide from mid-2020) while reducing our energy consumption.

55%

Reduction in our business air travel since 2007, in addition to full compensation for the resulting emissions.

4

Environmental education projects for students.

We are committed to these principles

Because they are the most important agreements for climate protection

The Paris Agreement

The Paris climate agreement aims to limit average global warming to well below 2 degrees Celsius compared with preindustrial levels. Public and private financial resources are to be diverted in such a way as to ensure economic development low in greenhouse gases and better adaptability to a changing climate.

Sustainable Development Goals (SDGs)

We are working to achieve the UN's 17 SDGs, including climate protection. By the end of last year, for example, we had invested USD 3.9 billion of client assets into new impact investments that help achieve the SDGs. We want to increase this volume to 5 billion US dollars by the end of 2021.

Principles for responsible banking

As a founding member, UBS was one of the first signatories of the Principles for Responsible Banking (PRB) in September 2019. The global framework defines what banks can and should contribute to a sustainable future. This includes aligning our business with the SDGs and the Paris climate agreement.

We are pursuing these strategies

Because of our leading role in their implementation

Ambitious targets

We want to play a leading role in climate protection. With innovative investment solutions, we are motivating our clients to invest in the environment. We finance companies with a more climate-friendly business model. We set ambitious goals and report comprehensively on our progress every year.

An orderly transition

We support an orderly transition to a climate-friendly economy. We are driving change, raising awareness and using our influence – in discussions with clients and the companies we invest in. We have introduced stricter criteria and have greatly reduced our financing of companies that pollute the atmosphere.

Strong cooperation

No industry or company can meet the challenges of climate change on its own. That's why we are committed to greater cooperation. We actively support the development of industry standards and often achieve more in dialog with companies than if we simply no longer do business with them. We are increasing our impact through our participation in organizations such as Climate Action 100+ and UNEP FI.

We receive these awards

Because independent experts also appreciate our commitment

#1 industry leader in the Dow Jones Sustainability Index

Last year we achieved a first-place rating in the prestigious sustainability rankings for the fifth straight time and are the leaders in the category "Climate Strategy."

"A-" ranking for our handling of climate risks (CDP)

For our handling of climate risks, we were awarded an A- last year by CDP, which assessed the most important listed companies in the world on a scale from A to D-.

#1 in climate change votes (ShareAction)

For our voting behavior on climate issues, we finished first in the 2019 ranking by ShareAction, which looked at asset managers worldwide.

Outstanding: We're proud of how far we've come, but we also know that there's still a lot to do ...

ubs.com/climate

UBS

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Exhibit F.

Americas Region Diversity & Inclusion

2019 Impact Report

Being the change

UBS

I'm pleased to share UBS's inaugural Diversity & Inclusion (D&I) Impact Report for the Americas region. On the following pages, you'll learn more about where we are as a company, and where we aspire to be in the future. The report details our D&I priority areas of focus, our strategic goals and our approach to achieving them in the region, with a particular emphasis on the United States.

Across our businesses, our clients look to UBS to provide the best possible advice, capabilities and solutions based on our ability to synthesize a range of views and perspectives. Fully delivering on those expectations requires high-performing, diverse teams at all levels of our company. Creating a workplace where colleagues with varied backgrounds and experiences can all grow and contribute is the right thing to do—for our clients, our shareholders and our communities.

As a company, we will only succeed when we know where we're heading, and when we hold ourselves collectively accountable to get there. And because we believe in transparency and the power of data, we've established and are now measuring a range of benchmarks that will help us to gauge our progress relative to our ambitions. While UBS is committed to improving in all dimensions of diversity, we're starting with what we can measure today: gender and racial/ethnic diversity. In 2020, we will also add the ability for employees to self-identify as a member of the LGBTQ+ community, and in the future we expect to add additional self-identification dimensions to deepen our understanding of our workforce.

To help drive progress, I am pleased to announce that this year we will establish the UBS Americas D&I Council, chaired by and composed of leaders from across the company who represent a range of diverse employee groups. The Council's mandate will be identifying common firm-wide needs and opportunities, as well as driving solutions across all of our regional business divisions. Underscoring the importance of our D&I efforts to our broader business strategy, UBS Asset Management President Suni Harford, UBS Investment Bank Co-President Rob Karofsky and I will serve as the Council's Executive Sponsors.

We hope this report is informative, and we also recognize that it may raise some questions. If we're going to be proud of what we're achieving, we also have to be candid about how we can improve. This report serves both of those purposes, and we believe it reaffirms our mission to create an even more inclusive culture and an even more diverse UBS.

Tom Naratil
President UBS Americas
Co-President UBS Global Wealth Management

An overview of our D&I strategy

UBS's D&I-focused mission is to create a diverse workforce and inclusive culture that is more innovative, provides better service to clients and makes our company the best place for all of our colleagues to grow and succeed.

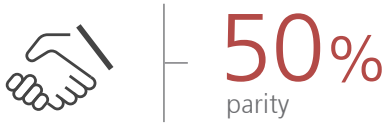
To achieve this, we've established five priority areas of focus and three strategic goals. These span a multi-year time horizon, and each of our business divisions and regions may pursue these goals in different ways.

Five priority areas of focus

1. **Inclusion:** All employees feel known, valued and appreciated, have equal access to opportunities and can achieve their career aspirations.
2. **Gender diversity:** More women in visible senior leadership and Financial Advisor roles.
3. **Racial/Ethnic diversity:** More people of color* in visible senior leadership and Financial Advisor roles.
4. **Brand and reputation:** Showcase UBS as a best practice employer in terms of our D&I policies and practices.
5. **Governance:** Leaders and Line Managers are engaged, have responsibility for execution and accountability for progress.

Three strategic goals

1. **Hire** more women and people of color



2. **Develop/promote** more women and people of color

3. **Retain** more women and people of color—an **inclusive culture** for all employees

Parity—50% diverse talent in hiring, promotion and retention—is our aspirational goal, and we've put processes and measurements in place to help us move toward that.

* In the US, we define people of color as Asian, Black or African American, Hispanic or Latino, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, and two or more races

Our framework for making progress on our strategic goals

We measure ourselves

Our core talent processes in the US—sourcing, hiring, developing, promoting and retaining the industry's best people—now have specific D&I targets: At least 50% of those hired and promoted are diverse. Reaching parity is both aspirational and possible. Our strategic goals don't guarantee success, but they keep us accountable.

We believe D&I is everyone's job

Creating a firm that's diverse and inclusive is the responsibility of everyone at UBS. That means all employees have a part to play in helping us achieve our strategic goals—in the way we attract diverse talent to UBS, in how we coach and elevate our colleagues and in the way we each contribute to strengthening an inclusive culture.

We have dedicated D&I leaders in each region

Senior Human Resources leaders have a sole focus to advise on our D&I strategy and execution in each of our regions. These professionals work with leaders across each business and function to ensure UBS's strategic D&I goals are reflected in our policies, programs, processes and practices.

Brand and reputation

How we're perceived in the marketplace is important to our current and prospective employees as well as to our individual and institutional clients. To better understand our positioning and progress relative to peer companies and other organizations, we engage in benchmarking, studies and public recognition.

Organizations that we use for benchmarking and that we are proud to be recognized by include:

McKinsey Women in the Workplace

Working Mother Top 100 Companies

Bloomberg Gender Equality Index

Human Rights Campaign Corporate Equality Index

These provide us with best practices and insight into how our programs and polices compare to our peers, and recognize leadership in D&I through published rankings and scores.

We also participate in several public recognition programs, including, but not limited to, MAKERS@ and 100 Women in Finance. These platforms provide women at UBS with external visibility, networking and professional development opportunities.

MAKERS@

100 Women in Finance

Progress on our D&I objectives

All UBS Group Executive Board (GEB) members and divisional Executive Committee members are evaluated on their efforts to improve the representation of women and underrepresented talent in our senior ranks, year over year. Annual improvement goals are specific to each division's overall growth plan. Progress is reviewed on a quarterly basis, side by side with business performance.

In 2019 we made important changes to our diversity recruiting, development and retention strategies in the US. Many of the steps we took were informed by learnings from peer institutions and best practices at other organizations, but the most significant source of ideas has been our own people. Both formal and informal feedback about what our colleagues see as our greatest opportunities are key to developing a concrete and results-oriented action plan.

Our new Multicultural Senior Talent Retention Program is a great example of our commitment to solicit perspectives and recommendations from our existing diverse talent about how we can better support them and also attract additional diverse talent to UBS. In a series of gatherings at the beginning of 2019, we brought together rising and established leaders who self-identify as Black or African-American, Hispanic/Latino or Asian-American with many of the firm's senior executives. The conversations at those events and the ongoing dialogue that followed throughout the year yielded valuable insights and ideas about how to move our D&I talent strategy forward.

Progress on goal #1: Hire more diverse talent

We are focused on building a robust, diverse pipeline of talent. Because we are able to measure them, gender and race/ethnicity are our priority areas of focus. Below are some of the changes and programs we've instituted to help us achieve our aspirational goal of hiring 50% women and/or people of color as well as address other dimensions of diversity.

Our efforts to date

- We created six new recruiting roles to ensure a dedicated focus on sourcing and hiring diverse talent at various levels. These HR specialists include: an internal diversity researcher to map the market for diverse talent;* a diversity coordinator for college/university recruiting; two internal diversity recruiters for Financial Advisors and two other recruiters for non-Financial Advisor positions.

- We updated all of our recruiting agency contracts to require them to deliver multiple diverse candidates for all open roles they are helping us to fill.

- We created metrics to track and measure the diversity of candidate slates and new hires across all major entry points and programs. We now require that, wherever possible, half of the candidates interviewed for a role must be either women, people of color or both. Our Human Resources team tracks this via candidate disclosure, and addresses shortfalls directly with the business doing the hiring.

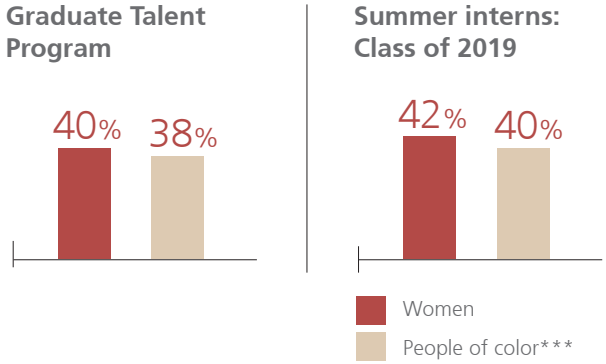
- We created new relationships with historically black colleagues and universities (HBCUs), women-only higher education institutions, and other pipelines that offer a broader pool of talent than where we've typically looked for interns and early career professionals.

- We deepened our relationships with various external diversity organizations to expand the pipeline of talent. For example, our Investment Bank created the Futures in Finance program with Knowledge is Power Program (KIPP) schools. The high school level program introduces students to careers in finance and the road to get there, which includes developing a network of UBS bankers. [For examples of other organizations we work with regularly, see footnote.**]

- Our Investment Bank sponsored both Out 4 Undergraduate Business and Reaching Out MBA, conferences for LGBTQ+ MBA students and undergrads interested in pursuing careers in business.

- In Brazil, in partnership with Goldman Sachs, BNP Paribas and Deutsche Bank, we introduced Dn'A Women. In its initial launch, the program received 1,318 applications and offered over 900 mentoring hours to underprivileged, high-potential female students.

- We launched Tomorrow's Leaders Program (TLP) to identify college students of color in their sophomore year. The program offers summer internships for these students between their sophomore and junior year. Our expectation is that TLP participants will over time broaden the diversity of our Graduate Talent Program (GTP) for new college graduates.



- We continued to hire via our Career Comeback Program, which focuses on senior talent (Director and above) returning to the workforce after a break of two or more years. Since its inception in 2016, the program has hired 150 women globally, including 39 in the US, with a retention rate of 85%.

- Our Veterans Associate Program, a US-based 20-week internship for military officers looking to transition to civilian life, has placed 18 veterans in permanent roles in the US over the past three years, with a retention rate of 85%. These men and women join an expansive network of reservists and former service members, as well as military family members, at UBS.

* Market mapping tells us the available pool of diverse financial services talent in any given market.
** Multicultural: Jopwell, Seizing Every Opportunity (SEO), Modern Guild, Toigo Foundation, Leadership Enterprise for A Diverse America, Knowledge is Power Program (KIPP), Association of Latino Professionals For America, National Association of Securities Professionals, The Greenwood Project. LGBTQ+: Human Rights Campaign, Williams Institute, Lambda Legal, Out for Undergrad. Veterans: National Service Academy, American Corporate Partners. Gender: iRelaunch, Grace Hopper.
*** People of color is US only and includes Asian, Black or African-American, Hispanic or Latino, American Indian or Alaska Native, Native Hawaiian or Pacific Islander and Two or More Races.

Progress on goal #2: Develop and promote more diverse talent

We are focused on building a diverse workforce across ranks. A key part of that is making sure people of color and women at the firm have access to training, networking, mentoring and development opportunities that help them envision and realize successful careers at UBS. Importantly, we're holding senior managers accountable for progress.

Our efforts to date

- Businesses and functions are now expected, wherever possible, to have 50% diverse promotion candidates as part of their annual talent review. When a promotion slate is less than 50% women and/or people of color, Human Resources will work with the unit on how to diversify the future pipeline.

- In the fourth quarter of 2019, our Investment Bank launched a new targeted global sponsorship program for all "high potential" Managing Directors, Executive Directors, Directors and women or people of color being considered for promotion. The program pairs employees with a senior Managing Director leader as their sponsor for a year and educates all participants on their roles and responsibilities. For sponsors, that includes using their influence to advocate for their paired employees, to gain visibility for them and to help them rise to the next level. The program's goal is, over time, to increase retention and advancement of diverse talent, increase senior awareness of diverse talent, and help foster an inclusive leadership culture.

- Our Asset Management division, following the success the Investment Bank generated through a similar program, launched a digital ad hoc mentoring tool via Rungway. This internal online tool enables employees to get advice from senior leaders and peers on sensitive subjects, to ask questions or share experiences—openly or anonymously.

- As part of our commitment to the growth of diverse talent, we've launched division-specific key talent programs for women, which prepare high-potential female colleagues to either move into a new or expanded role within the organization in the next one to two years, or to become an enterprise-wide leader.

- In Global Wealth Management, participants in the division's primary development program, Leading the Future, have been 34.3% women and 15.9% people of color.

- In the fourth quarter of 2019, our Wealth Management USA Divisional Directors launched tactical action plans focused on hiring, developing, promoting and retaining diversity in branch office leadership positions and among Financial Advisors.

Progress on goal #3: Retain more diverse talent

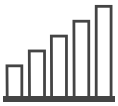
We are committed to ensuring that our diverse talent recognizes and feels valued, appreciated and that UBS is the best place for them to achieve their professional ambitions. We focus on providing resources and support that enable them to thrive, that foster a sense of belonging, that inspire loyalty and that strengthen a culture of inclusion.

Our efforts to date

- Managed by employees for employees, our Employee Networks help colleagues connect with each other, expand their professional networks and contribute to the advancement of UBS's policies and practices.

Employee Network Membership

6,704 employees



Up 35% from 2018

At UBS we have seven employee networks in the US and membership for each is open to all employees:

All Bar None (women)

MOSAIC (multicultural)

PRIDE (LGBTQ+)

Veterans

Family Connections

Young Professionals

Headscape (mental health)

- Our divisions also support affinity networks specific to their employees' D&I needs, profiles and interests. For example, the Women in Technology network in our Corporate Center division focuses on engaging, empowering and enabling women in UBS Technology to help increase their impact and the firm's competitiveness in a digitized world.

- Pioneered in our Investment Bank, Dads4Daughters, Brothers4Sisters (D4D, B4S) is now rolled out globally across the Investment Bank with content accessible to all employees. D4D, B4S at UBS is part of a global movement that advocates for workplace gender equality and making financial services a desirable, accessible career choice for young women. It aims to achieve this by: (a) actively advocating for everyone to speak up against non-inclusive workplace behaviors; and (b) building partnership with local schools and other financial industry companies to address gender diversity at an early age.

- Our Investment Bank is currently piloting a new D&I ambassadorship program, which challenges senior leaders to be more visible, active advocates for inclusive behavior and to promote an open door policy for conversations. Participating leaders receive training to develop a deeper understanding of professional conduct and escalation channels for potential policy violations. They also learn how to provide a safe, confidential space for their colleagues to seek advice or discuss sensitive issues.

- We've embedded the fundamentals of unconscious bias and inclusive leadership/management into two key development programs: the UBS House View on Leadership 2.0 for senior leaders, and Line Manager Effectiveness for leaders of any rank.

- We've launched more than 25 online training courses on inclusive leadership, unconscious bias and D&I topics through UBS University, our internal learning platform.

- In early 2019, we launched the Multicultural Senior Talent Retention Program, which serves as a forum for senior business leaders to hear the unique issues and opportunities of our underrepresented talent directly from these diverse senior employees. The program significantly opened up critical communication pathways and the ongoing dialogue is shaping how we define and address many of our D&I priorities.

- In May 2019, we held our inaugural Women of Wealth Management US Summit, a three-day event that gathered 400 women from across Global Wealth Management in the US for networking and professional and personal development. The goal of the Summit was to provide inspiration and motivation to attract, retain and continue to empower the best female employees at UBS.

- Our 2020 benefits package for eligible employees, introduced in fall 2019, includes several existing offerings and new enhancements, all of which were informed by feedback from colleagues. Supportive policies and offerings include:
  - 20 weeks gender-neutral parental care leave, which can be taken in two blocks if desired (no primary/secondary caregiver designation requirement)*
  - Two weeks phase-back-to-work program following parental leave
  - New parent coaching to support the transition back to work
  - New grandparents leave
  - Milk storage and shipping**
  - Full suite of flexible work arrangements
  - Elective egg freezing coverage (in addition to medically indicated)**
  - Transgender reassignment coverage
  - Adoption financial support

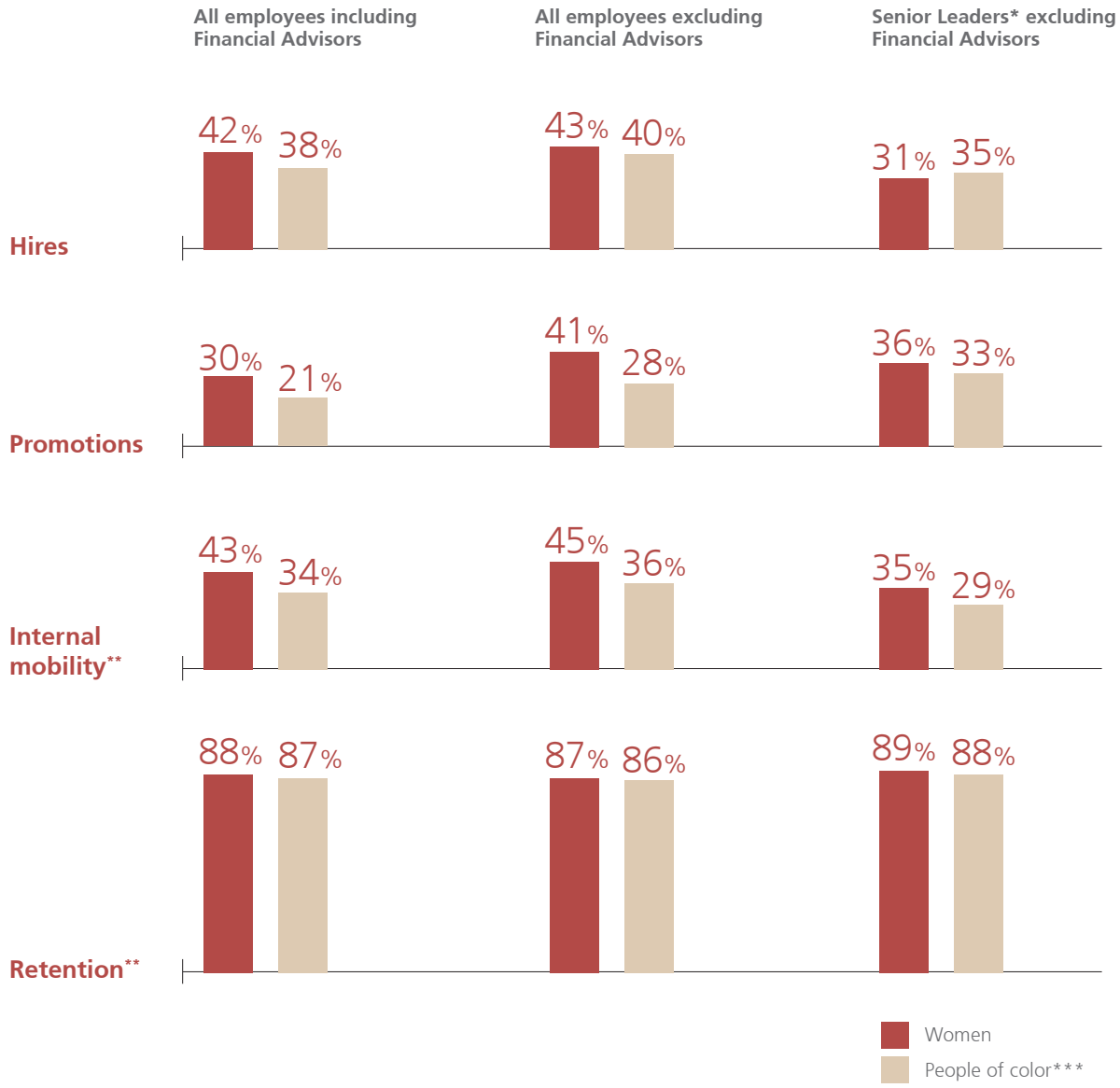
* In the US, UBS has offered 20 weeks parental care leave since 2017. In 2019, we expanded this offering to non-primary caregivers as well.
** Indicates new benefit in 2020. More information is available on ubs.com/usbenefits.

Our performance in 2019

The decisions we make around hiring and talent development are our most direct indicators of progress on our D&I goals. The full-year 2019 data below establishes a number of baselines against which future progress will be measured.

Key Measures

Americas unless otherwise noted



* Senior Leaders are defined as those ranked Director and higher and excludes Financial Advisors.
** Internal Mobility is the percentage of roles filled by internal candidates versus those filled by external hires; retention is the percentage of employees who stayed with UBS through the entire year.
*** People of color is US only and includes Asian, Black or African-American, Hispanic or Latino, American Indian or Alaska Native, Native Hawaiian or Pacific Islander and Two or More Races.

2019 year end snapshot

We are optimistic that our targets around hiring, promotion and retention, as well as the supportive resources and programs we're implementing, will help us to increase our demographic diversity.

We do recognize, however, that progress is rarely linear. In fact, there are likely to be year-over-year fluctuations. But if we can sustain gains across hiring, promotion and retention, we would expect to see improvement in the demographic representation of women and people of color over the coming years.

Here's how UBS in the Americas looked at the end of 2019.

Demographic representation

Americas unless otherwise noted

All employees including Financial Advisors

38%
Women

25%
People of color**

All employees excluding Financial Advisors

49%
Women

31%
People of color**

Senior Leaders* excluding Financial Advisors

31%
Women

27%
People of color**

* Senior Leaders are defined as those ranked Director and higher and excludes Financial Advisors.
** People of color is US only and includes Asian, Black or African-American, Hispanic or Latino, American Indian or Alaska Native, Native Hawaiian or Pacific Islander and Two or More Races.

More information and resources:
UBS Global D&I website
ubs.com/diversity

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ubs.com/fs

UBS

Exhibit G.

UBS

Sustainability Report 2019

Based on GRI Standards

Sustainability Highlights 2019

In finance

Core sustainable investments
in USD billion

Goal for 2020: 11.2% of total invested assets

182
is 5.6% of total invested assets

313
is 10.1% of total invested assets

488
is **13.5%** of total invested assets

+ 72%

+ 56%

2017 **2018** **2019**

We achieved our goal one year early

Commitment to direct client assets toward SDG-related impact investments

Goal for 2021: USD 5 billion

Current status:
USD 3.9 billion

In philanthropy

USD 66.6
million raised in donations in 2018

USD 89.5
million raised in donations in 2019

Well-being of
3.3 million
children improved with the help of UBS Optimus Foundation

In communities

USD 45.2 million direct cash contributions

38% of global workforce volunteered

48% of volunteer hours were skills-based

280,858
beneficiaries reached globally

Goal for 2020: 40% of global workforce volunteering

In business

Carbon-related assets

2018
USD 3.2 billion
1.6% of our banking balance sheet

– 41%

2019
USD 1.9 billion
0.8% of our banking balance sheet

Introduction of tougher fossil fuel standards

Awards

Industry leader in sustainability
validated by major ratings including Dow Jones Sustainability Indices and MSCI ESG Research (AA-Rating)

Our Pillars are the foundation for everything we do.

Capital strength
Efficiency and effectiveness
Risk management

Our Principles are what we stand for as a firm.

Client focus
Excellence
Sustainable performance

Our Behaviors are what we stand for individually.

Integrity
Collaboration
Challenge

Our approach to long-term value creation

As of or for the year ended 31 December 2019

What we put into the equation

Input

Financial capital

- Common equity tier 1 (CET1) capital ratio: 13.7%.
- CET1 leverage ratio: 3.9%.
- Going concern leverage ratio: 5.7%.
- Total loss-absorbing capacity: USD 89.6 billion.
- CET1 capital: USD 35.6 billion.

Relationships and intellectual capital

- Strong brand with over 150 years of experience in banking.
- Presence in all major financial centers worldwide.
- Strong culture and strategy based on our Pillars, Principles and Behaviors.
- We have access to the majority of the world's billionaires.
- We spent more than 10% of our revenues (around USD 3.5 billion) on technology in 2019, including amounts spent on regulatory change programs and innovative solutions for our businesses and clients.

Human capital

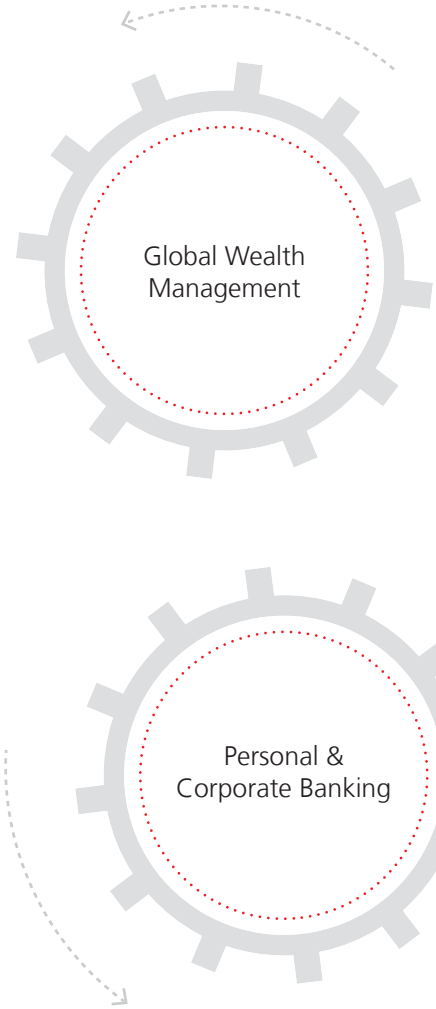
- We foster a corporate culture that supports and engages employees.
- Our 69,966 employees (by headcount) work in 50 countries, are citizens of 136 nations and speak more than 150 languages.
- 39% women and 61% men, with an average of 8 years of service.
- 19% under 30 years old, 60% between 30 and 50, and 21% over 50 years old.

Social and natural capital

- Our UBS in society organization focuses our firm on being a force for driving positive change in society and the environment.
- Our comprehensive environmental and social risk standards govern client and vendor relationships and are enforced firm-wide.
- We invest in communities: our employees have valuable skills and knowledge, which they use to make a difference in their communities.
- UBS Optimus Foundation is an award-winning grant-making foundation that helps our clients use their wealth to drive positive and sustainable social change for children.
- We regularly contribute to debates about important societal topics and, in collaboration with other firms and industry bodies, help to set standards on these topics.

What we do

Business activities



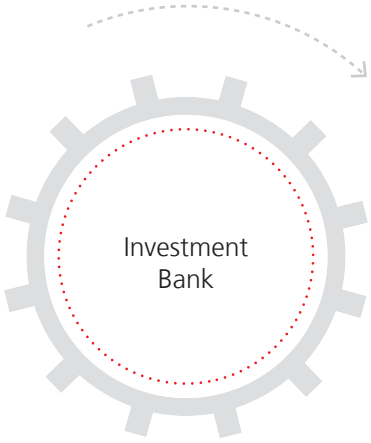
Catalyst: digitalization and innovation

ABCDE (automation, un-bundling, cloud, data, experience) trends drive the changes in how we operate.

Modernizing and modularizing technical estates leveraging new technologies, such as public cloud, microservices architecture, APIs, and front-to-back automation.

The results we deliver

Output



Co-developing digital innovation and ecosystems through partnerships, research and innovation pipeline management, facilitated by centers of excellence.

Strengthening our digital culture and engineering approach through training, communications, and adopting new toolsets and agile ways of collaborating.

Investors
Our financial results

- Net profit attributable to shareholders: USD 4,304 million.
- Diluted earnings per share: USD 1.14.
- Return on CET1 capital: 12.4% (with a target of 12–15% for 2020–2022).
- Invested assets: USD 3,607 billion.
- Cost / income ratio was 80.5%, compared with 79.9% in 2018. We are targeting a cost / income ratio of 75–78% in 2020–2022.

Clients
The products and services we offer

- We build and strengthen client relationships through various platforms and offerings, such as UBS Evidence Lab Innovations, GWM platforms and WM Online portal, UBS Partner, we.trade, UBS Atrium and Mobile Banking.
- A broad range of well-designed products and services for clients' personal wealth and their businesses.
- Effective procedures and processes to handle complaints.

Employees
How we work at UBS

- We are committed to further increasing our diversity, treating our employees fairly and providing equal opportunities for all.
- We strive to hire, promote and retain more women across the firm, with a stated aspiration of increasing the representation of women in management roles to one-third.
- Our in-house UBS University offers customized training and skills development opportunities.
- We support employees' career growth; our new Career Navigator online platform supports the mobility of internal talent.
- Modern cloud-enabled virtual workstations and mobile technologies have been deployed.

Society and environment
What we deliver on sustainability

- USD 488.5 billion of sustainable investing assets (13.5% of our total invested assets). USD 3.9 billion of clients' assets in SDG-related impact investments.
- With a market share of 20.2% among asset and wealth managers offering sustainable investment solutions, we are a leading provider of such products in Switzerland.
- USD 52.7 billion of the total deal value in equity or debt capital market services and USD 34.5 billion in financial advisory services provided by our Investment Bank to companies that make a positive contribution to climate change mitigation and adaptation.
- In 2019, we donated USD 45.2 million to local programs. 38% of our employees volunteered and invested 202,784 hours in community projects.
- UBS Optimus Foundation raised USD 89.5 million in donations.

How our stakeholders benefit

Outcome

How our investors benefit

- Attractive capital returns to our shareholders. A dividend of USD 0.73 per share proposed for the financial year 2019. We aim to increase our ordinary dividend per share by USD 0.01 per year, and to return excess capital through share repurchases.
- Total payout ratio for 2019 will be 80%, combining the proposed dividend with our share repurchases of USD 806 million in 2019.
- We aim to balance growth opportunities with cost and capital efficiency in order to drive attractive risk-adjusted returns and sustainable performance.

How our clients benefit

- Sustaining long-term relationships based on mutual respect, trust and integrity. Access to outstanding, tailored advice, financial solutions and services from around the globe delivered by experts our clients can trust; superior investment performance.
- Improved satisfaction through the offering of suitable products and services.
- Services accessible through convenient digital banking portals, which enable our clients to bank at their convenience, and through our branches and presences in Switzerland and abroad.

How our employees benefit

- UBS is widely recognized as an employer of choice and a great place to build a career.
- Levels of employee satisfaction and engagement, as shown in our most recent employee survey, are above the norm for financial services organizations.
- A diverse and inclusive culture across the firm to drive sustainable growth and innovation and to build a better place to work for all employees.
- Support for leadership development, as great leaders are the key to growing our people, client relationships and results.
- Pay for performance, with a strong commitment to pay equity embedded into our compensation policies and practices.

How society and the environment benefit

- Total reduction of greenhouse gas footprint by 71% from the 2004 baseline year, targeting a 75% reduction by the end of 2020.
- We further reduced our carbon-related assets to less than 1% of our total banking products exposure and strengthened our standards in the energy and utilities sectors.
- More than 280,000 direct beneficiaries and 107,388 lives substantially improved as a result of our community investments.
- UBS Optimus Foundation committed USD 109.5 million to carefully selected programs.
- The well-being of 3.3 million vulnerable children around the world was improved with help of the work of UBS Optimus Foundation.

The impact we create

Impact

Driving change in the world needs leadership. As the largest truly global wealth manager, we have a responsibility to take a leading role in shaping a positive future – for all of us and the generations to come.

We are an integral part of the Swiss economy and broader society – not only as a leading universal bank, but also as the third biggest private employer and one of the top taxpayers.

We significantly contribute to the prosperity of the Swiss economy by providing efficient financial services, capital allocation, stability, security and reliability.

We aim to protect and increase the value of our clients' assets. Understanding our clients' needs and expectations allows us to serve their best interests and to create value for them.

In sustainable and impact investing, we set standards across the industry and constantly challenge ourselves and our peers to raise the bar.

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About this Sustainability Report

We strive to report openly and transparently about our firm's sustainability approach and activities, consistently applying our firm's information policy and disclosure principles. The core medium for our sustainability disclosure is this Sustainability Report 2019, supplemented – as referenced in the GRI Content Index – by other relevant information, which can be found in the UBS Annual Report 2019.

We have included the following sections from the UBS Annual Report 2019 at the beginning of this document:

- Our strategy
- Performance targets and measurement
- Our businesses
- Our environment
- How we create value for our stakeholders

Except where clearly identified, all of UBS's sustainability information included in this Sustainability Report is presented for UBS Group AG and all its subsidiaries. Information on our consolidated subsidiaries can be found in Note 31 "Interests in subsidiaries and other entities" in our Annual Report 2019. UBS AG consolidated information does not differ in any material respect from UBS Group AG's consolidated information.

We use the Global Reporting Initiative (GRI) as the basis for our sustainability reporting and apply a careful process weighing up the materiality and relevance of the information reported and the expectations of all our stakeholders.

This document also includes our group's disclosures of non-financial information required by Germany's implementation law of EU directive 2014/95 (*CSR-Richtlinie-Umsetzungsgesetz / CSR-RUG*) (*nichtfinanzieller Konzernbericht*). A table at the end of this document (page 166) provides the references to such non-financial information.

This Sustainability Report has been reviewed by Ernst & Young Ltd (EY) against the GRI Standards (limited assurance). The content has been prepared in accordance with the GRI Standards, Comprehensive option, as evidenced in the EY assurance report. Both, the GRI content index and the assurance report, have been included in this document and can also be downloaded from *www.ubs.com/gri*.

5 March 2020
UBS Group AG and UBS AG

Contacts

UBS Corporate Responsibility Management
The Corporate Responsibility team manages UBS's sustainability disclosure and also acts as information provider for sustainability-related enquiries.

cr@ubs.com

Terms used in this report, unless the context requires otherwise

"UBS," "UBS Group," "UBS Group AG consolidated," "Group," "the Group," "we," "us" and "our"	UBS Group AG and its consolidated subsidiaries
"UBS Group AG" and "UBS Group AG standalone"	UBS Group AG on a standalone basis

Driving change that matters

.

Chairman's statement

In this statement, UBS Chairman and Corporate Culture and Responsibility Committee Chairman Axel A. Weber provides his views on UBS's long-term value creation

In 2019, we again demonstrated our commitment to advancing sustainability in our firm, for and with our clients, and in our industry. We are proud of what our firm has achieved during the course of last year – and of our ambitious plans going forward.

The Corporate Culture and Responsibility Committee (CCRC) regularly monitors our firm's sustainability activities and ambitions and approves its strategy and goals. In 2019, we witnessed an accelerated momentum in our *UBS in society* program as well as in our sustainable finance activities. A key indicator is the development of our Core SI (sustainable investing) assets under management where we managed to more than double penetration from 5.6% of total invested assets in 2017 to 13.5% in 2019 – and thus reached the goal we set ourselves then one year earlier than planned.

Highlights presented to the CCRC included the further strengthening of our firm's sustainability strategy. Notable examples include the integration of sustainability topics in our employee lifecycle activities – with the explicit ambition (included in our *UBS in society* constitutional document) of being an employer of choice, as well as the expansion of sustainable finance activities across our firm.

At UBS, we are convinced that this momentum will continue to accelerate during the coming years. Continually growing interest by our clients in sustainable finance solutions is evidenced in major surveys that we conducted among our private and institutional clients, as well as in our biannual stakeholder survey. I also experience it in my regular, personal interactions with clients across all of our firm's businesses and regions.

As we move into the 2020s, we will further expand our firm's sustainability efforts, shaping them in particular around three interconnected frameworks: the United Nations Sustainable Development Goals (SDGs); the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD); and the UN-backed Principles for Responsible Banking (PRB).

We were among the very first banks that shone a light on the importance of the SDGs – and specifically on what it takes to make them investable for clients, recognizing the major investment gap associated with their achievement with estimates ranging from USD 2 trillion to as high as USD 7 trillion annually. This gap needs to be closed if the world wants to successfully tackle the enormous societal and environmental challenges expressed through the SDGs. We are keen to help develop solutions in this regard, building on our successful and sometimes pioneering work aimed at mobilizing private and institutional capital towards the Goals.

Secondly, the TCFD's recommendations, focusing on the risks associated with climate change, try to help address in particular information gaps that prevent investors from properly assessing related financial risks for their portfolios and thus to direct capital flows to more sustainable uses. Following the launch of these recommendations in 2017, we have continuously improved and expanded our climate-related disclosures to demonstrate our active engagement for an orderly transition to a low-carbon economy. A key component of our comprehensive climate strategy is to offer innovative products and services in the areas of investments, financing and research as well as to encourage more transparency by companies. At the same time, we are working on further restricting assets that are associated with climate-related risks. We continue to be successful on both fronts, increasing our climate-related SI by 23% to USD 108 billion from 2018 to 2019 while reducing our carbon-related assets from USD 3.2 billion to USD 1.9 billion.

Finally, in 2019 we became a founding signatory of the PRB, a framework that is meant to support banks in integrating society's goals into their business strategy – and that incorporates both the SDGs and the Paris Agreement on Climate Change. For the PRB's four-year implementation period, we have committed to set, publish and work towards ambitious targets. This commitment reinforces our long-standing focus on maximizing positive effects through our sustainable business activities and on minimizing negative impacts, notably through our management of environmental and social risks.

This Sustainability Report provides comprehensive information on all of the aforementioned commitments and activities – and more. I invite you to read it, in particular as it demonstrates how our employees contribute to UBS's sustainable performance.

UBS's commitment to the UN Global Compact

UBS was among the 43 companies that first signed the UN Global Compact upon its launch in 2000 and is committed to its principles on human rights, labor standards, the environment and anti-corruption. We are also a member of the UN Global Compact Network Switzerland. As reflected in detail in this document, we have a comprehensive set of commitments and activities in place pertaining to the principles of the UN Global Compact.

Axel A. Weber
Chairman of the Board of Directors

Sustainability at UBS

Our concept of sustainability is guided by the United Nations (UN) Sustainable Development Goals (SDGs), which bring together the enormous societal and environmental challenges the world faces. We recognize that it is important to understand these challenges as well as the opportunities arising from them, to consider their relevance to UBS and to identify potential actions our firm may need to take.

Our commitment to the SDGs

As a founding signatory of the UN-backed Principles for Responsible Banking, UBS has committed to aligning our business strategy to be consistent with and contribute to society's goals. By doing so, we pledged to strategically align our business with the SDGs and the Paris Agreement on Climate Change.

What are the SDGs?

The 17 SDGs provide a global roadmap to address environmental, economic, and social imbalances that affect the world's population and its institutions. Such sustainability aims are relevant to everyone. The SDGs were agreed upon by 193 states in 2015 and officially launched by the UN on 1 January 2016.

How do they pertain to UBS?

We were among the very first banks that shone a light on the importance of the SDGs. Already in 2015, before their official launch, we published a paper on what it takes to make the SDGs investable for clients. Our focus has continued to be on investability as this is consistent with a key message that accompanied the launch of the SDGs – the recognition of a major investment gap (with estimates ranging from USD 2 trillion to as high as USD 7 trillion annually) that will need to be closed if the world was to achieve the Goals by 2030.

We have refined our analysis of and commitments to the SDGs ever since, not least in four successive white papers for the World Economic Forum (WEF) Annual Meeting. In our 2017 white paper we set out commitments to sustainable and impact investing, which we executed on by working with other institutions to create innovative solutions that can help private and institutional clients achieve their financial and societal objectives.

We have also executed on our 2018 white paper commitments to partnership for the Goals, by working more closely with multilateral development banks, through our partnership with the World Bank, to offer development bank bond solutions for private clients; by collaborating to fill gaps in the sustainable investing landscape with innovative new solutions; and by acknowledging the demand and impact of collaborative philanthropy.

In 2019 we highlighted the need for people to become more aware of the SDGs; for sustainability to be easier understood; and for more solutions that enable the public to make a real contribution to people and planet. We outlined eight potential solutions on how to improve the sustainable investing, giving, and consumption ecosystems to mobilize greater support for tackling world's most urgent challenges.

In 2020 we again published a white paper on the occasion of the WEF Annual Meeting, focusing on SDG 13, Climate action, and on ways in which investors can align their investments towards a climate-smart future.

Through the #TOGETHERBAND campaign, which we launched jointly with BOTTLETOP in 2019, we raise public awareness and inspire action to achieve the SDGs. The campaign is supported by a group of high-profile ambassadors and experts with a strong commitment to sustainability.

→ **Refer to *www.ubs.com/wef-2020* for more information about our white paper**

→ **Refer to *www.ubs.com/togetherband* for more details about the campaign**

What do we do?

At UBS we see a strong business rationale for catering to the growing importance of and demand for sustainability – as embodied by the SDGs. We are committed to play a leading role in providing both finance and expertise to meet these ambitious global goals. As the largest truly global wealth manager to high net worth and ultra high net worth clients, we regard it as particularly critical to help private wealth contribute to fund the development of a more sustainable world.

UBS has touchpoints to the SDGs across the entire firm. With a business model covering retail, private and institutional clients we have links to every single SDG through one or more of our firm's activities. Some of the key examples include the UBS Optimus Foundation's support for The Power of Nutrition foundation (SDG 2), the UBS Oncology Impact Fund (SDG 3), and the Gender Equality ETF (SDG 5).

We believe, however, that five SDGs (4, 8, 12, 13, 17), as per the table below, are of particular pertinence to our firm. In particular due to our strategy and business model and (business) focus areas it is with these five that we see the most material impacts across our value chain – notably by helping to advance positive developments through sustainable finance & investing and ESG expertise as well as minimizing negative impacts through the management of environmental and social risks.

We have captured these five SDGs, our rationale for each one and key focus areas pertaining to each of them in the graph on the following page. Over the coming years, we will continue to refine our analysis of our firm's links to the SDGs – in order to better understand and depict positive and negative impacts across our value chain and to set objectives accordingly.

Sustainable Development Goals in our focus

Sustainable Development Goal	Our rationale	Our key focus areas	Where to find out more in this report
Quality Education	Quality education is crucial for a well-functioning society. Constant change in the business world and the drive towards digitalization means our employees must continually build new skills and adapt to remain competitive.	**Client and corporate philanthropy** We focus on education both in our client foundation (UBS Optimus Foundation) and in our firm's community investments. **UBS as an employer** We help employees prepare for future work challenges, in particular by investing in learning and career development initiatives that are transforming our approach to talent management.	Society › pages 46–50 Driving change in philanthropy › page 75 Driving change in communities › pages 98–102 Employees › pages 35–45
Decent Work and Economic Growth	Banks play a crucial role in the economy through their business activities and through their generation of employment.	**Business activities** As the largest bank in Switzerland, we provide products and services to more than 125,000 firms. Our corporate and institutional clients benefit from our financing and investment services to grow their businesses, Our personal banking clients have access to a comprehensive, life-cycle-based offering and convenient digital banking. **UBS as an employer** Our 69,966 employees around the world work in 50 countries, are citizens of 136 nations and speak more than 150 languages.	Indirect economic impacts › page 129 Employees › pages 35–45
Responsible Consumption and Production	Positive environmental and social impact can be achieved by providing sustainable finance offerings, including sustainable and impact investing, to all our client segments.	We support clients with regard to their sustainability efforts and strive to incorporate ESG factors into the products and services we provide.	Our focus on ESG › pages 31–33 Society – Aims and progress › page 48 Driving change in business › pages 76–97
Climate Action	Climate change is one of the most significant challenges of our time. The world's key environmental and social challenges are all closely intertwined with climate change. This makes the orderly transition to a low-carbon economy vital.	We mobilize private and institutional capital for investments that facilitate climate change mitigation and adaptation. We protect our clients' and our own assets from climate-related financial risk. We are committed to reducing our direct climate impact and to taking collaborative action through climate initiatives, pilot programs and industry groups.	Our climate strategy › pages 54–63 Advancing sustainability in the financial sector › pages 76–77
Partnerships for the Goals	Achieving the SDGs demands new approaches to philanthropy and sustainable investing and partnerships for the Goals are critical to building these approaches.	We have been working with others across the industry for years to drive change, and are creating unique sustainability products and services that address the SDGs.	Advancing sustainability in the financial sector › pages 76–77 Our focus on ESG › pages 31–33 Key sustainable investing products and services in 2019 › pages 72–74 Driving change in philanthropy › page 75

Our strategy

We aim to drive higher and superior returns by growing and leveraging our unique, integrated and complementary business portfolio and geographic footprint.

UBS is the largest truly global wealth manager and a leading personal and corporate bank in Switzerland, with focused investment bank and asset management divisions. We concentrate on capital-efficient businesses in our targeted markets, where we have a strong competitive position and an attractive long-term growth or profitability outlook. We view capital strength as the foundation of our strategy.

In delivering all of UBS as one firm to our clients, we intend to: strengthen our leading client franchises and grow share; position UBS for growth by expanding our services and capabilities; drive greater efficiencies and scale; and further intensify collaboration for the benefit of our clients.

Driving increasing returns

We manage UBS for the long term, focusing on sustainable profit growth and responsible resource deployment. We aim to balance growth opportunities with cost and capital efficiency in order to drive attractive risk-adjusted returns and sustainable performance.

For the years 2020–2022, we have seven strategic priorities, which are outlined below.

Priority I We aim to increase profit before tax in our Global Wealth Management business by 10–15% and drive higher pre-tax margins by elevating our leading franchise. We are adjusting our coverage across the client spectrum to deliver more tailored services and solutions. We are reorganizing ourselves to be closer to clients, in order to increase time spent with them, empowering regions, improving our responsiveness and speed to market, as well as delivering on all of the firm's capabilities through expanded strategic partnerships with the Investment Bank and Asset Management. Furthermore, we are expanding our product offering while becoming more efficient, leveraging scale through partnerships and optimizing processes to increase productivity.

Priority II In our Investment Bank, we intend to improve returns by driving profitable growth, by further optimizing resources and through collaboration. We will maintain our capital-light business model that is focused on advice and execution and leverages our digital capabilities. Together with our other business divisions and through external partnerships, we aim to deliver market-leading digital, research and banking capabilities to our clients, while consuming up to one-third of Group resources.

Priority III In Asset Management, we intend to capitalize on our differentiated client offering for further growth, performance and scale. We plan to build on our strengths in fast-growing areas of the industry, such as sustainable investing, private markets and alternatives.

Priority IV Personal & Corporate Banking aims to deliver steady profit growth by enhancing its digital initiatives and services, while improving efficiency. By expanding our leading position in digital services in Switzerland, along with broadening our advisory solutions and product offering, we expect to increase profits despite the current negative interest rate environment.

Priority V We want to deliver more as one firm to our clients. The collaboration between our business divisions is critical to the success of our strategy and is a source of competitive advantage. This collaboration also provides further revenue growth potential and enables us to better meet client needs; for example, in the ultra high net worth and Global Family Office space.

Another area where collaboration between our business divisions can bring more value to clients is in sustainable finance. As the largest truly global wealth manager, we have a responsibility to take a leading role in shaping a positive future, and our goal is to be the financial provider of choice for clients who wish to mobilize capital toward the achievement of specific environmental or social outcomes. We are shaping the landscape of sustainable finance by using thought leadership, innovation and partnerships to support clients in their sustainability efforts.

→ **Refer to "Society" and "Our focus on ESG" in the "How we create value for our stakeholders" section of this report for more information about our engagement and leadership in sustainability matters**

Priority VI We aim to drive improvements in firm-wide efficiency to fund growth and enhance returns. We believe continued optimization of processes, platforms, our organization and capital resources will help us to achieve this.

We will continue to invest in technology with the goal of improving efficiency and effectiveness, driving growth and better serving our clients.

We also intend to realize the benefits of existing external partnerships and to explore selected new opportunities.

Priority VII We plan to maintain an attractive capital return profile through dividends and share repurchases. Our capital strength and capital-accretive business model allows us to grow our business while delivering attractive capital returns to our shareholders.

We aim to increase our ordinary dividend per share by USD 0.01 each year, and to return excess capital through share repurchases. We consider business conditions and any idiosyncratic developments when determining excess capital available for share repurchases.

Our sustainability strategy

Our firm's sustainability strategy is guided by our goal to be the financial provider of choice for clients wishing to mobilize capital towards the achievement of the SDGs and the orderly transition to a low-carbon economy. We work towards this goal by integrating sustainability into our mainstream offerings, through new and innovative financial products with a positive effect on the environment and society, and by advising clients on their philanthropic works. And it is through the management of environmental and social risks, the management of our environmental footprint and our sustainability disclosure that we continue to set standards in our industry.

→ **Refer to the UBS in society constitutional document in the Appendix 1 for more information about our sustainability strategy**

→ **Refer to "Society" in this section for more information about our sustainability strategy**

Performance targets and measurement

Targets and capital guidance

In January 2020, we updated and simplified our performance target framework. We reduced the number of targets to concentrate primarily on the Group rather than our business divisions, underlining our focus on cross-divisional collaboration. Our targets are underpinned by the latest three-year strategic plan, which reflects our strategic initiatives, management actions, as well as certain economic and market assumptions. The return and efficiency targets have been revised to reflect changes in the market outlook since the previously communicated targets were set in October 2018.

The table below shows the performance targets and capital guidance for the 2020–2022 period. Our updated performance targets are based on reported results. From the first quarter of 2020, we will no longer disclose adjusted results in our financial reports. We will continue to provide disclosure of restructuring and litigation expenses as well as other material profit or loss items that management believes are not representative of underlying business performance in our management's discussion and analysis.

Performance against targets is taken into account when determining variable compensation.

→ **Refer to "Performance and compensation at a glance" in the "Compensation" section of this report for more information about variable compensation**

→ **Refer to "Alternative performance measures" in the appendix to this report for definitions of and further information about our performance measures**

Targets and capital guidance 2020–2022
(on a reported basis)

Group returns	**12–15%** return on CET1 capital (RoCET1)
Cost efficiency	Positive operating leverage and **75–78%** cost / income ratio
Growth	**10–15%** profit before tax growth in Global Wealth Management
Capital allocation	**Up to ⅓** of Group RWA and LRD in the Investment Bank
Capital guidance	**~13%** CET1 capital ratio **~3.7%** CET1 leverage ratio

Sustainability objectives

We have set strong overarching ambitions that guide our sustainability performance. We are transparent about our aims and progress wherever possible to demonstrate our commitment. We set annual sustainability goals, which are reflected in the comprehensive set of GRI objectives included in this document.

In addition, our firm's sustainability aims, i.e., beyond the 2020 time horizon, reflect our focus on the mid- to long-term.

→ **Refer to "Society" in this section for more information about our sustainability aims and key goals**

→ **Refer to the Appendix 3 for our sustainability objectives and achievements 2019 and sustainability objectives 2020**

Our businesses

Working in partnership

We operate through four business divisions – Global Wealth Management, Personal & Corporate Banking, Asset Management and the Investment Bank. Our global reach and the breadth of our expertise are major assets that set us apart from our competitors. We see partnership as key to our growth, both within and between business divisions. We are at our best when we combine our strengths to provide our clients with more comprehensive and better solutions through, for example, the creation of a unified capital markets group across Global Wealth Management and the Investment Bank, and a Global Family Office joint venture.

Combining our strengths makes us a better firm. Initiatives such as the *Group Franchise Awards* encourage employees to look for ways to build bridges between areas and offer the whole firm to our clients.

How we deliver the whole firm to our clients – examples

Wealth Management Platform

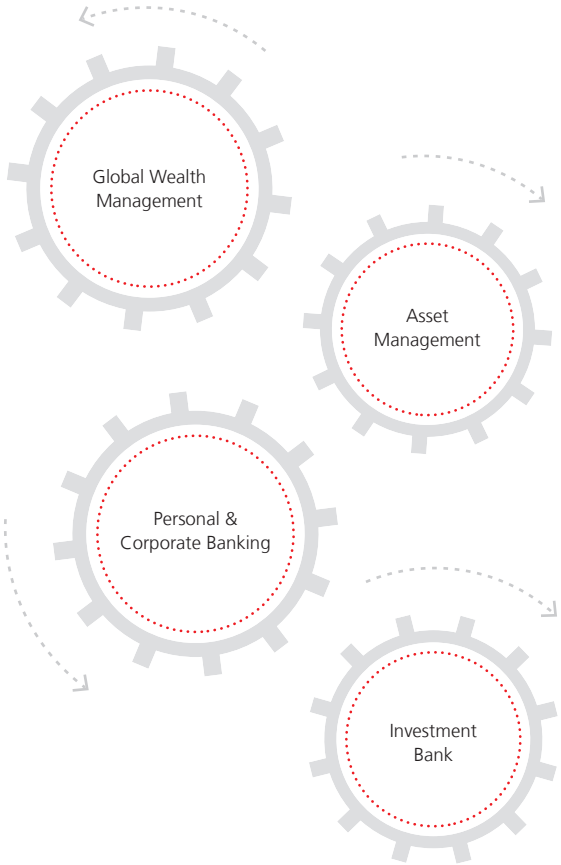
Outside the US, Global Wealth Management continues to migrate to one operating platform, which has been built on our Swiss IT platform. Our clients benefit from a broader universe of products and services, simplified onboarding, and a better banking experience through an intuitive digital platform with leading-edge advice capabilities across all channels. The same interface is shared by Personal & Corporate Banking clients in Switzerland and Global Wealth Management clients outside the US. In the US, the Wealth Management Americas Platform is improving advisor productivity by leveraging a newly created advisory utility.

Client shifts and referrals

Personal & Corporate Banking generates client shifts and referrals to other business divisions. For example, personal banking clients are shifted to Global Wealth Management, and corporate and institutional segment clients are referred to Asset Management for pension fund solutions or the Investment Bank for capital market and corporate transactions.

Global Family Office

Our Global Family Office unit brings together the capabilities of Global Wealth Management, Asset Management and the Investment Bank to leverage growth and efficiency opportunities. It provides customized, institutional-style services to wealthy families and individuals seeking access to, or advice on, capital market activities.



Separately managed accounts in the Americas

In the US, we have combined the portfolio management and related execution resources from across Global Wealth Management and Asset Management within Asset Management. Alongside this, in January 2020 we introduced an industry-leading approach enabling Global Wealth Management clients to access separately managed accounts in the Americas at no incremental fee. This transformative move allows our financial advisors to focus on delivering the best ideas, solutions and capabilities to our clients – regardless of where they originate in the firm – and positions UBS as an industry leader.

Unified capital markets group

We have created a strategic partnership between Global Wealth Management and the Investment Bank that is focused on spurring growth – in our ultra high net worth, middle market institutions and public finance businesses – and identifying synergies across the supporting infrastructure. This important initiative includes a unified capital markets team, integrating risk management systems and the simplification of our regional operating structure.

Global Wealth Management

We are the largest truly global wealth manager, with USD 2.6 trillion in invested assets. Our goal is to provide tailored advice and solutions to private clients and family offices.

Since the combination of Wealth Management and Wealth Management Americas in 2018, we have continued to deliver comprehensive services to clients, capture operational efficiencies, and invest in our business. More than 22,000 Global Wealth Management employees assist our clients with achieving their goals. Our presence in the ultra high net worth segment is particularly strong, and we have access to the majority of the world's billionaires.

In Japan, we have entered into a comprehensive strategic wealth management partnership with Sumitomo Mitsui Trust Holdings, Inc. (SuMi Trust Holdings). The new joint venture will combine UBS's wealth management capabilities with SuMi Trust Holdings' stature as Japan's largest independent trust bank. SuMi Trust Holdings offers a range of services, including banking, real estate, asset and wealth advisory services, and has strong client access and brand name awareness in Japan.

Global Wealth Management organizational changes

In January 2020, we announced several initiatives designed to achieve Global Wealth Management's growth ambitions and to elevate the quality and value of the service we deliver to our clients. First, we have reframed our offering around each client's needs to deliver more tailored services and solutions. Second, we have made it easier for advisors to spend more time with clients and to better understand their needs and preferences, and we have taken measures to improve our responsiveness and speed to market. We created three distinct business units in EMEA – Europe; Central and Eastern Europe; and the Middle East and Africa – to better capture the diverse opportunities in these markets. Finally, we intend to deliver all of the firm's capabilities through strategic partnerships with the Investment Bank and Asset Management.

Our focus

We serve high net worth and ultra high net worth individuals, families and family offices around the world, as well as affluent clients in selected markets. Through our organizational changes, we are making our Global Family Office capabilities, which are provided to ultra high net worth individuals, available to more clients, targeting coverage of around 1,500 in total.

While we are already a market leader in the ultra high net worth segment outside the US,[1] we believe that we can also become the firm of choice for the wealthiest clients in the US, many of whom already have a relationship with UBS. Our globally diversified footprint allows us to capture growth both in the largest (the US) and the fastest-growing (Asia Pacific) wealth markets.

We are focusing on increasing mandate and lending penetration, delivering innovative solutions for our clients (e.g., structured solutions, private markets, sustainability and thematic investing), as well as enhancing our advisors' productivity by making operational processes more efficient. Additionally, we aim to maintain low attrition and to increase our share of clients' business.

We are investing in our operating platforms and tools to support our clients and client advisors, in order to better serve our clients' needs and improve our efficiency. As of 31 December 2019, approximately 80% of invested assets booked outside the Americas were on the *Wealth Management Platform* as we continue to consolidate our operating platforms there. In the US, and in collaboration with our third-party software provider Broadridge, we are building the *Wealth Management Americas Platform*, which we expect to become operational in 2021. The development of our platforms is happening alongside enhancements to our digital capabilities for the benefit of our clients and advisors.

→ **Refer to "Clients" in the "How we create value for our stakeholders" section of this report for more information about innovation and digitalization**

How we operate

We have a global footprint, with a presence in the world's largest and fastest-growing markets and are well positioned to serve clients with global interests and demands. The US is our largest market, accounting for more than 50% of our invested assets. We are the largest wealth manager in Asia Pacific and the second largest in Latin America in terms of invested assets.[1]

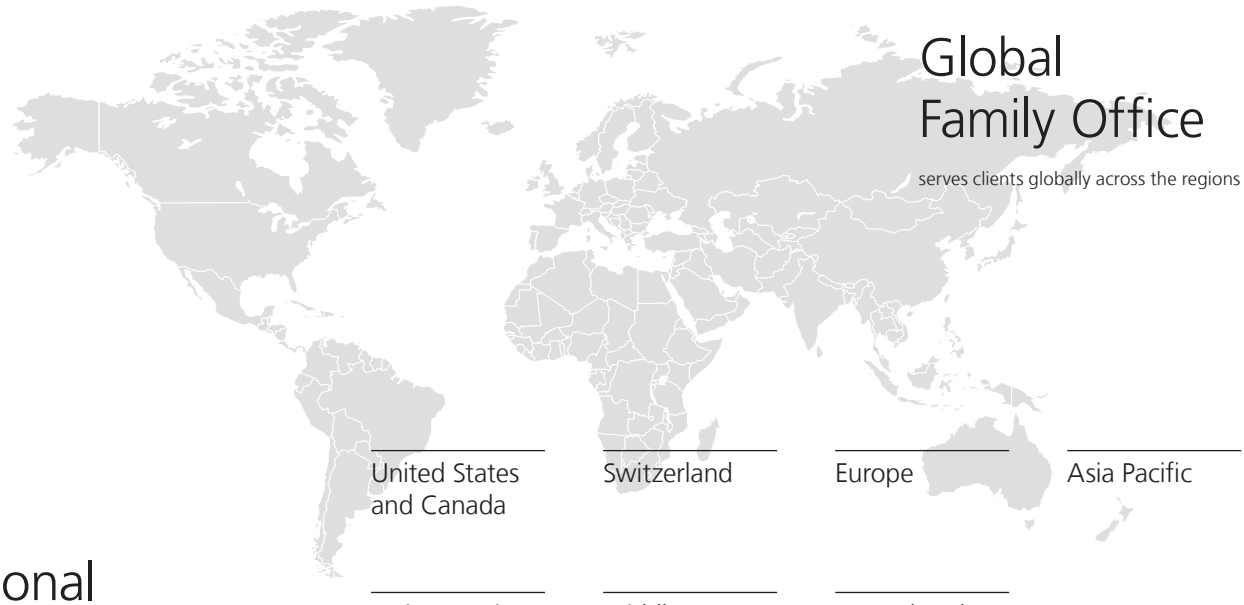
In Switzerland, we hold a leading market position[1] and can deploy the full range of the Group's products and services across Personal & Corporate Banking, Asset Management and the Investment Bank.

Our broad domestic footprint in Europe enables us to provide locally adapted offerings, and our local offices across Central Europe, the Middle East and Africa keep us close to our clients.

Through strategic partnerships with the Investment Bank and Asset Management, we provide clients with broad access to financing, global capital markets and portfolio solutions.

→ **Refer to "Working in partnership" in this section for examples of collaboration between the business divisions**

1 Statements of market position for Global Wealth Management are UBS's estimates based on published invested assets and internal estimates.



7 regional business units

As part of our organizational changes, ultra high net worth client relationships and advisors were integrated into regional business units to increase speed and proximity to clients. In our newly established Global Capital Markets team, we combined our Investment Product Services (IPS) unit and Investment Bank teams and their respective expertise. The Global Capital Markets team provides clients with an enhanced offering, faster execution, and more competitive conditions.

Our main competitors are either large US players that have a smaller presence outside the US (including Bank of America, JPMorgan Chase, Morgan Stanley and Wells Fargo) or geographically diverse firms with a smaller presence in the US (including BNP Paribas, Credit Suisse, HSBC and Julius Baer). Our size, geographic presence and diversified client portfolio are exceptional and would be difficult for other wealth managers to replicate organically.

What we offer

Our distinctive approach to wealth management is designed to strengthen engagement with our clients and to help them pursue what matters most to them.

By operating as a unified business, we aim to offer our clients the best wealth management solutions, services and expertise globally. Our experts provide our clients with thought leadership, investment analysis and formulated investment strategies, as well as develop and source solutions for them. The Chief Investment Office (CIO) provides the concise, comprehensive *UBS House View*, which identifies and communicates investment opportunities designed to protect and increase our clients' wealth over generations. Regional client strategy teams deepen our understanding of clients' needs, behaviors and preferences, enabling us to tailor our offerings to serve them better. Our product specialists deliver investment solutions, including our flagship investment mandates, innovative long-term themes and sustainable investment offerings.

→ **Refer to "Clients" in the "How we create value for our stakeholders" section of this report for more information about innovation and digitalization**

Clients benefit from our comprehensive set of capabilities and expertise, including wealth planning, investing, philanthropy, corporate and banking services, as well as family advisory services. We also offer considerable expertise across structured, mortgage and securities-based lending.

We work to improve our offerings and respond to changing client needs. In 2019, we launched a new line of *UBS Manage* offerings in Switzerland. In addition, to meet growing demand, we expanded the number of exclusive private markets opportunities for clients. Our sustainable investing solutions continue to be well received. Currently, invested assets in 100% sustainable investing solutions and bespoke sustainable investing solutions have grown to over USD 9 billion. We also broadened our sustainable investing offering, teaming up with external partners such as BMO Global Asset Management, Generation Investment Management and KKR & Co. Inc. to offer clients innovative sustainable development-related investment opportunities.

How we serve our clients

We serve our clients through local offices, dedicated advisors and experienced specialists. We use a mix of digital and non-digital channels (including marketing campaigns, events, advertising, publications and digital-only solutions) to help drive greater awareness of UBS among prospects and reinforce trust-based relationships between advisors and clients.

How we are organized

Our business division is organized into regional business units: the US and Canada; Latin America; Europe; Central and Eastern Europe; the Middle East and Africa; Asia Pacific; and Switzerland. We also have a business unit for our Global Family Office clients. Central functions for global capabilities supporting these business units are the CIO, Global Banking, Global Capital Markets and the Chief Operating Office. We are governed by the executive, risk, operating, and asset and liability committees.

Personal & Corporate Banking

As a leading personal and corporate bank in Switzerland, we provide comprehensive financial products and services to private, corporate and institutional clients. We are among the country's foremost players in the private and corporate loan market, with a substantial lending portfolio. Personal & Corporate Banking is at the core of our universal bank delivery model in Switzerland.

Our focus

We are a leading personal and corporate bank in Switzerland, providing a superior client experience and combining technology with a personal touch.

We have established a strong pipeline of growth initiatives across our business areas. Effective 1 November 2019, we have set up a new business area, Digital Platforms & Marketplaces, to rapidly extend our platform offering for mortgages.

We also aim to improve efficiency by streamlining processes and introducing new digital self-service tools. For example, we have rolled out an integrated mortgage workflow for extensions, which significantly reduces the time it takes to set up a contract. In addition, we have further optimized our contact center setup, increased automation of repetitive processes, and launched a pilot for a digital mailroom that reduces processing time by digitizing incoming physical mail and documents. Technology plays a key role in our client-centered operating model and we aim to expand our digital leadership. Our multi-year digitalization program enables us to further enhance the client experience. Thanks to technological solutions, we are able to offer clients new products and identify new cross-selling opportunities in a more targeted way.

→ **Refer to "Clients" in the "How we create value for our stakeholders" section of this report for more information about innovation and digitalization**

Operationally, we strive for excellence in execution, focusing on efficiency while improving our service quality and overall agility. To scale our digital transformation efforts, in 2019 we opened our second digital factory in Switzerland, which is larger than our first one. These digital factories are now home to approximately 1,100 employees across various functions. Moreover, we introduced an agile academy and quick-launch formats to drive innovation and attract key talent.

How we operate

While we operate primarily in our home market of Switzerland, we also provide capabilities to support the growth of the international business activities of our Swiss corporate and institutional clients through our local hubs in Frankfurt, New York, Hong Kong and Singapore. We are the only Swiss bank providing local banking capabilities abroad to its corporate clients.

In the Corporate & Institutional Clients business, our main competitors are Credit Suisse, the cantonal banks and globally active foreign banks. We compete in areas covering basic banking services, cash management, trade and export finance, asset servicing, investment advice for institutional clients, corporate finance and lending, and cash and securities transactions for banks.

In the Swiss Personal Banking business, our competitors are Credit Suisse, PostFinance, Raiffeisen, the cantonal banks and other regional and local Swiss banks. In addition to those traditional players, we also face competition from international players entering the Swiss market and neobanks. We compete in areas such as basic banking, mortgages and foreign exchange, as well as investment mandates and funds.

What we offer

Our personal banking clients have access to a comprehensive, life cycle-based offering and convenient digital banking. We deliver a broad range of basic banking products, from payments to deposits, cards, online and mobile banking, as well as lending (predominantly mortgages), investments and retirement services. The overall service range is complemented by our *UBS KeyClub* reward program, which provides clients residing in Switzerland with exclusive and attractive offers, including those from third-party partners. In close collaboration with Global Wealth Management, we offer leading private banking and wealth management services.

Our corporate and institutional clients benefit from our financing and investment solutions, particularly access to equity and debt capital markets, syndicated and structured credit, private placements, leasing, and traditional financing. Our transaction banking offers solutions for payment and cash management services, trade and export finance, as well as global custody solutions for institutional clients.

We collaborate closely with the Investment Bank to offer capital market and foreign exchange products, hedging strategies and trading capabilities, as well as corporate finance advice. In cooperation with Asset Management, we also provide fund and portfolio management solutions.

→ **Refer to "Working in partnership" in this section for examples of collaboration between the business divisions**

How we serve our clients

We are the recognized digital leader, with the highest online and mobile banking penetration in Switzerland, and continue to invest in a multi-channel distribution model to further enhance our leading position.

We are adapting existing branch formats to suit evolving client needs by converting some locations to smaller, more agile branches that serve as digital support hubs and are intended to ensure a strong local presence along with advice on basic client needs. We aim to further reshape our physical footprint in an innovative and client-centric way, particularly by defining future branch formats with different purposes.

In addition, we continue to provide our expertise to our clients through our contact center and our digital channels, offering basic banking services and transactions. Dedicated client advisors serve personal banking clients who need tailored solutions.

As part of our sustainability road map, we are substantially expanding our offerings. Our personal banking and institutional clients have access to a number of sustainable investment solutions, and we promote innovative approaches for corporate banking clients. For example, we issued the first green bond for a listed company in Switzerland.

For marketing campaigns, we use online media (including social media and search engine advertising), out-of-home media (posters and digital billboards) and, very selectively, print, TV, radio and cinema advertising. In line with our position as a digital leader in Swiss banking, and because of the channel's cost-effectiveness, we follow a digital-first media strategy. More than 50% of our media spending goes into online channels.

How we are organized

Our business division is organized into Personal Banking, Corporate & Institutional Clients, and Digital Platforms & Marketplaces. Geographically, our business, with its 267 branches, is organized into 10 regions, covering distinct Swiss economic areas. We are governed by the executive, risk and operating committees, and operate mainly through UBS Switzerland AG.

267
branches in Switzerland

Personal Banking has 267 branches[1] in Switzerland, of which more than 80 are shared with Global Wealth Management and 60 are shared with Corporate & Institutional Clients

1 The size of the circles on the map reflects the number of branches in each location.

Asset Management

UBS Asset Management is a large-scale and diversified global asset manager, with USD 903 billion in invested assets. We offer investment capabilities and styles across all major traditional and alternative asset classes, as well as advisory support to institutions, wholesale intermediaries and Global Wealth Management clients around the world.

Our focus

Our strategy is focused on capitalizing on the areas where we have a leading position to drive further profitable growth and scale.

Sustainable and Impact Investing remains a key area, as clients increasingly seek solutions that combine their investment goals with sustainability objectives. We continue the expansion of our world-class capabilities in areas such as climate-aware solutions. We do this through: product and service innovation; dedicated research; integration of environmental, social and governance factors into our investment processes, leveraging our proprietary analytics; and active corporate engagement.

In response to the increasing importance of private markets and alternative investments, we are building on our existing expertise in these areas, including our hedge fund and real estate businesses, as well as our capabilities across infrastructure, private equity and private debt.

We continue to develop our award-winning[1] Indexed and Alternative Beta business, including exchange-traded funds (ETFs) in Asia Pacific, Europe and Switzerland. We provide customization while leveraging our highly scalable platform, with a particular focus on key areas such as sustainability and fixed income products. Since 2016, the Alternative Beta business has seen growth in invested assets of approximately 85%.

Geographically, we are investing in our leading presence and products in China, both onshore and offshore, one of the fastest-growing asset management markets in the world, building on our extensive and long-standing presence in the Asia Pacific region.

In the rapidly evolving and attractive wholesale segment, we aim to significantly expand our market share through a combination of continued client penetration, expansion of our strategic partnerships with distributors and the build-out of our client service offerings.

→ **Refer to "Clients" in the "How we create value for our stakeholders" section of this report for more information about innovation and digitalization**

To drive further growth in our Investment Solutions business, which provides access to and combines the breadth and depth of our capabilities across public and private markets, we are focused on delivering superior multi-asset strategies and white-label solutions to meet the needs of clients around the world.

We also continue to intensify our cross-divisional collaboration, in particular with Global Wealth Management, to enable our teams to draw on the best ideas, solutions and capabilities from across the firm to deliver superior investment performance and experiences for our clients.

→ **Refer to "Working in partnership" in this section for examples of collaboration between the business divisions**

To support our growth, we are focused on disciplined execution of our operational excellence initiatives. This includes further automation, simplification, process optimization and offshoring / nearshoring of selected activities, complemented by a continued modernization of our platform and development of our analytics and data capabilities.

In January 2020, we announced a number of changes to the operational setup of our Platforms businesses intended to deliver greater scale and breadth of offering for our clients and ensure the ongoing development of these world-class businesses in a highly competitive marketplace. The changes include the proposed sale of a majority stake (51.2%) in UBS Fondcenter to Clearstream, Deutsche Börse Group's post-trade services provider. The sale is expected to close in the second half of 2020, subject to customary closing conditions. In addition, in order to fully leverage the expertise and resources within the wider Group to accelerate the growth of the business, we have decided to transfer *UBS Partner*, our highly innovative white-label technology solution, to the Corporate & Institutional Clients International business within the Personal & Corporate Banking business division. *UBS Partner* will be part of UBS's "The Bank for Banks" client offering, and this is an exciting step in our collaboration efforts across the firm to bring the best of UBS to our clients.

With these changes, we are making a step change in the proposition for our clients, who will have seamless access to expanded platform capabilities, while at the same time enabling us to sharpen our focus on the execution of our strategic priorities.

How we operate

We cover the main asset management markets globally, and have a local presence in four regions: the Americas; Europe, the Middle East and Africa; Switzerland; and Asia Pacific.

Our main competitors are global firms with wide-ranging capabilities and distribution channels, such as Amundi, BlackRock, DWS, Goldman Sachs Asset Management, Invesco, JPMorgan Asset Management, Morgan Stanley Investment Management and Schroders, as well as firms with a specific market or asset class focus.

1 Second largest Europe-based indexed player based on peers' public reporting (UBS calculation, 3Q19) and ranked fourth largest ETF provider in Europe as of December 2019 (source: ETFGI).

What we offer

We offer clients a wide range of investment products and services in different asset classes in the form of segregated, pooled or advisory mandates, as well as registered investment funds in various jurisdictions.

Our traditional and alternative capabilities include equities, fixed income, hedge funds, real estate and private markets, and indexed and alternative beta strategies (including ETFs), as well as sustainable and impact investing products and solutions.

Our Investment Solutions business draws on the breadth of our capabilities to offer: asset allocation and currency investment strategies across the risk / return spectrum; customized multi-asset solutions, advisory and fiduciary services; and multi-manager hedge fund solutions and advisory services.

How we serve our clients

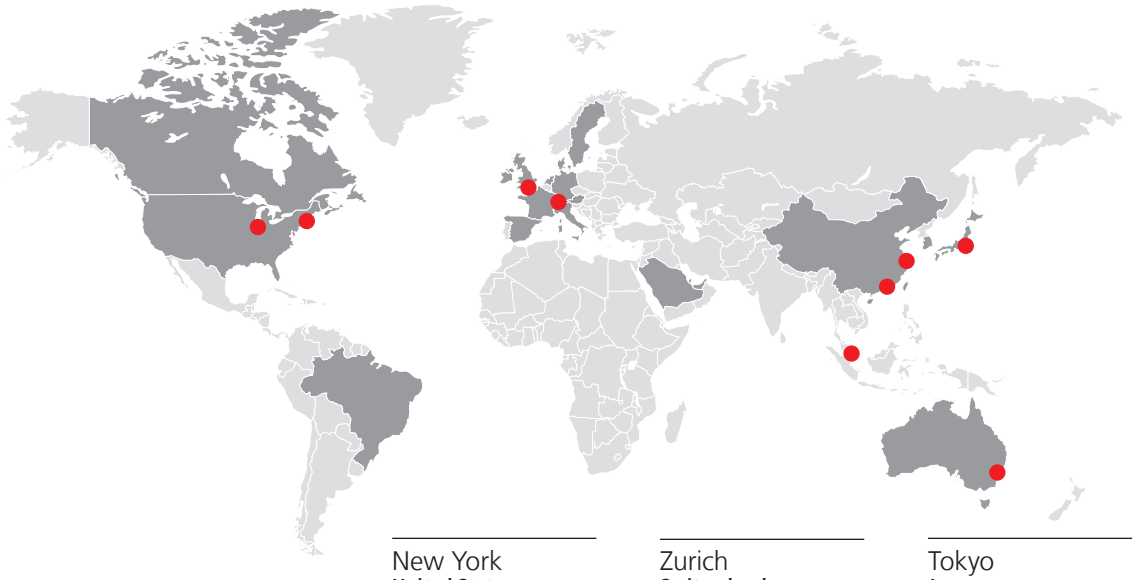
We deliver our investment products and services directly to institutional clients. High net worth and retail clients are served through Global Wealth Management, third-party banks and distributors.

Our teams are based in the key financial markets, bringing our unique perspectives and global expertise to our clients around the world. This, in combination with our presence on the ground, enables our teams to develop long-term relationships with our clients and a deep understanding of their specific needs.

How we are organized

Our business division is organized along five areas: Client Coverage, Investments, Real Estate & Private Markets, Products and the COO Area. We are based worldwide across four regions, with nine main hubs: Chicago, Hong Kong, London, New York, Shanghai, Singapore, Sydney, Tokyo and Zurich.

We are governed by executive, risk and operating committees, supplemented by business unit-specific committees.



9

main hubs

covering the full breadth of our investment insights across the world to serve our clients

New York
United States

Zurich
Switzerland

Tokyo
Japan

Chicago
United States

Hong Kong (SAR)
China

Sydney
Australia

London
United Kingdom

Singapore
Singapore

Shanghai
China

Investment Bank

The Investment Bank provides a range of services to institutional, corporate and wealth management clients to help them raise capital, grow their businesses, invest for growth and manage risks. We are focused on our traditional strengths in equities, foreign exchange, research, advisory services and capital markets, complemented by a targeted rates and credit platform. We use our powerful research and technology capabilities to support our clients as they adapt to the evolving market structures and changes in the regulatory, technological, economic and competitive landscapes.

We aspire to deliver market-leading solutions to clients, using our intellectual capital and electronic platforms. We also provide services to Global Wealth Management, Personal & Corporate Banking and Asset Management, while managing our balance sheet, costs, risk-weighted assets and leverage ratio denominator with discipline.

Our capital-light business model allows the Investment Bank to deliver digital, research and banking capabilities, consuming up to one-third of Group resources.

Structural changes in the Investment Bank

In January 2020, we realigned our Investment Bank to meet the evolving needs of our clients and to further focus resources on opportunities for profitable growth and digital transformation. Corporate Client Solutions and Investor Client Services were renamed Global Banking and Global Markets, respectively. Global Banking moves to two product verticals (Capital Markets and Advisory), adopting a global coverage model. Global Markets combines Equities and Foreign Exchange, Rates and Credit, and introduces three product verticals (Execution & Platform, Derivatives & Solutions, and Financing) and three horizontal functions (Risk & Trading, Distribution and Digital Transformation). The new Global Markets structure is designed to facilitate the alignment of business processes and operations and to reduce inefficiencies and duplication. It further permits a more holistic understanding of our clients' cross-product needs and is designed to foster tighter coordination of client coverage and distribution. This will allow for improved oversight of key risks and the allocation of resources. Investment Bank Research and UBS Evidence Lab Innovations continue to be a critical part of our advisory and content offering.

The changes are effective 1 January and we will provide restated prior-period information in advance of our first quarter 2020 results.

Our focus

Our key priority is disciplined growth in the capital-light advisory and execution businesses, while accelerating our digital transformation. Global Banking has a global coverage model and will utilize its deep global industry expertise to meet the emerging needs of its clients. In Global Markets, we are focused on clients' expectation of excellence in execution, financing and structured solutions.

Our digital strategy is led by our businesses, which harness technology to deliver superior and differentiated client service and content. We established the *UBS Investment Bank Innovation Lab* to speed up innovation by facilitating proofs of concept. In Global Markets, the new Digital Transformation horizontal function facilitates adoption of best-in-class practices around trade idea generation, liquidity management, pricing tools and risk management. In Investment Bank Research, we continue to build *UBS Evidence Lab Innovations* to concentrate on data-driven outcomes.

Our balanced global reach gives us attractive options for growth across various regions. In the Americas, the largest investment banking fee pool globally, we are focusing on increasing our market share in our core Global Banking and Global Markets businesses.

In Asia Pacific, we see opportunities primarily from expected market internationalization and growth in China. We are planning to grow by further strengthening Global Banking, both onshore and offshore. Partnerships between the Investment Bank's businesses and the Group, including the creation of a unified capital markets group, and, externally, joint ventures such as that with Banco do Brasil, are a key strategic focus. These initiatives should lead to growth by delivering global products to each region, leveraging our global connectivity across borders and sharing and strengthening our best client relationships.

→ **Refer to "Working in partnership" in this section for examples of collaboration between the business divisions**

How we operate

Our geographically balanced business has a global reach, with a presence in more than 30 countries and principal offices in the major financial hubs.

Competing firms are active in many of our markets, but our strategy differentiates us, with its focus on leadership in the selected areas where we have chosen to compete, and a business model that leverages talent and technology rather than balance sheet.

Our main competitors are the major global investment banks, including Morgan Stanley, Credit Suisse and Goldman Sachs, as well as corporate investment banks, including Bank of America, Barclays, Citigroup, BNP Paribas, Deutsche Bank and JPMorgan Chase. We also compete with boutique investment banks and fintech firms in certain regions and with regard to certain products.

Through strategic partnerships with Global Wealth Management and Asset Management, we provide clients with broad access to financing, global capital markets and portfolio solutions.

→ **Refer to "Working in partnership" in this section for examples of collaboration between the business divisions**

What we offer

Through our Global Banking business, we advise our clients on strategic business opportunities and help them raise capital to fund their activities.

Our Global Markets business enables our clients to buy, sell and finance securities on capital markets across the globe and to manage their risks and liquidity. Furthermore, in Investment Bank Research, we offer clients key insights on major financial markets and securities around the globe. Separately, our team of experts in UBS Evidence Lab Innovations specializes in creating insightful data sets on diverse topics for companies of all sizes, spanning more than 30 countries and 50 sectors. We seek to develop new products and solutions that are consistent with our capital-efficient business model. These are typically related to new technologies or changing market standards.

→ **Refer to "Clients" in the "How we create value for our stakeholders" section of this report for more information about innovation and digitalization**

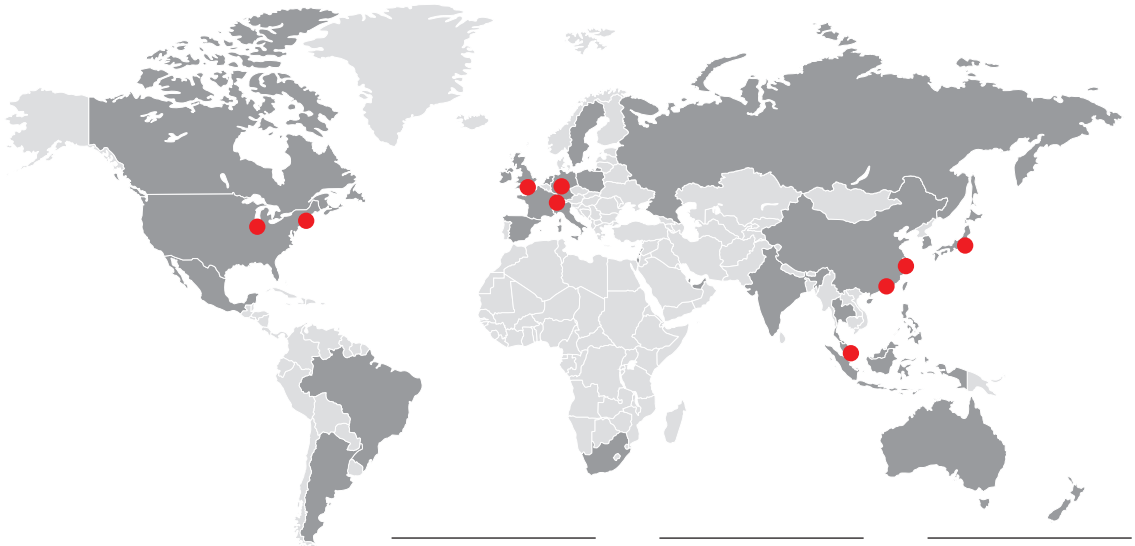
Since 2005, we have addressed increasing client demand for sustainable investing by providing thematic and sector research. We also provide investment solutions through socially responsible and impact exchange-traded funds and index-linked notes. In addition, we offer capital-raising and strategic advisory services globally to companies that make a positive contribution to climate change mitigation and adaptation.

How we serve our clients

We interact with our clients digitally and in person. In Global Banking, we leverage our intellectual capital and relationships to deliver high-quality solutions for our clients. In Global Markets, we use our execution capabilities, differentiated research content, bespoke solutions, client franchise model, and our global platform to expand coverage across a broad set of institutional and corporate clients. In Investment Bank Research, we deliver high-quality differentiated research to our institutional clients using a wide range of methods, including *UBS Neo*, our multi-channel platform.

How we are organized

Our business division is organized into the following three units: Global Banking, Global Markets, and Investment Bank Research and UBS Evidence Lab Innovations. We are governed by the executive, operating, risk, and asset and liability committees. Each business unit is organized globally by product.



9
financial
hubs
in all major financial centers

New York **United States**	Zurich **Switzerland**	Shanghai **China**
Chicago **United States**	Frankfurt **Germany**	Singapore **Singapore**
London **United Kingdom**	Hong Kong (SAR) **China**	Tokyo **Japan**

Corporate Center

Our Corporate Center provides services to the Group, with a focus on effectiveness, risk mitigation and efficiency. Corporate Center also includes the Non-core and Legacy Portfolio unit.

How we are organized

Corporate Center

The major areas within Corporate Center are Group Chief Operating Officer (Group Technology, Group Corporate Services, Group Human Resources and Group Operations), Group Treasury, Group Finance, Group Legal, Group Risk Control, Group Communications & Branding, Group Compliance, Regulatory & Governance, *UBS in society*, and Non-core and Legacy Portfolio.

Over recent years, we have progressively aligned our support functions with our business divisions. We operate the Group with the vast majority of these functions either fully aligned or shared among business divisions, where they have full management responsibility. By keeping the activities of the businesses and support functions close together, we increase efficiency and create a working environment built on a culture of accountability and collaboration

The Non-core and Legacy Portfolio, a small residual set of activities in Group Treasury and certain other function costs mainly related to deferred tax assets and costs relating to our legal entity transformation program are retained centrally.

Since our first quarter 2019 report and in compliance with IFRS 8, *Operating Segments*, we provide results for total Corporate Center only and do not separately report Corporate Center – Services, Group Asset and Liability Management (Group ALM) and Non-core and Legacy Portfolio. Furthermore, we have combined Group Treasury operationally with Group ALM and call this combined function Group Treasury.

→ **Refer to the "Significant accounting and financial reporting changes" section and "Note 1 Summary of significant accounting policies" in the "Consolidated financial statements" section of this report for more information about the changes in the structure of Corporate Center**

Group Treasury

Group Treasury manages the structural risk of our balance sheet, including interest rate risk, structural foreign exchange risk and collateral risk, as well as the risks associated with our liquidity and funding portfolios. Group Treasury serves all business divisions and its risk management is fully integrated into the Group's risk governance framework.

Non-core and Legacy Portfolio

Non-core and Legacy Portfolio manages legacy positions from businesses exited by the Investment Bank, following a largely passive wind-down strategy. It is overseen by a committee chaired by the Group Chief Risk Officer. The portfolio also includes positions relating to legal matters arising from businesses that were transferred to it at the time of its formation.

→ **Refer to "Note 21 Provisions and contingent liabilities" in the "Consolidated financial statements" section of this report for more information about litigation, regulatory and similar matters**

Our environment

Current market climate

Global economic developments in 2019

In a year characterized by strong equity markets, ultra-low volatility and an inflection in interest rates, the pace of the global economy slowed on a broad basis in 2019. World GDP grew by 3.1%, which was substantially lower than the 3.7% growth achieved in 2018 and represents the weakest growth rate since the financial crisis.

US GDP increased 2.3%, compared with 2.9% in 2018, as trade tensions between the US and China hindered business investment and the boost from tax cuts introduced in December 2017 ebbed.

Trade tensions represented an even more serious drag on growth in the eurozone, which relies more than the US on global trade, manufacturing output, and business investment. Growth in the eurozone decreased to 1.2% in 2019, compared with 1.9% in 2018. Germany's economy expanded by only 0.6%, after a 1.5% increase in the previous year. Outside the Eurozone, Swiss growth decreased as well, to 0.8%, compared with 2.8% in 2018.

China's government attempted to partially offset the effects of increasing tariffs on its exports to the US by reducing bank reserve requirements and providing extra fiscal leeway to local governments. However, this stimulus was limited by concerns over high leverage in the economy. GDP growth decreased to around 6.1%, compared with 6.7% in 2018.

In other leading emerging economies, growth slowed or stabilized at low levels. The economy of India, which until recently had been one of the world's fastest-growing major nations, expanded by 5%, compared with 6.1% in 2018. Momentum was weakened by the problems of the shadow-banking sector, which has been reducing the availability of credit to consumers. The Mexican economy, meanwhile, was roughly flat after expanding 2% in 2018, and Brazil's growth rate decreased to 1.1% from 1.3%.

Major central banks were able to keep their accommodating monetary policies in place in 2019, given that low inflation rates persisted. Eurozone inflation stayed below the European Central Bank's (the ECB) target (of at or below 2%), at around 1.2% for the year. The ECB cut its deposit rate from negative 0.4% to negative 0.5%. US inflation was close to the target at 1.8%, permitting three quarter-point rate cuts over the course of the year to between 1.5% and 1.75%.

Equity markets rallied, with all major indices advancing. The MSCI All Country World Index gave a total return of 27% in US dollars. The S&P 500 index in the US returned 31%, while the technology-heavy Nasdaq Composite gained 37%. China's CSI 300 was up 41% in local currency terms. Less well-performing markets included the UK's FTSE 100 and Hong Kong's Hang Seng, which both returned 17% in local currency terms.

It was also a favorable year for investors holding government bonds. The yield on 10-year US Treasury bonds fell around 80 basis points to 1.9%. The yield on the German Bund of the same tenor fell 40 basis points to negative 0.2%.

Economic and market outlook for 2020

We expect continued sub-trend growth in the coming year, and the global economy to continue expanding at about the same pace as in 2019. Consumer spending has remained robust in much of the world, especially in the US, where it is supported by a vibrant job market. The year ended with news of a "Phase 1" trade deal between the US and China, along with indications that tensions between the two powers may lessen. Not only did the agreement withdraw planned tariff increases and reverse some existing tariffs, it also moved negotiations forward in other areas of contention, such as intellectual property protection and US access to China's financial services market. While this truce could be fragile and the US–China rivalry is not about to end anytime soon, the deal appears to reduce the risks to the global economy and business investment.

The UK left the European Union on 31 January 2020 and has entered a transition period in which the UK now faces a race to conclude talks on a trade deal with the EU ahead of the end of its transition period on 31 December 2020.

The next major political focus for markets will be the US election in November, which could generate higher volatility and affect key US sectors, such as technology, energy, finance and health care.

Against a backdrop of sluggish growth and continued political risk, we believe central banks will be in no rush to raise rates. We do not expect the US Federal Reserve to increase rates in the coming year, barring an unexpected shift in the trajectory of the economic data. Rates are unlikely to rise again until 2021. We expect the ECB to cut rates to negative 0.6%, with the Swiss National Bank maintaining rates at a negative 0.75%.

The outbreak of novel Coronavirus or Covid-19 in China and its subsequent spread to other countries is likely to increase investor uncertainty. Although our base economic forecast is that the outbreak of Covid-19 will be contained and the effect on full-year economic growth will be relatively limited, the virus and containment measures are likely to have at least a short-term adverse effect on economic activity in China and other affected countries, with a collateral impact on the global economy. A significant rise in the number of Covid-19 infections, infections in a wide range of countries and regions, or a prolongation of the outbreak, could increase the adverse economic effects.

In terms of investing, stocks in most major markets are trading above historical averages on a price-to-earnings basis. As a result, we believe equity market returns are more likely to be driven by earnings growth than by a further expansion of multiples. Markets should also be supported by continuing economic growth in 2020. The risk of a recession remains relatively low. Uncertainty over the effects of the Covid-19 outbreak has substantially increased the macroeconomic risk to growth and this increased risk has at least partially been reflected in recent declines in equity markets.

Industry trends

While our industry was heavily affected by regulatory developments over the past decade, technology has clearly emerged as the main driver of change today and is expected to further affect the competitive landscape as well as our products and operations going forward. In parallel, our industry is materially driven by market and macroeconomic conditions.

→ **Refer to "Current market climate" in this section for information about global economic growth**

Digitalization

Technology is changing the way banks operate and we expect this to continue, in step with exponential advances in computing capability, evolving customer needs and digital trends. Investment in technology is no longer solely considered a means of making banks more efficient. Today, such investment is the key to keeping banks flexible and competitive in a digitalized world, and it creates the opportunity to develop new business models.

By connecting across the financial industry ecosystem through our innovation labs, digital factories, Future of Finance initiatives, and project collaborations, we aim to remain at the forefront of the digital movement to drive client experience as well as operational excellence. At the heart of our digital journey is the focus on our clients and their evolving needs. The speed, scale, security, transparency and precision that new technologies can offer enable us to create new services and experiences for our clients.

We also aim to improve operational efficiency by increasing the range of modernized and modularized applications and infrastructure in our IT portfolio, as well as by leveraging cloud technology and a growing number of front-to-back automated systems and processes. Effective data management and protection are crucial to us. The generated and curated data from our applications is protected under our data management framework, and supports the development of responsible artificial intelligence for better tailoring our client and employee experience.

Consolidation

In the financial services industry, many regions and businesses are still highly fragmented. We expect further consolidation, with ongoing margin pressure, the search for cost efficiencies and increasing scale advantages resulting from the fixed costs of technology and regulation being the key drivers. Many banks also seek increasing exposure and access to regions with attractive growth profiles, such as Asia and emerging markets, through local acquisitions or partnerships. Lastly, the increased focus on core capabilities or geographical footprints and the ongoing simplification of business models to reduce operational and compliance risks will result in further disposals of non-core businesses and assets.

New competitors

Our competitive environment is also evolving. In addition to our traditional competitors in the asset-gathering businesses, new entrants are targeting selected components of the value chain. However, we have not yet seen a fundamental unbundling of the value chain and client relationships, which might ultimately result in the disintermediation of banks by new competitors. Over the longer term, we believe the entry into the financial services industry of large platform companies could pose a significant competitive threat, given their strong client franchises and access to client data. Fintech firms are gaining momentum; however, they have not materially disrupted our asset-gathering businesses to date. We see a trend in forging partnerships between new entrants and incumbent banks, with the latter acquiring technology from fintech firms, thus gaining an edge over competitors in terms of technology, cost efficiency, and service quality.

Regulation

The post-2008 regulatory reform agenda has largely been completed. While some areas, such as funding in resolution, must still be fully addressed, and the implementation of certain standards, such as the finalized Basel III capital standard, is continuing on a national level, the focus is shifting from regulation to supervision. In parallel, some regulators are reviewing the efficiency of the new frameworks.

In general, regulatory-driven change continues to consume substantial resources. In 2020, we expect further consideration of adjustments to the Swiss too-big-to-fail framework, in particular focused on additional liquidity requirements for systemically important banks, and the national implementation of final Basel III rules. We expect continued work on resolution-related reforms, including stress testing, and a sustained focus on conduct and anti-money laundering. Furthermore, we are experiencing a surge in sustainability-related policy proposals targeted at various aspects of financial services across the globe. We also expect regulatory initiatives to address some of the more recent challenges that could affect financial stability, such as shadow banking and digital currencies.

Many of these developments are happening in the context of increased protectionism, posing challenges to the provision of cross-border financial services. Further restrictions with regard to market access into the EU in particular would have a significant effect on Switzerland as a financial center, affecting also UBS. Variations in how different countries implement rules, and an increasing national focus, bring a risk of additional regulatory fragmentation, which in turn may lead to higher costs for us and new financial stability risks.

However, we believe the adaptations made to our business model and our proactive management of regulatory change put us in a strong position to absorb upcoming changes to the regulatory environment.

→ **Refer to the "Regulatory and legal developments" section of this report for more information**

Wealth creation

In 2018, global wealth overall grew marginally, given a steep decline in equity market performance in the fourth quarter. This trend was partially reversed in 2019, as equity markets rallied. Today, half of global wealth is concentrated in the Americas, followed by Asia Pacific (with approximately 30%) and the remainder in Europe, the Middle East and Africa.[1] By segment,[2] approximately half of global wealth is with high net worth individuals, ultra high net worth individuals hold approximately 30% of global wealth, and the remaining approximately 20% is within the affluent segment. Over the next four years, global wealth is expected to grow by 5–10% annually.[1] Regionally, wealth creation will likely be driven by Asia Pacific and North America. The share of the Americas is expected to remain stable over the next four years at approximately 50% of global wealth, while the share of Europe, the Middle East and Africa is expected to further reduce as Asia Pacific grows. In particular, China's share of global wealth is expected to grow to around 15% by 2023.

Wealth transfer

Demographic and socioeconomic developments continue to generate shifts in wealth. By 2030 for example, USD 15.4 trillion of global wealth is expected to be transferred by individuals with a net worth of USD 5 million or more, according to a 2019 report by Wealth-X.[3] In addition, women now control more wealth than ever before: UBS's 2019 report titled "The billionaire effect – Billionaires insights 2019" found that the number of female billionaires had grown by 46% in five years, outpacing the growth of male billionaires. We are responding to the evolving wealth landscape with a framework that addresses all aspects of our clients' financial lives, called *UBS Wealth Way*. *UBS Wealth Way* begins with discovery questions and a conversation with clients about what is most important to them. We help clients organize their financial life along three key strategies: *Liquidity* to help provide cash flow for short-term expenses; *Longevity* for long-term needs; and *Legacy* for needs that go beyond their own and help improve the lives of others, a key part of wealth transfer planning.

Shift into passive strategies

We note a continuing trend of separation between low-cost, passive strategies and high-alpha active and alternative strategies. Passive management is beneficial in an environment with rising stock markets, such as the equity bull markets of the last decade. At the same time, central banks' monetary policies have kept interest rates at historically low levels, which has had an effect on bond yields and other asset classes. Investors searching for longer-term higher alpha than passive strategies can provide have been diversifying their portfolios into real assets and alternatives and we expect this trend to continue. We believe the breadth of UBS Asset Management's investment expertise allows us to meet client demands across asset classes and strategies.

Retirement funding

Over recent years, the pension industry has faced two key challenges: fundamental demographic shifts, such as aging populations, and lower expected returns due to all-time low interest rates.

Beyond structural answers to these challenges, such as the progressive shift from defined benefit to defined contribution pensions, we believe pension funds are reassessing their asset allocation approach. Indeed, many pension funds are now allocating a higher share of their portfolios to alternative investments, such as private equity, hedge funds, real estate and infrastructure, in a search for higher-yielding exposures.

We see this development as positive for UBS, as these funds will likely need further support to define their investment strategy and target portfolio allocation. In addition, our private banking and wealth management clients are expected to need further financial and retirement planning advice, which we are able to provide holistically through our wealth planning services.

1 Based on BCG Global Wealth Report 2019.
2 The BCG Global Wealth Report 2019 defines wealth segmentation as follows: wealth of greater than USD 20 million to be classified as ultra high net worth individuals; USD 1–20 million for high net worth individuals; USD 0.25–1 million for affluent individuals.
3 A Generational Shift: Family Wealth Transfer Report, issued by Wealth-X in 2019.

How we create value for our stakeholders

Stakeholder group	Stakeholder needs: what do our stakeholders expect from us?	Value proposition: how we create value for our stakeholders	Key topics discussed: what was important to our stakeholders in 2019	Stakeholder engagement: how did we engage with our stakeholders?
Clients	Advice on a broad range of products and services from trusted experts The option of personal interaction with our advisors in combination with digital service anywhere, anytime (convenient digital banking) Top quality solutions and the highest standards in terms of asset safety, data and information security, confidentiality and privacy A combination of global reach and local service resulting in positive investment outcomes Competitively priced products and services	Delivering tailored advice and customized solutions, using our intellectual capital and digital capabilities Building long-term personalized relationships with our clients Developing new products and services in response to clients' evolving needs in the digital age Providing access to the world's capital markets and bespoke financing Meeting increasing demand from clients for sustainable investments	Investment performance in light of current interest rate situation Holistic goals-based financial planning Sustainable finance and investing possibilities Data privacy and security Offerings for small enterprises in Personal & Corporate Banking	Individualized client meetings Requests for regular client feedback, feedback monitoring and complaints handling Specialized client events and conferences including information on key developments and opportunities Client satisfaction surveys
Investors	Disciplined execution of our strategy leading to attractive capital returns through dividends and share repurchases Comprehensive and clear disclosures on quantitative and qualitative data necessary to make an informed investment decision Recognize and proactively address strategic opportunities and challenges	Executing our strategy with discipline and agility as the external environment evolves, while aiming to deliver cost- and capital-efficient growth Providing transparent, timely and reliable public disclosures	Structural growth and return potential in our businesses Cost efficiency and ability to generate positive operating leverage Ability to protect or even grow revenues in a low-for-longer interest rate environment	Financial reports, investor and analyst conference calls, and/or webcasts, as well as media updates on our performance or other disclosures General shareholder meetings Investor and analyst meetings
Employees	A world-class employer providing an engaging and supportive workplace culture Skill and career development opportunities and rewards for performance An environment that provides a sense of belonging and of adding value to clients and to society	Attracting and developing great talent Fostering a workplace culture that supports and engages our employees, enabling them to develop their careers and unlock their full potential	The three keys to a strong corporate culture Our approach to hiring great people and supporting their growth The importance of diversity and inclusion	Regular employee surveys Group Franchise Awards program Regular "Ask the CEO" events, along with senior leadership, regional and functional employee sessions
Society	Facilitation of economic development that is sustainable for the planet and humanity Maximization of our positive effect and minimization of any negative effects on society and the environment Proactive management of the environmental and societal impacts of our business	Promoting significant and lasting improvements in the well-being of communities in which we operate Taking an active role in the transition of our economy toward environmentally and socially sustainable solutions	Sustainable finance Our climate strategy Our client and corporate philanthropy efforts	Dialogs with regulators and governments Partnerships with social institutions Community investments Interaction with NGOs Participation in forums and round tables, as well as industry-, sector- and topic-specific debates

Clients

Our clients are the heart of our business. We are committed to building and sustaining long-term relationships based on mutual respect, trust and integrity. Understanding our clients' needs and expectations enables us to best serve their interests and to create value for them.

Our clients and what matters most to them

There is no archetypal UBS client. Our clients have varying needs, but each of them expects outstanding advice and service, a wide range of choices, and an excellent client experience.

Global Wealth Management is focused on serving the unique and sophisticated needs of high net worth and ultra high net worth individuals, families, and family offices around the world, as well as affluent clients in selected markets. We provide these clients with access to outstanding advice, service, and investment opportunities from around the globe, delivered by experts they can trust. Using a holistic, goals-based approach to financial planning, we deliver a personalized wealth management experience and work side-by-side with clients to help them realize their ambitions.

Our client-facing advisors and the global teams that support them are focused on developing long-term client relationships, which often span generations. Global Wealth Management clients look to us for our expertise in helping them to plan for, protect and grow their wealth, as well as helping them make some of the most important decisions in their lives. From significant liquidity events to professional milestones and personal turning points, we aim to give our clients the confidence to move forward and achieve their goals. Through extensive research into our clients' preferences and goals, as well as broader analysis of investor sentiment globally, we are constantly evolving our offerings to meet the shifting priorities of today's wealthy clients. This includes investing in digital capabilities and developing products that help clients fund their lifestyles and manage their cash flow, as well as offering guidance on how clients can create a lasting and positive impact for their communities and the causes about which they care the most. We have been recognized as the leading global wealth manager for clients interested in sustainable investing,[1] with a commitment to developing solutions that allow clients to align their financial goals and their personal values.

→ **Refer to "Our focus on ESG" in this section for examples of how sustainable finance solutions are used across our business divisions and for the benefit of our clients**

Personal & Corporate Banking serves a total of approximately 2.6 million individuals and 128,000 firms. We provide services to companies ranging from start-ups to large multi-nationals, including specialized entities, such as pension funds and insurers, real estate companies, commodity traders, and banks. Personal & Corporate Banking clients look for financial advice based on their needs at each stage of their individual or corporate journey. We aim to deliver outstanding advice to them via our client advisors and also through digital banking. Our clients demand convenience, 24/7 availability, security and value for money. We provide clients with access to a broad range of services and products offered in all relevant areas: basic banking, investing, financing (including mortgages), retirement planning, cash management, trade and export finance, global custody, and company succession, among others.

In Asset Management, we deliver investment products and services directly to approximately 3,000 clients around the world – including sovereign institutions, central banks, supranational corporations, pension funds, insurers and charities – as well as to Global Wealth Management and its clients, wholesale intermediaries and financial institutions. Our clients seek global insights and a holistic approach to tailoring solutions. By building long-term, personalized relationships with our clients and partners, we aim to achieve a deep understanding of their needs and to earn their trust. We draw on the breadth and depth of our global investment capabilities – across traditional and alternative, active and passive categories – and provide seamless access to world-class platform services to deliver the solutions they need. We integrate sustainability into our financial analysis enabling us to help clients meet their sustainability objectives and their fiduciary duties.

The Investment Bank provides corporate, institutional and wealth management clients with expert advice, financial solutions, execution, and access to the world's capital markets. Our business model is specifically built around our clients and their needs. Corporate clients can access advisory services, debt and equity capital market solutions, and bespoke financing through our newly reshaped Global Banking business. Meanwhile, our Global Markets business is focused on helping institutional clients engage with local markets around the world, offering equities and equity-linked products, foreign exchange, rates and credit.

→ **Refer to "Investment Bank" in the "Our businesses" section of this report for more information about the structural changes in the Investment Bank**

Our advisory and content offering is underpinned by the research we provide. The differentiated nature of this research, combined with *UBS Evidence Lab Innovations*, which offers access to insight-ready data sets for thousands of companies, aims to give clients an informational edge when it comes to understanding markets. As a new offering for 2019, we have established the *UBS Research Academy*, where our fundamental analytics team provides training for institutional investors on all aspects of fundamental investing, leveraging the best of the *UBS Research* and *UBS Evidence Lab Innovations* platforms.

1 Euromoney Private Banking and Wealth Management Survey 2019: Global Results.

Our clients place the highest priority on the confidentiality and security of their data. The protection of our clients' data is of the utmost importance to us and we have comprehensive measures in place designed to ensure that data confidentiality and integrity are maintained. We are investing in our IT platform to preserve and improve our IT security standards, while enabling our clients to have secure access to their data via our digital channels. The volume, level of sophistication and impact of cyberattacks constantly increase, and we aim to maintain a robust and agile cybersecurity and information security program to manage cyber risk.

Enhancing the client experience through innovation and digitalization

We strive to streamline and simplify interactions with our clients through front-to-back digitalization and innovations.

In Global Wealth Management, we develop and deploy digital tools that preserve and enhance the value of human relationships. Clients expect the convenience and speed that technology offers but, simultaneously, consider personal communication with our advisors to be more important than ever. Modern technology that our advisors use enables them to spend more time with clients. And our clients appreciate digital tools that improve their experience, such as easy ways to view their portfolios, access to research that is tailored to their needs, and multiple ways to communicate with their advisors. In 2019, we introduced a number of new tools to help deliver on those expectations. For example, our *Asset Wizard* platform provides ultra high net worth clients in the US with consolidated and sophisticated performance and risk analytics for their assets held at UBS and across multiple banks, portfolios, managers, and locations. Also, in Asia, we launched the *UBS Advisor Messaging* for WhatsApp, allowing for real-time conversations between clients and advisors, to create a better client experience. And we continue to make progress by executing our multi-year strategy to serve clients globally from two platforms: the *Wealth Management Americas Platform* in the US and the *Wealth Management Platform* outside the US. Our core investment solutions consist of: *UBS Manage*, a discretionary mandate solution where we use our expertise to invest clients' assets according to a predefined investment strategy; *UBS Advice*, which adds portfolio monitoring and investment recommendations based on an agreed investment strategy to self-directed accounts; and *UBS Transact*, a self-directed account providing clients access to UBS execution capabilities and the *UBS House View*. All our solutions draw on our broad range of investment instruments across stocks, bonds, currencies, structured products, investment funds and alternative investments.

Personal & Corporate Banking launched several initiatives in 2019. Effective 1 November 2019, we have established a new business area, *Digital Platforms & Marketplaces*, which reflects our commitment to engage in new digital business models. In addition to the mortgage platform *UBS Atrium*, which we launched in 2017 and is directed at corporate and institutional clients, UBS is set to introduce a mortgage platform for private clients in the first half of 2020. We launched new tools for our client advisors aimed at improving the in-branch advisory experience for clients, so that we are able to suggest the right products that match the clients' needs. Thanks to our new mortgage workflow, we have been able to reduce contracting time substantially, from 10–15 days for extensions to 24 hours. We also further simplified our digital banking platform (for both mobile and desktop) and added new services, in addition to expanding the number of possible payment transaction currencies to more than 120. Our clients can now pay in stores directly with their smartphones and a wide array of wearables via *Mobile Pay* and *Swatch Pay*. Furthermore, we have introduced the ability to pay parking fees via *Twint*, which has more than 1.5 million users in Switzerland. As of October 2019, our clients can access *we.trade*, a blockchain-based trade finance platform, which was the first such platform to be launched by a Swiss bank. Recognizing changing client needs and growing demand from start-up companies for a broader offering, we have launched *UBS Start Business*, which includes digital accounting, mentoring for business planning, and many other services in addition to the banking services UBS offers. The attractive offering aims to assist young entrepreneurs in every stage of their business's journey. Similarly, we bundle our digital offering for small companies in *UBS Digital Business*, which provides the convenience and leading digital solutions that small companies look for. We have also introduced our vendor leasing solution, an online tool that allows vendors to provide leasing proposals directly to their clients (based on online credit decisions) and to generate contracts. For corporate clients, we have made available the new *UBS Payment Tracking* service (SWIFT global payments innovation).

In Asset Management, we are investing in new tools and technologies, as well as our alternative data capabilities, to support our teams' investment decision-making processes and enhance client service. In addition, our operational excellence programs are focused on building a scalable and globally integrated operating platform to better enable our teams to deliver the full breadth of our capabilities to clients around the world.

The Investment Bank strives to be the digital investment bank of the future, with innovation-led businesses that drive efficiencies and solutions. We set up the *UBS Investment Bank Innovation Lab* to help connect business teams in order to leverage best practice, build and test proofs of concept safely and quickly, and inspire a culture of innovation. We see increasing interest from clients in financial and alternative data sets that they can incorporate into their models. In response, we set up *UBS Data Solutions* to meet those needs through a centralized robust data processing and distribution platform.

We strive to develop new products and solutions that are consistent with our capital-efficient business model. These are typically related to new technologies or changing market standards. Examples include *FX spot & STIR tree E-pricing*, which provides client-tailored pricing streams and hedging optimization, and *Technology Enabled Sales*, which enables faster delivery and distribution of tailored content matched to our clients' interests. During 2019, we also launched the client portal of *UBS Evidence Lab Innovations* as part of the firm's strategy to expand our value proposition in the alternative data space, which relates to innovative ways to capture data critical for investment decisions. We also set up *UBS Neo*, our multi-channel platform, and the *One Client* service model, which aims to drive superior client outcomes via collaboration, technology and data-driven client intelligence.

Engaging with our clients

Communication with our clients enables us to understand their needs and what matters most to them. We use a variety of channels to engage with clients, including regular client relationship / service meetings where we monitor feedback and satisfaction, as well as various corporate roadshows and dedicated events. We also engage with our clients while supporting cultural and sports events across Switzerland.

We conduct client events on a regular basis and on a wide array of topics. For example, in Personal & Corporate Banking, we have financing and retirement planning events, and a dedicated event for the CFO community. In the Investment Bank, we host around 350 conferences and educational seminars globally throughout the year, covering a broad range of macro, sector, regional and regulatory topics. More than 50,000 clients attended such events in 2019, providing insight and access to our own opinion leaders, policy makers and leading industry experts. In Global Wealth Management, we engage with clients in a range of ways, from personalized private briefings with subject matter experts, to segment-specific events, to large-scale gatherings such as *UBS Wealth Insights*, our flagship Pan-Asian investment forum series, which attracts more than 3,000 clients every year. In Asset Management, a consistent program of engagement takes place throughout the year. Thematic events, such as the *UBS Reserve Management Seminar* and the *Sovereign Investment Circle*, bring together institutional investors to debate relevant topics and share best practices. Our experts also produce insightful thought leadership on markets and assets that is regularly shared with clients, as well as frequently meeting investors to answer questions, clarify the investment strategy or discuss issues that can affect markets.

How we measure client satisfaction

We utilize different measures to regularly assess our achievements and the satisfaction of our clients.

Global Wealth Management is increasingly leveraging technology and analytics software to collect client feedback. In 2019, we began introducing a digital feedback tool to supplement more traditional survey methods. The tool allows Global Wealth Management to survey clients about their satisfaction with their advisors and UBS, as well as to identify additional financial needs. Advisors are provided with real-time access to client feedback, enabling them to address concerns and to follow up on new topics of interest. The tool was piloted in selected markets in 2019 and is expected to be rolled out more broadly throughout 2020.

We conduct an annual client survey in Personal & Corporate Banking. We have been conducting client surveys in Switzerland since 2011, consistently covering all private and corporate client segments annually since 2015. Clients assess their satisfaction with regard to various topics (e.g., UBS overall, branches, client advisors, products, services) and indicate further product or advisory needs. Survey responses are distributed to client advisors, who subsequently follow up with each respondent individually. In 2019, we introduced a new machine learning model which enables us to identify the importance of internal factors (e.g., advisors, products, prices) and external factors (e.g., media impact, market development) with regard to overall satisfaction scores.

In Asset Management, we conduct regular surveys, inviting institutional and wholesale clients across all our markets to participate. They are asked about their satisfaction with client service, products and solutions, as well as other factors relevant to their investments. The results are analyzed to identify focus areas to improve client satisfaction.

For the Investment Bank, client satisfaction is closely monitored by individual product coverage points. Relationship managers then collate and review feedback holistically, conducting regular internal review sessions to address specific areas of feedback. The Investment Bank also closely monitors external surveys, such as the Global Institutional Investor Survey, which provides feedback across a range of investment banking services.

We thoroughly evaluate the feedback we receive, including complaints from clients, and take measures to address key themes identified. In 2019, clients specifically raised sustainable finance as a key priority, which provided confirmation that we are aligned with our clients' preferences in expanding our sustainable finance offering.

Clients (additional information)

Quality feedback management system

We have a Quality Feedback system within Global Wealth Management (GWM) and Personal & Corporate Banking (P&C), which provides a comprehensive and systematic platform to receive and process feedback and suggestions from both clients and employees. Feedback is received in a wide range of formats, including written, electronic, verbal (e.g., comments made to employees in our branches), through social media and via the Swiss Banking Ombudsman.

Client feedback, including complaints and suggestions, is of crucial importance, as it supports the development and introduction of new products and services as well as the adaptation of our offering in a client-oriented manner. By addressing client feedback, we strive to strengthen client relationships, improve client satisfaction and make a tangible improvement to client service and overall banking services. Having a wide variety of quality feedback from our clients enables us to systematically evaluate and review our actions. By sharing their views, clients contribute to quality improvements at all levels.

We strive to respond directly to each individual who provides feedback. On significant topics and key developments, we also provide a collective response in our external reporting. In 2019, key topics and enhancements included some targeted products and services that centered mostly around digital banking functionalities. These stemmed in particular from requests and improvement suggestions for existing and new features and queries regarding access and security.

Feedback from employees (i.e., quality tips and ideas) that is based on their knowledge and experience in improving and updating products, processes and services helps to foster creativity and innovation.

Suitability

Clients expect to be provided with products and services that are suitable for them. This is particularly the case in the divisions where we serve personal clients as opposed to institutions.

In nearly all of the countries where we do business, this expectation has been turned into a legal or regulatory requirement for banks acting as financial advisors. Most jurisdictions also require the systematic assessment and documentation of the suitability of products (including third-party products) and services, including compliance with applicable eligibility criteria and sales restrictions. These standards are reflected in local policies and procedures as well as in the respective local control framework. The European Union's Markets in Financial Instruments Directive (MiFID) and the Swiss Financial Services Act (FinSA) are examples of our reflection and implementation of specific standards required by regulators as part of a local control framework. Other locations apply similar standards as required by the relevant local regulators.

To meet both client expectations and regulatory requirements, we have established comprehensive rules for assessing the suitability of products and services. These rules are designed to align the assets in a customer's portfolio with their defined risk profile, and the customer is advised in line with his or her needs (i.e., client suitability). In addition, the rules require product documentation to contain appropriate and easily understandable information on its features, target audience and the scenarios in which the product can be used, as well as a balanced representation of the associated opportunities and risks (i.e., product suitability).

Suitability framework

In the GWM and P&C divisions, a comprehensive suitability policy framework is in place. This sets out the structured advisory process governing the way we advise and implement agreed solutions and also document the steps taken during this process. In addition to other purposes, it comprises requirements for monitoring and controlling activities that aim to capture tail risks. A revised version of this policy entered into force on 1 January 2018. The Investment Bank (IB) and Asset Management (AM) take their guidance from UBS's suitability principles and have implemented processes to ensure appropriate oversight of suitability requirements where applicable.

In this framework, we distinguish between client and product suitability. Client suitability refers to the alignment between the investor profile of the client and the products and services that are recommended or made available to the client (or already held in his or her portfolio), including risk information and disclosure. Product suitability refers to a consistent set of standards applied by a product management unit to define for which specific investors a product may be suitable.

Client suitability

GWM and P&C have established a structured advisory process with four distinct steps – understand, propose, agree and implement, and review. This process is supported by a number of forms and tools that are available to client advisors. In the first step (understand), these forms and tools support the initial identification of a client's investor profile, including but not limited to investment objectives and risk ability. In the second step (propose), they serve to help client advisors identify an appropriate investment strategy for a specific client portfolio. Furthermore, a number of tools and platforms have been established to help client advisors match a client's investment strategies with appropriate investment proposals and to support the review step. The IB and AM have established cross-functional governance committees to ensure oversight for client suitability where specific criteria or triggers are met.

Product suitability

Advisory platforms and tools divide products according to their risk characteristics and in doing so help clients and client advisors to properly assess the impact of investment products and services on a client's portfolio. Additional processes are in place to make product documentation available to both client advisors and clients. Finally, specific legal documentation is required for certain products with specific risks (e.g., hedge funds).

Divisional approach to suitability

Primary ownership of suitability risk and the responsibility for addressing it is owned by the business. The suitability policies applicable to GWM, P&C, IB and AM make this clear. Accordingly, we have pursued a divisional approach to ensure compliance with rapidly changing regulatory regimes, while also addressing particular suitability obligations and remediation of identified gaps relating to the divisions.

Monitoring and controls

Monitoring and controls for suitability follow a three-tiered approach. The first-level controls are conducted by the business risk management team under its Origination Control Framework, a set of controls designed to prevent and detect operational risks that arise within the front unit and to ensure that residual risk corresponds to risk appetite. The second-level controls are performed by Compliance & Operational Risk Control as Global Minimum Control Standards, which are part of the overall Operational Risk Framework. These controls focus on both a check-the-checker approach, and thematic, deep dive reviews. The third-level controls are exercised by Group Internal Audit, as part of its annual audit plan.

After-sales communications

The UBS client experience also includes after-sales communication. Again, this communication is, supported by a number of tools and platforms, including ready-to-use reporting and presentation material.

Accessibility

We ensure that our facilities and services are accessible to everyone regardless of disability, capability or technology. We are continuously optimizing our websites as well as our e-banking and mobile banking platforms to fit the requirements for an AA rating for accessibility (i.e., WCAG 2.0). All cash machines have access key buttons and PIN keypads that are equipped for the visually impaired. Additionally, all ATMs are enabled with voice output through clients' headphones, covering all functions including cash deposits. Around 100 ATMs are positioned especially for people with restricted mobility. All 40 of our free-standing cash machines correspond to recommendations made by the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

Our focus on ESG

Our firm is in a powerful position to contribute toward achieving the 17 United Nations (UN) Sustainable Development Goals (the SDGs) by integrating sustainability in our mainstream offerings, through new and innovative financial products with a positive effect on the environment and society, and by advising our clients on their philanthropic works. Our goal is to be the financial provider of choice for clients who wish to mobilize capital toward the achievement of the SDGs and the orderly transition to a low-carbon economy. We are shaping the landscape of sustainable finance by using thought leadership, innovation and partnerships to support clients in their sustainability efforts.

Our clients are increasingly interested in sustainable finance, including sustainable investing (SI), which is especially attractive if it can reduce risk or improve returns. More than 80% of wealthy individuals are interested in sustainable investing and 45% already hold sustainable investments.[1] With regard to asset owners across the globe, 78% are integrating environmental, social and governance (ESG) factors into their investment process.[2] Switzerland, for example, saw an 87% asset growth in institutional sustainable investments in 2018 (compared with 2017),[3] and the early indicators are that this growth continued throughout 2019.

Our key public commitments to sustainable finance

In 2019, we became a founding signatory of the UN Principles for Responsible Banking (the Principles). The Principles constitute a comprehensive framework for the integration of sustainability across banks. They define accountabilities and require each bank to set, publish and work toward ambitious targets.

Before signing up to the Principles, UBS had already been strongly committed both to maximizing positive effects through our sustainable business activities and to minimizing negative impacts. While our firm's growing range of sustainable finance products and services supports the former, our environmental and social risk framework helps us to better understand and respond to potential risks to the environment and human rights.

Our Asset Management business division is among the signatories of the PRI (the Principles for Responsible Investment). The PRI organization supports the signatories in incorporating ESG factors into their investment and ownership decisions. In 2019, UBS also became one of the inaugural members of the CEO Alliance on Global Investors for Sustainable Development, which is committed to scaling up and speeding up efforts to align business with the SDGs. The Alliance is aimed at harnessing the insights of private sector leaders on ways to remove impediments and introduce solutions for scaling long-term investment for sustainable development in line with the SDGs.

Since 2017, we have presented white papers to the World Economic Forum (the WEF) putting forward recommendations for ways in which private capital can achieve the SDGs, while also outlining our own actions and pledges in that regard. For the WEF annual meeting in 2020, our white paper focused on climate action and the ways in which investors can mobilize private and institutional capital toward the orderly transition to a low-carbon economy. In response, UBS has developed a Climate Aware framework.

We actively support the development of industry standards. In 2019, we contributed to the writing of and signed the International Finance Corporation's Operating Principles for Impact Management. These Impact Principles provide a standard for impact investing, in which investors seek to generate positive impact for society alongside financial returns. We also contributed to a report by the Sustainable Finance Working Group of the Institute of International Finance on sustainable investment terminology.

→ **Refer to the Sustainability Report 2019, available from 5 March 2020 under "Annual reporting" at *www.ubs.com/investors,* for our key documents, frameworks and external commitments, and for our climate disclosure following the recommendations of the Task Force on Climate-related Financial Disclosures**

What is our governance on ESG?

Our governance framework on sustainability supports the creation of long-term value. Our firm's sustainability activities, including sustainable finance, are overseen at the highest level of our firm and are founded in our Code of Conduct and Ethics.

→ **Refer to the Sustainability Report 2019, available from 5 March 2020 under "Annual reporting" at *www.ubs.com/investors,* for the sustainability governance chart**

We regularly review whether our governance framework continues to reflect our ambitions with regard to sustainability. In 2019, we therefore decided to further sharpen our focus on sustainable finance and we are now establishing a Sustainable Finance Steering Committee. It will be comprised of senior business leaders engaged in our firm's sustainable finance efforts, who will work together to ensure that we continue to drive innovation and develop expertise and thought leadership regarding sustainable finance. The Chair of the Sustainable Finance Steering Committee is a member of the *UBS in society* Steering Committee.

1 UBS Investor Watch on the Year Ahead, November 2019.
2 UBS Asset Management and Responsible Investor magazine, ESG: Do You or Don't You?, June 2019.
3 Swiss Sustainable Investment Market Study 2019, June 2019.

How do we define sustainable finance?

Sustainable finance refers to any form of financial service that integrates ESG criteria into business or investment decisions. We provide sustainable finance solutions across all our business divisions and to all our client groups (as shown in the "Key achievements in 2019" chart on the next page), with a particular focus on sustainable investing.

Sustainable investing is an approach that seeks to incorporate ESG considerations into investment decisions. SI strategies seek to achieve a positive environmental or social impact and/or align investments with an investor's values regarding ESG topics, while aiming to improve portfolio risk and return characteristics. In the main, we identify three approaches of sustainable investing: exclusion (individual companies or entire industries are excluded from portfolios if their areas of activity conflict with an investor's values); ESG integration (which combines ESG factors with traditional financial considerations); and impact investing (which is designed specifically to help generate a positive social or environmental impact alongside financial returns).

We were among the early movers in developing terminology to describe our sustainable investing activities and to consistently report on them. We are, however, conscious of the need to simplify and standardize the terminology for sustainable finance, which will help to develop and expand that market. We are therefore actively involved in the relevant discussions and are committed to reflecting pertinent changes to terminology in our reporting.

Core sustainable investments[1]

		For the year ended			% change from
USD billion, except where indicated	GRI[2]	31.12.19	31.12.18	31.12.17	31.12.18
Core SI products and mandates					
Integration – sustainability focus[3]	FS11	46.4	20.0	12.8	132.4
Integration – ESG integration[4]	FS11	372.3	224.5	63.2	65.9
Impact investing[5]	FS11	9.1	4.7	2.8	92.1
Exclusions[6]	FS11	52.2	50.3	93.0	3.7
Third-party[7]	FS11	8.5	13.4	9.8	(37.0)
Total core sustainable investments	FS11	488.5	312.9	181.7	56.1
UBS total invested assets		3,607.0	3,101.0	3,262.0	16.3
Core SI proportion of total invested assets (%)	FS11	13.5	10.1	5.6	

1 All figures are based on information available in January 2020. 2 FS stands for the performance indicators defined in the Financial Services Sector Supplement of the Global Reporting Initiative reporting framework. 3 Strategies where sustainability is an explicit part of the investment guidelines, universe, selection, and/or investment process. 4 Strategies that integrate environmental, social, and governance (ESG) factors into fundamental financial analysis to improve risk / return. 5 Strategies where the intention is to generate measurable environmental and social impact alongside financial return. 6 Strategies that exclude companies from portfolios where they are not aligned to an investor's values. Includes customized screening services (single or multiple exclusion criteria). 7 SI products from third-party providers applying a strict and diligent asset selection process; the selection criteria have been reviewed for the end of 2019 reporting cycle, following a stricter approach from the provider of sustainability ratings. Excludes third-party products that went through a systematic GWM onboarding process, now counted under "Integration – sustainability focus."

What do we offer?

We support clients' sustainability efforts through thought leadership, innovation and partnerships, and we strive to incorporate ESG factors into the products and services we provide. We support corporate and institutional clients who want to generate positive environmental and societal impact using our corporate advisory expertise or by directing capital through our lending or investment capacity. We assist private and institutional clients with their desire to invest in accordance with their own social and environmental objectives, and we are proactive in discussing these issues with them.

Through our Philanthropy Services platform, we are partnering with clients to manage their philanthropy and maximize their impact, by offering expert advice, carefully selected programs from UBS Optimus Foundation, and innovative social financing mechanisms, such as development impact bonds.

In 2019, we noted strong momentum in our sustainable finance activities. A key indicator is the development of our core SI assets, where we managed to more than double penetration, from 5.6% of total invested assets in 2017 to 13.5% (USD 488 billion) in 2019 (2018: 10.1% or USD 313 billion). Core sustainable investments are SI products that involve a strict and diligent asset selection process through either exclusions (of companies / sectors from portfolios where the companies / sectors are not aligned to an investor's values) or positive selections (such as best-in-class, thematic or ESG integration and impact investing).

Norms-based screening assets, i.e., assets that fall under the application of a UBS policy[1] and do not otherwise qualify as a core sustainable investment, amounted to USD 818 billion as of 31 December 2019 (up from USD 797 billion in 2018). Total sustainable investments, including norms-based screening assets, accounted for USD 1,306 billion (2018: USD 1,110 billion), or 36.2% (2018: 35.8%), of our total invested assets.

1 The assets in discretionary mandates, in UBS's actively managed retail and institutional funds, as well as in our firm's proprietary trading book, are subject to our firm's policy on the prohibition of investment in and indirect financing of companies involved in the development, production or purchase of anti-personnel mines and cluster munitions.

Key achievements in 2019

Group

We are committed to maximizing positive effects and to minimizing negative impact that we have on society and the environment.

- UBS Optimus Foundation: an award-winning grant-making foundation that helps our clients use their wealth to drive positive and sustainable social change for children.
- Environmental and social risk management: we engage with clients and suppliers to better understand their processes and policies, and to explore how any environmental and social risks may be mitigated.

Global Wealth Management

We are a leader in sustainable investing (SI),[1] with a global footprint and a network of resources to deliver a wide range of research, advisory and product capabilities that continue to grow.

- USD 3.9 billion raised toward commitment to direct at least USD 5 billion of client assets in SDG-related impact investments by 2021.
- Launch of the SDG Engagement High Yield Credit funds.

9.4 USD billion

invested in 100% SI solutions and bespoke SI solutions.

3.3 million children

In 2019, UBS Optimus Foundation raised USD 89.5 million in donations, approved USD 109.5 million in grants and helped improve the well-being of 3.3 million children worldwide.

Personal & Corporate Banking

We have been building sustainable finance offerings for all client segments.

- Retail clients: access to 100% sustainable investment solutions.
- Corporate clients: USD 200 million raised in the first green bond for a Swiss-listed energy and infrastructure company.
- Institutional clients: advice on SI integrated into strategic dialog with clients.

2 core SI products

were launched for our retail clients.

Investment Bank

We are focused on meeting the needs of our clients with regard to ESG and sustainable finance, and helping reshape business models and investment opportunities.

- Dedicated thought-leading ESG research team in its 15th year.
- Introduced the UBS ESG icon in our research reports in 2019, flagging ESG content in 32 reports.
- UBS ESG and Sustainability Symposium in London with over 40 speakers; relevant ESG content incorporated at key client conferences.
- Sustainability-driven investment solutions: launch of ESG Global Equity Premia.

Asset Management

We have established an industry-leading SI platform offering a wide range of SI strategies across various asset classes, integrating sustainability and impact into all our mainstream offerings.

- Invested assets in the categories "impact investing" and "sustainability focus" increased 14-fold since beginning of 2016 to USD 38.6 billion.
- ESG integration across all traditional asset classes, at USD 323.1 billion.

3.1 USD billion

Climate Aware strategy, a pioneering approach to integrate the 2°C climate change scenario into an investment solution, at USD 3.1 billion invested assets.

25 green and sustainable bonds

Support for companies driving positive impact: 25 high-profile issuances of green and sustainable bonds.

1 Euromoney Private Banking and Wealth Management Survey 2019: Global Results.

Investors

We generate long-term value for our investors by executing our strategy with discipline, striving for cost- and capital-efficient growth, long-term sustainable value creation, and attractive shareholder returns.

Investor base

Our investor base is well diversified. A substantial proportion of our institutional shareholders are based in the US, the UK and Switzerland.

→ **Refer to the "Corporate governance" section of this report for more information about disclosed shareholdings**

Cost- and capital-efficient revenue growth

We aim to drive higher and superior returns by growing and leveraging our unique, integrated and complementary business portfolio and geographic footprint. Our Global Wealth Management business is well positioned to take advantage of two secular trends: wealth transfer and wealth creation, partly driven by continued economic growth, particularly in Asia, where China is opening its financial markets. Each of our businesses has initiatives to achieve revenue growth and improve operating efficiency.

→ **Refer to "Industry trends" in the "Our environment" section of this report for more information about wealth creation and wealth transfer**

We aim to balance growth opportunities with cost and capital efficiency in order to drive attractive risk-adjusted returns and sustainable performance.

Our primary measurement of performance for the Group is return on common equity tier 1 capital (CET1), as regulatory capital is our binding constraint and drives our ability to return capital to shareholders.

→ **Refer to the "Performance targets and measurement" section of this report for more information**

Shareholder returns

We aim to increase our ordinary dividend per share by USD 0.01 each year, and to return excess capital through share repurchases. We consider business conditions and any idiosyncratic developments when determining excess capital available for share repurchases.

Alignment of interests

We aim to align the interests of our employees with those of our equity and debt investors. This is reflected in our compensation philosophy and practices.

→ **Refer to "Our compensation philosophy" in the "Compensation" section of this report for more information**

Communications

Our Investor Relations function serves as the primary point of contact between UBS and all shareholders. Our senior management and the Investor Relations team regularly interact with the institutional investors community, financial analysts and other market participants, such as credit rating agencies. Clear, transparent and relevant disclosures, together with regular and direct interactions with existing and prospective shareholders, form the basis for our communications. The Investor Relations team also relays the views of and feedback from institutional investors and other market participants on UBS to our senior management.

Investor Relations and Corporate Responsibility work together and interact with those investors focusing on sustainability topics relevant to UBS and society at large.

→ **Refer to "Corporate governance" and "Information policy" in the "Corporate governance" section of this report for more information**

→ **Refer to "Society" in this section for more information about our sustainability efforts**

Shareholders and investors (additional information)

Engagement with environmental, social and governance (ESG) rating and research agencies

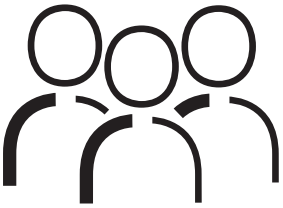
We actively engage in dialogue with analysts at rating and research agencies. The assessment of specialized agencies helps to evaluate our sustainability performance and activities, and provides a useful means for benchmarking.

In 2019, we provided detailed information on our sustainability performance to a range of agencies, either in response to questionnaires or via meetings or calls (with ESG analysts). Our Sustainability Report regularly serves as a key source of information for these agencies.

Employees

Our employees drive our success. Our employees work in 50 countries, are citizens of 136 nations and speak more than 150 languages. Their skills, experience and commitment enable us to deliver innovative solutions for our clients, foster sustainable business success, protect our reputation and drive the firm forward. As an employer, we attract, develop and retain a diverse range of talent and aim to ensure there is a workplace culture that supports and engages our employees, enabling them to build their careers and unlock their full potential.

Our workforce at a glance[1]



68,601

employees (by FTE)[2]

69,966 employees (by headcount)

50
countries

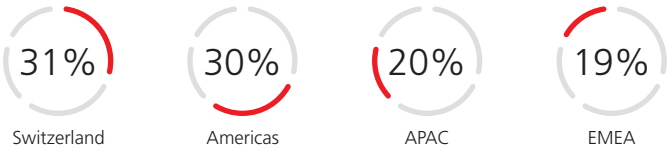
136
nationalities (by citizenship)

150+
languages spoken

8
years of service on average

Age

Region



1 Calculated as of 31 December 2019 on a headcount basis of 69,966 internal employees only. 2 Personnel (full-time equivalents) as of 31 December 2019 has been amended compared with our fourth quarter 2019 report, resulting in a decrease of 61.

The keys to a strong corporate culture

Our three keys to success remain the foundation of our strategy and culture. Together, they define what we stand for as a firm and as individuals, and they drive our business strategy. We set out on our cultural transformation in 2011, defining and then embedding our *Pillars, Principles and Behaviors* into our core people management processes. We conduct regular employee surveys to obtain feedback and ensure continuous improvement, discussing the findings and further actions with our employees. In 2019, responses indicated that employee engagement, appreciation for our talent management practices, and pride in working at UBS were all above the norm for financial services organizations.

→ **Refer to the foldout pages of this report for more information about our Pillars, Principles and Behaviors**

Engaging and enabling employees, instilling a strong risk culture and promoting sustainability were culture-building priorities in 2019. In this respect, our *Group Franchise Awards* program provided foundational support. This Group-wide initiative rewards employees for cross-divisional collaboration and operational effectiveness improvements.

We are convinced that leadership drives culture, and culture drives performance. Great leaders are the key to developing our people, client relationships and results. For many years, our *House View on Leadership* has outlined what effective leadership is at UBS, as well as what employees can expect. To help leaders better adapt to continuous change and digitalization, we updated our *House View* in 2019 and integrated its precepts into all of our core HR processes, including recruitment, performance evaluations, training, succession planning and promotions. Characteristics such as innovation, curiosity and agility complement our long-standing emphasis on inclusivity, sustainable profits, accountability, cross-firm partnership and putting clients first. It is an evolution of how we view leadership that creates an extraordinary experience for our clients and our people.

Hiring, developing and retaining talent

We are widely recognized as an employer of choice and a great place to build a career. Key to our success is our long-standing commitment to investing in our employees at every career stage. It starts with recruitment, where our philosophy is to hire for potential, considering the individual's experience and competencies, learning capabilities and agility, as well as digital and data savviness. We hired a total of 10,080 external candidates in 2019. Our junior talent programs hired more than 1,700 graduate and other trainees, interns and apprentices. We also continued our insourcing and hiring activities in our Business Solutions Centers in China, India, Poland, Switzerland and the US as part of our integrated workforce strategy.

Our in-house *UBS University* further updated its curriculum in 2019 to emphasize future-skills development and personal growth for all employees, with a new digital skills curriculum that builds knowledge about topics such as blockchain, cloud computing, robotics and artificial intelligence. We also launched a mobile learning app to enable employees to learn whenever and wherever they want. We revamped our leadership development offering in 2019 to ensure that our leaders have the skills they need to develop their businesses and their people, and to lead effectively in the digital transformation age. In 2019, our permanent employees completed more than 1,100,000 learning activities, including mandatory training on compliance, business and other topics. This averaged to more than two training days per employee.

Along with line manager effectiveness, having a wide range of learning and career development opportunities, as well as tools to facilitate professional growth, are key drivers of employee engagement. In this respect, our new *Career Navigator* tool, which was launched in June 2019, has been a game-changer. This online platform enables employees to explore career paths and search for open roles that match their interests while allowing our recruiters to find internal talent more easily. It also identifies skill gaps with regard to new roles and interests and directly links to learning opportunities to help fill these gaps.

We are committed to ensuring a workplace where employees are fairly treated, with equal opportunities for all. We do not tolerate harassment of any kind. Our global measures include employee and line manager training, specialist expertise in handling concerns raised, and a global employee hotline. A Harassment Guardian provides an independent view of the firm's setup, procedures and behaviors to prevent harassment and sexual misconduct.

We pay for performance, and a strong commitment to pay equity is embedded into our compensation policies. We conduct regular internal, as well as independent external, reviews, with the aim of ensuring that all employees are paid fairly, and we seek to address any unexplained gaps.

→ **Refer to *www.ubs.com/employerawards*, *www.ubs.com/careers* and the "Compensation" section of this report for more information**

Personnel by region

	As of			% change from
Full-time equivalents	31.12.19	31.12.18	31.12.17	31.12.18
Americas	21,036	21,309	20,770	(1)
of which: USA	*20,232*	*20,495*	*19,944*	*(1)*
Asia Pacific	13,956	12,119	8,959	15
Europe, Middle East and Africa (excluding Switzerland)	12,918	12,620	11,097	2
of which: UK	*5,704*	*5,782*	*5,274*	*(1)*
of which: rest of Europe (excluding Switzerland)	*7,048*	*6,670*	*5,662*	*6*
of which: Middle East and Africa	*166*	*168*	*161*	*(1)*
Switzerland	20,691	20,840	20,427	(1)
Total[1]	68,601	66,888	61,253	3

1 The increase in workforce in 2019 and 2018 was mainly due to insourcing initiatives and was more than offset by a decrease in external staff.

The importance of diversity and inclusion

A widely diverse workforce that reflects the experience of our global clients is important for our long-term success. We therefore strive to shape a diverse and inclusive culture across the firm to drive sustainable growth and innovation, deliver the best of UBS to our clients, and build a better place to work for all employees.

Our broad view of diversity encompasses a range of aspects, including gender, ethnicity, LGBTQ, disability, mental health and inclusive leadership. We remain committed to narrowing our gender representation gap, especially at the management level, through a global gender diversity strategy and a wide range of supporting initiatives to hire, promote and retain more women at all levels of the organization. We continue to make progress toward our stated aspiration of increasing the representation of women in management roles to one-third. In 2019, 25.2% of all employees in roles at Director level and above were women, up from 24.7% in 2018.

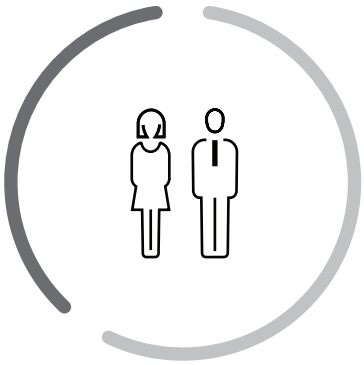
Our *UBS Career Comeback* program, which was launched in 2016, continues to help us increase our pipeline of female senior leaders. Professionals looking to return to corporate jobs after a career break are hired for permanent roles and supported with specialized onboarding, coaching and mentoring. In 2019, *Career Comeback* expanded beyond its four established hubs in the US, UK, Switzerland and India to become a global, year-round program. To date, *Career Comeback* has helped 142 women and 8 men relaunch their careers.

→ **Refer to *www.ubs.com/diversity* for additional information about our priorities and commitments, and the Sustainability Report 2019, available from 5 March 2020 under "Annual reporting" at *www.ubs.com/investors* for our management practices and detailed employee data, including gender- and region-specific data**

More about our workforce[1]

39%
women
27,136

61%
men
42,830



Switzerland

Americas

APAC

EMEA

1 Calculated as of 31 December 2019 on a headcount basis of 69,966 internal employees only.

Employees (additional information)

Engaging with our employees

Our employees are key to meeting our clients' needs and our long-term business success. We therefore invest in our employees by providing them with diverse learning opportunities, fostering internal mobility and creating a rewarding work environment. Having regular dialogue with employees helps ensure that we understand their needs.

Our senior leaders regularly update employees on our business strategy, priorities and policies, as well as people management topics such as goal setting, compensation, training, internal mobility, career development, new technologies, and risk and compliance topics. We use a variety of communication channels and events to ensure our employees are aligned with our corporate culture and the firm's three keys – the Pillars, Principles and Behaviors. We promote collaboration and efficiency efforts such as our Group Franchise Awards program, gender representation initiatives like UBS Career Comeback, and we have an ongoing focus on culture-building topics like inclusive leadership. We also support the global philanthropic projects managed by the UBS Optimus Foundation. On a regional and divisional basis, we celebrate and support involvement in our community engagement and employee volunteering activities. We interact with employees through a number of news and information channels such as our intranet, UBS Connections (our internal social network), UBS TV and a number of other interactive help and information sites.

Direct communication with employees also takes place through individual and team meetings, emails, all-staff sessions and the firm's Quality Feedback system (see page 29). In 2019, employees in all businesses and regions attended numerous town halls and small group meetings to discuss relevant issues directly with senior management. For example, regular "Ask the CEO" events allowed all employees globally to learn about (and ask questions on) topics such as the firm's strategy and direction. These events are attended in person by local employees and broadcast live (and via replay) on UBS TV. Additionally, an "Ask the GEB" event was held in New York in December 2019.

We want our employees to be engaged and share their views and have ample opportunities to influence the firm's future. We therefore regularly survey all our permanent employees to capture feedback on how we are doing as a firm, and we use that feedback to improve as an organization. As such, in 2019, all employees were asked to participate in a global survey, and 83% did. We particularly wanted to know whether our firm's principles and behaviors are being lived up to, how effective our line managers are and whether we are providing a positive and empowering work environment. This year, 78% of participating employees indicated high levels of engagement, 79% agreed that their line manager(s) are effective, and 81% recognized our positive work environment. All of these results are above the financial services industry norm.

Employees were informed of the Group-wide survey results, as well as divisional, regional and business area results, as applicable. Each year's data is analyzed and leveraged in future culture-building initiatives, as it is our ongoing ambition to have a highly motivated workforce that models integrity, collaboration and challenge in its daily work. We strive to be the clear employer of choice in the financial services industry and maintain overall engagement ratings in the top quartile; both ambitions have been achieved in 2019.

Our employee networks, which are sponsored by business leaders, are foundational to strengthening our culture. They help employees build cross-business relationships and support an open and inclusive workplace. In 2019, we sponsored 43 employee networks globally, including ones focused on topics around culture, gender, ethnicity, family, mental health, Pride / LGBTQ, disability and veterans. Of particular note, our disability-focused networks in the US, UK, Switzerland and Asia Pacific raise awareness of visible and invisible disabilities in the workplace, as well as our management's active support for hiring, developing and retaining employees with disabilities across the firm. Our women's networks in locations around the globe promote personal and professional development through networking, mentoring and education.

Employee representation

As a responsible employer, we maintain an open discourse with our formal employee representation groups. We have two pan-European forums – the UBS Employee Forum (which is our European Works Council) and the UBS Europe SE Works Council. These groups represent 17 countries and consider issues that may affect our performance, operations or prospects. Local and regional work councils, like the Employee Representation Committee in Switzerland, discuss topics such as business transfers, pensions, workplace conditions, health and safety, and redundancies. Collectively, these groups represent approximately 49% of our global workforce.

→ **Find out more about topics of interest to employees and potential employees at *www.ubs.com/employees* or *www.ubs.com/careers***

Managing our global workforce

Our employees' skills, experience and commitment are key to delivering on our business strategy. Our human resources strategy therefore seeks to attract, develop and retain employees who have the diverse backgrounds and capabilities to advise our clients, develop new products, manage risk and adapt to evolving business trends and regulations. We invest in our employees, for example, through a comprehensive learning platform and career development programs, and we promote initiatives to build engagement and a cohesive, collaborative culture.

Further increasing the diversity of our workforce and ensuring an inclusive workplace is vital to our business success. In our experience, diverse teams better understand and relate to our equally diverse clients' needs. Likewise, diversity of thought, opinion and experience helps us make better decisions and drives innovation, while an inclusive work environment attracts high-quality people and makes the firm a better place to work. Our human resources policies and procedures underscore our commitment to a diverse and inclusive workplace, with equal opportunities for all employees and a strong commitment to equal pay that is embedded in all our management processes.

We offer competitive benefits to all employees, including insurance, pension, retirement and personal leave, aligned with local market practices and focused on employee wellbeing. These benefits often go beyond legal requirements or market practice, and we regularly review them to ensure they meet our employees' needs. When it comes to mental wellbeing we enable employees to build their careers while managing personal commitments. A wide range of resources are available to help employees navigate work-life issues and personal challenges. We support flexible working arrangements including telecommuting, working from home, part-time roles, job sharing and partial retirement.

Our Employee Assistance Programs offer support and counseling for challenges such as illness, conflict, bereavement, psychological health and elderly care. In the UK, for instance, we promoted World Mental Health Day in October with the launch of Mental Health Champions, made up of UBS volunteers accredited with specialist training by Mental Health First Aid England. While these volunteers are not therapists or counselors, they are trained to listen, reassure and respond in addition to being a point of contact for any UBS employee who may be experiencing a mental health issue or any type of emotional distress. We have also added a variety of new learning opportunities focused on health and wellbeing to our UBS University offering.

At UBS, all new parents can take paid time off after the birth or adoption of a child. Our parental leave policies meet the legal standards in all locations and exceed them in most. For example, in the US, our gender-neutral Child Care Leave policy enables the primary caregiver to take up to 20 weeks of paid leave during the period immediately following the birth, adoption or foster care placement of the employee's (or partner's) child. In Switzerland, new fathers can take up to 10 days of paid paternity leave within the first year. In addition, they can either take up to 30 calendar days of unpaid leave or reduce their level of employment to 80% for up to six months.

In the US, just as we help our clients, our goal is to also help our employees make informed decisions so they can feel confident about their financial situation. That is why we have partnered with UBS Financial Wellness and from January 2020, employees will have access to educational content, digital tools and licensed Financial Wellness Advisors who can assist and guide them on their unique financial journey. UBS Financial Wellness strives to deliver education on a myriad of topics including budgeting, savings, debt management, insurance protection, big purchases, life changes, retirement planning, investing basics, estate planning and more.

We offer redeployment and outplacement initiatives to help employees find new roles, and we have clear policies and processes for handling redundancies. As an example, when job losses occur in the Swiss labor market due to restructuring, we offer affected employees access to our COACH process. This process supports employees in finding a new position internally or externally.

Our Code of Conduct and Ethics is the basis for all human resource policies, guidelines and procedures. It includes a commitment to the health and safety of employees and external staff.

→ **Refer to the Health and Safety statement in the Appendix 1 for more information**

→ **Refer to the UBS in society constitutional document in the Appendix 1 for more information**

Our 2019 workforce at a glance[1]

We report in depth on our global workforce to give stakeholders a clear picture of our management philosophy and priorities. Our reporting covers key statistics relevant to full- and part-time employees, as well as relevant data about external staff. Both groups rely on us to provide a safe, respectful and collaborative workplace.

As of 31 December 2019, we had 68,601 employees (full-time equivalents / FTEs), 1,713 FTEs more than in 2018. This included Swiss apprentices on three-year limited contracts who received benefits equivalent to permanent employees.

A total of 16,408 external staff for core business services were active at the end of 2019, primarily in technology and operations roles. This included 2,215 FTEs employed through third parties on short-term contracts to fill positions on an interim basis. Additionally, a total of 11,647 external staff for non-core business services were active at the end of 2019, primarily in premises-related roles.

Also of note:

- Our workforce in 2019 was 39% female and 61% male; 25% of senior managers who reported to GEB members were female.
- Switzerland was our largest cross-border importer of employees from other countries; China was our largest cross-border exporter of employees.
- 1,125 employees changed business divisions in 2019; 499 changed regions.
- Employees are asked to record their absences due to illness or accident in our self-service human resources tool. In 2019, our global workforce recorded an absentee rate of 1.7% of total scheduled days.

Our workforce by the numbers

To give the most accurate view of our global workforce, human resources reporting considers a person (working full time or part time) as one headcount. This accounts for the total UBS employee number of 69,966 as of 31 December 2019 (versus 68,338 as of 31 December 2018). These numbers exclude staff from UBS Card Center, Hotel Seepark Thun and Wolfsberg. The following tables are all reported on this basis, unless otherwise specified. The percentages in the tables may not total 100 due to rounding.

1 All data was calculated on/as of 31 December 2019, unless otherwise noted.

UBS employees: full-time and part-time employees

Employees: full time / part time

	31.12.19		31.12.18	
	Number	%	Number	%
Male				
Full Time	41,324	96%	40,298	96%
Part Time	1,506	4%	1,473	4%
Total	42,830	100%	41,771	100%
Female				
Full Time	23,364	86%	22,800	86%
Part Time	3,772	14%	3,767	14%
Total	27,136	100%	26,567	100%
Grand Total	69,966		68,338	

UBS employees: permanent and "limited employment period" employees (by gender and by region)

Employees: employment term / region

	31.12.19		31.12.18	
	Number	%	Number	%
Americas				
Permanent	21,288	100%	21,563	100%
Limited Term	0	0%	0	0%
Total	21,288	100%	21,563	100%
APAC				
Permanent	13,944	100%	12,095	100%
Limited Term	11	0%	38	0%
Total	13,955	100%	12,133	100%
EMEA (excluding Switzerland)				
Permanent	13,259	100%	12,960	100%
Limited Term	1	0%	0	0%
Total	13,260	100%	12,960	100%
Switzerland				
Permanent	20,296	95%	20,466	94%
Limited Term	1,167	5%	1,216	6%
Total	21,463	100%	21,682	100%
Grand Total	69,966		68,338	

Employees: employment term / gender

	31.12.19		31.12.18	
	Number	%	Number	%
Male				
Permanent	42,160	98%	41,050	98%
Limited Term	670	2%	721	2%
Total	42,830	100%	41,771	100%
Female				
Permanent	26,627	98%	26,034	98%
Limited Term	509	2%	533	2%
Total	27,136	100%	26,567	100%
Grand Total	69,966		68,338	

UBS employees: external hires

External hires by age group

	31.12.19		31.12.18	
	Number	%	Number	%
Under 30	4,676	46%	5,723	43%
Between 30 and 50	4,985	50%	6,928	52%
Over 50	419	4%	598	5%
Total external hires	10,080	100%	13,249	100%

External hires by gender

	31.12.19		31.12.18	
	Number	%	Number	%
Male	6,073	60%	8,143	61%
Female	4,007	40%	5,106	39%
Total external hires	10,080	100%	13,249	100%

External hires by region

	31.12.19		31.12.18	
	Number	%	Number	%
Americas	2,328	23%	2,959	22%
APAC	3,620	36%	4,207	32%
EMEA (excluding Switzerland)	1,998	20%	3,062	23%
Switzerland	2,134	21%	3,021	23%
Total external hires	10,080	100%	13,249	100%

UBS employees: employee turnover

Turnover by age group

	31.12.19	31.12.18
	%	%
Under 30	19%	18%
Between 30 and 50	11%	11%
Over 50	10%	9%
Overall turnover	12%	12%

Turnover by gender

	31.12.19	31.12.18
		%
Male	12%	12%
Female	13%	12%
Overall turnover	12%	12%

Turnover by region

	31.12.19	31.12.18
	%	%
Americas	12%	11%
APAC	14%	14%
EMEA (excluding Switzerland)	13%	13%
Switzerland	11%	11%
Overall turnover	12%	12%

Note: The turnover rate is calculated by dividing the number of employees (in FTE) who left by the average number of employees (in FTE) over the full year period.

UBS employees: age group

Employees by age group

	31.12.19	31.12.18
	%	%
Under 30	19%	20%
Between 30 and 50	60%	59%
Over 50	21%	21%
Total	100%	100%

UBS employees: employee category (rank group)

Distribution by employee category and gender

	31.12.19		31.12.18	
	Number	%	Number	%
Officers (Director and above)				
Male	18,425	75%	18,513	75%
Female	6,223	25%	6,079	25%
Total	24,648	100%	24,592	100%
Officers (other officers)				
Male	16,447	61%	15,464	61%
Female	10,583	39%	10,060	39%
Total	27,030	100%	25,524	100%
Employee rank				
Male	7,958	44%	7,794	43%
Female	10,330	56%	10,428	57%
Total	18,288	100%	18,222	100%
Grand Total	69,966		68,338	

Distribution by employee category and age group

	31.12.19		31.12.18	
	Number	%	Number	%
Officers (Director and above)				
Under 30	143	1%	126	1%
Between 30 and 50	16,402	67%	16,774	68%
Over 50	8,103	33%	7,692	31%
Total	24,648	100%	24,592	100%
Officers (other officers)				
Under 30	4,075	15%	3,951	15%
Between 30 and 50	18,801	70%	17,507	69%
Over 50	4,154	15%	4,066	16%
Total	27,030	100%	25,524	100%
Employee rank				
Under 30	9,287	51%	9,253	51%
Between 30 and 50	6,369	35%	6,231	34%
Over 50	2,632	14%	2,738	15%
Total	18,288	100%	18,222	100%
Grand Total	69,966		68,338	

UBS employees: average training days (gender)

Training by gender

	Average training days	
	31.12.19	31.12.18
Female	2.16	1.83
Male	2.12	1.71
Total average training days	2.14	1.76

UBS employees: average training days (rank group)

Training by rank group

	Average training days	
	31.12.19	31.12.18
Officers (Director and above)	2.36	1.88
Officers (other officers)	2.02	1.61
Employee rank	2.01	1.80
Total average training days	2.14	1.76

Note: Employee development activities include on-the-job experience and internal mobility (changing roles within the firm), exposure to senior leaders, new teams and experiences (e.g., through networking and mentoring) and education (both voluntary and required). Experience and exposure generally account for approximately 90% of an employee's development activities. It is also important to note that in 2018 and 2019, our in-house university revamped its offering to better prepare for future global trends and enable employees to choose the depth of learning to meet their voluntary learning goals based on their needs. We also increased the efficiency of mandatory trainings in both 2018 and 2019.

UBS employees: parental leave taken

Parental leave taken (by gender)

	2019	2018
Male	2,557	2,196
Female	3,439	2,951
Total number of employees	5,996	5,147

All employees are entitled to take parental leave as indicated in the respective local human resources policies. This table shows number of employees who took parental leave as recorded in the UBS HRi system; data aggregation is subject to limitations such as the disparate definitions and permutations of parental leave across the firm and the various leave and absence tools used in the 50+ countries in which we operate.

Society

As expressed in the 17 United Nations Sustainable Development Goals (the SDGs), the world faces enormous societal and environmental challenges. We recognize that it is important to understand these challenges, as well as the opportunities arising from them, to consider their relevance to UBS and to identify potential actions our firm may need to take.

As the world's largest truly global wealth manager, we have a responsibility to take a leading role in shaping a positive future, for everyone, including the generations to come.

Code of Conduct and Ethics

In our Code of Conduct and Ethics (the Code), the Board of Directors and the Group Executive Board set out the principles and practices that define our ethical standards and the way we do business. These principles apply to all aspects of our business.

All employees must confirm annually that they have read and will adhere to the Code and other key policies, supporting a culture where ethical and responsible behavior is part of our everyday operations.

In the Code, we make a commitment to integrating financial and societal performance for the mutual benefit of our clients and our firm – and that we are constantly looking for better ways to do business in an environmentally sound and socially responsible manner.

→ **Refer to the Code of Conduct and Ethics of UBS, available at *www.ubs.com/code*, for more information**

Engaging with society

We engage with representatives of wider society on a regular basis and on a wide range of topics. This engagement yields important information about society's expectations and concerns and makes a critical contribution to our understanding and management of issues with potential (positive and negative) relevance to our firm – and to society. By actively fostering such interactions, we are in a position to address expectations and concerns in an informed and effective manner.

UBS in society

UBS in society is a dedicated organization within the firm, focused on maximizing our positive effect and minimizing any negative effects UBS has on society and the environment. It covers all of the activities and capabilities related to sustainable finance (including sustainable investing), philanthropy, environmental, climate and human rights policies governing client and supplier relationships, our environmental footprint, human resources, and community investment. It is through this cross-divisional organization that we leverage our expertise across all of these areas to drive sustainable performance. *UBS in society* is committed to making UBS a force for driving positive change in society and the environment.

The activities driven by *UBS in society* are overseen, at the highest level of our firm, by our Board of Directors' Corporate Culture and Responsibility Committee (the CCRC). The Group CEO supervises the execution of the *UBS in society* strategy and annual objectives and informs the Group Executive Board and CCRC about *UBS in society* updates as appropriate. Reporting to the Group CEO, the Head *UBS in society* is UBS's senior-level representative for sustainability issues and, on behalf of the Group CEO, proposes the *UBS in society* strategy and annual objectives to the CCRC for approval.

→ **Refer to "Board of Directors" in the "Corporate governance" section of this report for more information about the CCRC**

Driving change in finance

As a major financial institution, we are conscious that the activities and decisions of our clients can have a substantial impact on society. It is for that reason that we strive to incorporate environmental, social and governance (ESG) impacts into the products and services we provide to clients and partner with them to help mobilize capital toward the achievement of the SDGs and the orderly transition to a low-carbon economy.

We know that ESG topics are increasingly important to our clients. That is why we have dedicated a separate section in this report to highlight our commitment to serving the growing sustainable finance needs and expectations of our clients, and to the key activities associated with our commitment.

→ **Refer to "Our focus on ESG" in this section for more information**

Driving change in philanthropy

We believe our clients can make a meaningful, and measurable, difference for their chosen causes with advice from our philanthropy experts and the more than 200 global programs that have been carefully selected through our UBS Optimus Foundation. We increase social impact by combining our expertise with capital and networks. Through our Philanthropy Services platform, we offer clients unique access to social and financial innovation and philanthropic advice, as well as tailored program design, co-funding and co-development opportunities.

→ **Refer to *www.ubs.com/optimus* for more information**

Driving change in communities

We recognize that our firm's long-term success depends on the health and prosperity of the communities of which we are a part. We seek to redress disadvantages through long-term investments in education and entrepreneurship. We provide strategic financial commitments and targeted employee volunteering to drive impact across a number of the SDGs.

→ **Refer to the "Driving change in communities" section in the Sustainability Report 2019, available from 5 March 2020 under "Annual reporting" at *www.ubs.com/investors* for more information**

Driving change in business

We view the proper, firm-wide management of our firm's own environmental footprint and our supply chain as important proof of how we do business in a sustainable manner for the benefit of society.

This is equally true of our comprehensive environmental and social risk management and framework that governs client and vendor relationships and is applied firm-wide to all activities. We have set environmental and social risk standards pertaining to environmental and human rights topics in product development, investments, financing and supply chain management. We have identified certain controversial activities that we will not engage in at all, or only under stringent criteria. As part of this process, we engage with clients and vendors to better understand their processes and policies, and to explore how any environmental and social risks may be mitigated.

We have set ambitious targets relating to our use of energy, water and paper, as well as to our travel and the amount of waste we produce, and we aim to increase the awareness of environmental and social matters among our employees and foster a long-term sustainable mindset in all our activities. In 2019, the year in which we celebrated 20 years since becoming the first bank to gain global environmental management system certification (ISO 14001), we ran major campaigns on key environmental themes.

Our campaigns demonstrate our strong commitment to reducing UBS's environmental footprint and further raising our employees' awareness of key environmental challenges. The "Go drastic. Cut the plastic." global campaign, which was launched in July 2019, aims at encouraging behavioral change to help tackle, reduce and phase out single-use plastic items across our firm. In October, we held our first Zero Waste Day at 22 sites across the globe, which featured numerous sustainability-themed activities. Additionally, at five major offices across the globe, we hosted events featuring subject matter experts talking about their life's work and passion, including speakers from innovative companies.

→ **Refer to the Sustainability Report 2019, available from 5 March 2020 under "Annual reporting" at *www.ubs.com/investors*, for full descriptions of our environmental management, our responsible supply chain management and our environmental and social risk management and framework**

Reducing our environmental footprint

Reduced environmental impact through focused management (status 2019)

100 %
CO_2 emissions from **air travel** are offset

72 %
electricity from **renewable** sources; on track to achieve 100% by mid-2020

83 %
share of **paper** from **sustainable** sources

Environmental performance since 2012

30 %
reduction of business air travel

28 %
decrease in **energy consumption**
= USD 30 million savings per year

36 %
reduction of **paper consumption** per FTE

71 % reduction of **greenhouse gas** footprint since 2004 › on track to meet the 2020 target of 75%

Reporting to our stakeholders on our sustainability strategy and activities

Information about all our sustainability efforts and commitments is provided in the UBS Sustainability Report,[1] available under "Annual reporting" at *www.ubs.com/investors*. The content of the Sustainability Report has been prepared in accordance with the Global Reporting Initiative (GRI) Standards ("comprehensive" option) and with the German rules implementing the EU directive on disclosure of non-financial and diversity information (2014/95/EU). Our reporting on sustainability has been reviewed on a limited assurance basis by Ernst & Young Ltd against the GRI Standards. Our Sustainability Report 2019 also includes our full climate disclosure, which we have been aligning with the recommendations provided by the Financial Stability Board's Task Force on Climate-related Financial Disclosures since their introduction in 2017.

1 The UBS Sustainability Report is available from 5 March 2020, and is not deemed incorporated by reference into the SEC Form 20-F filing.

Aims and progress

We work with a long-term focus on providing appropriate returns to all of our stakeholders in a responsible manner. To underline our commitment, we provide transparent goals and report on progress made against them wherever possible. In 2019, we made good progress in delivering against the Group's aims.

We aim to be / Our key goals[1]	Our progress
A leader in sustainable finance across all client segments	
2017–2020 – Double the penetration of core SI assets from 5.6% (USD 182 billion) of total invested assets[2]	– Achieved our goal one year early, reaching USD 488.5 billion in core SI assets representing 13.5% of total invested assets[2,3]
2016–2021 – Direct at least USD 5 billion of client assets into SDG-related impact investments	– USD 3.9 billion of client assets directed into SDG-related impact investments[4]
A recognized innovator and thought leader in philanthropy	
2017–2020 – Achieve 40% of employees volunteering with 40% of volunteer hours being skills based – Increase donations to UBS Optimus Foundation to CHF 100 million in 2020	– 38% of global workforce volunteered and 48% of volunteer hours were skills based[5] – UBS Optimus Foundation: USD 89.5 million (CHF 86.9 million) in donations raised; USD 109.5 million (CHF 106.3 million) in grants approved
2020–2025 – Support 1 million young people and adults ("beneficiaries") to learn and develop skills for employment, decent jobs and entrepreneurship through our community investment activities – Improve the lives of 5 million children globally by engaging at least 1,000 clients in UBS Optimus Foundation's collective giving platforms	– Progress against these goals will be reported for the financial year 2020 onward
An industry leader in sustainable business practices	
– Retain favorable positions in key ESG ratings	– Maintained leadership position (Dow Jones Sustainability Indices / DJSI) – AA rating maintained (MSCI ESG Research) – Industry leader rank maintained (Sustainalytics) – A– rating and included in Leadership band (CDP)
2017–2022 – Implement the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)	– First TCFD reporting introduced for the financial year 2017, continuous improvements ever since
2019–2024 – Implement the requirements of the Principles for Responsible Banking (PRB)	– Among the founding signatories of the PRB (September 2019)
An employer of choice	
– Being recognized as one of the world's most attractive employers in key ratings and rankings	– Included in Global Universum ranking of Top 50 World's Most Attractive Employers – Peer-leading position in human resources elements of DJSI – Score above financial services norm in employee engagement and work environment (based on employee survey results) – Recognized by Bloomberg Gender-Equality Index

1 Refer to the UBS in society constitutional document (in the Sustainability Report 2019) for more information about all aims. Goals are to be achieved by the end of the target year. 2 Core SI are SI products that involve a strict and diligent asset selection process through either exclusions (of companies / sectors from the portfolio where the companies are not aligned to an investor's values) or positive selections (such as best-in-class, thematic or ESG integration and impact investing). Refer to the "Core sustainable investments" table in "Our focus on ESG" in this section. 3 The increase in core SI assets was mainly driven by the ESG integration strategy of Asset Management. Refer to the "Core sustainable investments" table in "Our focus on ESG" in this section. 4 Strategies where the investment has the intention of generating measurable environmental and social impact alongside a financial return. 5 Refer to the "Driving change in communities" section in the Sustainability Report 2019.

Stakeholder relations (additional information)

Governments and regulators

Financial market stability is largely dependent on the overall economic, regulatory and political environment and the conduct of the firms within the sector. We actively participate in political discussions to share our expertise on proposed regulatory and supervisory changes. The regime set out by the post-2008 regulatory reform agenda is now largely completed with focus shifting to final national implementation of key prudential rules such as the Basel III standards.

With regard to corporate responsibility and sustainability issues, we actively participated in governmental discussions concerning the implementation of commitments made at the Paris Climate Change Conference and in the United Nations Sustainable Development Goals. In addition, we contribute to the Task Force on Climate-related Financial Disclosures (TCFD). On a regional basis, we contribute to various fora to engage with policymakers on the European Commission's Sustainable Finance Action Plan. In our home country Switzerland, we continue to actively contribute to pertinent sustainability discussions with various government bodies. We also contribute our experience and knowledge to supervisors in their efforts to further thinking on new topics, such as the appropriate regulatory environment for digital finance and the financial risks of climate change.

→ **Refer to UBS's quarterly reports and annual reports available at *www.ubs.com/investors* for more information on regulatory topics**

Politicians and political parties

We maintain a regular dialogue with politicians globally and strive to establish long-term relationships with political representatives.

We comply with legal requirements on disclosing political donations, as applicable in the relevant jurisdictions. Outside of Switzerland, we do not provide financial support to political parties. In the US, eligible employees may make financial contributions through a federal Political Action Committee (PAC), the UBS Americas Fund for Better Government. The PAC makes contributions to federal candidates. These employee contributions do not constitute political donations by UBS.

Support of the Swiss militia system

Swiss citizens actively and voluntarily engage in political institutions at all three levels of the Swiss state (federal, cantonal and local) as public officials (e.g., members of parliament, members of commissions and executive mandates), while they continue to pursue other professional activities. This arrangement – citizens taking on public tasks and mandates on a part-time basis – is referred to as the militia system.

In this system, members of parliament in Switzerland are (usually) not professional politicians and political parties do not receive state funding. It is for this reason that we view the support of the militia system as a crucial component of our societal responsibility in our home market. In recognition of the vital function of Switzerland's political parties, we provided a total of CHF 1 million to political parties in 2019 as a contribution to their operational costs. Financial contributions are calculated based on the number of parliamentary seats the respective party holds at the federal and cantonal level. Swiss parties are eligible to apply for a financial contribution if they commit to free competition, the market economy and to the Swiss financial center. They should also have a national focus and either form a parliamentary group in the federal parliament or be represented in at least one cantonal government. We view our contribution to political parties in Switzerland as a long-term commitment, which is, however, subject to regular reviews.

Annual political forum for employees who hold elected public office in Switzerland

We expressly support the political involvement of our employees. About 250 employees currently hold political office at the federal, cantonal and local level. If necessary, employees may spend a certain amount of their working time on their public duties. We organize an annual political forum at which senior management and political office holders discuss topics of relevance to UBS in Switzerland.

→ **Refer to *www.ubs.com/gov* for more information on governmental topics pertaining to Switzerland**

Peers

We actively engage in regular discussions on corporate responsibility and sustainability issues with specialists in peer banks, and more widely through trade bodies and associations. Sharing experiences and assessments of corporate responsibility and sustainability issues helps us to compare and improve our strategy, approach and tools.

We are a founding member of the Wolfsberg Group, an association of global banks that aims to develop financial services industry standards regarding anti-money laundering, Know Your Client and counter-terrorist financing policies. Meeting regularly, the Wolfsberg Group also works closely with the Financial Action Task Force.

With regards to climate risk, UBS is cooperating on two fronts. Firstly, we are part of the United Nations Environment Programme Finance Initiative (UNEP FI) TCFD working group for banks to refine methodologies, scenarios and data sources to assess climate-related financial risk in loan portfolios and secondly, we are pilot-testing the Paris Agreement Capital Transition Assessment (PACTA) to shape the development of methodologies and study the alignment of corporate lending portfolios with the Paris Agreement benchmarks.

In 2011, we were a driving force behind the establishment of the Thun Group of Banks. The group has published two papers that propose a framework to help identify key challenges and best practice examples for the banking sector's implementation of the UN Guiding Principles on Business and Human Rights. The Thun Group maintains regular discussions, both in calls and in annual meetings at the UBS Conference Center in Thun, Switzerland.

Communities

At UBS, we recognize that our long-term success depends on the health and prosperity of the communities that we are a part of. Our approach is to build sustainable and successful partnerships with non-profit organizations and social enterprises to help our contributions have a lasting impact. Our Community Affairs programs seek to overcome disadvantage through long-term investment in education and entrepreneurship in the communities within which we operate.

Through local execution and partnerships, which operate under a global framework and with coordination across regions, we endeavor to deliver business and community impact by identifying innovative and high-quality programs that are aligned to the business. We provide focused financial and human support, including skills-based employee volunteering programs and client participation where appropriate. We are an active member of the London Benchmarking Group, an internationally recognized standard for measuring corporate community investment.

→ **Refer to the "Driving change in communities" section for further information and data of relevance to the communities we do business in**

Vendors

In 2019, we spent USD 9.01 billion on a broad range of products and services. A large proportion of this expenditure comprises real estate, outsourcing, IT as well as consultancy and legal fees. Our sourcing and procurement services are provided by an external company, Chain IQ, which applies our responsible supply chain management (RSCM) framework and processes. The experienced procurement and sourcing specialists at Chain IQ perform vendor due diligence and establish remediation measures, supported by a centralized team of experts within UBS.

We aim to ensure that our social and environmental values are being followed throughout the supply chain. A firm-wide RSCM guideline provides systematic assistance on identifying, assessing and monitoring vendor practices in the areas of human and labor rights, environmental protection and anti-corruption. A central component of this guideline is the UBS Responsible Supply Chain Standard, to which our direct vendors are normally bound by contract. We expect our vendors to apply these same standards to relationships with their vendors.

→ **Refer to "Responsible supply chain management" in the "Driving change in business" section for more information**

Non-governmental organizations

We regularly interact with non-governmental organizations (NGOs) and appreciate their input and insight, as it helps us consider our approach to, and understanding of, societal issues and concerns.

NGOs have long established themselves as critical watchdogs of companies, both scrutinizing and challenging how we address a broad range of environmental, social and human rights concerns. In 2019, discussions with NGOs were particularly focused on climate change (notably on fossil fuels). Other topics discussed included sustainable finance and human rights.

Media

Our media teams maintain direct and long-term relations with media representatives across all our business regions and provide them with timely information on a wide range of global, regional and local topics. Senior management (at the Board of Directors and Group Executive Board level) also regularly provide accounts to journalists, predominantly through interviews. In addition to interviews at our corporate events (i.e., via quarterly and annual reporting and at the Annual General Meeting), senior management conducted many other interviews in 2019.

We also communicated with media representatives – through interviews or background talks – on a broad range of corporate responsibility and sustainability topics such as climate change, human rights and environmental and social risks in general.

→ **Refer to *www.ubs.com/media* for further information on UBS media relations**

Our governance and principles

Our firm's societal and corporate culture activities are overseen at the highest level of our firm and are founded in our Principles and Behaviors.

Sustainability governance

The Board of Directors (the BoD) of UBS Group AG decides on the strategy of the Group upon recommendation by the Group Chief Executive Officer (the Group CEO) and is responsible for the overall direction, supervision and control of the Group and its management, as well as for supervising compliance with applicable laws, rules and regulations. The BoD exercises oversight over UBS Group AG and its subsidiaries and is responsible for establishing a clear Group governance framework to provide effective steering and supervision of the Group, taking into account the material risks to which UBS Group AG and its subsidiaries are exposed. The BoD has ultimate responsibility for the success of the Group and for delivering sustainable shareholder value within a framework of prudent and effective controls.

The BoD of UBS Group AG is responsible for setting our firm's values and standards to ensure that the Group's obligations to our stakeholders are met. Both the Chairman of the BoD and the Group CEO play a key role in safeguarding our reputation and ensuring we communicate effectively with all our stakeholders.

All BoD committees have responsibilities and authorities of direct relevance to our goal of creating sustainable value. The Governance and Nominating Committee, for instance, supports the BoD in fulfilling its duty to establish best practices in corporate governance across the UBS Group. The Compensation Committee supports the BoD in its duties to set guidelines on compensation and benefits. The Risk Committee oversees and supports the BoD in fulfilling its duty to supervise and set an appropriate risk management and control framework (in the areas of risk management and control, treasury and capital management, as well as balance sheet management).

The Corporate Culture and Responsibility Committee (CCRC) is the body primarily responsible for corporate culture, responsibility and sustainability. The oversight role of the CCRC has been embedded in the Organization Regulations of UBS Group AG.

In view of the many environmental and social challenges globally, as encompassed by the Sustainable Development Goals (SDGs), these topics will continue to increase in relevance for banks. These developments therefore require regular and critical assessment of our policies and practices, based on an accurate monitoring and analysis of societal topics of potential relevance to UBS. This process is the responsibility of a committee at Group Executive Board-level, the Global Environmental and Social Risk (ESR) Committee, which sets the overall risk appetite for the firm and resolves transactional and policy matters relating to environmental and social risks and their associated reputation risks. It is chaired by the Group Chief Risk Officer, who is responsible for the development and implementation of principles and appropriate independent control frameworks for environmental and social risks within UBS.

The GEB oversees our efforts to combat money laundering, corruption and terrorist financing. These efforts are led by a dedicated financial crime team of anti-money laundering compliance experts. The GEB also oversees our approach to diversity and inclusion. Our global head of diversity and inclusion drives a group-wide strategy complemented by divisional and regional initiatives.

→ **Refer to the "Sustainability governance" graph below**

→ **Refer to the Appendix 1 for the CCRC charter and the ESR policy framework**

Key policies and guidelines

Code of Conduct and Ethics

The Code of Conduct and Ethics of UBS (the Code) sets out the principles and practices that UBS expects all of its employees and directors to follow both in form and intention. The principles and standards set out in the Code should characterize all of UBS's business activities and all its dealings with the firm's stakeholders including clients, colleagues, shareholders, regulators and business partners. It is the basis for all UBS policies, guidelines and statements relating to each of the firm's employees' personal commitment to appropriate and responsible corporate behavior.

→ **Refer to *www.ubs.com/code* and the Appendix1 of this document for the full text of the Code**

UBS in society constitutional document

It is our goal to be the financial provider of choice for clients wishing to mobilize capital towards the SDGs and the orderly transition to a low-carbon economy (the Paris Agreement). The *UBS in society* constitutional document defines the principles and responsibilities for promoting this commitment systematically across all relevant businesses and for implementing the ethical standards defined in the Code that govern UBS's interaction with society and the environment.

→ **Refer to the Appendix 1 for the full text of the UBS in society constitutional document**

Policies to combat financial crime

We have developed policies intended to prevent, detect and report money laundering, corruption and terrorist financing. These policies seek to protect the firm and our reputation from those who may be intending to use UBS to legitimize illicit assets.

At UBS, we apply a risk-based approach and have a framework in place to identify and manage potential money laundering risks associated with customers and transactions. With our systematic assessment of money laundering risks we strive to arrive at the appropriate level of initial and ongoing due diligence and monitoring of transactions throughout the course of a relationship. For certain higher risk clients, face-to-face due diligence requirements are mandatory. Our anti-money laundering (AML) policy sets out the processes and risk criteria pertaining to politically exposed persons (PEPs). Global PEP clients are reviewed and reapproved on an annual basis by the responsible member of each divisional Executive Committee.

Our Code focuses on preventing the misuse of the financial system, including in relation to bribery. The specific anti-corruption standards of conduct that apply to all employees are also set out in the Group Policy Against Corruption. The policy sets out our zero-tolerance stance toward corruption and prohibits all forms of bribery by the firm and our employees, including facilitation payments.

Anti-corruption policies and procedures that aim to prevent bribery occurring throughout our operations apply to all business divisions. These policies are derived from the standards set out in the Group Policy Against Corruption and the Group Policy on Gifts and Business Entertainment.

→ **Refer to the "Driving change in business" section for more information about how we are combating financial crime**

Grievances and whistleblowing protection, policies and procedures

We strive to maintaining high legal, regulatory and ethical standards. We have longstanding procedures in every region to help us resolve employee grievances, and employees are strongly encouraged to speak with their line manager or HR about any concerns.

Our global whistleblowing policy and procedures offer multiple channels (including a whistleblowing and sexual misconduct hotline) for staff to raise concerns about any suspected breaches of laws, regulations, rules or other legal requirements, sexual misconduct or harassment, or any infringement of our Code, policies or professional standards. They may raise concerns openly or anonymously.

Our policies do not tolerate harassment of any kind, including sexual harassment, and our whistleblowing policies, procedures, employee education and awareness materials specifically encourage employees to raise concerns.

As set out in the Code, employees are required to immediately report any potential violations of the Code to their line manager or local compliance officer. Employees may also report them confidentially to their Legal or Compliance teams, or using our whistleblowing procedures. UBS prohibits retaliation against employees for reporting a concern that they reasonably believe constitute a breach or violation of this kind.

→ **Refer to "Risk management and control" in the "Risk, treasury and capital management" section of the UBS Annual Report 2019 for more information**

Human Resources policies

Human Resources has global and country-specific policies designed to ensure effective management practices, a strong culture and a safe and respectful working environment. An overarching global employment policy sets the minimum hiring and employment standards for all UBS locations. It provides fair, consistent and transparent treatment for our employees while taking into account local legal requirements, market best practices and shareholders' interests. This policy is supplemented by Employee Handbooks providing local information and clarification. Along with the individual employment contract / offer letter, Employee Handbooks are the primary source of information for employees on the terms and conditions of employment and human resources programs, policies and procedures applicable to them.

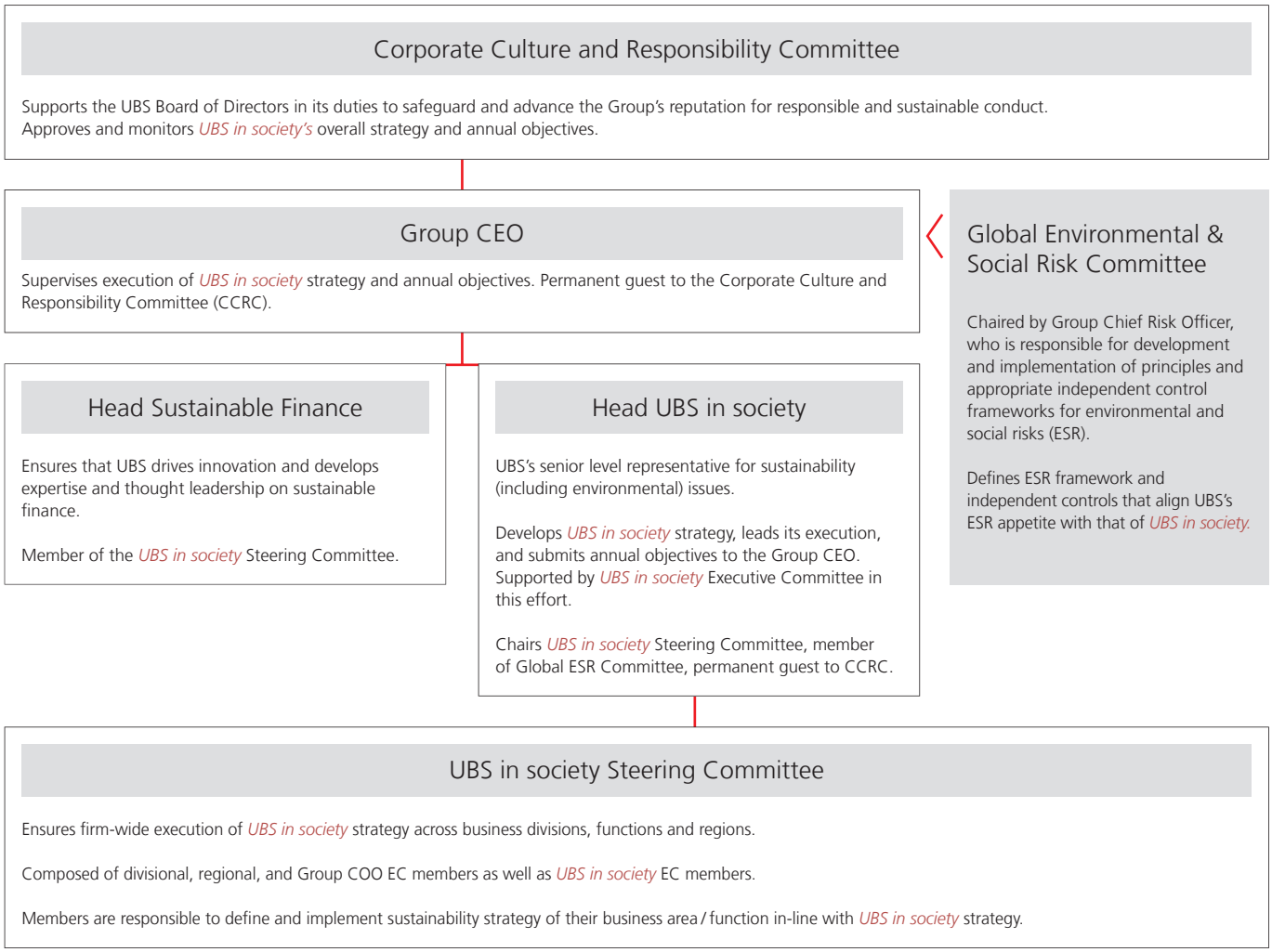
UBS policies and principles pertaining to (political, charitable, sponsorship) contributions

UBS has in place appropriate policies on political donations, which set out the principles (including by referencing UBS's anti-corruption standards) and approval processes for corporate political donations made on behalf of UBS or its entities and their respective approval processes.

UBS's community interaction (i.e., charitable contributions and employee volunteering) is guided by a global policy, which governs the responsibilities for Community Affairs activities within UBS and represents the official guidelines for all employees to follow. It defines the governance, principles, responsibilities, focus themes, criteria (including on anti-corruption and anti-bribery), financial planning framework as well as due diligence requirements applicable to all Community Affairs activities and all financial contributions to non-profit organizations and social enterprises made by UBS.

Our sponsorship activities are guided by a group-wide governance document which describes how the UBS policy on brand & marketing should be implemented in sponsorship and events. The document clarifies roles and responsibilities (including as regards anti-corruption and anti-bribery), describes ways of working and is intended to ensure effective and efficient cooperation among the various stakeholders.

Sustainability governance



Our climate strategy – taking action towards a low-carbon future

Climate action – a snapshot

Nearly five years have passed since the adoption of the Paris Agreement on Climate Change (the Paris Agreement). Collective progress towards achieving the goals of the Paris Agreement will be assessed in a global stocktake in 2023, acknowledging the 2 °C benchmark and the more recent 1.5 °C limit in global warming urged by the Intergovernmental Panel on Climate Change (IPCC) in its 2018 special report. Achieving the Paris Agreement goals demands unprecedented levels of investment. In terms of the current state of climate action, there is a recognized climate finance gap as well as a Sustainable Development Goals (SDGs) investment gap – to meet the low-carbon transition targets. At the same time, we see a clear investor appetite for directing capital toward a low-carbon future. To support in scaling up collective action, UBS assists private and institutional clients in their desire to invest in accordance with their social and environmental objectives, thus helping to close the gap.

We aspire to drive positive change in society and the environment for future generations. Our climate strategy underlines our commitment to the SDGs on climate action and on affordable and clean energy as well as the Paris Agreement. These key UBS commitments are embedded in the United Nations (UN)-backed Principles for Responsible Banking (PRB). This global framework specifies the role of banks in supporting a sustainable future and scaling up their contribution to the achievement of both the SDGs and the Paris Agreement. UBS became a founding signatory of the PRB in September 2019.

We regularly report on the implementation of our climate strategy and follow the recommendations provided by the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD). The recommendations call on companies to disclose the impacts of climate change on their businesses. This will allow investors and financial institutions to make better investment decisions with a common set of data to assess the climate-related risks and opportunities of specific companies. We are committed to aligning our climate disclosure within the five-year pathway outlined by the TCFD (until end of 2022) and to collaborating within the industry to close gaps.

We publicly support international, collaborative action against climate change. Our Chairman is a signatory to the European Financial Services Round Table's statement in support of a strong, ambitious response to climate change. Our Group CEO is a member of the Alliance of CEO Climate Leaders, an informal network of CEOs convened by the World Economic Forum and committed to climate action. Our Head Sustainable Equity Team within UBS Asset Management (AM) is a member of the TCFD.

Our climate-related achievements have been recognized by external experts. For the fifth year running, UBS has been named the best performer in the Diversified Financial Services and Capital Markets Industry of the Dow Jones Sustainability Indices (DJSI), the most widely recognized corporate sustainability rating. CDP, which runs a global disclosure system that enables companies, cities, states and regions to measure and manage their environmental impacts, has awarded UBS with Leadership status and a A- rating on climate change. In 2019, ShareAction, an international organization focused on advancing responsible investment, awarded UBS as the best performing asset manager in climate proxy voting in its report, "Voting matters – Are asset managers using their proxy votes for climate action?"

Climate-related highlights

- Our climate strategy underlines our commitment to the SDGs on climate action and on affordable and clean energy and supports an orderly transition to a low-carbon economy, as defined by the Paris Agreement.
- Our exposure to carbon-related assets on our banking balance sheet is low, at 0.8% or USD 1.9 billion as of 31 December 2019, decreasing further from 1.6% at the end of 2018 and 2.8% at the end of 2017.
- Our climate-related sustainable investments increased to USD 108 billion in 2019 from USD 87.5 billion in 2018.
- We actively engaged on climate topics with 50 oil & gas and utilities companies, and voted on 44 climate-related shareholder resolutions.
- We reduced our firm's greenhouse gas (GHG) footprint by 71% by 2019 compared with 2004 levels. We were awarded top ratings and rankings by external experts; climate industry group leader (Dow Jones Sustainability Indices); Climate A- rating (CDP) and best performing asset manager in proxy voting (ShareAction, 2019).

Climate governance

As embedded in the Organization Regulations of UBS Group AG, the Board of Directors' (BoD) Corporate Culture and Responsibility Committee (CCRC) oversees our climate strategy. Within the parameters set by the CCRC, the *UBS in society* Steering Committee ensures firm-wide execution of the climate strategy while our firm's climate-related risk appetite is set by the Global Environmental & Social Risk (ESR) Committee. In joint meetings, the CCRC and the BoD's Risk Committee regularly and critically review the assessments and steps taken by these management bodies towards executing our climate strategy. The CCRC approves UBS's annual climate-related objectives and oversees the progressive alignment of our climate disclosure with the TCFD recommendations. These annual plans and objectives are managed as part of our ISO 14001-certified environmental management system (EMS) with defined management accountabilities across the firm. The EMS helps us to systematically reduce environmental risks, seize market opportunities and continuously improve our environmental and climate performance and resource efficiency.

→ **Refer to the "Sustainability governance" graph in this section**

Climate strategy

As one of the world's largest managers of private and institutional wealth, we play an active role in shaping a sustainable future. As with the SDGs, we aim to be a leading financial provider in enabling investors to mobilize private and institutional capital to climate change mitigation and adaptation while supporting the transition to a low-carbon economy. At UBS we see a clear investor appetite for directing capital in climate solutions. We address this by continuously developing our offering in sustainable finance and actively engaging with clients. Our climate strategy supports our clients and our firm preparing for success in an increasingly carbon-constrained world.

We support this goal through our innovative financial product offering and advisory, as well as through embedding climate risk in our firm-wide risk management framework and in our own operations. Our climate strategy focuses on four pillars:

- Protecting our own assets: We seek to protect our assets by limiting our risk appetite for carbon-related assets and by estimating our firm's vulnerability to climate-related risks using scenario-based stress testing approaches and other forward-looking portfolio analyses. We have reduced carbon-related assets on our balance sheet to 0.8% or USD 1.9 billion as of 31 December 2019, down from 1.6% at the end of 2018 and 2.8% at the end of 2017.
- Protecting our clients' assets: We support our clients' efforts to assess, manage and protect them from climate-related risks by offering innovative products and services in investment, financing and research. We actively engage on climate topics with companies that we invest in; AM has implemented an engagement program with 50 companies from oil and gas and utilities sectors and we voted on 44 climate-related shareholder resolutions during 2019.
- Mobilizing private and institutional capital: We mobilize private and institutional capital towards investments facilitating climate change mitigation and adaptation and in supporting the transition to a low-carbon economy as corporate advisor, and/or with our lending capacity. In 2019, our climate-related sustainable investments rose to USD 108 billion from USD 87.5 billion at the end of 2018, and the deal value in equity and debt capital market services, and in financial advisory services, related to climate change mitigation and adaptation, rose to USD 87.2 billion, from USD 56.5 billion in 2018.
- Reducing our direct climate impact: We continue to reduce our greenhouse gas (GHG) emissions and increase the firm's share in renewable energy. We have committed to using 100% renewable electricity by mid-2020. This will reduce our firm's GHG footprint by 75% compared with 2004 levels. At the end of 2019, we had reduced our GHG emissions by 71% compared to baseline year 2004.

→ **Refer to " "Our focus on ESG" in the "How we create value for our stakeholders" section for more information about our sustainable investments**

→ **Refer to "In-house environmental management" in the "Driving change in business" section for more information**

Climate risk management

The physical and transition risks of climate change contribute to a structural change affecting banks and the financial sector at large. In order to protect our own and our clients' assets from climate-related risks, we continue to drive the integration of climate-related risk into our standard risk management framework. This framework involves procedures and tools for identifying, assessing and monitoring environmental and social risks in our standard risk, compliance and operations processes. These include client onboarding, transaction due diligence, product development and investment decision processes, own operations, supply chain management and portfolio reviews. These processes are geared toward identifying clients, transactions or suppliers potentially in breach of our standards or otherwise subject to significant environmental and human rights controversies, including climate change.

In 2019, we embedded climate risk into our risk taxonomy and operational risk appetite statement, further reduced our exposure to carbon-related assets and, more broadly, to climate-sensitive sectors. We also refined our ability to estimate the firm's vulnerability to climate-related risks using forward-looking scenario-based approaches, and revised our standards in the energy and utilities sectors.

→ **Refer to the "Climate-related standards in the energy and utilities sectors" table below**

→ **Refer to "Scenario analysis" further below**

Climate-related standards in the energy and utilities sectors

Coal	**Coal-fired power plants**	Not providing project-level finance to new coal-fired power plants globally. Only supporting financing to transactions of existing coal-fired operators (>30% coal reliance) who have a transition strategy in place that aligns with a pathway under the Paris Agreement, or the transaction is related to renewable energy.
	Coal mining	**New:** Not providing financing where the stated use of proceeds is for greenfield[1] thermal coal mines. Continuing to severely restrict lending and capital raising to the coal mining sector.
	Mountaintop removal (MTR)	Not providing financing to coal mining companies engaged in MTR operations.
Oil and gas	**Arctic oil and oil sands**	**New:** Not providing financing where the stated use of proceeds is for new offshore oil projects in the Arctic or greenfield[1] oil sands projects. **New:** Only provide financing to companies which have significant reserves or production in arctic oil and/or oil sands (>30% of reserves or production) where the stated use of proceeds is related to renewable energy or conventional oil & gas assets.
	Liquefied natural gas (LNG) and ultra-deepwater drilling	**New:** Transactions directly related to LNG infrastructure assets are subject to enhanced Environmental & Social Risk (ESR) due diligence considering relevant factors such as management of methane leaks, and the company's past and present environmental and social performance. **New:** Transactions directly related to ultra-deepwater drilling assets are subject to enhanced ESR due diligence considering relevant factors such as environmental impact analysis, spill prevention and response plans, and the company's past and present environmental and social performance.

1 Greenfield means a new mine / well or an expansion of an existing mine / well which results in a material increase in existing production capacity.

Scenario analysis

We have been using scenario-based approaches since 2014 to assess our exposure to physical and transition risks associated with climate change. We have performed both top-down balance sheet stress testing (across the firm), as well as targeted, bottom-up analysis of specific sector exposures in short, mid-, and long-term horizons. The table below summarizes the UBS scenario assessments performed to date.

Scenario assessments

	Assessment	Year	Scenarios used	Outcomes
In-house scenario analysis	**Top-down**			
	UBS climate stress test to assess UBS's vulnerability (balance sheet, operational income and physical assets) to climate change.	2014	Climate scenario developed in-house	Moderate financial impact in line with other stress scenarios, such as those that foresee an oil shock.
	Bottom-up			
	Assessment on exposure of loan portfolios secured by real estate to climate-related hazards.	2015	Climate scenario developed in-house	Low financial impact due to insurance coverage and loan maturity profile.
	Assessment on impacts of changing oil, gas and coal prices on oil, gas and electric utilities credit portfolios.	2015	Climate scenario developed in-house	Low financial impact due to high quality and maturity profile of portfolio.
Industry collaboration	Drought stress test (Natural Capital Finance Alliance tool) on UBS's energy portfolio.	2017	Based on historic academic precipitation observations	No significant production impact from drought.
	UNEP FI TCFD pilot project for banks: standardizing climate risk identification and translating climate risks into credit impacts. Testing in 2019 focused on our power utilities credit portfolio, work on other sectors continues in 2020.	2018 – 2020	Integrated Assessment Modelling Consortium (IAMC)	No significant credit loss from transition risks in 1.5 and 2 degree scenarios, nor from physical risks in 2 and 4 degree scenarios.
	Paris Agreement Capital Transition Assessment (PACTA): testing alignment of corporate lending portfolios with Paris Agreement benchmarks.	2019 – 2020	• IEA[1] • B2DS[2] • SDS[3] • NPS[4] • CPS[5]	Low lending exposure to high-carbon sectors.

1 International Energy Agency (IEA), World Energy Outlook 2 Beyond 2 Degrees Scenario 3 Sustainable Development Scenario 4 New Policies Scenario 5 Current Policies Scenario

Our initial (2014) top-down approach consisted of a scenario-based stress test to assess UBS's balance sheet vulnerability across the firm. Leveraging our existing firm-wide top-down stress testing methodology, we developed a climate change scenario (which assumes that severe weather events result in governments around the world agreeing to implement carbon pricing mechanisms to assess the impact on financial assets, operational income and physical assets). The scenario anticipated that these mechanisms will prompt a shift away from coal and other fossil fuels to cleaner alternatives and adversely impact markets and gross domestic product. Our subsequent (2015) bottom-up analyses of oil and gas utilities as well as electric utilities loan portfolios consisted of a forward-looking analysis to assess impacts of a long-term low fossil fuel price scenario resulting from policies promoting greater use of renewables, enhancing efficiency standards and limiting emissions. We calculated the impact this scenario would have on company probability of default and aggregated company-level results at the portfolio level to assess changes to expected loss. We also assessed the vulnerability of loan portfolios secured by real estate in Switzerland and the US to physical risk by mapping the location of collateral in over 6,000 postal code areas against Swiss Re's CatNet tool, which aggregates a large dataset of observed natural hazards such as wildfire, river and pluvial flooding and tropical cyclones.

From both top-down and bottom-up approaches, our internal stress tests suggested no immediate threat to UBS's balance sheet. However, we identified methodological challenges ranging from the suitability of climate scenarios for banking risk modelling to data availability. To address these challenges, 16 banks, including UBS, the UN Environment Programme Finance Initiative (UNEP FI), the Integrated Assessment Modelling Consortium (IAMC), and risk consultancies Oliver Wyman and Acclimatise began a collaboration of several years in 2018. The objective is to develop analytical tools that help banks define and disclose climate-related risks and opportunities as envisioned by the TCFD. This includes developing and further refining scenario-based stress-testing methodologies. Now in its second phase, the UNEP FI TCFD working group for banks has grown to 35 banks and has expanded the development of these analytical tools to include a range of possible scenarios, further advancement on scenario-based stress testing methodologies, and standardization between institutions on what defines climate-sensitive activities. These advancements aim for banks to more robustly identify and disclose exposure to climate-related risks and opportunities.

In addition to the UNEP FI TCFD working group, UBS is one of the pilot banks testing the Paris Agreement Capital Transition Assessment (PACTA). In the context of the PACTA pilot, we studied the alignment of select climate-sensitive sectors in our corporate credit portfolio with Paris Agreement benchmarks. The methodology provides an assessment of a bank's credit-financed activities in relation to the global shift to a low-carbon economy. For example, the assessment showed that the fuel mix in UBS' s power utilities credit portfolio, according to the PACTA methodology, is significantly less carbon intensive than the global corporate economy, as of 2019 (see "PACTA methodology for power generation" further below). However, the limitations of the outputs from this assessment are very similar to the other pilots and we will continue to work on improving methodology, data availability and scenario applicability.

Both pilots promote industry learning and provide guidance for disclosing climate-related risks and opportunities in line with TCFD recommendations. Overall, the results of the 2019 climate risk pilots have confirmed findings from our previous pilot stress tests on climate, which started in 2014: we have so far not identified significant climate-related financial risk on our balance sheet. We explain this by UBS's relatively small lending book in climate-sensitive-sectors (see "UBS corporate lending to climate-sensitive sectors 2019" further below) and availability of insurance where we have relevant exposures to such sectors (e.g., Swiss mortgage lending book).

Protecting our clients' assets

We help our clients assess, manage and protect their assets from climate-related risks by offering innovative products and services in investment, financing and research. AM has developed a suite of products allowing clients to identify the carbon intensity of their investments and/or to align them with the Paris Agreement: In 2017, AM together with the New Employment Savings Trust launched a strategy called *Climate Aware* with an aim to do more than manage investments based on carbon foot-printing. In 2018, AM followed its successful UK *Climate Aware* rules-based fund with an Irish-based fund that is available for international investors outside of the UK. The portfolio is oriented towards companies that are better prepared for a low-carbon future while reducing exposure to, rather than excluding, companies with higher carbon risk, in order to pursue strategic engagement with these companies. The strategy involves not only a reduction of the CO_2 footprint of the portfolio but also an innovative approach to aligning the portfolio with the 2 °C carbon reduction scenario.

Finally, AM empowers equity portfolio managers to examine the carbon footprint of their portfolios and compare the relative carbon footprints of their company holdings to that of the benchmark.

Engagement

On behalf of clients, AM engages with companies it invests in to discuss approaches to mitigating climate-related risk. AM also actively votes on shareholder resolutions to improve transparency and disclosure around climate-related reporting. Specifically in the context of its *Climate Aware* fund, AM has implemented an engagement program with 50 oil and gas companies as well as utilities companies underweighted in the fund. Communication with these companies aims at improving their disclosure and performance alignment with the TCFD recommendations. Engagement also makes it possible to share the results of the quantitative and qualitative assessments included in the fund methodology with investee companies. This allows for the verification of company performance with additional information collected before and after meetings. It also means AM can collect feedback, explicitly communicate objectives for change in corporate practices and further enhance the model used to inform the under- / overweights in the strategy.

AM is also involved in Climate Action 100+, a collaborative engagement initiative launched in December 2017. Its aim is to engage with high-level greenhouse gas emitters, and other companies across the global economy, that have significant opportunities to drive the clean energy transition and help achieve the goals of the Paris Agreement. It has the support of 320 investors, representing more than USD 33 trillion of assets under management (at end of 2019). AM is directly involved in 30 coalitions of investors (at the end of 2019) within Climate Action 100+ and leads seven of the company dialogues across regions. Whether AM is a lead or participating investor, it is an active member of these coalitions, providing feedback on the climate change performance of companies, the discussion agenda, engagement goals and the progress of these dialogues.

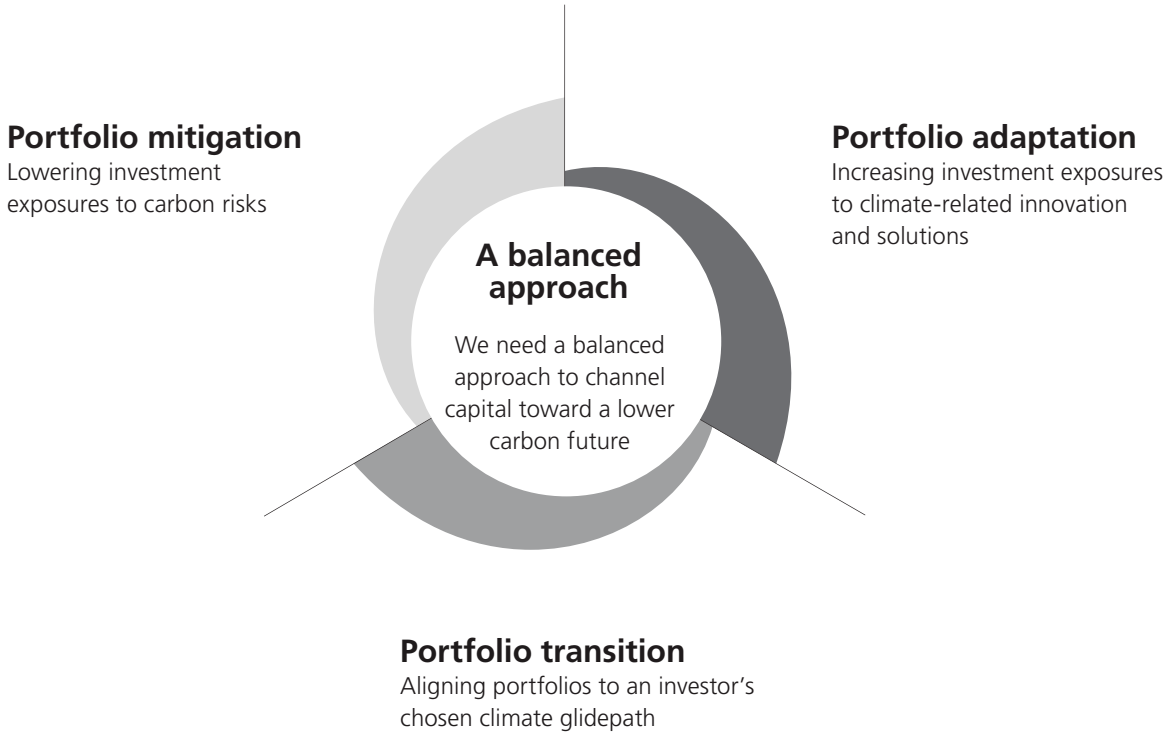
Opportunities

We mobilize private and institutional capital for investments that facilitate climate change mitigation and adaptation. UBS supports the orderly transition to a low-carbon economy as corporate advisor, and/or with its lending capacity.

As we outlined in our 2020 white paper for the World Economic Forum annual meeting, "Becoming climate aware: Mobilizing capital to help meet climate change goals", we have formulated a *Climate Aware* framework which helps investors align their portfolios towards a climate-smart future. The framework is built on the methodology which underlies UBS-AM's *Climate Aware* strategy. The main characteristics of the framework are:

- Portfolio mitigation: Lowering investment exposures to carbon risk
- Portfolio adaptation: Increasing investment exposure to climate-related innovation and solutions
- Portfolio transition: Aligning portfolios to an investor's chosen climate glidepath

A Climate Aware framework for investors



Portfolio mitigation

Based on our experience, maintaining a balance between required investment returns and minimizing climate risks works most effectively when investors integrate climate change considerations into a diversified portfolio. Similar to ESG integration, this is an important element in understanding the specific effects of climate change. As TCFD has highlighted, these can be viewed as regulatory, market, technology and physical risks. How they play out at the level of markets, industry sectors and individual issuers depends on an interplay of:

- regulation;
- commercial considerations;
- impact of technology on business models, revenues, costs and capital requirements.

Integrating these three aspects puts the focus on the most material issues relating to the reduction of emissions generated by the most carbon-intensive sectors. It also leads to a deeper and more investment-relevant understanding of the physical risks.

Portfolio adaptation

Investing for a low-carbon future hinges on the ability to invest in, and fund, new technologies and solutions. The key investing areas relate to GHG emissions reduction, energy transition, and energy efficiency. They include companies that manufacture and deploy these technologies as well as the infrastructure and services that make these achievable at scale. There are variety of developments in business structure, asset ownership, supply chains and delivery models that may be deployed as part of the climate change transition. It is also important to recognize that there are different kinds of investors that are better-placed for certain kinds of investments. Venture capital, private equity, real estate, public equity and public fixed income all have different appetites for technology risk.

Portfolio transition

It is important for investors to understand the difference between where they are now and the possibilities of the climate transition. Scenario analysis is emerging as a response to the uncertainties of climate change. Engagement, meanwhile, provides an opportunity for investors to encourage good corporate practice and, together with voting, keep management accountable for the actions needed to keep pace with the climate transition. It also allows investors to understand the investment dynamics in individual sectors and countries and determine the overall direction of travel. By applying the tools of scenario analysis and engagement, investors are better able to manage the transition to a climate-smart future.

AM is also a member of the Institutional Investors Group on Climate Change (IIGCC) Climate Action 100+ European Advisory Group, which advocates for the world's transition to a low-carbon economy.

Our other business divisions also translate this strategic thinking on climate into concrete products and services. UBS offers 100% sustainable discretionary mandates and asset allocation funds based on an innovative dedicated Sustainable Investing Strategic Asset Allocation for private clients in Global Wealth Management (GWM) and Personal & Corporate Banking (P&C). These include an explicit allocation to strategies that aim at mitigating climate change, such as green bonds and thematic investments, but also others that contribute indirectly to climate change mitigation such as Multilateral Development Bank bonds, ESG leaders and ESG improvers. GWM developed a new advisory solution that includes an explicit climate change dimension, allowing clients to tilt their portfolios towards the issues they care about. Ultimately our goal in developing new products and services is to ensure that all material risks and opportunities are addressed, and to allow clients to select sustainable investments aligned to their interests while receiving financial returns in line with traditional investment approaches.

GWM integrates sustainability assessments, focusing on the sustainability intentionality of fund managers, into all fund and ETF onboardings. We have set a target of directing USD 5 billion of client assets by the end of 2021 into new impact investments contributing to the SDGs. These investments include a significant climate component. GWM's mutual fund and ETF offering includes climate-focused investment strategies, comprising those focused on clean / alternative energy.

We participated in launching, and have an ongoing partnership with, Align17, an independent, third-party digital marketplace. Align17 stands out in connecting a wider range of public, institutional, and private wealth investors with SDG-related investment opportunities. These opportunities are available to qualifying UBS clients and often serve to finance climate-related projects.

Our AM and GWM businesses have in place a comprehensive approach to address environmental, social and corporate governance factors across investment disciplines. For example, sustainability themes are embedded in GWM's equity research processes, while AM's Real Estate and Private Markets has developed a Responsible Investment Strategy to enhance investment performance of mandates for direct and indirect real estate and infrastructure investments. The 2019 GRESB (formerly Global Real Estate Sustainability Benchmark) awarded 15 out of 20 of AM's submitted real estate and infrastructure funds 5-star ratings with the remaining funds achieving a 4-star rating.

Our Investment Bank provides capital-raising and strategic advisory services globally to companies that make a positive contribution to climate change mitigation and adaptation, including those in the solar, wind, hydro, energy efficiency, waste and biofuels, and transport sectors. In 2019, the deal value in equity or debt capital market services, and of financial advisory services, related to climate change mitigation and adaptation, rose to USD 87.2 billion, from USD 56.5 billion in 2018.

We strive to be the preferred strategic financial partner relating to Switzerland's Energy Strategy 2050. In 2019, P&C supported 12 strategic transactions in support of the strategy. The UBS Clean Energy Infrastructure Switzerland strategy offers institutional investors unprecedented access to a diversified portfolio of Swiss Infrastructure facilities and renewable energy companies. Due to clients' demand, a successor strategy was launched in September 2017. In our P&C business we have also integrated Sustainable Investing Advisory into the strategic dialogue with our institutional clients.

To support philanthropists entering the climate space, UBS Optimus Foundation and the Climate Leadership Initiative (CLI) have developed four principles for effective climate philanthropy. CLI was created by six of the top climate donors this year with the express goal of making it easier for new philanthropists to learn, become connected to peers and experts and join the fight.

The four principles are Understand Climate Solutions and Impact; Collaborate and Take Action Swiftly; Be Prepared to Stick With It; Marshall All Your Resources.

Climate-related metrics

In 2019, we have again significantly reduced the share of our carbon-related assets to 0.8%, down from 1.6% in 2018 (and 2.8% in 2017). More broadly, our share of exposure to climate-sensitive sectors has reduced in 2019 to 15.5% from 19.6% in 2018 (% of total gross banking exposure across IB and P&C).

Climate-related sustainable investments increased to USD 108 billion, up from USD 87.5 billion in the previous year. At the end of 2019, we had reduced our GHG emissions by 71% compared to baseline year 2004.

Climate-related metrics 2019

	For the year ended			% change from
	31.12.19	31.12.18	31.12.17	31.12.18
Risk management				
Identified significant climate-related financial risk on balance sheet[1]	None	None	None	
Carbon-related assets (USD bn)[2]	1.9	3.2	5.8	(41)
Proportion of total banking products exposure, gross (%)	*0.8*	*1.6*	*2.8*	
Total exposure to climate-sensitive sectors (USD bn)[3]	37.6	38.6	42.6	(3)
Proportion of total banking products exposure, gross (%)	*15.5*	*19.6*	*20.5*	
Weighted carbon intensity of the Climate Aware equities strategy (in tons CO_2e per million of USD revenue) [4]	74.8	95.6	117.5	(22)
Compared to benchmark (FTSE Developed World Index) (%)	*(56.0)*	*(55.7)*	*(44.0)*	
Number of climate-related shareholder resolutions voted upon	44	43	34	2
Proportion of supported climate-related shareholder resolutions (%) [5]	*81.8*	*88.0*	*82.0*	
Opportunities				
Climate-related sustainable investments (USD bn)[6]	108.0	87.5	74.0	23
Proportion of UBS clients' total invested assets (%)	*3.0*	*2.8*	*2.3*	
Total deal value in equity or debt capital market services related to climate change mitigation and adaptation (CCMA)[7] (USD bn)	52.7	31.6	44.3	67
Total deal value of financial advisory services related to CCMA (USD bn)	34.5	24.9	5.5	39
Number of strategic transactions in support of Switzerland's Energy Strategy 2050	12	8	4	50
Own operations				
GHG footprint (kilotons CO_2e)[8]	104	132	148	(21)
Percentage change from baseline 2004 (Target: -75% by 2020) (%)	*(71.2)*	*(63.4)*	*(59.0)*	

1 Methodologies for climate-related financial risk are emerging and may change over time, as described earlier under Scenario Analysis. 2 Carbon-related assets exposures are adjusted from previous years' versions to align with IFRS 9: Banking products across Investment Bank and Personal & Corporate Banking. IFRS 9 gross exposure including other financial assets at amortized cost, but excluding cash, receivables from securities financing transactions, cash collateral receivables on derivative instruments, financial assets at FVOCI, irrevocable committed prolongation of existing loans and unconditionally revocable committed credit lines and forward starting reverse repurchase and securities borrowing agreements. As recommended by the TCFD, carbon-related assets are defined as assets tied to the energy and utilities sectors (Global Industry Classification Standard). Non-carbon-related assets, such as renewables, water utilities, and nuclear power are excluded. For grid utilities, the national grid mix is applied. 3 Gross banking products across Investment Bank and Personal & Corporate Banking (IFRS 9). Climate-sensitive sectors defined as inventory of activities with higher vulnerability to transition and physical climate risks, for more see in-text description. 4 Year-on-year decrease of carbon intensity is mainly driven by higher carbon targets of the investment strategy. Carbon intensity is based on scope 1 and 2 CO_2 emissions of investee companies, which often rely on third-party estimates. 5 On all proposals that we supported, we voted against the recommendation provided by the issuer. 6 Invested assets of products such as sustainably managed properties and infrastructure, and renewable energy. 7 Refer to "Calculating and reporting on climate change-related financing and advisory activities" in the Appendix of this document. 8 GHG footprint equals gross GHG emissions minus GHG reductions from renewable energy and GHG offsets (gross GHG emissions include: direct GHG emissions by UBS; indirect GHG emissions associated with the generation of imported / purchased electricity (grid average emission factor), heat or steam and other indirect GHG emissions associated with business travel, paper consumption and waste disposal). A breakdown of our GHG emissions (scope 1, 2, 3) is available in the in-house environmental section in this document.

UBS corporate lending to climate-sensitive sectors 2019

UBS is leading an effort, with UNEP FI and peer banks, to define an inventory of climate-sensitive activities based on TCFD, regulators' and rating agencies' climate risk definitions. The current inventory is summarized in the table below at the sector level.

UBS corporate lending to climate-sensitive sectors 2019

banking products across Personal & Corporate Banking and the Investment Bank	As of 31.12.19	
USD million, except where indicated	Gross exposure[2]	Share of total exposure to all sectors (%)
Climate-sensitive sector [1]		
Aerospace and defence [3]	2,115	0.9
Automotive	449	0.2
Chemicals	1,052	0.4
Constructions and materials [4]	3,993	1.6
Food and beverage [5]	2,460	1.0
Industrial Materials [6]	345	0.1
Machinery and equipment [7]	2,576	1.1
Mining [8]	3,000	1.2
Oil and gas [9]	1,415	0.6
Plastic and rubber	356	0.1
Primary materials [10]	332	0.1
Real estate [11]	15,031	6.2
Transportation [12]	3,272	1.3
Utilities [13]	1,186	0.5
Total exposure to climate-sensitive sectors	37,582	15.5
Total exposure to all sectors	242,565	100.0

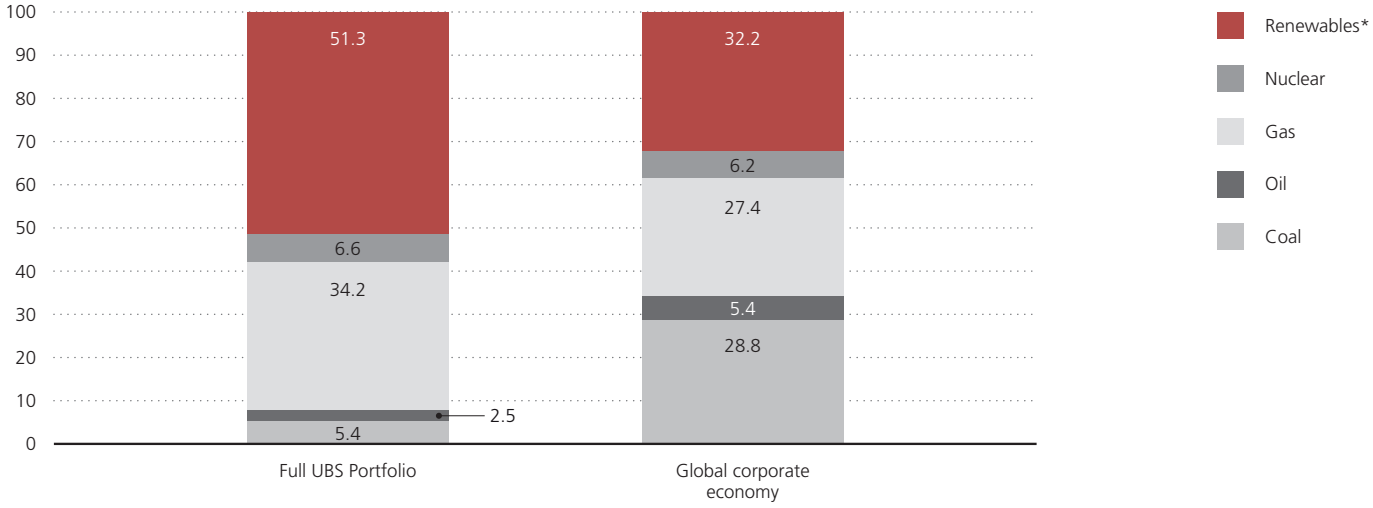
1 Climate-sensitive sectors defined as inventory of activities with higher vulnerability to transition and physical climate risks, for more see in-text description. 2 Banking products across the Investment Bank and Personal and Corporate banking divisions. IFRS 9 gross exposure including other financial assets at amortized cost, but excluding cash, receivables from securities financing transactions, cash collateral receivables on derivative instruments, financial assets at FVOCI, irrevocable committed prolongation of existing loans and unconditionally revocable committed credit lines and forward starting reverse repurchase and securities borrowing agreements. 3 Of which air transport: USD 1.9 billion 4 Of which construction: USD 3.2 billion, mfg. concrete / cement: USD 0.4 billion 5 Of which food / grain traders / wholesalers: USD 1.4 billion, mfg. food / bev: USD 1.1 billion 6 Of which mfg. iron / steel: USD 0.2 billion, mfg. pulp / paper: USD 0.06 billion 7 Of which mfg. metal products: USD 0.7 billion 8 Of which metal ore traders USD 2.7 billion, coal mining: USD 0.02 billion 9 Of which upstream extraction: USD 1.1 billion, integrated O&G: USD 0.2 billion 10 Of which agriculture-related: USD 0.2 billion, forestry / wood: USD 0.02 billion 11 Of which development / selling real estate: USD 14 billion, agencies: USD 0.8 billion. In addition UBS has loans and advances to customers backed by residential real estate totaling USD 155 billion across Global Wealth Management and Personal & Corporate Banking 12 Of which shipping: USD 0.5 billion, mfg. trains: USD 0.8 billion, logistics / post: USD 0.5 billion 13 Of which prod. / dist. electricity: USD 0.8 billion (for a closer look at the carbon exposure of UBS's power utilities portfolio, see PACTA graph below), refuse / recycling: USD 0.2 billion, water collection / purification: USD 0.01 billion

PACTA methodology for power generation

In 2019 we further assessed select climate-sensitive sectors using the PACTA methodology. Results on power sector show that the technology mix of UBS' s power sector corporate lending portfolio is significantly less carbon intensive than the global corporate economy, as of 2019[1].

UBS corporate lending portfolio technology mix of production against global corporate economy

Capacity distribution across technologies
In %



* Renewables, including solar, wind, hydro, biofuels and others.

1 Across the Investment Bank and Personal & Corporate Banking, banking products only. As of 30.9.19, includes clients who are classified as power utilities. The methodology is driven by the 2° Investing Initiative's PACTA pilot.

Sustainability-related training and raising awareness

Overview

Throughout the year, we continued training and raising the awareness of employees, including with respect to embracing our Code of Conduct and Ethics (the Code). All employees have to confirm annually that they have read UBS's key documents and policies, including the Code.

We actively engage in internal and external education and awareness raising on corporate responsibility and sustainability topics and issues. Through induction, education and broader awareness-raising activities, we ensure that our employees understand their responsibilities in complying with our policies and the importance of our societal commitments.

UBS in society

UBS promotes employees' understanding of the goals and actions of *UBS in society* through a wide range of training and awareness-raising activities, as well as performance management. For example, in 2019, specialist training program on environmental and human rights topics (including sustainable investing) has been provided to approximately 14,000 employees in front-office and support functions who are dealing directly with the related aspects in every day's business processes. In addition, employee volunteering activities across all regions help raise awareness of *UBS in society* and our sustainability goals.

General information is published on our intranet and on our *UBS in society* internet site.

→ **Refer to the Appendix 2 for the UBS in society management indicators (including training numbers)**

Combating financial crime

All employees are required to complete financial crime training which covers anti-money laundering (AML), sanctions, fraud and anti-corruption. The training is mandatory and must be completed at least on an annual basis.

We regularly update web-based training modules to address compliance issues, including anti-corruption standards. Employees in specific areas also receive targeted training on client-related corruption, including the bank's own corruption risks in regard to intermediaries, gifts and entertainment or when major new developments require additional training.

→ **Refer to "Combating financial crime" in the "Driving change in business" section for more information about our AML and anti-corruption activities**

Sustainable performance and compensation

Total Reward Principles

Our compensation philosophy is to align the interests of our employees with those of our investors and clients, building on our three keys to success – our Pillars, Principles and Behaviors. Our Total Reward Principles establish a framework that balances sustainable performance, supporting our growth ambitions and prudent risk-taking with a focus on conduct and sound risk management practices.

Our compensation structure is aligned with our strategic priorities. It aligns the interests of our employees with those of our stakeholders and encourages our employees to focus on our clients, create sustainable value, deliver on our growth ambitions and achieve the highest standards of performance. Moreover, we reward behaviors that help build and protect the firm's reputation, specifically integrity, collaboration and challenge. We strive for client focus, excellence and sustainable performance in everything we do. Compensation for each employee is based on individual, team, business division and Group performance, within the context of the markets in which we operate.

Our Total Reward Principles apply to all employees globally. They may vary in certain locations according to local legal requirements and regulations.

Managing a high-performing workforce

Managing our people effectively is vital for our long-term success. As such, our global performance management process evaluates both performance and behavior. This helps us assess how well integrity, collaboration and challenge (the firm's expected behaviors) are demonstrated in daily business activities. It also makes our management, promotion and reward processes more transparent. For 2019, 99.9% of eligible employees received a performance review.

To help us attract and retain a skilled global workforce, our pay is differentiated by location, rank and role. We pay for performance and are committed to ensuring that all employees are paid fairly, embedding pay equity principles into our compensation policies and practices. We conduct regular internal and external reviews, and we seek to address any unexplained gaps. Certain jurisdictions such as the UK may require specific disclosure on this topic, which we fully adhere to.

ESG in the compensation determination process

ESG (Environmental, Social and Governance) is considered in the compensation determination process in different phases through objective setting, performance award pool funding, performance assessment and compensation decision.

At the beginning of the year, objectives relative to Group, business divisions, Pillars, Principles and Behaviors are set. ESG-related objectives have been embedded in our Pillars and Principles since they were established in 2011. To maintain the focus on these important ESG topics, our Group CEO and other GEB members have specific ESG-aligned goals under Pillars and Principles including governance and risk management, talent management and diversity, client satisfaction and corporate responsibility. These include goals for reducing our carbon footprint and corporate waste, and progressing our philanthropic efforts.

In the performance award pool funding, ESG is reflected through the assessment of risks, such as legal, compliance, reputational and operational risks. Therefore ESG is taken into consideration when the Compensation Committee assesses not only what results were achieved, but also how they were achieved. These achievements versus the ESG-related goals are reflected in the qualitative performance assessment and affect the final compensation decision.

Objectives focusing on our key ESG commitments are also set for managers and employees in pertinent departments or units. Most notably, this includes managers and employees in investment, research and product development, *UBS in society*, anti-money laundering, human resources, environmental and Community Affairs functions.

Group Executive Board

Annual performance awards for the Group CEO and the other GEB members are based on the GEB compensation determination process and, in aggregate, subject to shareholder approval at the AGM. We assess the GEB members' performance against a number of financial targets and goals related to Pillars, Principles, and Behaviors. The financial measures for the Group CEO are based on overall Group performance. For the other GEB members, such measures are based on both Group performance and the performance of the relevant business division and/or region; those who lead Group functions are assessed on the performance of the Group and the function they oversee.

The weighting between Group, business division, regional and functional measures varies depending on a GEB member's role. A significant weight is given to Group measures for all GEB members. The achievements relative to goals related to Pillars and Principles are additional factors for assessing the overall quality and sustainability of the financial results. We have adjusted the metric and goal weightings and enhanced the transparency of the respective disclosure. New for 2019, the financial measures account for 70% of the assessment while Pillars and Principles account for 15% and Behaviors account for the remaining 15%.

Board of Directors

As set out in the Organization Regulations of UBS Group AG, BoD members, as a group, must have the necessary qualifications, skills and diversity to perform all BoD duties In particular, the BoD must together possess financial literacy, experience in banking and risk management, as well as international experience, including experience of international financial matters, and knowledge of the duties of directors.

At least every three years an external assessment of the effectiveness of the BoD is conducted. In each year when there is no independent external assessment, a thorough self-assessment is completed at the level of the BoD, while the committees perform self-assessments every year.

The results of the in-depth external assessment undertaken from end 2018 until May 2019 concluded that the BoD and its committees were operating effectively, in line with best practice and best in class in comparison with leading European peers. The final report did not raise any material issues, but did make a number of recommendations for consideration by the BoD. These led to minor adjustments in the BoD agenda and served as a source for the definition of the BoD's priorities for 2019/2020. Areas of particular focus for the BoD were strategy, growth and value creation, as well as succession planning. Furthermore, a particular focus remained on the oversight of the regulatory, risk and legal issues as well as on digital transformation. Environment, social and governance topics, in particular sustainability and the continued emphasis on cultural values were other key priorities.

→ **Refer to the "Corporate governance and compensation" section of the UBS Annual Report 2019 and the Organization Regulations of UBS Group AG available at *www.ubs.com/governance* for further information**

Materiality under GRI Standards

GRI-based materiality assessment

We put great emphasis on learning the views and values of our stakeholders with regard to the business activities of UBS and its role in society. Every year, we conduct a materiality assessment, as defined by the guidelines of the Global Reporting Initiative (GRI), to collect stakeholder views on key topics pertaining to our firm's economic, social and environmental performance and impacts. Our materiality assessment draws on formal and informal monitoring, from our dialog with stakeholders and from relevant external studies and reports.

Requested and supervised by the Corporate Culture and Responsibility Committee (CCRC), UBS's comprehensive materiality assessment process is managed by a UBS-internal, cross-business division and cross-regional materiality assessment team. The team consists of a group of experts who – due to their function – deal with stakeholder expectations and concerns on a daily basis. The team is responsible for delivering the outcome of the materiality assessment to the CCRC on an annual basis.

We also regularly invite stakeholders to directly share their views. In 2019, we did so through our biannual online survey that was completed by nearly 3,300 stakeholders, with clients being by far the largest stakeholder group. We plan to undertake a stakeholder survey again in 2021.

UBS materiality matrix 2019

The overall results of the materiality assessment are expressed in the UBS 2019 materiality matrix below. The matrix ranks topics by their relevance to UBS stakeholders and their impact on UBS's sustainable performance. Sustainable performance, one of UBS's three principles, signifies our focus on the long term and our efforts to provide consistent returns to our stakeholders.

For the 2018 materiality matrix, we substantially reduced the number of topics, including by subsuming several topics previously listed separately in the matrix (Combating financial crime; Financial stability and resilience; Cyber security; Conduct; Client protection) within the topic of Regulatory compliance and by merging topics. In 2019, we continued with this list of topics. Among the 13 topics, Regulatory compliance continues to be the most material, followed by, as in 2018, Client experience.

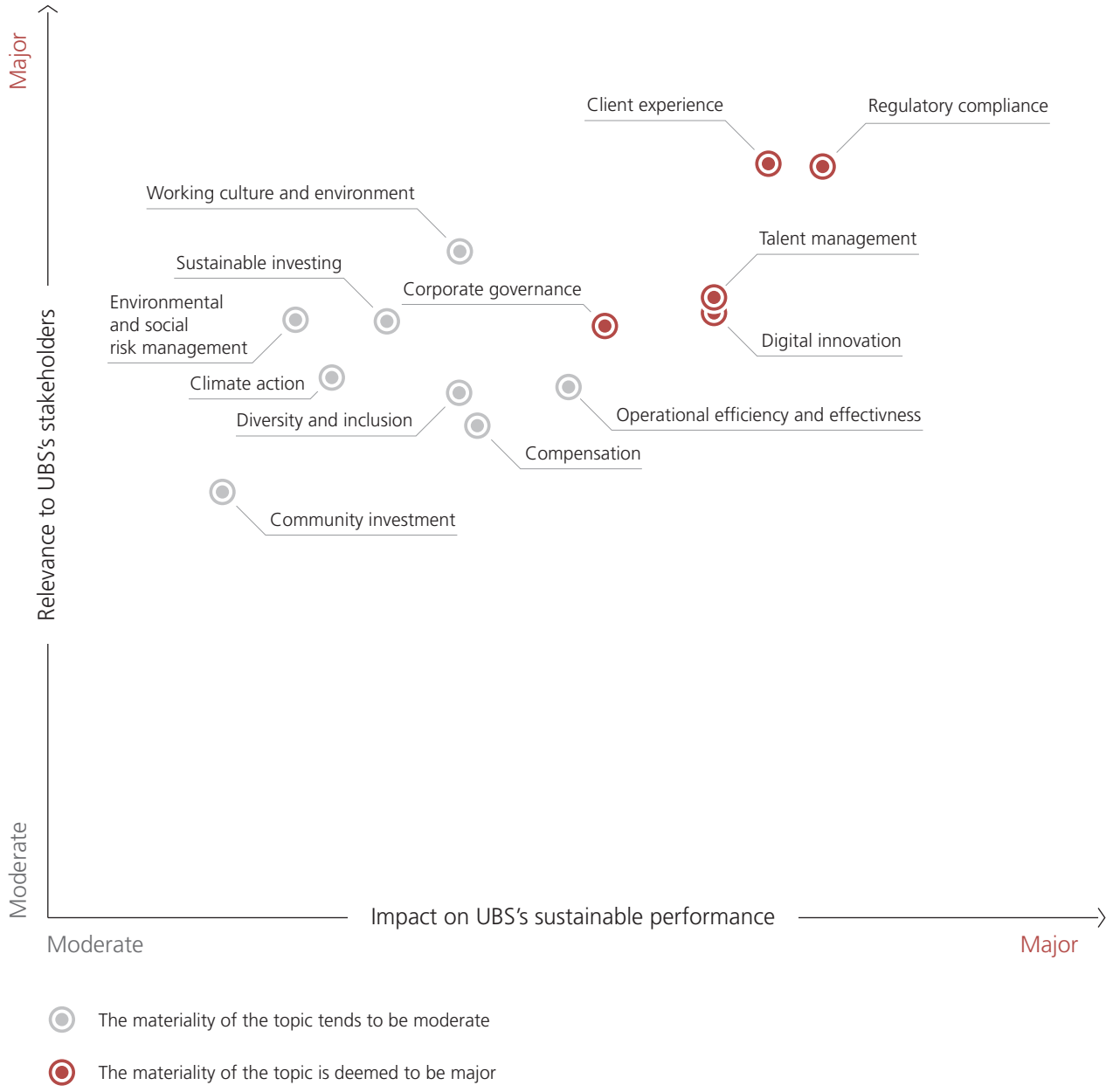
Our materiality assessment also included a consultation of internal experts on our firm's significant economic, environmental and social impacts. We concluded that these impacts are directly reflected in the topics deemed most material in the GRI-based materiality assessment and that they are overwhelmingly concerned with economic impacts. These topics fall within two significant impact areas of our firm: ensuring the provision of high-quality services to clients and actively managing potential major risks to clients as well as other stakeholders. Jointly, these two significant impact areas of our firm are reflected in the highly ranked topics of Regulatory compliance and Client experience.

→ **Refer to the Appendix 2 for a detailed overview of the impact of material GRI topics**

As shown in the matrix, stakeholders currently regard the impact of environmental and social topics as partly influencing their assessments and decisions. The relevance of these topics has, however, increased compared to 2018 and, with it, the probability that the relevance of some of these topics to UBS, notably Climate action and Sustainable investing will further increase in coming years.

As in previous years, the overall result of the assessment was reviewed by the CCRC. It also becomes part of the decision-making processes of this Board of Directors committee with a particular focus on those topics that were assessed as very relevant or have considerably increased their relevance since the preceding year.

UBS materiality matrix 2019



Material GRI topics 2019

For the purpose of the GRI Standards materiality assessment we map the GRI topics to UBS's materiality matrix and we identify the most material topics on the basis of their significance to stakeholders and their impact on sustainable performance.

All material topics are relevant to all entities consolidated within UBS. Information describing any relevant impacts of the topics outside UBS is provided as part of the description of the respective GRI indicator or material topic in the following pages.

The following table provides an overview of all topics on the UBS materiality matrix and their subtopics.

→ **Refer to the Appendix 2 for relevant management approaches**

Material topics	Sub topics	GRI topics
Governance		
Regulatory compliance	– client protection: data confidentiality; transparency (clear terms and conditions of products); fair pricing schemes; easy-to-understand products and services – combating financial crime: anti-corruption and anti-money laundering; crime and manipulation detection processes – conduct: compliance with laws, rules and regulations; integrity of the financial system; Code of Conduct and Ethics; forward-looking engagement with risk topics and risk prevention – cyber security; data confidentiality and cyber security – financial stability and resilience: going concern leverage ratio (phase-in, %); common equity tier 1 capital ratio; manage risk-weighted assets within increasingly stringent risk framework; clear strategy	GRI 417: Marketing and Labeling GRI 418: Customer Privacy GRI 205: Anti-corruption GRI 206: Anti-competitive Behavior GRI 419: Socioeconomic Compliance
Corporate governance	– internal policies and guidelines – governance structure – strategy	GRI 102: General Disclosures
Financial and economics		
Digital innovation	– innovation lab – digital transformation – digital product and service offering	
Operational efficiency and effectiveness	– cost and process efficiency – focus on core competencies – flexibility to adapt to changing regulatory environment – outsourcing / nearshoring / offshoring – automation – location strategy – product and execution excellence	GRI 201: Economic Performance
Client experience	– excellence – above-average performance – best services and practices	
Employees and workplace		
Compensation	– compensation structure – bonus and executive payments – reward long-term performance	GRI 401: Employment
Diversity and inclusion	– diverse work force – inclusive culture – equal employment conditions and opportunities – women in management – age diversity within teams – flexible working conditions – diverse client base	GRI 405: Diversity and Equal Opportunity GRI 406: Non-Discrimination GRI 419: Socioeconomic Compliance
Talent management	– talent attraction – employee training on particular skills – internal mobility – management of talent pipeline and succession planning – talent and leadership development programs – provision of apprenticeships and vocational training	GRI 404: Training and Education

Material topics	Sub topics	GRI topics
Working culture and environment	– behaviors – flexible working times – availability of remote working and/or home office – occupational health and well-being: work-life balance; health protection; health and safety of employees	
Environmental and social		
Climate action	– commitment and strategy for the topic of climate change – climate-related investments, financing and research – climate-related risk management – external disclosure on the topic – increasing energy efficiency and reducing our CO_2 emissions – reduction of resource (energy, paper, water) consumption and increased resource efficiency	GRI 201 Economic Performance GRI 302: Energy GRI 305: Emissions Financial Supplement (FS) Product Portfolio
Environmental and social risk management	– identify and manage potential negative effects on the environment and human rights – standards in environmentally and socially sensitive industries and activities – standards in product development, investments, financing and for supply chain management decisions – responsible supply chain management	FS Audit FS Product Portfolio GRI 308: Supplier Environmental Assessment GRI 414: Supplier Social Assessment
Community investment	– employee engagement through employee volunteering – support of non-profits, charitable organizations and social enterprises (positive impact on communities) – supporting education and entrepreneurship in local communities – financial inclusion	GRI 203: Indirect Economic Impacts
Sustainable investing	– sustainable finance – combination of societal and financial returns – sustainable investment criteria – impact investing – ESG integration – client foundation – philanthropy advisory	FS Product Portfolio FS Active Ownership

Driving change in finance

We strive to systematically incorporate the economic impacts of environmental, social and governance (ESG) issues into the products and services we provide to clients. We support corporate and institutional clients who want to generate positive environment and social impact using our corporate advisory expertise or by directing capital through our lending or investment capacity. We assist private and institutional clients in their desire to invest in accordance with their own social and environmental objectives and we are proactive in discussing these issues with them.

Sustainable investing

Sustainable investing (SI) is an approach that seeks to incorporate environmental, social and/or governance considerations into investment decisions. SI strategies seek to achieve one or more of the following objectives: achieve a positive environmental or social impact, align investments with an investor's personal environmental or social values, or improve portfolio risk and return characteristics.

As of 31 December 2019, our core SI assets increased to USD 488 billion (2018: USD 313 billion) representing 13.5% (2018:10.1%) of our total invested assets. The major driver behind this increase was the growth in the "ESG integration" and "sustainability focus" categories, which went up 65.9% and 132.4% respectively. Norms-based screening assets, i.e., assets that fall under the application of a UBS policy[1] and do not otherwise qualify as a core sustainable investment, amounted to USD 818 billion as of 31 December 2019 (up from USD 797 billion in 2018). Total sustainable investments, including norms-based screening assets, accounted for USD 1,306 billion (2018: USD 1,110 billion), or 36.2% (2018: 35.8%), of our total invested assets.

→ **Refer to "Our focus on ESG" in the "How we create value for our stakeholders" section for more information about our sustainable investing numbers**

In its efforts to achieve UBS's goal to be a leader in SI for private clients, Global Wealth Management (GWM) provides clients with a comprehensive set of SI solutions in its mandate and advisory offerings as well as through impact investments opportunities. We offer a suite of discretionary *UBS Manage* offerings with 100% (excluding liquidity) sustainable and impact investments available in our main booking centers worldwide. These offerings are based on our global Chief Investment Office's (CIO) UBS House View and align to its SI strategic asset allocation. In 2019, we successfully piloted our innovative *UBS Advice Premium [Sustainable Investing]* offering. Starting from January 2020, our clients in Booking Center Switzerland can express their sustainability preferences and receive, after appropriate fiduciary checks, investment recommendations that are personalized to their interests and values.

Our global CIO includes material ESG considerations in its investment research and regularly translates key societal and environmental concerns into investment themes as part of its Longer Term Investments series (aimed at investing in long-term solutions to key environmental and social challenges) and global *Research-based Advice*. In 2019, some notable examples of CIO perspectives were the World Economic Forum white paper aimed at encouraging the sustainable finance community to agree on common terminology and the launch of a new ESG data management methodology that combines insights from multiple data providers; the new ESG data framework also aligns with the Sustainability Accounting Standard Board's (SASB) materiality framework terminology. Simplifying and standardizing sustainable investment terminology is a crucial part of growing sustainable finance, which is why we partner with Blackrock and the Institute of International Finance to outline a simplified sustainable investing taxonomy. We also arrange networking platforms, roundtables and events for our clients to exchange ideas with one another.

We believe the private sector has a crucial role to play in bringing innovative solutions to some of the world's most pressing issues. This is why UBS supports social entrepreneurs, via the UBS Global Visionaries program, who are tackling some of the world's biggest social and environmental challenges. These *Global Visionaries* have been recognized by our teams in GWM for their plans to improve the world in areas such as health, education, equality and the environment. We connect these Global Visionaries with our clients, and UBS employees volunteer their time and expertise to help the Global Visionaries in their endeavors.

Asset Management (AM) has integrated sustainability into its entire investment approach. We are convinced that sustainable and impact investing can add value to portfolios within the same risk / return profile. Investment strategies customized to address particular sustainability objectives, such as reducing carbon risk or tilting a portfolio toward specific environmental, social or governance factors, in combination with traditional financial and risk / return expectations are increasingly popular. Over the last decade, we have developed capabilities to provide customized solutions to meet the specific goals and needs of individual investors. We offer a wide range of SI strategies across various asset classes, integrating sustainability and impact into our entire mainstream offerings, including in active equities, fixed income, hedge funds, infrastructure and private equity, real estate and passive strategies.

1 The assets in discretionary mandates, in UBS's actively-managed retail and institutional funds, as well as in our firm's proprietary trading book are subject to our firm's policy on the prohibition of investment on and indirect financing of companies involved in the development, production or purchase of anti-personnel mines and cluster munitions.

The Investment Bank provides industry-leading thematic and sector research in ESG / SI through a widely recognized team working closely with our global line-up of outstanding expert sector teams, and UBS Evidence Lab's primary research specialists. Our investment solutions include, for example, sustainable and socially responsible Index-linked notes. We offer capital-raising and strategic advisory services globally to companies that make a positive contribution to climate change mitigation and adaptation, including those in the solar, wind, hydro, energy efficiency, waste and biofuels, and transport sectors. In 2019, the total deal value in equity or debt capital market services relating to these areas was USD 52.7 billion, and USD 34.5 billion in financial advisory services.

Personal & Corporate Banking clients have access to appropriate and relevant sustainable investment products from AM and GWM that follow our Group-wide approach to SI. In addition, our sustainability analytics offering enables institutional clients to achieve full transparency by screening their portfolio for industry exposure. We also support energy utilities in raising capital on international capital markets to progress their quest for renewable energy. Furthermore, we support Swiss small and medium-sized enterprises (SMEs) in their energy-saving efforts and transition to a low-carbon economy. SMEs benefit from initiatives such as energy check-ups or leasing bonuses (financial contributions toward enhancing environmental performance) for production machines. In addition, we support Swiss start-ups in developing innovative circular economy solutions.

Having the financial expertise, networks and access to the capital required to build or support innovative financial products, we remain committed to introducing and funding innovative financial solutions. Examples include the *SDG Engagement High Yield Credit funds* (in co-operation with Federated Investors and Hermes Investment Management); the *Climate Aware Equity (TTF)*, the *UBS Managed Portfolio* of Sustainable Investments, and our partnership with Align 17.

As of 31 December 2019, we also held green and social bonds in the amount of USD 867 million in our high-quality liquid assets portfolios under the management of Group Treasury.

→ **Refer to the table *Key sustainable investing products and services in 2019* on the following pages for further information**

→ **Refer to *www.ubs.com/globalvisionaries* for more information about UBS Global Visionaries**

Stewardship / voting rights

UBS Asset Management's stewardship policy is our commitment to act as responsible stewards of assets held and managed on behalf of our clients. We recognize that clients expect us to ensure the alignment of our approach with their own investment beliefs, policies and guidelines. We have a strong interest in ensuring that companies in which we invest on behalf of clients are successful, and through our stewardship activities we seek to encourage a high standard of corporate practices, develop a relationship with investee companies and an understanding of mutual objectives and concerns. In addition, where clients of AM have delegated to us the discretion to exercise the voting rights for shares they beneficially own, we have a fiduciary duty to vote such shares in the clients' best interest and in a manner which achieves the best economic outcome for their investments.

We maintain a comprehensive database of our meetings with companies and our voting activities. We review progress over time and follow up on issues identified. In the 12-month period ended 31 December 2019, we gave instructions (based on AM's corporate governance principles) to vote on 104,372 separate resolutions at 10,432 company meetings. Information on such resolutions and company meetings is provided in the Proxy Voting Dashboard.

→ **Refer to *www.ubs.com/am-sustainability* and *vds.issgovernance.com/vds/#/MjU0/* for more information and for the Proxy Voting Dashboard.**

Key sustainable investing products and services in 2019 [2]

Product / service	Business division	Key features
The Rise Fund	Global Wealth Management (GWM)	USD 325 million raised of client commitments (fund raising concluded) Invests in seven sectors – education, financial services, health care, infrastructure, energy, food and agriculture, and IT – with a dual mandate: generating competitive financial returns and measurable positive societal outcomes
Rethink Impact Fund	GWM	USD 75 million of client commitments (fund raising concluded) Direct-access social impact private equity fund that invests in early- to growth-stage, high-impact companies, primarily in the United States. The fund focuses on four themes: health care, economic opportunity, environmental sustainability, and education
OrbiMed Asia Partners III	GWM	USD 85 million of client commitments (fund raising concluded) Growth investments in health care companies in China and India, focusing on biopharmaceuticals, medical technology and health care services
Generation Partners Sustainable Solutions Fund III	GWM	USD 94 million of client commitments (fund raising concluded) Invests in transformative technologies providing disruptive solutions to global sustainability challenges
Impact Direct Investing Offering	GWM	Initiated to address high demand for direct impact deals as well as UBS's strong commitment to support the SDGs Complements the UBS SI Offering with direct impact investing opportunities
ADM Cibus Fund	GWM	USD 125 million of client commitments (fund raising concluded) Aims to find investment opportunities arising out of the high-value food supply-demand imbalance faced by many developing economies, particularly in Asia and Middle East and North Africa
KKR Global Impact Fund	GWM	USD 244 million of client commitments Invests in businesses that contribute measurable progress toward one or more of the SDGs
RXR Qualified Opportunity Zone Fund	GWM	USD 283 million of client commitments Invests in real estate and/or real estate –focused businesses within qualified opportunity zones
Bridge Workforce & Affordable Housing Fund	GWM	USD 167 million of client commitments Invests in real estate located throughout the United States, with a focus on workforce and affordable multifamily housing communities
UBS Manage SI (discretionary mandate and SI fund)	GWM, Personal & Corporate (P&C)	Based on Chief Investment Office (CIO) SI (sustainable investing) Strategic Asset Allocation (SAA) (100% SI excl. liquidity allocation) AuM: USD 9.1 billion (of which USD 7.1 billion track the SI SAA)
UBS Managed Portfolio of SI (US only)	GWM	Based on CIO SI SAA (100% SI excl. liquidity allocation) AuM: USD 284 million
UBS Advice Premium SI	GWM	Innovative Advice mandate, reflecting our clients' individual preferences; launched in January 2020

Product / service	Business division	Key features
SI-focused UBS Advice solutions	GWM	Expanded SI offering that includes mutual funds, exchange-traded funds, separately managed accounts, unit investment trusts, private equity and structured products
SDG Engagement High Yield Credit funds	GWM	Launched in co-operation with Federated Investors and Hermes Investment Management
ESG Portfolio Analyzer	GWM	Provides transparency and analysis of ESG topics in client portfolios
Align 17	GWM	UBS-initiated third-party digital marketplace for impact investments that connects private wealth to vetted co-investment opportunities with diligence done by some of the world's leading impact fund managers
SI Strategy Fund	GWM, P&C	Based on CIO SI SAA and aligned to UBS Manage SI (discretionary mandate) AuM: USD 154 million
UBS Long Term Themes Equity Fund UBS Long Term Themes Portfolio SMA	GWM, Asset Management (AM)	USD 2.5 billion held in Long Term Themes Fund and mandates Invests in companies that are solution providers for challenges such as water scarcity, emerging market infrastructure and health care, waste management and recycling
Climate Aware Equity (TTF) Climate Aware CH Institutional Climate Aware UK Life	AM	Innovative rules-based equities strategy to address carbon risks and opportunities in portfolios
Global (Engage for) Impact Equity	AM	Strategy focusing on engagement as a key driver of impact and investment results
US Sustainable Equity	AM	Sustainability focused US equity fund
US Sustainable Growth Equity	AM	Sustainability focused US equity fund
Multilateral Development Bank (MDB)	AM	Innovative product investing in Development Bank bonds to support the SDGs through high-grade fixed income exposure
Sustainable Corporate Bonds	AM	Investment Grade USD / EUR / CHF bond portfolios with superior ESG profile
Multi Asset	AM	Multi asset portfolio with enhanced ESG profile in asset categories where possible
Short Duration High Yield Sustainable Bond	AM	Investment guidelines with sustainability criteria aiming to deliver a better sustainability profile relative to their investment universe
Global Gender Equality	AM	Systematic strategy targeting companies committed to sustainability and gender diversity
S&P 500 ESG	AM	ETF invested in all equities included in the S&P 500 ESG index
Eurostoxx 50 ESG	AM	ETF invested in all equities included in the EURO STOXX 50® ESG index

Product / service	Business division	Key features
MSCI China ESG Universal	AM	ETF invested in all equities included in the MSCI China ESG Universal 5% Issuer Capped Index
JPM Emerging Markets Debt IG ESG Bonds	AM	Designed to track the performance of US Dollar-denominated emerging market fixed and floating-rate debt instruments classified as investment grade (IG) and issued by Sovereigns, Quasi-Sovereigns and Corporates.
JPM Global Government ESG	AM	Provides exposure to local currency sovereign debt that meets certain sustainability standards
Voting (on behalf of clients)	AM	Provided instructions (based on AM's corporate governance principles) to vote on 104,372 separate resolutions at 10,432 company meetings
World Bank Index-Linked Sustainable Development Bond	Investment Bank (IB) / GWM	Debt securities issued by the International Bank for Reconstruction and Development, with a return at maturity based on the performance of the Global Sustainability Signatories Index Provides investors access to a sustainable development bond issued by the World Bank and access to a global equity index with companies selected based on ESG ratings
Green and sustainable bonds	IB	25 green and sustainable bond transactions supported
Global Sustainability Leaders index	IB, GWM	Companies selected include leaders with regard to the UN Global Compact principles
Renewable energy and cleantech financing	IB	Participation in significant renewables and cleantech deals globally, for both established utilities clients and innovative growth-stage companies
Energy check-up for SMEs	P&C	UBS SME efficiency bonus for energy reduction plan with overall energy savings of 58,000 MWh/a, equivalent to the annual energy consumption of approximately 3,000 single-family homes[3]
Preferred strategic partner for advisory and financing transactions related to Switzerland's Energy Strategy 2050	P&C	Supports energy utilities in raising capital on international capital markets to progress their quest for renewable energy Twelve strategic transactions executed for Switzerland's Energy Strategy 2050

2 All information provided is as of 31 December 2019, except where otherwise noted. 3 Information provided is as of 31 December 2018

Driving change in philanthropy

UBS Philanthropy

Developed over more than two decades, our unique, award-winning[1] offering partners with clients and their families to manage their philanthropy and maximize their impact. It is based on three core pillars: comprehensive advice, insight experiences, and execution services. We employ an investment-based approach delivering solutions to pressing social and environmental issues.

UBS Philanthropy Services connects clients to an international network of expertise and support. With a team of close to 60 philanthropy experts in 12 locations, we can support clients wherever their philanthropic objectives lead. We work closely with government bodies such as the United States Agency for International Development and the Department for International Development in the UK. And alongside academic institutions such as Oxford, Stanford and Harvard. This breadth and depth of know-how makes sure that every piece of advice we offer is informed by the latest thinking and a clear understanding of the prevailing rules and regulations in each territory.

Advice

We provide comprehensive advice to clients and their families, whatever their philanthropic goals. Examples include clients considering establishing their first charitable fund and guidance on how to ensure their giving is tax-efficient, thereby maximizing the value of their charitable funds.

Insights

We want our clients to be able to make the best informed decisions about their philanthropy, and a key way we do that is by connecting people and providing insight through our global network. This can be anything from a philanthropy insights trip, to a report on the latest charitable giving tax rules or an invitation to a networking event with fellow philanthropists.

Execution

We offer a number of execution services, providing our clients with flexible options on how to manage their philanthropic giving. They include structures that make it easier and more cost-effective to put their strategy into practice.

Donor-Advised Fund

A UBS Donor Advised Fund (DAF) offers clients an easy flexible and efficient alternative to setting up an independent foundation. Quick to set up and simple in structure, a DAF can be managed in line with a client's usual investment approach. Their charitable donations are invested within the parameters they select, such as capital, growth or income, so they can grow their fund to make grants at a later date.

UBS Optimus Foundation

The Foundation connects clients with inspiring entrepreneurs, new technologies and proven models that are making a measurable, long-term difference to the most serious and enduring social and environmental problems.

UBS Optimus Foundation has a 20-year track record, is recognized globally as a philanthropic thought leader and as a pioneer in the social finance space. The latter aims for "impact first", and often entails greater financial risk than investing in mainstream assets. In fact, impact bonds or loans for impact are a way to drive financial returns that are directly linked to actual social impact.

In all its activities, the Foundation always takes an evidence-based approach and focuses on programs that have the potential to be transformative, scalable and sustainable. This gives our clients the reassurance that they are funding innovative projects that have a stronger chance of achieving all-important systemic change. In some cases, UBS also makes matching contributions to the Foundation, ensuring that our clients' donations go even further.

Achievements in 2019

UBS Optimus Foundation raised USD 89.5 million in donations and approved USD 109.5 million grants. Across our portfolios and programs, we helped improve the well-being of 3.3 million children worldwide (500,000 more than last year).

Approximately 400 ultra-high net worth individuals or philanthropists attended our events on the topic of philanthropy to foster collaboration, share knowledge and best practice.

1 Best Global Bank for Philanthropy Advice, Euromoney Private Banking Survey 2017–2019.

Driving change in business

This section includes key initiatives and activities that we are committed to in order to incorporate sustainability in our way to do business and that meet the expectations of our stakeholders. These include our management of environmental and social risks, our firm's environmental footprint, our responsible supply chain management and our approach to combating financial crime.

We recognize that we have a role to play in leading debates on important societal topics and, in collaboration with other firms and industry bodies, in setting high standards for these topics in and beyond our industry. Our key activities in 2019 in this regard are set out in the table below and on the next page.

Advancing sustainability in the financial sector – UBS's key activities in 2019

Initiative	Focus topic	Role / activity of UBS	Key outcome of initiative in 2019
Principles for Responsible Banking (PRB)	Sustainable finance	Founding signatory of the PRB	Active input to the consultation process and participation at PRB launch event
Financial Stability Board Task Force on Climate-related Financial Disclosures (TCFD)	Climate change	Member of TCFD and aligning of UBS disclosure with TCFD recommendations	Continued development and implementation of TCFD
UN Environment Programme Finance Initiative (UNEP FI)	Climate change	Collaborates in developing approaches to help banks disclose their exposures to climate-related risks and opportunities, as envisioned by the TCFD	Launched second phase working group to expand risk and opportunity assessment methodologies, climate scenarios, and related data and tools, building on previous efforts disclosed in two publicly available reports
EnergyCom	Climate change	Premium partner	Key annual Swiss SME event on climate and energy topics
Climate Action 100+	Stewardship / climate change	Directly involved in 30 coalitions of investors and engagement lead on seven coalition dialogues	Engagement resulted in strengthened climate change commitments from some of the world's largest energy producers
Institutional Investors Group on Climate Change	Climate change	Participant and stream lead	Chairing working group dedicated to exploring the alignment of portfolios to the goals of the Paris Agreement
Circular Economy Incubator (Impact Hub)	Responsible production	Premium partner. In addition, we support Swiss start-ups in developing innovative business models which follow the idea of a circular economy (resell and reuse, repair and refurbish).	Incubator for Swiss sustainable start-ups

Initiative	Focus topic	Role / activity of UBS	Key outcome of initiative in 2019
Paris Agreement Capital Transition Assessment (PACTA)	Climate change	One of 17 banks pilot-testing and shaping the development of the methodology	First assessment on the alignment of corporate lending portfolios with the Paris Agreement benchmarks completed
Natural Capital Finance Alliance	Natural capital	Participant in various work streams	Continued participation in advisory committee for the second stage of the project tool ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure)
Swiss Sustainable Finance (SSF)	Sustainable finance	Member of SSF board	Events and projects to promote sustainable finance in Switzerland
Association for Environmental Management and Sustainability in Financial Institutions (VfU)	Sustainable finance	Member of VfU board	Events and projects to advance sustainable finance in Germany, Austria and Switzerland
Thun Group of Banks	Human rights	Convener of Group	Thun Group input to OECD Responsible Business Conduct (RBC) guidance
Organisation for Economic Co-operation and Development (OECD)	Due diligence	Member of advisory group of OECD Responsible Business Conduct (RBC) project	Launch of OECD guidance on Due Diligence for Responsible Corporate Lending and Securities Underwriting
Belt and Road Green Investment Principles (GIP)	Climate change and sustainable finance	Signatory to the GIP	Participation at the first GIP Plenary meeting
Institute of International Finance (IIF) Sustainable Finance Working Group (SFWG)	Sustainability standards and regulation	Member of IIF SFWG and lead on policy and regulatory engagement	Best practices on TCFD, proposal to simplify SI taxonomy, greening infrastructure, and continued input to other initiatives including EC TEG
Global Impact Investing Network	Sustainable finance	Member of Investor Council	Regular dialogue and event presentations
IFC Operating Principles for Impact Management	Sustainable finance	Founding signatory, Advisory Board member	Launch and publication of Principles, led by World Bank's IFC
Impact Management Project (IMP)	Sustainable finance	Project partner	Integration of IMP conventions into diligence and investment approach
PRI (Principles for Responsible Investment)	Sustainable finance	Various, including members of SDG Advisory Committee	Proposals on how to measure SDGs for corporations
Global Research Alliance for Sustainable Finance and Investment (GRAFSI)	Sustainable finance	Sponsor	Advance theoretical understanding of SI / ESG integration
UBS ESG and Sustainability Symposium	Sustainable finance and investing	Organizer	One-day conference around the key issues the financial markets are navigating, including academic panel (in collaboration with GRAFSI)
UBS Conferences, e.g., European Conference, Greater China Conference	Various	Organizer	Variety of panels on sustainable finance, climate risk, energy transition, etc.

Environment and human rights

Our environmental management system covers the entire scope of UBS products, services and in-house operations that may give rise to an environmental impact. It is externally audited annually and recertified every three years.

We view the proper management of our firm's own environmental footprint and our supply chain as important proof points for how we do business in a sustainable manner. This is equally true for our comprehensive management of environmental and social risks (ESR). Our in-house environmental management, responsible supply chain management (RSCM), and ESR standards and management are aligned with the *UBS in society* strategy and enforced across the firm.

We constantly strive to reduce our greenhouse gas (GHG) emissions, waste production, energy and paper consumption as well as water usage.

By engaging with vendors to promote responsible practices, we look to reduce negative environmental and social effects of the goods and services UBS purchases. Our RSCM principles embed UBS's ethics and values in our interactions with our vendors, contractors and service partners. Since 2008, firm-wide guidelines have provided systematic assistance on identifying, assessing and monitoring vendor practices in the areas of human and labor rights, environmental protection and corruption. A central component of this guideline is the UBS Responsible Supply Chain Standard to which our vendors are bound by contract.

We apply an ESR framework to identify and manage potential adverse impacts to the environment and/or human rights, as well as the associated environmental and/or social risks that our clients' and our own assets are exposed to. We support the orderly transition to a low-carbon economy. Our climate strategy underlines our commitment to the United Nations Sustainable Development Goals on climate action and on affordable and clean energy – and to the Paris Agreement on Climate Change (Paris Agreement). We regularly report on the implementation of our climate strategy and follow the recommendations of the Task Force on Climate-related Financial Disclosures.

In assessing UBS's potential human rights impacts we focus on three key stakeholder groups: employees, clients and vendors. With regard to employees, UBS, through its human resource (HR) policies and practices, meets the obligations that a responsible company is expected to comply with. We review our HR policies and practices on a regular basis to ensure that human and labor rights continue to be respected. With regard to clients, we conduct ongoing reviews of our business relationships to assess whether they might lead to potential negative impacts on rights holders. All client relationships that are considered important from an ESR point of view are subject to enhanced ESR due diligence.

With regard to our vendors, we identify high-risk vendors when establishing new contracts or renewals based on the vendors' provision of goods and services that have either a substantial environmental and social impact, or are sourced in markets with potentially high social risks. We also regularly screen active vendors as part of our ESR control processes.

Both our firm's approach to the environment and human rights and our commitment to our employees (as reflected in our HR processes and policies) are overseen by the Board of Directors, notably by the Corporate Culture and Responsibility Committee (CCRC). Within the parameters set by the CCRC, environmental and human rights issues at Group Executive Board-level are overseen by the Global ESR Committee. The CCRC regularly reviews the assessments and steps taken by the Global ESR Committee toward executing UBS's environmental and human rights commitments and climate strategy.

→ **Refer to "Our climate strategy" in the "Our governance and principles" section and to the "ESR policy framework" in the Appendix 1 for more information**

→ **Refer to "In-house environmental management" in this section for more information**

Management of environmental and social risks

We apply an environmental & social risk (ESR) framework to identify and manage potential adverse impacts on the environment and/or to human rights, as well as the associated environmental and social risks to which our clients' and our own assets are exposed to. Our comprehensive ESR standards, which are in line with the principles expressed in the *UBS in society* constitutional document, govern client and vendor relationships and are enforced firm-wide.

We have set ESR standards for product development, investments, financing and supply chain management decisions. As part of our due diligence process, we engage with clients and vendors to better understand their processes and policies and to explore how any environmental and social risks may be mitigated. We apply a precautionary approach by avoiding transactions, products, services, activities or vendors if they are associated with material, environmental or social risks that cannot be properly assessed or mitigated.

Our ESR standards include a description of controversial activities and other areas of concern where we will not engage, or where we will only engage with stringent criteria in place, as outlined below. These standards are reviewed on a regular basis.

Our standard risk, compliance and operations processes involve procedures and tools for identifying, assessing, reporting and monitoring environmental and social risks. These include client onboarding, ongoing Know Your Client reviews, transaction due diligence, product development, investment decisions, supply chain management and portfolio reviews.

These processes are geared toward identifying clients, transactions or vendors potentially in breach of our standards, or otherwise subject to significant environmental and human rights controversies. We use advanced data analytics to assess companies associated with such risks, integrated into our web-based compliance tool, before we enter into a client or vendor relationship or transaction. This significantly enhances our ability to identify potential risks. In 2019, 1,889 referrals were assessed by our ESR unit, of which 82 were rejected or not further pursued, while 299 were approved with qualifications and 32 were still pending.

→ **Refer to the "ESR policy framework" in the Appendix 1 for more information**

We will not do business if associated with severe environmental or social damage to or through the use of:	We will only do business under stringent criteria in the following areas:
– UNESCO world heritage sites – wetlands, endangered species, – high conservation value forests, illegal logging and use of fire, – child labor, forced labor, indigenous peoples' rights	– soft commodities: palm oil, soy, timber, fish and seafood – power generation: coal-fired power plants, large dams, nuclear power – extractives: arctic oil and oil sands, coal mining, Liquefied Natural Gas (LNG), ultra-deepwater drilling, hydraulic fracturing, oil sands, arctic drilling, coal mining, precious metals, diamonds

Case studies on the management of environmental and human rights matters

Environmental and social risk in trade finance and commodity trade finance

Why is trade finance relevant?
Trade finance supports about 20% of world trade, playing a central role in facilitating the global trade of raw commodities and other goods. Commercial banks support importers, exporters and traders (for commodities) to secure or finance international transactions. Trade may be exposed to heightened environmental and social risks, especially when linked with extraction of raw commodities and/or specific projects. Depending on the type of the trade, such risks may arise for the producer, the exporter and/or the importer of traded goods – as well as for the bank providing the financing.

What do we do?
UBS enables buyers, sellers and traders to successfully trade goods and commodities, by guaranteeing deal performance through a variety of financial instruments. For example, in Commodity Trade Finance, UBS offers structured, short- to mid-term loans that finance deals trading metals, energy, and soft-commodities between producers and end users. Recognizing the role that UBS plays in facilitating and growing global trade, UBS implements its environmental and social risk framework in the context of individual transactions.

How do we implement the ESR framework in trade finance, commodity trade finance?
ESR controls are part of the standard transaction due diligence processes. Based on our daily feed into the standard compliance tool, every transaction is checked against ESR. We use a risk-based approach. This means for commodity trade finance, we focus on the originator of the commodity. For trade finance, we focus on the counterparty and on projects that will use the goods involved, for example machinery produced by our client in Switzerland. This means we apply checks beyond our clients on all relevant counterparties in a transaction. We may ask additional questions to clarify the origin or the final use of the goods and we may approve or decline. With a fast moving underlying business (same day in and out), additional in-depth due diligence is limited on transactional level. It is however possible to perform enhanced due diligence during periodic Know Your Client reviews or with separate deep-dive reviews in between transactions, which we conduct on a periodic and ongoing basis.

Climate risks in financing electric utilities

What are the climate risks associated with electric utilities?
According to the International Energy Agency, approximately 35% of global power generation today is coal-fired. As the world transitions to a low-carbon economy, reliance on coal-fired power generation will reduce significantly, eventually to 0%. Risks embedded in this transition are found with clients who have a significant reliance on coal-fired power plants in their own asset portfolios.

What is our commitment?
We are supporting the utility sector in providing solutions that are in line with a sustainable development pathway. Recognizing the climate implications created by the extraction and burning of coal, we are committed to not providing project-level financing for new coal-fired power plants globally and only supporting financing transactions of existing coal-fired operators (>30% coal reliance) who have a transition strategy in place that aligns with a pathway under the Paris Agreement, or if the transaction is related to renewable energy.

How do we execute our commitment when financing electric utilities?
ESR controls are part of our standard transaction due diligence processes. Utilities are screened for exposure to coal-fired power plants. Where a client or related entity has coal-fired power plants in their portfolio, we first determine the current and future asset base of the client, by megawatt capacity of the various fuel types in the client's power generation portfolio (e.g., nuclear, natural gas and coal). This is determined through desk research, third-party specialty databases and engaging with the client in question. We then benchmark the coal reduction trajectory against the Paris Agreement-aligned benchmarks for host countries, as determined by our third-party environmental, social and corporate governance data partner. The rates are then compared to determine if the client's forward-looking strategy meets our Paris Agreement-aligned commitment.

Case study: Non-compliance with the standards of the Roundtable on Sustainable Palm Oil (RSPO)

Why is palm oil such a hot topic?
It is estimated that more than 50% of tropical deforestation is due to the production of palm oil, soy, timber and beef. Deforestation and forest degradation can cause biodiversity to decline. Deforestation is, in fact, second only to the energy sector as a source of global greenhouse gas emissions and accounts for up to 20% of global emissions. Furthermore, as millions of people rely directly on forests, deforestation continues to cause severe societal problems, sometimes leading to violent conflict.

What do we do?
Before doing business with any company involved in palm oil production or trading, our experts for environmental and social risk inquire how a company manages environmental and social challenges in its palm oil operations, as required by UBS's standards for palm oil production. Depending on the client and the type of transaction that UBS is confronted with, for example lending, trade finance, underwriting or investment banking advisory mandates, due diligence may involve desk research and interaction with the companies, external experts, as well as global and local non-governmental organizations. Depending on the results, this can lead to a variety of actions, from requesting the client to certify its production or trading processes against the standards of the RSPO to declining to do business with the client.

How does our ESR approach impact a particular case?
UBS negotiated the commencement of a relationship with a corporate client whose activities also included the palm oil business. At that point, the corporate entity was not a member of the RSPO, which is a requirement under the respective UBS standard. UBS therefore agreed to a conditional onboarding of the corporate entity under the condition that it adhered to the RSPO within a predefined time period. After the agreed period had passed without the client taking the necessary steps, UBS exited the relationship.

In-house environmental management

Introduction

We are committed to reducing our environmental footprint and make an effort to go beyond our duty to protect the environment. We continuously seek to increase recycling and the use of environmentally friendly products as well as the efficiency of our energy and water use, decreasing waste, paper usage, business travel and employee commuting.

We manage our environmental management system in accordance with ISO 14001. In 1999, we were the first bank to obtain this ISO certification for our worldwide environmental management system, which covers the entire scope of UBS products, services and in-house operations that may cause an environmental impact. It is externally audited on an annual basis, with our latest recertification having taken place in 2017. We have also further developed our Environmental and Energy Management System in our European locations to be compliant with ISO 50001. We received our first ISO 50001 certification (energy management system standard) in 2017, the recertification is due in 2020.

Our environmental indicators (energy, water, paper, waste, recycling and travel) and related greenhouse gas (GHG) emissions data are externally verified on the basis of the ISO 14064 standard. These comprehensive audits confirm not only that appropriate policies and processes are in place to manage environmental issues but also that they are applied on a day-to-day basis.

→ **Refer to the "Assurance and certification" section for our ISO certificates**

ISO Standard

The International Organization for Standardization (ISO) is an independent, non-governmental organization with boards of experts who develop worldwide proprietary, industrial and commercial standards for global challenges in various market-relevant topics. ISO Standards help organizations of any size to drive their internal processes forward and develop their business. ISO 14001 specifies the requirements for an environmental management system of organizations, ISO 14064 helps companies to quantify and report their GHG and manage its verification, whereas ISO 50001 focuses on their energy management system and their continual improvement of energy performance.

Objectives and targets

We have established environmental objectives at relevant levels and functions. To continuously improve our environmental performance, we have set quantitative targets related to our significant environmental aspects since 2006. The current quantitative objectives were set in 2016 and have 2020 as the target year.

Environmental targets and performance in our operations[1]

	GRI[2]	2019	Target 2020	Baseline	% change from baseline	Progress / Achievement[7]	2018	2017
Total net greenhouse gas emissions (GHG footprint) in t CO_2e[3]	305	103,670	-75%	360,501[4]	-71.2	●	131,960	147,757
Energy consumption in GWh	302	556	-5%	661[5]	-15.9	●	584	627
Share of renewable electricity	302	72.0%	100%	27.7%[4]	158.7	●	59.2%	56.0%
GHG offsetting (business air travel) in t CO_2e[3]	305	42,949	100%	0[4]	100	●	50,166	54,412
Paper consumption in kg per FTE[6]	301	78	-5%	114[5]	-31.5	●	91	95
Share of recycled and FSC paper	301	83.4%	90%	89.5%[5]	-6.8	●	79.8%	90.8%
Waste in kg per FTE[6]	306	156	-5%	206[5]	-24.2	●	175	203
Waste recycling ratio	306	51.2%	60%	54.1%[5]	-5.5	●	50.8%	55.0%
Water consumption in m m^3	303	0.79	-5%	0.96[5]	-17.7	●	0.79	0.87

Legend: CO_2e = CO_2 equivalents; FTE = full-time employee; GWh = giga watt hour; kWh = kilo watt hour; km = kilometer; kg = kilogram; m m^3 = million cubic meter; t = tonne

1 Reporting period 2019 (1 July 2018-30 June 2019). 2 Reference to GRI Sustainability Reporting Standards (see also www.globalreporting.org). 3 GHG footprint equals gross GHG emissions minus GHG reductions from renewable energy and GHG offsets (gross GHG emissions include: direct GHG emissions by UBS; indirect GHG emissions associated with the generation of imported / purchased electricity (grid average emission factor), heat or steam and other indirect GHG emissions associated with business travel, paper consumption and waste disposal). 4 Baseline year 2004. 5 Baseline year 2016. 6 FTEs are calculated on an average basis including contractors. 7 Green: on track; Amber: improvements required.

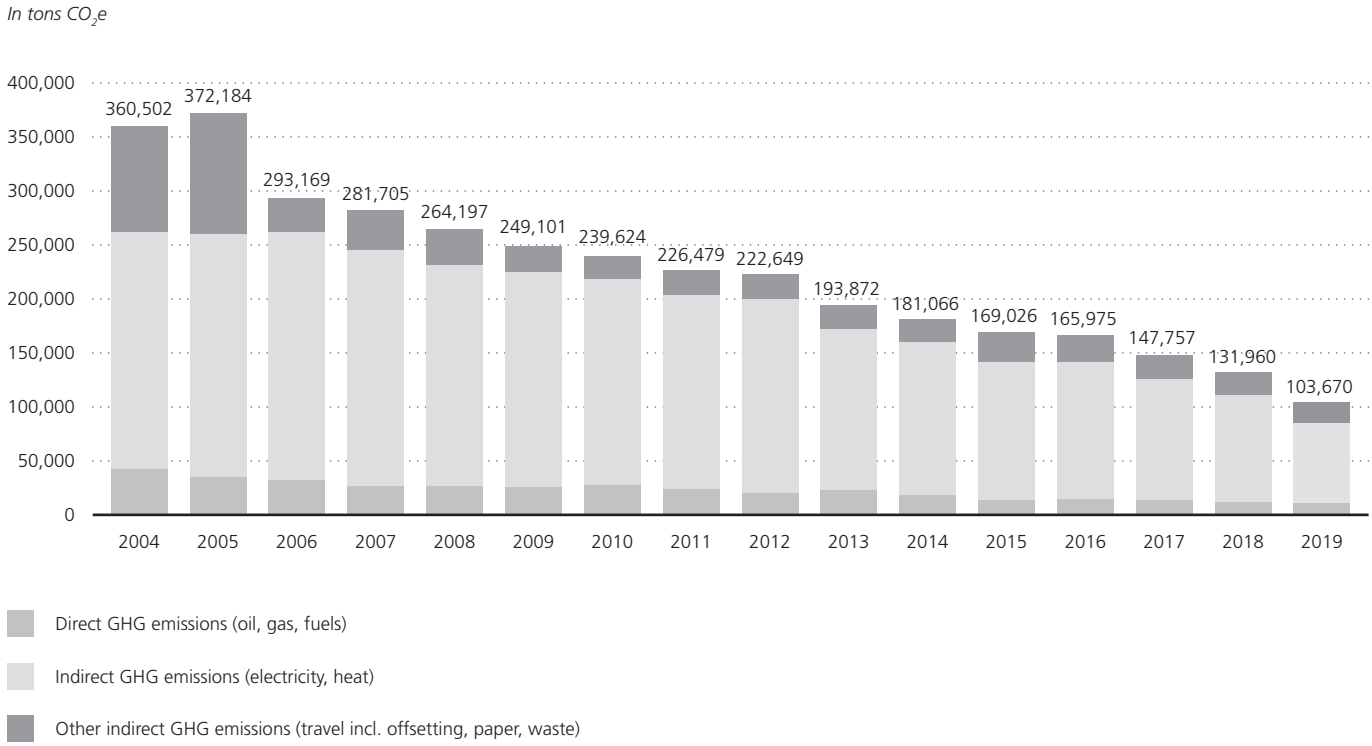
GHG emissions

In line with our climate strategy, we aim to reduce our GHG footprint 75% by 2020 compared to 2004.

Our strategy to reduce GHG emissions is based on increasing energy efficiency, replacing fossil fuel-based heating systems with renewable heating systems and increasing our share of renewable energy. In various branches in Switzerland, we have replaced oil heating systems with geothermal heat pumps and district heating with heat from waste incineration plants.

In 2019, we cut UBS's GHG footprint by another 21%, or 26% per full-time employee, year on year. This is a total reduction of 71% since 2004.

UBS's Greenhouse Gas (GHG) Footprint



Sustainable real estate

The building infrastructure directly impacts our environmental footprint. Taking a building life cycle perspective, we apply our environmental consideration before we enter a new building and until we exit the building. To reduce our impact on the environment, we have adopted well-recognized green building standards, such as LEED (Leadership in Energy and Environmental Design) or local green building standards, to manage our real estate's environmental aspect, including green lease. Across our global building portfolio, eight projects achieved LEED certification in 2019.

In India Pune EON, our office has been certified to LEED Platinum. It was designed to optimize energy consumption which helps us reduce our environmental footprint. In this newly built office, we achieved 57% energy saving in lighting over the LEED baseline.

Collaboration is at the core of our culture, and a key to our success. We are committed to creating smart and engaging workspaces that bring employees closer together and focused on increased productivity and more frequent interaction.

Transitioning to an agile desk sharing work space in our newest build outs in our campus in Lincoln Harbor enables us to reduce our real estate footprint. We are in the process of attaining a LEED certification for these new spaces.

8

new LEED certifications

worldwide in 2019

LEED GOLD

LEED PLATINUM

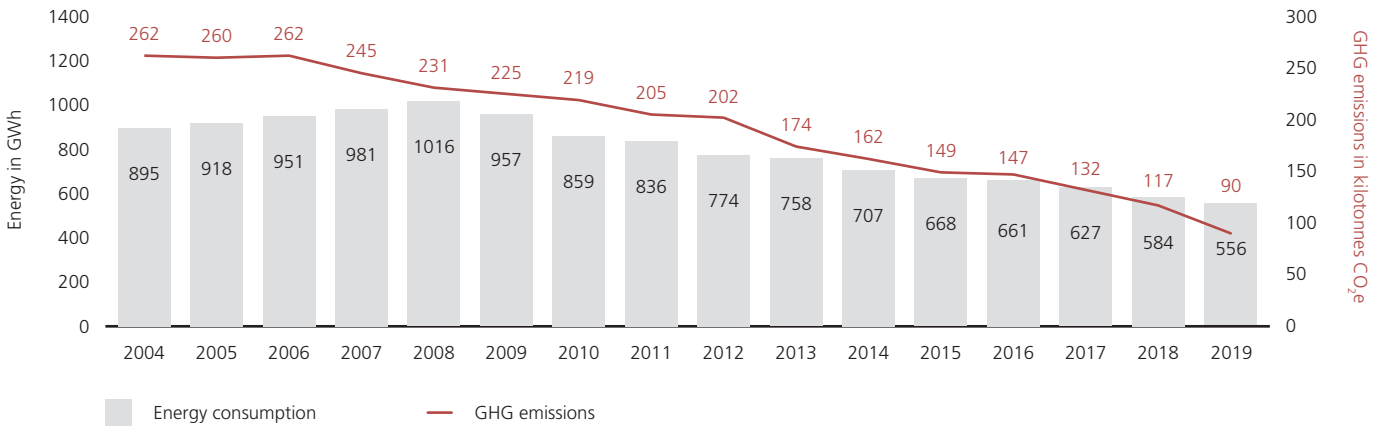
Seattle **United States**	Bern **Switzerland**	Pune **India**	Hong Kong (SAR) **China**
Chicago **United States**	Zurich **Switzerland**	Shenzhen **China**	Shanghai **China**

Energy consumption

For the last decade, we have managed to consistently reduce our energy consumption. In 2019, we used 556 GWh, which is equal to a reduction in energy consumption of 5% compared to 2018. This success was mainly driven by environmental as well as energy management measures. We pursue a holistic approach, incorporating all levels of our organization. For example, through strategic measures at company level, like the targeted adaption of energy composition, adaptive measures in portfolio management (such as consolidating workspaces in energy-efficient buildings and alternative workplace concepts) or stricter procurement guidelines, we set the framework for continued improvement. This strategic orientation is then implemented throughout the firm, leading to tangible changes in the whole organization. Thereby, we implement smaller measures like switching to LEDs, refurbishing windows or optimizing building services (such as heating, cooling, ventilation and lighting). To ensure successful implementation, as well as for monitoring purposes, we have externally audited and certified the accuracy of our energy reporting (ISO 14064), document successful building projects with LEED certificates and constantly review and update quantitative targets.

Global IT demand has drastically increased over the years. However, we have achieved significant improvements in IT operational efficiencies. Strategic programs include transformation to next-generation networks, modernization and virtualization of the global server estate. Consolidation of desktop computers to centrally based systems within data centers has also significantly reduced desktop power and hardware requirements. Although business demand in 2019 has increased by 10% for computers and by 36% for storage, the technology refresh strategy and virtualization programs have meant that data center power demand has remained stable.

Energy consumption and related greenhouse gas emissions



Footnote: GHG emission = Direct GHG emissions (scope 1) + Gross indirect GHG emissions (Gross scope 2) – GHG reductions from renewable energy + GHG emissions from leased assets not included in scope 1 and 2.

Renewable energy

In order to strengthen our commitment to limiting the effects of climate change and enabling the orderly transition to a low-carbon economy, we joined the RE100 initiative in September 2015. By mid-2020, we will source 100% of our electricity from renewable sources, which will help reduce our GHG footprint by 75% compared to 2004.

Where possible, we try to produce our own renewable electricity for the buildings we occupy.

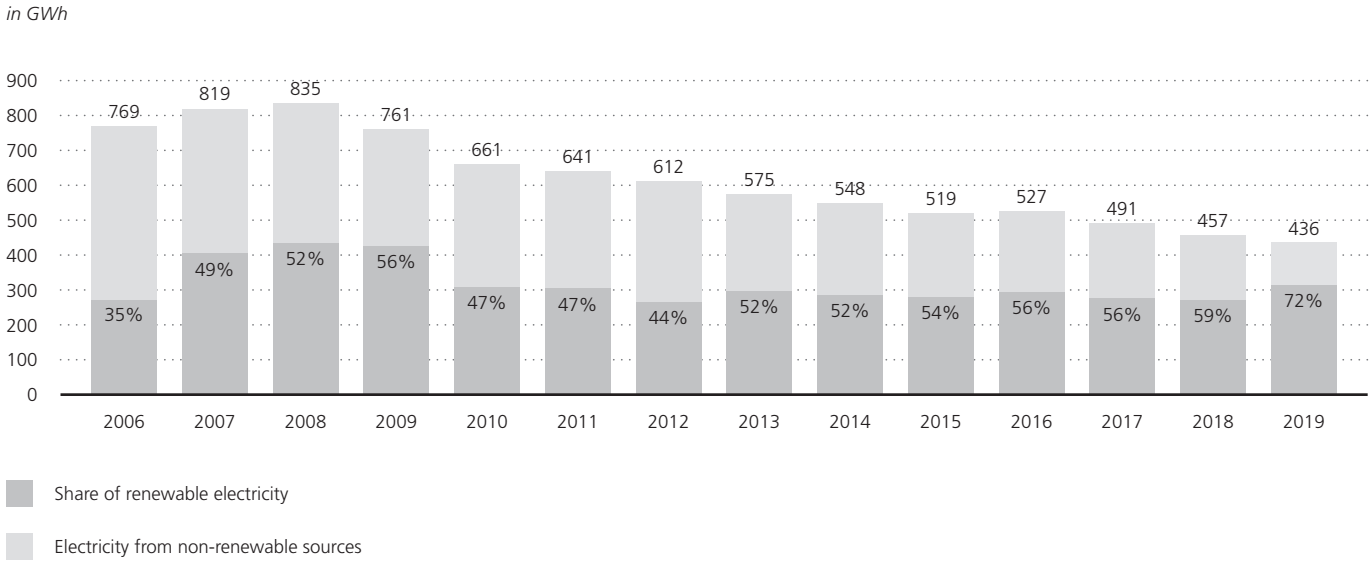
In 2019, 72% of UBS's worldwide electricity consumption was drawn from renewable sources. In Switzerland we started over 12 years ago and have been sourcing electricity from 100% renewable sources in various countries around the globe, such as Germany, the UK and Austria. In 2019, we signed a long-term solar energy deal in Singapore, which will locally supply renewable energy to support our operations in Singapore over the next 10 years.

As part of the effort to meet UBS's global RE 100 commitment, we signed an agreement to purchase approximately 135,000 renewable energy credits (RECs) to match our 2019 electricity consumption in twelve countries across the Americas region, including Brazil, Canada, Chile, Colombia, Mexico and the US.

RE 100

RE100 is a global initiative launched by The Climate Group in partnership with CDP, urging the world's most influential companies to commit to source 100% of their electricity from renewable sources. RE100 brings together more than 200 multinationals committed to 100% renewable electricity.

Electricity consumption and share of electricity from renewable sources



Business travel and offsetting CO_2 emissions

Business travel is a necessary part of the way we work, and is regarded as an enabler for business. Nevertheless, we continue to challenge ourselves on the need, frequency and type of travel. Working with partners that invest in sustainable aviation fuel (SAF), improved waste management (in the air and on the ground) and more fuel-efficient aircraft fleets, we maintain a keen interest in lowering the carbon intensity of our business travel.

Over the years, we have taken many steps to encourage the use of collaborative work tools, like Skype or video conference, in order to reduce the need to travel. Overall demand management as well as general behavioral change have led to a 19% reduction in air spend, non-client-related air travel was reduced by 30%. In addition, high-speed rail travel has increased by 5%, compared to 2018.

Since 2007, we have been offsetting all of our CO_2 emissions from business air travel. We currently support two major wind power Gold Standard projects in Europe and Asia, reducing the same amount of CO_2 emissions and contributing to local sustainable development.

We encourage the shift to electric mobility and are expanding our e-charging stations in Switzerland and Germany. This gives our employees and clients the opportunity to charge their electric or hybrid cars with renewable energy while on site.

Gold Standard

Gold Standard was established in 2003 by WWF and other international non-governmental organizations to ensure projects that reduced carbon emissions featured the highest levels of environmental integrity, are trustful, verifiable and make measurable contributions to sustainable development.

Business travel

~ 450 million

kilometers flown in 2019, this is an all-time low

55%

reduction of business air travel since our all-time high in 2007

All

CO_2 emissions from business air travel globally offset via Gold Standard projects

Paper

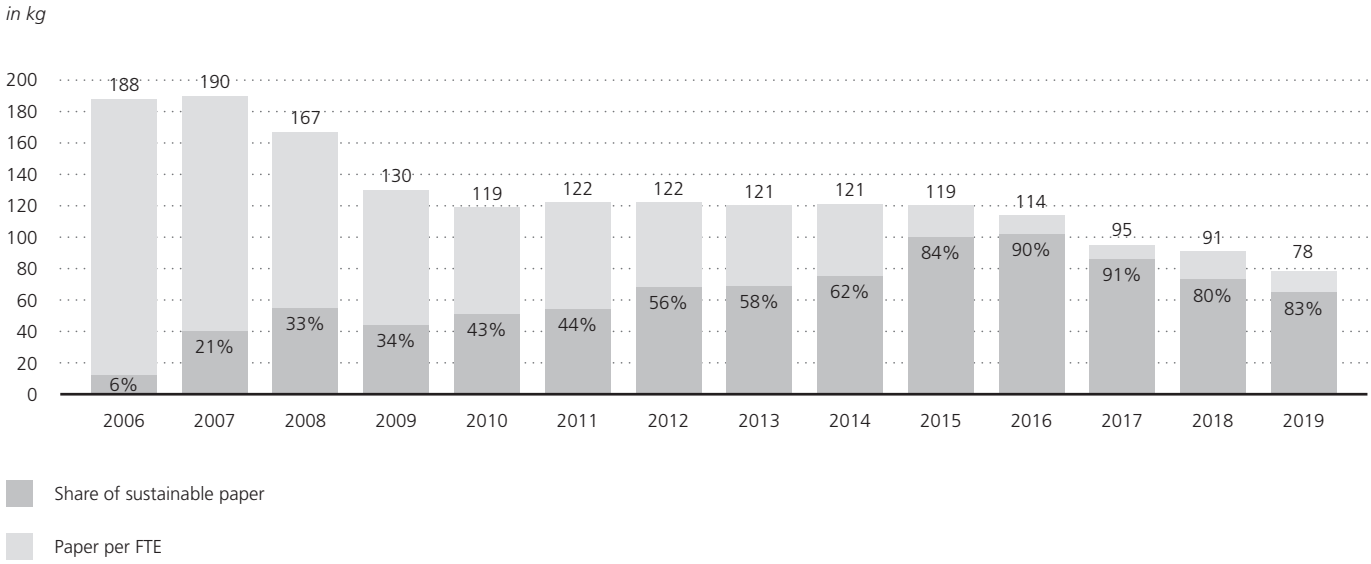
Our total paper consumption is at an all-time low and is composed of 36% copier or printer paper, 36% client output, 16% publications and the remainder are for various paper products. Globally, around 83% of our paper consumption originates from recycled sources or those certified by the Forest Stewardship Council (FSC). UBS has been using paper from sustainable sources since 2006.

Digitalization brings environmental, economic and client experience benefits. The more digitally based online services we offer to our clients, the more we improve our efforts to go paperless. In September 2019, our active UBS Digital Banking clients in Booking Center Switzerland were informed that bank documents, credit card and prepaid card invoices would be sent to them digitally. By going digital, documents are now available faster and the environmental impact is reduced significantly. We are also moving away from paper internally. Our digitalization efforts here involve creating digital copies of paper-based information, through scanning and machine-reading technologies turning paper into data. Simplifying, automating and digitizing processes leads to more efficiency and effectiveness. Many of our meeting rooms have video capability which saves the need to print multiple presentations.

Our Digital Mailroom program is a further concrete example of our sustainable engagement. The objective of this program is to support the implementation of our digital office strategy, by digitizing all physical inbound mail and therefore allowing integrated and digital processing within the bank.

Over the past year, our Secure Print team has been working on installing 8,400 new secure printers in UBS offices in 32 UBS countries around the world. This helps preventing accidental extra printing.

Paper per FTE



Note: FTEs are calculated on an average basis including FTEs which were employed through third parties on short-term contracts.

Waste and recycling

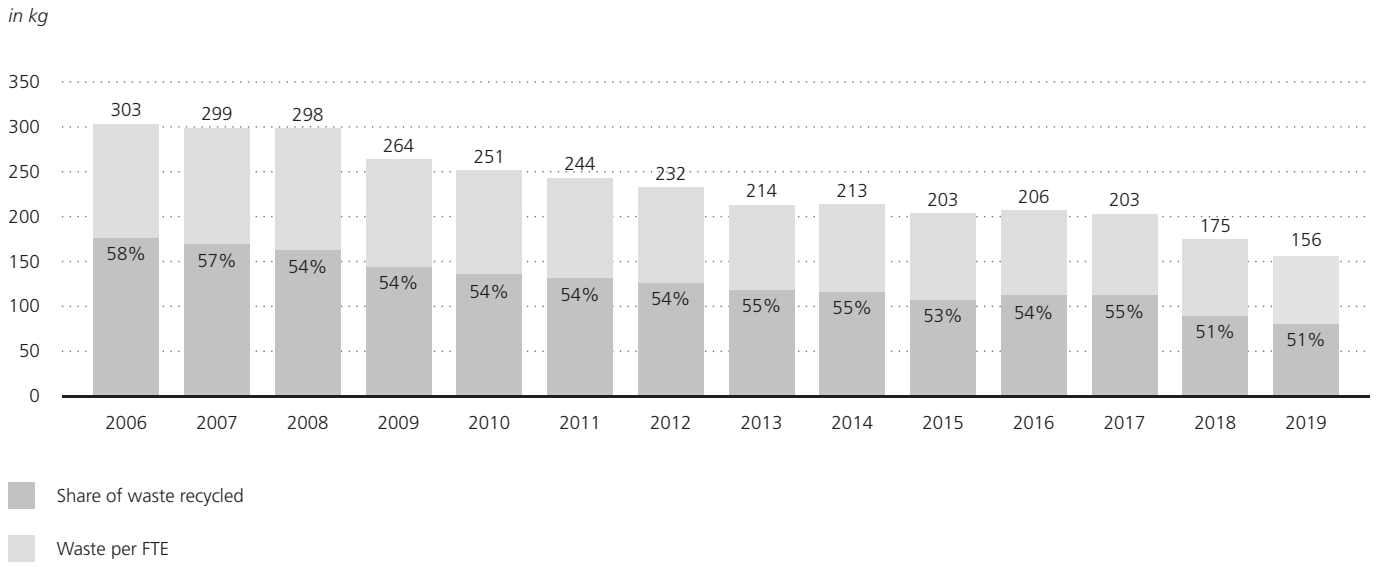
"Single-use" was named word of the year by Collins Dictionary in 2018. Global awareness on the adverse impact of single-use plastic and plastics waste streams – which harm wildlife, pollute beaches and threaten our food security – has continued to increase since.

We have implemented a variety of strategies across our firm to reduce waste and increase the amount of reused and recycled products. At the beginning of 2019, we started to remove single-use (plastic) items globally. We eliminated disposable coffee and water cups in office kitchens with a limited number of compostable coffee cups being made available if necessary. Employees have been encouraged to bring their own reusable coffee mugs and water bottles to support this effort, and our firm has either provided reusable mugs or sold branded mugs, water bottles and reusable cutlery to support these initiatives. Plastic bottles in vending machines and other points of sale are being replaced with glass and aluminum product alternatives. We removed the option to choose disposables for internal catering orders.

UBS technology is constantly changing and evolving, from end user desktop computers to servers, storage, networks and the data center physical infrastructure itself. Our asset recovery program includes hardware and peripheral components from both our data centers and office buildings. On occasion, these changes require the decommissioning and disposal of hardware, which is always performed in alignment with the ISO 14001 standard by our accredited, licensed global providers.

With all these activities, we are looking to drastically reduce our amount of waste, specifically the plastic and non-recyclable material found in all our locations worldwide. In 2019, 51% of waste produced in UBS locations was recycled.

Waste per FTE



Note: FTEs are calculated on an average basis including FTEs which were employed through third parties on short-term contracts.

Water

Water, both waste and clean, is a central focus of our environmental program. We are determined to reduce the overall usage of fresh water at. Many measures have been taken, ranging from water-saving fittings to rainwater collection. To ensure continuous reduction in water consumption, rules have been implemented for procurement, building utility replacements and new developments, thus allowing for long-term refinement. Adequate disposal of wastewater is also a priority. Negative environmental impacts, especially ecotoxicology, loading of waterbodies with nitrogen and phosphorus as well as public health are taken into consideration. Overall, we reduced our water usage by 52% since 2009.

Reporting standards and methodologies

We have prepared our GHG reporting in accordance with key concepts and requirements stated by the International Organization for Standardization in ISO 14064-1 (specification with guidance at the organization level for quantification and reporting of GHG emissions and removals) and the World Business Council for Sustainable Development / World Resources Institute in the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard.

Our firm's environmental and GHG reporting has been prepared based on a reporting year of 1 July to 30 June. This differs from UBS's financial reporting period (1 January to 31 December).

All GHG emission figures are in tons of carbon dioxide equivalents (CO_2e) and include three of the six GHGs covered by the Kyoto Protocol – carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). We have omitted hydrofluorocarbon (HFC) emissions from our reporting, as they are not a material source of GHGs for the business. There are no GHG sources contributing to perfluorocarbons (PFCs) and sulphurhexafluoride (SF_6) emissions.

Direct GHG emissions and indirect GHG emissions from electricity have been reported by UBS Group AG, its branches, representative offices and entities where UBS has operational control and through which UBS conducts its banking and finance business or provides services in support of such business. Based on the GHG protocol Scope 2 Guidance and Scope 3 Standard, energy consumption for heating purposes of leased space, where UBS does not have any operational control of the heating system, is classified as other indirect GHG emissions.

We have determined the GHG emissions associated with UBS activities on the basis of measured or estimated energy and fuel use, multiplied by relevant GHG emission factors.

Where possible, fuel or energy use is based on direct measurement, purchase invoices or actual mileage data covering more than 80% of our reported energy usage. In other cases it has been necessary to make estimations.

We used published national conversion factors and global warming potentials (GWPs) to calculate emissions from operations. In the absence of any such national data, we used the UK Government GHG Conversion Factors for Company Reporting for the calculation of GHG emissions.

The GHG base year was set as 2004 (July 2003 to June 2004), as this was the first year we reported detailed GHG emissions verified according to ISO 14064. The 2004 GHG footprint baseline is 360,502 tons and consists of 41,858 tons scope 1, 219,727 tons net scope 2, and 98,918 tons scope 3 emissions. The appropriateness of the base year is reviewed on an annual basis. In 2006, we set global quantitative objectives for energy, paper, waste and water for 2009. They were revised and extended three times so far and covered the periods 2009 until 2012 and 2012 until 2016. The current quantitative objectives have 2016 as a baseline and 2020 as a target year.

Environmental indicators[1]

	GRI[3]	2019[2] Absolute normalized[4]	2019[2] Data quality[5]	2019[2] Trend[6]	2018[2] Absolute normalized[4]	2017[2] Absolute normalized[4]
Total direct and intermediate energy consumption[7]	302	556 GWh	***	→	584 GWh	627 GWh
Total direct energy consumption[8]	302	55 GWh	***	↘	60 GWh	68 GWh
natural gas		87.2%	***	→	88.0%	84.8%
heating oil		7.4%	***	↘	7.9%	10.4%
fuels (petrol, diesel, gas)		4.6%	***	↑	3.7%	4.4%
renewable energy (solar power, etc.)		0.8%	***	↑	0.4%	0.4%
Total intermediate energy purchased[9]	302	501 GWh	***	→	524 GWh	559 GWh
electricity		436 GWh	***	→	457 GWh	491 GWh
electricity from gas-fired power stations		10.1%	***	↓	13.9%	15.2%
electricity from oil-fired power stations		1.8%	***	↓	2.3%	2.5%
electricity from coal-fired power stations		11.9%	***	↓	16.5%	16.7%
electricity from nuclear power stations		4.6%	***	↓	8.2%	9.6%
electricity from hydroelectric power stations		35.8%	***	→	35.6%	34.6%
electricity from other renewable resources		35.8%	***	↑	23.5%	21.4%
heat (e.g., district heating)		65 GWh	**	→	67 GWh	68 GWh
Share of electricity from renewable sources	302	72%	***	↑	59%	56%
Total business travel		459 m Pkm	***	↓	532 m Pkm	579 m Pkm
rail travel[10]		2.4%	***	↑	2.2%	1.9%
road travel[10]		1.1%	***	→	1.0%	1.6%
air travel		96.5%	***	→	96.8%	96.4%
Number of flights (segments)		218,679	***	↓	246,107	250,743
Total paper consumption	301	5,370 t	***	↘	5,852 t	5,866 t
post-consumer recycled		21.9%	***	↑	14.1%	14.9%
new fibers FSC[11]		61.5%	***	↘	65.7%	75.9%
new fibers ECF + TCF[11]		16.5%	***	↓	20.2%	9.2%
new fibers chlorine-bleached		0.02%	**	↓	0.04%	0.07%
Total waste	306	10,749 t	***	→	11,252 t	12,543 t
valuable materials separated and recycled		51.1%	***	→	50.8%	55.0%
incinerated		16.1%	***	→	16.0%	16.9%
landfilled		32.7%	**	→	33.2%	28.1%
Total water consumption	303	0.79 m m3	**	→	0.79 m m3	0.87 m m3
Greenhouse Gas (GHG) Emissions in CO_2e	305					
Direct GHG emissions (Scope 1)[12]		10,574 t	***	↘	11,522 t	13,305 t
Gross indirect GHG emissions (Gross Scope 2)[12]		142,636 t	***	↘	150,957 t	161,349 t
Gross other indirect GHG emissions (Gross Scope 3)[12]		62,585 t	***	↓	71,389 t	76,763 t
Total Gross GHG Emissions		215,794 t	***	↘	233,868 t	251,417 t
GHG reductions from renewable energy[13]		(69,175) t	***	↑	(51,742) t	(49,247) t
CO_2e offsets (business air travel)[14]		(42,949) t	***	↓	(50,166) t	(54,412) t
Total Net GHG Emissions (GHG Footprint)[15]		103,670 t	***	↓	131,960 t	147,757 t

Legend: GWh = giga watt hour; Pkm = person kilometer; t = ton; m^3 = cubic meter; m = million; CO_2e = CO_2 equivalents

1 All figures are based on the level of knowledge as of January 2020. 2 Reporting period: 2019 (1 July 2018 – 30 June 2019), 2018 (1 July 2017 – 30 June 2018), 2017 (1 July 2016 – 30 June 2017) 3 Reference to GRI Sustainability Reporting Standards (see also www.globalreporting.org). 4 Non-significant discrepancies from 100% are possible due to roundings. 5 Specifies the estimated reliability of the aggregated data and corresponds approximately to the following uncertainty (confidence level 95%): up to 5% – ***, up to 15% – **, up to 30% – *. Uncertainty is the likely difference between a reported value and a real value. 6 Trend: at a ***/**/* data quality, the respective trend is stable (→) if the variance equals 5/10/15%, low decreasing / increasing (↘,↗) if it equals 10 /20/30% and decreasing / increasing if the variance is bigger than 10/20/30% (↓,↑). 7 Refers to energy consumed within the operational boundaries of UBS. 8 Refers to primary energy purchased that is consumed within the operational boundaries of UBS (oil, gas, fuels). 9 Refers to energy purchased that is produced by converting primary energy and consumed within the operational boundaries of UBS (electricity and district heating). 10 Rail and road travel: Switzerland only. 11 Paper produced from new fibers. FSC stands for Forest Stewardship Council, ECF for Elementary Chlorine Free and TCF for Totally Chlorine Free. 12 Refers to ISO 14064 and the "GHG (greenhouse gas) protocol initiative" (www.ghgprotocol.org), the international standards for GHG reporting: scope 1 accounts for direct GHG emissions by UBS; gross scope 2 accounts for indirect GHG emissions associated with the generation of imported / purchased electricity (grid average emission factor), heat or steam; gross scope 3 accounts for other indirect GHG emissions associated with business travel, paper consumption and waste disposal. 13 GHG savings by consuming electricity from renewable sources 14 Offsets from third-party GHG reduction projects measured in CO_2 equivalents (CO_2e). These offsets neutralize GHG emission from our business air travel. 15 GHG footprint equals gross GHG emissions minus GHG reductions from renewable energy and CO_2e offsets.

Environmental indicators per full time employee

	Unit	2019	Trend	2018	2017
Direct and intermediate energy	kWh / FTE	8,081	↓	9,080	10,151
Business travel	Pkm / FTE	6,670	↓	8,272	9,377
Paper consumption	kg / FTE	78	↓	91	95
Waste	kg / FTE	156	↓	175	203
Water consumption	m^3 / FTE	11.5	↘	12.3	14
CO_2 footprint	t / FTE	1.51	↓	2.05	2.39

Legend: FTE = full-time employee; kWh = kilo watt hour; Pkm = person kilometer; kg = kilogram; m^3 = cubic meter; t = ton
Note: FTEs are calculated on an average basis including FTEs that were employed through third parties on short term contracts.

Responsible supply chain management

We embed environmental and social standards into our sourcing and procurement activities. Our firm-wide responsible supply chain management (RSCM) framework is based on identifying, assessing and monitoring vendor practices in the areas of human and labor rights, the environment, health and safety and anti-corruption, in line with our commitment to the UN Global Compact and the *UBS in society* constitutional document.

In 2019, remediation measures were requested for 18 vendors that provide UBS with goods and services with high risk. Improving their adherence to UBS's RSCM standards has a potentially high positive impact.

Committing our vendors to our standards

We aim to reduce negative environmental and social effects of the goods and services UBS purchases and we engage with vendors to promote responsible practices. A central component of our RSCM framework is the UBS Responsible Supply Chain Standard to which our direct vendors are bound by contract. The standard defines our expectations towards vendors and their subcontractors regarding legal compliance, environmental protection, avoidance of child and forced labor, non-discrimination, remuneration, hours of work, freedom of association, humane treatment, health and safety and anti-corruption issues and a whistleblowing mechanism to support and protect employees.

→ **Refer to the "Our documents" page on *www.ubs.com/insociety* to download the Responsible Supply Chain Standard in various languages**

Identifying, assessing and monitoring high-impact vendors

The RSCM framework includes an impact assessment of newly sourced goods and services, which takes into account potential negative environmental and social impacts along the lifecycle of a product or a service, and all purchased goods and services are categorized accordingly.

We identify high-impact vendors when establishing new contracts or renewals based on the vendors' provision of goods and services that have either a substantial environmental and social impact or are sourced in markets with potentially high social risks. Such high-impact vendors are requested to fulfill further requirements towards product and service provision and are assessed against the UBS Responsible Supply Chain Standard. If this assessment reveals any non-compliance with our standard, UBS defines and agrees, together with the vendor, on specific improvement measures, which we monitor. Lack of improvement may lead to the termination of the vendor relationship. We also regularly screen active vendors as part of our environmental and social risk control processes.

Vendors of potentially high-impact goods or services are requested to conduct a self-assessment on their responsible management practices and to provide corresponding evidence. Actual and potential negative impacts that are considered in the impact assessment of purchased goods and services include:

→ Adverse environmental impacts due to inefficient use of resources (e.g., water, energy, biomass) and emissions during the lifecycle of the product
→ Hazardous substances, emissions, pollutants and limited recyclability of products, adversely affecting people and the environment
→ Unfair employment practices, such as low wages, excessive overtime, absence of occupational health and safety measures
→ Risks for consumer health and safety
→ Procurement and use of materials with a strongly negative environmental and/or social impact
→ Insufficient management of subcontractors regarding sustainability aspects

In 2019, 103 vendors were classified as vendors that provide UBS with goods or services with potentially high impacts, both newly sourced as well as ongoing engagements, which are regularly re-assessed. 17% of these vendors were considered as in need of improving their management practices. Specific remediation actions were agreed with all of them and the implementation progress has been closely monitored.

In 2019, no UBS vendor relationship was terminated as a result of RSCM assessments. This can partly be related to the fact that we assess the vendor's potential risks before entering into a contract with them.

Combating financial crime

We are committed to combating money laundering, corruption and terrorist financing and have implemented policies, procedures and internal controls that are designed to comply with such laws and regulations. We have developed a financial crime prevention framework that is intended to prevent, detect and report money laundering, corruption and terrorist financing.

We annually assess the money laundering, bribery and corruption, and sanctions risks associated with all of our business operations against our control framework, and take actions to further mitigate these risks.

We are a founding member of the Wolfsberg Group, an association of global banks that aims to develop financial services industry standards for policies on preventing financial crime such as corruption, money laundering and terrorist financing, and on Know Your Client principles. The Wolfsberg Group brings together banks globally at its annual forum and regional reach-out meetings focused on financial crime topics and works on guidance papers in related key areas of AML.

Together with the other members of the Wolfsberg Group, we work closely with the Financial Action Task Force (FATF), an intergovernmental body that helps develop national and international policies on preventing money laundering and terrorist financing through consultation with the private sector. We have adopted the global FATF standards with respect to record keeping.

In 2019, we have successfully achieved ISO certification in accordance with ISO standard Anti Bribery Management System 37001:2016. The audit certifies that UBS's global anti-bribery & corruption framework meets global requirements to prevent and detect bribery as defined by ISO, and it evidences UBS's commitment. The ISO certification is renewed annually and is the result of UBS proactively engaging an accredited ISO auditor. The ISO standard requires a series of measures which are aimed at preventing, detecting and addressing bribery. Such measures include, but are not limited to: policies and procedures, culture and tone from the top, appropriate resourcing, training, risk assessments, third party due diligence, and implementing appropriate controls.

→ **Refer to the "Assurance and certification" section for the ISO 37001:2016 certificate**

Monitoring

We apply Know Your Client rules and use advanced technology to help identify suspicious transaction patterns and compliance risk issues.

We continue to invest in our detection capabilities and core systems as part of our financial crime prevention program.

Our framework requires any suspicious activities to be promptly escalated to independent control units and external authorities, as required by law. Our monitoring framework covers risk-based transaction monitoring, real-time screening and retroactive searches. The UBS AML monitoring framework is established in accordance with the Monitoring Screening and Searching Wolfsberg Statement and is reviewed on an annual basis.

→ **Refer to the "Our governance and principles" section for information about combating financial crime governance and policies**

Ratings and recognitions

In 2019, we continued to gain industry recognition for our commitment to improving performance under ESG criteria and for our efforts in offering clients world-class expertise and sustainable products. For the fifth year running, we were named the best performer in the Diversified Financial Services and Capital Markets Industry of the Dow Jones Sustainability Index (DJSI), the most widely recognized corporate sustainability rating. MSCI ESG Research maintained our rating at AA, while Sustainalytics ranked our firm as an industry leader.

Ratings and recognitions[1]

Ratings and recognitions	Scope	UBS result
Dow Jones Sustainability Indices (DJSI)	Environmental, social and governance (ESG) performance	Industry leader Index member of DJSI World and DJSI Europe
CDP	Climate change	Climate A- rating (on Leadership band)[2]
Sustainalytics	ESG performance	Leader score within our industry 95th percentile ranking
MSCI	ESG performance	AA rating Top three among primary peer group[3]
ISS-ESG	ESG performance	Corporate responsibility prime status
FTSE4Good Index	ESG performance	Index member
Euromoney Private Banking and Wealth Management Survey 2019	Philanthropic advice	Winner
Euromoney Private Banking and Wealth Management Survey 2019	SRI / Social impact investing	Winner
PWM / The Banker Global Private Banking Awards 2019	Sustainable investing	Winner
Environmental Finance Sustainable Investment Awards 2019	Best ESG Hybrid Fund	Winner
Environmental Finance Sustainable Investments Awards 2019	Best ESG Initiative of the Year	Winner
GRESB Real Estate, Debt and Infrastructure assessments	Sustainability performance of real asset portfolios worldwide	Submission of 20 of REPM's (Real Estate & Private Markets) flagship funds (across real estate equity, real estate debt and infrastructure globally), representing 95% of REPM's direct pooled real estate and infrastructure vehicles globally. 15 real estate and infrastructure funds achieved 5-star status, the highest recognition available
ShareAction	Stewardship	AM ranked as the leading asset manager globally for voting on climate-related resolutions

Ratings and recognitions (continued)

Ratings and recognitions	Scope	UBS result
Corporate Engagement Awards	Community investment	Gold for Best Educational Programme Best alignment of brand values through sponsorship activity
Better Society Awards (UK)	Community investment	Highly Commended for Commitment to Local Community
Global Good Awards (UK)	Community investment	Gold for Community Partnerships in Education and Entrepreneurships Silver Award in the Best Education Project category for UBS's 10 year partnership with The Bridge Academy
2019 Top 10 Enterprises for Public Welfare (China)	Community investment	Winner of the Charity Award
Japan Corporate Philanthropy Award (Japan)	Community investment	Grand Prix of the Award
Employer of Tomorrow Award (Polish Agency for Enterprise Development)	Employment-related and community investment	Winner
World's Most Attractive Employers (Universum)	Employment-related	Top 50
Bloomberg Gender-Equality Index	Employment-related	Index member
Working Mother magazine's "100 Best Companies" (US)	Employment-related	Top 100
Best Places to Work for LGBT Equality (Human Rights Campaign), US	Employment-related	15th consecutive year
The Times Top 100 Graduate Employers (UK)	Employment-related	Top 100
Best HR Center of Expertise in Greater China Award (HRoot 2019)	Employment-related	Winner

1 All information provided is as of 31 December 2019, except where indicated. 2 As of 20 January 2020 3 As defined in the UBS Compensation Report 2019

External commitments and memberships

Transparency & reporting

- ISO 37001 certified Anti Bribery Management System (since 2019)
- Task Force on Climate-related Financial Disclosures (implementing recommendations since 2017)
- ISO 50001 certified Energy Management System (since 2017)
- SASB (member since 2013)
- Global Reporting Initiative (user of GRI reporting framework since reporting year 2008)
- ISO 14064 certified Greenhouse gases (since 2004)
- CDP (founding signatory in 2002)
- ISO 14001 certified Environmental Management System (since 1999)

Corporate responsibility & sustainability

- UN LGBTI Standards of Conduct for Business (member since 2018)
- CEO Climate Leaders (signatory in 2015)
- European Bankers Alliance (member since 2015)
- RE100 (member since 2015)
- Conference Board (CR&S Council member since 2014)
- Swiss Better Gold Association (member since 2014)
- Global Apprenticeship Network (member since 2013)
- Banking Environment Initiative's and Consumer Goods Forum's Soft Commodities Compact (member since 2013)
- Roundtable on Sustainable Palm Oil (RSPO member since 2012)
- Global Compact Network Switzerland (member since 2011)
- Thun Group of Banks (founding participant in 2011 and Convener)
- Swiss Center of Expertise in Human Rights (member of advisory board since 2010)
- University of Zurich Competence Center for Human Rights (member of advisory board since 2010)
- UN Global Compact (signatory since 2000)
- Wolfsberg Group (founding member in 2000)
- Business in the Community (cofounding member in 1988)
- Zurich Energy Model (founding member in 1987)

Sustainable finance

- Principles for Responsible Banking (founding signatory in 2019)
- Global Investors for Sustainable Development Alliance (founding member in 2019)
- IFC Operating Principles for Impact Management (founding signatory in 2019)
- Green investment principles for the Belt and Road (signatory in 2019)
- Transition Pathway Initiative (since 2019)
- Climate Action 100+ (member since 2017)
- Swiss Sustainable Finance (member since 2015)
- USSIF (member since 2015)
- CSFI (member since 2015)
- GRESB (member since 2012 and member of the advisory board since 2015)
- Sustainable Finance Geneva (member since 2012)
- Global Impact Investing Network (member since 2011)
- Principles for Responsible Investment (PRI signatory since 2009)
- European Venture Philanthropy Association (member since 2007)
- Association for Environmental Management and Sustainability in Financial Institutions (VfU member since 1996)
- UNEP FI (member since 1992)

Driving change in communities

Overview

At UBS, we are committed to making a lasting impact by addressing and overcoming disadvantage within our local communities. Our Community Affairs programs enable us to achieve this commitment. Through successful and sustainable partnerships with non-profit organizations and social enterprises, we make long-term investments into education and entrepreneurship. We provide strategic financial commitments and focused employee volunteering to drive change.

We believe every individual plays a role in ensuring a healthy and thriving future for our communities. This is why we offer UBS employees two days of paid leave to volunteer each year. Our focus on skills-based volunteering aims to address issues within society that hinder sustainable growth and development.

→ **Refer to *www.ubs.com/insociety* for more information**

Our contributions in 2019

Our Community Affairs framework is global in scope and delivers both community and business impact in each of the regions in which we operate. The globally mandated strategy is flexible in nature, and regional execution of the strategy ensures we are aligning our programs to address local community issues and support business priorities. The impact of our Community Affairs program is driven by both financial donations and hours volunteered by our employees.

We use a global framework, based on the industry-leading London Benchmarking Group (LBG) model, for measuring and reporting on our Community Affairs programs and investments. Use of such a standardized model across our global strategy ensures that we are able to effectively focus our approach.

2019 in numbers

USD
45.2 million

direct cash contributions

202,784

volunteer hours (145,148 during work hours and 57,636 outside of work hours)

280,858

beneficiaries reached

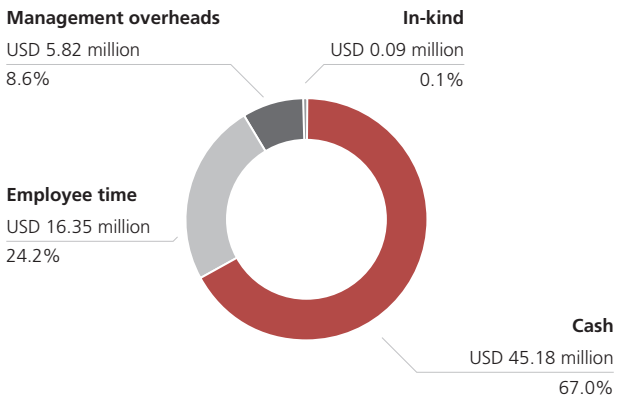
38%

of the UBS workforce volunteered (27,297 employees)

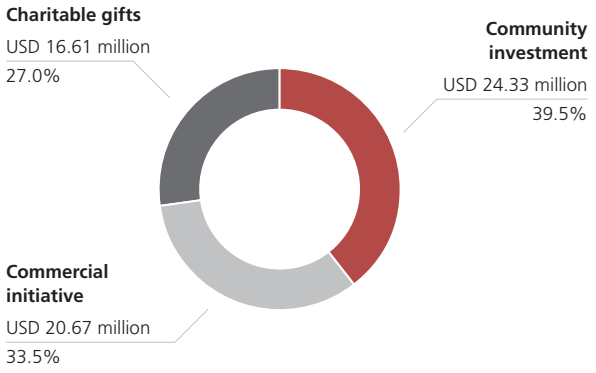
48%

of volunteer hours were skills-based

Contributions by type



Contributions by motivation



- **Cash** – direct cash contributions from the firm, including support through its affiliated foundations in Switzerland and the UBS Anniversary Education Initiative and contributions to the UBS Optimus Foundation.[1]
- **Employee time** – the cost to UBS of the time that employees spend on community programs during working hours. This is calculated by multiplying the number of volunteer hours during working hours by the average hourly salary.
- **In-kind** – contributions of products, equipment, services and other non-cash items from the company to the community. For UBS, this is primarily the cost of making our premises available to our partner charities for events.
- **Management overheads** – the cost associated with the firm's Community Affairs function.
- **Community investment** – long-term strategic involvement in community partnerships in the areas of education and entrepreneurship. 88% of UBS's Community Affairs grants were made in these areas.
- **Commercial initiative** – activities in the community, to directly support the success of the company, promoting corporate brand identities and other policies, in partnership with charities and community-based organizations.
- **Charitable gifts** – intermittent support to a wide range of good causes in response to the needs and appeals of charitable and community organizations. This includes our programs to match employee donations.

[1] All cash contributions shown here are recognized on a cash rather than accrual basis. The cash contribution does not include contributions totaling USD 513,845 which are required by law (India and South Africa). This is consistent with LBG methodology. Separately (see page 48 of this report), we recognize UBS Optimus Foundation contributions on an accrual basis reflecting committed grants made in the reporting period.

Employee volunteering

In 2018, we made a commitment to our local communities by setting a target to achieve 40% of employees volunteering by the end of 2020, of which 40% of volunteer hours will be skills-based.

By encouraging our employee volunteering efforts towards skills-based volunteering, we ensure that we work to tackle local social issues in the most powerful and effective way. Our skills-based volunteering programs include building the capacity of social enterprises through mentoring and supporting the career aspirations of local students. Leveraging the specialized skills and talents of our employees is key to the success of our program and to our business.

Progress against 2020 target

We are making progress towards our 2020 target, and at the end of 2019, 38% of our global workforce volunteered, with 48% of the hours being skills-based.

	Target 2020	2019	2018	2017
Number of employees volunteering		27,297	25,256	20,140
% employees engaged	*40%*	***38%***	*36%*	*31%*
Number of volunteer hours		202,784	197,807	168,226
% hours that are skills-based	*40%*	***48%***	*45%*	*38%*

Measuring Impact

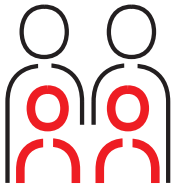
Our strategic focus is on education and entrepreneurship. We offer programs which support young people globally, to help increase their educational attainment and acquire workplace skills. We also work with entrepreneurs to help them build and scale businesses that tackle unemployment and revitalize underserved communities. Many of our offices focus on social entrepreneurship, supporting businesses that have social impact at the heart of their business model.

UBS uses the global LBG framework to capture data from our Community Affairs partners on the impact that UBS's contributions have made.

Individual beneficiaries in 2019

Our Community Affairs program benefited 280,858 young people and entrepreneurs across all of the regions in which we operate.

We also measure the extent to which our support has benefitted them (i.e., by using the LBG depth of impact scale in the figure below). Measuring based on this model has shown that UBS's support has substantively improved or transformed the lives of 107,388 individuals in 2019. This represents 38% of the number of beneficiaries for whom depth of impact was reported.



280,858

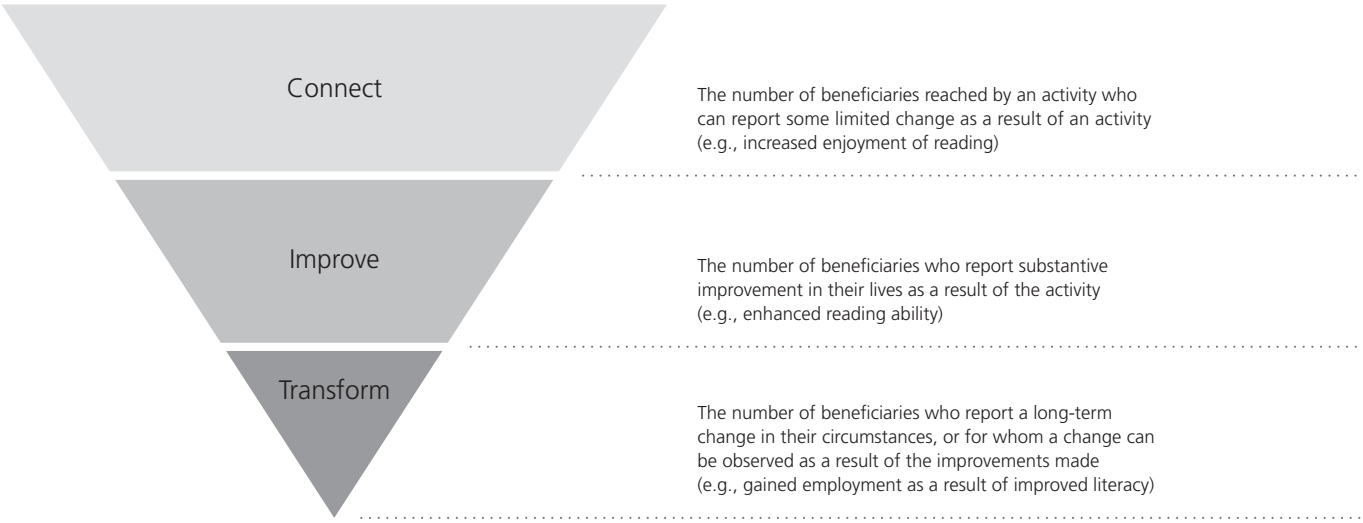
individual beneficiaries reached globally

144

community partners

LBG depth of impact scale

LBG depth of impact scale



Impacting organizations in 2019

36

intermediary organizations supported by UBS that are building the capacity of charities, social enterprises and social sector organizations

1,742

third-party organizations reached by UBS's support for intermediary organizations

2025 goal

We know that long-term change can only be achieved by setting long term and impactful targets. In 2020, for the first time, we are setting a long-term target on the change that we want to make.

Our 2025 goal is to support 1 million young people and adults to learn, and develop skills for employment, decent jobs and entrepreneurship by 2025. We recognize this is best achieved through strategic grant funding and by engaging our employees in skills-based volunteering. Our work will focus on supporting three UN Sustainable Development Goals (SDGs) specifically: SDG 4 Quality Education, SDG 8 Decent work and economic growth and SDG 10 Reduced inequalities.

We will continue to use our depth of impact scale (see above) to report both, the number of beneficiaries we have reached, and the extent to which our support has changed lives. We also have a 2020 target to maintain 38% of beneficiaries whose lives are "improved" or "transformed" by UBS's support.

Our sustainability track record

1954	Beginnings of Community Affairs at Wealth Management US
1962	Establishment of Union Bank of Switzerland's 100th anniversary foundation (since 1999: UBS Culture Foundation)
1971	Launch of A Helping Hand from UBS Employees (UBS Mitarbeiter helfen) in Switzerland
1972	Establishment of Swiss Bank Corporation's 100-year anniversary foundation (since 1999: UBS Foundation for Social Issues and Education)
1978	Beginnings of Community Affairs in EMEA
1982	Establishment of first energy-functional unit
1988	Co-founding member of Business in the Community in the UK
1989	First bank in Switzerland with the position of environmental officer
1992	First formal energy guidelines
1993	Among the first signatories of the United Nations Environment Programme bank declaration (UNEP FI)
1994	Introduction of first environmental policy
1995	Publication of first environmental report and introduction of environmental credit assessment procedure for Swiss corporate clients
1996	Introduction of employee volunteering at Wealth Management US and of matched-giving scheme for London employees
1997	Launch of Socially Responsible Investment (SRI) Funds Establishment of the Investment Bank Community Affairs in Stamford (monetary and in-kind donations, and employee volunteering).
1998	Merger of Union Bank of Switzerland and Swiss Bank Corporation to create UBS
1999	Founding member of Wolfsberg Group First bank to obtain ISO 14001 certification for worldwide environmental management system in banking business and launch of Environmental Risk Policy in the Investment Bank Establishment of UBS Optimus Foundation
2000	UBS among first companies to sign UN Global Compact Wolfsberg Group Anti-Money Laundering (AML) Principles for Private Banking (revised 2002) UBS commences reporting on corporate responsibility in Annual Report
2001	Establishment of Corporate Responsibility Committee, a Board of Directors committee, and publication of first Corporate Responsibility section in Annual Report Establishment of a Global Diversity Steering Committee within the Investment Bank Founding member of European Social Investment Forum (Eurosif) Wolfsberg Group Commitment against Terrorism Employee volunteering time-off policy introduced for London employees
2002	Wolfsberg Group Statement on Fight against Financing of Terrorism and AML Principles for Correspondent Banking Launch of Group-wide Diversity initiative Founding signatory of CDP (originally known as Carbon Disclosure Project) Commencement of joint Wealth Management and Investment Bank Community Affairs in Chicago Expansion of in-house environmental program to Corporate Services outside Switzerland
2003	First financial services firm to formally register interest as an academy sponsor in the UK (leads to the opening of the The Bridge Academy, Hackney, in 2007) Institution of NGO communications and analysis function
2004	Establishment of SRI Equity Research in the Investment Bank

2005	Establishment of coordination function for Community Affairs in Switzerland Setting up of UBS Tsunami Relief Fund UBS commences social reporting in Annual Report (section on employees)
2006	Introduction of climate strategy Adoption of UBS Statement on Human Rights Wolfsberg Group releases Investment Banking FAQs, Guidance for Mutual Funds and Pooled Vehicles, Correspondent Banking FAQs and Guidance on the Risk-Based Approach
2007	Establishment of SRI Research in Global WMBB Wolfsberg Group Statement against Corruption and Wolfsberg Group Statement on Transparency in International Payments First company-wide volunteering at Wealth Management US
2008	Introduction of group-wide Responsible Supply Chain Guideline Wolfsberg Group Revised PEP FAQs
2009	UBS applies Global Reporting Initiative (GRI) framework to its 2008 non-financial disclosure UBS's Sustainability Disclosure 2008 meets the requirements of level A+ of the GRI (continued in subsequent years) UBS Asset Management becomes a signatory to the Principles for Responsible Investment (PRI)
2010	Launch of UBS's new Code of Business Conduct and Ethics Publication of UBS Position on Controversial Activities
2011	Convener of Thun Group of Banks on banking and human rights Establishment of UBS Environmental & Social Risk Committee Awarded with UK Big Society Award (established by the UK Prime Minister)
2012	UBS celebrates its 150th anniversary Setting up of the UBS International Center of Economics in Society at the University of Zurich Global roll-out of the Investment Bank's environmental, social and governance (ESG) Analyzer
2013	Thun Group launches discussion paper on banking and human rights Renewal of climate strategy
2014	Introduction of UBS Environmental and Human Rights Policy Launch of UBS and Society, UBS's sustainability organization Publication of UBS's comprehensive Environmental and Social Risk Framework document UBS's Sustainability Disclosure 2013 meets the requirements of GRI G4 comprehensive
2015	Dow Jones Sustainability Indices (DJSI) industry group leadership Appointment of Head UBS and Society
2016	DJSI industry group leadership maintained Introduction of UBS and Society Policy (replacing and expanding upon UBS Environmental and Human Rights Policy)
2017	DJSI industry group leadership maintained for third year running UBS and Society constitutional document (replaces UBS and Society policy) UBS unveils a blueprint for channeling private wealth towards the UN SDGs at the World Economic Forum Annual Meeting in Davos UBS joins UN working group on TFCD implementation to help banks disclose their exposures to climate-related risks and opportunities
2018	Listed as number 1 market player for sustainable investments in Switzerland according to the Swiss sustainable investment market study 2018 DJSI industry group leadership maintained for fourth year running MSCI ESG increased rating of UBS from A to AA UBS and Society renamed into *UBS in society*
2019	DJSI industry group leadership and MSCI ESG rating of AA maintained Appointment of Head Sustainable Finance

→ **Refer to *www.ubs.com/history* for information on the history of UBS**

Assurance and certification

Independent assurance report by EY

Building a better working world

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To the Management of

UBS Group AG, Zurich

Basel, 27 February 2020

Independent assurance report

We have undertaken a limited assurance engagement on the information disclosed as part of the sustainability reporting of UBS Group AG on the basis of the Global Reporting Initiative (GRI) for the period 1 January to 31 December 2019 (hereafter the "report"):

- Information in the "Sustainability Report 2019" (online at www.ubs.com/annualreporting as of 5 March 2020)

Limitations of the engagement

Our engagement was limited to the information listed above. We have not assessed the following information disclosed in the report:

- The financial information in scope of the statutory audit of the financial statements has not been additionally reviewed to obtain limited assurance. Our engagement was limited to the presentation of the information in line with the GRI requirements.
- Forward-looking statements.

Responsibility of UBS Group AG's management

The management of UBS Group AG is responsible for the preparation of the report and the information contained therein in accordance with the applicable criteria. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation of the report that is free from material misstatement, whether due to fraud or error.

Applicable criteria

We assessed the information in the sustainability reporting against the following criteria (hereafter "criteria"):

- GRI Sustainability Reporting Standards, Comprehensive Option

A summary of the standards is presented on the GRI homepage (online at *https://www.globalreporting.org/standards/gri-standards-download-center*). We believe that these criteria are a suitable basis for our review.

Independence and quality control

We have complied with the independence and other ethical requirements of the *International Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior.

The firm applies International Standard on Quality Control 1 and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

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Our responsibility

Our responsibility is to express a limited assurance conclusion on the information disclosed in the sustainability report based on the procedures we have performed and the evidence we have obtained. We conducted our limited assurance engagement in accordance with International Standard on Assurance Engagements (ISAE) 3000 "Assurance Engagements Other than Audits or Reviews of Historical Financial Information", issued by the International Auditing and Assurance Standards Board. This standard requires that we plan and perform the engagement to obtain limited assurance about whether the report is free from material misstatement.

In accordance with the engagement agreement, our duty of care for this engagement only extends to the management of UBS Group AG.

Based on risk and materiality consideration we have undertaken procedures to obtain sufficient appropriate evidence. The procedures selected depend on the auditor's judgment. This includes the assessment of the risks of material misstatements in the report with regard to the applicable criteria. The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in scope than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had we performed a reasonable assurance engagement.

Summary of work performed

Our limited assurance procedures included, amongst others, the following work:

- Interviews with representatives of senior management and employees regarding the sustainability strategy and the materiality matrix
- Review of material topics against key issues raised in stakeholder dialogues, areas of performance covered in external media reports and sustainability reports of UBS' peers
- Interviews with employees responsible for preparing the GRI-based sustainability reporting to assess the process of preparing the report, the reporting system, the data capture and compilation methods as well as internal controls to the extent relevant for a review of the report
- Interviews of employees in specialist departments responsible for the topics included in the „Sustainability Report 2019"
- Review of the documentation of the systems and processes for compiling, analyzing, and aggregating sustainability data and testing such documentation on a sample basis
- Analytical considerations, interviews and review of documents on a sample basis with respect to the compilation and reporting of quantitative data included in the report
- Review of the application of the GRI Sustainability Reporting Standards in accordance with the Comprehensive Option
- Evaluation of the overall view of sustainability information provided in the report

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Our conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the report has not been prepared, in all material respects, in accordance with the applicable criteria.

Ernst & Young Ltd

Marie-Laure Delarue
Partner

Roger Müller
Partner

ISO 14001 and 50001 certificates

UBS is globally certified according to ISO 14001, the international environmental management system standard. In 1999, UBS was the first bank to obtain ISO 14001 certification for its worldwide environmental management system. The management system covers the entire scope of UBS's products, services and in-house operations that may give rise to an environmental impact. Additionally, we have further developed our environmental and energy management system in our European locations in order to be compliant with ISO 50001. We received the first ISO 50001 certification (energy management system standard) in 2017. The integrated management system is externally audited annually and re-certified every three years.

These comprehensive audits verify that appropriate policies and processes are in place to manage environmental and energy-related topics and that they are executed in day-to-day practice.

In 2019, UBS successfully passed the ISO 14001 and ISO 50001 surveillance audit on its environmental and energy management system.

MGMT. SYS.
RvA C 466

Certificate

Certificate number: 2017-015

Certified by EY CertifyPoint since September 1, 2017

Based on certification examination in conformity with defined requirements in ISO/IEC 17021-1:2015, the Environmental Management System as defined and implemented by

UBS Group AG*

located in Zurich, Switzerland is compliant with the requirements as stated in the standard:

ISO 14001:2015

Original issue date of certificate: September 1, 2017
Re-issue date of certificate: March 8, 2018
Expiration date of certificate: June 29, 2020

EY CertifyPoint will, according to the certification agreement dated June 13, 2017, perform surveillance audits and acknowledge the certificate until the expiration date noted above.

**The certification is applicable for the assets, services and locations as described in the scoping section on the back of this certificate.*

www.iaf.nu

J. Sehgal | Director, EY CertifyPoint

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UBS Group AG

Scope for certificate 2017-015

The scope of this ISO 14001:2015 certification is as follows:

The EMS includes banking business activities, UBS employees, products and services of the following business divisions (Corporate Center, Wealth Management, Wealth Management Americas, Personal and Corporate Banking, Asset Management and the Investment Bank) with environmental aspects governed under the UBS and Society policy (available at www.ubs.com/ubsandsociety). The EMS applies to all in-house operations and all major locations and data centers in the following geographical locations (as per the UBS Scope Register v.1.0).

The Environmental Management System is centrally managed out of Zurich, Switzerland. The scope mentioned above applies to the following locations:

Argentina
Australia
Austria
Bahamas
Bahrain
Brazil
Canada
Cayman Islands
Chile
China
Colombia
Denmark
Egypt
France
Germany
Hong Kong
India
Indonesia
Ireland
Israel
Italy
Japan
Jersey
Kazakhstan
Korea, Republic of
Lebanon
Luxembourg
Malaysia
Mexico
Monaco
Netherlands
New Zealand
Nigeria
Panama
Philippines
Poland
Puerto Rico
Qatar
Russia
Saudi Arabia
Singapore
South Africa
Spain
Sweden
Switzerland
Taiwan
Thailand
Turkey
United Arab Emirates
United Kingdom
United States
Uruguay

The Environmental Management System mentioned in the above scope is restricted as defined in "Manual for UBS's environmental and energy management systems" version 9, dated July 14, 2017.

This scope (edition: March 8, 2018) is only valid in connection with certificate 2017-015.

Digital version

Certificate

Certificate number: 2017-017
Certified by EY CertifyPoint since: September 1, 2017

Based on certification examination in conformity with defined requirements in ISO/IEC 17021-1:2015, the Energy Management System as defined and implemented by

UBS Group AG*

located in Zurich, Switzerland is compliant with the requirements as stated in the standard:

ISO 50001:2011

Issue date of certificate: September 1, 2017
Expiration date of certificate: June 29, 2020

EY CertifyPoint will, according to the certification agreement dated June 23, 2017, perform surveillance audits and acknowledge the certificate until the expiration date noted above.

**The certification is applicable for the assets, services and locations as described in the scoping section on the back of this certificate.*

Drs. J. Sehgal RE | Director, EY CertifyPoint

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Digital version

UBS Group AG

Scope for certificate 2017-017

The scope of this ISO 50001:2011 certification is as follows:

The EnMS includes all in-house operations conducted at 38 locations, consisting of offices and datacenters in selected European countries and cities as per the UBS Scope Register v.1.0 (January 26, 2017).

The Energy Management System is centrally managed out of Zurich, Switzerland. The scope mentioned above applies to the locations in following cities:

France, Bordeaux
France, Lyon
France, Nantes
France, Paris
France, Strasbourg
Germany, Berlin
Germany, Düsseldorf
Germany, Frankfurt
Germany, Hamburg
Germany, München
Germany, Stuttgart
Italy, Bologna
Italy, Brescia
Italy, Firenze
Italy, Milano
Italy, Modena
Italy, Napoli
Italy, Padova
Italy, Roma
Italy, Torino
Italy, Treviso
Italy, Varese
Luxembourg, Luxembourg
Poland, Kraków
Poland, Warszawa
Poland, Wroclaw
Poland, Zabierzów
Spain, Barcelona
Spain, La Coruña
Spain, Madrid
Spain, Seville
Spain, Valencia
Spain, Zaragoza
United Kingdom, London
Switzerland, Zurich

The Energy Management System mentioned in the above scope is restricted as defined in "Manual for UBS's environmental and energy management systems" version 9, dated July 14, 2017.

This scope (edition: July 14, 2017) is only valid in connection with certificate 2017-017.

Digital version

ISO 37001 certificate

euroCompliance

AFFIRMING SHARED VALUES

UBS Group AG

Bahnhofstrasse 45, CH-8001 Zurich, Switzerland

has been assessed and certified as meeting the requirements of the standard

ISO 37001 : 2016

for the Anti-Bribery Management System in relation to its activities of global financing services.

CERTIFICATE n° 3741191003A

Date of issuance March 18th 2019 valid until March 17th 2022

Subject to satisfactory surveillance visits

List of entities under scope

euroCompliance - 76 rue de la Pompe - 75116 Paris, France

Philippe Lesoing, General Manager

cofrac

Accréditation n°4-0599

www.eurocompliance.com

Signature numérique de CELESTE CORNU ID

Charter of the Corporate Culture and Responsibility Committee

Excerpt from *The Organization Regulations of UBS Group AG* (Annex C – Charter for the Committees of the Board of Directors of UBS Group AG)

Corporate Culture and Responsibility Committee		
7.1	The CCRC supports the Board in its duties to safeguard and advance the Group's reputation for responsible and sustainable conduct. Its function is forward-looking in that it monitors and reviews societal trends and transformational developments and assesses their potential relevance for the Group. In undertaking this assessment, it reviews stakeholder concerns and expectations pertaining to the societal performance of UBS and to the development of its corporate culture. The CCRC's function also encompasses the monitoring of the current state and implementation of the programs and initiatives within the Group pertaining to corporate culture and corporate responsibility.	In general
7.2	The CCRC's responsibilities and authorities are to: (i) General: (a) monitor and advise the Board on current and emerging societal trends and developments of potential relevance for the Group; (b) review and assess the current state and implementation of the corporate culture and corporate responsibility programs and initiatives within the Group; and (c) monitor the consistent application of the behaviors of integrity, challenge and collaboration within UBS; (ii) Policies and regulations: (a) monitor and advise the Board on evolving external corporate culture and corporate responsibility regulations, standards and practices; (b) conduct the annual review process for the Code of Conduct and Ethics of UBS and make proposals for amendments to the Board; and (c) review and oversee that policies and guidelines of UBS pertaining to corporate culture and corporate responsibility are relevant and up to date; (ii) Strategy: (a) monitor the effectiveness of actions taken by UBS relating to the corporate culture and responsibility regulations and policies as well as objectives of UBS; (b) support the GEB, if required, in the adjustment of processes pertaining to corporate culture and responsibility; (c) approve UBS in society's overall strategy and annual objectives and (d) support a strong and responsible corporate culture firmly founded in a spirit of long-term thinking; (iv) Programs and initiatives: oversee UBS's corporate culture and corporate responsibility programs and initiatives, including: (a) UBS in society; (b) sustainable and impact investing; (c) client philanthropy; (d) environmental and social (including human rights) risk management; (e) climate strategy; (f) in-house environmental management; (g) responsible supply chain management; (h) community affairs; (i) diversity and inclusion; (j) talent management; (k) working environment; and (l) combating financial crime; (v) Communications: (a) advise the Board on the reporting of the Group's corporate culture and responsibility strategy and activities, review the relevant sections of the Group's annual report, and provide oversight of the annual UBS sustainability disclosure assurance audit process; and (b) monitor and review communications with stakeholders on corporate culture and corporate responsibility (including with relevant organizations and with sustainability rating and ranking bodies) and their effectiveness with regard to the reputation of the Group.	Responsibilities and authorities

Our Code of Conduct and Ethics

In this Code, the Board of Directors and the Group Executive Board set out the principles and practices that define our ethical standards and the way we do business.

By following it, we will foster an ethical culture where responsible behavior is second nature. We will protect our most important asset – our reputation. And, ultimately, we will create lasting value for our shareholders. The Code sets the standards that help us to make that happen.

It is based on three Principles: client focus, which is about building relationships that create long-term value, focusing on investment returns and anticipating and managing conflicts of interest; excellence in everything from our products and services to how we collaborate across the firm to deliver the best of what UBS has to offer; and sustainable performance, which is about working continuously to strengthen our reputation as a rock- solid firm and provide consistent returns for shareholders.

It is essential that we all follow these Principles. In short, if we do business in the right way, we will be a better business, and an even more successful one.

The Code applies to everything and everyone

The Code covers our dealings with stakeholders, clients, counterparties, shareholders, regulators and business partners – and each other. And it is the basis for all our policies, guidelines and procedures.

Ignorance of the Code is no excuse

As part of our training, everyone hears about the standards in the Code and learns how to apply them. But we also strongly encourage you to read the Code and get to know it. Not knowing the Code is no excuse for violating it.

Our Boards are fully behind the Code – and needs the whole bank to be behind it, too

The Code has the full backing of the Board of Directors and Group Executive Board. And every one of us needs to make sure our day-to-day actions and decisions follow the standards set out here. Above all, we must put the interests of UBS, our clients and our shareholders above our own.

Of course, the Code cannot describe every possible situation. If you find yourself dealing with something unexpected, apply these ethical standards in your judgment and get guidance or help.

Thank you for your support.

Axel A. Weber
Chairman of the Board of Directors

Sergio P. Ermotti
Group Chief Executive Officer

Laws, rules and regulations

Obeying the law

We obey the laws, rules and regulations where we live, work and do business – as well as our own governance documents.

And we cooperate with our regulators, being open and transparent in our dealings with them.

Cross-border business

When we are working across borders, we obey all pertinent laws, rules and regulations – both at home and abroad.

If we are selling to, buying from, visiting or dealing with clients from outside our home country, it is our job to understand what rules, laws or policies apply – and follow them.

Fair dealing and fair competition

We succeed by outperforming our competitors fairly and honestly, not by resorting to unfair or underhand tactics.

We don't stretch, distort or try to hide the facts or the truth. Nor do we use information we are not meant to have to gain an unfair advantage over competitors.

We act fairly, honestly and in good faith with everyone we deal with: our clients, business partners, competitors, suppliers, the public and each other.

And we act in the interest of fair and effective competition and respect all the laws, rules and regulations that are designed to create a level playing field for all – including antitrust and competition laws.

Fighting crime

We have a duty to contribute to the integrity of the financial system, as well as our own business.

So we do whatever we can to combat money laundering, corruption and terrorist financing – including imposing global sanctions in line with our policy.

Money laundering

We have rigorous systems in place to detect, report and stop any suspected money laundering.

Corruption

We have zero tolerance for corruption or any kind of bribery, including so-called "facilitation payments." We don't offer or accept improper gifts or payments in the course of our business.

Criminal activity

We carry out due diligence and keep a constant lookout for any suspicious activities, reporting them to senior management as soon as we discover them. And we follow strict Know-Your-Customer regulations.

Tax matters

We follow all the laws, rules, regulations and treaties around tax that apply to us, all over the world – not just to the letter, but in their true spirit. We pay and report all taxes due. We report information relating to our own tax position and that of our clients and employees as required.

We will not help our clients or any other party avoid paying the tax that they owe or reporting their income and gains, nor will we support any transactions where we know or shall presume that the tax outcome is dependent on unrealistic assumptions or the hiding of facts.

We will also not contract with third parties that provide services for or on our behalf, where those acts help others to evade taxes owed.

Behaving responsibly and ethically

Values and ethics

We don't just follow the laws, rules and regulations in everything we do. We do what is right. We don't just ask ourselves whether what we're doing is legal, but whether it fits with our three UBS Behaviors: Integrity, Collaboration and Challenge.

Client relationships

We look after our clients for the long term, winning their loyalty by earning their trust.

We try to anticipate what our clients are going to need before they ask. We go out of our way to give them an exceptional service. We make sure our products and services are adequate for our clients and are sold in a way that is not detrimental to their interests.

And we treat them fairly, and with the same courtesy and respect, however large or small they may be.

Conflicts of interest

We put our clients' best interests before our own – and UBS's interests before our personal interests. And we never let UBS's or our personal interests influence our advice to a client, or our dealings with them.

We have systems to identify and manage potential conflicts of interest. And as soon as we do identify any such conflicts, we raise them immediately with our line manager or with Legal or Compliance & Operational Risk Control.

Sharing, using and storing information

Reporting and information sharing

When we share or report anything, especially financial information – to either the public or our regulators – we take great care to make sure it is accurate, up to date and as easy to understand as it can be (and in line with any legal or regulatory requirements and best practice).

We maintain an internal control framework that is designed to support the preparation and fair representation of consolidated financial statements in accordance with International Financial Reporting Standards (IFRS) and that are free from material misstatement.

Based on their audit work, our independent external auditors express an opinion on our internal controls over financial reporting as well as on the financial statements themselves. Our internal audit function often provides support to our external auditors in discharging their responsibilities, and also assesses the adherence to our strategy and the effectiveness of our governance, risk management and control processes.

Inside information

We never use inside information (material information that is not public) to do anything other than what it was given to us for in the first place.

Having made every effort to ascertain whether information is inside information, we only ever share such information on a need-to-know basis. That applies to people inside and outside UBS, in line with our internal procedures, as well as any relevant laws, rules and regulations.

Client confidentiality

Our clients trust us to keep the information they've shared with us safe and secure and only use it in the ways we've agreed with them.

We follow the highest standards of information security to keep our client information confidential and to protect legitimate client privacy rights. We have strict data security standards and procedures designed to prevent data being tampered with, seen or used by the wrong people, stolen, lost or destroyed.

We never share our clients' details with anyone, unless we have their express permission to do so – or where we have a legal duty to share it with the relevant authorities. And even within UBS, we will only share client details with those colleagues who genuinely need to see it to serve our clients' best interests.

Creating the right culture

Diversity and equal opportunity

We believe that people from different backgrounds, with different thoughts and opinions, make us a stronger business. They bring us valuable new ideas, approaches and experiences.

Regardless of their status, everyone has the same chance to get ahead at UBS – whatever their ethnicity, gender, national origin, age, ability, sexual orientation or religion. And we work to create a culture where everyone feels they are welcome, respected and that they are a valuable part of our team – whatever part of UBS they work in.

We do not tolerate any kind of discrimination, bullying or harassment. And we encourage each other to speak up and report it through clear channels, without fear of reprisals.

Performance and professionalism

Our professionalism, integrity and pursuit of excellence are how we create value for our clients and shareholders. So our compensation system is designed to reward long-term value creation by balancing performance and prudent risk-taking with a focus on conduct and sound risk management practices.

We know that our business is only as strong as our people. So we work hard to create a working environment where talent can thrive and reach its full potential.

Protecting our assets

We keep UBS's assets safe and secure – from sensitive, confidential information about our business, plans and people to our intellectual property, systems and equipment, as well as documents, information and other materials belonging to others that are entrusted or made available to us. That means making sure that these assets are handled properly and used in line with relevant laws and regulations and doing what we can to prevent them from being lost, stolen, damaged or misused. We retain data to fulfill regulatory retention and legal hold obligations.

We will not use such assets for non-UBS business or for our own personal advantage.

Health and safety

We never do anything that might put people in danger or harm them in any way – whether they're colleagues, clients, partners, competitors, visitors or anyone else.

We keep our workplaces safe by following health and safety rules. Doing this makes sure we have safe and healthy working conditions in which our dignity is respected.

Society and the environment

Integrating financial and societal performance

We integrate financial and societal performance for the mutual benefit of our clients and our firm.

So we're constantly looking for better ways to do business in an environmentally sound and socially responsible manner.

That includes monitoring, managing and reducing any negative impact we might have on the environment and on human rights. It means managing social and environmental risks that our own and our clients' assets are exposed to. And it means looking for sustainable investment opportunities, for ourselves and our clients.

Investing in our communities

We constantly look for ways to contribute to the well-being of our local communities – by supporting charitable activities financially and non-financially, including through our volunteering efforts.

Violating the Code

Disciplinary procedures

Anyone who breaks the rules (whether it is our Code, UBS policies or outside laws, rules and regulations) will face consequences – from reprimands and warnings to dismissals.

This includes not only the person who broke the rules, but also their line manager and anyone who knew about it but did not report it.

And where a violation amounts to criminal behavior, we will not hesitate to bring it to the attention of the relevant authorities.

Upholding the Code

From our Board of Directors down, we live up to this Code at all times, with no exceptions.

UBS will not accept any justification or excuse for breaking it, whatever the reason – whether for profit, convenience or competitive advantage or because a client or someone else asked for it.

Changes to the Code

The Code defines the way we do business. It is reviewed regularly to make sure it reflects our principles and standards and is consistent with the law. Whenever there's a change, an announcement goes to every employee.

Affirmation process

Each of us declares that we have read and affirmed our awareness of the Code, as part of our annual affirmation process.

Speak Up

We immediately report any potential violations [of the Code] to our line manager or local investigations officer. We can also report them confidentially or anonymously using the whistleblowing procedures published on the intranet site goto/speakup.

UBS regards any form of retaliation against whistleblowers to be unacceptable.

And UBS expects its line managers to escalate and report any violations of laws, rules, regulations, policies, professional standards and the principles of the Code.

Questions about the Code

Any questions about any part of this Code, or what it means in practice, should go to the Group General Counsel or the Head of Group Compliance, Regulatory & Governance.

UBS in society constitutional document

Our Commitment

UBS's goal is to be the financial provider of choice for clients wishing to mobilize capital towards the achievement of the United Nations Sustainable Development Goals (SDGs) and the orderly transition to a low-carbon economy (the Paris Agreement). We work towards this goal by integrating sustainability into our mainstream offerings, through new and innovative financial products with a positive effect on the environment and society, and by advising clients on their philanthropy. And it is through the management of environmental and social risks, the management of our environmental footprint and our sustainability disclosure that we continue to set standards in the industry.

Our cross divisional organization, *UBS in society*, focuses our firm on this direction. *UBS in society* is committed to making UBS a force for driving positive change in society and the environment for future generations. It will do so by focusing our firm on creating long-term positive impact for clients, employees, investors and society. Our ambition is to be:

- A leader in sustainable finance across all client segments
- A recognized innovator and thought leader in philanthropy[1]
- An industry leader for sustainable business practices
- An employer of choice

UBS in society covers all the activities and capabilities related to sustainable finance (including sustainable investing), philanthropy, environmental, climate and human rights policies governing client and supplier relationships, our environmental footprint, human resources as well as community investment. It is through this cross divisional organization that UBS leverages its expertise across all of these areas to drive sustainable performance.

We intend to make sustainable performance the standard across our firm and part of every client conversation. This means that we will focus on the long term and work to provide appropriate returns to all of our stakeholders in a responsible manner. In addition, we are transparent about our targets and progress wherever possible to demonstrate our commitment.

Scope

The document defines the principles, governance and controls for implementing this commitment. It outlines how UBS is becoming a force for driving positive change – in finance, in philanthropy, in communities and in our business. Our banking activities, in-house operations, supply chain management and community interactions are subject to, and must be conducted in compliance with, this commitment.

Principles

The following principles outline how *UBS in society* promotes the implementation of its commitment to make UBS a force for driving positive change in society and the environment for future generations, across four areas: in finance, in philanthropy, in communities and in our business.

In finance

We're reshaping the landscape of sustainable finance by using thought leadership, innovation and partnerships to support clients in their sustainability efforts. For:

- Private investors: We're helping clients invest in companies that use their resources wisely and deliver reliable, long-term results. It's important to us that our clients can invest in what they care about, make the difference they desire and still get the returns they are looking for.
- Institutional investors: We're transforming the business of asset management and taking a long-term perspective by establishing sustainable and impact investing as core components across our offering and solutions.
- Corporate organizations: We're offering in-depth research, innovative products and expert advice to organizations who would like to consider environmental, societal and governance criteria in their financing and investing decisions.
- Swiss businesses: We're creating programs to help Swiss companies prepare for the new, low-carbon economy.

In philanthropy

We're partnering with clients and others for good, by offering expert advice, carefully selected programs from UBS Optimus Foundation, and innovative social financing mechanisms, so that our clients can make meaningful and measureable impact:

- UBS Optimus Foundation: We're making a measureable improvement in the lives of world's most vulnerable children. From getting more girls into school, to using solar power to improve maternal health we're bringing our clients, partners and extensive network together to support SDG-focused initiatives with the potential to be transformative, scalable and sustainable. We do this through evidence-based grant making and innovative social finance, finding the most effective ways to use capital to drive social change.
- Philanthropy advisors: We're dedicated to making the philanthropic vision of our clients come to life. From helping them understand where they can begin, to how they can give in the most effective way, our advice is supported by in-depth research. We offer access to a global philanthropist network and insight experiences through our Philanthropy Forums and visits to the foundation's programs.

1 Includes client and corporate donations

In communities

We recognize that UBS's long-term success depends on the health and prosperity of the communities of which we are part.

Our Community Affairs programs represent the firm's investment in communities. Our programs seek to overcome disadvantage through long-term investment in education and entrepreneurship. We provide UBS resources (both financial and employee volunteering) to drive change and create a positive impact. Our approach is to build sustainable and successful partnerships with non-profit organizations and social enterprises to ensure that our contributions have a lasting impact.

Our Community Affairs framework is global in scope and delivers both community and business impact in each of the regions in which we operate. Regional execution of the global strategy ensures we are effectively aligning our programs to address local community issues and support business priorities.

In our business

We're leading by example in that we challenge ourselves and our peers to raise the bar and be open about the impact our actions have on society and the environment. Our focus is on:

- Environmental and social risk: We apply an environmental and social risk (ESR) framework to identify and manage potential adverse impacts to the environment, the climate and to human rights as well as the associated environmental and social risks our clients' and our own assets are exposed to. UBS's comprehensive ESR standards are aligned with *UBS in society*, govern client and supplier relationships, and are enforced firm-wide and applied to all activities.
- Environmental footprint: We set quantitative targets to reduce group-wide greenhouse gas emissions and the environmental impact of our operations. Environmental programs include investments in sustainable real estate and efficient information technology, energy and water efficiency, paper and waste reduction and recycling, the use of environmentally friendly products (such as renewable energy or recycled paper), business travel and employee commuting. UBS aims to reduce negative environmental and social impacts of goods and services it purchases and engages with suppliers to promote responsible practices.
- Human resources: Our employees are crucial to our business success. We seek to attract, develop and retain talented people at all levels with diverse background and skills to effectively advise our clients, deliver innovative solutions, manage risk, navigate evolving regulatory requirements, and drive change. We also focus on increasing awareness of *UBS in society* amongst our employees by integrating sustainability topics in our employee lifecycle activities.
- Corporate responsibility: We report openly and transparently about our firm's environmental, social, governance (ESG) performance, including *UBS in society*, and seek to maintain open dialogue and active communications with our stakeholders.

Responsibilities and Structure

The Corporate Culture and Responsibility Committee (CCRC)[2] supports the UBS Board of Directors in its duties to safeguard and advance the Group's reputation for responsible and sustainable conduct. It approves and monitors *UBS in society*'s overall strategy and annual objectives, reviews that the *UBS in society* constitutional document is relevant and up to date, and oversees the program's annual management review.

The Group CEO[3] supervises the execution of the *UBS in society* strategy and annual objectives. The Group CEO also informs the Group Executive Board (GEB) and Corporate Culture and Responsibility Committee (CCRC) about *UBS in society* updates as appropriate.

The Head *UBS in society* is UBS's senior level representative for environmental and sustainability issues. He or she is nominated by the Group CEO, chairs the *UBS in society* Steering Committee, is a member of the Global Environmental Social Risk Committee, and is a permanent guest to the CCRC. He or she develops the *UBS in society* strategy, leads in its execution, and submits annual objectives to the Group CEO. On behalf of the Group CEO, he or she proposes the UBS in society strategy and annual objectives to the CCRC for approval. He or she is supported by the *UBS in society* Executive Committee (EC)[4] in this effort.

The *UBS in society* Steering Committee (SC)[5] ensures firm-wide execution of the *UBS in society* strategy across business divisions, functions and regions. The Committee is chaired by the Head *UBS in society* and is composed of divisional, regional, and Group COO EC members as well as *UBS in society* EC members. SC members are nominated by their respective GEB member and/or the Head *UBS in society*, and are responsible to define and implement the sustainability strategy of their BA / Function (and to allocate resources accordingly) in line with the *UBS in society* strategy. SC members ensure their objectives and plans are signed off by their GEB member / ECs.

The Global Environmental & Social Risk Committee[6] defines an ESR framework and independent controls that align UBS's environmental and social risk appetite with that of *UBS in society*. It is chaired by the Group Chief Risk Officer, who is responsible for the development and implementation of principles and appropriate independent control frameworks for environmental and social risks within UBS.

2 Responsibilities and authority of the CCRC are defined in Annex C of the Organization Regulations of UBS Group AG
3 As set out in the Business Regulations Corporate Center
4 As set out in the UBS in society Executive Committee Terms of Reference
5 As set out in the UBS in society Steering Committee Terms of Reference
6 As set out in the Global Environmental and Social Risk Committee Terms of Reference

The Business Divisions are responsible for developing, providing resources to, and executing the *UBS in society* annual objectives in their respective division as they relate to client relationships, product development, investment management, distribution and risk management, predominantly in the areas of sustainable finance and client philanthropy.

The Regions are responsible for providing resources to, and executing Community Affairs objectives in their region through their respective regional Community Affairs teams. The Community Affairs objectives are aligned with the global framework of *UBS in society*.

The Corporate Center functions are responsible for developing, providing resources to, and executing *UBS in society* annual objectives as they relate to risk control, sustainability regulation, employee training and development, in-house environmental and supply chain management, and communications.

Reporting and Controls

Our commitment is implemented through a firm-wide management system steered by defined measurable objectives. Their achievement is reviewed on a semi-annual basis by the Head of *UBS in society*, and on an annual basis by the Corporate Culture and Responsibility Committee.

Progress made in implementing *UBS in society*'s strategy, commitment, and objectives is reported as part of UBS's annual reporting. This reporting is reviewed and assured externally according to the requirements of the Global Reporting Initiative's (GRI) sustainability reporting guideline. We also regularly report on the implementation of our climate strategy and follow the recommendations provided by the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) and externally verify our greenhouse gas reporting according to ISO 14064.

UBS is certified according to ISO 14001 and ISO 50001 international environmental and energy management standards. These certificates attest that UBS's environmental management system is an appropriate tool for evaluating compliance with the relevant environmental regulations, achieving self-defined environmental objectives, and maintaining continual improvement of environmental performance.

The implementation of our commitment and principles, as laid out in this document, is a process of continual improvement.

Standard Information

The Sustainable Development Goals (SDGs)

In September 2015, with the support of 193 nations, the United Nations launched the 2030 Agenda for Sustainable Development to end poverty, combat climate change, and fight injustice. Seventeen Sustainable Development Goals (SDGs) went into effect in January 2016 to address global socioeconomic imbalances threatening the lives of people living in developing economies and the future of generations to come.

The Paris Agreement

The Paris Agreement is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC) signed in 2016. As of March 2019, 195 countries had signed committing to keep the long-term global average temperature increase to well below 2 °C above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 °C above pre-industrial levels, recognizing that this would substantially reduce the risks and impacts of climate change. It also aims to increase the ability of parties to adapt to the adverse impacts of climate change, and make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

Climate strategy

UBS considers an orderly transition to a low-carbon economy as vital. Orderly means that emissions are reduced in a measured way to meet climate goals, starting now. We support this transition through our comprehensive climate strategy. We are determined to protect our clients, and our own assets from climate-related risks in the context of uncertain policy and technology developments, mobilize private and institutional capital to finance the transition and reduce our own direct climate impact.

Environmental and social risk (ESR)

Environmental and social risks are broadly defined as the risk that UBS supports clients, or sources from suppliers, who cause or contribute to severe environmental damage or human rights infringements. Environmental and social risks can also arise if UBS's operational activities and its employees (or contractors working on behalf of UBS) fail to operate within relevant environmental and human rights regulations. Environmental and social risks (including human rights and climate-related risks) may result in adverse financial and reputational impacts for UBS.

Sustainable investments (SI)

Sustainable investing is an approach that seeks to incorporate environmental, social and governance (ESG) considerations into investment decisions. SI strategies seek to 1) achieve a positive environmental or social impact, and/or 2) align investments with an investor's values regarding ESG topics, while aiming to improve the portfolio risk and return characteristics.

Sustainable finance

Sustainable finance refers to any form of financial service that integrates environmental, social and governance (ESG) criteria into the business or investment decisions for the lasting benefit of both clients and society at large.

7 NGFS – A call for action, Climate change as a source of financial risk, First comprehensive report, 2019

Environmental and social risk policy framework

Comprehensive, highest industry standards, deeply rooted in our culture

Our comprehensive environmental and social risk framework is deeply rooted in our culture, and
- governs client and supplier relationships and applies firm-wide to all activities
- meets the highest industry standards as recognized by environmental, social, governance ratings
- is integrated in management practices and control principles and overseen at the most senior level of our firm.

This framework is aligned with our *UBS in society* organization that covers all the activities and capabilities related to sustainable finance (including sustainable investing), philanthropy, environmental, climate and human rights policies governing client and supplier relationships, our environmental footprint, human resources as well as community investment.

Introduction

We live in a world that is more interconnected, more interdependent and more interactive than ever before. Rapid technological advances in particular continue to have a profound effect on the economic, political, cultural, environmental and social landscape. These advances have changed the way we think and act. They have altered the way we do business. They have transformed the products and services we consume, and reshaped the perceptions of the world around us. While this has brought with it significant benefits and opportunities, it has also created far greater awareness of the challenges we all face.

As a global company, and the largest truly global wealth manager to high net worth and ultra high net worth clients, UBS is in a unique position to help address these challenges, both together with our clients and through our own efforts.

Our principles and standards clearly define how we want to do things at UBS. They apply to all aspects of our business and the ways in which we engage with our stakeholders. Our Code of Conduct and Ethics documents our corporate responsibility. Our work in key societal areas such as protecting the environment and respecting human rights are part of this. Living up to our societal responsibilities contributes to the wider goal of sustainable development. As a global firm we take responsibility to lead the debate on important societal topics, contribute to the setting of standards and collaborate in and beyond our industry.

Managing environmental and social risks is a key component of our corporate responsibility. We apply an environmental and social risk policy framework to all our activities. This helps us identify and manage potential adverse impacts to the environment and to human rights, as well as the associated risks affecting our clients and us. We have set standards in product development, investments, financing and for supply chain management decisions. We have identified certain controversial activities we will not engage in, or will only engage in under stringent criteria. As part of this process, we engage with clients and suppliers to better understand their processes and policies and to explore how any environmental and social risks may be mitigated.

The foundation of UBS's environmental and social risk policy framework is established in the Code of Conduct and Ethics of UBS and the *UBS in society* constitutional document.

Our focus

Our industry is playing an active role in addressing global issues such as human rights and the protection of our environment. Climate change impacts ecosystems, societies, and economies worldwide, and we support clients achieving their goals in support of the transition to a low-carbon economy. Growing environmental and human rights concerns have resulted in a fast-changing regulatory and competitive landscape which is affecting our firm, our suppliers and our clients. In response to these emerging risks and opportunities, we are shaping appropriate solutions and commitments.

Over twenty-five years ago, UBS was one of the first financial institutions to sign the United Nations (UN) Environment Programme's "Statement by Financial Institutions on the Environment and Sustainable Development." We were also among the first companies to endorse the UN Global Compact, we were an original signatory of the CDP, and our Asset Management (AM) business is an Investment Manager signatory to the Principles for Responsible Investment.

In 2019, we became a founding signatory of the UN Principles for Responsible Banking. The Principles constitute a comprehensive framework for the integration of sustainability across banks. They define accountabilities and require each bank to set, publish and work toward ambitious targets.

In 2000, our firm was a founding member of the Wolfsberg Group of banks, which was originally set up to promote good practice in combatting money laundering. In 2011, the firm was a driving force behind the establishment of the Thun Group of Banks, which has in the meantime published two discussion papers that seek to establish a framework to facilitate the identification of the key challenges and best practice examples for the banking sector's implementation of the UN Guiding Principles on Business and Human Rights (UNGPs). We are a member of the Roundtable on Sustainable Palm Oil (RSPO). In 2014, we endorsed the Banking Environment Initiative's and Consumer Goods Forum's "Soft Commodities" Compact, which reconfirms our commitment to developing and implementing responsible business standards.

Progress made in implementing *UBS in society* is reported as part of UBS's annual reporting. This reporting is reviewed and assured externally according to the requirements of the Global Reporting Initiative's (GRI) Sustainability Reporting Guideline. UBS is certified according to ISO 14001, the international environmental management standard.

→ **Refer to the "Driving change in business" section of this document for an overview of external commitments and memberships**

Climate change

Climate change is one of the most significant challenges of our time. The world's key environmental and social challenges – such as population growth, energy security, loss of biodiversity and access to drinking water and food – are all closely intertwined with climate change. This makes the transition to a low-carbon economy vital. We support this transition through our comprehensive climate strategy, focusing on four pillars:

- Protecting our own assets: We have reduced carbon-related assets on our balance sheet to 0.8% or USD 1.9 billion as of 31 December 2019, down from 1.6% at the end of 2018 and 2.8% at the end of 2017. In 2019 we also revised our standards in the energy and utilities sector and further embedded climate-related risk into our standard risk management framework.
- Protecting our clients' assets: We support our clients' efforts to assess, manage and protect them from climate-related risks by offering innovative products and services in investment, financing and research. We also actively engage on climate topics with companies that we invest in.
- Mobilizing private and institutional capital: We mobilize private and institutional capital towards investments facilitating climate change mitigation and adaptation and in supporting the transition to a low-carbon economy as corporate advisor, and/or with our lending capacity.
- Reducing our direct climate impact: We have committed to using 100% renewable electricity by mid-2020. This will reduce our firm's GHG footprint by 75% compared with 2004 levels.

We publicly support international, collaborative action against climate change. Our Chairman is a signatory to the European Financial Services Round Table's statement in support of a strong, ambitious response to climate change. Our Group CEO is a member of the Alliance of CEO Climate Leaders, an informal network of CEOs convened by the World Economic Forum and committed to climate action. Our Head Sustainable Equity Team within AM is a member of the Task Force on Climate-related Financial Disclosures (TCFD).

→ **Refer to the "Our governance and principles" section of this document for the full climate strategy**

Forests and biodiversity

Deforestation and forest degradation can cause biodiversity to decline. As approximately 80% of the world's documented species are found in tropical rainforests, deforestation will impact global biodiversity. Deforestation is, in fact, second only to the energy sector as a source of global greenhouse gas emissions and accounts for up to 20% of emissions, more than the entire global transport sector.

It is further estimated that more than 50% of tropical deforestation is due to the production of soy, palm oil, timber and beef. In human terms, millions of people rely directly on forests (small-scale agriculture, hunting and gathering, and harvesting forest products such as rubber). Yet, deforestation continues to cause severe societal problems, sometimes leading to violent conflict.

Recognizing these risks, we:

- became member of the RSPO in 2012.
- endorsed the Banking Environment Initiative's and Consumer Goods Forum's "Soft Commodities" Compact. In doing so, we aim to support the transformation of soft commodity supply chains by expecting producers to be committed to achieving full certification according to applicable sustainability certification schemes, such as the RSPO. We acknowledge that land acquired without adequate consultation, compensation, and consideration of customary land rights (commonly referred to as land grabbing), can significantly impact local communities: often smallholders who primarily rely on subsistence farming to sustain their livelihood.
- have identified and will not engage in certain activities that contribute to deforestation and its related impacts (sections Controversial Activities – Where UBS will not do business and Areas of Concern – Where UBS will only do business under stringent criteria).

Human rights

UBS is committed to respecting and promoting human rights in all our business activities. We believe this is a responsible approach underlining our desire to reduce as far as possible potentially negative impacts on society. Our commitment in this important area is long standing. In July 2000, UBS was one of 43 companies that pledged to adhere to the Global Compact.

The principles of the Global Compact, today the largest corporate responsibility initiative globally, stem from the Universal Declaration of Human Rights, the International Labor Organization's Declaration on Fundamental Principles and Rights at Work, the Rio Declaration on Environment and Development and the UN Convention Against Corruption. The United Nations took a significant step in 2011 by endorsing the UNGPs. At this point, UBS together with other banks formed the Thun Group of Banks to jointly consider these developments and conclusions and to share experiences and ideas regarding the implementation of the UNGPs. To this end, the Thun Group of Banks has published two discussion papers that seek to establish a framework to facilitate the identification of the key challenges and best practice examples for the banking sector's implementation of the UNGPs. Both discussion papers were also intended to inform other pertinent initiatives, in the specific case of the second the OECD's proactive agenda on Responsible Business Conduct, which released in 2019 its guidance on due diligence for Responsible Business Conduct in General Corporate Lending and Securities Underwriting. UBS is a member of the Advisory Group to the OECD's project.

Recognizing these risks, we:

- established a UBS Position on human rights in 2006. In 2013, we revised the firm's Environmental and Social Risk Framework to formalize accountability for human rights issues.
- stipulated that we will not engage in commercial activities that make use of child labor and forced labor, or that infringe the rights of indigenous peoples (see section Controversial Activities – Where UBS will not do business).
- will continue our work internally, and externally with the Thun Group of Banks and the OECD, to understand how best to implement the UNGPs across our operations.

Our standards

UBS has set standards in product development, investments, financing and supply chain management decisions, which include the stipulation of controversial activities and other areas of concern UBS will not engage in, or will only engage in under stringent criteria.

Controversial Activities – Where UBS will not do business

UBS will not knowingly provide financial or advisory services to clients whose primary business activity, or where the proposed transaction, is associated with severe environmental or social damage to or through use of:

- World heritage sites as classified by UNESCO;
- Wetlands on the Ramsar list;
- Endangered species of wild flora and fauna listed in Appendix 1 of the Convention on International Trade in Endangered Species;
- High conservation value forests as defined by the six categories of the Forestry Stewardship Council (FSC);
- Illegal fire: uncontrolled and/or illegal use of fire for land clearance;
- Illegal logging including purchase of illegal harvested timber (logs or roundwood);
- Child labor according to ILO-conventions 138 (minimum age) and 182 (worst forms);
- Forced labor according to ILO-convention 29; and
- Indigenous peoples' rights in accordance with IFC Performance Standard 7.

The same standards apply when UBS purchases goods or services from suppliers.

In addition, UBS does not directly or indirectly finance the development, production or purchase of controversial weapons of such companies determined to fall within the "Swiss Federal Act on War Materials."

On the topic of cluster munitions and anti-personnel mines: UBS does not provide credit facilities to, nor conduct capital market transactions for, companies that are involved in the development, production or purchase of cluster munitions and anti-personnel mines. UBS does not include securities of affected companies in its actively managed retail and institutional funds and in discretionary mandates. UBS draws upon external expertise to decide whether a company is subject to the restrictions imposed by Swiss law.

Areas of Concern – Where UBS will only do business under stringent criteria

Specific guidelines and assessment criteria apply to transactions with corporate clients engaged in the areas of concern listed below. The guidelines and assessment criteria apply to loans, trade finance, direct investments in real estate and infrastructure, securities and loan underwriting transactions, and investment banking advisory assignments.

Transactions in the areas listed below trigger an enhanced due diligence and approval process. In addition to the assessment of regulatory compliance, adherence to UBS's controversial activities standards, past and present environmental and human rights performance, as well as concerns of stakeholder groups, these transactions require an assessment of the following criteria:

Soft commodities

- Palm oil: Companies must be a member of the RSPO and not subject to any unresolved public criticism from the RSPO. Companies must further have some level of mill or plantation certification and be publicly committed to achieving full certification (evidence must be available). Company must also be committed to "No Deforestation, No Peat and No Exploitation" (NDPE).
- Soy: Companies producing soy in markets at high risk of tropical deforestation must be a member of the Roundtable on Responsible Soy (RTRS) and not subject to any unresolved public criticism from the RTRS. Companies must further be publicly committed to achieving full certification (evidence must be available).
- Timber: Companies producing timber in markets at high risk of tropical deforestation must seek to achieve full certification of their production according to the Forest Stewardship Council (FSC) or a national scheme endorsed against the 2010 Programme for the Endorsement of Forest Certification (PEFC) meta standard for timber products. Company must also have fire prevention, monitoring and suppression measures in place.
- Fish and seafood: Companies producing, processing or trading fish and seafood must provide credible evidence of no illegal, unreported and unregulated fishing in their own production and supply chain.

Power Generation

- Coal-fired power plants (CFPP): We do not provide project-level finance for new coal-fired power plants globally and only support financing transactions of existing coal-fired operators (>30% coal reliance) who have a transition strategy in place that aligns with a pathway under the Paris Agreement, or the transaction is related to renewable energy.
- Large dams: Transactions directly related to large dams include an assessment against the recommendations made by the World Commission on Dams (WCD) and the International Hydropower Association Sustainability Assessment Protocol.
- Nuclear power: Transactions directly related to the construction of new, or the upgrading of existing nuclear power plants include an assessment on whether the country of domicile of the client / operation has ratified the Treaty on the Non-Proliferation of Nuclear Weapons.

Extractives

- Arctic oil and oil sands: We do not provide financing where the stated use of proceeds is for new offshore oil projects in the Arctic or greenfield[1] oil sands projects, and only provide financing to companies, which have significant reserves or production in arctic oil and/or oil sands (>30% of reserves or production), where the stated use of proceeds is related to renewable energy or conventional oil & gas assets.
- Coal mining: We do not provide financing where the stated use of proceeds is for greenfield[1] thermal coal mines and do not provide financing to coal mining companies engaged in mountain top removal operations. We continue to severely restrict lending and capital raising to the coal mining sector.
- Liquefied Natural Gas (LNG): Transactions directly related to LNG infrastructure assets are subject to enhanced ESR due diligence considering relevant factors such as management of methane leaks, and the company's past and present environmental and social performance.
- Ultra-deepwater drilling: Transactions directly related to ultra-deepwater drilling assets are subject to enhanced ESR due diligence considering relevant factors such as environmental impact analysis, spill prevention and response plans, and the company's past and present environmental and social performance
- Hydraulic fracturing: Transactions with companies that practice hydraulic fracturing in environmentally and socially sensitive areas are assessed against their commitment to and certification of voluntary standards, such as the American Petroleum Institute's documents and standards for hydraulic fracturing.
- Precious metals: Transactions directly related to precious metals assets that have a controversial environmental and social risk track record are assessed against the client's commitment to and certification of voluntary standards, such as the International Council on Mining & Metals' (ICMM) International Cyanide Management Code (ICMC).
- Diamonds: Transactions with companies that mine and trade rough diamonds are assessed on the client's commitment to and certification of voluntary standards, such as the ICMC, and rough diamonds must be certified under the Kimberley Process.

Our processes and governance

UBS applies an environmental and social risk framework to all transactions, products, services and activities such as lending, capital raising, advisory services or investments that involve a party associated with environmentally or socially sensitive activities. The framework seeks to identify and manage potential adverse impacts to the environment and to human rights, as well as the financial and reputation risks of being associated with them.

Integration in risk, compliance and operations processes

Procedures and tools for the identification, assessment and monitoring of environmental and social risks are applied and integrated into standard risk, compliance and operations processes.

- Client onboarding: Potential clients are assessed for environmental and social risks associated with their business activities as part of UBS's Know Your Client compliance processes.
- Transaction due diligence: Environmental and social risks are identified and assessed as part of standard transaction due diligence and decision-making processes in all business divisions and relevant product lines.
- Product development and investment decision processes: New financial products and services are reviewed before their launch in order to assess their compatibility and consistency with UBS's environmental and human rights standards. Environmental and social risks are also considered in investment decision processes and when exercising ownership rights like proxy voting and engagement with the management of investee entities.
- Own operations: Our operational activities and employees, or contractors working on UBS premises, are assessed for compliance with relevant environmental, health and safety, and labor rights regulations.
- Supply chain management: Environmental and social risks are assessed when selecting and dealing with suppliers. UBS also evaluates goods and services that pose potential environmental, labor and human rights risks during lifecycle (production, usage, and disposal) as part of its purchasing processes.
- Portfolio review: At portfolio level, we regularly review sensitive sectors and activities prone to bearing environmental and social risks. We assess client exposure and revenue in such sectors and attempt to benchmark the portfolio quality against regional and/or sector averages. Such portfolio reviews give us an accurate aggregated exposure profile and an enhanced insight into our transaction and client onboarding processes. Based on the outcome of these reviews, we can explore ways to improve the future portfolio profile along a range of risk parameters.

Clients, transactions or suppliers potentially in breach of UBS's position, or otherwise subject to significant environmental and human rights controversies, are identified as part of UBS's standard risk and compliance processes. Advanced data analytics on companies associated with such risks is integrated into the web-based compliance tool used by our staff before they enter into a client or supplier relationship, or a transaction. The systematic nature of this tool significantly enhances our ability to identify potential risk. In 2019, 1,889 referrals were assessed by our environmental and social risk unit, of which 82 were rejected or not pursued, 299 were approved with qualifications and 32 were pending.

1 Greenfield means a new mine / well or an expansion of an existing mine / well which results in a material increase in existing production capacity.

Environmental and social risk assessments

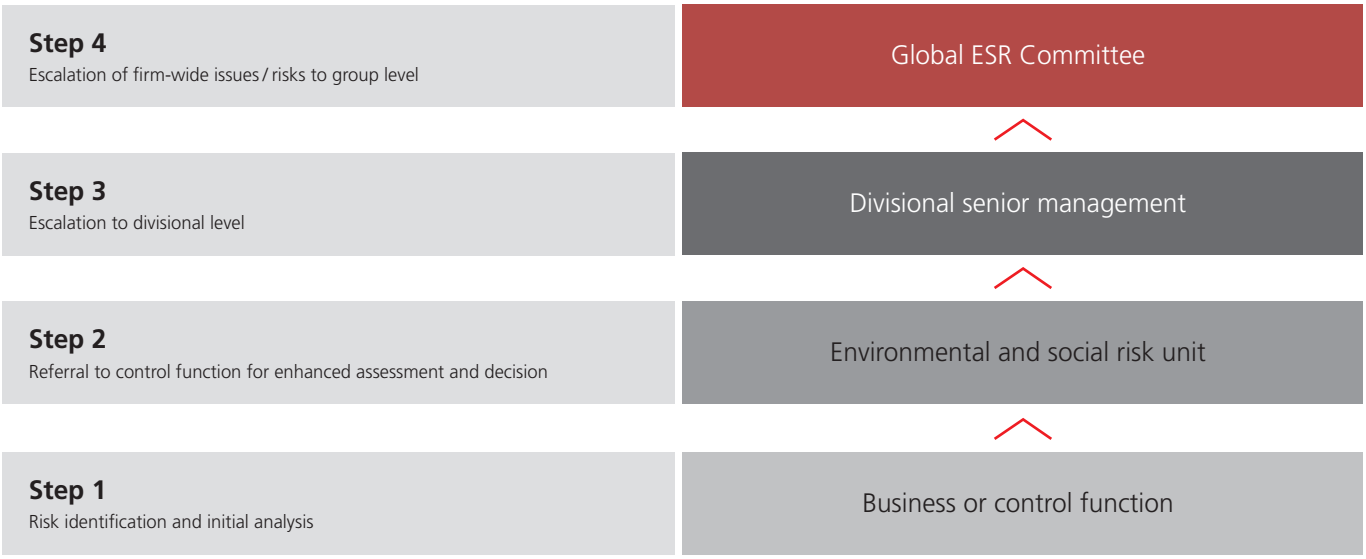
	For the year ended			% change from
	31.12.19	31.12.18	31.12.17	31.12.18
Cases referred for assessment[1]	1,889	2,114	2,170	(11)
by region				
Americas	248	288	305	(14)
Asia Pacific	479	718	604	(33)
Europe, Middle East and Africa (excluding Switzerland)	282	293	253	(4)
Switzerland	880	815	1,008	8
by business division				
Global Wealth Management[2]	199	426	507	(53)
Personal & Corporate Banking	801	684	795	17
Asset Management	4	7	7	(43)
Investment Bank	849	980	852	(13)
Corporate Center[3]	36	17	9	112
by sector				
Agribusiness[4]	197	277	291	(29)
Chemicals	61	91	87	(33)
Financial[5]	722	589	617	23
Infrastructure	82	109	53	(25)
Metals and mining	200	249	233	(20)
Oil and gas	150	187	207	(20)
Technology[6]	105	164	140	(36)
Transport	40	51	53	(22)
Utilities	108	176	191	(39)
Other[7]	224	221	298	1
by outcome[8]				
approved[9]	1,476	1,648	1,679	(10)
approved with qualifications[10]	299	358	397	(16)
rejected or not further pursued[11]	82	108	94	(24)
pending[12]	32	0	0	

1 Transactions and client onboarding requests referred to the environmental and social risk (ESR) function. 2 Wealth Management and Wealth Management Americas reported as Global Wealth Management from 2018. Therefore, 2017 numbers were restated. 3 Relates to procurement / sourcing of products and services. 4 Includes, e.g., companies producing or processing fish and seafood, forestry products, biofuels, food and beverage. 5 Includes, e.g., banks, commodity traders, investments and equity firms. 6 Includes technology and telecom companies. 7 Includes, e.g., aerospace and defense, general industrials, retail and wholesale (from 2017). 8 "By outcome" 2019 data is from 22.1.2020 9 Client / transaction / supplier subject to an ESR assessment and considered in compliance with UBS's ESR framework. 10 Client / transaction / supplier subject to an ESR assessment and approved with qualifications. Qualifications may include ring-fencing of certain assets, conditions towards client / supplier or internal recommendations. 11 Client / transaction / supplier subject to an ESR assessment and rejected or not further pursued. 12 Decision pending. Pending cases 2018 have been closed and reallocated to the other outcome categories.

Escalation and approval processes

Where business or control functions responsible for identifying and assessing environmental and social risks as part of due diligence processes determine the existence of potential material risks, they refer the client, supplier or transaction to a specialized environmental and social risk unit for enhanced due diligence. If identified risks are believed to pose potentially significant environmental or social risks, they are rejected by the risk unit or are escalated according to the firm's reputation risk escalation process.

Environmental and social risk escalation process



Governance and oversight

In view of the many environmental and social challenges globally, these topics will continue to increase in relevance for banks. These developments therefore require regular and critical assessment of our policies and practices, based on an accurate monitoring and analysis of societal topics of potential relevance to UBS.

This process is the responsibility of a committee at Group Executive Board-level, the Global Environmental and Social Risk Committee, which sets the overall risk appetite for the firm and resolves and policy matters relating to environmental and social risks and their associated reputation risks.

It is chaired by the Group Chief Risk Officer, who is responsible for the development and implementation of principles and appropriate independent control frameworks for environmental and social risks within UBS.

All corporate responsibility and sustainability developments at UBS are monitored and reviewed by the UBS Corporate Culture and Responsibility Committee, a Board of Directors' committee of UBS Group AG. The Committee supports the Board in its duties to safeguard and advance UBS's reputation for responsible corporate conduct. In this capacity it reviews and monitors the implementation of UBS's ESR framework.

Health and safety statement

UBS is committed to ensuring that all staff have a working environment that protects their health, safety and wellbeing.

Our Code of Conduct and Ethics includes a commitment to follow health and safety rules and implement best practices to ensure as safe a workplace as possible.

We have health and safety guidelines that stress the importance of having a physical infrastructure and working environment that support our staff in performing up to their potential. As work patterns and employee expectations have changed, UBS has taken a proactive approach to ensure that our work spaces continue to meet the needs of our businesses, our staff, our clients and our business partners, while also meeting our legal obligations.

UBS complies with all health and safety standards and restrictions imposed by applicable laws in all the countries in which we operate. We also apply internal policies and guidelines – both globally and regionally – which may go beyond the legal health and safety requirements.

An environment without incidents or accidents is in everyone's interests. In addition to applying our own health and safety measures, we ask third parties conducting business with us or operating on our premises to consider health and safety matters too, and all vendors and contractors are required to comply with our health and safety guidelines when dealing with us.

All of our staff are expected to conduct themselves in a way that helps to ensure their own health and safety and that of their colleagues.

Health and Safety Principles

- We aim to maintain a working environment that supports the general health and well-being of all staff.
- We build and maintain innovative work places that allow employees to work efficiently and collaboratively.
- Our agile working arrangements (and our leave and benefit arrangements) are designed to support employees' work and personal lives.
- We actively promote an open and respectful work environment.
- We strive to ensure that our working environment is as safe as possible, including addressing issues such as protection of non-smokers, radiation exposure risk assessments, etc.
- We have measures in place to mitigate potential emergencies in the workplace and while travelling on business.
- Travel and security experts, crisis management committees, first aid providers, health specialists, social counselors and other specialists are available to employees.
- UBS has a range of services and programs (for example, our Employee Assistance Programs, Social Counseling and online support materials) to help employees navigate through various personal issues, including health, family care, addiction and dependency problems.
- Workplace issues can also impact employee wellbeing. We have appropriate routes for employees to raise any concerns, including documented grievance, complaint and whistleblowing processes.

Measures Taken to Ensure Health and Safety

- UBS provides information to employees on topical issues and initiatives.
- Our line managers help to maintain a safe and healthy work environment and UBS gives them the information and support that is relevant to their role.
- We regularly review our health and safety activities to ensure issues are effectively managed and improvements are made where necessary. Our reviews also include employee consultation (where appropriate).

Health and Safety Governance

Responsibility for the governance and review of health and safety sits with the Group Chief Operating Officer and the Group Head Human Resources.

Day-to-day responsibility for health and safety matters is shared between Group Corporate Services and HR Reward.

The Corporate Culture and Responsibility Committee has oversight of health and safety matters.

UBS in society management indicators

UBS in society management indicators

	For the year ended			% change from
	31.12.19	31.12.18	31.12.17	31.12.18
Personnel in specialized units / functions (full time equivalents)[1]	145	135	108	7
Awareness raising[2,4]				
Training participation (headcounts)	85,589	43,722	68,955	114
Specialized training[3,4]				
Training participation (headcounts)	13,979	11,821	9,460	18
External audits[5]				
Audit participation (headcounts)	109	135	203	(19)
Auditing time (calendar days on site)	15	25	35	(40)
Internal audits[6]				
Audit participation (headcounts)	287	437	537	(34)
Auditing time (person days)	772	572	875	35

1 Employees that are part of the UBS in society organization and/or have specialized knowledge relevant for the UBS in society management system. 2 Increase due to high participation rate regarding environmental and social risk awareness training and mandatory Code of Conduct and Culture training in Q4 3 Specialized training is provided to employees in front-office and support functions who are dealing directly with UBS in society aspects in everyday business processes. 4 Possible double counts, i.e., one employee may complete more than one training in a year 5 ISO 14001, ISO 50001, ISO 14064 and Global Reporting Initiative (GRI). 6 Audits / reviews conducted by specialized internal units. The implementation of environmental and social risk policies is also audited by Group Internal Audit.

Information for management approaches for material topics

Information relevant to all material topics

Governance

See "Board of Directors and sustainability" in the "Our governance and principles" section in this document. Resources for material topics are allocated in accordance with corporate budgeting processes

Grievance mechanisms

We have a global whistleblowing policy and procedures (plus an internal website with guidance and links to an online form, hotlines and other resources), as referenced in our Code of Conduct and Ethics, and we ask all employees to promptly speak up about any conduct that might breach policies, laws or regulations. We also provide mandatory training for all employees to ensure everyone understands our commitment, procedures and responsibilities.

Additionally, we also have various feedback channels for external stakeholders. Our Corporate Responsibility team can be contacted for all sustainability inquiries and issues via the *UBS in society* website. Client feedback (including that which is collected through our Quality Feedback management system or through the Report Misconduct of UBS Staff online form) enables the firm to act and continuously improve products and client service standards in order to provide the best client experience.

Evaluation of management approaches

We assess the effectiveness of the approaches as listed in the management approach section (GRI 103-2) of each material GRI topic in the GRI content index through a number of measures, most visibly through:

- Performance against targets
- Internal and external audits (e.g., ISO 14001 certification)
- External ratings (e.g., environmental, social and governance (ESG) ratings), employer awards / honors
- Stakeholder feedback (e.g., employee and client surveys)
- Reputation measurement (through UBS-internal approaches)
- Measurement systems (e.g., UBS-internal reporting, management reviews, impact measurements)
- Assessment and testing of controls

Results from such evaluations may lead to potential adjustments to our approaches. In the reporting period, significant adjustments were made to the Group strategy and our climate strategy (see references in 103-3 for GRI topic "Economic Performance" in the GRI Content Index).

Information relevant to specific material topics

Indirect economic impacts

This topic is partly covered by UBS's Community Affairs activities. However, there is a much larger component that includes the financing of companies by the Investment Bank worldwide as well as the specific (economic) role UBS holds as the largest bank in Switzerland. In Switzerland, UBS's indirect economic impact is determined for instance through its business relations to more than 120,000 companies (including over 90% of the largest 250). More than 80% of the 250 banks in Switzerland, as well as a majority of medium and large pension funds, are UBS clients and benefit from a wide range of services. 2.5 million private clients and almost half of all Swiss companies are served by UBS. Further indirect economic impact is realized through its employees throughout the country (more than 20,000).

Digital innovation

Digitalization continues to transform the banking industry. Our investments in technology play a critical role in maintaining our position as the largest global wealth manager. They are designed to enhance and differentiate the client experience and product excellence our firm offers, while accelerating effectiveness and efficiency. Digital innovation is a focus across the firm, both within the business divisions (e.g., product development) and Corporate Center (notably within the Chief Operating Officer area).

In 2019, we spent around USD 3.5 billion on technology. We gear our investments toward technologies to enable business growth through innovation and superior client experience, and to continue to increase efficiency across the organization.

Advanced technologies are used in our business divisions and Corporate Center to enhance the client experience by increasing front-to-back digitalization, improving product excellence and distribution, driving efficiency gains and maintaining platform security.

Employee topics

This section covers the management approach for the following topics: employment, training and education, diversity and equal opportunity, non-discrimination, and working culture and environment. This information is provided in addition to the "Employees" section, where we describe these topics and how we manage them. The purpose of our management approach is to engage and enable our employees to meet clients' needs while positively impacting our employees.

Group policies are global and apply to all employees. Additionally, there are local policies to address specific local requirements, where applicable. Refer to the "Key policies and guidelines" section for further information.

Our objectives are provided in the "Employees" and the "UBS sustainability objectives and achievements 2019 and sustainability objectives 2020" sections of this document.

The firm's Board of Directors (BoD), Group Executive Board, Group COO and Head Group Human Resources specifically have responsibility for defining and executing an human resources strategy aligned to UBS's objectives and positioning the firm as an employer of choice. This includes providing advisory, human resources services to employees as well as strategic advice to managers and executives to support them in attracting, engaging, developing and retaining talent.

The BoD's CCRC regularly and critically reviews developments in key human resources areas, notably employee health and wellbeing as well as corporate culture. The CCRC's responsibility to oversee our firm's corporate culture and corporate responsibility programs and initiatives has been included in the Organization Regulations of UBS Group AG.

With regard to evaluating our management approach, and in addition to the measures outlined above, we undertake focused initiatives and take action in areas where we could do better. Each initiative has associated analysis, communication and accountability elements to ensure that we can continue to build on strengths but especially so we can improve on areas of relative weakness or concern.

Impact of material GRI topics

This table lists those GRI topics that we have identified as material and additional topics identified as material in the UBS GRI-based materiality assessment (see above). The table shows the level of involvement we believe our firm has with the economic, social or environmental impacts (positive or negative) that may occur in relation to the respective material topic. For every topic, the table shows our assessment of whether UBS's involvement with the impacts of such topic upon the economy, society or environment is direct, indirect or limited.

Impact of material GRI topics

Material GRI topic	Where the impact occurs		
	Economy	Society	Environment
GRI 201: Economic Performance	direct	direct	direct
GRI 203: Indirect Economic Impacts	indirect	direct	
GRI 205: Anti-Corruption	indirect	indirect	
GRI 206: Anti-competitive Behavior	direct	limited	
GRI 302: Energy			direct
GRI 305: Emissions			direct
GRI 308: Supplier Environmental Assessment			indirect
GRI 401: Employment	direct	direct	limited
GRI 404: Training and Education	direct	direct	
GRI 405: Diversity and Equal Opportunities	indirect	direct	
GRI 406: Non-Discrimination	indirect	direct	
GRI 414: Supplier Social Assessment		indirect	
GRI 417: Marketing and Labeling	direct	direct	
GRI 418: Customer Privacy	direct	direct	
GRI 419: Socioeconomic Compliance	direct	direct	
GRI G4 Financial Services Sector Disclosures: Product Portfolio	direct	direct	direct
GRI G4 Financial Services Sector Disclosures: Audit			
GRI G4 Financial Services Sector Disclosures: Active Ownership	direct	indirect	indirect
Client experience	direct	indirect	
Digital innovation	direct	direct	
Operational efficiency and effectiveness	direct	limited	limited
Working culture and environment	indirect	direct	

direct indirect limited

Calculating and reporting on climate change-related financing and advisory activities

The following text explains how the numbers for climate change-related financing and advisory activities featured in the "Our climate strategy" section of this Sustainability Report have been calculated.

In 2019, the Investment Bank provided equity or debt capital market services for a total deal value of USD 52.7 billion, or acted as financial advisor for a total deal value of USD 34.5 billion, to clients that contribute to climate change mitigation and adaptation.

The methodology behind these numbers consists first in identifying clients who, through the products and services they offer, work to mitigate the effects of global climate change and help to adapt to changing climate impacts. We use internal expertise, deal specific information such as green bond issuance or a high MSCI ranking of clients to identify these clients and deals. Clients' activities span all industry sectors, including renewable energy generation and clean tech but also energy efficiency, waste management, transport, infrastructure renewal and development or water management. They range from small-cap and pure-play startups to large international and diversified companies.

We aggregate total USD deal value of all global capital market deals in which UBS acted as lead manager or bookrunner for these companies and aggregate total USD value of deals where UBS acted as financial advisor. The data represents all our transactions with these clients and not only transactions that can be classified as directly climate-related.

Direct economic value generated and distributed by UBS Group AG consolidated in 2019

USD million	31.12.19
Operating income	28,889
Operating expenses	23,312
of which: Personnel expenses	*16,084*
of which: Community investments	*45*
2018 dividends paid on UBS shares	2,544
Tax expenses, excluding deferred taxes	791
Economic value retained	2,242

Financial literacy

The topic is mainly relevant in Switzerland, the only country where we offer comprehensive financial products and services to retail and small / medium enterprise (SME) clients. Many of our products and services that contribute to the enhancement of financial literacy are therefore limited to our Swiss clients. Examples include:

- Financial check-up for young people and students
- Saving tips for young people and students
- Budget calculator for young people and students
- Mortgage calculator
- Download center for SMEs offering a collection of our broad range of publications, documents and resources, such as succession planning checklists

Services not limited to Swiss clients include:

- UBS Key Invest provides know-how about structured products
- UBS Dictionary of Banking
- Chief Investment Office Wealth Management Research
- UBS Financial Education Program (for US clients only)

Additionally, UBS runs various community programs globally that enhance financial literacy. Many of our skills-based volunteering activities across the key themes of education and entrepreneurship also contribute to the enhancement of financial literacy. Examples include:

- UBS Social Investment Toolkit
- UBS Elevating Entrepreneurs

UBS sustainability objectives and achievements 2019 and sustainability objectives 2020

Objectives and achievements 2019

UBS in society

For our reporting against the *UBS in society* mid-term targets, please refer to page 48 of this Sustainability Report.

Material GRI topics	Objectives 2019	Achievements 2019	Status
FS Product Portfolio; FS Active Ownership	Sustainable investments / finance: • Make progress towards our mid-term goal to direct USD 5 billion of client assets into new Sustainable Development Goal (SDG)-related impact investments to help mainstream the asset class and its contribution to the SDGs (by 2021) • Global Wealth Management (GWM) to launch at least two private markets impact investing products • Asset Management (AM) and GWM to further support the sustainable and impact investing cause (e.g., internal / external communication, events, research and whitepapers) • Investment Bank (IB) to maintain leadership position in Environmental / Social / Governance (ESG) Integration / Sustainable Investing (SI) research through the collaborative delivery of differentiated content and client events • Further strengthen the collaboration to establish AM as SI leader in the industry • AM to launch SI products and solutions both in the active and passive space • AM to strengthen the company engagement approach focusing on climate action and impact categories in order to improve the sustainability performance of our investments	• USD 2 billion of client assets directed into SDG-related impact investments in 2019, reaching USD 3.9 billion (i.e., 78% of our 2021 goal) • Launch by GWM of two Sustainable Investing Private Equity Impact Funds in 2019: Bridge Workforce and Affordable Housing and RXR Opportunity Zone Fund. • Publication of UBS whitepaper at the World Economic Forum 2019 annual meeting; offering policymakers, investors and the financial sector recommendations for meeting the SDGs. Publication by AM of research papers, including one on climate, climate engagement, stewardship, climate change and central banks, and global institutional survey on ESG. • 168 research activities (reports / calls / events / videos), supporting our aim to deliver differentiated ESG and Sustainable Investing (SI) content to institutional investors. Launch by IB of ESG icon to highlight, where relevant, substantive ESG content in "mainstream" research. Publication of 32 such reports. Inaugural UBS ESG and Sustainability Symposium, with over 300 clients, corporate attendees, UBS staff, industry leaders and global experts, including over 40 speakers. Symposium done with Global Research Alliance for Sustainable Finance and Investment (GRASFI) which receives sponsorship from UBS. Key client conferences and events integrated ESG content, including UBS Greater China Conference, UBS's flagship client conference held annually in Shanghai – and UBS OneASEAN Conference in Bangkok. • See Achievements reported above on supporting the sustainable and impact investing, as well as Achievements reported below regarding engagement. AM sponsor of PRI (Principles for Responsible Investment), Responsible Investor Europe, Americas, and Japan events . • Launch by AM of 13 funds. AM reached USD 38.6 billion of Assets under Management (AuM) for SI focused and Impact products (i.e.. progress of USD 21 billion for the year) • AM a lead manager for 7 collaborative engagements within Climate Action 100+ and supported 82% of climate related resolutions proposed by shareholders. AM ranked as number 1 asset manager for voting on climate resolutions according to ShareAction. AM engaged with 50 companies in the oil & gas and utilities sectors on climate risk specifically to share our findings, receive feedback, receive additional data to enhance our models over-time and also to encourage companies to mitigate climate change risks.	On Track / Achieved

Material GRI topics	Objectives 2019	Achievements 2019	Status
GRI 203: Indirect Economic Impacts	Pioneer two to three new ways to finance international aid in partnership with bilateral or multilateral agencies, foundations and/or the private sector. Raise at least CHF 30 million through these new partnerships or philanthropic products.	UBS Optimus Foundation (Optimus) on track with development of innovative ways to finance international aid, including designing a social impact bond (SIB) with the Hong Kong Government, and a client-funded East Africa Education facility (an outcomes based investment fund). Optimus raised more than CHF 35 million from strategic partnerships and social finance .	On track
FS Product Portfolio; FS Active Ownership	Launch of a consolidated global UHNW community to meet the different needs / passions of UHNW clients and their successors. Note: Target changed as of H1 2019 due to a change of IT platform and a review of the existing UHNW communities concept. Original target: Continue to build the Global Philanthropists Community (GPC) to grow beyond 500 members and create value by facilitating 50 connections amongst community members.	Launch of new platform as UBS Global Connections for existing members. Platform will be open for new members in Q1 2020.	On track
GRI 203: Indirect Economic Impacts	Make progress towards our mid-term goal to achieve a volunteering rate of 40% of employees by the end of 2020, with 40% of volunteers' time directed at skills-based programs.	38% of employee volunteering. 48% of all volunteer hours skills-based	On track
FS Product Portfolio; GRI 203: Indirect Economic Impacts	Achieve 2,000 client touch points with Global Visionaries program.	Over 7,000 client touch points through the Global Visionaries program.	Achieved
GRI 201: Economic Performance; GRI 302: Energy; GRI 305: Emissions; FS Product Portfolio	Climate strategy: • Further aligning UBS's risk appetite with reduction path under Paris Agreement and refine climate risk methodologies	• Further integrated climate-related risk into UBS's risk management framework: climate risk is now embedded into the firm's risk taxonomy and operational risk appetite statement. In addition, UBS further limited its risk appetite for carbon-related assets: the firm reduced exposure to carbon-related assets (0.8%) and strengthened UBS standards in the energy and utilities sectors. We further developed forward-looking scenario-based climate risk methodologies: Participation in the Paris Agreement Capital Transition Assessment (PACTA) pilot for corporate lending portfolios; as well as in phase II of UN Environment Programme Finance Initiative (UNEP FI) pertaining to Task Force on Climate-related Disclosures (TCFD).	Achieved
	Execute on 2020 greenhouse gas / energy reduction target and RE100 implementation plan: • Reduce Greenhouse gas (GHG) emissions by 75% below 2004 level • Reduce energy by 5% below 2016 level • Increase share of renewable electricity to 100% by June 30, 2020	On track to achieve 2020 targets for GHG / energy reduction and RE100 implementation plan:[1] • GHG reduction: –71% compared to 2004 • Energy reduction: –15% compared to 2016 • Share of renewable energy: 72% up from 59% in 2018	On Track
	Execute on 2020 operational environmental targets for water, paper and waste: • Reduce water consumption by 5% below 2016 level • Reduce paper consumption per FTE by 5% below 2016 level • Increase share of sustainable (FSC / recycled) to 90% • Reduce waste per FTE by 5% below 2016 level • Increase waste recycling ratio to 60%	On track to achieve 2020 operational environmental targets for water, paper and waste:[1] • Water reduction: –17% compared to 2016 • Paper consumption per FTE: – 31% compared to 2016 • Share of sustainable paper: 83% up from 80% in 2018 • Waste per FTE: –24% compared to 2016 • Waste recycling ratio: 51.2% up from 50.8% in 2018	On Track

Material GRI topics	Objectives 2019	Achievements 2019	Status
FS Audit	Strengthen UBS's long-term value creation (LTVC) case for investors by supporting the integration of LTVC report into Annual Report.	LTVC case advanced by changes made to Book 1 of the Annual Report. LTVC fold-out integrated at the very beginning of Annual Report and Book 1 re-structured and content adapted to reflect integrated approach.	Achieved
All	Increase ESG engagement with UBS investors by participating in at least two ESG investor events / roadshows.	ESG is increasingly integrated into mainstream investor engagements (with one dedicated ESG investor roadshow conducted).	Partly Achieved
FS Audit	Execute firm-wide ISO 14001 surveillance audit and ensure continued certification by addressing audit findings.	ISO 14001 2019 surveillance audit passed with no major non-conformities. All minor non-conformities from last audit closed.	Achieved
FS Product Portfolio; FS Active Ownership	Simplify Environmental & Social Risk (ESR) checks and processes in onboarding and periodic Know Your Client (KYC) reviews and train approx. 50% of relevant target groups.	Simplified ESR operational controls in onboarding and periodic Know your Client (KYC) reviews to increase their efficiency and effectiveness; 100% of target group (front staff in GWM and Personal & Corporate Banking [P&C], and risk officers) trained on revised controls as part of mandatory Anti-money Laundering (AML) training. Additional specialist trainings rolled out in various locations (e.g. Singapore, Switzerland).	Achieved
GRI 308: Supplier Environmental Assessment; GRI 414: Supplier Social Assessment	Further improve approach to assess vendors and enhance UBS Responsible Supply Chain Standard (RSCM).	RSCM guideline and Factbase, an internal database, updated.	Achieved

1 Reporting period 2019 (1 July 2018 – 30 June 2019)

Other areas

Material GRI topics	Objectives 2019	Achievements 2019	Status
GRI 201: Economic Performance; Operational efficiency and effectiveness	• Reported return on CET1 capital of ~15% for 2019, with an ambition to improve to ~17% by 2021 • Adjusted cost / income ratio of ~ 77% for 2019, with an ambition to improve to ~ 72% by 2021	• Return on common equity tier 1 capital of 12.4% in 2019 • Adjusted cost / income ratio of 80.8% in 2019	New targets / guidance for 2020-2022
GRI 205: Anti-Corruption	Review UBS's financial crime framework to ensure that emerging risks are reflected.	Review of UBS's Financial Crime framework conducted, to ensure that emerging risks are reflected.	Achieved
GRI 401: Employment; Working culture and environment	Build engagement and strengthen our corporate culture • Reinforce culture programs across the organization • Promote a feedback culture and measure, foster and recognize the UBS behaviors of integrity, collaboration and challenge • Remain an employer of choice for employees at all career stages • Attract the right external talent and maintain a highly motivated workforce • Continue to foster internal mobility and provide long-term career prospects	We are widely recognized as an employer of choice and received various top-employer honors in 2019. Of particular note are our achievements in Global Universum ranking of Top 50 World's Most Attractive Employers, our peer-leading position in human resources elements of Dow Jones Sustainability Index, employee survey scores above financial services norm in employee engagement (78%) and work environment (81%) and our recognition by Bloomberg Gender Equality Index. Internal mobility remained a key priority in 2019, as it builds cross-firm connections, increases engagement and enables employees to leverage existing skills as well as developing new ones. Along with line manager effectiveness, having a wide range of learning and career development opportunities, as well as tools to facilitate professional growth, are key drivers of employee engagement. In this respect, our new Career Navigator tool, which debuted in June 2019, has been instrumental. This online platform enables employees to explore career paths and search for open roles that match their interests while allowing our recruiters to find internal talent more easily. The tool also identifies skill gaps with regards to new roles and interests and directly links to learning opportunities to help fill these gaps. In 2019, 1,125 employees changed business divisions; 499 changed regions.	On track
GRI 404 Training and Education	Effectively develop, manage and retain our talent • Curate and modernize the UBS University learning offering to continue to enhance learner experience • Prepare current and future leaders for enhanced responsibilities in an ever-evolving banking and working environment	In 2019, our in-house UBS University further updated its curriculum to emphasize future-skills development and personal growth for all employees. These updates included a new digital skills curriculum that builds knowledge about topics such as blockchain, cloud computing, robotics and artificial intelligence. A new mobile learning app launched in mid-2019 enabled employees to learn whenever and wherever they want. We also completely revamped our leadership development offering in 2019 to ensure that our leaders have the skills they need to grow their businesses and their people, and to lead effectively in an age of digital transformation. In 2019, our permanent employees completed more than 1,100,000 learning activities, including mandatory training on compliance, business and other topics. This averaged to 16.2 sessions, or more than 2 training days, per employee.	On track

Material GRI topics	Objectives 2019	Achievements 2019	Status
GRI 405: Diversity and Equal Opportunity; GRI 406: Non-Discrimination	Strengthen our diverse and inclusive workplace • Aspiration to increase the ratio of women in management roles to one-third • Expansion of understanding and skill base around Inclusive Leadership	Our diverse workforce and inclusive culture are critical to our long-term success. Already diverse in many ways, we are committed to further increasing our diversity and to ensuring equal opportunities for all employees. We are especially focused on hiring, retaining and promoting more women across the firm with a focus on senior ranks. We continue to make progress toward our stated aspiration to increase the representation of women in management roles to one-third. In 2019, 25.2% of all employees in roles at Director level and above were women, up from 24.7% in 2018 Our award-winning UBS Career Comeback program, already established in the UK, US, Switzerland and India, was extended to include all other UBS locations in 2019. In addition to our strategic initiatives, every year we sponsor numerous activities to promote greater diversity and inclusiveness, including events and communications around International Women's Day and Pride Month. In 2019, we sponsored 43 employee networks globally, including networks focused on culture, gender, ethnicity, family, mental health, disability, Pride / LGBTQ and veterans topics.	On track
Client experience	• Implement new tool to handle client complaints as well as requests in connection with FADP (Swiss Federal Act on Data Protection) / EU GDPR (General Data Protection Regulation) • Finalize alignment of complaint process with FIDLEG (Swiss Financial Services Act) • Define rules / processes for handling data requests under FIDLEG	• The workflow-tool for processing FADP client requests was deployed in October 2019 • Alignment was completed with policy update and communication to Client Advisors • Process is being finalized: ongoing discussions with stakeholder to define responsibilities	On track Achieved On track
GRI 417: Marketing and Labeling	Suitability: • Implement the new Swiss FIDLEG law applicable to financial service delivery in Switzerland • Implement the 2018 ESMA Guidelines on certain aspects of MIFID II suitability requirements for MIFID-affected clients	• Implementation of Swiss FIDLEG under way (FIDLEG entered into force on 1 Jan 2020) • All MIFID requirements have been implemented and compliance gaps closed.	On track Achieved
GRI 206: Anti-competitive Behavior; GRI 418: Customer Privacy; GRI 419: Socioeconomic Compliance	Maintain an effectively designed and operating conduct risk framework with standards consistently applied across all businesses, functions and regions	Conduct risk framework is operating effectively across all businesses, functions and regions. Closure of various conduct risk framework-related issues and remediation throughout 2019.	Achieved
Digital innovation	Technology spending to be maintained at current levels (~3.5 bn CHF) with a focus on advanced technology to enable business growth and innovation and create further efficiencies.	• Maintained ~USD 3.5 billion tech spend • Innovative client solutions delivered across business division and corporate centers • Continuation of cloud journey incl. public cloud and O365 adoption with 10K users onboarded • AI governance underway; 100 +PoC (Proof of Concepts) and experiments and 30+ applications in production of implementation across the company • Digital factories and labs opened in Singapore, Zurich and the US	Achieved

Objectives 2020

UBS in society

UBS in society is committed to making UBS a force for driving positive change in society and the environment for future generations. It will do so by focusing our firm on creating long-term positive impact for clients, employees, investors and society. We intend to make sustainable performance the standard across our firm and part of every client conversation. To implement our strategy, we have defined firm-wide goals that we plan to achieve by the end of 2025.

Please refer to page 48 of this Sustainability Report for an overview of these mid-term goals. The following 2020 *UBS in society* objectives are aligned to these mid-term goals.

Material GRI topics	Objectives 2020
FS Product Portfolio; FS Active Ownership	Sustainable investments / finance: • Make progress towards our mid-term goal to direct USD 5 billion of client assets into new SDG-related impact investments to help mainstream the asset class and its contribution to the SDGs (by the end of 2021) • GWM to continue to add funds and exchange-traded funds (ETFs) with SI focus or stronger SI integration to the fund shelf • P&C to increase sustainable solutions and facilitate further increase by benefit-oriented client advice, and by leveraging digital technologies • P&C to be the preferred strategic partner for advisory and financing transactions related to Switzerland's energy strategy 2050 • IB to encourage corporate disclosure and drive client dialogue around relevant Environment, Social and Governance (ESG) matters; as well as increase the number of green and sustainable bond (or similar) mandates • AM to continue marketing sustainable investing to institutional clients.
GRI 201: Economic Performance; GRI 302: Energy; GRI 305: Emissions; FS Product Portfolio; FS Active Ownership	Climate strategy: AM to continue expanding climate solutions and engagement programs, as well as collaboration with Climate Action 100+. Climate risk objectives (following the 5-year TCFD implementation path by 2022): • Further align UBS's risk appetite with the Paris Agreement and conduct portfolio reviews on climate-sensitive sectors • Further develop climate risk methodologies in-house and through participation in industry-wide working groups (UNEP FI TCFD Phase II; PACTA pilot by Two Degrees Investing Initiative and Institute of International Finance (IIF)) • Address emerging regulatory expectations regarding the identification and management of climate risks. Execute on 2020 greenhouse gas / energy reduction target and RE100 implementation plan: • Reduce greenhouse gas (GHG) emissions by 75% below 2004 level • Reduce energy consumption by 5% below 2016 level • Increase share of renewable electricity to 100% by mid-2020. Execute on 2020 operational environmental targets for water, paper and waste: • Reduce water consumption by 5% below 2016 level • Reduce paper consumption per full-time employee (FTE) by 5% below 2016 level • Increase share of sustainable (FSC / recycled) to 90% • Reduce waste per FTE by 5% below 2016 level • Increase waste recycling ratio to 60%.

Material GRI topics	Objectives 2020
FS Product Portfolio; GRI 203: Indirect Economic Impacts	Pioneer new ways to finance international aid in partnership with bilateral or multilateral agencies, foundations and/or the private sector
FS Product Portfolio; FS Active Ownership	• All business divisions to further support the development of sustainable finance (e.g., internal / external communication, events, research and whitepapers) • IB to maintain leadership position in ESG Integration / Sustainable Investing research through the collaborative delivery of differentiated content and client events.
GRI 203: Indirect Economic Impacts	• Achieve a volunteering rate of 40% of employees by the end of 2020, with 40% of volunteers' time directed at skills-based programs • Community Affairs to maintain the 2019 percentage of beneficiaries reporting significant improvement in skills or transformation in quality of life resulting from UBS's investment.
GRI 308: Supplier Environmental Assessment; GRI 414: Supplier Social Assessment	Responsible Supply Chain Management – review product catalogue and increase the number of sustainable products.
FS Audit; GRI 201: Economic Performance; FS Product Portfolio; FS Active Ownership	• Strengthen Environmental Social and Governance (ESG) disclosures in the UBS Annual Report 2019 by including a "focus on ESG" section • Execute firm-wide ISO 14001 surveillance audit and ensure continued certification by addressing audit findings • Start the preparation work for the implementation of the UNEP FI Principles for Responsible Banking (PRB).

Other areas

Material GRI topics	Objectives 2020
GRI 201: Economic Performance; Operational efficiency and effectiveness	Targets, capital and resource guidelines 2020-2022 (on a reported basis): • Group returns: 12–15% return on CET1 capital (RoCET1) • Cost efficiency: Positive operating leverage and 75–78% cost / income ratio • Growth 10–15% profit before tax growth in Global Wealth Management • Capital allocation: Up to $^{1}/_{3}$ of Group RWA and LRD in the Investment Bank • Capital guidance: ~13% CET1 capital ratio; ~3.7% CET1 leverage ratio
GRI 205: Anti-Corruption	Review UBS's financial crime framework to ensure that emerging risks are reflected.
GRI 401: Employment; Working culture and environment	Build engagement and strengthen our corporate culture • Reinforce culture programs across the organization • Promote a feedback culture and measure, foster and recognize the UBS behaviors of integrity, collaboration and challenge • Remain an employer of choice for employees at all career stages • Attract the right external talent and maintain a highly motivated workforce • Continue to foster internal mobility and provide long-term career prospects
GRI 404 Training and Education	Effectively develop, manage and retain our talent • Emphasize future-skills development and personal growth for all employees • Ensure that our leaders have the skills they need to grow their businesses and their people in an age of digital transformation
GRI 405: Diversity and Equal Opportunity; GRI 406: Non-Discrimination	Strengthen our diverse and inclusive workplace • Aspiration to increase the ratio of women in management roles to one-third • Expansion of understanding and skill base around Inclusive Leadership • Implement supporting initiatives to hire, promote and retain more women at all levels of the organization
Client experience	• Rollout of a new client feedback tool to handle client complaints in Booking Center CH • Rollout of a web-based training for dealing with client complaints
GRI 417: Marketing and Labeling	Suitability: • Implement the new Swiss FIDLEG law applicable to financial service delivery in Switzerland • Assess and implement changes made to the EU regulations pursuant to sustainable investments and other ESG – Environmental, Social and Governance criteria
GRI 206: Anti-competitive Behavior; GRI 418: Customer Privacy; GRI 419: Socioeconomic Compliance	Promote and maintain an effectively designed and operating conduct risk framework as the conduct risk discipline continues to mature and regulators converge on requirements and expectations.
Digital innovation	Technology spending to be maintained at current levels (~3.5 bn USD) with a continued focus on modularization and modernization of our estate, leveraging innovation and ecosystem to enable business growth and create further efficiencies.

Global Reporting Initiative Content Index 2019

This content index refers to the Global Reporting Initiative (GRI) Standards issued by the Global Sustainability Standards Board and the Financial Services Sector Supplements, which form together a voluntary reporting framework that provides guidance on how organizations can disclose their sustainability performance.

UBS's reporting has been reviewed by Ernst & Young Ltd (EY) against the GRI Standards. The content has been prepared in accordance with the comprehensive option as evidenced in the EY assurance report. The limited assurance by EY covered all items of the GRI Content Index.

This report has been prepared in accordance with the GRI Standards: Comprehensive option.

Guidance

Disclosure	Number and title of disclosure
Reference	Referenced text which covers the GRI Standard
Page	Page reference in the UBS Annual Report 2019 (UBS AR 2019) or UBS Sustainability Report 2019 (UBS SR 2019)

Note

Topics in the index that do not feature a management approach are not material, but are reported on a voluntary basis (selected indicators only).

All references to the Annual Report 2019 are referring to the combined UBS Group AG and UBS AG Annual Report 2019 available on *www.ubs.com/investors*.

GRI Standard	Disclosure	Reference	Page
GRI 102 General Disclosures (2016)	102–1 Name of organization	Corporate information	UBS AR 2019 / 7
	102–2 Activities, brands, products, and services	Our strategy	UBS SR 2019 / 7–8
		Global Wealth Management	UBS SR 2019 / 11–13
		Personal & Corporate Banking	UBS SR 2019 / 14–15
		Asset Management	UBS SR 2019 / 16–17
		Investment Bank	UBS SR 2019 / 18–19
		Corporate Center	UBS SR 2019 / 20
	102–3 Location of headquarters	Corporate information	UBS AR 2019 / 7
	102–4 Location of operations	Global Wealth Management	UBS SR 2019 / 11–13
		Personal & Corporate Banking	UBS SR 2019 / 14–15
		Asset Management	UBS SR 2019 / 16–17
		Investment Bank	UBS SR 2019 / 18–19
		Further information reg. locations, incl. list of all UBS Branches worldwide can be found under *https://www.ubs.com/global/en/about_ubs/about_us/locations.html*	
	102–5 Ownership and legal form	Corporate information	UBS AR 2019 / 7
		Group structure and shareholders	UBS AR 2019 / 204–205
		Share capital structure	UBS AR 2019 / 206–210
	102–6 Markets served	Our strategy	UBS SR 2019 / 7–8
		Global Wealth Management	UBS SR 2019 / 11–13
		Personal & Corporate Banking	UBS SR 2019 / 14–15
		Asset Management	UBS SR 2019 / 16–17
		Investment Bank	UBS SR 2019 / 18–19
	102–7 Scale of the organization	Our key figures	UBS AR 2019 / 8
		Note 2a Segment reporting	UBS AR 2019 / 353–356
		Note 2b Segment reporting by geographic location	UBS AR 2019 / 357
	102–8 Information on employees and other workers	Employees (additional information)	UBS SR 2019 / 38–45
		Employees	UBS SR 2019 / 35–37
	102–9 Supply chain	Vendors	UBS SR 2019 / 50
		Responsible supply chain management	UBS SR 2019 / 93
	102–10 Significant changes to the organization and its supply chain	Our evolution	UBS AR 2019 / 14–15
		Note 1b Changes in accounting policies, comparability and other adjustments	UBS AR 2019 / 349–351
		Note 32 Changes in organization and acquisitions and disposals of subsidiaries and businesses	UBS AR 2019 / 470–471
	102–11 Precautionary Principle or approach	Risk management and control	UBS AR 2019 / 105–155
		Key policies and guidelines	UBS SR 2019 / 51–52
	102–12 External initiatives	External commitments and memberships	UBS SR 2019 / 97
		Advancing sustainability in the financial sector	UBS SR 2019 / 76–77
	102–13 Membership of associations	See 102–12	UBS SR 2019 / 97
			UBS SR 2019 / 76–77
	102–14 Statement from senior decision-maker	Chairman's statement	UBS SR 2019 / 3–4

GRI Standard	Disclosure	Reference	Page
GRI 102 General Disclosures (2016)	102–15 Key impacts, risks, and opportunities	Sustainability at UBS	UBS SR 2019 / 5–6
		Our strategy, business model and environment	UBS SR 2019 / 7–50
		Risk management and control	UBS AR 2019 / 105–155
		Risk evaluation	UBS SR 2019 / 165
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Objectives 2020	UBS SR 2019 / 140–142
		Sustainability governance	UBS SR 2019 / 51–53
	102–16 Values, principles, standards, and norms of behavior	Our Code of Conduct and Ethics	UBS SR 2019 / 113–116
		Key policies and guidelines	UBS SR 2019 / 51–52
		The keys to a strong corporate culture	UBS SR 2019 / 35
		Pillars, Principles and Behaviors (foldout pages)	UBS AR 2019 / 0
	102–17 Mechanisms for advice and concerns about ethics	Our Code of Conduct and Ethics	UBS SR 2019 / 113–116
		Key policies and guidelines	UBS SR 2019 / 51–52
		Quality feedback management system	UBS SR 2019 / 29
		Grievance mechanisms	UBS SR 2019 / 129
	102–18 Governance structure	Board of Directors	UBS AR 2019 / 213–228
		Group Executive Board	UBS AR 2019 / 229–236
		Charter of the Corporate Culture and Responsibility Committee	UBS SR 2019 / 112
		Sustainability governance	UBS SR 2019 / 51–53
	102–19 Delegating authority	Charter of the Corporate Culture and Responsibility Committee	UBS SR 2019 / 112
		Sustainability governance	UBS SR 2019 / 51–53
	102–20 Executive-level responsibility for economic, environmental, and social topics	Sustainability governance	UBS SR 2019 / 51–53
		Charter of the Corporate Culture and Responsibility Committee	UBS SR 2019 / 112
	102–21 Consulting stakeholders on economic, environmental, and social topics	Chairman's statement	UBS SR 2019 / 3–4
		How we create value for our stakeholders	UBS SR 2019 / 25–50
		Shareholders' participation rights	UBS AR 2019 / 211–212
		Corporate calendar UBS Group AG	UBS AR 2019 / 7
	102–22 Composition of highest governance body	Board of Directors	UBS AR 2019 / 213–228
		Group Executive Board	UBS AR 2019 / 229–236
		Sustainability governance	UBS SR 2019 / 51–53
	102–23 Chair of the highest governance body	Not relevant to UBS (two-tiered board structure)	
		Board of Directors	UBS AR 2019 / 213–228
	102–24 Nominating and selecting the highest governance body	Sustainable performance and compensation	UBS SR 2019 / 64–65
		Board of Directors	UBS AR 2019 / 213–228
		Elections and terms of office	
		Organizational principles and structure	
		Governance and Nominating Committee	
		Skills, expertise and training of the Board of Directors	
		Succession planning	
	102–25 Conflicts of interest	Key policies and guidelines (Code of Conduct and Ethics)	UBS SR 2019 / 51–52
		Important business connections of independent members of the Board of Directors	UBS AR 2019/ 226
	102–26 Role of highest governance body in setting purpose, values, and strategy	Sustainability governance	UBS SR 2019 / 51–53
		Charter of the Corporate Culture and Responsibility Committee	UBS SR 2019 / 112
		Chairman's statement	UBS SR 2019 / 3–4
	102–27 Collective knowledge of highest governance body	Skills, expertise and training of the Board of Directors	UBS AR 2019 / 227

GRI Standard	Disclosure	Reference	Page
GRI 102 General Disclosures (2016)	102–28 Evaluating the highest governance body's performance	Performance assessment	UBS AR 2019 / 222
		Sustainable performance and compensation	UBS SR 2019 / 64–65
	102–29 Identifying and managing economic, environmental, and social impacts	Sustainability governance	UBS SR 2019 / 51–53
		Charter of the Corporate Culture and Responsibility Committee	UBS SR 2019 / 112
		Chairman's statement	UBS SR 2019 / 3–4
		How we create value for our stakeholders	UBS SR 2019 / 25–50
		Materiality under GRI Standards	UBS SR 2019 / 66–69
	102–30 Effectiveness of risk management processes	Charter of the Corporate Culture and Responsibility Committee	UBS SR 2019 / 112
	102–31 Review of economic, environmental, and social topics	Board of Directors – Corporate Culture and Responsibility Committee	UBS AR 2019 / 224
	102–32 Highest governance body's role in sustainability reporting	Charter of the Corporate Culture and Responsibility Committee	UBS SR 2019 / 112
	102–33 Communicating critical concerns	Sustainability governance	UBS SR 2019 / 51–53
		Charter of the Corporate Culture and Responsibility Committee	UBS SR 2019 / 112
		Chairman's statement	UBS SR 2019 / 3–4
		Grievances and whistleblowing protection, policies and procedures	UBS SR 2019 / 52
	102–34 Nature and total number of critical concerns	Materiality under GRI Standards	UBS SR 2019 / 66–69
		How we create value for our stakeholders	UBS SR 2019 / 25–50
		Note: Due to the diverse nature and sources of critical concerns it is not possible to report their total number.	
	102–35 Remuneration policies	Compensation Report 2019	UBS AR 2019 / 242–288
		Sustainable performance and compensation	UBS SR 2019 / 64–65
	102–36 Process for determining remuneration	Compensation Report 2019	UBS AR 2019 / 242–288
	102–37 Stakeholders' involvement in remuneration	How we create value for our stakeholders	UBS SR 2019 / 25–50
		Shareholders' participation rights	UBS AR 2019 / 211–212
		Corporate calendar UBS Group AG	UBS AR 2019 / 7
		Compensation report – Overview of the performance assessment measures	UBS AR 2019 / 268
		Shareholder engagement and say on pay	UBS AR 2019 / 246–249
		Note: Voting results of AGMs are published on *www.ubs.com/agm*	
	102–38 Annual total compensation ratio	Reason for omission: Not disclosed due to confidentiality	
		Compensation for the CEO, the highest paid GEB member, total compensation for GEB members, compensation for the BoD members, including the Chairman, and compensation for employees other than GEB members are disclosed in the Compensation Report 2019.	UBS AR 2019 / 242–288
	102–39 Percentage increase in annual total compensation ratio	Reason for omission: Not disclosed due to confidentiality	
		Compensation increase for the CEO, the highest paid GEB member, total compensation for GEB members, compensation for the BoD members, including the Chairman, and general employee compensation for employees other than GEB members are disclosed in the Compensation Report 2019.	UBS AR 2019 / 242–288

GRI Standard	Disclosure	Reference	Page
GRI 102 General Disclosures (2016)	102–40 List of stakeholder groups	How we create value for our stakeholders Materiality under GRI Standards	UBS SR 2019 / 25–50 UBS SR 2019 / 66–69
	102–41 Collective bargaining agreements	Employee representation	UBS SR 2019 / 38
	102–42 Identifying and selecting stakeholders	See 102–40	UBS SR 2019 / 25–50 UBS SR 2019 / 66–69
	102–43 Approach to stakeholder engagement	See 102–40	UBS SR 2019 / 25–50 UBS SR 2019 / 66–69
	102–44 Key topics and concerns raised	See 102–40	UBS SR 2019 / 25–50 UBS SR 2019 / 66–69
	102–45 Entities included in the consolidated financial statements	Our external reporting approach Our evolution Note 1 Summary of significant accounting policies Note 31 Interests in subsidiaries and other entities Note: Except where clearly identified, all of UBS's sustainability information referenced in this GRI index is presented on a consolidated basis under IFRS requirements for financial reporting for the UBS Group AG.	UBS AR 2019 (at the very beginning of the report) UBS AR 2019 / 14–15 UBS AR 2019 / 317–352 UBS AR 2019 / 464–469
	102–46 Defining report content and topic boundaries	Information policy How we create value for our stakeholders Materiality under GRI Standards Impact of material GRI topics	UBS AR 2019 / 240–241 UBS SR 2019 / 25–50 UBS SR 2019 / 66–69 UBS SR 2019 / 131
	102–47 List of material topics	Material GRI topics 2019	UBS SR 2019 / 67–69
	102–48 Restatements of information	None	
	102–49 Changes in reporting	No significant changes	
	102–50 Reporting period	1.1.2019–31.12.2019	
	102–51 Date of most recent report	15.3.2019	
	102–52 Reporting cycle	Financial reporting: quarterly Sustainability reporting: annually	
	102–53 Contact point for questions regarding the report	Questions related to Annual Report: Contacts Questions related to Sustainability Report: Contacts	UBS AR 2019 / 7 UBS SR 2019 / 2
	102–54 Claims of reporting in accordance with the GRI standards	GRI content index Independent assurance report by EY	UBS SR 2019 / 143 UBS SR 2019 / 105–106
	102–55 GRI content index		
	102–56 External assurance	Auditors Management's report on internal control over financial reporting Independent assurance report by EY About this Sustainability Report	UBS AR 2019 / 238–239 UBS AR 2019 / 292–305 UBS SR 2019 / 105–106 UBS SR 2019 / 2

GRI Standard	Disclosure	Reference	Page
Economic Performance (Material topics: Operational efficiency and effectiveness; Climate action)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Our strategy	UBS SR 2019 / 7–8
		Performance targets and measurement	UBS SR 2019 / 9
		Our key figures	UBS AR 2019 / 8
		Group Internal Audit	UBS AR 2019 / 239
		Organizational principles and structure	UBS AR 2019 / 221
		Our climate strategy	UBS SR 2019 / 54–63
		Charter of the Corporate Culture and Responsibility Committee	UBS SR 2019 / 112
		Sustainability governance	UBS SR 2019 / 51–53
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
		Our strategy	UBS SR 2019 / 7–8
		Performance targets and measurement	UBS SR 2019 / 9
		Our climate strategy	UBS SR 2019 / 54–63
GRI 201 Economic Performance (2016)	201–1 Direct economic value generated and distributed	Direct economic value generated and distributed by UBS Group AG consolidated in 2019	UBS SR 2019 / 133
		Income statement	UBS AR 2019 / 306
		Statement of cash flows	UBS AR 2019 / 315–316
		Note 6 Personnel expenses	UBS AR 2019 / 360
		Note 7 General and administrative expenses	UBS AR 2019 / 360
		Note 8 Income taxes	UBS AR 2019 / 361–364
		Driving change in communities	UBS SR 2019 / 98–102
		Vendors (total purchase amount)	UBS SR 2019 / 50
	201–2 Financial implications and other risks and opportunities for the organization's activities due to climate change	Our climate strategy	UBS SR 2019 / 54–63
		Refer to *Submission* to the CDP climate change questionnaire for further information	
	201–3 Defined benefit plan obligations and other retirement plans	Note 29 Pension and other post-employment benefit plans	UBS AR 2019 / 442–455
	201–4 Financial assistance received from government	UBS did not receive any significant monetary support from governments in 2019	
Indirect Economic Impacts (Community investment)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Sustainability governance	UBS SR 2019 / 51–53
		Society	UBS SR 2019 / 46–48
		Indirect economic impacts	UBS SR 2019 / 129
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129

GRI Standard	Disclosure	Reference	Page
GRI 203 Indirect Economic Impacts (2016)	203–1 Infrastructure investments and services supported	Driving change in communities	UBS SR 2019 / 98–102
	203–2 Significant indirect economic impacts	Indirect economic impacts	UBS SR 2019 / 129
		Recovery and resolution	UBS AR 2019 / 51–53
		Personal & Corporate Banking	UBS SR 2019 / 14–15
		Society	UBS SR 2019 / 46–48
		Sustainability at UBS	UBS SR 2019 / 5–6
		For further information see also Switzerland and UBS – Strong partners	*https://www.ubs.com/ch/en/microsites/switzerland-facts-figures-and-stories/switzerland-and-ubs.html*
Anti–corruption (Regulatory compliance)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Sustainability governance	UBS SR 2019 / 51–53
		Policies to combat financial crime	UBS SR 2019 / 52
		Combating financial crime	UBS SR 2019 / 94
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
GRI 205 Anti–corruption (2016)	205–1 Operations assessed for risks related to corruption	Combating financial crime	UBS SR 2019 / 94
	205–2 Communication and training about anti–corruption policies and procedures	Sustainability-related training and raising awareness	UBS SR 2019 / 64
		Responsible supply chain management – Committing our vendors to our standards	UBS SR 2019 / 93
	205–3 Confirmed incidents of corruption and actions taken	Reason for omission: Confidentiality constraints: UBS treats this data as confidential company information. Significant cases would be discussed in Note 21 b) "Litigation, regulatory and similar matters" of the UBS Annual Report.	UBS AR 2019 / 387–394
Anti–competitive Behavior (Regulatory compliance)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Risk appetite framework	UBS AR 2019 / 111–114
		Operational risk	UBS AR 2019 / 153–155
		Our Code of Conduct and Ethics	UBS SR 2019 / 113–116
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
GRI 206 Anti-competitive Behavior (2016)	206–1 Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	See GRI 419–1	

GRI Standard	Disclosure	Reference	Page
Materials			
GRI 301 Materials (2016)	301–1 Materials used by weight or volume.	Paper is the only relevant material for this indicator	
		In-house environmental management – Paper	UBS SR 2019 / 88
	301–2 Recycled input materials used	Paper is the only relevant material for this indicator	
		In-house environmental management – Paper	UBS SR 2019 / 88
Energy (Climate action)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Sustainability governance	UBS SR 2019 / 51–53
		Sustainability-related training and raising awareness	UBS SR 2019 / 64
		UBS in society management indicators	UBS SR 2019 / 128
		Our climate strategy	UBS SR 2019 / 54–63
		Environmental targets and performance in our operations	UBS SR 2019 / 82
		UBS in society constitutional document	UBS SR 2019 / 117–119
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to all material topics	UBS SR 2019 / 129
		Refer to *Submission* to the CDP climate change questionnaire for further information	
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
		ISO 14001 and 50001 certificates	UBS SR 2019 / 107–110

GRI Standard	Disclosure	Reference	Page
GRI 302 Energy (2016)	302–1 Energy consumption within the organization	GHG emissions	UBS SR 2019 / 83
		Energy consumption	UBS SR 2019 / 85
		Environmental indicators	UBS SR 2019 / 91
		Reporting standards and methodologies	UBS SR 2019 / 89–90
	302–2 Energy consumption outside of the organization	Not relevant	
	302–3 Energy intensity	Environmental indicators per full time employee	UBS SR 2019 / 92
		Reporting standards and methodologies	UBS SR 2019 / 89–90
	302–4 Reduction of energy consumption	GHG emissions	UBS SR 2019 / 83
		Energy consumption	UBS SR 2019 / 85
		Environmental targets and performance in our operations	UBS SR 2019 / 82
		Reporting standards and methodologies	UBS SR 2019 / 89–90
	302–5 Reductions in energy requirements of products and services	Not relevant for financial institutions, see FS8	
Emissions (Climate action)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Sustainability governance	UBS SR 2019 / 51–53
		Sustainability-related training and raising awareness	UBS SR 2019 / 64
		UBS in society management indicators	UBS SR 2019 / 128
		Our climate strategy	UBS SR 2019 / 54–63
		Environmental targets and performance in our operations	UBS SR 2019 / 82
		UBS in society constitutional document	UBS SR 2019 / 117–119
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to all material topics	UBS SR 2019 / 129
		Refer to *Submission* to the CDP climate change questionnaire for further information	
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
		ISO 14001 and 50001 certificates	UBS SR 2019 / 107–110
GRI 305 Emissions (2016)	305–1 Direct (Scope 1) GHG emissions	Environmental indicators	UBS SR 2019 / 91
		GHG emissions	UBS SR 2019 / 83
		Reporting standards and methodologies	UBS SR 2019 / 89–90
	305–2 Energy indirect (Scope 2) GHG emissions	Environmental indicators	UBS SR 2019 / 91
		GHG emissions	UBS SR 2019 / 83
		Reporting standards and methodologies	UBS SR 2019 / 89–90
	305–3 Other indirect (Scope 3) GHG emissions	Environmental indicators	UBS SR 2019 / 91
		GHG emissions	UBS SR 2019 / 83
		Reporting standards and methodologies	UBS SR 2019 / 89–90
	305–4 GHG emissions intensity	Environmental indicators per full time employee	UBS SR 2019 / 92
		Reporting standards and methodologies	UBS SR 2019 / 89–90
	305–5 Reduction of GHG emissions	see 302–4	
	305–6 Emissions of ozone-depleting substances (ODS)	Not relevant	
	305–7 Nitrogen oxides (NO_X), sulfur oxides (SO_X), and other significant air emissions	Not relevant	

GRI Standard	Disclosure	Reference	Page
Effluents and Waste			
GRI 306 Effluents and Waste (2016)	306–2 Waste by type and disposal method	Environmental indicators Waste and recycling	UBS SR 2019 / 91 UBS SR 2019 / 89
Supplier Environmental Assessment (Environmental and social risk management)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards Impact of material GRI topics Our approach to long-term value creation	UBS SR 2019 / 66–69 UBS SR 2019 / 131 UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Sustainability governance Objectives 2020 Objectives and achievements 2019 UBS in society constitutional document Responsible supply chain management Information relevant to all material topics	UBS SR 2019 / 51–53 UBS SR 2019 / 140–142 UBS SR 2019 / 135–139 UBS SR 2019 / 117–119 UBS SR 2019 / 93 UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches ISO 14001 and 50001 certificates	UBS SR 2019 / 129 UBS SR 2019 / 107–110
GRI 308 Supplier Environmental Assessment (2016)	308–1 New suppliers that were screened using environmental criteria	Responsible supply chain management	UBS SR 2019 / 93
	308–2 Negative environmental impacts in the supply chain and actions taken	Responsible supply chain management	UBS SR 2019 / 93
Employment (Compensation)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards Impact of material GRI topics Our approach to long-term value creation	UBS SR 2019 / 66–69 UBS SR 2019 / 131 UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Compensation Committee Employees Compensation Key policies and guidelines Sustainable performance and compensation Objectives 2020 Objectives and achievements 2019 Information relevant to specific material topics – Employee topics Information relevant to all material topics	UBS AR 2019 / 224 UBS SR 2019 / 35–39 UBS AR 2019 / 242–288 UBS SR 2019 / 51–52 UBS SR 2019 / 64–65 UBS SR 2019 / 140–142 UBS SR 2019 / 135–139 UBS SR 2019 / 129–130 UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
GRI 401 Employment (2016)	401–1 New employee hires and employee turnover	Hiring, developing and retaining talent Our workforce by the numbers	UBS SR 2019 / 36 UBS SR 2019 / 40–45
	401–2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	Managing our global workforce	UBS SR 2019 / 39
	401–3 Parental leave	Managing our global workforce UBS employees: parental leave taken Reason for omission: Information unavailable for GRI 401–3 c), d) and e). Data aggregation is subject to limitations such as the disparate definitions and permutations of parental leave across the firm and the various leave and absence tools used in the more than 50 countries in which we operate.	UBS SR 2019 / 39 UBS SR 2019 / 45

GRI Standard	Disclosure	Reference	Page
Training and Education (Talent management)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Employees	UBS SR 2019 / 35–39
		Key policies and guidelines	UBS SR 2019 / 51–52
		Sustainable performance and compensation	UBS SR 2019 / 64–65
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to specific material topics – Employee topics	UBS SR 2019 / 129–130
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
GRI 404 Training and Education (2016)	404–1 Average hours of training per year per employee	UBS reports in training days instead of training hours. One training day equals eight training hours.	
		Hiring, developing and retaining talent	UBS SR 2019 / 36
		Our workforce by the numbers	UBS SR 2019 / 40–45
	404–2 Programs for upgrading employee skills and transition assistance programs	Hiring, developing and retaining talent	UBS SR 2019 / 36
		The importance of diversity and inclusion	UBS SR 2019 / 37
		Managing our global workforce	UBS SR 2019 / 39
	404–3 Percentage of employees receiving regular performance and career development reviews	Sustainable performance and compensation	UBS SR 2019 / 64–65
		Hiring, developing and retaining talent	UBS SR 2019 / 36
		As the performance review percentage covers 99,9% of all our eligible employees, there is no added value for further breakdown by gender or employment category.	
Diversity and Equal Opportunity (Diversity and inclusion)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Employees	UBS SR 2019 / 35–39
		Key policies and guidelines	UBS SR 2019 / 51–52
		Sustainable performance and compensation	UBS SR 2019 / 64–65
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to specific material topics – Employee topics	UBS SR 2019 / 129–130
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129

GRI Standard	Disclosure	Reference	Page
GRI 405 Diversity and Equal Opportunity (2016)	405–1 Diversity of governance bodies and employees	The importance of diversity and inclusion	UBS SR 2019 / 37
		Our workforce by the numbers	UBS SR 2019 / 40–45
		Members of the Board of Directors	UBS AR 2019 / 223–220
		Skills, expertise and training of the Board of Directors	UBS AR 2019 / 227
		Members of the Group Executive Board	UBS AR 2019 / 229–236
	405–2 Ratio of basic salary and remuneration of women to men	Hiring, developing and retaining talent	UBS SR 2019 / 36
		Our commitment to pay fairness	UBS AR 2019 / 250
		Sustainable performance and compensation	UBS SR 2019 / 64–65
		Total Reward Principles	UBS AR 2019 / 250
Non-discrimination (Diversity and inclusion)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Employees	UBS SR 2019 / 35–39
		Key policies and guidelines	UBS SR 2019 / 51–52
		Sustainable performance and compensation	UBS SR 2019 / 64–65
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to specific material topics – Employee topics	UBS SR 2019 / 129–130
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
GRI 406 Non-discrimination (2016)	406–1 Incidents of discrimination and corrective actions taken	Reason for omission: Confidentiality constraints: UBS treats this data as confidential company information. Significant cases would be discussed in Note 21 b) "Litigation, regulatory and similar matters" of the UBS Annual Report.	UBS AR 2019 / 387–394
Supplier Social Assessment (Environmental and social risk management)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Sustainability governance	UBS SR 2019 / 51–53
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		UBS in society constitutional document	UBS SR 2019 / 117–119
		Responsible supply chain management	UBS SR 2019 / 93
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
		ISO 14001 and 50001 certificates	UBS SR 2019 / 107–110
GRI 414 Supplier Social Assessment (2016)	414–1 New suppliers that were screened using social criteria	Responsible supply chain management	UBS SR 2019 / 93
	414–2 Negative social impacts in the supply chain and actions taken	Responsible supply chain management	UBS SR 2019 / 93
Local Communities			
GRI G4 Financial Services Sector Disclosures	FS 14 Initiatives to improve access to financial services for disadvantaged people	Accessibility	UBS SR 2019 / 30

GRI Standard	Disclosure	Reference	Page
Public Policy			
GRI 415 Public Policy (2016)	415–1 Political contributions	Politicians and political parties	UBS SR 2019 / 49
Marketing and Labelling (Regulatory compliance)			
GRI 103 Management Approach (2016) GRI G4 Financial Services Sector Disclosures	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Regulation and supervision	UBS AR 2019 / 49–50
		Our Code of Conduct and Ethics	UBS SR 2019 / 113–116
		Suitability	UBS SR 2019 / 29–30
		Key policies and guidelines	UBS SR 2019 / 51–52
		Quality feedback management system	UBS SR 2019 / 29
		Financial literacy	UBS SR 2019 / 134
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
GRI 417 Marketing and Labelling (2016)	417–1 Requirements for product and service information and labelling	Not relevant for financial services company See former FS15 which has been included in 103 for Marketing and Labelling (i.e., Suitability)	
	417–2 Incidents of non-compliance concerning product and service information and labelling	Reason for omission: Confidentiality constraints: UBS treats this data as confidential company information. Significant cases would be discussed in Note 21 b) "Litigation, regulatory and similar matters" of the UBS Annual Report.	UBS AR 2019 / 387–394
	417–3 Incidents of non-compliance concerning marketing communications	Reason for omission: Confidentiality constraints: UBS treats this data as confidential company information. Significant cases would be discussed in Note 21 b) "Litigation, regulatory and similar matters" of the UBS Annual Report.	UBS AR 2019 / 387–394
Customer Privacy (Regulatory compliance)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Regulation and supervision	UBS AR 2019 / 49–50
		Our Code of Conduct and Ethics	UBS SR 2019 / 113–116
		Information relevant to all material topics	UBS SR 2019 / 129
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
GRI 418 Customer Privacy (2016)	418–1 Substantiated complaints concerning breaches of customer privacy and losses of customer data	Reason for omission: Confidentiality constraints: UBS treats this data as confidential company information. Significant cases would be discussed in Note 21 b) "Litigation, regulatory and similar matters" of the UBS Annual Report.	UBS AR 2019 / 387–394

GRI Standard	Disclosure	Reference	Page
Socioeconomic Compliance (Regulatory compliance; Diversity and inclusion)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Our Code of Conduct and Ethics	UBS SR 2019 / 113–116
		Operational risk	UBS AR 2019 / 153–155
		Information relevant to all material topics	UBS SR 2019 / 129
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
GRI 419 Socioeconomic Compliance (2016)	419–1 Non-compliance with laws and regulations in the social and economic area	Reason for omission: Confidentiality constraints: UBS treats this data as confidential company information. Significant cases would be discussed in Note 21 b) "Litigation, regulatory and similar matters" of the UBS Annual Report.	UBS AR 2019 / 387–394
Product Portfolio (Climate action; Environmental and social risk management; Sustainable investing)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Sustainability governance	UBS SR 2019 / 51–53
		Our focus on ESG	UBS SR 2019 / 31–33
		Society	UBS SR 2019 / 46–48
		Key policies and guidelines	UBS SR 2019 / 51–52
		Our Code of Conduct and Ethics	UBS SR 2019 / 113–116
		UBS in society constitutional document	UBS SR 2019 / 117–119
		Our climate strategy	UBS SR 2019 / 54–63
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Environmental and social risk policy framework	UBS SR 2019 / 120–126
		Driving change in finance	UBS SR 2019 / 70–74
		Driving change in philanthropy	UBS SR 2019 / 75
		Sustainability-related training and raising awareness	UBS SR 2019 / 64
		UBS in society management indicators	UBS SR 2019 / 128
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
		ISO 14001 and 50001 certificates	UBS SR 2019 / 107–110

GRI Standard	Disclosure	Reference	Page
GRI G4 Financial Services Sector Disclosures	FS6 Percentage of the portfolio for business lines by specific region, size (e.g., micro/SME/large) and by sector	Global Wealth Management	UBS SR 2019 / 11–13
		Global Wealth Management	UBS AR 2019 / 85–87
		Personal & Corporate Banking	UBS SR 2019 / 14–15
		Personal & Corporate Banking	UBS AR 2019 / 88–92
		Asset Management	UBS SR 2019 / 16–17
		Asset Management	UBS AR 2019 / 93–96
		Investment Bank	UBS SR 2019 / 18–19
		Investment Bank	UBS AR 2019 / 97–100
		Market risk	UBS AR 2019 / 138–147
		Country risk	UBS AR 2019 / 148–152
		Credit risk	UBS AR 2019 / 119–137
		Basel III Pillar 3 UBS Group AG 2019 report	*https://www.ubs.com/global/en/investor-relations/financial-information/pillar-3-disclosures.html*
	FS7 Monetary value of products and services designed to deliver a specific social benefit for each business line broken down by purpose	Driving change in philanthropy	UBS SR 2019 / 75
	FS8 Monetary value of products and services designed to deliver a specific environmental benefit for each business line broken down by purpose	Our climate strategy	UBS SR 2019 / 54–63
		Calculating and reporting on climate change-related financing and advisory activities	UBS SR 2019 / 132
Audit (Environmental and social risk management)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	UBS in society constitutional document	UBS SR 2019 / 117–119
		UBS in society management indicators	UBS SR 2019 / 128
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
		ISO 14001 and 50001 certificate	UBS SR 2019 / 107–110

GRI Standard	Disclosure	Reference	Page
Active Ownership (Sustainable investing)			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Society	UBS SR 2019 / 46–48
		Sustainability governance	UBS SR 2019 / 51–53
		UBS in society constitutional document	UBS SR 2019 / 117–119
		Our focus on ESG	UBS SR 2019 / 31–33
		Driving change in finance	UBS SR 2019 / 70–74
		Environmental and social risk policy framework	UBS SR 2019 / 120–126
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
		ISO 14001 and 50001 certificate	UBS SR 2019 / 107–110
GRI G4 Financial Services Sector Disclosures	FS10 Percentage and number of companies held in the institution's portfolio with which the reporting organization has interacted on environmental or social issues	Reason for omission: Our interactions with companies take a comprehensive ESG approach. Selective quantitative data provision on environmental and social issues only is therefore not practical.	
		Stewardship / voting rights	UBS SR 2019 / 71
		Climate strategy	UBS SR 2019 / 50–51
	FS11 Percentage of assets subject to positive and negative environmental or social screening	Our focus on ESG	UBS SR 2019 / 31–33
		Driving change in finance	UBS SR 2019 / 70–74

Topics not covered by the topic-specific standards

GRI Standard	Disclosure	Reference	Page
Digital Innovation			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Enhancing the client experience through innovation and digitalization	UBS SR 2019 / 27–28
		Digital innovation	UBS SR 2019 / 129
		Information relevant to all material topics	UBS SR 2019 / 129
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
	KPI: USD billion spent on technology	Digital innovation	UBS SR 2019 / 129
Operational Efficiency and Effectiveness			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Corporate Center	UBS SR 2019 / 20
		Our strategy	UBS SR 2019 / 7–8
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
	KPI: Cost / income ration	Our Key Figures	UBS AR 2019 / 8
Client Experience			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Our Code of Conduct and Ethics	UBS SR 2019 / 113–116
		Quality feedback management system	UBS SR 2019 / 29
		Clients	UBS SR 2019 / 26–33
		Current market climate and industry trends	UBS SR 2019 / 21–24
		Our strategy	UBS SR 2019 / 7–8
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
	KPI: Net new money growth (%) for Global Wealth Management	Global Wealth Management Net new money growth	UBS AR 2019 / 85

GRI Standard	Disclosure	Reference	Page
Working Culture and Environment			
GRI 103 Management Approach (2016)	103–1 Explanation of the material topic and its boundary	Materiality under GRI Standards	UBS SR 2019 / 66–69
		Impact of material GRI topics	UBS SR 2019 / 131
		Our approach to long-term value creation	UBS SR 2019 (at the very beginning of the report)
	103–2 The management approach and its components	Compensation Committee	UBS AR 2019 / 224
		Employees	UBS SR 2019 / 35–39
		Society	UBS SR 2019 / 46–48
		Key policies and guidelines	UBS SR 2019 / 51–52
		Sustainable performance and compensation	UBS SR 2019 / 64–65
		Objectives 2020	UBS SR 2019 / 140–142
		Objectives and achievements 2019	UBS SR 2019 / 135–139
		Information relevant to specific material topics – Employee topics	UBS SR 2019 / 129–130
		Health and safety statement	UBS SR 2019 / 127
		Our Code of Conduct and Ethics	UBS SR 2019 / 113–116
		Information relevant to all material topics	UBS SR 2019 / 129
	103–3 Evaluation of the management approach	Evaluation of management approaches	UBS SR 2019 / 129
	KPI: Employer of choice	Society – Aims and progress	UBS SR 2019 / 48

Sustainability Accounting Standards Board Index 2019

Reporting under the Sustainability Accounting Standards Board (SASB) standards for the first time, we have focused on the three sector standards most relevant to our firm: Asset Management & Custody Activities, Investment Banking & Brokerage and Commercial Banks. Except where clearly identified, all of UBS's information included in this index is presented for UBS Group AG and all its subsidiaries. While we do not disclose all information and metrics included in the SASB standards in our 2019 reporting, we are endeavoring to develop our disclosure over time and to close relevant gaps.

Note
All references to the Annual Report 2019 are referring to the combined UBS Group AG and UBS AG Annual Report 2019 available on *www.ubs.com/investors*.

SASB Code	Accounting Metric	Reference	Page
Disclosures Included in Multiple Sectors' Standards			
FN-AC-330a.1 FN-IB-330a.1	Percentage of gender and racial / ethnic group representation for (1) executive management, (2) non-executive management, (3) professionals, and (4) all other employees	Employees Our Code of Conduct and Ethics Skills, expertise and training of the Board of Directors Gender-related aspects in compensation	UBS SR 2019 / 35–45 UBS SR 2019 / 113–116 UBS AR 2019 / 227 UBS AR 2019 / 244
FN-IB-510a.1 FN-CB-510a.1 FN-AC-510a.1	Total amount of monetary losses as a result of legal proceedings associated with fraud, insider trading, anti-trust, anti-competitive behavior, market manipulation, malpractice, or other related financial industry laws or regulations	Note 21 Provisions and contingent liabilities	UBS AR 2019 / 387–394
FN-AC-510a.2 FN-IB-510a.2 FN-CB-510a.2	Description of whistleblower policies and procedures	Grievances and whistleblowing protection, policies and procedures Upholding the Code Grievance mechanism Risk principles and risk culture	UBS SR 2019 / 52 UBS SR 2019 / 116 UBS SR 2019 / 129 UBS AR 2019 / 112
FN-IB-550a.1 FN-CB-550a.1	Global Systemically Important Bank (G-SIB) score, by category	G-SIB information is included in our Pillar III Disclosure (see *https://www.ubs.com/global/en/investor-relations/financial-information/pillar-3-disclosures.html*) Regulation and supervision	Pillar III Disclosure UBS AR 2019 / 49–53
FN-IB-550a.2 FN-CB-550a.2	Description of approach to incorporation of results of mandatory and voluntary stress tests into capital adequacy planning, long-term corporate strategy, and other business activities	Our climate strategy Stress testing Further key aspects of credit risk models Regulation and supervision	UBS SR 2019 / 54–63 UBS AR 2019 / 116–117 UBS AR 2019 / 133–135 UBS AR 2019 / 49–53
Asset Management & Custody Activities			
FN-AC-270a.2	Total amount of monetary losses as a result of legal proceedings associated with marketing and communication of financial product-related information to new and returning customers	Note 21 Provisions and contingent liabilities	UBS AR 2019 / 387–394
FN-AC-270a.3	Description of approach to informing customers about products and services	Suitability Operational risk	UBS SR 2019 / 29–30 UBS AR 2019 / 153–155
FN-AC-410a.1	Amount of assets under management, by asset class, that employ (1) integration of environmental, social and governance (ESG) issues, (2) sustainability-themed investing, and (3) screening	Our focus on ESG Driving change in finance	UBS SR 2019 / 31–33 UBS SR 2019 / 70–74
FN-AC-410a.2	Description of approach to incorporation of environmental, social and governance (ESG) factors in investment and/or wealth management processes and strategies	Global Wealth Management Society Our climate strategy Our focus on ESG Driving change in finance UBS in society constitutional document	UBS SR 2019 / 11–13 UBS SR 2019 / 46–48 UBS SR 2019 / 54–63 UBS SR 2019 / 31–33 UBS SR 2019 / 70–74 UBS SR 2019 / 117–119

SASB Code	Accounting Metric	Reference	Page
FN-AC-410a.3	Description of proxy voting and investee engagement policies and procedures	Protecting our clients' assets Stewardship / voting rights Key sustainability investing products and services	UBS SR 2019 / 58–59 UBS SR 2019 / 71 UBS SR 2019 / 74
FN-AC-550a.2	Description of approach to incorporation of liquidity risk management programs into portfolio strategy and redemption risk management	UBS AM defines Liquidity risk as the risk that a fund cannot meet client redemption requests at current prices while fulfilling ongoing obligations to remaining investors in line with the fund's stated investment objective, strategy and policies. UBS AM operates a Liquidity Risk Framework in line with our fiduciary duty towards investors, which: • Considers liquidity risk management at product design / fund setup; • Requires ongoing liquidity monitoring; and • Includes escalation protocols and governance for management of liquidity risk events	
FN-AC-550a.3	Total exposure to securities financing transactions	Traded products Leverage ratio denominator	UBS AR 2019 / 125–126 UBS AR 2019 / 188–189
FN-AC-550a.4	Net exposure to written credit derivatives	Note 11 Derivative instruments	UBS AR 2019 / 371–376
FN-AC-000.A	(1) Total registered and (2) total unregistered assets under management (AUM)	Note 36 Invested assets and net new money Global Wealth Management Asset Management	UBS AR 2019 / 475 UBS AR 2019 / 85–87 UBS AR 2019 / 93–96
FN-AC-000.B	Total assets under custody and supervision	Note 36 Invested assets and net new money Global Wealth Management Asset Management	UBS AR 2019 / 475 UBS AR 2019 / 85–87 UBS AR 2019 / 93–96
Investment Banking & Brokerage			
FN-IB-410a.1	Revenue from (1) underwriting, (2) advisory, and (3) securitization transactions incorporating integration of environmental, social, and governance (ESG) factors, by industry	Our focus on ESG Driving change in finance Environmental and social risk policy framework (Note: "UBS applies an environmental and social risk framework to ALL transactions, products, services and activities such as lending, capital raising, advisory services or investments that involve a party associated with environmentally or socially sensitive activities.")	UBS SR 2019 / 31–33 UBS SR 2019 / 70–74 UBS SR 2019 / 120–126
FN-IB-410a.2	(1) Number and (2) total value of investments and loans incorporating integration of environmental, social, and governance (ESG) factors, by industry	Our focus on ESG Driving change in finance Environmental and social risk policy framework (Note: "UBS applies an environmental and social risk framework to ALL transactions, products, services and activities such as lending, capital raising, advisory services or investments that involve a party associated with environmentally or socially sensitive activities.")	UBS SR 2019 / 31–33 UBS SR 2019 / 70–74 UBS SR 2019 / 120–126
FN-IB-410a.3	Description of approach to incorporation of environmental, social, and governance (ESG) factors in investment banking and brokerage activities	Society Our climate strategy Our focus on ESG Driving change in finance UBS in society constitutional document Environmental and social risk policy framework	UBS SR 2019 / 46–48 UBS SR 2019 / 54–63 UBS SR 2019 / 31–33 UBS SR 2019 / 70–74 UBS SR 2019 / 117–119 UBS SR 2019 / 120–126
FN-IB-510b.3	Total amount of monetary losses as a result of legal proceedings associated with professional integrity, including duty of care	Note 21 Provisions and contingent liabilities	UBS AR 2019 / 387–394

SASB Code	Accounting Metric	Reference	Page
FN-IB-510b.4	Description of approach to ensuring professional integrity, including duty of care	Employees	UBS SR 2019 / 35–37
		Key policies and guidelines	UBS SR 2019 / 51–52
		Sustainable performance and compensation	UBS SR 2019 / 64–65
		Sustainability-related training and raising awareness	UBS SR 2019 / 64
		Our Code of Conduct and Ethics	UBS SR 2019 / 113–116
		Charter of the Corporate Culture and Responsibility Committee	UBS SR 2019 / 112
		Risk categories	UBS AR 2019 / 107
		Risk principles and risk culture	UBS AR 2019 / 112
		Operational risk	UBS AR 2019 / 153–155
		Compensation framework for employees other than GEB members	UBS AR 2019 / 257
FN-IB-550b.1	Percentage of total remuneration that is variable for Material Risk Takers (MRTs)	Sustainable performance and compensation	UBS SR 2019 / 64–65
		Compensation	UBS AR 2019 / 242–288
FN-IB-550b.2	Percentage of variable remuneration of Material Risk Takers (MRTs) to which malus or clawback provisions were applied	Regulated staff	UBS AR 2019 / 277–278
		2019 performance award pool and expenses	UBS AR 2019 / 279–280
FN-IB-550b.3	Discussion of policies around supervision, control and validation of traders' pricing of Level 3 assets and liabilities	Note 24 Fair value measurement	UBS AR 2019 / 410–429
		Regulated staff	UBS AR 2019 / 277–278
FN-IB-000.A	(1) Number and (2) value of (a) underwriting, (b) advisory, and (c) securitization transactions	Investment Bank	UBS AR 2019 / 97–100
Commercial banks			
FN-CB-230a.2	Description of approach to identifying and addressing data security risks	Our clients and what matters most to them	UBS SR 2019 / 26–27
		Operational risks affect our business	UBS AR 2019 / 67–68
		Top and emerging risks	UBS AR 2019 / 108
		Operational risk	UBS AR 2019 / 153–155
FN-CB-240a.1	(1) Number and (2) amount of loans outstanding qualified to programs designed to promote small business and community development	Personal & Corporate Banking	UBS AR 2019 / 88–92
		Personal & Corporate Banking	UBS AR 2019 / 122
		Driving change in communities	UBS SR 2019 / 98–102
FN-CB-240a.4	Number of participants in financial literacy initiatives for unbanked, underbanked, or underserved customers	Financial literacy	UBS SR 2019 / 134
FN-CB-410a.1	Commercial and industrial credit exposure, by industry	Credit risk	UBS AR 2019 / 119–137
		Loans and advances to banks and customers by industry	UBS AR 2019 / 733–734
		Climate strategy	UBS SR 2019 / 54–63
		Also see Pillar III Disclosure at *https://www.ubs.com/global/en/investor-relations/financial-information/pillar-3-disclosures.html*	Pillar III Report
FN-CB-410a.2	Description of approach to incorporation of environmental, social, and governance (ESG) factors in credit analysis	Our climate strategy	UBS SR 2019 / 54–63
		Environmental and social risk policy framework	UBS SR 2019 / 120–126
FN-CB-000.A	(1) Number and (2) value of checking and savings accounts by segment: (a) personal and (b) small business	Personal & Corporate Banking	UBS AR 2019 / 24–25
		Personal & Corporate Banking	UBS AR 2019 / 88–92
FN-CB-000.B	(1) Number and (2) value of loans by segment: (a) personal, (b) small business, and (c) corporate	Personal & Corporate Banking	UBS AR 2019 / 88–92
		Personal & Corporate Banking	UBS AR 2019 / 122

Risk evaluation

In pursuance of the requirements of the German law implementing the EU directive 2014/95 (on non-financial disclosures, CSR-Richtlinie-Umsetzungsgesetz / CSR-RUG) this section includes an evaluation of the risks that have a high probability of potential negative impacts upon the "aspects" covered by said law.

Combating money laundering and terrorist financing has been a major focus of government policies relating to financial institutions in recent years. The US Bank Secrecy Act and other laws and regulations require the maintenance of effective policies, procedures and controls to detect, prevent and report money laundering and terrorist financing, and to verify the identity of our clients. Failure to maintain and implement adequate programs to prevent money laundering and terrorist financing could result in significant legal and reputation risk. In addition, we are subject to laws and regulations, in jurisdictions in which we operate, prohibiting corrupt or illegal payments to government officials and others, including the US Foreign Corrupt Practices Act and the UK Bribery Act. We maintain policies, procedures and internal controls intended to comply with those regulations.

The financial services industry is characterized by intense competition, continuous innovation, restrictive, detailed, and sometimes fragmented regulation and ongoing consolidation, and we may be unable to retain and attract qualified employees. The amount and structure of our employee compensation is affected not only by our business results but also by competitive factors and regulatory considerations. In recent years, in response to the demands of various stakeholders, including regulatory authorities and shareholders, and in order to better align the interests of our staff with other stakeholders, we have increased average deferral periods for stock awards, expanded forfeiture provisions and, to a more limited extent, introduced clawback provisions for certain awards linked to business performance. We have also introduced individual caps on the proportion of fixed to variable pay for the Group Executive Board (GEB) members, as well as certain other employees. Constraints on the amount or structure of employee compensation, higher levels of deferral, performance conditions and other circumstances triggering the forfeiture of unvested awards may adversely affect our ability to retain and attract key employees. The loss of key staff and the inability to attract qualified replacements could seriously compromise our ability to execute our strategy and to successfully improve our operating and control environment, and could affect our business performance.

→ **Refer to the "Risk factors" and "Regulation and supervision" sections of UBS's Annual Report 2019 for more information**

Non-financial disclosures in accordance with German law implementing the EU directive 2014/95

This GRI Document also includes our firm's disclosures of non-financial information required by German law implementing the EU directive 2014/95 (CSR-Richtlinie-Umsetzungsgesetz / CSR-RUG). These disclosures can be found in the sections and the pages indicated below. Due to the differing materiality requirements of the GRI Standards and of CSR-RUG the material topics listed in the CSR-RUG index are therefore limited to the matters ("*Belange*") addressed by CSR-RUG.

	Section in Sustainability Report 2019	Page(s)
About this report (including framework)	About this Sustainability Report	2
Description of the business model	Our strategy, business model and environment	7–50
Material risks	Risk evaluation	165

Non financial aspects	Section in Sustainability Report 2019	Page(s)
Broad thematic issues affecting all nonfinancial aspects	Our focus on ESG Our governance and principles Sustainable performance and compensation Sustainable investments Sustainability-related training and raising awareness UBS sustainability objectives and achievements 2019 and sustainability objectives 2020	31–33 51–53 64–65 70–71 64 135–142
Environmental and human rights matters (Material topics: Climate action; Environmental and social risk management; Sustainable investing)	Society Stakeholder relations (additional information): Vendors Environment and human rights Our climate strategy – taking action towards a low-carbon future Management of environmental and social risks Responsible supply chain management In-house environmental management	46–48 50 78 54–63 79 93 82–92
Social and employee matters (Working culture and environment; Talent management; Compensation; Diversity and inclusion; Community investing)	Society Employees Sustainable performance and compensation Driving change in communities	46–48 35–45 64–65 98–102
Anti-corruption and bribery matters (Combating financial crime as sub-topic of Regulatory compliance)	Combating financial crime	94

UBS Group AG
P.O. Box
CH-8098 Zurich

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UBS

Santa Clara Valley Water District

Response to Request for Proposals for:

Revolving Line of Credit – SUPPLEMENTAL INFORMATION

June 15, 2020

Bank of America, N.A.
555 California St., Suite 1160
San Francisco, CA 94104

333 S. Hope St., Suite 3820
Los Angeles, CA 90071

BANK OF AMERICA

Valley Water

BANK OF AMERICA

June 15, 2020

Ms. Charlene Sun
Treasury and Debt Officer
Office of the Chief Executive Officer
Santa Clara Valley Water District
csun@valleywater.org

Dear Ms. Sun:

Bank of America, N.A. ("BANA" or "Bank") appreciates the opportunity to respond to the Santa Clara Valley Water District's (the "District" or "Valley Water") request for additional information related to our RFP response dated May 22, 2020. Bank of America is strongly committed to fundamental human rights. Our policies and practices promote and protect human rights, and we strive to conduct our business in a manner consistent with guiding principles. We are submitting the attached information to convey our effort.

Thank you, again, for your consideration of BANA. Please feel free to contact either of us with any questions.

Sincerely,

Greg Bailey
Senior Vice President
Bank of America, N.A.
213.621.7131
greg.s.bailey@bofa.com

Holly Vocal
Director
BofA Securities / Bank of America, N.A.
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cc: Ed Soong, Public Resources Advisory Group, esoong@pragadvisors.com
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1. Supplemental Information: Responses for Additional Information 1

Appendix

A. Bank of America's Human Rights Statement

B. Bank of America's Environmental and Social Risk Policy ("ESRP") Framework

C. Bank of America's ESG Performance Data Summary

Confidential Notice to Recipient

"Bank of America" is the marketing name for the global banking and global markets businesses of Bank of America Corporation. Lending, derivatives, and other commercial banking activities are performed globally by banking affiliates of Bank of America Corporation, including Bank of America, N.A., Member FDIC. Securities, strategic advisory, and other investment banking activities are performed globally by investment banking affiliates of Bank of America Corporation ("Investment Banking Affiliates"), including, in the United States, BofA Securities, Inc. ("BofAS"), Merrill Lynch, Pierce, Fenner & Smith Incorporated ("Merrill"), and Merrill Lynch Professional Clearing Corp., ("MLPFC") all of which are registered broker-dealers and Members of SIPC, and, in other jurisdictions, by locally registered entities. References to BofA herein refer to the institutional business of Merrill prior to May 13, 2019, and as of that date to BofAS. BofAS, Merrill, and MLPFC are registered as futures commission merchants with the CFTC and are members of the NFA.

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Bank of America Corporation and its affiliates (collectively, the "BAC Group") comprise a full service securities firm and commercial bank engaged in securities, commodities and derivatives trading, foreign exchange and other brokerage activities, and principal investing as well as providing investment, corporate and private banking, asset and investment management, financing and strategic advisory services and other commercial services and products to a wide range of corporations, governments and individuals, domestically and offshore, from which conflicting interests or duties, or a perception thereof, may arise. In the ordinary course of these activities, parts of the BAC Group at any time may invest on a principal basis or manage funds that invest, make or hold long or short positions, finance positions or trade or otherwise effect transactions, for their own accounts or the accounts of customers, in debt, equity or other securities or financial instruments (including derivatives, bank loans or other obligations) of the Company, potential counterparties or any other company that may be involved in a transaction. Products and services that may be referenced in the accompanying materials may be provided through one or more affiliates of Bank of America Corporation. We have adopted policies and guidelines designed to preserve the independence of our research analysts. The BAC Group prohibits employees from, directly or indirectly, offering a favorable research rating or specific price target, or offering to change a rating or price target to a subject company as consideration or inducement for the receipt of business or for compensation and the BAC Group prohibits research analysts from being directly compensated for involvement in investment banking transactions. The views expressed herein are the views solely of Global Corporate and Investment Banking, and no inference should be made that the views expressed represent the view of the firm's research department. We are required to obtain, verify and record certain information that identifies the Company, which information includes the name and address of the Company and other information that will allow us to identify the Company in accordance, as applicable, with the USA Patriot Act (Title III of Pub. L. 107-56 (signed into law October 26, 2001)) and such other laws, rules and regulations as applicable within and outside the United States.

We do not provide legal, compliance, tax or accounting advice. Accordingly, any statements contained herein as to tax matters were neither written nor intended by us to be used and cannot be used by any taxpayer for the purpose of avoiding tax penalties that may be imposed on such taxpayer. If any person uses or refers to any such tax statement in promoting, marketing or recommending a partnership or other entity, investment plan or arrangement to any taxpayer, then the statement expressed herein is being delivered to support the promotion or marketing of the transaction or matter addressed and the recipient should seek advice based on its particular circumstances from an independent tax advisor. Notwithstanding anything that may appear herein or in other materials to the contrary, the Company shall be permitted to disclose the tax treatment and tax structure of a transaction (including any materials, opinions or analyses relating to such tax treatment or tax structure, but without disclosure of identifying information or any nonpublic commercial or financial information (except to the extent any such information relates to the tax structure or tax treatment)) on and after the earliest to occur of the date of (i) public announcement of discussions relating to such transaction, (ii) public announcement of such transaction or (iii) execution of a definitive agreement (with or without conditions) to enter into such transaction; provided, however, that if such transaction is not consummated for any reason, the provisions of this sentence shall cease to apply.

SUPPLEMENTAL INFORMATION

1. *What is the Bank's response to Banktrak's rankings (attached)? Have you or do you plan on implementing any changes to address the issues raised by Banktrak?*

Commitment to Human Rights. BankTrack's rankings provides scores in four main categories (policies, due diligence, reporting and remedy) and several sub-categories. Bank of America Coporation's (the "Firm" or "Bank of America") scores reflect "no information" in many of the sub-categories. However, we would like to convey to Valley Water and its Board that our Firm is strongly committed to fundamental human rights. Our policies and practices promote and protect human rights, and we strive to conduct our business in a manner consistent with the United Nations Universal Declaration of Human Rights, the United Nations Guiding Principles on Business and Human Rights and the International Labor Organization's Fundamental Conventions. **Bank of America's Human Rights Statement** can be found in **Appendix A.**

With respect to the policies, due diligence and remedies, the Firm's Board of Directors (the Board") oversees the Firm's domestic and international human rights policies and standards, including the management of related risks. As part of the environmental, social and related governance ("ESG") and risk oversight structures to oversee domestic and international developments in human rights and the risks those developments present for the Firm, the Board Governance Committee has chartered a Global ESG Committee. The Global ESG Committee is led by the Firm's Vice Chairman, Anne Finucane, and comprises senior leaders from each business line and control functions across the Firm and is accountable to the Firm's Chief Executive Officer. The Global ESG Committee's work is reflected in part in the Firm's **Environmental and Social Risk Policy ("ESRP") Framework**, which includes provisions that address human rights. A copy of the Firm's ESRP Framework is provided in **Appendix B**.

The Global ESG Committee reviews and approves the ESRP Framework at least every two years or more frequently as material issues develop. Furthermore, the Global ESG Committee convenes six times a year and reports regularly to the Board Governance Committee. The Firm also provides regional oversight through committees in Asia Pacific (APAC), Europe, Middle East and Africa (EMEA), and Latin America (LatAm) that focus on region-specific issues and are chaired by in-region leaders.

As it relates to reporting, we are committed to managing environmental and social risk, as well as providing industry-leading disclosures on our progress. The Firm provides annual reports of our ESG and ESRP Framework items. A copy of latest **ESG Performance Data Summary** report is provided in **Appendix C**. The report aligns to G4 guidelines under the Global Reporting Initiative standards.

2. *What is the Bank's response to Bloomberg's rankings (attached)? Have you or do you plan on implementing any changes to address the issues raised by Bloomberg?*

Commitment to ESG Principles. Based on the Bloomberg report, Bank of America's scores are above the median scores for RobescoSAM and ISS. We believe that these high scores reflect the Firm's ESG approach, which is fully-integrated into all our lines of business and ensures that we are taking ESG factors into account as we make the decisions that drive our business. At Bank of America, we drive our business by focusing on responsible growth and ESG leadership. We are proud of Bank of America's ESG-related achievements and various awards and recognitions, as noted below.

Recent ESG Accomplishments:

- In 2019, we announced the completion of our Environmental Business Commitment to deploy $125 billion by 2025 to support to support low-carbon, sustainable business activities through lending, investing, capital raising and advisory services. This goal was completed six years early. We also announced an expanded Environmental Business Initiative of $300 billion by 2030.

- First company to issue a benchmark-sized corporate green bond and co-authored the original version of the Green Bond Principles.
- Since 2013, we issued nearly $8 billion in green and social bonds, and helped more than 150 clients support their sustainable business needs by raising in excess of $200 billion through more than 300 ESG-themed bond offerings.
- In 2020, to accelerate our progress, identify new opportunities, and build upon our work in sustainable finance in particular, we announced the establishment of a Sustainable Markets Committee
- We also are making our operations more sustainable – including achieving carbon neutrality and procuring 100% renewable electricity in 2019, a year ahead of schedule. We offer programs and benefits that help employees become better environmental stewards.
- Advanced economic mobility in local communities around the world by deploying more than $200 million in philanthropic capital from the Bank of America Charitable Foundation.
- In 2018, we committed to hiring 10,000 individuals from low- and moderate-income neighborhoods in our Consumer and Small Business division, through our Pathways program, over the next five years.

Recent ESG-Related Recognitions:

- Ranked No. 1 financial services company and No. 3 overall on Fortune Magazine's annual Change the World list in 2018.
- Named one of America's most JUST Companies by Just Capital and Forbes in 2018.
- Recipient of the 2018 Momentum for Change award presented by the United Nations Climate Change Secretariat. Recognized for the bank's leadership in the Catalytic Finance Initiative.
- Named Asia's Best Environmental, Social and Governance (ESG) Bank in 2019 by The Asset magazine for four consecutive years.
- Euromoney Awards for Excellence 2019: Asia's Best Bank for Corporate Social Responsibility.

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3. *Are there any other ESG information the bank wishes to provide? For example, how many branches/employees does the bank have in Santa Clara County and the 9 Bay area counties? Does the Bank have any social responsibility (corporate policies) policies that can be shared with the Board?*

Efforts to Assist with COVID-19 Relief and Promote Racial and Economic Equality. The Firm has made the following commitments in recent months to help address challenges faced by communities in light of the COVID-19 pandemic and social unrest stemming from racial and economic inequality.

- June 2020 – Committed $1 billion over four years to help local communities address economic and racial inequality accelerated by a global pandemic. The programs will be focused on assisting people and communities of color that have experienced a greater impact from the health crisis.
- June 2020 – Committed $25 million to support the Smithsonian's launch of its new "Race, Community and Our Shared Future" initiative, which will explore how Americans currently understand, experience and confront race, its impact on communities and how that impact is shaping the nation's future.
- May 2020 – Issued $1 billion corporate social bond to support the fight against the COVID-19 pandemic, the first such offering by a U.S. commercial bank.
- May 2020 – Bank of America contributed $5 million to the Brave of Heart Fund, established to provide financial and emotional support to the surviving family members of frontline health care workers and volunteers who lose their lives in the COVID-19 fight.

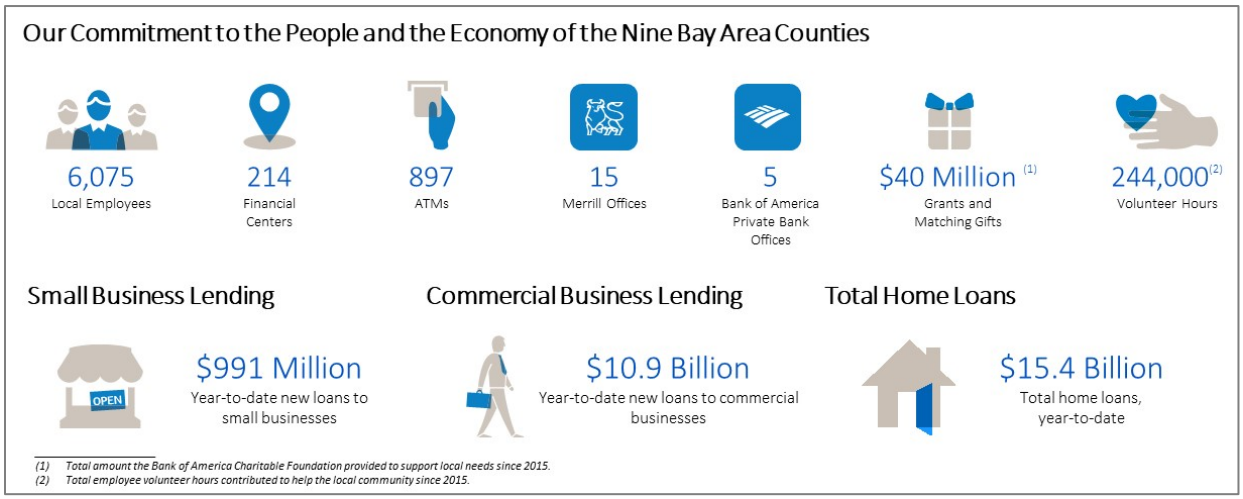
Diversity and Inclusion. In addition to our focus on ESG, diversity and inclusion are central to the Firm's core values. Bank of America is honored to be recognized by various organizations and media around the world for our employment practices.

- Named one of Fortune Magazine's Best Workplaces for Diversity List in 2019.
- Named Euromoney's World's Best Bank for Diversity & Inclusion in 2019.

- 2019 Global Employer of the Year by Disability:IN for leading the way in policies, practices and programs that are inclusive of people with disabilities.
- Ranked No. 24 on PEOPLE's 2019 Companies that Care list, which spotlights 50 U.S. companies that have succeeded in business while also demonstrating respect, compassion and concern for their communities, their employees, and the environment.
- Bank of America recognized among top corporations for inclusion by the National LGBT Chamber of Commerce and National Business Consortium.
- Recognized as a leader for the fourth consecutive year on Bloomberg's annual Gender-Equality Index.
- Named to the Working Mother Magazine's "2019 Best Companies for Multicultural Women" list in 2019.
- Received the 2019 Catalyst Award recognizing our exceptional efforts to accelerate progress for women in business.

Local Presence and Commitment. Bank of America has a strong presence within the Bay Area. In all of the nine Bay Area Counties, BofA has 221 branches with 1,943 branch associates, and in Santa Clara County alone, there are 57 branches with 536 branch associates. Overall, we have 6,075 total employees working in the 234 total locations in the nine Bay Area Counties.

Furthermore, we pride ourselves on not just being a leader in financial services, but also a leader in our communities. In the nine Bay Area Counties, the Bank of America Charitable Foundation has provided $40 million in grants and matching gifts, and we have volunteered 244,000 employee hours since 2015. In Silicon Valley, we've worked Sacred Heart Community Services and Charities Housing to advance community sustainability by equipping the organization and their leaders with tools and resources to do more.



Policies. As noted above, we've provided our Human Rights Statement and ERSP Framework Policies in the Appendix.

4. *Will the bank consider offering Valley Water credit <u>up to $180million, and, act as a lead bank to offer an additional $20 million syndicated loan to small and local banks/credit unions</u>? The syndication agreement would be between the lead bank and the local banks. The pricing for the local banks is subject to discussion, and may be higher than pricing for the lead bank given the District board's desire to incentivize small local banks participation. If not, does the bank have other ideas/mechanisms to involve small local banks participation in the line of credit business?*

Lead Arranger. Bank of America, N.A. appreciates the opportunity to respond to Valley Water's Request for Proposals for Line of Credit. BANA is a leading provider of both traditional bank facilities and direct

purchase products such as lines of credit. The Bank remains willing to offer up to $75 million of capacity and may act as lead arranger with other financing partners (collectively, the "Lenders" or the "Banks") to meet Valley Water's total request of $200 million. The Lenders will provide their respective commitments on the basis of several, but not joint liability, with each Lender liable for its pro rata share of the Facility and each draw thereunder. Valley Water would be required to accept parity pricing, covenants, events of defaults and remedies amongst the Lenders. Such Lead Arrangement role would necessitate a fee approximating 0.05% of the total arranged commitment amount and estimated legal fees of $75,000 plus $10,000 per additional bank (assuming common bank counsel).

5. *Will the bank consider revising the fee proposal after reviewing the 6/9 Staff Report summarizing the results of the RFP? If so, please submit your revised fee proposals along with the information requested here by 10 am on June 15, 2020.*

Fee Proposal. Subject to adjustments in the above response, BANA's fee proposal remains as presented in our RFP response dated May 22, 2020.

No Advisory or Fiduciary Role

The Issuer acknowledges and agrees that: (i) the transaction contemplated by this Proposal Response is an arm's length, commercial transaction between the Issuer and the Bank in which the Bank is acting solely as a principal and for its own interest; (ii) the Bank is not acting as a municipal advisor or financial advisor to the Issuer; (iii) the Bank has no fiduciary duty pursuant to Section 15B of the Securities Exchange Act of 1934 to the Issuer with respect to the transaction contemplated hereby and the discussions, undertakings and procedures leading thereto (irrespective of whether the Bank has provided other services or is currently providing other services to the Issuer on other matters); (iv) the only obligations the Bank has to the Issuer with respect to the transaction contemplated hereby expressly are set forth in this Proposal Response; and (v) the Bank is not recommending that the Issuer take an action with respect to the transaction contemplated by this Proposal Response, and before taking any action with respect to the contemplated transaction, the Issuer should discuss the information contained herein with its own legal, accounting, tax, financial and other advisors, as it deems appropriate. If the Issuer would like a municipal advisor in this transaction that has legal fiduciary duties to Issuer, the Issuer is free to engage a municipal advisor to serve in that capacity. This Proposal Response is provided to the Issuer pursuant to and in reliance upon the "RFP exemption" and the "Bank exemption" under the municipal advisor rules (the "Rules") of the Securities and Exchange Commission (Rule 15Ba1-1 et seq.).

APPENDIX A:
HUMAN RIGHTS STATEMENT

BANK OF AMERICA

Bank of America Human Rights Statement

Bank of America supports fundamental human rights and demonstrates leadership in responsible workplace practices across our enterprise and in all regions where we conduct business.

While national government's bear the primary responsibility for upholding human rights, our company policies and practices promote and protect human rights, and we strive to conduct our business in a manner consistent with the United Nations Universal Declaration of Human Rights, the United Nations Guiding Principles on Business and Human Rights and the International Labor Organization's Fundamental Conventions. Our commitment to fair, ethical and responsible business practices, as we engage with our employees, clients, vendors and communities around the world, is embodied in our values and Code of Conduct.

Employees

Our success as a company is driven by the people supporting our customers and clients each day. Bank of America is committed to treating every employee with respect and dignity and protecting their human rights. We offer equal employment opportunity to all, do not tolerate discrimination or harassment, and are proud to be a leader in supporting diversity and inclusion. We abide by labor laws and regulations in the regions where we conduct business including those that address child labor, forced labor, equal pay and nondiscrimination in our workforce. We strive to provide a safe and healthy work environment for all employees. We also acknowledge and support the rights of each employee and value an open dialogue with our employees so we may continue to improve their work environment as well as the service we provide customers and clients around the world.

Customers, Clients and Vendors

Bank of America has policies to prevent the illegal use of our products and services, including abuse that may result in human rights violations. These policies include a rigorous Customer Due Diligence process, compliance with U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act and the Modern Slavery Act as well as anti-money laundering controls. All employees are required to complete annual training on many of these subjects, as well as acknowledge our Code of Conduct.

We have endorsed a number of international charters, principles and initiatives that address social and environmental issues, including the United Nations Principles for Responsible Investment, the Equator Principles, Carbon Principles, United Nations Global Compact and CERES Principles. Our Environmental and Social Risk Policy Framework (ESRPF) articulates how we approach environmental and social risks across our business, as well as outlining the environmental and social issues most relevant to us. The policies referenced in the ESRPF are reviewed as a part of our internal audit process, which evaluates our adherence to all policies in place within each of our lines of business.

Bank of America strives to work with vendors whose policies and practices regarding human rights are consistent with our own. We have set out clear expectations for our vendors in their management of human rights and other key areas in the bank's Vendor Code of Conduct.

Communities

At Bank of America, our purpose is to make financial lives better. This purpose informs our company's values and reinforces our mission to help local economies grow and prosper. We believe by working with key partners to address critical human rights issues, such as economic empowerment, hunger, jobs, improved health, and access to sustainable energy and water, we can help improve the economic and social health of the communities we serve.

APPENDIX B:
ENVIRONMENTAL AND SOCIAL RISK POLICY ("ESRP") FRAMEWORK

Bank of America Corporation Environmental and Social Risk Policy Framework

October 2019

BANK OF AMERICA

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Introduction

At Bank of America, we drive our business by focusing on responsible growth and Environmental, Social and Governance (ESG) leadership. Responsible growth means we have to grow and win in the marketplace by developing a deep relationship with each client, and by serving the client well. And we must do this in a way that manages risk carefully and ensures our growth is sustainable, enabling us to continue to invest in our people, capabilities and communities.

ESG principles help define how Bank of America delivers responsible growth and contributes to the global economy. Our ESG leadership enables us to pursue growing business opportunities and manage risks associated with addressing the world's biggest environmental and social challenges. It defines how we deploy our capital and resources, informs our business practices and helps determine how and when we use our voice in support of our values. Integrated across our eight lines of business, our ESG focus reflects how we hold ourselves accountable and allows us to create shared success with our clients and communities.

Our approach

Risk management

As a financial institution, risk is inherent in all of our business activities. At Bank of America, the principles of sound risk management are embodied in our values, operating principles and Code of Conduct, which all employees are expected to follow. Our Risk Framework describes our risk management approach and provides for the clear ownership of and accountability for managing risk well across the company. Key to this philosophy is that all employees are accountable for identifying, escalating and debating risks facing the company.

We have established this Environmental and Social Risk Policy (ESRP) Framework to provide additional clarity and transparency around how we approach environmental and social risks, which touch almost every aspect of our business. Like all risks, environmental and social risks require coordinated governance, clearly defined roles and responsibilities, and well-developed processes to ensure they are identified, measured, monitored and managed appropriately and in a timely manner.

This ESRP Framework is aligned with our Enterprise Risk Framework, which outlines Bank of America's approach to risk management and each employee's responsibilities for risk management. As articulated in our Enterprise Risk Framework, there are seven key risk types that we face as an organization: strategic, credit, market, liquidity, operational, compliance and reputational. Increasingly, environmental and social issues impact many of these risk areas, but most often result in potential reputational risk at this point in time.

Materiality

Bank of America takes a proactive approach to identifying and managing risks, which includes an ongoing and rigorous process for identifying the issues that are most material to our company. This process includes formal and informal engagement with both internal and external stakeholders, including clients, shareholders, socially responsible investment firms, and experts from civil rights, consumer, community development and environmental organizations.[1] We weigh up the importance of risk issues in relation to our stakeholders and to our business success.

Our initial lens has been and continues to be our seven key risk types, but our materiality assessments[2] help us to better understand that enterprise risk also includes risks that threaten the safety, human dignity and equal treatment of our employees, clients and the communities where we do business. These broader risks include issues such as climate change and human rights. Due to the extensive and complex role we play in the local and global economy, these issues can and will impact our future business performance, making our management of them a business imperative.

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[1] https://about.bankofamerica.com/en-us/what-guides-us/materiality.html

[2] We have completed a detailed Environmental, Social and Governance (ESG) materiality assessment in line with the Global Reporting Initiative's G4 Sustainability Reporting Guidelines, and published the results in both our 2015 Business Standards Report and Environmental, Social and Governance Addendum (ESG Report). We update and review this materiality assessment with our Global Environmental, Social & Governance Committee (ESG Committee, see discussion below) on a regular basis.

Our ESRP Framework guides our approach to managing material issues. In developing this ESRP Framework, we have benchmarked all of our existing environmental and social policies and positions against industry best practices.

Governance

To strengthen our oversight of environmental, social and governance issues, we established our Global Environmental, Social & Governance Committee (ESG Committee), a management-level committee comprised of senior leaders across every major line of business and support function. The ESG Committee reports to the Corporate Governance Committee of the Board of Directors on environmental and social activities and practices, and also updates the Enterprise Risk Committee of the Board of Directors. The Corporate Governance Committee has overall responsibility for reviewing the company's activities and practices relating to ESG matters.

The ESG Committee also engages other management committees as necessary. On matters of environmental and social risk, the ESG Committee reports to the Management Risk Committee, which in turn reports to the Enterprise Risk Committee of the Board of Directors.

The ESRP Framework is reviewed by the ESG Group at least every two years. If at that time, or any other time in the interim, changes need to be made to the ESRP Framework, they will be reviewed and approved by the ESG and Management Risk Committees and will be reflected, as appropriate, in internal policies and procedures.

Our relationship with individual clients

We serve individual consumers and small businesses with a full range of banking products and services, including retail financial centers and digital banking options. We focus on helping individuals navigate every stage of their financial lives and we work to provide education and support to meet our clients' needs.

We also support communities in becoming more financially resilient by delivering access to products, resources and capital at scale. Serving clients and partners in low- and moderate-income (LMI) communities is part of our broader business strategy, and our continued investment in a tailored community-centered approach means that we can make a meaningful impact by advancing economic mobility for our clients and making neighborhoods stronger.

This approach includes connecting communities to local financial centers, offering safe and transparent products, enabling digital banking, and providing resources that build financial literacy among clients. We are providing capital to help drive small business and community development through loans and grants to community development financial institutions (CDFIs). We have also established relationships with more than 260 CDFI partners to extend credit to those individuals and organizations who may not qualify for traditional lending.

Wealth management

Our wealth management clients are increasingly interested in the role that ESG criteria can play in evaluating portfolio risks and long-term investment opportunities. They are also interested in the positive societal impact their investments may have.

Our wealth management business has developed — and continues to expand — an offering that provides our clients access to strategies across multiple asset classes that integrate ESG criteria into their investment approach. We are committed to continuously providing education and thought leadership to advisors, portfolio managers and clients on the benefits of incorporating ESG criteria into investment strategies and portfolios.

Our relationship with business clients

A key aspect of our strategy is active and extensive engagement with our clients. This engagement allows us to deepen our collective understanding of issues, learn and share perspectives, and, often, create connections between stakeholders with differing views. While this engagement can be conducted in conjunction with due diligence related to a specific transaction, it is ongoing and in addition to the due diligence and risk review processes highlighted below.

As part of our Know Your Customer (KYC) Policy, due diligence, and other onboarding processes, front line units and risk teams will determine if a proposed transaction or relationship presents any potential environmental or social risks. This determination is driven by a number of factors, including cross-referencing our prohibition list and any areas of heightened sensitivity, which are both part of this ESRP Framework; understanding our clients' business, industry, management and reputation; application of our policies; adherence to regulation; and consultation with subject matter experts (SMEs) and teams focused on client screening and onboarding.

Due diligence, heightened risk review and the prohibited list

Standard due diligence

Standard due diligence is conducted when environmental and social risks are well understood or expected to be relatively low for the client, business activity, industry or geography. Due diligence begins with the front line unit, and this process may include, but is not limited to, client engagement, media searches and other screening tools. This standard review may result in a client relationship or transaction being approved, conditionally approved subject to specific mitigating actions, or declined in line with the line of business approval process. If, during this due diligence process, the client, business activity, industry or geography is identified as posing heightened risk, then enhanced due diligence will be conducted.

Enhanced due diligence

A client relationship or transaction may require enhanced due diligence related to environmental and social issues due to a policy or standard, because a front line unit or risk manager made a referral after standard due diligence; or if the client, business activity, industry or geography is deemed sufficiently sensitive. In these instances, enhanced due diligence is conducted before the relationship or transaction can proceed toward approval.

Enhanced due diligence includes a deeper analysis of issues related to client transactions and associated stakeholders. While each client opportunity is unique and therefore requires a customized due diligence process, there are common elements to enhanced due diligence as it relates to the environmental and social areas identified in this ESRP Framework. Enhanced due diligence is conducted by individuals with subject matter expertise and an understanding of a range of stakeholder perspectives. We recognize that environmental and social issues can be interrelated and both need to be considered. Evaluation of environmental matters may include land and water use impacts, a remediation/reclamation track record (if applicable), climate risk reporting, community and stakeholder engagement and overall transparency. Evaluation of social issues may include a review of the client's relationship with relevant civil society organizations, and a particular focus on stakeholder engagement with local communities including Indigenous Peoples and First Nations relations.

The enhanced due diligence process is tailored to provide a deep analysis of risk issues for specific transactions, thus each analysis varies. These analyses may include, but are not limited to, direct client discussion on related environmental and social risks, review of client disclosures, a comparison of the client's practices to industry peers, and consultation with and assessment by additional SMEs. Reviewed material may include regulatory filings, environmental and social impact reports and assessments, Task Force on Climate-related Financial Disclosure (TCFD) reporting, ESG and Corporate Social Responsibility (CSR) reports, and a media search that is focused on environmental and social reputation risk.

Issues that have additional enhanced due diligence specific to this topic are detailed in the section below titled *Managing environmental and social areas of heightened sensitivity.*

Committee review of reputational risk

If due diligence reveals that a business activity presents significant environmental and social risk, that activity – including client relationships, transactions, new products or other corporate activities – may be escalated to the appropriate committee responsible for reputational risk management for further evaluation. These committees are comprised of the business heads and senior executives from our Global Risk, Compliance, Legal and ESG groups, and can approve, conditionally approve or decline a business activity. If the committee does not approve a business activity, the business head may appeal the matter to the executive management team.

Prohibited list

Bank of America will not knowingly engage in illegal activities including:

- Bribery – including giving, offering, receiving or requesting bribes
- Child labor, forced labor or human trafficking – including engaging with companies or transactions in which a client is directly involved in child labor, forced labor or human trafficking
- Illegal logging or uncontrolled fire – including transactions in which a client engages in illegal logging or uncontrolled use of fire for clearing forest lands
- Transactions for illegal purposes – including transactions involving internet gaming in certain jurisdictions.

In addition, we will not knowingly engage in the following types of activities that, while not illegal, are contrary to our values, operating principles and Code of Conduct:

- Payday lending services – directly to our consumer clients or by providing credit to business clients with significant payday lending activities
- Financing the manufacture of military-style firearms for non-law enforcement, non-military use
- Natural resource extraction in UNESCO World Heritage sites – engaging in transactions focused on natural resource extraction within UNESCO World Heritage sites, unless there is prior consensus between UNESCO and the host country's governmental authorities that activities will not adversely affect the natural or cultural value of the site
- Transactions designed to manipulate financial results – including transactions or activities designed to artificially or unfairly manipulate or change the reported value of a client, instrument or transaction or inappropriately reduce tax liabilities.

General purpose financing

As part of our ongoing client engagement process, we regularly monitor our client relationships. We recognize that some clients use general purpose financing to support the development of specific projects and that environmental and social risk can be elevated in a specific project. In some cases, it can even be elevated in an entire sector or industry. We actively engage with clients and prospective clients with significant exposure to highly associated environmental and social risks and, in some circumstances, conduct enhanced due diligence as part of our normal KYC practices.

Subject matter expertise (SME)

Bank of America employs a variety of internal SMEs who participate in the environmental and social risk management process. These SMEs include employees from our front line units, as well as our ESG Group and our Global Risk Management and Public Policy teams. Risk assessments may be conducted by consultants along with internal or external experts, and they range from simple questionnaires to complex evaluations that may include geological, engineering and other analyses.

Positions on key issues

Climate change and energy

As evidenced by the United Nations Intergovernmental Panel on Climate Change's Fifth Assessment Report and the United States government's Fourth National Climate Assessment, urgent action is needed to address climate change and prevent its increasingly devastating impacts from accelerating further. At Bank of America, we recognize that climate change poses a significant risk to our business, our clients and the communities where we live and work.

As one of the world's largest financial institutions, Bank of America has a responsibility and an important role to play in helping to mitigate and build resilience to climate change by using our expertise and resources, as well as our scale, to accelerate the transition from a high-carbon to a low-carbon society. In alignment with more than 190 countries, we support the Paris Agreement on climate change, its commitment to take action to keep global temperature rise this century to below 2°C above pre-industrial levels, and its efforts to limit the temperature increase to no more than 1.5°C. Doing so will require changes in all sectors of our economy, particularly the transformation of critical areas like energy, power, transportation and real estate.

In helping to address climate change, Bank of America is focused on supporting key sectors in the transition from a high-carbon to a low-carbon society, including:

- Energy efficient design and retrofitting of buildings; in particular, deep retrofits required to meet climate goals
- Decarbonization of the power sector, including the enhancement and expansion of renewable energy, advanced nuclear and carbon capture, and storage/use technologies
- Electrification and low-carbon fuels for industry, transport and building heating
- Sustainable agriculture and reforestation
- New technologies, products and services as they evolve.

As part of our strategy to address climate change, we have partnered closely with clients to finance the adoption of low-carbon solutions that are now in widespread commercial use; for instance, Leadership in Energy and Environmental Design (LEED)- and Energy Star-certified building construction, solar and wind power generation, electric vehicles and charging infrastructure, resource efficient agriculture, and canopy protection and reforestation. Other technologies are still in development or have not achieved commercialization, and are therefore more challenging for a highly regulated consumer and commercial bank to finance. For those areas, we have dedicated significant intellectual and philanthropic capital to support their advancement, most notably through our current $125 billion environmental business initiative and the new $300 billion initiative we will launch in 2020.

It is important to note that nearly all comprehensive roadmaps to meeting the Paris Agreement include significant increases in nuclear power generation and carbon capture, and the storage or use of emissions from fossil fuel power generation. These technologies are important options to provide on-demand power and support power-intensive industry. We recognize many stakeholders have strong views about these areas. At Bank of America, we believe advancing these elements is necessary to address the significant urgency of climate change, and form part of a pragmatic, risk-informed strategy for supporting the transition to a low-carbon economy.

A critical part of our strategy is strong engagement and partnership with clients across energy, power and other sectors, including those that are currently fossil fuel intensive. Through this active client engagement, we are able to effectively share our expertise and perspectives, create positive and constructive dialogues with key stakeholders, and encourage and influence clients to consider their role in the transition to a low-carbon economy. A key element of this engagement is helping clients to access the capital they need to affect this transition within their companies.

Transitioning entire sectors of the economy will take time. Like many companies, we continue to balance the need to support traditional energy sources in the near term with the recognition that their emissions contribute to climate change and exacerbate risk to our business and communities in the longer term. At Bank of America, our energy and power strategy is reflective of this challenge.

We maintain our strong focus on driving capital to critical areas like energy efficiency, renewable energy, electric vehicles and other low-carbon technology adoption while working to progress areas like advanced nuclear and carbon capture, and storage or use. We also understand that access to reliable, low-cost energy can play a significant role in economic growth, reducing poverty and improving health outcomes, particularly in developing countries. As a result, we are partnering closely with our power utility clients – most of which generate power from a range of high- and low-carbon energy sources – to help them accelerate their low-carbon transition in a way that is economical and in line with meeting clients' needs.

We have dramatically reduced exposure to companies focused on coal extraction, will not finance construction of new coal-fired power plants in developed countries without technologies to address their carbon emissions, and will only finance construction in developing countries in certain circumstances (see below). Natural gas has been a key contributor in reducing carbon emissions in the U.S. and other developed countries. We will continue to support natural gas extraction and delivery while encouraging efforts to improve their environmental performance. As is often the case for these higher risk sectors, we will engage in further client and transactional review and due diligence to evaluate their associated risks, as articulated in greater detail throughout the ESRP Framework.

Carbon markets

We are supportive of policies that will help accelerate the transition to a low-carbon economy and have continuously stated our support for a price on carbon. Bank of America believes that voluntary action alone will not be enough to address the climate challenge, and we continue to support public policy focused on solutions. Carbon pricing regimes, including carbon taxes, are seen by many policymakers and business leaders as a critical step in promoting a shift to a low-carbon economy. Bank of America supports approaches to reducing carbon emissions that are economy-wide and market-based. We will continue to monitor developments in carbon pricing and the potential implications for our company and our clients.

Human rights

In our operations around the world, we strive to conduct our business in a manner consistent with the United Nations Universal Declaration of Human Rights, the United Nations Guiding Principles on Business and Human Rights, and the International Labour Organization's (ILO) Fundamental Conventions. We have set clear expectations for our vendors in their management of human rights and other key areas in our Vendor Code of Conduct, including expecting vendors and their subcontractors to abide by labor laws and regulations in the regions where they conduct business. They must also adhere to laws addressing child labor, forced labor, slavery, human trafficking, equal pay and non-discrimination in their workforce, and not engage in any practice that could reasonably be considered as employing or encouraging child labor, forced labor, slavery or human trafficking.

To learn more, please see our Bank of America Human Rights Statement.

External standards

We are participants in or signatories to the following principles (listed alphabetically) and use these principles to help guide our approach to lending, investing and other financing decisions relating to critical environmental and social issues.

Equator Principles

The Equator Principles provide a framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects. They are primarily intended to establish a minimum standard for due diligence in project-related lending and finance. By following and supporting the Equator Principles, we help to ensure financing for projects in a manner that is socially responsible and reflective of sound environmental management practices. Bank of America continues to support these principles as an industry best standard.

Green, Social and Sustainability Bond Principles

In June 2013, Bank of America co-authored a white paper called "A Framework for Green Bonds." We then co-led a consortium of banks to publish the Green Bond Principles, using the Framework document as a blueprint. The document was subsequently passed to the International Capital Market Association (ICMA), the newly named Secretariat. As an inaugural member of ICMA's Green Bond Principles Executive Committee, Bank of America also contributed to the release of ICMA Social Bond Principles and Sustainability Bond Guidelines.

Principles for Responsible Investing

Bank of America's Global Wealth and Investment Management business was one of the first major wealth management firms to become a signatory to the United Nations-supported Principles for Responsible Investment (PRI). Since its launch in 2006, the PRI has been instrumental in raising awareness about responsible investment among the global investment community and fostering collaboration among companies and policymakers on environmental and social issues.

Task Force for Climate-related Financial Disclosures (TCFD)

In 2017, the TCFD released its recommended voluntary, consistent financial disclosures designed to be used by investors, lenders and insurance underwriters in understanding material climate-related risks. Bank of America has signed on to support the TCFD recommendations alongside more than 600 other companies, including many peers and clients. Bank of America is in the early stages of evaluating and incorporating the recommendations of the TCFD. By building on our experience, and carrying out our annual CDP reporting, we are assessing ways to enhance our management of transition and physical risks and opportunities that climate change poses to our business and clients.

UN Guiding Principles on Business and Human Rights

The United Nations Guiding Principles on Business and Human Rights (UNGP) provide guidance on a corporation's responsibility to respect human rights. Bank of America uses the UNGP and other external frameworks to help inform our policies and practices in this area, as articulated in our Human Rights Statement.

Managing environmental and social areas of heightened sensitivity

This section contains a summary (in alphabetical order) of environmental and social topics that Bank of America recognizes as being of heightened sensitivity and importance to us and our stakeholders, along with our approach to each area. While we expect our clients to comply with environmental laws and regulations, we also take additional measures to identify, evaluate and mitigate environmental and social risks for certain clients, business activities, industries and geographies.

Issues that need additional enhanced due diligence are detailed in the sections below.

Arms and munitions

Our Arms and Munitions Policy establishes an enhanced due diligence standard for clients and transactions involved in arms and munitions trade finance, with a primary focus on managing reputational risk concerns. The maintenance and implementation of this policy is conducted by SMEs with specialized industry knowledge and follow a clear process with senior executive checkpoints, escalation routines and risk management.

We recognize that many of the communities where we operate, and where our clients and employees live, have been affected directly and indirectly by mass shootings using military-style firearms. In an effort to reduce risk to our communities, we will not finance the manufacture of military-style firearms for non-law enforcement, non-military use.

Biodiversity and ecosystems

There are many areas of the planet with rich biodiversity and sensitive ecosystems that are particularly vulnerable to the negative impacts of irresponsible development and unsustainable practices. Recent reports show that the world's natural systems are in decline. Oceans, in particular, are impacted by climate change, overfishing and pollution. The growing deterioration of the ocean and marine life can present a range of challenges in the future, from the collapse of fish stocks to increasing ocean temperatures that contribute to stronger storm systems. We continue to monitor these issues as they evolve and relate to our clients and our business.

We recognize the importance of biodiversity and its environmental, cultural, religious and health contributions to societies. When issues of concern are identified by the front line unit or a control function, they are escalated for further review.

Agricultural commodity trading

We recognize the risks associated with trading in agricultural commodities, where certain types of financial trading or speculation have the potential to increase the cost of food and/or food poverty, especially in developing economies. Our Commodities Trading Group periodically reviews these aspects and has determined that we do not take significant market risk. However, we continue to monitor for exposure in this regard.

Forestry

The world's forests play a vital role in the carbon cycle and can significantly help mitigate global climate change. We developed our Forests Practices Policy, including our position on Forest Certification and Paper Procurement Policy, in consultation with our clients who have expertise in the sector, and with environmental partners focused on developing best practices, including forestry certification. Our Forests Practices Policy places additional value on forestry certification by using it as a due diligence tool. The Forests Practices Policy also includes an explicit prohibition of illegal logging and practices involving uncontrolled fire.

Palm oil

The increased use of palm oil has raised serious concerns regarding the impacts on forests and land use in sensitive tropical environments. We require clients whose business is focused on ownership and management of palm oil plantations and operations, including growers and mills, to have their operations certified, or have in place an outlined action plan and schedule for certification. We use the Roundtable on Sustainable Palm Oil (RSPO) certification or equivalent certification standards as a minimum requirement for clients, and closely monitor developments relating to the sustainable sourcing of palm oil.

Energy and extractives

We have a comprehensive, pragmatic strategy for supporting the transition of our energy and power systems. At the same time, we recognize that activities involving natural resource extraction elevate the risk of disturbing sensitive environments which can lead to impacts on both biodiversity and the human communities that depend on them. In addition, certain energy generation can result in increased environmental risk, including climate change. Accordingly, Bank of America has developed client and transaction standards and guidance, informed by international standards and best practices, to govern particularly sensitive situations where energy and extractive activity occurs.

Arctic drilling

Bank of America recognizes that the Arctic is a unique region with specific considerations to take into account including those of marine and wildlife, a fragile ecosystem and the rights of Indigenous Peoples. Considering these sensitivities, we conduct enhanced due diligence for any transactions where the majority use of proceeds is identified as supporting petroleum exploration or production activities in the Arctic. We define the Arctic as any lands subject to permafrost and extensive seasonal ice cover (generally above the Arctic Circle) and major sections of the Arctic Ocean and its component water bodies that are also subject to extensive or permanent ice cover.

Coal extraction

Energy companies and their subsidiaries focused on coal face significant challenges. These include greater regulatory scrutiny related to both extraction and combustion, changes in economic conditions and increased pricing pressure from the proliferation of natural gas and new energy technologies. Bank of America's Coal Policy outlines our approach to the financing of coal and other energy sources while balancing the risks and opportunities to our shareholders and the communities we serve. Since 2011, we have significantly reduced our exposure to coal extraction companies. Going forward, we will maintain our significantly reduced credit exposure to these companies. This commitment applies globally to companies focused on coal extraction and to divisions of diversified mining companies that are focused on coal. In keeping with our commitment to reduce credit exposure to extraction companies focused on coal mining, Bank of America has also reduced exposure to coal mining companies that utilize mountain top removal mining practices in Appalachia.

Other ongoing transactions involving companies focused on coal mining are subject to enhanced due diligence that incorporates evolving market dynamics, as well as specific risks and regulations related to coal mining.

Coal-fired power generation

Bank of America seeks to reduce the negative impacts of coal-fired electric generation through the following measures.

We will not directly finance the construction of new coal-fired power plants in developed countries, unless those facilities employ technology that is focused on complete or near elimination of atmospheric carbon emissions, such as carbon capture technology.

We will only provide financial products and services that are directly related to the construction of new coal-fired power generation in emerging markets after senior review and approval. These circumstances will be rare and based on a review of criteria including:

- Energy access and affordability in the region
- Technological efficiency and emission controls
- Client commitment to measure, report and reduce carbon emissions reductions
- Alignment with host country's commitments to international climate accords.

Although not a regular part of our business, in certain circumstances Bank of America will provide direct financing or support for the retrofitting of existing coal-fired power assets that enhance efficiency or pollution abatement when there is a clear human health and environmental benefit.

Energy transport

Bank of America supports the responsible and safe delivery of energy that powers our society. We recognize the environmental and safety issues connected to transporting natural gas and oil by pipeline, rail, truck or tanker. We also recognize that some of these fuels, such as natural gas, are helping society transition away from more carbon-intensive forms of energy. And while expanded infrastructure is needed for projects such as new pipelines, it often has an impact on local communities. Rather than pivoting away from these issues, we are engaging more deeply to understand our clients' challenges in the energy transport space and to support our clients' efforts to increase safety, reduce impacts and improve community and stakeholder engagement.

Large dams

Bank of America recognizes that the construction of dams to control water flow can bring much needed economic opportunity and development to certain regions of the world. Dams can also affect the ecological systems in which they are located and to which they are connected, as well as causing potential social impacts to the surrounding communities. Any transactions in which the majority use of proceeds is identified as supporting large scale dam construction for hydroelectric generation or lands involved in such construction, are subject to enhanced due diligence. This scrutiny includes adherence to the Equator Principles, which we have adopted, and the Hydropower Sustainability Assessment Protocol as guidance.

Nuclear energy

Nuclear power delivers an important part of many nations' energy portfolios and is an alternative to carbon-intensive fuels. Bank of America understands the particular sensitivities regarding the use of nuclear energy, including the safety and handling of nuclear fuel and waste. Transactions in which the majority use of proceeds is identified as or clearly intended for the development of nuclear projects are subject to enhanced due diligence, which includes a requirement that clients adhere to regional, national, international and industry best practices, as well as a review of the client's track record on environmental compliance, safety and training.

Oil sands

We recognize the concerns raised over the extraction of bitumen from oil sands, particularly in sensitive ecosystems such as those found in Northern Canada. Accordingly, Bank of America conducts enhanced due diligence on all relationships with companies that are focused on oil sands extraction. Site visits to client operations are conducted periodically. These due diligence trips may include meetings with impacted Indigenous Peoples and First Nations communities. These actions are in addition to meeting requirements of the Equator Principles, if applicable.

Renewable energy

We have increased our focus on renewable energy sources as part of our efforts to finance the transition to a low-carbon, sustainable economy through our $125 billion environmental business commitment. We recognize that some renewable energy projects present other environmental and social challenges, such as the impact on wildlife and land use changes, and we include a review of these issues in our due diligence processes. When environmental or social issues of concern are identified, they undergo enhanced due diligence as appropriate.

World Heritage Sites

We respect the designation of United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites, including areas of cultural and natural value that are deemed to be of national or international significance. Bank of America will not knowingly engage in transactions focused on natural resource extraction within UNESCO World Heritage Sites unless there is prior consensus between UNESCO and the host country's governmental authorities such that the activities will not adversely affect the natural or cultural value of the site.

If client activity is known or anticipated to directly impact a World Heritage Site, relationship managers are directed to notify SMEs within Bank of America's ESG Group for further guidance. Review of these situations involves client engagement, a deep review of the client activity, and internal escalation and discussion among senior risk committees.

Financial products and services

Our product review and business review committees — together with external input that we solicit from clients, consumer advocates and other stakeholders — ensure that our products and services are responsible, in line with Bank of America's values, and are clear and easily understood.

Consumer debt sales

Bank of America does not sell our clients' consumer debt. In addition, we will not knowingly provide credit to buyers of consumer debt who employ predatory practices. For advisory or capital markets transactions in which a client is involved in consumer debt sales or purchases, we conduct enhanced due diligence.

Consumer protection

Bank of America offers a suite of simple, safe and transparent banking products to help clients manage their financial affairs and goals. All of our consumer banking products and services are subjected to a rigorous review process and are designed to address client needs at a fair and equitable cost, with terms our clients understand. We constantly solicit external feedback to help ensure that our products, solutions and services meet the needs of our clients.

We are committed to fairly and consistently meeting the credit needs of our clients and to complying fully with our Fair Lending Policy, and any other applicable consumer laws and regulations. This includes fair and non-discriminatory access to credit products, terms and conditions, and services throughout the entire credit life cycle. Our commitment to fair lending is the cornerstone of our culture and is clearly articulated in our Fair Lending Policy. All Bank of America employees must comply with the policy, and failure to do so may result in disciplinary action up to and including termination. Our employees participate in mandatory Fair Lending training.

Overdrafts

Our overdraft policies are informed by our company's strategy of responsible growth, and we continue to evolve our overdraft policies and procedures to help our clients prevent unnecessary and unanticipated fees. For example, over the last ten years, we have eliminated the ability for a client to overdraft for non-recurring debit card purchases if the client does not have sufficient

funds; implemented the Low Dollar Threshold to protect clients from incurring overdraft fees for a very small amount; eliminated the extended overdraft balance charge; and introduced the Advantage SafeBalance Banking account, a low-cost alternative to a traditional checking account that eliminates all insufficient funds fees and overdraft fees.

Payday lending

A payday loan is a short-term loan, generally for $500 or less, that is typically due on the borrower's next payday and requires the borrower to give lenders access to his or her checking account, or to write a post-dated check for the full loan balance that a lender may deposit when the loan is due. At Bank of America, we do not offer payday lending services directly to our clients. We also do not provide credit to business clients for which providing payday lending services to consumers is a significant part of their business. We conduct enhanced due diligence for advisory and capital markets transactions involving businesses significantly engaged in payday lending.

Subprime lending

Bank of America is committed to providing responsible lending products to clients who have the ability to repay their obligations. There has been significant public focus on financial products with unaffordable, unfair or predatory terms provided to consumers with certain higher risk characteristics, such as low credit scores, previous bankruptcies or foreclosures, recent loan delinquencies or legal judgment. Bank of America does not offer subprime products to clients. For credit, advisory, and capital markets transactions with business clients involving a pool of assets, a significant portion of which is from consumers with higher risk characteristics such as described above, we conduct enhanced due diligence.

Gaming

To reflect the regulatory determination that gaming establishments are vulnerable to manipulation by money laundering and other financial risks, Bank of America has long maintained an industry-focused approach to the gaming sector. Gaming activities include legal businesses providing gambling activities and operations designed to attract wagering (e.g., gaming devices like slot machines, table games, etc.). Bank of America conducts enhanced due diligence on this sector and requires that all credit requests be underwritten and approved in designated specialty units within Bank of America.

Human rights

In addition to our larger approach to human rights, as noted above in *Position on key issues*, Bank of America has an enhanced due diligence process for transactions that may raise questions related to human rights.

In addition to the enhanced due diligence outlined above, other specific enhanced due diligence elements for these transactions may include the identification of company practices and comparison of these to acceptable standards including industry best practices, in-country laws, standards and norms, and developed country standards; consideration of mitigation steps taken by the client; client policies related to or addressing the issue; level of company transparency; a review against Bank of America's Code of Conduct; and consistency with the principles of the United Nations Universal Declaration of Human Rights, the ILO's Fundamental Conventions, and the United Nations Guiding Principles on Business and Human Rights.

Indigenous peoples

Bank of America recognizes that Indigenous Peoples, Native, and First Nations Communities have cultural beliefs, values and lands that are often under threat. We conduct enhanced due diligence for transactions in which the majority use of proceeds is attributed to identified activities that may negatively impact an area used by or traditionally claimed by an indigenous community. For these transactions, we expect our clients to demonstrate alignment with the objectives and requirements of the International Finance Corporation (IFC) Performance Standard 7, which addresses impacts to Indigenous Peoples including free, prior and informed consent.

Private prisons and detention centers

The U.S. federal and many state governments currently contract with a small number of private companies to manage certain prisons and detention centers. The growth in this sector has been driven by public and governmental policy that many, including Bank of America, agree require reform. We have evaluated these issues as a company, and we understand they pose many challenging questions, as well as risk to our company. Going forward, Bank of America will be exiting business relationships with companies that provide prisoner and immigrant detention services for U.S. federal and state governments.

Tobacco

We recognize the focus on health impacts associated with tobacco products. Particularly challenging is the rapid increase in usage of and potential addiction to tobacco products by minors through use of next generation products such as vaping. There are many differing views on the benefits of next generation products for smoking cessation for adults, as is evidenced by the current debates in the U.S. and around the globe. We are working to examine these issues and manage our related risk.

To ensure we are engaging our clients on best-in-class practices in this sector, we conduct enhanced due diligence on clients that manufacture and focus on distribution of tobacco-related products. Enhanced due diligence includes reviewing product design, packaging, marketing and sales practices. Our evaluations include understanding client safeguards to prevent the sale of their products to minors, and whether clients employ the same overall practices in developed and developing countries, where consumer protection laws may be less robust.

Our operations and vendors

Operations management

Bank of America recognizes that a focus on environmental and social issues must begin with addressing impacts from our own operations. We are therefore committed to tracking and managing our progress toward our ambitious targets to reduce greenhouse gas (GHG) emissions, paper and water consumption, and waste sent to landfill, as well as increasing the percentage of our occupied space that is LEED certified. In 2016, we announced a set of operational goals that we are working to achieve by 2020, including a commitment to carbon neutrality and purchasing 100% renewable electricity. For full details on our operational efforts, please see our latest ESG Report.

Environmental management system (EMS)

We employ an EMS that relies on a comprehensive compliance database to help the Global Real Estate Services Environmental Risk team identify, manage and mitigate risk, and improve performance across our corporate real estate portfolio. Our EMS encourages:

- Stringent compliance with applicable environmental laws and regulations
- Pollution prevention and environmentally sustainable practices
- Continuous improvement in all areas of environmental management.

Our EMS includes roles and responsibilities, training, inspections, inventory procedures, formal targets, documentation, measurement, complaint response, and emergency procedures. One component of our EMS – Integrated Data for Environmental Applications – is an online tool that enables our employees and partners to understand and manage environmental compliance across our global real estate footprint. Bank of America's strong record of compliance across our real estate portfolio is a direct result of the successful implementation of our EMS.

Greenhouse gas emissions reductions

In 2016, we set a goal to achieve by 2020: to become carbon neutral and to reduce our location-based GHG emissions by 50%. This builds on a strong track record of setting and achieving previous GHG emissions reduction goals. More detail on our GHG emissions reduction progress and our suite of operational goals can be found in our ESG Report and our submission to CDP.

Scope 3 emissions

We maintain an active dialogue with our global peers in the banking sector, as well as other stakeholders, relating to indirect GHG emissions attributed to the financial products and services we provide clients in support of their activities. These discussions build on the lessons we have learned from the historical tracking and reporting of GHG emissions attributed to our U.S. power utility loan portfolio, which we continue to include in our annual reporting. More detail on our utility portfolio emissions can be found in our latest ESG Report.

Our vendors

We strive to work with vendors whose policies and practices are consistent with our own – from having diverse leadership, to paying an economically viable wage, to working to reduce their environmental footprints. Our Vendor Code of Conduct sets forth Bank of America's expectations for human rights, labor and environmental standards throughout our vendor value chain. The principles contained within the code are consistent with the United Nations Universal Declaration of Human Rights, the United Nations Guiding Principles on Business and Human Rights, and the ILO's Fundamental Conventions. Additionally, our Modern Slavery Act Statement sets forth the steps we take to guard against modern slavery and human trafficking in our supply chain. Lastly, our vendors are expected to publish a code of conduct for their employees and to deploy a formal process for reporting and investigating unethical behavior.

Vendor engagement

Since 2009, we have invited suppliers to respond to the CDP supply chain questionnaire, which helps us track GHG emissions and associated risks that impact our global supply chain. In 2016, we set our first-ever public goals to address GHG emissions in our supply chain with two vendor engagement goals: to maintain a response rate to CDP supply chain information requests of at least 90%, and for 90% of CDP supply chain responding vendors to disclose GHG emissions.

Vendor diversity

We are committed to supporting diverse-owned vendors because we believe this strengthens communities as well as our supply chain by driving innovation and competition. Annually, we spend more than $2 billion with certified diverse-owned companies and award scholarships for executive education and entrepreneurial programs to help diverse business owners take their companies to the next level. We also encourage participation in our Supplier Diversity and Development Mentoring Program — a high-touch mentor program which is customized for each participating diverse supplier to drive optimum developmental impact. These initiatives are helping drive impact while building resiliency throughout our supply chain.

Reporting and disclosure

Bank of America annually publishes our ESG Report covering areas relevant to this ESRP Framework, including the development of products and services to address the needs and concerns of low- and moderate-income communities, our financing in support of environmental and social goals, our progress toward public goals, as well as specific transactions that are escalated due to heightened environmental and social risks. This reporting provides transparency to stakeholders on the nature of the transactions and issues that are escalated and demonstrates robust risk management routines and governance. As part of this, we report and disclose:

- Details of transactions subject to the Equator Principles
- The number and nature of transactions reviewed by the committees responsible for reputational risk review
- Case studies of specific transactions that were reviewed and issues identified, with client information removed.

Our workforce and employment practices

Our employees are central to everything we do and critical to our long-term success as a company. Accordingly, we are committed to ensuring Bank of America is a great place to work for our employees. We deliver on this commitment by being an inclusive workplace for all of our employees, creating opportunities for growth and development, recognizing and rewarding performance, and supporting our employees' physical, emotional and financial wellness.

Diversity and inclusion

Being a diverse and inclusive company is core to our ability to serve the needs of our clients. We are strengthened by the diverse backgrounds, experiences and perspectives of our employees, and we strive to ensure our workforce represents the communities we serve — in thought, style, experience, culture, race, ethnicity, gender identity, and sexual orientation.

We have a long history of being recognized as a leader in maintaining a diverse and inclusive workplace free of discrimination. Our company's ethos is to support in both policy and practice equal opportunities for employment, advancement and professional development, and prohibit discrimination or harassment of any kind on the basis of race, color, religious creed, religion, sex (including pregnancy, childbirth or related medical condition), genetic information, gender, gender identity, gender expression, sexual orientation, national origin, citizenship status, age, ancestry, marital status, medical condition, physical or mental disability status, military and veteran status, or any other factor that is irrelevant to employment and advancement or prohibited by law. An example of the tools and processes we have in place to ensure that every employee is treated with dignity and respect is our Code of Conduct.

Fair wages and benefits

Paying fair and competitive wages and supporting all aspects of our employees' wellness are critical components of being a great place to work. We pay our employees competitively based on market rates for their roles and how they perform, and we regularly benchmark against other companies both within and outside our industry to ensure our pay is competitive in the market for comparable roles. Our company is committed to compensating all of our employees fairly and equitably based on performance, with equal pay for equal work, regardless of race or gender.

Core to this is our support for a competitive minimum rate of pay. We have been an industry leader in establishing an internal minimum rate of pay for our U.S. hourly employees and have made regular increases over many years. In 2019, we raised our minimum wage to $17 per hour, and we will continue to increase our minimum wage until it reaches $20 per hour in 2021.

Training on the ESRP Framework

Bank of America employees across the enterprise receive high-level awareness on our ESRP Framework as part of our annual enterprise risk training. As necessary, we also conduct specialized training on the ESRP Framework and related policies for relevant employees who regularly deal with specific environmental and social issues.

Conclusion

Environmental and social issues affect all companies operating in today's global economy. Properly managing these risks is a critical component of business success. Equally important is communicating the process by which those risks are managed to stakeholders. This ESRP Framework outlines Bank of America's approach to environmental and social issues, and how that aligns with our fundamental business strategy of responsible growth. Moving forward, we will continually review this framework in light of feedback from stakeholders, future materiality assessments, market developments, evolving best practices and regulatory developments.

APPENDIX C:
ESG PERFORMANCE DATA SUMMARY

BANK OF AMERICA CORPORATION

2018 Environmental, Social & Governance Performance Data Summary

BANK OF AMERICA

ESG Goals & Progress

Target	Target year	Progress	Status
OUR PEOPLE			
Hire 10,000 veterans, guard and reservists over the next several years	N/A	We employ thousands of veterans and their spouses. In addition, since 2014 we have hired over 8,600 service members moving towards our goal of hiring 10,000 veterans, guard, and reservists over the next several years.	On track
DRIVING ECONOMIC & SOCIAL PROGRESS			
$2 billion in philanthropic investments globally	2018	In 2018, Bank of America provided $210 million in global philanthropic investments, including cash giving and in-kind donations. To date we've delivered $2.1 billion toward our ten year $2 billion goal (2009-2018).	Achieved
2 million hours of volunteer service annually and engage our employees to be more active citizens	N/A	Our employee volunteers contributed approximately 2 million hours in 2018 addressing a range of community needs, including advancing better money habits and building affordable housing.	Achieved
$1.5 trillion for community development lending and investments in the U.S.	2018	Since 2009, we've extended nearly $960 billion in community development lending and investments in the U.S., including nearly $48 billion in 2018. This totals – on average – approximately $190.2 million in support of community development every business day throughout 2018.	64% complete
ENVIRONMENTAL SUSTAINABILITY			
Business			
$125 billion Environmental Business Initiative	2025	Since we launched this goal in 2013, we've provided nearly $105 billion in financing for low carbon and other sustainable business. In 2018 alone, we delivered $21.5 billion toward this goal.	On track
Greenhouse gases and energy			
Achieve carbon neutrality for Scope 1 and 2 emissions	2020	We have reduced market-based emissions 89% since 2010 across our portfolio primarily by consolidating space, implementing energy-efficiency projects and purchasing renewable power.	On track
Purchase 100 percent of electricity from renewable sources	2020	In 2018, Bank of America purchased 1.8 million MWh of renewable electricity, which amounts to 91% of our global energy use.	On track

Target	Target year	Progress	Status
Greenhouse gases and energy			
Reduce energy use by 40 percent	2020	We have reduced energy use 40% since 2010 across our portfolio primarily by consolidating space and implementing energy efficiency projects.	On track
Reduce location-based GHG emissions by 50 percent	2020	We have reduced location-based emissions 52% since 2010 across our portfolio primarily as a result of the energy reductions achieved.	On track
Green building			
Maintain LEED® certification in 20 percent of the company's owned and leased space	2020	We have more than 19 million square feet of LEED certified workspace, representing 25% of our total workspace globally. At year's end, 206 of our financial centers had achieved LEED certification.	On track
Water			
Reduce water use by 45 percent	2020	As of 2018, we have reduced our annual global water usage by nearly 1.5 billion gallons since 2010 – a 42% reduction – primarily by consolidating space and implementing water conservation projects.	Slower than expected progress
Waste			
Reduce waste to landfill by 35 percent (baseline 2011)	2020	Since 2011, we have reduced the amount of waste sent to landfill by 30%. We focus our waste efforts on increasing availability of recycling services for office waste and construction waste, employee education and reducing waste generated.	Slower than expected progress
Dispose 100 percent of e-waste using certified responsible vendors	2020	In 2018, we disposed of 99% of our e-waste using certified responsible vendors. 100% of e-waste in the U.S. was disposed of using certified responsible vendors. In countries where certified vendors do not exist, items are disposed of responsibly.	Slower than expected progress
Paper			
Maintain paper reduction of 30 percent	2020	Since 2010, we have reduced our paper use by 36% through our focus on transitioning customers to online banking, reducing employee printing, and increasing the digital delivery of key documents.	On track
Maintain an average of 10 percent recycled content in paper purchased	2020	In 2018, we purchased paper with an average of 15% recycled content globally, which is almost double the average recycled content in 2010.	On track
Purchase 100 percent of paper from certified sources	2020	We increased the amount of paper purchased from certified sources from 95% in 2011 to 99% in 2018.	Slower than expected progress
Vendor engagement			
Maintain a 90 percent response rate to our CDP supply chain information requests	2020	In 2018, we requested disclosures from 202 vendors and achieved a best-in-class response rate of 90%.	On track
Increase the number of our CDP supply chain responding vendors who report GHG emissions to 90 percent	2020	In 2018, 80% of our responding vendors reported GHG emissions.	Slower than expected progress

ESG Performance Data

Disclosure	Metrics	Year
OUR PEOPLE		
Global workforce by gender		
% total	Men: 101,688 (50%) Women: 102,801 (50%)	2018
% global management*	Men: 54% Women: 46%	2018
% board of directors	Men: 69% Women: 31%	2018
U.S. workforce by gender		
% total	Men: 46% Women: 54%	2018
% officials & managers**	Men: 53% Women: 47%	2018
% workforce excluding officials & managers***	Men: 45% Women: 55%	2018
Diverse races/ethnic backgrounds		
% U.S. workforce	46%	2018
% U.S. officials & managers**	33%	2018
% U.S. workforce excluding officials & managers***	48%	2018
Employee engagement		
% employee engagement score	82%	2018
401(k) plan participation		
% of employees who made contributions to their 401(k) account	90%	2018
Training hours		
# diversity, inclusion and aspects of human rights total training hours	93,968	2018

**Includes CEO's direct reports.*
***Includes EEO codes 1.1 and 1.2.*
****Includes EEO codes 2-9.*

U.S. EMPLOYEE DIVERSITY IN 2018

Job Category	Gender	White	Black/ African American	Hispanic/ Latino	Asian	American Indian/ Alaskan Native	Native Hawaiian/ Other Pacific Islander	Two or more races	Total by gender	Total
Executive/ senior level officials and managers	Male	2,215	88	99	244	7	0	20	2,673	4,012
	Female	1,085	82	57	102	6	0	7	1,339	
First/ mid-level officials & managers	Male	7,689	823	1,325	1,676	32	35	154	11,734	23,117
	Female	7,205	1,348	1,599	1,024	36	27	144	11,383	
Professionals*	Male	26,334	2,093	2,558	6,141	111	91	570	37,898	59,537
	Female	13,277	2,148	1,689	4,068	74	70	313	21,639	
All other	Male	11,523	4,148	6,929	2,992	85	111	752	26,540	83,042
	Female	23,053	11,395	14,962	5,274	244	240	1,334	56,502	
Totals	Male	47,761	7,152	10,911	11,053	235	237	1,496	78,845	169,708
	Female	44,620	14,973	18,307	10,468	360	337	1,798	90,863	

**As defined by the Equal Employment Opportunity Commission: "Professionals" refers to job categories that require bachelor and graduate degrees, and/or professional certification. In some instances, comparable experience may establish a person's qualifications.*

Disclosure	Metrics	Year
DRIVING ECONOMIC & SOCIAL PROGRESS		
Women's economic empowerment		
$ loaned to women business owners through Tory Burch Foundation Capital Program	$46 million	2014-2018
Access to capital		
$ community development banking	$4.7 billion	2018
# affordable housing units created through community development banking	15,000	2018
$ CDFI investments	$1.57 billion	2018
# of CDFIs with whom we invest	255	2018
Community development lending & investments: $ affordable housing	$23.56 billion $26.68 billion $32.42 billion $37.62 billion $37.84 billion	2018 2017 2016 2015 2014
Community development lending & investments: $ small business lending	$15.14 billion $15.54 billion $15.99 billion $14.41 billion $15.38 billion	2018 2017 2016 2015 2014
Community development lending & investments: $ consumer lending	$3.53 billion $4.63 billion $4.11 billion $3.88 billion $3.24 billion	2018 2017 2016 2015 2014
Community development lending & investments: $ economic development	$5.50 billion $6.80 billion $6.58 billion $6.42 billion $4.06 billion	2018 2017 2016 2015 2014
Philanthropic investments to advance economic mobility		
Workforce development and education grants	$48.6 million $45.8 million $48.5 million $49.1 million	2018 2017 2016 2015
Community development grants	$40.1 million $41.8 million $35.2 million $32.3 million	2018 2017 2016 2015
Basic needs grants	$33.0 million $33.4 million $36.1 million $33.0 million	2018 2017 2016 2015
OUR BUSINESS PRACTICES		
$ diverse supplier spend trend	$1.87 billion $2.19 billion $2.24 billion $2.1 billion $2.5 billion $2.3 billion $2.3 billion	2018 2017 2016 2015 2014 2013 2012
# customers/prospects for customer and client satisfaction surveys	11.7 million 4.9 million 4.5 million 3 million	2018 2017 2016 2015

Disclosure	Metrics	Year
ENABLING FINANCIAL HEALTH		
# total SafeBalance accounts at the end of 2018	592,517	2018
# mobile banking users added during 2018	2.2 million	2018
# total mobile banking users at the end of 2018	26.4 million	2018
Client balances with a clearly defined ESG approach	$17.9 billion $15.2 billion $11.3 billion $9.9 billion	2018 2017 2016 2015
Homeownership		
Homeowner assistance: modifications and foreclosure alternatives (cumulative)	2,166,869 2,154,495 2,137,072 2,101,546 2,039,520 1,945,459 1,711,078 1,281,906 940,692	2018 2017 2016 2015 2014 2013 2012 2011 2010
Home finance metrics: $ value of first mortgages extended to U.S. homeowners	$41.7 billion $49.5 billion $61.0 billion $54.7 billion	2018 2017 2016 2015
Home finance metrics: $ value of first mortgages to low- and moderate-income customers	$4.9 billion $5.5 billion $7.1 billion $8.3 billion	2018 2017 2016 2015
Home finance metrics: # total first mortgage customers	89,460 111,031 159,025 169,175	2018 2017 2016 2015
Home finance metrics: # low- and moderate-income first mortgage customers	21,100 26,004 38,840 49,294	2018 2017 2016 2015
Home finance metrics: % of total first mortgage customers who are low- and moderate-income	23.6% 23.4% 24.4% 29.1%	2018 2017 2016 2015
Home finance metrics: $ value of home equity lines of credit extended to low- and moderate-income customers	$2.76 billion $3.01 billion $2.48 billion $2.01 billion	2018 2017 2016 2015
Small businesses		
Total credit to small business owners (new and renewal)	34.7 billion	2018
$ new credit to small business owners	$8.6 billion $11.2 billion $11.6 billion $10.7 billion	2018 2017 2016 2015
$ extended to smaller businesses with less than $1 million in revenue or less than $5 million in revenue in LMI communities	$15.14 billion $15.53 billion $16.0 billion $14.4 billion	2018 2017 2016 2015
# small business specialists serving clients	2,300	2018

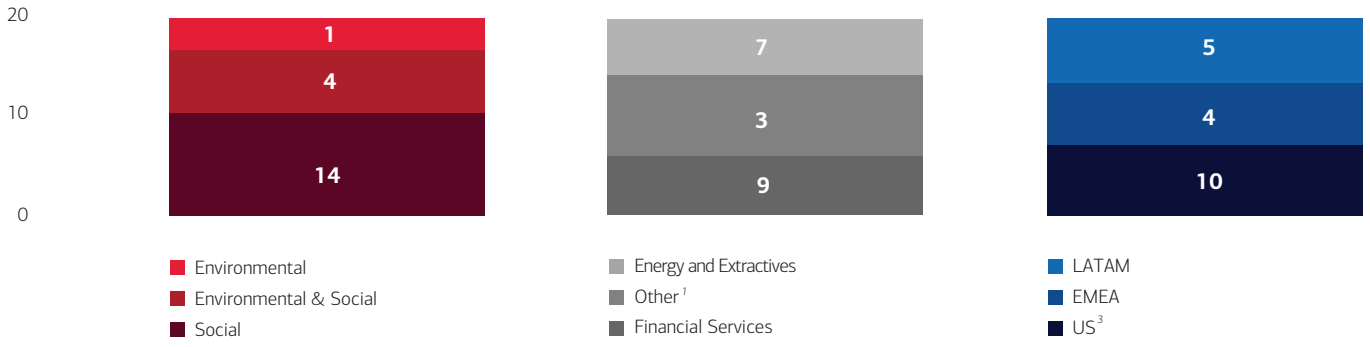
Disclosure	Metrics	Year
ENVIRONMENTAL SUSTAINABILITY		
Environmental business by line of business		
Investment Banking and Markets	$8.1 billion	2018
Public Finance	$8 billion	2018
Leasing	$3.2 billion	2018
Commercial Real Estate and Community Development Banking	$1.6 billion	2018
Consumer Vehicle Lending	$587 million	2018
Commercial Banking	$71 million	2018
CDFI Lending	$12 million	2018
Environmental business by sector		
Energy efficiency	$24.1 billion	2007-2018
Sustainable transportation	$21.0 billion	2007-2018
Mixed	$15.4 billion	2007-2018
Wind	$14.5 billion	2007-2018
Water	$13.6 billion	2007-2018
Mixed renewables	$9.6 billion	2007-2018
Solar	$8.9 billion	2007-2018
Nuclear	$8.8 billion	2007-2018
Other	$7.1 billion	2007-2018
Biomass/bioFuel	$1.3 billion	2007-2018
Hydro	$1.3 billion	2007-2018
Geothermal	$600 million	2007-2018
Fuel cells	$28 million	2007-2018
Environmental and Economic Benefits of Environmental Business Initiative		
MWh saved from energy conservation projects	79,000	2018
MWh produced from alternative energy projects	16,545,000	2018
Total sqft of LEED certified buildings funded	2,906,000	2018
Total sqft of ENERGY STAR certified buildings funded	860,000	2018
Total sqft of Other Certified Green buildings funded	285,000	2018
Ridership supported by sustainable transportation projects	2,400,000,000	2018
People impacted by water treatment projects	107,000,000	2018
Global Warming Metric Tons (MT) CO2e avoided	10,000,000	2018
Water Use avoided (thousands of gallons)	200,000,000	2018
Waste avoided Metric Tons (MT)	1,000,000	2018
Amount of Water Treated (thousands of gallons)	109,000,000	2018
Average annual # of jobs supported	159,998	2018
Contribution to GDP	$15.8 billion	2018
Economic Output Contribution	$30.4 billion	2018
Labor Income Contribution	$10.2 billion	2018

Disclosure	Metrics		Year
Environmental impact of investments			
Utility portfolio emission intensity[1]	Short tons CO_2 per MWh – restated/reported from newly available data	Short tons CO_2 per MWh – previously reported from available data	
	0.4749	NA	2018
	0.5016	NA	2017
	0.5314	NA	2016
	0.5678	NA	2015
	0.5700	NA	2014
	0.5645	NA	2013
	0.621	NA	2012
	0.6093	0.568	2011[2]
		0.580	2010
		Bank of America was unable to compile	2009
		0.581	2008
		0.634	2007
		0.638	2006
		0.658	2005
		0.733	2004
Environmental philanthropy	$19,336,877 million		2018
Environmental and social risk			
# transactions subject to the Equator Principles	1 Category B transaction in the petrochemicals sector (United States)		2018
	2 Category B transactions in the oil & gas sector (United States)		2017
	2 Category B transactions in the power generation sector (United States)		2016
	0		2015
	1		2014
# of unique employees and contractors trained on Environmental and Social Risk Policy Framework	Risk framework training is mandatory for all employees. Available through this training is additional awareness material on the ESRPF. In 2018 approximately 250,000 colleagues in control functions and front line units across the enterprise underwent enterprise risk framework training.		2018
Examples of deals requiring additional review	1. Bank of America was invited to provide capital markets services to a company that develops Non-transgenic crops for large scale agriculture. While the company develops products that are considered non genetically modified organisms (GMOs) in most countries, use of bio-engineering is considered controversial by some. We conducted enhanced due diligence on the firm, evaluating their process and policies, and transparency. We further considered the companies positioning on global climate change and using their products to help address related challenges. Balancing these elements, we decided to move forward with the opportunity. 2. We were presented with an opportunity to on-board a client in the mining sector, the firm is moving towards commercialization of marine mining for metals. We engaged in enhanced due diligence with the company, learning about their advanced processes of minimizing marine impacts through their operations. We evaluated their approach on addressing biodiversity impacts and social issues attributed to terrestrial mining. The company had a compelling approach on the ESG dynamics attributed to the mining sector, but we ultimately decided to pass on the opportunity given the early stage of development of standards and best practices within marine mining. 3. We evaluated an opportunity to provide financial products and services in support of a large utility-scale wind power project in the US. While the location of the wind farm provided great potential for power generation, it is also identified as an area of particularly heightened sensitivity for certain species of birds that would be impacted by the wind turbines. After enhanced due diligence that focused on permitting and evaluation of avian (bird) wildlife, and mitigation steps to minimize wildlife impacts, we decided to move forward in supporting the power company in development of the project.		2018

[1]Our consideration of value chain emissions includes tracking and reporting on the greenhouse gas emissions intensity of our U.S. power utility corporate loan portfolio, and we remain the only financial institution to do so since 2004. This portfolio includes electric generators with whom the bank has significant credit relationships.
[2]Using newly expanded emissions data, we have recalculated our utility portfolio emissions intensity for 2011.

Environmental and Social Risk Policy Framework Reporting

Environmental and Social Risk Policy Framework (ESRPF) related items, relationships and transactions discussed by the responsible risk committees in 2018.



In 2018, we continued our process of tracking ESRPF related items, relationships and transactions discussed by the responsible risk committees. Our front line units have primary responsibility for evaluating and managing all risks, including the environmental and social risks inherent within their businesses. Through this process of due diligence, many issues are resolved and do not need to be escalated to risk review committee. The chart above represents only those items, relationships or transactions related to environmental or social risk that were discussed by the responsible risk committees. For more information about our governance structure or risk framework, see the Business Standards report or the ESRPF.

[1]*Other is made up of small numbers of items from all other industries that BAC conducts business with, including but not limited to Manufacturing, Pharmaceuticals etc.*
[2]*Global includes US based GBAM items.*
[3]*US refers to items from lines of business that only have a US footprint.*

About Our 2018 Environmental Operations Data

We continue to track and manage the environmental impacts of our operations and refine our methodology in order to most accurately collect and report on these data. Our 2018 environmental activities are reported here using the Global Reporting Initiative Standards, as well as its Financial Services Sector Disclosure.

GREENHOUSE GAS EMISSIONS	UNITS	2010	2016	2017	2018
Scope 1 and location-based Scope 2 emissions					
Scope 1 direct emissions	Metric tons CO_2e	140,489	84,399	82,271	85,145
Location-based Scope 2 indirect emissions	Metric tons CO_2e	1,678,547	973,306	839,986	791,166
Total Scope 1 and location-based Scope 2 emissions	Metric tons CO_2e	1,819,036	1,057,706	922,257	876,311
Reduction in total Scope 1 and location-based Scope 2 emissions	Percent decrease from base year	N/A	42%	49%	52%
Scope 1 and market-based Scope 2 emissions					
Scope 1 direct emissions	Metric tons CO_2e	140,489	84,399	82,271	85,145
Market-based Scope 2 indirect emissions	Metric tons CO_2e	1,673,002	373,229	178,593	108,614
Total Scope 1 and location-based Scope 2 emissions	Metric tons CO_2e	1,813,490	457,629	260,864	193,759
Reduction in total Scope 1 and market-based Scope 2 emissions	Percent decrease from base year	N/A	75%	86%	89%

GREENHOUSE GAS EMISSIONS	UNITS	2010	2016	2017	2018
Scope 3 indirect emission					
Category 1 - purchased goods and services	Metric tons CO_2e	Not available	2,315,069	2,423,747	2,004,292
Category 2 - capital goods	Metric tons CO_2e	Not available	237,286	386,195	397,794
Category 3 - fuel- and energy-related activities	Metric tons CO_2e	339,211	224,042	177,790	169,233
Category 4 - upstream transportation and distribution	Not Available	255,685	178,634	210,979	200,813
Category 5 - waste (traditional disposal)	Metric tons CO_2e	Not available	24,373	23,510	23,091
Category 6 - business travel	Metric tons CO_2e	191,687	155,342	151,186	154,501
Category 7 - employee commuting	Metric tons CO_2e	675,193	363,910	350,814	345,389
Category 8 - upstream leased assets	Metric tons CO_2e	Not relevant	Not relevant	Not relevant	Not relevant
Category 9 - downstream transportation and distribution	Metric tons CO_2e	Not available	2,000,000	1,500,000	1,500,000
Category 10 - processing of sold products	Metric tons CO_2e	Not relevant	Not relevant	Not relevant	Not relevant
Category 11 - use of sold products	Metric tons CO_2e	Not available	5,000	4,000	4,000
Category 12 - end of life treatment of sold products	Metric tons CO_2e	Not available	20,000	21,000	20,000
Category 13 - downstream leased assets	Metric tons CO_2e	Not relevant	Not relevant	Not relevant	Not relevant
Category 14 - franchises	Metric tons CO_2e	Not relevant	Not relevant	Not relevant	Not relevant
Category 15 - investments	Metric tons CO_2e	Relevant, not yet calculated	Relevant, not yet calculated	Relevant, not yet calculated	Relevant, not yet calculated

We follow the WRI and WBCSD GHG Protocol Corporate Accounting and Reporting Standard to calculate Scope 1, 2 and 3 emissions. We use an operational control approach to define our boundary. The base year for emissions reductions is 2010; the rationale for choosing 2010 as the base year is that 2010 is the earliest year with complete, high quality data. Emissions are recalculated back to the base year when a change to a prior inventory would result in a change in emissions of 0.5% or greater. Scope 1 and 2 calculations are based on site-specific data for fuel consumed and utilities purchased, applying published emissions factors and global warming potentials (GWPs). Scope 3 calculations are based on data for the relevant activity, applying published emissions factors and GWPs. Where actual data are not available, estimates are made based on actual data collected in prior years. The gases included in the calculation of Scope 1, 2 and 3 emissions are CO2, CH4, N2O, HFCs and PFCs. Our market-based GHG emissions include the impact of renewable energy certificates (RECs) purchased in the U.S., Renewable Energy Guarantees of Origin (REGOs) purchased in the U.K., and Guarantees of Origin (GOs) purchased in Spain and Ireland. All U.S. RECs purchased by Bank of America are Green-e certified. Emissions reflect supplier-specific emission rates where available, all of which comply with Scope 2 Guidance criteria. Emissions reflect residual mix factors for European facilities. Residual mix factors are not currently available for facilities outside of Europe. Location-based emission factors are used to quantify electricity-related Scope 3 emissions.

GREENHOUSE GAS EMISSIONS BY REGION	UNITS	2018 LOCATION-BASED EMISSIONS			2018 MARKET-BASED EMISSIONS		
		SCOPE 1 DIRECT EMISSIONS	SCOPE 2 INDIRECT EMISSIONS	TOTAL SCOPE 1 AND SCOPE 2 EMISSIONS	SCOPE 1 DIRECT EMISSIONS	SCOPE 2 INDIRECT EMISSIONS	TOTAL SCOPE 1 AND SCOPE 2 EMISSIONS
U.S. & Canada	Metric tons CO_2e	78,149	691,194	769,344	78,149	29,387	107,536
Asia Pacific	Metric tons CO_2e	1,649	69,457	71,106	1,649	69,457	71,106
EMEA	Metric tons CO_2e	5,232	29,215	34,447	5,232	8,471	13,703
Latin America	Metric tons CO_2e	115	1,299	1,414	115	1,299	1,414

GREENHOUSE GAS EMISSIONS BY COUNTRY	UNITS	2018 LOCATION-BASED EMISSIONS			2018 MARKET-BASED EMISSIONS		
		SCOPE 1 DIRECT EMISSIONS	SCOPE 2 INDIRECT EMISSIONS	TOTAL SCOPE 1 AND SCOPE 2 EMISSIONS	SCOPE 1 DIRECT EMISSIONS	SCOPE 2 INDIRECT EMISSIONS	TOTAL SCOPE 1 AND SCOPE 2 EMISSIONS
United States	Metric tons CO_2e	77,967	691,009	768,976	77,967	29,201	107,168
India	Metric tons CO_2e	1,109	46,166	47,275	1,109	46,166	47,275
United Kingdom	Metric tons CO_2e	3,372	25,524	28,896	3,372	4,287	7,659
China	Metric tons CO_2e	324	10,584	10,908	324	10,584	10,908
Southeast Asia - Singapore, Malaysia, Philippines, Thailand, and Indonesia	Metric tons CO_2e	62	4,984	5,046	62	4,984	5,046
Japan	Metric tons CO_2e	82	4,893	4,975	82	4,893	4,975
Ireland	Metric tons CO_2e	623	1,000	1,623	623	940	1,563
Australia	Metric tons CO_2e	7	1,195	1,202	7	1,195	1,202
Italy	Metric tons CO_2e	42	733	775	42	1,027	1,069
Mexico	Metric tons CO_2e	61	446	507	61	446	507
Germany	Metric tons CO_2e	93	391	484	93	633	726
South Africa	Metric tons CO_2e	22	437	459	22	437	459
Canada	Metric tons CO_2e	182	186	368	182	186	368

GREENHOUSE GAS EMISSIONS BY COUNTRY	UNITS	2018 LOCATION-BASED EMISSIONS			2018 MARKET-BASED EMISSIONS		
		SCOPE 1 DIRECT EMISSIONS	SCOPE 2 INDIRECT EMISSIONS	TOTAL SCOPE 1 AND SCOPE 2 EMISSIONS	SCOPE 1 DIRECT EMISSIONS	SCOPE 2 INDIRECT EMISSIONS	TOTAL SCOPE 1 AND SCOPE 2 EMISSIONS
Russia	Metric tons CO_2e	93	264	357	93	264	357
Brazil	Metric tons CO_2e	28	231	259	28	231	259
France	Metric tons CO_2e	112	136	248	112	119	231
Saudi Arabia	Metric tons CO_2e	5	68	73	5	68	73
Rest of world	Metric tons CO_2e	961	2,919	3,880	961	2,953	3,914

NO_X, SO_X, AND OTHER SIGNIFICANT AIR EMISSIONS FROM DIRECT COMBUSTION	UNITS	2010	2016	2017	2018
SO_x	Metric tons	17	1	1	1
NO_x	Metric tons	45	20	20	20
CO	Metric tons	56	32	31	32
VOC	Metric tons	7	2	2	2
PM	Metric tons	4	3	3	3
Ozone depleting substances	Metric tons CFC -11e	14	14	12	12

Data are sourced from the Scope 1 and 2 inventory and records kept through our compliance program. Significant air emissions are calculated based on site-specific data and published emission factors. We use the same boundary in calculating these air emissions as in our GHG emissions calculations.

DIRECT AND INDIRECT ENERGY CONSUMPTION	UNITS	2010	2016	2017	2018
Electricity	Gigajoules	11,889,018	7,686,379	7,394,551	7,120,998
Other indirect (purchased steam and cooling)	Gigajoules	200,907	161,972	147,310	143,370
Natural gas	Gigajoules	1,488,556	872,071	845,645	886,465
Other direct (fuel oil, jet fuel, gasoline, diesel fuel, propane)	Gigajoules	348,755	163,217	152,063	162,950
Total energy	Gigajoules	13,927,236	8,883,639	8,539,569	8,313,783
Reduction in total energy	Percent decrease from base year	N/A	36%	39%	40%

Data are sourced from utility bills where possible. Where utility bills are not available (such as in a leased property), we estimate based on internal estimation intensities by building type. These estimation intensities are calculated annually based on actual data. We use the same boundary in calculating energy consumption as in our GHG emissions calculations.

ELECTRICITY FROM RENEWABLE SOURCES	UNITS	2010	2016	2017	2018
Electricity consumption	MWh	3,302,505	2,135,105	2,054,042	1,978,055
Total renewable electricity procured	MWh	39,598	1,356,721	1,702,470	1,798,110
% of electricity from renewable sources	% of electricity	1%	64%	83%	91%

Bank of America adheres to certification, geography, technology, and project age standards when purchasing Renewable Energy Certificates (RECs), Renewable Energy Guarantees of Origin (REGOs), and Guarantees of Origin (GOs).

REDUCTIONS IN GREENHOUSE GAS EMISSIONS AND ENERGY CONSUMPTION	UNITS	2010	2016	2017	2018
Projected annual emissions savings from reduction initiatives	Metric tons CO_2e	Not available	11,248	12,114	19,166
Projected annual savings from energy efficiency measures	Gigajoules	Not available	83,710	107,785	179,090

Data are sourced from records kept by Real Estate Services, which document each project undertaken and relevant details, including project annual electricity or fuel savings and projected annual monetary savings. Energy savings are estimated based on projections of project performance.

INDIRECT ENERGY CONSUMPTION BY FUEL MIX	2010	2016	2017	2018
Coal	35%	38%	23%	22%
Petroleum	3%	1%	1%	1%
Natural gas	30%	30%	40%	41%
Nuclear	23%	19%	23%	23%
Renewable	9%	11%	13%	13%

These data represent the mix of primary energy consumed to produce the intermediate energy (electricity, steam, chilled water) used. They represent primarily the mix of grid electricity sources provided by electricity suppliers, and thus are distinct from the above tracking of electricity from renewable sources, which represent the bank's proactive purchase and implementation of renewable electricity.

INDIRECT ENERGY CONSUMPTION BY PRIMARY FUEL SOURCE	UNITS	2010	2016	2017	2018
Coal	Gigajoules	13,024,897	9,192,521	5,264,485	4,788,550
Petroleum	Gigajoules	791,057	230,107	466,551	431,070
Natural gas	Gigajoules	8,357,102	5,317,796	6,913,998	6,828,144

These data represent total primary energy consumed to produce the intermediate energy (electricity, steam, chilled water) used.

RENEWABLE MATERIAL USAGE - PAPER	UNITS	2010	2016	2017	2018
Paper	Total usage (Metric tons)	65,501	45,941	45,050	42,157
	Percent decrease from base year	N/A	30%	31%	36%
	Recycled input materials by weight	8%	14%	15%	15%
	Certified input materials by weight	Not available	99%	99%	99%

Paper is purchased from external suppliers. Data are sourced from direct measurements based on invoices from our paper vendors.

WATER	UNITS	2010	2016	2017	2018
Total water withdrawals	Billion US gallons	3.52	2.17	2.11	2.04
	Million cubic meters	13.33	8.23	7.99	7.72
Reduction in total water withdrawals	Percent decrease from base year	N/A	38%	40%	42%
Water withdrawals by source – municipal	Billion US gallons	3.52	2.13	2.10	2.03
Water withdrawals by source – rainwater	Thousand US gallons	Not available	41,200	12,860	13,490
Estimated annual savings from water reduction projects	Thousand US gallons	Not available	0	12,582	11,466

Data for water withdrawals are sourced from utility bills where possible. Where utility bills are not available (such as in a leased property), we estimate based on internal estimation intensities by building type. These estimation intensities are calculated annually based on actual data. We use the same boundary in calculating water consumption as in our GHG emissions calculations. Water is withdrawn from municipal sources (except for a small amount of rainwater) and discharged to municipal sewer systems. Data for water reused or recycled are sourced from meter readings of the rainwater systems in place.

WASTE	UNITS	DISPOSAL METHOD	2011	2016	2017	2018
Non-hazardous waste (office, confidential, construction and demolition, electronic, and other)	Metric tons	Landfill & incineration	60,420	40,875	45,690	42,424
	Metric tons	Recycling, compost & remarketing	68,252	69,390	53,914	51,987
	Diversion rate		53%	63%	54%	55%
Hazardous waste	Metric tons	Landfill & incineration	3	1	2	1
	Metric tons	Recycling, reuse & salvage	334	642	1,051	670
	Diversion rate		99%	100%	100%	100%
Total waste	Metric tons	Landfill & incineration	60,422	40,875	45,692	42,424
	Metric tons	Recycling & other diversion	68,586	70,033	54,965	52,657
	Metric tons	Total waste	129,008	110,908	100,657	95,081
	Waste to landfill percent decrease from base year[1]		N/A	32%	24%	30%
	Diversion rate		53%	63%	55%	55%
E-waste disposed through certified vendors	Percent certified		68%	99%	97%	99%

The base year for waste data is 2011. Data are sourced from vendors that provide waste removal services where possible. Where invoices are not available (such as in a leased property), we estimate based on internal intensities by building type which were developed using actual data. We use the same boundary in calculating waste as in our GHG emissions calculations. The waste disposal method was determined from data provided by the waste vendors. Note: Numbers may not sum exactly due to rounding.

**Regulated waste is reported on a 1-year lag. E.g. the 2018 data presented in this report are for 2017.*

***Improvements in data quality and completeness to the data collection process for construction and demolition project waste changed in 2018. As a result, intensities were updated and waste data has been rebaselined back to the base year to incorporate these improvements.*

FACILITIES	UNITS	2010	2016	2017	2018
LEED certifications	Net square feet	12,537,553	18,414,298	19,485,608	19,453,541
	Percent of total workplace	10%	23%	25%	25%
Carpet	Metric tons purchased	530	975	909	1,098
	Recycled input materials by weight	39%	34%	31%	30%

TRANSPORTATION	UNITS	2010	2016	2017	2018
Electric vehicle charging stations	Total charging stations installed at Bank of America sites	Not available	Not available	Not available	129
Low-carbon vehicle reimbursement program	New participants	669	357	452	916
	Metric tons of CO_2e avoided by new participants	771	818	1,094	1,617

Total charging stations installed at Bank of America sites includes the cumulative number of global charging stations active in 2018. Data not available prior to 2018.

COMPLIANCE	UNITS	2010	2016	2017	2018
Non-compliance with environmental regulations	Value of monetary fines	$23,854	$3,345	$17,567	$1,814
	Non-monetary violations	9	2	2	2
Reportable spills	Number	2	1	2	3
	Volume - US gallons	3	200	Not available	29

Data are sourced from our compliance management system, in which we record all instances of non-compliance with environmental regulations and spills.

ENVIRONMENTAL SPEND	UNITS	2010	2016	2017	2018
Compliance management spend	Value of spend	Not available	$8,300,000	$8,900,000	$10,500,000
Environmental assessment and remediation spend	Value of spend	Not available	$4,300,000	$5,900,000	$8,000,000
Waste management spend	Value of spend	Not available	$200,000	$200,000	$100,000
Total environmental protection spend	Value of spend	Not available	$12,700,000	$15,000,000	$18,600,000

Data are sourced from our compliance management system, in which we record spend with select third-party vendors on environmental protection and compliance.

VENDOR ENGAGEMENT	UNITS	2010	2016	2017	2018
Number of vendors invited to CDP supply chain	Number of vendors	89	195	195	202
Response rate to our CDP supply chain information requests	Response rate	84%	90%	88%	90%
CDP supply chain responding vendors who report GHG emissions	Response rate	Not available	79%	78%	80%

Santa Clara Valley Water District

File No.: 20-0493

Agenda Date: 8/11/2020
Item No.: 3.1.

BOARD AGENDA MEMORANDUM

SUBJECT:
Adopt Plans and Specifications and Authorize Advertisement for Bids for the Central and Parallel East Pipelines Inspection and Rehabilitation Project, Project No. 95084002, Contract No. C0661 (San Jose and Unincorporated Santa Clara County), (Districts 1, 2, 4, 6, and 7).

RECOMMENDATION:

A. Find that the Central and Parallel East Pipelines Inspection and Rehabilitation Project is substantially complex and requires a construction contract retention of 10 percent;
B. Adopt Plans and Specifications and Authorize Advertisement for Bids for Construction of the Central and Parallel East Pipelines Inspection and Rehabilitation Project per the Notice to Bidders; and
C. Authorize the Designated Engineer to issue addenda, as necessary, during the bidding process.

SUMMARY:
The objective of the Central and Parallel East Pipelines Inspection and Rehabilitation Project (Project) is to increase the reliability and useful life of these pipelines.

The Project scope of work includes the dewatering and inspection of Central Pipeline, repair and rehabilitation of the appurtenances, replacement of a line valve, installation of an Acoustic Fiber Optic (AFO) monitoring system on Central Pipeline which provides Valley Water with real-time monitoring, and installation of other miscellaneous pipeline appurtenances.

Staff has completed the final construction documents and is recommending the Board approve the plans and specifications and authorize the advertisement for bids for construction of the Project per the Notice to Bidders (Attachment 1).

Project Background

The Central and Parallel East Pipelines are included in the District's Pipeline Maintenance Program (PMP) and are an identified capital effort under the 10-Year Pipeline Inspection and Rehabilitation Program. The PMP defines the activities associated with maintenance and repair of water supply conveyance systems throughout the District's jurisdiction. The PMP serves as a comprehensive plan

that defines how routine and preventative maintenance activities are to be carried out. The primary objectives of the PMP are to maintain the District's water conveyance systems to their specifications and design, coordinate the various aspects of maintenance to achieve this goal, reduce environmental impacts associated with maintenance, and assist in obtaining multi-year permits for these activities.

The purpose of the 10-Year Pipeline Inspection and Rehabilitation Project is to maintain the integrity of the approximately 140 miles of large diameter raw and treated water transmission pipelines, extend their useful life, and address infrastructure reliability concerns. The Project is the fourth project to be undertaken, following Almaden Valley Pipeline, Pacheco Conduit, and Cross Valley and Calero Pipelines.

Central Pipeline

Central Pipeline consists of approximately 12.7 linear miles of 66-inch prestressed concrete cylinder pipe (PCCP). It conveys raw water between Penitencia Treatment Plant and Rinconada Treatment Plant. Central Pipeline was constructed in eight phases and was completed in 1966. It begins at the end of Penitencia Force Main which connects to the Penitencia Treatment Plant in northeast San Jose, runs southwest through the urban streets of San Jose, Campbell, and Los Gatos, and ends at the Vasona Pump Station in Los Gatos.

In May and June of 2018, staff conducted a condition assessment of the Central Pipeline to evaluate and assess the overall condition of the pipelines and their appurtenances. The results indicate that replacement and renewal on pipeline appurtenances must be performed at 63 sites which include air valves, guard valves, blowoff valves, two flowmeters, three energy dissipation valves, one 66-inch in-line isolation valve, ladders, and manholes.

An external third party, pursuant to a separate contract, will install an Acoustic Fiber Optic (AFO) monitoring system to allow for live monitoring of the structural condition of the pipeline.

Parallel East Pipeline

Parallel East Pipeline (PEP) consists of 2.3 miles of 54-inch welded steel pipe. It begins as a branch off the East Pipeline (EPL) on White Road and Ocala Road, runs south along White Road and ends by connecting back to the EPL near the intersection of White Road and Aborn Road in East San Jose.

The Parallel East Pipeline Rehabilitation Project was originally scheduled to be completed in 2021. In 2018, the project was split into two phases. The first phase was completed in the Spring of 2019 and included the refurbishment of the reducing spools, guard valves, air release valves (ARV), and removal of all failing 2-inch threaded branch connections in 14 underground vaults. This Phase II will include modifying air release valve vent piping from within underground vaults to above ground enclosures to comply with CA Waterworks Standard 64576(a) which requires vent openings to be above grade and above the calculated 100-year flood water level. This work requires traffic control and trenching along White Road and Ocala Road.

As part of Phase I, Valley Water staff requested a temporary waiver of compliance with the above CA Waterworks Standard from the State Water Resources Control Board - Division of Drinking Water (DDW). One of the conditions of granting the waiver is to install the air vents by the end of 2020 which has been defined as a milestone within the construction contract.

Construction Contract Retention

Public Contract Code (PCC) Section 7201 limits retention amounts for public works construction contracts to five percent (5%) of the total contract price. PCC section 7201(b)(4) provides that retention proceeds on a project may exceed 5% where the Board makes a finding that the proposed project is “substantially complex” and, therefore, requires a retention amount greater than 5%.

To comply with the PCC in regard to increasing the retention to 10%, staff recommends the Board find that the Project is substantially complex based on the precision required to perform this critical work within a constrained shutdown schedule to minimize unplanned disruption in the delivery of raw water to Santa Clara County.

Relevant Prior Board Actions:

On November 13, 2007, the Board certified the Pipeline Maintenance Program Environmental Impact Report (PMP EIR) and adopted the Mitigation Monitoring Plan.

On March 9, 2010, the Board adopted Resolution 10-24 specifying intent to consider undertaking the Project and setting the time and date for a public hearing on the Engineer’s Report for the subject Project.

On April 13, 2010, the Board held a public hearing and adopted Resolution 10-29 approving the PMP Engineer’s Report and approving the PMP.

On January 8, 2019, the Board approved a sole source purchase of equipment and services from Pure Technologies U.S., Inc. to provide electromagnetic inspection, acoustic fiber optic (AFO) monitoring system, and AFO system services for the 10-Year Pipeline Inspection and Rehabilitation Program. The construction contract scope provides for the contractor to support and provide physical access to Pure Technologies U.S. to install the monitoring system.

Permits

Staff has received a Lake-Stream Alteration Agreement from the California Department of Fish and Wildlife. Staff has also coordinated with the cities of San Jose and Campbell and the County of Santa Clara, and received conditional encroachment permits that will be finalized after contract award by the construction contractor and those public entities when its submittals for the encroachment permits are approved.

Next Steps

If the Board approves the recommendations, staff will proceed to advertise the Project for construction bids. Staff anticipates recommending the Board award a construction contract on October 13, 2020.

FINANCIAL IMPACT:
The total Project cost is estimated at $14.3 million and is included in the FY 21-25 CIP as part of the 10-Year Pipeline Inspection and Rehabilitation Project (Project #: 95084002) under the Water Utility Enterprise Fund.

The estimated construction contract cost for the Project is between $8 million and $11 million. There are sufficient funds in the 10-Year Pipeline Inspection and Rehabilitation Project's FY21 budget to encumber the anticipated construction contract amount.

CEQA:
On November 13, 2007, the Board certified the Pipeline Maintenance Program Environmental Impact Report (PMP EIR) [Resolution 07-71]. The PMP provides for the maintenance of the Valley Water's 14 raw water pipelines and 9 treated water pipelines.

In February 2019, District environmental staff reviewed the Project and concluded in a CEQA Internal Decision Memorandum that the PMP EIR can be relied on by Valley Water for this Project. Potential impacts related to all components of the Project have been evaluated and mitigation measures are specified in the PMP EIR. During Project implementation, the District and the contractor will comply with all BMPs and mitigation measures per the PMP EIR, California Department of Fish and Wildlife Lake-Stream Alteration Agreement, and Valley Habitat Plan's conditions.

ATTACHMENTS:
Attachment 1: Notice to Bidders
Attachment 2: Project Delivery Process Chart
Attachment 3: Site Map
Attachment 4: Plans
Attachment 5: Specifications

UNCLASSIFIED MANAGER:
Heath McMahon, 408-630-3126

CENTRAL AND PARALLEL EAST PIPELINES

INSPECTION AND REHABILITATION PROJECT

Project No. 95084002

Contract No. C0661

1. Notice. **Due to the County of Santa Clara Public Health Officer's Order, the Santa Clara Valley Water District offices remain closed to the public until further notice**.

Notice is hereby given that sealed Bids will be received by the Construction Program of the Santa Clara Valley Water District (District), delivered only by a third party carrier such as FED EX, UPS, DHL, Overnight, Golden State Overnight, etc., at the District's Winfield Warehouse Building located at 5905 Winfield Boulevard, San Jose, California, 95123-2428 up to 2:00 p.m. on **Wednesday, September 23, 2020**, for furnishing all material and performing all work necessary for construction of the Central and Parallel East Pipelines Inspection and Rehabilitation Project, in San Jose, Campbell, and Los Gatos, California.

NO BIDS WILL BE ACCEPTED VIA IN PERSON DELIVERY OR USPS (US MAIL).

Additional information and Instructions to Bidders are posted on the District's Construction Administration webpage: https://www.valleywater.org/construction

2. California State Department of Industrial Relations Contractor and Subcontractor Registration Requirements.

California Labor Code Section 1771.1 requires:

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, unless currently registered and qualified to perform public work pursuant to Section 1725.5 of the California Labor Code.

An inadvertent error in listing a subcontractor who is not registered pursuant to Section 1725.5 in a bid proposal shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive, provided that any of the following apply:

A. The subcontractor is registered prior to the bid opening.

B. Within 24 hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee.

C. The subcontractor is replaced by another registered subcontractor pursuant to Section 4107 of the Public Contract Code.

3. Summary of Work

A. Project Description. The Project scope includes the following:

1. For Central Pipeline:

   a. Completely drain and remove all water from approximately 12.6 linear miles of 66-inch pipeline.

   b. Perform work on pipeline appurtenances at sixty-three (63) sites which include air valves, guard valves, blowoff valves, two (2) flowmeters, three (3) energy dissipation valves, and one (1) line valve.

   c. Provide logistical support for and participate in the manned internal visual and electromagnetic inspection by the District and its third-party consultant.

   d. Provide logistical support for the installation of the Acoustic Fiber Optic (AFO) monitoring system by the District's third-party consultant.

   e. Clear and grub as needed for access to perform the Work.

   f. Perform internal pipeline repair work as specified and as needed should deteriorated pipe sections be identified during the internal pipeline visual and electromagnetic inspection, including carbon fiber reinforcement of Pre-stressed Concrete Cylinder Pipe.

   g. Prepare and coat all in-vault and exposed pipeline and tunnel appurtenances and associated piping assembly components.

   h. Coordinate and install supervisory control and data acquisition (SCADA) system components.

   i. Install or rehabilitate corrosion control test stations and related equipment.

   j. Furnish and install vault manholes, hatches, and ladders.

   k. Provide environmental support and BMP management.

   l. Restore all impacted work sites to a condition equal to or better than that existing prior to construction.

   m. Design and implement necessary traffic control.

2. For Parallel East Pipeline:

   a. Locate, identify and field verify existing utilities crossing and adjacent to all proposed piping and appurtenances.

   b. Perform work on treated water transmission pipeline appurtenances at sixteen (16) sites. See the Pipeline Maintenance Tables on sheet 7G-05 of the Project drawings for the appurtenance work to be completed at each site.

   c. Leak and pressure test all newly installed piping and appurtenances.

   d. Furnish, install, and test all cathodic protection systems and associated components.

   e. Prepare and coat all in-vault and exposed pipeline appurtenances and associated piping assembly components on Parallel East Pipeline.

   f. Restore all impacted work sites to a condition equal to or better than that existing prior to construction.

   g. Design and implement necessary traffic control.

B. Sole Source Products. None

4. Contract Time. Time limit for the completion of the Work is **305** calendar days. See Contract Documents, Special Provisions, Article 12.03. Contract Time(s) for Milestones and Contract Times.

5. Liquidated Damages. See Standard Provisions, Liquidated Damages, Article 5.07 and Special Provisions, Liquidated Damages, Article 12.05 of the Contract Documents for requirements regarding Liquidated Damages.

6. Estimated Cost. The estimated cost of the Project is between $8 and $11 million. This estimate is intended to serve merely as an indication of the magnitude of the Work. Neither the Bidder(s) nor the Contractor will be entitled to pursue a claim or be compensated due to variance in the stated estimated cost range.

A. Additive/Deductive Bid Items. **[NOT USED]**.

B. Supplemental Bid Items. These Bid Items may or may not be required. They may be deleted entirely or in part, by deductive change order(s), at the sole discretion of the District. The sum of the Total Base Bid and the Total Supplemental Bid will be used to determine the lowest Bid price.

7. **Contractor's License Requirement**. The Bidder must possess a current **Class A** Contractor's license issued by the California Department of Consumer affairs, Contractor's State License Board when the Bid is submitted. Regardless of whether a subcontractor must be identified at the time of Bid, each subcontractor must also be properly licensed to perform its scope of Work.

8. **Pre-Bid Conference and Site Showing**. A Pre-Bid conference/site showing will be conducted by the District on **Tuesday, August 25, 2020**. The conference will convene at 10:00 a.m. (by District time), by video teleconference, live-stream via Zoom (see Item 13.A. to join Zoom Meeting). Anyone not in attendance at the meeting by 10:05 a.m. will be considered late and as having not attended this **MANDATORY** Pre-Bid conference/site showing. A Bid submitted by any Bidder not represented at the entire mandatory Pre-Bid conference/site showing will not be considered and its Bid will be returned unopened. Attendance at the Pre-Bid conference/site showing by subcontractors is not required.

   Attendance by the Bidder at the Pre-Bid conference/site showing is:

   ☒ Mandatory

   ☐ Optional

   The objective of the Pre-Bid conference/site showing is to familiarize prospective Bidders with the site; no additional site showing will be allowed. Please confirm your intent to attend the Pre-Bid conference/site showing 24 hours in advance by sending an email to scvwdplanroom@valleywater.org. Additional information regarding the Pre-Bid conference/site showing will be sent to all prospective Bidders who confirm their intention to attend.

9. **Availability of Bid Documents**

   Due to the County of Santa Clara Public Health Officer's Order, District offices will remain closed to the public until further notice. The Contract Documents are therefore not available for in-person purchase and are only available in electronic (PDF) format. The electronic version is free and will be transferred via file transfer appliance (FTA) site.

   To Request Electronic Contract Documents:

   Request Form and information available online.

   - Website: https://www.valleywater.org/construction
   - Email: scvwdplanroom@valleywater.org
   - Phone District Plan Room: Kristy McMurtrie: (408) 630-3088 for questions.

10. **Inquiries**. The Bidder must submit all requests for clarification, or interpretation of the Bid Documents in accordance with the requirements stated in Instructions to Bidders, paragraph #7. Questions During Bidding. Written questions must be directed to the Contracts Administrator at scvwdplanroom@valleywater.org and submitted at least nine (9) calendar days before the deadline for receipt of Bids.

The District may issue written Addenda as appropriate for clarification or other purposes during the bidding period. Addendum notification(s) will be sent to each planholder at the email address provided by the contractor for the planholders list and addenda will be posted on the District's website at https://www.valleywater.org/construction.

A. **Project Manager**. The District's project manager for this Project is Calvin Nguyen.

B. **Process Questions**. For questions regarding the bid process, please contact the District Plan Room at scvwdplanroom@valleywater.org or call Kristy McMurtrie (408) 630-3088.

11. **Prevailing Wage Requirements**

A. Workers employed on this Project must be paid at rates at least equal to the prevailing wage rates as determined by the State of California Department of Industrial Relations pursuant to Section 1770 *et seq.* of the Labor Code. Said wage rates are incorporated herein by reference and are available on the State of California Department of Industrial Relations website at: http://www.dir.ca.gov/. See Standard Provisions, Prevailing Wages Article 4.04. through Apprentices Article 4.06. for related requirements.

Due to the County of Santa Clara Public Health Officer's Order, District offices will remain closed to the public until further notice. The wage rates are therefore not currently available for review at District offices.

B. This Project is subject to compliance monitoring and enforcement by the State of California Department of Industrial Relations. The Contractor and subcontractors must furnish the records specified in Section 1776 directly to the Labor Commissioner, in the following manner: monthly, in a format prescribed by the Labor Commissioner.

12. **Bid Proposal Submittal**. All Bids must be submitted in sealed envelopes addressed to the Santa Clara Valley Water District. Attention: Construction Programs and state the Project name and Project number on the outside of the sealed envelope. Each Bid must be submitted on the prescribed Bid Forms. All information on Bid Forms must be completed in ink.

A. **Bid Submittal Delivery**. Bidders are only allowed to submit a Proposal by third party carrier such as: FEDEX, UPS, DHL, CA Overnight, Golden State Overnight, etc., and must address the submittal in accordance with instructions stated in this

paragraph 12. Any Proposal received after 2 p.m. will not be considered. Late Bids will be returned unopened.

NO BIDS WILL BE ACCEPTED VIA IN PERSON DELIVERY OR USPS (US MAIL).

Address the outside delivery envelope as follows:

Santa Clara Valley Water District
Attention: Construction Program
C0661 – Central and Parallel East Pipelines Inspection and Rehabilitation Project
5905 Winfield Boulevard
San Jose, CA 95123-2428

Note: USPS (US Mail) does not deliver to 5905 Winfield Boulevard.

13. **Bid Opening**. For the duration of the COVID-19 pandemic, to ensure the safety of the public and District employees and requisite social distancing requirements by Order of the County of Santa Clara Public Health Officer, the opening of bids shall be made available to the public only by video teleconference, live-stream, on the date stated in this Notice to Bidders, paragraph #1. Notice, above, at **2:30 p.m.** The results will be posted on the District's website at https://www.valleywater.org/construction no later than the following day.

A. **Join Zoom Meeting**. Any person interested in attending the live-stream bid opening and **MANDATORY** Pre-Bid conference/site showing as detailed under Item 8, may do so by accessing the link below, or join via phone by calling the toll-free number listed below:

Join Zoom Meeting

https://valleywater.zoom.us/j/3796054075

Meeting ID: 379 605 4075

One tap mobile

+16699009128,,3796054075# US (San Jose)
+13462487799,,3796054075# US (Houston)

Dial by your location

+1 669 900 9128 US (San Jose)
+1 346 248 7799 US (Houston)
+1 253 215 8782 US (Tacoma)
+1 646 558 8656 US (New York)
+1 301 715 8592 US (Germantown)
+1 312 626 6799 US (Chicago)

Meeting ID: 379 605 4075

Find your local number: https://valleywater.zoom.us/u/aekffBkBma

14. **Errors or Discrepancies in the Bids**. The District Board of Directors reserves the right to reject any and all Bid Proposals and to waive minor defects or irregularities in any submitted Bid Form(s).

15. **Bidder's Security**. Each Proposal must be accompanied by cash, a certified check, cashier's check, or an original Bidder's bond in the sum of not less than 10 percent of the total aggregate of the Proposal including all additive Bid items. Said checks or bond must be made payable to the Santa Clara Valley Water District.

16. **Contract Retention**

☐ The Contract Retention for this Project is established at five (5) percent of the Contract Price.

☒ The Contract Retention for this Project is established at ten (10) percent of the Contract Price. The Board of Directors has made a finding that the Project is substantially complex and therefore requires retention higher than five percent.

17. **Substitution of Securities**. The Contractor may, at the Contractor's request and expense substitute securities equivalent to the amount withheld by District to ensure the performance of the contract, in accordance with Public Contract Code Section 22300.

18. **Small Business Preference [NOT USED]**

19. **Equal Opportunity**. The District is an equal opportunity employer and all Contractors of District projects are to have and follow a policy of equal opportunity including adherence to all state and federal laws and regulations, including the Federal Equal Opportunity Clause.

By order of the Board of Directors of the Santa Clara Valley Water District, San Jose, California, on Tuesday, August 11, 2020.

ATTEST: MICHELE L. KING, CMC

_____
Clerk, Board of Directors

Project Delivery Process

Central and Parallel East Pipelines Inspection and Rehabilitation Project

as part of the

10-Year Pipeline Inspection and Rehabilitation Project

Project No. 95084002

Design → Construction

FY 2019-2023

Board Approves CIP

Board approves changes, additions, & deletions to previous year's CIP

November 13, 2007

CEQA Document

Board certifies that the Final Program Environmental Impact Report for the Pipeline Maintenance Program has been completed in compliance with CEQA

April 13, 2010

Engineer's Report

Board holds public hearing and approves Engineer's Report

July 28, 2020

Advertise for Bids ★

Board adopts PS&E and authorizes bidding

Board Awards Contract

Board reviews bids and awards contract to responsible bidder with lowest responsive bid

Notice of Contract Completion

Board accepts completed project

★ **Proposed Board Action(s) requested by this Item**

Attachment 2
Page 1 of 1

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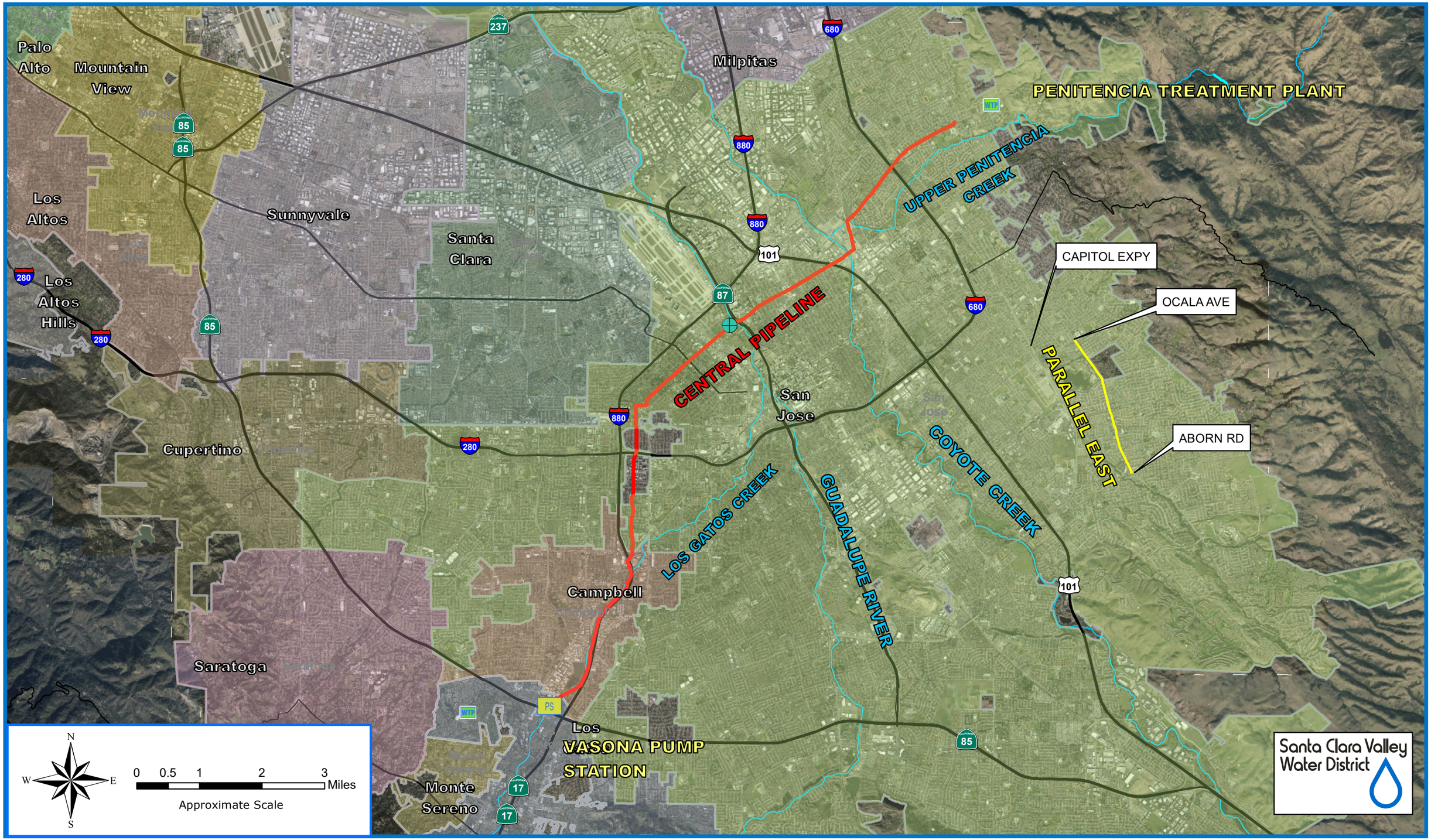
CENTRAL PIPELINE &
PARALLEL EAST PIPELINE SITE MAP



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SPECIFICATIONS AND CONTRACT DOCUMENTS

FOR THE CONSTRUCTION OF THE

CENTRAL AND PARALLEL EAST PIPELINES INSPECTION AND REHABILITATION PROJECT

Project No. 95084002

Contract No. C0661

JULY 2020

Santa Clara Valley Water District

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STANDARD PROVISIONS

SECTION 1. DEFINITIONS

Whenever in these Specifications and other Contract Documents the following abbreviations and terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISI	American Iron and Steel Institute
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
API	American Petroleum Institute
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWG	American Wire Gage
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BAAQMD	Bay Area Air Quality Management District
CAEPA	California Environmental Protection Agency
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CWA	Federal Clean Water Act
DHS	California Department of Health Services
HSC	California Health and Safety Code
IEEE	Institute of Electrical and Electronics Engineers
MSDS	Material Safety Data Sheet
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPDES	National Pollution Discharge Elimination System
RWQCB	California Regional Water Quality Control Board
SAE	Society of Automotive Engineers
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
UBC	Uniform Building Code
UL	Underwriters Laboratories
USEPA	United States Environmental Protection Agency
WCLB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association

DEFINITIONS

Acceptance: The formal, written acceptance of the Contract by the District's Board of Directors, as documented in a recorded Notice of Completion of Contract and Acceptance of Work. Acceptance indicates that all Work has been completed in all respects in accordance with the Drawings and Specifications and with any modifications thereof previously approved.

Activity Hazard Analysis (AHA)/Job Hazard Analysis (JHA): A form used to identify the task and break it down into steps, identify the hazards associated with each step, and identify the control measures used for each step to protect the worker, environment, or public. This form is also commonly referred to as a Job Safety Analysis (JSA).

Addendum: Written or graphic instruments issued prior to the opening of Proposals that make changes, additions, or deletions to the Bid Documents, or Contract Documents.

Agreement: The written document executed by the parties formalizing the Contract.

Approved, Directed, Ordered, or Required: Whenever these words or their derivatives are used, it is the intent, unless otherwise clearly stated, that approval or direction by the Engineer is indicated.

Article: A numbered portion of a title Section of the Specifications.

Bid: The completed Proposal and all associated Bid Forms, including Bidder's Bond or other Bidder's security. Bids not accompanied by the required documents are considered incomplete bids and are nonresponsive.

Bid Documents: All documents to be considered when preparing a Bid. The Notice to Bidders, Instructions to Bidders, Proposal and all accompanying Bid Forms, Bidder's Bond or other Bidder's security, and Contract Documents.

Bidder: Any individual, firm, partnership, corporation, or combination thereof, submitting a proposal for the Work contemplated, acting directly or through a duly authorized representative.

Board, Board of Directors: The Board of Directors of the District.

Certified Industrial Hygienist: A professional who is certified by the American Board of Industrial Hygienists as trained to evaluate safety and health hazards and to determine safety measures necessary for personnel working under hazardous conditions.

Code: The terms Government Code, Labor Code, etc. refer to codes of the State of California.

Competent Person: A person capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt, corrective measures to eliminate those conditions.

Construction Equipment: Equipment used for the performance of work but not incorporated into the Project.

Contract: The written Agreement between the Contractor and the District comprised of the Contract Documents.

Contract Documents: Refer to Article 2.01. Contract Documents and Precedence.

Contract Time(s): The time (Days) allowed for completion of the entire Work or portion thereof as defined by specified Milestones that meets the requirements of the Contract Documents and is accepted by the Engineer. See also Project Completion and Milestone Completion.

Contract Price(s): The price (dollars) for completion of the entire Work set forth in the Contract Documents.

Contractor: The entity or person with whom the District has executed the Contract and has identified as such therein and referred to throughout the Contract Documents as singular in number and neuter in gender. The term "Contractor" means Contractor or its authorized representative.

Controlling Item of Work: Any feature or combination of features of the Work considered at the time by the Engineer, which if delayed, will delay the completion of Work associated with a specified Contract Time(s).

Days: Calendar days, unless otherwise designated.

Delay: An increase in the duration or length of time for performing the Work that is caused by any event, action, inaction, or factor. The five types of delay are defined in Article 3.08. Change in Contract Time(s).

Definable Feature of Work: A task that is separate and distinct from other tasks and that has separate control requirements.

District: The Santa Clara Valley Water District.

Drawings: The official Drawings, working Drawings, detail Drawings, and supplemental Drawings, or reproductions thereof, that show the location, character, dimension, and details of the Work to be done and that are to be considered as part of the Contract.

Engineer: The designated Engineer as defined in Article 3.02. Engineer of the Standard Provisions who, acting either directly or through a properly designated representative, assumes all duties and responsibilities, and has all rights and authority in accordance with the Contract Documents.

Equipment: Equipment incorporated or to be incorporated into the Project.

First Chargeable Day: The first day of Contract Time allowed for completion of the entire Work. The First Chargeable Day will be specified in the Notice to Proceed.

Fixed Costs: Any necessary labor, Material, and Equipment costs directly expended on the item or items under consideration that remain constant regardless of the quantity of Work done.

Hazardous Material: (A) Any substance, product, waste, or other material of any nature whatsoever that is or that becomes listed, regulated, or addressed pursuant to any Federal, State, or Local Statute, Law, Ordinance, Resolution, Code, Rule, Regulation, Order, or Decree regulating, relating to, or imposing liability (including, but not limited to, response, removal, and Remediation costs) or standards of conduct or performance concerning any hazardous, toxic, explosive, corrosive, flammable, infectious, radioactive, carcinogenic, mutagenic, or as otherwise dangerous waste, substance, or material; (B) any substance, product, waste, or other material of any nature whatsoever whose presence in and of itself may give rise to liability under any of the above Statutes or under any statutory or common law theory based on negligence, trespass, intentional tort, nuisance, strict, or absolute liability or under any reported decisions of a State or Federal court; (C) any substance without limitation that contains petroleum or crude oil, including, but not limited to, petroleum and petroleum products.

Hazardous Waste: Any substance or material as defined in the California Hazardous Waste Control Act Health and Safety Code, Chapter 6.5, Sections 25100 - 25257.1, or in the Resource Conservation and Recovery Act, 42 U.S.C. 6901 et seq.

Liquidated Damages: The amount stated in the Specifications, as provided for in Government Code Section 53069.85, to be paid to the District or to be deducted from any payments due or to become due the Contractor for each Day of Inexcusable Delay in completing the whole or any specified portion of the Work beyond the specified Contract Time(s) or any other amount specifically stated as a Liquidated Damage in the Contract.

Material: Material incorporated or to be incorporated into the Project.

Milestone: A specified portion of the Work identified in the Contract as a Milestone that is to be completed under the Contract.

Milestone Completion: The date determined by the District when the Milestone is to be complete. Milestone Completion does not constitute acceptance but does establish the completion date of the Milestone for the purpose of assessing Liquidated Damages, if any, associated with the Milestone.

Personnel Protection: Equipment and procedures that minimize human exposure to Regulated Material, Hazardous Material, Hazardous Waste, or unsafe situations.

Plans, Construction Plans: See Drawings.

Project: The erection, construction, alteration, repair, or improvement to be accomplished under the Contract. Refer to Work.

Project Completion: The stage at which the whole Work is complete per the Contract Documents, and the Engineer has performed the final inspection and issued a Project Completion letter.

Proposal: The Proposal states the price for which the Bidder proposes and agrees to perform the Work. See Proposal and Bid Items, Bid Form No. 1.

Qualified Biologist: A biologist who has the experience, education and training necessary to perform specific tasks related to the biological subject discipline, and in an unbiased fashion. The term 'qualified biologist' is used generically to mean a biologist who is trained to perform the given task; specifically, a fisheries biologist, wildlife biologist, or botanist. Training must be in the field to which the task is related. (Refer to the appendices for specific fields of study).

Reasonable Accuracy: Within the tolerances as shown on the Drawings or as indicated in the Specifications.

Regulated Material: Any substance or combination of substances for which Federal, State, or Local regulations require special management, storage, disposal, or handling practices. This includes, but is not limited to, material defined as Hazardous Material and Waste; designated waste (California Water Code Section 13173); and special waste (California Code of Regulations, Title 22, Div. 4.5 [Environmental Health Standards for the Management of Hazardous Waste]).

Remediation: Restoration of contaminated soil, groundwater, or other materials to its pre-contaminated level or to a level acceptable to the District and Local, State, and Federal agencies.

Responsible Bidder: Responsible Bidder as defined in California Public Contract Code Section 1103.

Specifications: The directions, provisions, and requirements contained in the Standard Provisions, Special Provisions, and Technical Provisions.

Subcontractor: An entity or person contracting with the Contractor or with another Subcontractor to perform any portion of the Work. The term "Subcontractor" is referred to throughout the Contract Documents as singular in number and neuter in gender and means a Subcontractor or its authorized representative.

Supplier: An entity or person contracted with the District, the Contractor or its Subcontractors to provide materials and/or equipment for any portion of the Work. The term "Supplier" is referred to throughout the Contract Documents as singular in number and neuter in gender and means a Supplier or its authorized representative.

Total Bid Price: The sum stated in the Bid for which the Bidder offers to perform the Work described in the Bid Documents. The Total Bid Price shall include the entire cost of all Work necessary for a complete and fully operational structure or facility in accordance with the requirements of the Contract Documents.

Work: Refer to Article 3.01. Work to be Done, paragraph A. References in the Contract Documents to "Work" may be to specific items of Work.

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SECTION 2. CONTRACT DOCUMENTS

2.01. Contract Documents and Precedence

A. The Contract Documents comprise the entire Agreement between the District and the Contractor concerning the Work. The Contractor shall properly perform all requirements of the Contract Documents.

B. The Contract Documents include the District's Contract form and any exhibits attached thereto, including the Notice to Bidders, Instructions to Bidders, Proposal Form, Proposal, Standard Provisions, Special Provisions, Technical Provisions, Drawings, Specifications, Addenda, Appendices, approved Change Orders, and Directed Change Orders (DCO) as defined in Section 3, if any.

C. The Contract Documents are intended to be complementary and include all items necessary for the Contractor's proper execution and completion of the Work. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be as if shown or mentioned in both. Any part of the Work not shown or mentioned in the Drawings or in the Specifications that is inferable or implied by either, or that is necessary or usual for proper performance of the Work, shall be provided by the Contractor at its own expense.

D. In case of conflicts, errors, and discrepancies in any of the Contract Documents, the order of precedence (from highest to lowest priority) is as follows. Within the same order of precedence, specific requirements shall take precedence over general requirements:

1. Change Orders (CO) or DCO
2. Agreement
3. Addenda
4. Special Provisions
5. Technical Provisions
6. Drawings/Plans
7. Standard Provisions
8. State Specifications and Plans
9. Appendices

E. With reference to the Drawings:

1. Figures or numerical dimensions govern over scaled dimensions.
2. Detail Drawings govern over general Drawings.

3. Addenda/CO or DCO Drawings govern over Contract Drawings.

4. Contract Drawings govern over standard Drawings.

5. Notes apply only to the Drawings where the notes appear, unless classified as “typical,” “general,” or “universally applicable,” in which case they apply to all Drawings where the conditions or circumstances noted occur.

6. Typical details apply to all Drawings, unless a specific, different detail is shown.

2.02. State Specifications and Plans

A. Unless otherwise stated, State Specifications and Plans referred to in these Specifications shall be the latest published edition of the State of California Department of Transportation Standard Specifications and Standard Plans and updates thereto and are by reference made a part of these Specifications the same as though set out in full, as to the provisions requiring compliance.

B. When specifically stated to follow the State Specifications and Plans for an item, the Work set forth in these Contract Documents shall be accomplished in accordance with the appropriate provisions and details of the State Standard Specifications and Standard Plans.

2.03. Clarification of Contract

A. The following interpretative rules apply throughout the Contract Documents:

1. The provisions of the Contract Documents are complementary and should be interpreted to view the Contract Documents as a whole.

2. A concept phrased in the singular should be interpreted in the plural as required.

3. Masculine includes feminine and feminine includes masculine.

4. The words “shall,” “will,” and “must” in any of their tenses indicate mandatory requirements. The word “may” indicates “may apply” or “may not apply.”

5. The use of examples (e.g., “such as” or “including”) does not limit or exclude examples not specifically mentioned.

6. The words “provide,” “furnish,” “perform,” “construct,” and “install” mean that the Contractor shall provide, perform, construct, and install and shall include all services necessary to provide, perform, construct, and install unless preceded by the word “only.”

B. The Contract Documents are not complete in every detail but show the purpose and intent only. The Contractor shall comply with their true intent and meaning, taken as a whole, and shall not avail itself of any manifest error, omission, discrepancy, or ambiguity that appears in the Contract Documents, instructions, or work performed by others.

C. All corrections of readily apparent errors or omissions in the Contract may be made by the Engineer when such corrections are necessary for the proper fulfillment of their intention as construed by the Engineer. The misplacement, addition, or omission of any word, letter, figure, or punctuation mark that has no substantive legal effect will in no way change the due spirit, intent, or meaning of these Specifications.

D. Any part of the Work not shown on the Drawings or described in these Specifications, but that is reasonably or ordinarily implied by either, shall be furnished and installed by the Contractor as if fully described in these Specifications and shown upon the Drawings.

E. **Contract Document Clarifications (CDC)**: A document initiated by the District consisting of supplementary details, instructions, or information issued by the District that clarifies or supplements the Contract Documents. Contract Document Clarifications do not constitute a change in Contract Work, Contract Price(s), or an extension in Contract Time(s) unless requested by the Contractor and approved by the District in accordance with the Contract Documents.

F. Payment for items of Work that are called for in the Specifications or that are shown on the Drawings but that are not separately identified in the Proposal Form, shall be compensated as part of the Bid price of one or more of the items that are listed; no additional payment shall be made.

2.04. Requests for Information

A. **Request for Information (RFI)**: A document prepared by the Contractor requesting information from the District regarding the Project or Contract Documents.

B. Contractor shall be responsible for its costs and the costs of its Subcontractors to review Contract Documents and field conditions and to implement and administer an RFI system throughout the Contract Time(s) in accordance with the requirements of the Contract. The Contractor shall be responsible for costs incurred by the District for the work of the District's consultants and District administrative efforts in answering Contractor RFIs where the answer could reasonably be found by reviewing the Contract Documents.

C. The Contractor shall carefully review the appropriate portions of the Contract Documents a minimum of 30 Days in advance of the Work to be executed for the express purposes of checking for manifest errors, omissions, discrepancies, or ambiguities. The Contractor shall not be entitled to any compensation for

Delays, disruptions, inefficiencies, or additional administrative effort caused by the Contractor's untimely review of the Contract Documents.

D. Should it appear that the Work to be done or any of the matters relative thereto are not sufficiently detailed or explained in the Specifications or on the Drawings, or if the Contractor discovers any discrepancies between the Contract Drawings and conditions in the field, or any errors or omissions in the Contract, or in the layout given by stakes, points, or instructions, the Contractor shall submit a written RFI to the Engineer. If the Contractor proceeds with any such Work without receiving such clarification or RFI reply, it shall be responsible for correcting all resulting damage and any nonconforming Work.

E. The Engineer will issue written clarification or interpretation of Contract Document requirements in response to the Contractor's requests and other sources of information. The Engineer's decision thereon shall be final; the Contractor shall conform to it as part of the Contract.

2.05. Examination of Drawings, Specifications, and Site of Work

A. As noted in the Notice to Bidders, the Contractor's submission of a Proposal is conclusive evidence that the Contractor investigated and is fully aware of the conditions and difficulties to be encountered of the character, quality, and quantities of work to be performed, the Material to be furnished, and the requirements of the Proposal, Drawings, Specifications, and other Contract Documents.

B. Where investigation of subsurface conditions has been made by the District in respect to foundation, characterization of soils, groundwater, or other design, Bidders may inspect the records of the District as to such investigation, including examination of samples and drill cores, if any. When logs of test boring showing a record of the data obtained by the District's investigation of subsurface conditions are made available, these logs represent only the opinion of the District as to the character of material encountered by it in its test borings and are made available only for the convenience of Bidders.

C. Note that the District's investigation of subsurface conditions is made for the purpose of design. The District assumes no responsibility whatsoever in respect to the sufficiency of test borings, or to accuracy of the log of test borings, or to other preliminary investigations, or of the interpretation thereof. There is no guarantee, expressed or implied, that the conditions indicated are representative of those existing throughout the Work, or to any part of it, or that unforeseen developments may not occur.

D. Making such information available to the Contractor is not to be construed in any way as a waiver of the provisions of this Article; Bidders must satisfy themselves through their own investigations, analyses, and interpretations as to conditions to be encountered.

E. No information derived from such inspection of records or from preliminary investigations made by the District, or from the Engineer, or from assistants, or from the maps, Specifications, profiles, or Drawings will in any way relieve the Contractor from any risk or from properly fulfilling all the terms of the Contract.

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SECTION 3. SCOPE OF WORK

3.01. Work to be Done

A. The performance by the Contractor of all of its responsibilities and obligations set forth in the Contract Documents. Work includes, but is not limited to, providing labor, Materials, Equipment, testing, services, and documentation required by the Contract Documents. References in the Contract Documents to "Work" may be to specific items of Work. All Work performed is to be in compliance with the Contract Documents.

B. During construction, the Contractor shall keep the worksite, areas adjacent to the worksite or otherwise impacted by the Contractor's operations and access roads in an orderly condition, free and clear of debris and discarded materials.

3.02. Engineer

A. The Engineer of the District shall be the District's representative who assumes all duties and responsibility and has all rights and authority as assigned in the Contract Documents.

B. The Engineer of the District is the Deputy Operating Officer or Assistant Operating Officer of the Water Utility Capital or Watershed Capital or Water Utility Technical Support Division or Office of Watersheds as applicable. Administrative hearings, if required, will be conducted by an Operating Officer of a different Division or Office.

C. Authority of Engineer: The Engineer shall decide all questions that may arise as to the quality or acceptability of Material furnished, Work performed, and rate of progress of the Work; all questions that may arise as to the interpretation of the Drawings and Specifications; and all questions as to the acceptable fulfillment of the Contract on the part of the Contractor. The Engineer's decisions shall be final. The Engineer has the authority to enforce these decisions and provide direction to the Contractor, which the Contractor shall carry out promptly.

3.03. Contractor Staffing

A. A project manager and superintendent shall be provided as specified below:

1. The Contractor shall submit for approval in writing before starting the Work the name of the project manager and superintendent who shall have complete authority to represent and act for the Contractor. This submittal shall also include a list of reference projects with the following information: (i) the individual's name; (ii) the project name that serves as the basis of qualification; (iii) the project site location; (iv) a brief project description; and (v) the name and mailing address of the project owner.

2. The project manager shall have at a minimum seven (7) years' experience as a contractor's project manager on public works with not less than four (4) years' experience as a project manager on projects with

complexity and configuration similar to the Work described in the Contract Documents.

3. The superintendent shall have at a minimum seven (7) years' experience as a contractor's general superintendent on public works with not less than four (4) years' experience as a superintendent on projects with complexity and configuration similar to the Work described in the Contract Documents.

4. The superintendent of the Contractor shall normally be present at the site of the Work at all times while Work is actually in progress on the Contract. During any period when Work is suspended, arrangements acceptable to the Engineer shall be made for any emergency Work that may be required to be done by the Contractor.

5. Whenever the Contractor or an authorized representative is not present on any part of the Work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the superintendent who may have charge of the particular Work in reference to which the orders are given. Any order given by the Engineer not otherwise required by the Specifications to be in writing will, on the request of the Contractor, be given or be confirmed by the Engineer in writing.

6. If the project manager or superintendent is not deemed qualified or if the project manager's or superintendent's performance on the Work is determined to be unsatisfactory by the Engineer, the project manager or superintendent shall be immediately removed from the Project. The Contractor shall submit for approval the same information described in this article for a proposed substitute project manager or superintendent.

7. The Contractor shall designate, in writing, the names and telephone numbers of at least three (3) representatives who can be contacted at any time in the event that an emergency occurs.

B. A Professional Scheduler shall be provided unless removed in the Special Provisions. The Professional Scheduler shall meet the requirements specified in Article 5.04. Professional Scheduler. If Professional Scheduler is not required, the Contractor is responsible for providing adequate resources required to develop and to maintain schedules.

C. A Site Safety and Health Supervisor shall be provided unless removed in the Special Provisions. The Site Safety and Health Supervisor shall meet the requirements specified in Article 8.11. Site Safety and Health Supervisor.

D. A Field Quality Control Manager shall be provided if required in the Special Provisions. The Field Quality Control Manager shall meet the requirements specified in the Special Provisions Article 20.04.02. Contractor's Quality Staffing Requirements.

3.04. Character of Workers

A. Any Subcontractor or person employed by the Contractor or Subcontractor who fails or refuses to carry out the directions of the Engineer, or who appears to the Engineer to be incompetent, or who acts in a disorderly or improper manner shall be removed from the Work immediately on the written request of the Engineer; such person shall not again be employed on the Work.

3.05. Layout of Work and Surveys

3.05.01 Responsibility of District

A. The District shall establish survey control points and reference points as shown on the Drawings for required field layout by the Contractor.

B. The District shall provide only the minimum survey crew services essential for orderly performance of the Work; District survey crews will not be available at all times for the Work under these Specifications.

C. The District shall provide to the Contractor the station(s) and offset distance(s) to all reference points and benchmarks that were provided by the District in paragraph A.

D. The District shall establish required stakes only once. Survey stakes destroyed or removed will be replaced by the District at the Contractor's expense.

3.05.02. Responsibility of Contractor

A. When the Contractor requires stakes or marks as provided for in paragraph A, it shall clear and grub the area to be staked and then notify the Engineer of such requirements in a reasonable length of time in advance of starting operations that require such stakes or marks. In no event shall a notice of less than seven (7) Days be considered a reasonable length of time.

B. Where construction operations require removal of the District's stakes or other survey marks, the Contractor shall reference such points in an approved manner. Survey stakes or marks established by the District shall be preserved by the Contractor until their removal is authorized. In case of their unauthorized destruction or removal by the Contractor's forces, they will be replaced at the Contractor's expense. Any cost to the District of replacing survey stakes or marks will be deducted from payments due the Contractor. Such cost will include a reasonable charge for use of District supplies, labor, and Equipment, plus overhead.

C. The Contractor is solely responsible for the measurements and layout of the Project from the given survey control points and reference points provided by the District. Any questions with regard to interpretation of Project layout shall be resolved by the Engineer.

D. The Contractor shall not remove or disturb survey monuments and permanent markers unless otherwise approved by the Engineer and not until the District has recorded and referenced the locations. The Contractor shall be charged at a reasonable rate for the restoration or replacement of survey monuments and permanent markers by the District.

E. No survey monuments, permanent markers for the District right of way, or District survey control points shall be removed or disturbed until the Engineer has recorded the locations thereof and a permit for such removal has been received from the agency having jurisdiction. When the construction Work has been completed, the Contractor shall replace said monuments accurately in the locations as referenced by the Engineer at no cost to the District.

F. If any marker or monument is destroyed by the Contractor without prior written approval of the Engineer, the Contractor shall be responsible for the accurate replacement of that marker or monument at no expense to the District by a Land Surveyor licensed by the State of California in accordance with the California Business and Professions Code Chapter 15, Land Surveyors, Section 8771.

3.06. Changes in the Work

A. **Change Order**: A written document that changes the Contract and has been fully executed bilaterally by the District and Contractor that authorizes an addition, deletion, or revision in the Work; an adjustment in the Contract Price(s); and/or the Contract Time(s), including Milestone Completion dates or durations.

B. **Directed Change Order (DCO)**: The District's written order that is a Change Order unilaterally executed by the District to order additions, deletions, or revisions in the Contract Work. If deemed necessary and/or appropriate by the Engineer, the DCO will include an adjustment in the Contract Price(s) and/or in the Contract Time(s) and/or in other terms and conditions that the District, at its sole discretion, deems reasonable for the change.

C. **Potential Change Order (PCO)**: The District's written request to the Contractor for a proposal to perform PCO Work prior to the District's issuance of a Change Order or DCO. A PCO may also be created by the District to track disputed Work.

3.06.01. Potential Change Orders and Change Orders

A. The District may at any time, or from time to time and without notice to the Contractor's surety, order additions, deletions, or revisions to the Work and/or to the Contract Time(s) and may request a proposal from the Contractor for a PCO for such additions, deletions, or revisions in the Work and/or in the Contract Time(s). Pursuant to Articles 3.07. Change in Contract Price(s) and 3.08. Change in Contract Time(s), the Contractor shall submit any requests the Contractor has for adjustments in the Contract Price(s) and/or in the Contract Time(s).

B. Notwithstanding the time limits stated in Article 3.06.01. Potential Change Orders and Change Orders, upon receipt of such request, the Contractor shall furnish a detailed estimate of increase or decrease in costs and/or in time, together with cost and schedule breakdowns and other supporting data within the time specified in the request, but no later than 30 Days after receipt of such a request unless the Engineer allows additional response time. The Engineer shall review and respond in writing to the Contractor's estimate prior to proceeding with the Work.

C. Changes in the Contract Price(s) shall be determined and paid in accordance with Article 3.07. Change in Contract Price(s). Changes in the Contract Time(s) shall be determined and adjusted in accordance with Article 3.08. Change in Contract Time(s).

D. The District and the Contractor shall execute appropriate Change Orders covering:

1. changes in the Work that are ordered by the District pursuant to paragraph "A" above;

2. changes in the Contract Price(s) and/or Contract Time(s) that are agreed to by the parties; or

3. any other changes agreed to by the parties.

E. The Contractor shall not be entitled to an increase in the Contract Price(s) nor to an extension of the Contract Time(s) with respect to any Work performed that is not required by the Contract, except in the case of an emergency or in the case of uncovering Work as provided in Article 9.06.01. Inspection, paragraph H.

3.06.02. Change Order Request

A. Should the District's Contract Document Clarifications (CDC) or other written directive, in the opinion of Contractor, materially exceed or change the requirements of the Contract Documents, the Contractor shall submit to the District a written Change Order Request (COR) within seven (7) Days of receipt of the CDCs or of other written directive.

B. A COR shall reference the CDC or other written directive and the relevant Specifications and Drawings.

C. A COR shall also include a cost proposal and/or time adjustment proposal as a good faith estimate of any additional compensation or time associated with the affected Work.

D. Failure to submit a timely, documented COR shall constitute a waiver of any future claim for additional compensation or time relating to such Work.

3.06.03. Directed Change Orders

A. In situations where (i) the Contractor fails to submit a proposal for a PCO within the time specified; or (ii) when the District and the Contractor cannot agree on the terms and conditions of a PCO within a reasonable amount of time as determined by District; or (iii) if, in the judgment of the Engineer, it is impracticable because of the nature of the change or for any other reason for the parties to determine and agree on the costs and schedule impacts before the change must be performed, the District has the right to issue to the Contractor a DCO signed by the District only, with compensation based on the Engineer's estimate of cost, time, and other impacts associated with performance of changes in the Work.

B. A DCO may be issued by the District as a result of, but not limited to, any of the following conditions:

1. Responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in Article 3.09. Differing Conditions.

2. Responding to any damage to improvements of property or to an emergency affecting the safety of life or property as provided in Article 4.10. Preservation of Property.

3. Utility relocation as provided in Article 4.25. Coordination With Utilities.

4. Emergency work as provided in Article 4.10. Preservation of Property and in the Special Provisions.

5. Protested Work under Article 3.11.01. Protest.

6. PCO work.

C. Upon receipt of a DCO, the Contractor shall immediately act upon the Work ordered by the District, all in accordance with the applicable terms and conditions of the Contract Documents.

D. The District's issuance of a DCO is for the purpose of unilaterally modifying the Contract Work, and/or Contract Price(s), and/or Contract Time(s), as deemed necessary by the Engineer. The parties may subsequently negotiate mutually acceptable terms and conditions of a Change Order to replace the DCO, as provided in this Article.

E. The Contractor may, at any time after the District's issuance of a DCO, furnish a detailed estimate of increases or decreases in costs and/or time, cost and schedule breakdowns, and references to relevant Contract Specifications in support of its position with regard to the unilateral directive.

F. Should the Contractor disagree with the terms of the DCO, the Contractor may protest in accordance with Article 3.11.01. Protest. This action shall not delay the requirement to immediately act upon the Work as provided herein.

3.06.04. Allowable Quantity Variations

A. General: Increases or decreases in the quantity of a Contract item of Work shall be determined by comparing the actual pay quantity of an item of Work with the approximate quantity in the listing of the Bid items contained in the Proposal.

1. If the actual pay quantity of an item of Work varies from the approximate quantity by 25 percent or less, payment shall be made for the actual quantity of Work performed at the Contract unit price listed in the Proposal.

2. If the actual pay quantity of an item of Work varies from the approximate quantity by more than 25 percent, in the absence of an executed Contract Change Order or DCO specifying the compensation to be paid, the compensation payable to the Contractor shall be determined in accordance with this Article.

a. Increases of More Than 25 Percent: If the actual pay quantity of an item of Work exceeds the approximate quantity by more than 25 percent, the amount of Work in excess of 125 percent of the approximate quantity may be paid for by adjusting the Contract unit price, subject to the following conditions: (i) the Contractor can demonstrate to the satisfaction of the Engineer that an adjustment in the Contract unit price is warranted; and (ii) the adjusted unit prices are reasonable and approved by the Engineer. Such adjustment of the Contract unit price shall be the positive or negative difference between the Contract unit price and the actual unit cost of the total pay quantity of the item. At the sole option of the Engineer, the actual unit cost of the Work involved in such excess shall be determined in accordance with Article 3.07.01.G.2. (by mutual acceptance of a lump sum) or with Article 3.07.02. Cost of Extra Work (based on Time and Materials); such unit costs shall include an appropriate portion of the Contractor's allowable overhead and profit.

(1) If the cost of an item of Work includes Fixed Costs, the Fixed Costs shall be deemed to have been recovered by the Contractor by the payments made for 125 percent of the approximate quantity at the Contract unit price for the item; in computing the actual unit cost, the Fixed Costs shall be excluded.

(2) When the compensation payable for the quantity of Work performed in excess of 125 percent of the approximate quantity is less than $5,000 at the Contract unit price, no adjustment in the Contract unit price shall be made unless

requested in writing by the Contractor within 14 Days from the date the Contractor became aware, or should have reasonably become aware, of the increase in quantity.

b. Decreases of More Than 25 Percent: If the actual pay quantity of an item of Work is less than 75 percent of the approximate quantity, an adjustment in unit price shall not be made unless the Contractor makes a request in writing within 14 Days from the date the Contractor became aware, or should have reasonably become aware, of the decrease in quantity. If the Contractor makes a request, the actual pay quantity of this item of Work performed may be paid for by adjusting the Contract unit price, subject to the following conditions: (i) the Contractor can demonstrate to the satisfaction of the Engineer that an adjustment in Contract unit price is warranted; and (ii) the adjusted unit prices are reasonable and approved by the Engineer. Such adjustment of the Contract unit price shall be the positive or negative difference between the Contract unit price and the actual unit cost of the total pay quantity of the item, including Fixed Costs. At the sole option of the Engineer, payment for the actual quantity of Work shall be made by mutual acceptance of a lump sum amount or cost of Work based on Time and Materials; such unit costs shall include an appropriate portion of the Contractor's allowable overhead and profit.

(1) Payment for the actual pay quantity of such item of Work shall in no case exceed the payment that would have been made for the performance of 75 percent of the approximate quantity of such item at the Contract unit price.

B. Eliminated Items: If any Contract item of the Work is eliminated in its entirety, the Contract Sum shall be reduced by the amount bid for that Bid item, including overhead and profit. Payment shall be made to the Contractor for the actual cost incurred in connection with the eliminated Contract item if incurred prior to the date of notification in writing by the Engineer of such elimination.

1. If acceptable Material is ordered by the Contractor for an eliminated Contract item prior to the date of notification of the elimination by the Engineer, and if orders for the Material cannot be canceled, payment for the Material shall be made at the actual cost to the Contractor. In this case, the Material shall become the property of the District. If the Material can be returned to the vendor and if the Engineer so directs, the Material shall be returned, and the Contractor shall be paid for the actual cost for returning the Material.
2. The actual costs to be paid by the District to the Contractor in accordance with this Article will be computed in accordance with Article 3.07.02. Cost of Extra Work, which shall include an allowance for overhead and profit.
3. In the event the Contractor and the District are unable to agree on the credit amount due, the District shall unilaterally determine the amount.

C. Supplemental Contract Items: Items noted as “Supplemental” in the Proposal may be deleted entirely or in part at the sole discretion of the District. The provisions of Articles associated with Allowable Quantity Variations or Eliminated Items shall not apply to Supplemental Contract Items.

3.07. Change in Contract Price(s)

3.07.01. General

A. The Contract Price(s) constitutes the total compensation payable to the Contractor for performing the Work. All duties, responsibilities, and obligations assigned to or undertaken by the Contractor to perform the Work shall be at the Contractor’s expense without a change in the Contract Price(s).

B. The Contract Price(s) shall only be changed by a fully executed Change Order or by a DCO. Any requests by the Contractor for an increase or decrease in the Contract Price(s) shall be based on a written Change Order Request (COR) delivered promptly by the Contractor to the Engineer by no later than seven (7) Days after the date of the occurrence of the event giving rise to the request and stating the general nature of the request, unless the time is modified in the Special Provisions.

C. The COR by the Contractor shall be substantiated within 30 Days after submittal of the written notice with a cost proposal quantifying the costs and schedule impacts associated with the request with supporting data, unless the Engineer allows an additional period of time for the Contractor to ascertain more accurate data in support of the request, or unless the time is modified in the Special Provisions.

D. No request by the Contractor for an adjustment in the Contract Price(s) shall be valid if not submitted timely in accordance with this Article; failure to submit a timely and fully documented request shall constitute a waiver of any future requests or Claims for additional compensation or a time extension related to such Work.

E. Any request for an adjustment in the Contract Price(s) and/or in the Contract Time(s) shall include, but shall not be limited to:

1. a written description of the event or issue or combination of events/issues that gave rise to the request, including and without limitation, the start date of the event or events and the anticipated or actual finish date;

2. a written description of the legal basis of the request with specific references to the Contract provisions upon which the Contractor relies;

3. an identification of the Work (e.g., activities with the current updated Detailed Progress Schedule and similar information) affected by the event(s);

4. relevant correspondence and other information related to and supporting entitlement;

5. written documentation pursuant to Article 3.07.02. Cost of Extra Work through 3.07.05. Compensation for Time Extension related to pricing of the requested change;

6. a written description of the effect of the request on the progress of the Work;

7. a detailed schedule analysis based on the most current Detailed Progress Schedule that identifies the critical and/or controlling portions of the Work impacted by the change and the anticipated dates of the impact;

8. the specific number of Days of time extension requested for any impacted Contract Time(s);

9. a written proposal for any additional compensation being requested that would fully compensate the Contractor for all costs of acceleration of the related Work needed to overcome the associated Delay, if any; and

10. a written statement from the Contractor that the proposed adjustment is the entire adjustment of the Contract Price(s) and/or of the Contract Time(s).

F. The Engineer shall review the Contractor's COR within 14 Days after receipt of the cost proposal and supporting documents, and render its determination in writing, unless the time is modified in the Special Provisions, Work, and Contract Time. If the Engineer requires a longer period for its determination, it will provide written notice to the Contractor within the initial 14-Day period. If the Engineer does not issue a determination within the initial or extended period, the request shall be deemed rejected and the provisions of Article 3.11. Disputes shall apply.

G. The value of any Work covered by a PCO, Change Order, DCO, or any request for an increase or decrease in the Contract Price(s) shall be determined in one of the following ways:

1. Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved; or

2. By mutual acceptance of a lump sum, which shall follow the basic pricing rules set forth under Article 3.07.02. Cost of Extra Work and include an allowance for overhead and profit in accordance with Article 3.07.02.G. Contractor's Fee; unless otherwise approved by the Engineer; or

3. On the basis of the cost of Work (determined as provided in Articles 3.07.02. Cost of Extra Work and in 3.07.04. Special Services) plus a Contractor's fee for overhead and profit (determined as provided in

Article 3.07.02. Cost of Extra Work). For this payment basis, the Engineer will direct the Contractor to proceed on a Time-and-Materials basis and may also establish a Not-to-Exceed (NTE) budget for the change.

3.07.02. Cost of Extra Work

A. The term "cost of extra Work" means the sum of all direct costs necessarily incurred and paid by the Contractor or estimated to be incurred and paid by the Contractor for labor, Materials, and Equipment in the proper performance of Work, plus a markup for overhead and profit as defined in this Article. Except as otherwise may be agreed to in writing by the District, such costs shall be in amounts no higher than those prevailing in the locality of the Project.

B. Labor: The direct cost of labor used in performing Work by the Contractor, a Subcontractor, or by other forces will be the sum of the following:

1. The actual or estimated wages paid plus any employer payments to or on behalf of workers for fringe benefits, including health and welfare, pension, vacation, and similar purposes.

2. There shall be added to the actual or estimated wages as defined above a percentage set forth in the latest "Labor Surcharge and Equipment Rental Rates" in use by the California State Department of Transportation, which is in effect on the date upon which the Work is accomplished. This percentage shall constitute full compensation for all payments imposed by State and Federal laws, including, but not limited to, workers' compensation insurance and Social Security payments.

3. The amount paid or estimated to be paid for subsistence and travel required by collective bargaining agreements.

4. For Equipment operators, payment for the actual or estimated cost of labor and subsistence or travel allowance shall be made at the rates paid, or estimated to be paid, by the Contractor to other workers operating similar Equipment already on the Work, or in the absence of such labor, established by collective bargaining agreements for the type of workers and location of the extra Work, whether or not the operator is actually covered by such an agreement. A labor surcharge shall be added to the cost of labor described herein in accordance with the provisions in this Article, which surcharge shall constitute full compensation for payments imposed by State and Federal laws, and all other payments made to on behalf of workers other than actual or estimated wages.

C. Materials: The direct cost of Materials used or to be used in performing Work shall be the actual or estimated cost to the purchaser, including sales tax, whether the Contractor or a Subcontractor, from the Supplier thereof, except as the following are applicable:

1. Trade discounts available to the purchaser shall be credited to the District notwithstanding that such discounts may not have been taken by the Contractor.

2. For Materials secured other than by a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid, or estimated to be paid, to the actual Supplier as determined by the Engineer. Markup, except for actual or estimated costs incurred in the handling of such Materials, shall not be allowed.

3. Payment for Materials from sources owned wholly or in part by the purchaser shall not exceed the price paid, or estimated to be paid, by the purchaser for similar Materials from said sources on extra Work items or the current wholesale price for such Materials delivered to the worksite, whichever price is lower.

4. The Contractor is responsible for and shall not be compensated for any increases in Material costs beyond those included in its Contract Price(s), including, but not limited to, sudden market changes or unexpected Material price increases.

5. If, in the opinion of the Engineer, the estimated or actual cost of Materials is excessive or the Contractor does not furnish satisfactory evidence of the cost of such Material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned delivered to the worksite, less any trade discount. The District reserves the right to furnish Material for the extra Work; no Claim shall be made by the Contractor for costs and profit on such Material.

D. Equipment: The Contractor shall be paid for the use of Equipment at the rental rate listed for such Equipment specified in the current edition of the Department of Transportation publication entitled, *Labor Surcharge and Equipment Rental Rates*, which is in effect on the date upon which the Work is accomplished. Such rental rates shall be used to compute payments for Equipment whether the Equipment is under the Contractor's control through direct ownership, leasing, renting, or under another method of acquisition. The rental rate to be applied for use of each item of Equipment shall be the rate resulting in the least total cost to the District for the total period of use. If it is deemed necessary by the Contractor to use Equipment not listed in the foregoing publication, an equitable rental rate for the Equipment will be established by the Engineer. The Contractor shall furnish cost data, which might assist the Engineer in establishing the rental rate.

1. The rental rates paid, or estimated to be paid, as above provided shall include the cost of fuel, oil, lubrication supplies, small tools, necessary attachments, repairs, and maintenance of all kinds; depreciation, storage, insurance, and all incidentals, unless the Equipment is idle due to a Delay. Operators of Equipment will be separately paid for as provided in paragraph 4 of Article 3.07.02.B. Labor.

2. All Equipment shall be in good working condition and suitable for the purpose for which the Equipment is to be used.

3. Before construction Equipment is used on the extra Work, the Contractor shall plainly stencil or stamp an identifying number thereon at a conspicuous location and shall furnish to the Engineer, in duplicate, a description of the Equipment and its identifying number.

4. Unless otherwise specified, manufacturer ratings and manufacturer-approved modifications shall be used to classify Equipment to determine applicable rental rates. Equipment that has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

5. Individual pieces of Equipment or tools having a replacement value of $500 or less, whether or not consumed by use, shall be considered to be small tools; no payment shall be made.

6. Compensation for idle time of Equipment shall include the ownership costs only, not including operating costs, in accordance with the following:

   a. The Equipment rental rate shall be based on the delay factor in the edition of the Department of Transportation's publication entitled, *Labor Surcharge and Equipment Rental Rates*, in effect on the date the Work is accomplished.

   b. Daily number of payable hours equals the normal working hours during the delay, not to exceed eight (8) hours per Day or 40 hours per week.

   c. Delay Days exclude nonworking Days.

   d. Markups are not added.

E. Owner-Operated Equipment: When owner-operated Equipment is used, or anticipated to be used, to perform Work and is to be paid for as extra Work, the Contractor shall be paid for the Equipment and for the operator as follows:

1. Payment for the Equipment shall be made in accordance with the provisions in Contractor's Article 3.07.02.D. Equipment.

2. Payment for the cost of labor and subsistence or travel allowance shall be made at the rates paid, or estimated to be paid, by the Contractor to other workers operating similar Equipment already on the Project, or, in the absence of such other workers, at the rates for such labor established by collective bargaining agreement for the type of worker and location of the Work, whether or not the owner-operator is actually covered by such an agreement. A labor surcharge shall be added to the cost of labor

described herein in accordance with the provisions in paragraph 2 of Article 3.07.02.B. Labor.

3. Markup for Equipment rental and labor as provided in Article 3.07.02.G. Contractor's Fee shall be added to the direct cost of Equipment rental and labor, computed as provided herein.

F. Equipment Time: The rental time to be paid, or estimated to be paid, for Equipment on the Work shall be the time the Equipment is in productive operation on the Work being performed and shall include the time required to move the Equipment to the new location and return it to the original location or to another location, requiring no more time than that required to return it to its original location. Moving time shall not be paid if the Equipment is used on Work other than the extra Work. Loading and transporting costs shall be allowed, in lieu of moving time, when the Equipment is moved by means other than by its own power. No payment shall be made for loading and transporting costs when the Equipment is used at the site of the extra Work on other than the extra Work. The following shall be used in computing the rental time of Equipment on the Work:

1. When hourly rates are listed, any part of an hour less than 30 minutes of operation shall be considered to be a half hour of operation, and any part of an hour in excess of 30 minutes will be considered one (1) hour of operation.

2. When daily rates are listed, operation for any part of a day less than four (4) hours shall be considered to be a half Day of operation.

3. Rental time will not be allowed while Equipment is inoperative due to breakdowns or due to Contractor-caused Delays.

G. Contractor's Fee

a. Work ordered on the basis of Time and Materials or forward-priced lump sum will be paid for at the estimated or actual and necessary cost as determined by the Engineer, plus allowances for overhead and profit; said allowances shall constitute the Contractor's Fee. For extra Work involving a combination of increases and decreases in the Work, the estimated or actual and necessary cost will be the arithmetic sum of the additive and deductive costs.

b. To the total of the direct costs computed as provided above, there will be added a markup for overhead and profit as specified below. The markup shall constitute full compensation for all direct and indirect overhead costs and profit, which shall be deemed to include all items of expense not specifically listed above as direct costs. No separate allowance or itemization for overhead costs shall be allowed. The following list, though not intended to be comprehensive, indicates the types of costs that are

included in the markup for overhead and profit for all Change Orders, including Time-and-Material Work:

i. Field and home office personnel, including, but not limited to, principals, project managers, superintendents, supervisory foremen, estimators, project engineers, detailers, draftspersons, schedulers, consultants, watchpersons, payroll clerks, administrative assistants, and secretaries.

ii. All field and home office expenses, including, but not limited to, field trailers, parking, storage sheds, office equipment and supplies, telephone service at the Site, long-distance telephone calls, fax machines, computers and software, Internet and e-mail services, temporary utilities, sanitary facilities and services, janitorial services, small tools and Equipment with a cost under $500 each, portable scaffolding, blocking, shores, appliances, job vehicles, security and fencing, conformance to all regulatory requirements, including compliance with safety regulations, safety programs and meetings, cartage, warranties, record documents, and all related maintenance costs.

iii. Administrative functions, including, but not limited to, reviewing, coordinating, distributing, processing, posting, recording, estimating, negotiating, scheduling, schedule updating and revising, expediting, surveying, engineering, drawing, detailing, revising shop Drawings, preparing record Drawings, carting, cleaning, protecting the Work, and other incidental Work related to the Change Order.

iv. All other costs and taxes required to be paid, but not included under direct costs as defined in this Article.

c. The allowance for overhead and profit shall be made in accordance with the following schedule:

Element of the Work	**Overhead and Profit Allowance**
Labor	33 percent
Materials	15 percent
Equipment	15 percent

d. Subcontractor Markup: Labor, Materials, and Equipment may be furnished by the Contractor or by a Subcontractor on behalf of the Contractor. When all or any part of the extra Work is performed by a Subcontractor, the allowance specified in the above subparagraph “c” shall only be applied to the labor, Material, and Equipment costs of the Subcontractors to which the Contractor may add no more than five (5) percent of the Subcontractor’s total cost for the extra Work. In no case shall the sum of the individual markups applied to a Change Order

exceed ten (10) percent regardless of the number of Subcontractor tiers involved in performing the Work.

e. Bond and Insurance: Only the actual cost of bond and insurance premiums required because of the Change Order, with no markup for overhead and profit, will be allowed.

3.07.03. Time-and-Materials Work

A. If an NTE budget is established by the Engineer for Time-and-Material Work, the Contractor shall notify the Engineer when the cumulative costs incurred by the Contractor for Time-and-Material Work equal 80 percent of the preestablished budget. The Contractor may not be compensated for such Work that exceeds the NTE budget if the Contractor fails to provide the required notice before exceeding 80 percent of the established budget.

B. If Work being performed on a Time-and-Material basis is expected to take more than one (1) month, the Engineer may, in its sole discretion, issue an allowance Change Order to allow timely payment to the Contractor for undisputed Work performed. The dollar value of the Change Order shall be an allowance amount equal to or greater than the NTE. Any amount remaining after all Time-and-Materials sheets are priced shall revert to the District.

C. Cost of Work Documentation: For Time-and-Material Work, the Contractor shall furnish the Engineer extra work reports on a daily basis covering the direct costs of labor and Materials and charges for Equipment whether furnished by the Contractor, Subcontractor, or by other forces. The District shall provide the extra daily work report forms to the Contractor. The Contractor or an authorized agent shall sign each daily extra work report. The daily extra work report shall provide names and classifications of workers and hours worked; size, type, and identification number of Equipment; and the hours operated. Copies of certified payrolls and statements of fringe benefits shall substantiate labor charges. Valid copies of vendor invoices shall substantiate Material charges.

D. The Engineer shall make any necessary adjustments. When these reports are agreed upon and signed by both parties, they shall become the basis of payment for the undisputed Work performed but shall not preclude subsequent adjustment based on a later audit.

E. The Contractor shall inform the Engineer when extra Work will begin so that the District inspector can concur with the daily extra work reports. Failure to conform to these requirements may impact the Contractor's ability to receive proper compensation.

F. The Contractor shall price and submit to the Engineer in both electronic format and in hard copy a native Microsoft Excel-based cost summary of the daily extra work reports on no less than a weekly basis. This summary report shall total all costs incurred to date and compare them to the NTE amount with a percent-spent-to-date amount prominently displayed. The Contractor shall be fully

responsible for tracking the costs and for notifying the Engineer when the costs exceed 80 percent of the NTE value. The summary report shall not be considered a substitute for the notice required in this Section.

3.07.04. Special Services

A. Special services are defined as that Work characterized by extraordinary complexity, sophistication, or innovations, or a combination of the foregoing attributes that are unique to the construction industry. The following may be considered by the Engineer in reviewing or approving estimates for payment for special services:

1. When the Engineer and the Contractor, by agreement, determine that a special service is required that cannot be performed by the forces of the Contractor or by those of any of its Subcontractors, the special service shall be performed by an entity especially skilled in the Work to be performed. After validation of invoices and determination of market values by the Engineer, invoices for special services based upon the current fair market value thereof may be accepted without complete itemization of labor, Materials, and Equipment rental costs if backup provided is acceptable to the Engineer.

2. When the Contractor is required to perform Work necessitating special fabrication or machining process in a fabrication or a machine shop facility away from the job site, charges for that portion of the Work performed at the off-site facility may, by agreement, be accepted as a special service, and accordingly, invoices for the Work may be accepted without detailed itemization at the Engineer's discretion.

B. All invoices for special services shall be adjusted by deducting all trade discounts offered or available, whether the discounts were taken or not. In lieu of the allowances for overhead and profit on labor, Materials, and Equipment specified herein, a single allowance of ten (10) percent will be added to invoices for special services.

3.07.05. Compensation for Time Extensions

A. Adjustments in compensation for adjustments in Contract Time(s) shall be allowed only for causes in Article 3.08.01. Change in Contract Time(s), General, paragraphs "E.1." through "E.5." computed in accordance with Article 3.07.02. Cost of Extra Work. No adjustments in compensation shall be allowed when District-caused Delays to a Controlling Item of Work and Contractor-caused Delays to a Controlling Item of Work occur concurrently or for causes stated in Article 3.08. Change in Contract Time(s).

3.08. Change in Contract Time(s)

3.08.01. General

A. The Contract Time(s) for the Contract is specified in the Special Provisions. The Contract Time(s) shall only be changed or adjusted by a fully executed Change Order or by a DCO.

B. Notice and Substantiation: Any request for a change in the Contract Time(s) shall comply with the notice and substantiation requirements shown in Article 3.07. Change in Contract Price(s). No request for an adjustment in the Contract Time(s) will be valid if not submitted in accordance with the requirements of this Article.

C. The Contract Time(s) shall only be extended when a Delay occurs that impacts a Controlling Item of Work as shown in the most recently accepted Detailed Progress Schedule. Time extensions shall be allowed only if the cause is beyond the control and without the fault or negligence of the Contractor. Time extensions may also be allowed when District-caused delays to a Controlling Item of Work and Contractor-caused Delays to a Controlling Item of Work occur concurrently. The Contractor shall be notified if the Engineer determines that a time extension is not justified.

D. Types of Delays are defined below:

1. Compensable Delay: An Excusable Delay for which the Contractor is entitled to receive additional compensation for delay-related costs if a) the delay was caused by the District or within its control or responsibility; b) the Delay results in additional costs incurred by the Contractor; and c) the Contractor has not assumed the risk of the Delay.

2. Concurrent Delay: Two or more independent causes of Delay to the Contractor's performance of Work that meet all of the following criteria: a) the Delays occur at the same time during all or a portion of the delay period being considered; b) the Delays directly prevent the Contractor from performing a Controlling Item of Work; c) each Delay would have delayed the Contractor's performance of a Controlling Item of Work even in the absence of any of the other Delays;

3. Excusable Delay: A Delay to the completion of a specified Contract Time(s) that is due to causes that are unforeseeable and beyond the control and responsibility of the Contractor for which a time extension may be granted.

4. Inexcusable Delay: A Delay to the completion of a specified Contract Time(s) that was reasonably foreseeable or within the control and responsibility of the Contractor for which no compensation or time extension will be granted.

5. Non-compensable Delay: An Excusable Delay for which the Contractor may be entitled to an extension of time without additional compensation for delay-related costs.

E. The Contract Time(s) shall be extended in an amount equal to time lost due to Excusable Delays if a request is made thereof as provided in this Article. An extension in Contract Time(s) shall only be granted for Days on which the Contractor is prevented from proceeding with at least 75 percent of the normal labor and Equipment force actually engaged on the Work by occurrences or conditions resulting immediately therefrom that impact a Controlling Item of Work as determined by the Engineer. Causes of such Delays shall include:

1. changes;

2. failure of the District to furnish access, right of way, completed facilities of related projects, Drawings, Material, Equipment, or services for which the District is responsible;

3. survey error by the District;

4. suspension of Work pursuant to Article 5.06. Temporary Suspension of Work, paragraph C;

5. differing site conditions;

6. occurrences of a severe and unusual nature, including, but not limited to, acts of God, wars, riots, insurrections, fires, and excusable inclement weather. An “act of God” is defined as an earthquake, flood, cloudburst, cyclone, or other cataclysmic phenomena of nature beyond the power of the Contractor to foresee or to make preparation for in defense against, but does not include ordinary inclement weather; and

7. act of the public enemy, act of another governmental entity, act of a public utility or other third party outside the control of the District, epidemic, quarantine restriction, freight embargo, strike, or labor dispute. A delay to a Subcontractor or Supplier due to the above circumstances will be taken into consideration for extensions to the time of completion.

3.08.02. Inclement Weather

A. Inclement weather is any weather condition, the duration of which varies in excess of the average conditions expected, that is unusual for the particular time and place where the Work is to be performed or that could not have been reasonably anticipated by the Contractor as provided for in the Special Provisions.

B. The Contract Time(s) shall only be extended for Days in excess of the number of Days of inclement weather where the Contractor is prevented by inclement weather, or by conditions resulting immediately therefrom, from proceeding with

at least 75 percent of the normal labor and Equipment force engaged on Controlling Items of Work as shown on the current, updated, and accepted Detailed Progress Schedule.

C. Should the Contractor prepare to begin Work at the regular starting time at the beginning of any regular work shift on any Day on which inclement weather, or the conditions resulting from the weather, prevents Work from beginning at the usual starting time and the crew is dismissed as a result thereof, the Contractor shall be entitled to a one (1)-Day extension, whether or not conditions change thereafter during that Day and the major portion of the Day could be considered suitable for such construction operations.

D. The Contractor shall include a calendar in all of its Progress Schedules that includes nonworking Days for the number of inclement weather Days specified in the Special Provisions. This calendar shall be used for all weather-sensitive Work.

E. No extension in the Contract Time(s) due to inclement weather shall be considered until after the number of Days of inclement weather Days specified in the Special Provisions has been reached. No reduction in Contract Time(s) shall be made if the number of Days of inclement weather is not reached.

F. The Contractor shall not be entitled to additional compensation for Delays caused by inclement weather.

3.09. Differing Conditions

A. If any Work involves digging trenches or other excavations below the surface, the Contractor shall promptly, and before the following conditions are disturbed, notify the District in writing of any:

1. Material that the Contractor believes may be a Regulated Material that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law;

2. subsurface or latent physical conditions at the site differing from those indicated in this Contract (Type I Differing Site Condition); and

3. unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered, and generally recognized as inherent in Work of the character provided for in the Contract (Type II Differing Site Condition).

B. The Contractor’s written notice shall inform the District as to how such conditions affect its Work and shall recommend methods to overcome such conditions.

C. Differing Conditions shall not include:

1. all that is indicated or reasonably interpreted from the Contract Documents or reference documents;

2. all that could be seen on the Project site;

3. conditions that are materially similar to or characteristically the same as those indicated or described in the Contract Documents or reference documents; and

4. conditions where the location of a building component is in the proximity where indicated in or reasonably interpreted from the Contract Documents or reference documents.

D. The District will promptly investigate the condition. If it finds that the conditions do materially so differ or do involve Regulated Material and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work, the District may issue a Change Order or a DCO under the procedures described in this Contract. For Regulated Material, the District reserves the right to use other forces for exploratory work to identify and determine the extent of such material and for removing Regulated Material from such areas.

E. In the event that a dispute arises between the District and the Contractor on whether the conditions materially differ or on the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any scheduled completion date provided for by this Contract but shall proceed with all Work to be performed under the Contract. The Contractor shall retain any and all rights provided either by this Contract or by law that pertain to the resolution of disputes and protests between the contracting parties.

F. The Contractor shall be responsible for the safety and protection of the affected area of the Work for the duration of the District's investigation of potential differing conditions.

3.10. Cost Reduction Incentive

A. The Contractor may submit to the Engineer, in writing, proposals for modifying the Drawings, Specifications, or other requirements of the Contract for the sole purpose of reducing the total cost of construction (known as value engineering change proposals) as provided for in State Specifications Section 4-1.07B wherein the words "State" and "Department" shall mean the District.

3.11. Disputes

A. Claim: A written demand by the Contractor for an adjustment in the Contract Price(s) or in the Contract Time(s), or both, that is submitted in accordance with the requirements of the Contract Documents. Within the context of this Contract, a Claim is associated with a dispute as described in Articles 3.11. Disputes through 3.13. Dispute Review Board.

B. It is the intention of this Article that disputes between parties arising under and by virtue of the Contract be brought to the attention of the Engineer at the earliest possible time in order that matters may be resolved, if possible, or other appropriate action promptly taken. Disputes are divided into four categories: (i) protest, (ii) notice, (iii) potential Claim, and (iv) Claim. During the course of the Project and up to receiving the proposed final estimate, the Contractor must submit a Contract dispute in the form of a written notice, protest, potential Claim, or Claim to the Engineer.

C. Any disputes from Subcontractors or Suppliers that the Contractor passes through to the District for review and consideration shall be certified in the same manner the Contractor would certify its own disputes.

3.11.01. Protest

A. If the Contractor considers any Work demanded to be outside of the requirements of the Contract, or considers any records or ruling or act or omission of the Engineer to be unfair, the Contractor shall immediately, upon such Work being demanded or such record or ruling being made, ask in writing for written instructions or decisions, whereupon the Contractor shall proceed without delay to perform the Work or to conform to the record or ruling and, within seven (7) Days after date of receipt of the written instructions or decisions, shall file a written protest with the Engineer stating clearly in detail the basis of the protest. Except for such protests as are made of record in the manner herein specified and within the time limit stated, the records, rulings, instructions, decisions, and acts or omissions of the Engineer shall be final and conclusive. Instructions and decisions of the Engineer contained in letters transmitting Drawings to the Contractor shall be considered as written instructions and decisions subject to protest as herein provided.

3.11.02. Notice of Potential Claims

A. The Contractor is not entitled to additional compensation for any cause unless the Contractor submits to the District a written Notice of Potential Claim as hereinafter specified.

B. The written Notice of Potential Claim must set forth the reasons for which the Contractor believes additional compensation and/or adjustments in the specified Contract Time(s) will or may be due, the nature of the costs and/or time involved, and, insofar as possible, the amount of the potential Claim. This notice as above required must have been submitted to the District before the Contractor performs the Work giving rise to the potential Claim for additional compensation and/or time, if based on an act or failure to act by the District, or in all other cases, within seven (7) Days after the happening of the event, thing, or occurrence giving rise to the potential Claim.

C. The Notice of Potential Claim shall be certified as required in Article 3.12. Claims.

D. Compliance with the foregoing shall not be a prerequisite to any Claim that is based on differences in measurement or errors of computations as to Contract quantities.

3.12. Claims

A. Claims by the Contractor must be submitted to the Engineer before the date of final payment. The Claim shall relate directly to the circumstances addressed in the Notice of Potential Claim and may not raise new issues or circumstances that were not identified in the Notice of Potential Claim. Claims shall be in writing, shall specify the basis for each Claim, shall refer to the applicable provision or provisions of the Contract, and shall show the method of computation and the actual amount claimed. The Claim shall include documents necessary to substantiate the Claim and to establish liability, causation, and damages. All other factual data, including documentation of actual costs pertaining to that Claim, shall be submitted. Each issue contained in a Claim must include documentation, including background, chronology, Contractor's position, supporting documentation of merit, supporting documentation of damages, schedules (if appropriate), and productivity exhibits (if appropriate). The Claim shall clearly state that it is a Claim being submitted under this Article. Failure to submit a written Claim within the 30-Day period waives any right to recover compensation or to an extension in the Contract Time(s) due to the issues referenced in the Notice of Potential Claim. In addition to the foregoing, to substantiate any Claim, the Contractor shall provide the information required by Article 3.07. Change in Contract Price(s).

B. Pricing of Claims shall be consistent and compliant with the requirements herein for adjustments in the Contract Price(s) and adjustments in the Contract Time(s).

C. Claims must be certified using the following language:

I,_____, BEING THE _____ (MUST BE AN OFFICER) OF_____ (CONTRACTOR), DECLARE UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA, AND DO PERSONALLY CERTIFY AND ATTEST THAT: I HAVE THOROUGHLY REVIEWED THE ATTACHED CLAIM FOR ADDITIONAL COMPENSATION AND/OR EXTENSION OF TIME FOR WORK PERFORMED BY THE CONTRACTOR AND/OR ANY SUBCONTRACTOR CLAIMS THAT ARE BEING PASSED THROUGH TO THE DISTRICT, AND KNOW ITS CONTENTS, AND SAID CLAIM IS TRUTHFUL AND ACCURATE; THAT THE AMOUNT REQUESTED ACCURATELY REFLECTS THE CONTRACT ADJUSTMENT FOR WHICH THE DISTRICT IS LIABLE; AND, FURTHER, THAT I HAVE REVIEWED AND AM FAMILIAR WITH BOTH CALIFORNIA PENAL CODE SECTION 72 AND CALIFORNIA GOVERNMENT CODE SECTION 12650, ET SEQ., PERTAINING TO FALSE CLAIMS, AND FURTHER KNOW AND UNDERSTAND THAT SUBMISSION OR CERTIFICATION OF A FALSE CLAIM MAY LEAD TO FINES, IMPRISONMENT, AND/OR OTHER SEVERE LEGAL CONSEQUENCES.

D. The District, or its authorized representatives, shall have access, upon reasonable notice during normal business hours, to Contractor and Subcontractor books, documents, and accounting records, including, but not limited to, Bid worksheets, Bids, Subcontractor Bids and proposals, estimates, cost accounting data, accounting records, payroll records, time sheets, canceled checks, profit and loss statements, balance sheets, Project correspondence, including, but not limited to, all correspondence between the Contractor and its sureties and Subcontractors/vendors, Project files, scheduling information, and other records of the Contractor and all Subcontractors directly or indirectly pertinent to the Work of the Project; original as well as changed and claimed extra Work to verify and evaluate the accuracy of cost and pricing data submitted with any Claim for which additional compensation has been requested or Notice of Potential Claim has been tendered. Such access shall include the right to examine and audit such records and make excerpts, transcriptions, and photocopies at the District's cost.

E. The parties agree that in the event the Contractor or any Subcontractor fails to comply with this Article, the Claim will not be considered by the District. The Contractor agrees to impose upon its Subcontractors by appropriate subcontract provisions the obligations of this Article of the Standard Provisions.

F. No Claim shall be considered where there has been a failure to comply with the requirements relative to protest and Notice of Potential Claim as written elsewhere in these Specifications.

G. The presentation of a Claim shall be an express condition precedent to the Contractor's recourse to (i) informal conference; (ii) nonbinding mediation; and (iii) judicial arbitration to resolve disputes on construction Claims of three hundred seventy-five thousand dollars ($375,000) or less or court action upon the Contract for Claims in excess of three hundred seventy-five thousand dollars ($375,000) in compliance with Public Contract Code Section 20104 et seq.

3.12.01. Claims Less Than Fifty Thousand Dollars

A. For Claims less than fifty thousand dollars ($50,000), the Engineer shall respond in writing to any written Claim within 45 Days of receipt of the Claim or may request in writing within 30 Days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or Claims the District may have against the Contractor.

B. If additional information is thereafter required, it shall be requested and provided pursuant to this Article upon mutual agreement of the Engineer and of the Contractor.

C. The Engineer's written response to the Claim, as further documented, shall be submitted to the Contractor within 15 Days after receipt of further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information, whichever is greater.

3.12.02. Claims from Fifty Thousand Dollars to Three Hundred and Seventy-Five Thousand Dollars

A. For Claims greater than or equal to fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the Engineer shall respond in writing to any written Claims within 60 Days of receipt of the Claim or may request in writing within 30 Days of receipt of the Claim any additional documentation supporting the Claim or relating to defenses or Claims the District may have against the Contractor.

B. If additional information is thereafter required, it shall be requested and provided pursuant to this Article upon mutual agreement of the Engineer and of the Contractor.

C. The Engineer's written response to the Claims, as further documented, shall be submitted to the Contractor within 30 Days after receipt of further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

3.12.03. Informal Conferences

A. If the Contractor disputes the Engineer's written response or if the Engineer fails to respond within the time prescribed, the Contractor may so notify the Engineer in writing either within 15 Days of receipt of the Engineer's response, or within 15 Days of the Engineer's failure to respond within the time prescribed respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon such demand, the Engineer shall schedule a meet-and-confer conference within 30 Days for settlement of the dispute.

B. If, following the meet-and-confer conference, the Claim or any portion remains in dispute, the Contractor may file a Claim pursuant to California Government Code, Title 1, Division 3.6, Part 3, Chapter 1 commencing with Section 900 and Chapter 2 commencing with Section 910. For purposes of those provisions, the running of the period of time within which a Claim must be filed shall be tolled from the time the Contractor submits its written Claim until the time the Claim is denied, including any period of time utilized by the meet-and-confer process conference.

3.12.04. Civil Actions

A. The following procedures are established for all civil actions filed to resolve Claims:

1. Within 60 Days, but no earlier than 30 Days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 Days by both

parties of a disinterested third person as mediator, shall be commenced within 30 Days of the submittal, and shall be concluded within 15 Days from the commencement of the mediation unless a time requirement is extended upon a good-cause showing to the court.

2. If the matter remains in dispute, the parties agree to resolve their dispute by binding judicial arbitration pursuant to the Local Civil Rules of the County of Santa Clara Superior Court; notwithstanding, anything in such Local Civil Rules, the parties agree that the Civil Discovery Act of 1986 (Code of Civil Procedure, Title 3, Part 4, Chapter 3, Article 3 commencing with Section 2016 of Chapter 3 of Title 3 of Part 4 of Code of Civil Procedure) shall apply to any proceeding brought under this subdivision.

B. In addition to the Code of Civil Procedure, Part 3, Title 3, Chapter 2.5 commencing with Section 1141.10, (i) arbitrators shall, when possible, be experienced in construction law; and (ii) any party appealing an arbitration award who does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, also pay the attorney's fees on appeal of the other party.

3.13. Dispute Review Board

A. When specified in the Special Provisions that a Dispute Review Board (DRB) process is required, the DRB process shall be in accordance with these Specification Provisions.

3.13.01. General

A. A DRB is to assist in and facilitate the avoidance and timely, impartial resolution of disputes.

B. All disputes referred to the DRB shall be subject to the dispute resolution process herein described as a condition precedent to initiating a subsequent dispute resolution process, such as arbitration or litigation, for that dispute.

C. Except as explicitly otherwise provided, all disputes that are actionable under the provisions of the prime Contract between the District and the Contractor may be referred to the DRB.

D. The DRB shall be utilized when dispute or potential Claim resolution at the Project level is unsuccessful. The DRB shall function until the Day of Acceptance of the Work by the District Board of Directors, at which time the work of the DRB will cease except for completion of unfinished dispute hearings and reports.

E. The Contractor shall include in all subcontracts that Subcontractors and Suppliers of any tier (i) agree to submit Subcontractor Claims to the Contractor in a proper form and in sufficient time to allow processing by the Contractor in conformance with the DRB resolution specifications; (ii) agree to be bound by the

terms of the DRB provisions to the extent applicable to Subcontractor Claims; (iii) agree that, to the extent a Subcontractor Claim is involved, completion of all steps required under these DRB Special Provisions shall be a condition precedent to pursuit by the Subcontractor of other remedies permitted by law, including without limitation of a lawsuit against the Contractor; and (iv) agree that the existence of a dispute resolution process for disputes involving Subcontractor Claims shall not be deemed to create any Claim, right, or cause of action by any Subcontractor or Supplier against the District.

F. The DRB reports shall not be binding on the District or on the Contractor and shall be admissible in subsequent dispute resolution proceedings.

G. Immediately after award of the Contract, the District and the Contractor shall meet and discuss and establish the qualifications upon which nominees for the DRB are to be evaluated and jointly select prospective nominees.

H. The District, the Contractor, and the DRB shall execute an agreement similar to the Three Party Agreement form included as an appendix to these Specifications. If there are any conflicts between the provisions of that agreement and these Specifications, the provisions of that agreement shall take precedence.

I. The District and the Contractor shall each bear their respective in-house costs and costs of providing those DRB-related services for which responsibility has been allocated herein. The cost of the DRB panelists shall be split evenly between the Contractor and the District in the manner as described in paragraph "J" in this Article.

J. The Contractor shall pay the full amount of any invoice or costs incurred from the DRB members in accordance with and as set forth in the DRB agreement and in these Specifications. The Contractor shall be reimbursed for 50 percent of these services utilizing the DRB Bid item, or Contract Change Order if no Bid item is specified.

3.13.02. DRB Qualifications

A. Board members shall be experienced in the interpretation of Contract Documents and the resolution of construction disputes and in the type of construction to be performed.

B. The following definitions apply for the purpose of setting forth experience and disclosure requirements.

1. Party directly involved: The District or the Contractor of this Project.

2. Contractor includes all joint-venture partners individually.

3. Party indirectly involved: The construction manager, designers, architects, engineers, or other professional service firms or consultants,

joint-venture partners, Subcontractors of any tier, and Suppliers on this Project.

4. Financial ties: Any ownership interest, loans, receivables, or payables.

C. Eligibility

1. Direct Employment

a. Current employees of any of the parties directly or indirectly involved are prohibited from serving as Board members.

b. Prospective Board members who were past employees of one of the parties directly involved must obtain permission from the other party prior to appointment.

c. Previous, direct employment by one of the parties indirectly involved must be disclosed.

2. Consulting Assignments

a. Individuals who are employed in a consulting capacity by any of the parties directly involved are prohibited from serving as Board members.

b. Prospective Board members who are currently employed as a consultant by one of the parties indirectly involved must obtain permission from the other party prior to appointment.

c. Previous employment as a consultant by any party directly or indirectly involved must be disclosed.

3. Financial Ties

a. Individuals with financial ties to any of the parties directly involved are prohibited from serving as Board members.

b. Current financial ties to any of the parties indirectly involved must be disclosed.

c. Previous financial ties with any party directly or indirectly involved must be disclosed.

4. Close Personal or Professional Relationships

a. Individuals with close personal or professional relationships with a key member of any party directly involved are prohibited from serving as Board members.

b. Such current relationships with a member of any party indirectly involved in the Contract must be disclosed.

c. All past personal or professional relationships with a key member of one of the parties directly or indirectly involved must be disclosed.

5. All past and current service as a Board member on projects where any of the parties directly or indirectly involved in this Contract were also involved must be disclosed.

6. No member shall have had substantial prior involvement in the Project in the judgment of the District and the Contractor.

7. Ongoing Responsibilities: While serving as a Board member on the DRB, no member shall participate in any discussion contemplating the creation of an agreement or making an agreement with any party directly or indirectly involved in the Contract regarding employment, or fee-based consulting services, or any other business arrangement after the Contract is completed.

3.13.03. Establishment of the DRB

A. The District and the Contractor shall jointly participate in the evaluation and selection of prospective nominees for the DRB.

B. The District and the Contractor shall provide to the DRB nominees a list of the construction manager, designers, architects, engineers, professional service firms, consultants, joint-venture partners, Subcontractors, and Suppliers involved or likely to be involved in the Project with a list of each party's key personnel.

C. DRB nominees shall provide the following, pursuant to the above requirements and in addition to the nominee's full name and contact information, to both parties:

1. Résumé showing construction experience qualifying the person as a DRB member.

2. Résumé showing past DRB participation, if any. List each DRB assignment separately, indicating the name and location of the Project, dates of DRB service, name of owner, name of contractor, Contract value, nominating party, if applicable, names of the other Board members, and the number of disputes heard.

3. Disclosure statement describing past, present, and anticipated relationships, including indirect relationships through the nominee's full-time employer, if any, to the Project, with all parties directly and indirectly involved in the Contract. Disclose close professional or personal relationships with key members of all of these parties.

4. Disclosure is a continuing obligation of all Board members throughout the life of the Contract.

D. The District and the Contractor shall then have three (3) weeks to solicit and receive information from prospective candidates, and another two (2) weeks to review and to jointly agree on the final selection of the three (3) members to serve on the DRB. In the event that all three (3) members were not selected from the initial pool of nominees, the process shall be repeated.

E. If the DRB Chair has not already been appointed as part of the selection process, as soon as is practicable, the Board members shall nominate the Chair and submit the nominee's résumé and request approval by the District and by the Contractor.

3.13.04. DRB Meetings

A. The DRB shall visit the Project site and meet with representatives of the parties at periodic intervals and at other times requested by the parties.

B. Each meeting shall consist of an informal discussion and a field observation of the Work in progress. The discussion and field observation shall be attended by personnel of the District and by the Contractor.

3.13.05. Dispute Resolution

A. Prior Good-Faith Negotiation

1. The District and the Contractor shall enter into good-faith negotiations to settle a dispute before referring the dispute to the DRB.

2. These good-faith negotiations shall be founded on the principle of full and timely disclosure of each party's position to the other party, including the exchange of pertinent supporting records, analyses, expert reports, and similar documentation, and shall proceed without delay following the inception of the dispute. Such good-faith negotiations may involve the solicitation and rendering of a DRB advisory opinion as described herein.

B. Dispute Referral

1. A dispute may be referred to the DRB by either the District or by the Contractor. The dispute referral shall be made in writing to the DRB Chair with a copy concurrently provided to the other Board members and to the other party.

2. If the Contract stipulates a precedent dispute resolution process prior to referral to the DRB and if one party fails to meet or adhere to the time requirements set forth under the Contract for this process, the other party may then refer the dispute to the DRB. In the event that the Contract does not specify a precedent process or specifies a precedent process

without time requirements, either party may refer the dispute to the DRB after passage of a reasonable period of time without progress toward a negotiated settlement; the DRB will determine if the dispute should be heard.

3. The dispute referral shall concisely define the nature and specifics of the dispute that are to be considered by the DRB and the scope of the recommendation requested.

4. The DRB Chair shall confer with the parties to establish a due date for delivering pre-hearing submittals, and a date, time, and location for convening the DRB hearing. Hearings shall be convened at the next periodic meeting, unless the parties agree to a shorter or longer period.

C. Pre-hearing Submittal

1. The District and the Contractor shall each prepare a pre-hearing submittal and transmit it to all three (3) members of the DRB and to the other party. The pre-hearing submittal, comprised of a position paper with such backup data as is referenced in the position paper, shall be tabbed, indexed, and the pages consecutively numbered.

2. Both position papers shall, at a minimum, contain the following:

   a. A joint statement of the dispute and the scope of the desired report placed in a prominent location. The language of this joint statement shall summarize in a few sentences the nature of the dispute. If the parties are unable to agree on the wording of the joint statement of dispute, each party's position paper shall contain both statements and identify the party authoring each statement.

   b. The basis and justification for the party's position with reference to Contract language and other supporting documents for each element of the dispute. To minimize duplication and repetitiveness, the parties may identify a common set of documents that will be referred to by both parties and submit it in a separate package.

   c. When the scope of the hearing includes quantum, the referring party shall include a schedule impact analysis and full cost details, calculated in accordance with methods set forth in the Contract. This requirement does not apply if the report is to be made for entitlement alone or for entitlement with guidelines for quantum.

3. The number of copies, distribution requirements, and time for submittal will be established by the DRB and communicated to the parties by the Chair.

D. DRB Hearings

1. The District will arrange for or will provide hearing facilities at or near the site.

2. Attendance

   a. The District and Contractor shall both limit attendance at the hearing to personnel directly involved in the dispute and participants in the good-faith negotiations that were conducted prior to submittal to the DRB except as noted below.

   b. Prior to the date established for the hearing, each party shall provide a list of proposed attendees to the DRB and to the other party. In the event of any disagreement, the DRB shall make the final determination as to who attends the hearing.

   c. Attorneys shall not participate in the hearing. Attorneys representing the parties are permitted to attend dispute hearings provided that prior permission is obtained from the other party.

   d. At DRB hearings regarding Claims by a Subcontractor, including pass-through Claims by a lower tier Subcontractor or Supplier against the Contractor that are actionable by the Contractor against the District, the Contractor shall require and ensure that each Subcontractor involved in the dispute has presented an authorized representative with actual knowledge of the facts underlying the Subcontractor Claims.

3. The conduct of the hearing shall be established by the DRB according to its operating procedures and be generally consistent with the following guidelines:

   a. The party who referred the dispute to the DRB shall present its position first, followed by the other party.

   b. Both parties shall be allowed successive rebuttals, assuring a full and adequate opportunity to present their position, and to rebut the opposing party's position, until, in the DRB's opinion, all aspects of the dispute have been fully and fairly covered.

   c. The DRB shall be fully prepared to, and may at any time, ask questions, request clarifications, or ask for additional data and/or for job records.

   d. Either party may request that the DRB direct a question to or request a clarification from the other party. The DRB shall determine at what point in the proceedings such requests may be

made and if they will be granted. In general, the DRB will not allow one party to be questioned directly by the other party.

e. In difficult or complex cases, additional hearings may be necessary to facilitate full consideration and understanding of the dispute.

f. The DRB, in its discretion, may allow introduction of arguments, exhibits, handouts, or documentary evidence that were not included in that party's pre-hearing position paper and that had not been previously submitted to the other party. In such cases, the other party will be granted time to review and prepare a rebuttal to the new material.

E. Failure to Prepare a Pre-hearing Submittal or Attend a DRB Hearing

1. In the event that either party fails to deliver a pre-hearing submittal by the date established by the DRB, the DRB shall, at its discretion, determine whether the hearing shall proceed as originally scheduled or whether additional time shall be provided and a new date established. On the final date and time established for the hearing, the DRB shall proceed with the hearing utilizing the information that has been submitted.

2. In the event that some or all of the representatives of either party fail to appear at the appointed time of a DRB hearing, the DRB shall proceed with the hearing. The hearing shall take place as if all party representatives were in attendance. The DRB shall consider all evidence brought before it and hear testimony from those party representatives who are present.

F. Use of Outside Experts

1. By the District or by the Contractor

a. A party intending to offer an outside expert's analysis at the hearing shall disclose such intention in writing to the other party and to the DRB no less than 30 Days prior to the due date for delivering the pre-hearing submittal. The expert's name and a general statement of the area of the dispute that will be covered by his/her testimony shall be included in the disclosure.

b. Upon receipt of the above disclosure, the other party shall have the opportunity to secure the services of an outside expert to address or respond to those issues that may be raised by the other party's outside expert. The disclosure requirements shall be the same as that specified above, except the time requirement is ten (10) Days.

c. The cost for securing outside expert services shall be borne by the party securing such services.

2. By the DRB

a. Prior to arranging for outside experts, the DRB shall obtain prior approval from the District and from the Contractor by providing:

1. A statement explaining why the expert assistance is needed.

2. An estimate of the cost of the expert assistance.

3. A disclosure statement in accordance with the requirements of Article 3.13.03. Establishment of the DRB herein using the criteria established in Article 3.13.02. DRB Qualifications.

4. A confidentiality statement, consistent with the DRB's agreement, executed by the proposed expert.

5. The Contractor and the District shall equally bear the cost of the services of the outside expert employed by the DRB.

G. DRB Report

1. The DRB's recommendations for resolution of a dispute will be formalized in a written report with a format as determined by the DRB and signed by all Board members. The report should consist of a concise description of the dispute, short statements of each party's position, findings as to the facts of the dispute, discussion and rationale for the recommendation(s), and the recommendation(s). The report shall be submitted concurrently to the parties as soon as possible after completion of the hearing as agreed by all parties.

2. If the DRB cannot arrive at a unanimous report, the Board shall prepare minority findings and recommendation(s), which, together with the majority findings and recommendation(s), shall comprise the DRB report. The report shall identify the issues of disagreement along with the reasons for disagreement.

3. Clarification

a. Either party may request clarification of a report within ten (10) Days following receipt of the report. Within a reasonable period of time, the DRB shall provide written clarification to both parties.

b. Requests for clarification shall be submitted in writing simultaneously to the DRB and to the other party.

c. Only one request for clarification per dispute from each party shall be allowed.

4. Reconsideration

a. Either party may request reconsideration of a report within ten (10) Days following receipt of the report when new information is obtained or developed that was not known at the time of the hearing, or when, in the party's opinion, the DRB misunderstood or failed to consider pertinent facts of the dispute. Within a reasonable period of time, the DRB shall provide written reconsideration to both parties.

b. Requests for reconsideration shall be submitted in writing simultaneously to the DRB and to the other party.

c. The Board will not entertain requests for reconsideration that amount to a renewal of a prior argument or an additional argument based on facts available at the time of the hearing.

d. Only one request for reconsideration per dispute from each party shall be allowed.

5. Acceptance

a. The District and the Contractor shall submit their written acceptance or rejection of the report concurrently to the other party and to the DRB within 14 Days of receipt of the report or following receipt of responses to requests for clarification or reconsideration.

b. Failure by either party to accept or reject within the specified period shall be construed as acceptance of the report by that party.

c. Acceptance by the District of a report on entitlement only, or on entitlement with guidelines for quantum, does not obligate the District to any particular quantum amount.

H. Advisory Opinions

1. An advisory opinion serves as a method for potentially avoiding a DRB hearing. It is not intended to replace the dispute resolution process specified herein but may be implemented as part of the good-faith negotiations conducted between the parties.

2. When mutually agreed to by the District and by the Contractor, the DRB may, at its discretion, provide an advisory opinion on any issue.

3.14 Escrow Bid Documents

A. When required by the Special Provisions, Escrow Bid Documents shall be prepared and submitted as specified herein.

3.14.01. Introduction

A. The Escrow Bid Documents shall include complete documentation of all backup information used in the preparation of the Contractor's Bid prices for this Project as described below. The Escrow Bid Documents of the successful Bidder will be held in escrow for the duration of the Contract or until all Claims are resolved, whichever is later.

B. The Escrow Bid Documents are, and shall always remain, the property of the Contractor, subject to joint review by the District and by the Contractor as provided herein.

C. The District stipulates and expressly acknowledges that the Escrow Bid Documents, as defined herein, constitute trade secrets.

1. This acknowledgement is based on the District's express understanding that the information contained in the Escrow Bid Documents is not known outside the Bidder's business, is known only to a limited extent and by a limited number of employees of the Bidder, is safeguarded while in the Bidder's possession, and is extremely valuable to the Bidder's competitors by virtue of its reflecting Bidder's construction strategies, assumptions, and intended means, methods, and techniques of construction.

2. The District acknowledges that the Bidder expended substantial sums of money in developing the information included in the Escrow Bid Documents and further acknowledges that it would be difficult for a competitor to replicate the information contained therein.

3. The District further acknowledges that the Escrow Bid Documents and the information contained therein are being provided to the District only because it is an express prerequisite to award of the Contract.

4. The District further acknowledges that the Escrow Bid Documents include a compilation of information used in the Bidder's business intended to give the Bidder an opportunity to obtain an advantage over competitors who do not know or do not use the contents of such information.

5. The District further agrees, to the fullest extent permitted by law, to safeguard the Escrow Bid Documents against disclosure and not provide as public records.

D. The successful Bidder agrees, as a condition of award of the Contract, that the Escrow Bid Documents constitute all of the information used in the preparation of its Bid for this Work and that no other Bid preparation information shall be considered in resolving disputes or Claims. The successful Bidder also agrees that nothing in the Escrow Bid Documents shall change or modify the terms or conditions of the Contract Documents.

3.14.02. Purpose

A. The Escrow Bid Documents will be used solely to assist in the settlement of disputes and Claims. They will not be used for pre-award evaluation of the Contractor's anticipated methods of construction nor to assess the Contractor's qualifications for performing the Work.

3.14.03. Format and Contents

A. The Bidders may submit the Escrow Bid Documents in their usual cost estimating format; a standard format is not required. However, sufficient detail shall be included to ensure that the Escrow Bid Documents enable complete understanding and proper interpretation of their content.

B. The Escrow Bid Documents shall clearly itemize and separate the estimated cost of performing each major activity for each Bid item contained in the Bid. Bid items should be separated into sub-items to present a detailed cost estimate. Crews, Equipment, estimated quantities, and the rate of production shall be detailed. Increments of cost shall include, but shall not be limited to, such items as direct labor, permanent Material, supplies, consumables, subcontracts, Equipment charges, and allocation of overhead and profit. Plant, Equipment, and indirect costs should be detailed. All costs included in the Bid prices must be specifically identified and the methods of application described.

C. The Escrow Bid Documents shall include all quantity takeoffs; calculations of rates of production and progress; copies of quotes from Subcontractors and Suppliers; and memoranda, narratives, and all other information used by the Bidder to arrive at the prices contained in its Bid.

3.14.04. Submittal

A. The Escrow Bid Documents shall be submitted by the three (3) apparent low Bidders in a sealed container separate from their proposal no later than 5 p.m. on the second business day following the Bid opening Day. Each container shall be clearly marked on the outside with the Bidder's name, date of submittal, Project name, and the words “Escrow Bid Documents.” Timely submission of these forms is considered material by the District.

B. The Escrow Bid Documents shall be accompanied by a separate certification, “Bid Form 10 – Escrow Bid Documents Certification of Completeness,” signed by an individual authorized by the Bidder to execute the bidding proposal and stating that the material in the Escrow Bid Documents constitutes all of the

documentary information used in preparation of this Bid, and that the Bidder's authorized individual has personally examined the contents of the Escrow Bid Documents container and has found that the documents in the container are complete.

C. The Escrow Bid Documents of the apparent successful Bidder will be opened and examined by an appointed member of the District in the presence of the Bidder before the Contract is awarded. The apparent successful Bidder and applicable Subcontractors as stated in paragraph "G" in this Article shall attend this examination.

D. This examination is to ensure that the Escrow Bid Documents are legible and complete. It will not include a review of, or constitute approval of, proposed construction methods, estimating assumptions, or interpretations of the Contract Documents. The examination will not alter any condition or term of the Contract. Should the examination indicate that any data is incomplete or missing, the Bidder shall supply the missing information within 24 hours or at such other time as is mutually agreeable.

E. The timely submittal of complete Escrow Bid Documents is an essential element of the bidding process and a prerequisite to Contract award. Failure to provide the necessary Escrow Bid Documents will be sufficient cause for the District to reject the Bid as nonresponsive.

F. If the Contract is not awarded to the apparent successful Bidder, the Escrow Bid Documents of the Bidder next to be considered for award shall be processed as described above. The Escrow Bid Documents of unsuccessful Bidders will be held in escrow until such time that they are returned unopened upon execution of the Contract by the successful Bidder.

G. If any Bidder's proposal is based upon subcontracting any part of the work, each Subcontractor whose total subcontract price exceeds the percentage of the total Bid price specified in the Special Provisions shall provide separate Escrow Bid Documents to be included with those of the Bidder. Such documents shall be opened and reviewed in the presence of the Subcontractor only in the same manner and at the same time as the review described above for the apparent successful Bidder.

H. It is the District's policy, in accordance with State law, that new Subcontractors are not accepted after award. However, if the Contractor wishes to lawfully change a Subcontractor or lawfully issue an additional subcontract for any portion of the Work after award and the District grants a specific exception to this policy, the District retains the right to require that the new Subcontractor submit Escrow Bid Documents before the new subcontract is approved.

3.14.05. Storage

A. Upon completion of the examination, receipt of the apparent successful Bidder's Escrow Bid Documents will be acknowledged in writing by the District. The

documents will be placed in escrow for the life of the Contract at an escrow firm within the greater Santa Clara County area chosen by the District. The District will pay for storage and maintenance of the Escrow Bid Documents.

3.14.06. Examination

A. The Escrow Bid Documents may be examined at any time deemed necessary by either the District or by the Contractor to assist in settling disputes and Claims.

B. An examination of the Escrow Bid Documents is subject to the following conditions:

1. As trade secrets, Escrow Bid Documents are proprietary and confidential.

2. The District and the Contractor (and any Subcontractor to the extent Escrow Bid Documents are required by a Subcontractor) shall each designate in writing to the other party seven (7) Days prior to any examination representatives who are authorized to examine the Escrow Bid Documents. With the consent of both the District and the Contractor, members of the DRB may participate in the examination of the Escrow Bid Documents. No other person shall have access to the Escrow Bid Documents.

3. Access to the Escrow Bid Documents may take place only in the presence of a duly designated representative of both the District and the Contractor. If the Contractor fails to designate a representative or fails to appear for joint examination on seven (7) Days' notice, then the District representative may examine the Escrow Bid Documents upon an additional three (3) Days' notice.

3.14.07. Final Deposition

A. The Escrow Bid Documents will be returned to the Contractor after the Work has been completed and accepted and after all Claims and disputes involving this Work have been settled. The Contractor will thereupon be required to waive, in writing, any right to lodge further Claims involving this Work.

3.15. Partnering

3.15.01. Partnering Relationship

A. The District encourages a partnering relationship with the Contractor to effectively complete the Contract to the benefit of both parties. The purpose of this relationship will be to maintain cooperative communication and to mutually resolve conflicts at the lowest possible management level.

3.15.02. Professionally Facilitated Project Partnering

A. To further the partnering relationship, Professionally Facilitated Project Partnering can be implemented by one of two methods:

1. The District requires Professionally Facilitated Project Partnering. The Contractor shall comply with the Special Provisions regarding this requirement.

2. The Contractor submits a written request for Professionally Facilitated Project Partnering. However, this method can only be implemented if the Engineer approves the request in writing.

B. Implementation of Professionally Facilitated Project Partnering

1. Scheduling the Professionally Facilitated Project Partnering workshops, selecting the Professional Partnering Facilitator and workshop site, and other administrative details shall be as agreed to by both parties.

2. Partnering workshops will be held on a quarterly basis during construction, or as needed, and as determined by the Engineer and by the Contractor. Both parties will determine workshop attendees, agenda, and duration. Persons required to be in attendance will be the Engineer and/or the Engineer's authorized agents and key Project personnel; the Contractor's authorized representative, on-site Project manager, and key Project supervision personnel of both the prime and principal Subcontractors and Suppliers; and other personnel as deemed necessary by the District and by the Contractor.

3. The Contractor shall secure the Professional Partnering Facilitator and the off-site meeting room. The District will pay in full for the services of a Professional Partnering Facilitator and for the off-site meeting room based on invoices priced without markup. Payment for these services shall be made utilizing the Professionally Facilitated Project Partnering Bid item or Contract Change Order if no Bid item is specified. All other costs associated with the partnering workshops will be borne separately by the party incurring the costs (e.g., wages and travel expenses); no additional payment shall be made.

C. The establishment of Professionally Facilitated Project Partnering will not change or modify the terms and conditions of the Contract and will not relieve either party of its legal requirements of the Contract.

3.16. Claims and Disputes per Public Contract Code Section 9204

A. Public Contract Code Section 9204 (PCC 9204) applies to all contracts entered into on or after January 1, 2017. PCC 9204 shall remain in effect only until January 1, 2020, and as of that date is repealed, unless a later enacted statute,

that is enacted before January 1, 2020, deletes or extends that date. The provisions of PCC 9204 are set forth below.

B. The Legislature has found and declared that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner. PCC 9204 shall apply to any claim by a contractor in connection with a public works project.

C. Prior to submitting a claim per PCC 9204, the Contractor shall comply with Article 3.11.01. Protest, Article 3.11.02 Notice of Potential Claims, 3.12. Claims, A. through F.

D. For purposes of PCC 9204, the following definitions apply:

1. "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

    a. A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.

    b. Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.

    c. Payment of an amount that is disputed by the public entity.

2. "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.

3. "Public entity" means, without limitation, except as provided in subparagraph (b), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.

4. "Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.

5. "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.

E. 1. a. Upon receipt of a claim pursuant to PCC 9204, the District shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the Contractor a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, the District and Contractor may, by mutual agreement, extend the time period provided in this Article.

1.b. The Contractor shall furnish reasonable documentation to support the claim.

1.c. If the District needs approval from the Board to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the claim, and the Board does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the District shall have up to three days following the next Board meeting after the 45-day period, or extension, expires to provide the Contactor a written statement identifying the disputed portion and the undisputed portion.

1.d. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the District issues its written statement. If the District fails to issue a written statement, paragraph 3. below shall apply.

2.a. If the Contractor disputes the District's written response, or if the District fails to respond to a claim issued pursuant to this Article within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the District shall schedule a meet and confer conference within 30 days for settlement of the dispute.

2.b. Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the District shall provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the District issues its written statement. Any disputed portion of the claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the District and the Contractor sharing the associated costs equally. The District and Contractor shall mutually agree to a mediator within ten (10) business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall

select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this Article.

2.c. For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this Article.

2.d. Unless otherwise agreed to by the District and the Contractor in writing, the mediation conducted pursuant to this Article shall excuse any further obligation under Public Contract Code Section 20104.4 (see Article 3.12.01. Claims Less Than Fifty Thousand Dollars through Article 3.12.04. Civil Actions) to mediate after litigation has been commenced.

2.e. This Article does not preclude the District from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this Article does not resolve the parties' dispute.

3. Failure by the District to respond to a claim from a Contractor within the time periods described in this Article shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the District's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this Article, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the Contractor.

4. Amounts not paid in a timely manner as required by this Article shall bear interest at 7 percent per annum.

5. If a Subcontractor or a lower tier Subcontractor lacks legal standing to assert a claim against the District because privity of contract does not exist, the Contractor may present to the District a claim on behalf of a Subcontractor or lower tier Subcontractor. A Subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier Subcontractor, that the Contractor present a claim for work which was performed by the Subcontractor or by a lower tier Subcontractor on behalf of the Subcontractor. The Subcontractor requesting that the claim be presented to the District shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the Contractor shall notify the Subcontractor in writing as to whether the Contractor presented the claim to the District and, if the original

Contractor did not present the claim, provide the Subcontractor with a statement of the reasons for not having done so.

F. A waiver of the rights granted by PCC 9204 is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of PCC 9204, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in PCC 9204.

G. Nothing in PCC 9204 shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations**.**

SECTION 4. LEGAL REGULATIONS AND RESPONSIBILITY

4.01. Laws to be Observed

A. The Contractor shall remain informed of and in compliance with the latest version of applicable existing and future Federal, State, County, and Municipal laws, ordinances, rules, and regulations, including, but not limited to, those cited herein.

4.02. Equal Opportunity Requirements

A. The Santa Clara Valley Water District is an equal opportunity employer and requires its contractors to have and adhere to a policy of equal opportunity and nondiscrimination. In the performance of the Agreement, the Contractor will comply with all applicable Federal, State, Local Laws and Regulations, and will not discriminate against any Subcontractor, employee, or applicant for employment in the recruitment, hiring, employment, utilization, promotion, classification or reclassification, transfer, recruitment advertising, evaluation, treatment, demotion, layoff, termination, rates of pay or other forms of compensation, and selection for professional development training (including apprenticeship); or against any other person on the basis of sex (which includes pregnancy, childbirth, breastfeeding, and medical conditions related to pregnancy, childbirth, or breastfeeding); race, religion, color, national origin (including language-use restrictions); ancestry, religious creed (including religious dress and grooming practices); political affiliation, disability (mental and physical, including HIV or AIDS); medical condition (cancer and genetic characteristics) and genetic information; marital status, parental status, gender, age (40 and over); pregnancy, military, and veteran status; sexual orientation, gender identity, and gender expression; the exercise of family and medical care leave; the exercise of pregnancy disability leave; or the request, exercise, or need for reasonable accommodation.

B. The Contractor's policy must conform with applicable State and Federal guidelines, including the Federal Equal Opportunity Clause, "Section 60-1.4 of Title 41, Part 60 of the Code of Federal Regulations;" Title VII of the Civil Rights Act of 1964 as amended; the American's with Disabilities Act of 1990; the Rehabilitation Act of 1973 (Sections 503 and 504); the Age Discrimination Act of 1975 (42 U.S.C. Section 6101 et. seq.); California Fair Employment and Housing Act (Government Code Section 12900 et. seq.); and California Labor Code Sections 1101 and 1102.

4.03. Employment of Labor

A. In the employment of labor in the performance of the Contract, the District desires that the Contractor and all Subcontractors give first consideration to residents of the District.

4.04. Prevailing Wages

A. The Work to be performed pursuant to this Contract is "public works" subject to the California Prevailing Wage Law, California Labor Code Section 1720, et seq. and the applicable implementing regulations (the Prevailing Wage Law) with which the Contractor must comply. The General Prevailing Wage Rates issued by the California Department of Industrial Relations may be adjusted by the State during the term of this Contract. Notwithstanding any other provisions of this Contract, the Contractor will not be entitled to any adjustment in compensation in the event there are adjustments to the General Prevailing Wage Rates.

1. In accordance with the Prevailing Wage Law, the Director of the Department of Industrial Relations has ascertained the general prevailing rate of wages and employer payments for health and welfare, pension, vacation, and similar purposes available to the particular craft, classification, or type of workers employed on the Work. These rates are set forth in the latest determination obtained from the Director, which is on file in the office of the Clerk of the Board of Directors and incorporated herein by reference the same as though set out in full. The rates are also available on the State of California Department of Industrial Relations website at http://www.dir.ca.gov.

2. The Contractor shall pay a penalty to the District of $200 for each Day, or portion thereof, for each worker paid less than the stipulated prevailing rate for any public Work done under the Contract by the Contractor or by any Subcontractor in violation of the provisions of the Prevailing Wage Law.

B. Each Contractor and Subcontractor shall keep an accurate payroll record, showing the name, address, Social Security number, work classification, straight time, and overtime hours worked each Day and week, and the actual per-diem wages paid to each journeyman, apprentice, worker, or other employee by him/her in connection with the public Work. The payroll records shall be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor in accordance with the Prevailing Wage Law.

1. The Contractor and each Subcontractor, pursuant to California Labor Code Section 1776, must submit certified weekly payroll(s) within ten (10) Days after the Owner's request for submission of certified weekly payroll records. The certified payroll(s) must include the date of actual payment of wages for each worker employed on the Project and a breakdown of each payment, including all fringe benefits included in such wage for each worker.

2. In the event that the Contractor fails to comply with the ten (10)-Day submission deadline of California Labor Code Section 1776, the Contractor shall pay a penalty to the District of $100 for each calendar Day or portion thereof, for each worker, until the Contractor achieves compliance with Section 1776.

3. The Contractor shall inform the District of the location of the payroll records—including the street address, city, and county—and shall, within five (5) working Days, provide a notice of a change in location and address. The Contractor is responsible for compliance with payroll record requirements imposed by Section 1776 of the Labor Code.

C. The Contractor must submit certified weekly payroll(s) in support of the monthly request for payment as required herein. Certified weekly payroll(s) must be submitted within ten (10) calendar Days from the progress payment end date. Payroll(s) shall contain the full name, address, and Social Security number of each employee; his/her correct classification and rate of pay; daily and weekly number of hours worked; itemized deductions made; and actual wages paid. Payroll shall also indicate apprentices and ratio of apprentices to journeymen. The employee's address and Social Security number need only appear on the first payroll on which his/her name appears. The payroll(s) shall be accompanied by a Statement of Compliance signed by the employer or agent indicating that the payroll(s) is correct and complete and that the wage rates contained therein are not less than those required by the Contract. The Statement of Compliance shall be on forms furnished by the District or on any form with identical wording. The Contractor shall be responsible for the submission of copies of the payroll(s) of all Subcontractors, including sub-Subcontractors.

1. This project is subject to compliance monitoring and enforcement by the State of California Department of Industrial Relations. The Contractor and Subcontractors must furnish the records specified in Section 1776 directly to the Labor Commissioner in the following manner: monthly, in a format prescribed by the Labor Commissioner.

2. The District will take all actions reasonably necessary to enforce the prevailing wage requirements of this Contract, including retaining progress payment funds not supported by certified payroll(s).

3. Retentions for failure to submit satisfactory payroll(s) are in addition to all other retentions provided for in the Contract.

D. The Contractor and each Subcontractor shall preserve their respective payroll records for a period of four (4) years from the date of filing a Notice of Completion and Acceptance under the Contract.

1. The work of installing, assembling, repairing, or reconditioning—or other work of any nature on machinery, Equipment, or tools used in or upon the Work—is considered a part of the Work to be performed under the Contract; any laborers, workers, or mechanics working on such machinery, Equipment, or tools are subject to all of the requirements relating to labor set forth in the Contract.

2. The construction, erection, and operation of Material production, proportioning, or mixing plants from which Material is used wholly on the Contract or on contracts under the supervision of the District shall be

considered a part of the Work to be performed under the Contract; any laborers, workers, or mechanics working on such plants shall be subject to all of the requirements relating to labor set forth in the Contract.

4.05. Hours of Labor

A. Eight (8) hours of labor constitutes a legal Day of work. The Contractor shall pay a penalty to the District of $25 for each worker employed in the execution of the Contract by the Contractor or by any Subcontractor for each Day during which such worker is required or permitted to labor more than eight (8) hours in violation of Labor Code Sections 1810 to 1815, inclusive.

4.06. Apprentices

A. The Contractor shall comply with Sections 1777.5, 1777.6, and 1777.7 of the Labor Code concerning the employment of apprentices by the Contractor or by any Subcontractor.

B. Section 1777.5 requires the Contractor or Subcontractor employing persons as defined in any apprenticeable occupation to apply for a certificate of approval to the joint apprenticeship committee that is nearest the site of the public works project and that administers the apprenticeship program in that trade. The certificate will also fix the ratio of apprentices to journeymen that will be used in the performance of the Contract. The ratio of work performed by apprentices to journeymen in such cases shall not be less than one (1) hour to five (5) hours, except when the committee finds that any one of the following conditions are met:

1. In the event unemployment for the previous three (3)-month period in the Project site area exceeds an average of 15 percent; or

2. In the event the number of apprentices in the area exceeds a ratio of one (1) to five (5); or

3. If there is a showing that the apprenticeable craft or trade is replacing at least one thirtieth of its journeymen annually through apprenticeship training either (i) on a statewide basis, or (ii) on a local basis; or

4. If assignment of an apprentice to any Work performed under a public works contract would create a condition that would jeopardize his/her life; or the life, safety, or property of fellow employees; or the public at large; or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyman.

C. The Contractor is required to make contributions to funds established for the administration of apprenticeship programs if the Contractor employs registered apprentices or journeymen in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions.

D. The Contractor and any Subcontractor shall comply with the requirements of Sections 1777.5 and 1777.6 in the employment of apprentices.

E. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex officio the Administrator of Apprenticeship, San Francisco, CA, or from the Division of Apprenticeship Standards and its branch offices.

4.07. Permits and Licenses

A. The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the prosecution of the Work, except as provided in the Special Provisions.

4.08. Patents and Copyrights

A. The Contractor shall assume all costs, including any costs of defense arising from the use of any copyrighted composition, secret process, patented or unpatented invention, article, Equipment, device, or appliance manufactured, furnished, or used in the performance of the Contract, including their use by the District, unless otherwise specifically stipulated in the Specifications.

4.09. Interference With Fire Hydrants, Highways, and Fences

A. The Contractor shall conduct operations so as not to close or obstruct any portion of any highway, road, or street, or prevent in any way free access to fire hydrants until permits have been obtained thereof from the proper authorities. If any highway required to be kept open shall be rendered unsafe by the Contractor's operations, the Contractor shall make such repairs or provide such temporary guards as shall be acceptable to the authorities having jurisdiction and to the Engineer. Any highway or street maintenance or repair work required by local authorities in connection with necessary operations under the Contract shall be performed by the Contractor at the Contractor's own cost and expense. Fences subject to interference shall be maintained as effective barriers consistent with the original intent; upon approval of the Engineer, they may be moved or rearranged to facilitate prosecution of the Work until the Work is finished, after which they shall be restored to their original location in an equal or better condition than existed prior to rearrangement.

4.10. Preservation of Property

A. The Contractor shall exercise due care to avoid damage to existing improvements, utility facilities, and adjacent property, real and personal. The fact that any existing underground improvement or facility is not shown on the Drawings shall not relieve the Contractor of the responsibility to ascertain the existence of any underground improvement or facility that may be subject to damage by reason of the Contractor's operations.

B. Any damage to improvements or property—whether above or below ground, private or public, within or adjacent to the Project limits—arising from or in consequence of the performance of the Contract shall be promptly repaired by the Contractor.

C. If the Engineer requires such repair to be made prior to the execution or continued performance of any part of the Work included in this Contract, the Engineer will so notify the Contractor who shall delay or discontinue the performance of that part of the Work until the necessary repair has been made. Such delay shall be considered Inexcusable Delay; no extension of time for completion of the Contract will be allowed. The Contractor will be subject to Contract damages for any impact to the Contract Milestones resulting from its damage to property or from failure to make timely repairs.

D. When ordered by the Engineer to make any such repair, the Contractor shall start work thereon within four (4) hours and shall prosecute the same with diligence to completion. Upon failure of the Contractor to so comply with such order, or upon the Contractor's failure to make immediate emergency repairs reasonably determined by the Engineer to be necessary in the best interests of the public, the Engineer shall have authority to cause the repair to be made and to deduct the costs thereof from any money due, or which may become due, the Contractor.

E. In an emergency affecting the safety of life or property, including adjoining property, the Contractor shall act to prevent, to the extent possible, such threatened loss or injury whether instructed or not to do so by the Engineer.

4.11. Contractor's Responsibility for the Work

A. Until the Acceptance of the Work, the Contractor shall have the charge and care of the Work and of the Material to be used therein and shall bear the risk of injury, loss, or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from non-execution of the Work. The Material to be used in the Work include both those furnished by the District and those furnished by the Contractor, including Material for which the Contractor has received partial payment.

4.12. Indemnification

A. The Contractor shall defend, indemnify, and hold harmless the District and its Directors, officers, employees, and agents from liability, loss, suits, actions, or claims brought for or on account of violation of Laws, Ordinances, Rules, or Regulations, or injury, damage, or loss (including death) caused by acts or omissions of the Contractor, its employees, or its agents.

B. The Contractor shall defend, indemnify, and hold harmless the agencies/parties named in Article 14.16. Insurance, of the Special Provisions—including their officers, employees, and agents—from liability, loss, suits, actions, or claims brought for or on account of any violation of Laws, Ordinances, Rules, or

Regulations, or injury, damage, or loss (including death) caused by acts or omissions of the Contractor, its employees, or its agents.

4.13. Contractor's Insurance

4.13.01. General

A. The insurance procured by the Contractor for the benefit of Santa Clara Valley Water District shall not be deemed to release or limit any liability of the Contractor. Damages recoverable by Santa Clara Valley Water District for any liability of the Contractor shall, in any event, not be limited by the amount of the required insurance coverage. Failure by the Contractor to maintain all required insurance at all times during the performance of this Contract and until acceptance by the District, shall, at the discretion of the District, result in temporary suspension of Work, or termination of control, or termination of the Contract as indicated herein, and shall not be a basis for a time extension. The Contractor's insurance shall be primary with respect to any other insurance that may be carried by Santa Clara Valley Water District.

B. The District has the right to require the Contractor to provide complete, certified copies of all required pertinent insurance policies, including endorsements affecting the coverage required by the Agreement.

C. The specific insurance requirements and coverages shall be in accordance with the Special Provisions.

4.13.02. Insurance on Work and Material

A. The Contractor shall secure and maintain such direct damage insurance against such perils as the Contractor may deem necessary to protect the Work called for in this Contract, including Work completed, Material in place or to be used in the performance of this Contract, and such other miscellaneous items as may be necessary to the performance of this Contract.

4.14. Payment of Taxes

A. Except as otherwise specifically provided in the Special Provisions, the Contract Price(s) shall include full compensation for all current and future taxes that the Contractor is required to pay, whether imposed by Federal, State, or Local government; no tax exemption certificate or any other document designed to exempt the Contractor from payment of tax will be furnished to the Contractor by the District.

4.15. Cooperation With Others

A. The District reserves the right to do other work on or near the Project. The Contractor shall cooperate with others and coordinate its Work with planned or ongoing work of the District or of other District contractors within or adjacent to the limits of the Contract Work. The Contractor shall conduct the Work so as to

facilitate work by the District or by others and prevent delay, additional expense, or hindrance thereto, and allow for the satisfactory prosecution of the Work.

B. The Contractor shall request from, and exchange with others, Drawings, data, and information as necessary to ensure proper completion of the Project and of the work of others. The Contractor shall furnish to the Engineer copies of correspondence and Drawings exchanged with other contractors.

C. The Contractor shall complete the following activities as requested by the Engineer to assist in the coordination of Contract Work with work by others: attend planning meetings; review and comment on Project documents relative to coordination aspects; schedule Work to promote efficient installation of all improvements; move Material, Equipment, or vehicles to allow work by others to proceed; and other reasonable activities.

D. No additional payment shall be made or Claims considered for Delay due to the Contractor's failure to coordinate the Work or because of conflicts with other construction, including that of the District.

E. The Contractor agrees to reimburse the District for any payments made to other Contractors that were incurred as a result of the Contractor's Inexcusable Delays.

4.16. Property Rights in Material

A. Nothing in the Contract shall be construed as vesting in the Contractor any right of property in the Material used after they have been attached or affixed to the Work or after payment has been made for 90 percent of the value of Material delivered to the site of the Work, whether or not they have been so attached or affixed. All such Materials shall become the property of the District upon being so attached or affixed or upon payment of 90 percent of the value of Material delivered by the Contractor to the worksite and not used as provided herein.

4.17. Rights in Land and Improvements

A. Nothing in these Standards shall be construed as allowing the Contractor to make any arrangements with any person to permit occupancy or use of any land, structure, or building within the limits of the Contract for any purpose whatsoever, either with or without compensation, in conflict with any agreement between the District and any owner, former owner, or tenant of such land, structure, or building.

4.18. Title to Material Found on the Work

A. The title to all water and to the right to use all water; and all soil, stone, gravel, sand, minerals; and all other Material developed or obtained in the excavation or other operations by the Contractor, or by any Subcontractor, or by any of their employees, and the right to use or dispose of the same are hereby expressly reserved by the District; neither the Contractor, nor any Subcontractor, nor any of

their employees shall have any right, title, or interest in, or to any part thereof; neither shall they, nor any of them, assert or make any claim thereto. The Contractor may be permitted to use in the Work, without charge, any such Material that meet the requirements of these Specifications.

4.19. Trespass

A. The Contractor shall be responsible for all damage or injury that may be caused on or to any property by trespass by the Contractor, any Subcontractor, or any of their employees in the course of their employment, whether the said trespass was committed with or without the consent or knowledge of the Contractor.

4.20. Subcontracting

A. The Contractor shall comply with the Subletting and Subcontracting Fair Practices Act commencing with Public Contract Code Section 4100. Violations shall subject the Contractor to penalties described therein.

B. For the purposes of consenting to substitution of a designated Subcontractor in accordance with Public Contract Code Section 4107, 4109, and 4110, the Administrative Hearing Officer will be in accordance with Article 3.02. Engineer.

C. The Engineer reserves the right to order the Contractor to terminate any subcontract if, in the Engineer's opinion, the Subcontractor fails to comply with the applicable requirements of this Contract.

D. Nothing herein contained shall create any contractual relation between any Subcontractor and the District or shall relieve the Contractor of any liability or obligation hereunder.

E. All contracts with Subcontractors and lower-tier Subcontractors and purchase agreements with Suppliers and lower-tier Suppliers shall provide that they are freely assignable to the District or to the District’s designee under the following conditions:

1. The District terminates the Contractor’s control of the Work in accordance with Article 4.22. Termination of Control; and

2. The District directs such assignment.

4.21. Assignment of Antitrust Claims

A. Government Code Sections 4550 through 4554 pertaining to the assignment of antitrust claims are incorporated herein in full by this reference.

4.22. Termination of Control

A. The District may terminate the Contractor’s control of the Work at any time upon a determination that the same is in the best interests of the District.

4.23. Termination of Contract

A. The District may terminate the Contract at any time upon a determination that the same is in the best interests of the District. Upon such termination, the rights, duties, and obligations of the parties shall be as stated in Section 8-1.14 of the 2010 State Specifications, wherein the words “Director” and “Engineer” shall mean the Engineer and the words “State” and “Department” shall mean District. Payment after termination of Contract shall be in accordance with the District’s Standard and Special Provisions.

4.24. Contractor’s Cost Data

A. The District or any of its duly authorized representatives shall, until the expiration of four (4) years after filing the Notice of Completion and Acceptance under this Contract or any subcontract under it, have access to and the right to examine any Contractor or Subcontractor payroll, records of personnel, invoices of Material, records of plant and Equipment costs, and any and all other directly pertinent books, documents, papers, and records of such Contractor or Subcontractors involving transactions related to the said Contract or subcontracts. In the event State or Federal funds are involved in financing the Project, the State or Federal Government shall have the same rights of inspection as the District.

4.25. Coordination With Utilities

A. In general, the location of existing utility facilities as shown on the Drawings is approximate. This information has been obtained from utility maps furnished by the various agencies involved; the District does not guarantee either the correctness of the locations or the extent of such locations.

B. California Government Code Section 4215 does not require public agencies to indicate the presence of service laterals or appurtenances whenever the presence of such utilities can be inferred from the presence of other visible facilities (e.g., buildings, meter boxes, junction boxes) on or adjacent to the construction site. Service laterals (e.g., house sanitary, water, electrical, gas, cable TV, storm or telephone cables, appurtenances) may not all be shown on the Drawings. No changes in the Contract Price(s) or the Contract Time(s) shall be made due to the presence of unidentified or incorrectly located service laterals or appurtenances. It shall be the responsibility of the Contractor to ascertain the exact location of the utility facilities.

C. Unless otherwise indicated on the Drawings or specified in the Specifications, the Contractor shall maintain in service all utilities, including house services, power, lighting, and telephone conduits, and any other surface or subsurface structure or facility of any nature that may be affected by the Work; provided, however, that the Contractor, for convenience, may arrange with the owner to temporarily disconnect house service lines or other facilities along the line of the Work. The cost of disconnecting and restoring such utilities shall be borne by the Contractor.

D. In the event that a main or trunk-line utility facility is encountered that interferes with the Work and that is neither shown on the Drawings nor specified in the Specifications, the Contractor shall immediately notify the District in writing. The District may have the appropriate utility company or public agency relocate the facility, or the District may direct the Contractor to relocate the facility in accordance with Article 3.06. Changes in the Work.

E. In the event that a main or trunk-line utility facility is encountered that interferes with the Work and that the Contractor believes is not shown on the Drawings or indicated in the Specifications with Reasonable Accuracy, the Contractor shall immediately notify the District in writing.

1. If the Engineer determines that the main or trunk-line utility facility was shown on the Drawings or was indicated in the Specifications with Reasonable Accuracy, the Contractor shall be solely responsible for relocation or removal; no additional time shall be granted nor additional payment made, for any additional Work required.

2. If the Engineer determines that the main or trunk-line utility facility was not shown on the Drawings or was not indicated in the Specifications with Reasonable Accuracy, the District may have the appropriate utility company or public agency relocate the facility, or the District may direct the Contractor to relocate the facility in accordance with Article 3.06. Changes in the Work.

F. When a delay in the completion of the Project is caused by the failure of the District or by the owner of a utility facility to provide for removal or relocation of existing main or trunk-line utility facilities that are not shown on the Drawings or that are not indicated in the Specifications or that are not shown on the Drawings or indicated in the Specifications with Reasonable Accuracy, the Contract Time(s) shall be extended in accordance with Article 3.08. Change in Contract Time(s).

4.26. Asbestos-Related Work

A. The Contractor shall comply with California Business and Professions Code Section 7058.5, which states that no Contractor shall engage in asbestos-related work, as defined, unless certified by the Contractor's State License Board to do so.

B. The Contractor shall comply with California Labor Code Section 6501.5 relative to asbestos related work, the applicable provisions of the Code of Regulations, Title 8 General Industry Safety Orders, and BAAQMD Regulation 11 Rule 2.

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SECTION 5. PROSECUTION AND PROGRESS OF WORK

5.01. Assignment

A. The performance of the Contract may not be assigned except upon consent of the Board of Directors. Consent shall not be given to any proposed assignment that would relieve the original Contractor or surety of its responsibilities set forth in the Contract.

B. The Contractor may assign moneys due in accordance with the Contract; such assignment shall be recognized by the District if given proper notice thereof, to the extent permitted by law. Assignment of moneys shall be subject to all proper setoffs in favor of the District and to all deductions provided for in the Contract. All money withheld, whether assigned or not, shall be controlled by the District.

5.02. Notice to Proceed

A. The Notice to Proceed (NTP) shall be issued by the Engineer within ten (10) Days after receipt of the signed Agreement and after approval by the District of the contract bonds and insurance documents. The NTP authorizes the Contractor to proceed with the Work and establishes the First Chargeable Day of the Contract.

5.03. Commencement of Work

A. The First Chargeable Day as specified in the NTP will be at least ten (10) Days after the date of said Notice.

B. The Contractor shall provide written notice to the Engineer, at least 2 working days in advance, of the date the Contractor intends to start work on site.

5.04. Professional Scheduler

A. All Detailed Progress Schedules shall be prepared and updated throughout the Contract Time(s) by a Schedule Professional who has, at a minimum, five (5) years of recent, verifiable experience in preparing, updating, and maintaining computerized Critical Path Method (CPM) construction schedules using Oracle Primavera, Microsoft Project, or similar scheduling software on at least two (2) completed construction projects of a similar size and degree of complexity as this Project.

B. Prior to the Contractor’s submission of the initial Detailed Progress Schedule, the Contractor shall submit and receive a favorable review of the résumé and professional references of the proposed Scheduler. The references shall be from at least two (2) project owners or construction managers familiar with the Scheduler's work on projects identified in the Scheduler’s résumé. The District reserves the right to reject the proposed Scheduler based on lack of qualifications as defined in this Article.

5.05. Progress Schedules

A. The Contractor is responsible for scheduling the sequence of its Work in all Progress Schedule(s) as described below.

5.05.01. Preliminary Progress Schedule

A. Within ten (10) Days of the First Chargeable Day of the Contract as specified in the NTP, the Contractor shall submit to the Engineer a Preliminary Progress Schedule. This schedule shall include all activities that are planned to occur within the first 45 Days of the Contract.

5.05.02. Baseline Progress Schedule

A. Within 30 Days of the First Chargeable Day of the Contract as specified in the NTP, the Contractor shall submit its initial Detailed Progress Schedule, which, if accepted, shall become the Baseline Progress Schedule for the Project. The submittal shall be in hard copy and native electronic format and shall fully conform to the numbered items below:

1. The schedule shall be prepared using Oracle Primavera, Microsoft Project or similar Precedence Diagramming Method (PDM) scheduling software.

2. The Baseline Progress Schedule shall be a Critical Path Method (CPM) schedule that is comprehensive, credible, well-constructed, and controlled. The schedule shall include input from its major Subcontractors and Suppliers and represent the complete scope of work. It shall represent the planned order of significant activities to complete the Work within the time allowed under this Contract. Any Detailed Progress Schedules shall be presented in sufficient detail such that sequence and interdependence of activities of the Project can be identified. The schedule shall include proper logic and adequate activity durations and show a logical critical path and Controlling Items of Work.

3. The schedule shall account for on-site and off-site activities, including, but not limited to, permits, mobilization, and submittals (prepare and submit, review and approve, revise and resubmit); fabrication and delivery, installation, construction, system shutdowns, testing and start-up; training of District personnel; deficiency list; closeout; and demobilization. The schedule shall include key Milestones; reviews by the District, regulatory agencies, and other third parties of the Work; construction and sequencing constraints as specified in these Specifications; construction Work by the District forces or other third parties that interface with the Work; District-managed activities, such as the District furnishing Equipment; removal or relocation of interfering utilities by third parties; delivery of operation and maintenance manuals; and adequate time for Work completion and closeout activities.

4. Activity calendars shall reflect the planning basis and any Contract restrictions. All non-work Days and work hours shall be explained for each calendar.

5. The schedule shall reflect any limitations on work hours required by the Contract and any permit restrictions and conditions that are required.

6. Each schedule activity shall include a unique ID number and description, pertinent predecessors and successors, start/finish dates, an assigned workday calendar, a duration, percent complete, calculated float and activity codes to group the Work into Work Breakdown Structure (WBS) categories, location, responsibility, trade, and other rational groupings to facilitate sorting and filtering of the schedule activities.

7. Activities making up the critical path for the entire Contract and the critical path for each specific designated portion of the Work shall be identified. The network diagram shall be organized to indicate a continuous flow of progress of activities from left to right.

8. Except for concrete curing, submittal review, Equipment fabrication and deliveries, schedule activities shall be no longer than 20 working days. Activities longer than 20 working Days shall be subdivided into sub elements of work.

9. The Contractor shall submit a tabular listing of the schedule along with the network diagram.

10. The use of float suppression techniques, such as preferential sequencing (arranging critical path through activities more susceptible to District-caused delay); special lead/lag logic restraints; zero-total or free-float constraints; extended activity times; or imposing constraint dates other than required by this Contract shall be cause for rejection of the schedule using such techniques. The use of Resource Leveling (or similar software features) for the purpose of artificially adjusting activity durations to consume float and influence the critical path shall also be cause for rejection.

11. The Engineer’s favorable review of the schedule shall not relieve the Contractor of errors and omissions in tasks, durations, or logic. No time extensions shall be granted because of errors or omissions on the schedule. It is the Contractor's responsibility to incorporate all necessary activities to cover the entire Work scope.

12. A favorably reviewed Baseline Progress Schedule is a condition precedent to payment.

B. Cost Loading

1. Work activities other than third-party and District-managed activities shall be cost loaded. No activity shall have a value greater than $50,000 except for activities representing major Equipment purchases or installation. Progress Schedules exhibiting front-loaded costs are unacceptable. The Contractor shall revise the Schedule of Values (SOV) pursuant to Article 6.01. Schedule of Values until accepted by the Engineer.

2. The Contractor shall create two (2) hierarchical schedule activity codes in the scheduling software: (i) Bid Item and (ii) SOV. Each code shall have line item name corresponding to the accepted Bid items and SOV titles. Costs shall progressively roll up from the activity level to the SOV level; SOV codes shall roll up to the Bid Item level.

3. Each cost-loaded schedule activity shall be assigned one of the SOV codes. An activity shall not contain work assigned to more than one SOV code. The SOV code will be used to summarize cost-loaded activity values to produce the required SOV submittal. Table 6-1, referenced in Article 6.01.02. Submittal, is an acceptable form for this submittal. The SOV submittal shall be produced from the Progress Schedule software.

4. The sum of the monetary values of the activities assigned to each SOV code shall be equal to the accepted amount of that SOV line item. The sum of all the cost-loaded activities in the latest accepted schedule update shall total the latest approved Contract amount.

C. Early Completion Schedule

1. The District is not required to accept an earlier (advanced) schedule (i.e., one that shows early completion date[s] but within the specified Contract Time[s]). Time(s) for completion of Work shall adhere to the Contract Time(s) specified in these Specifications unless earlier time(s) of completion is requested by the Contractor and agreed to by the District. Any such agreement shall be formalized by a Change Order or by a DCO.

2. If the Contractor submits any Baseline Progress Schedule or Detailed Progress Schedules showing any Contract Time(s) earlier than a corresponding, specified Contract Time(s) and that early completion date is not agreed to by both parties through a Change Order or through a DCO, the duration from such early completion date and from the specified Contract Time(s) is considered “float” and shall belong to the Project.

3. Accordingly, the Contractor in this situation is to show in the Baseline Progress Schedule or in the Detailed Progress Schedules a specific activity identified as Project Completion Float, which may be adjusted as that float is used or increased. The Contractor shall not be entitled to a

time extension due to any cause or reason that consumes Project Completion Float.

5.05.03. Revised Baseline Schedules

A. If the Contractor desires to make a change to the Baseline Progress Schedule after commencing construction, a revised Baseline Progress Schedule and associated narrative shall be submitted to the District at least 15 Days prior to any such change.

B. The narrative shall state the reasons for the change; any change to the Baseline Progress Schedule shall be discussed in the submittal to the District.

C. A revised Baseline Progress Schedule shall not become effective until accepted by the District.

5.05.04. Updates to the Detailed Progress Schedules

A. Any and all updates or revisions to the initial Detailed Progress Schedule shall conform to the same requirements as the Baseline Schedule in Article 5.05.02. Baseline Progress Schedule.

B. The Contractor shall submit an update of the prior month's Detailed Progress Schedule to the Engineer before the twenty-fifth Day of each month.

C. Each schedule update shall incorporate all current information, including progress. Actual start and finish dates shall be updated and shall match daily reports. Work completed shall be shown with actual start and finish dates for each activity. Work in progress shall be shown with the actual start date and the percentage of Work completed as of the last date of the previous month.

D. The Contractor shall also submit a narrative report that shall include a description of problem areas, state the reasons for any changes made to the schedule activities, current and anticipated delaying factors and their impact, and an explanation of corrective actions taken or proposed.

E. Progress status shall be evaluated on the basis of float on the critical path at the time of updating, with negative float indicating the Project is behind schedule and positive float indicating ahead-of-schedule status.

F. Acceptance of the Detailed Progress Schedule updates is a condition precedent to payment.

G. Recovery Schedules

1. At any time that construction progress lags behind any Baseline Progress Schedule or any updated/revised Detailed Progress Schedule accepted by the Engineer by either ten (10) working days or by five (5) percent of the remaining time to complete the Contract, whichever is less, the

Contractor shall prepare and submit a Recovery Schedule to the Engineer. This Recovery Schedule shall demonstrate how construction will be expedited and executed to achieve the contractual completion dates (either Milestone Completion or Project Completion dates).

2. Activity ID numbers shall be the same as in the most current and accepted and updated Detailed Progress Schedule. ID numbers of deleted activities shall not be reused on the Recovery Schedule. New ID numbers (not used in the most current and accepted Detailed Progress Schedule) shall be used for new activities.

3. A revised narrative describing the remaining Work as reflected in the Recovery Schedule shall be included and shall include a separate listing of all activities deleted, changed, or added with an explanation for each change.

4. Once favorably reviewed by the Engineer, the Recovery Schedule shall become the current, revised Detailed Progress Schedule against which future progress is to be measured.

5.05.05 Time Impact Analysis

A. If the Contractor foresees that an Excusable Delay, as defined, will impact a Controlling Item of Work, a written request for adjustment of the impacted Contract Time(s) and supporting data shall be promptly submitted to the Engineer in accordance with Article 3.08. Change in Contract Time(s). To substantiate the Contractor's request, the supporting data shall include a Time Impact Analysis (TIA) based on the updated and accepted Detailed Progress Schedule for the month preceding the Excusable Delay.

B. The TIA shall represent Excusable Delays as separate activities or as groups of activities. These activities shall be entered into the relevant part of the schedule update that was accepted just prior to the time the Excusable Delay occurred. In case of a deductive change reducing the quantity of Work, activities representing the deleted scope shall be dissolved or its estimated duration adjusted to reflect the reduction.

C. The Contractor shall submit a written report with the TIA describing the Excusable Delay by the occurrence and the impact of the event time computation on all affected activities.

D. Only changes or delays that affect or create Controlling Items of Work as defined by the schedule shall result in time adjustments. The Engineer shall determine if a request for time extension is warranted.

E. Total float or slack is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date of any activity in the schedule. Total float or slack is not for the exclusive use or benefit

of either the District or the Contractor. It is an expiring resource available to either party on a first-come, first-served basis.

5.05.06. "Three-Week-Look-Ahead" Schedules

A. The Contractor shall provide Three-Week-Look-Ahead Schedules on a weekly basis and present them at the weekly progress meetings.

B. The Three-Week-Look-Ahead Schedules shall be prepared in the form of a bar chart breaking down activities into detailed subtasks on the Contractor's Detailed Progress Schedules. Subtasks shall identify related activities on the Detailed Progress Schedules and responsibility for completion of the sub task.

C. The Contractor shall notify the Engineer in writing of any deviation from the current Three-Week-Look-Ahead Schedule within 24 hours of identification of said deviation.

D. The Three-Week-Look-Ahead Schedules shall indicate inspections by the Engineer or by regulatory agencies and construction Work by the District forces or by other third parties that interface with the Work.

5.05.07. Payment

A. Contractor shall submit a Baseline Progress Schedule, detailed monthly Progress Schedule updates, and Recovery Schedules to the District. The schedules shall be favorably reviewed by the District before a pending payment request is approved.

B. Full compensation for furnishing, updating, revising, and submitting Detailed Progress Schedules and associated reports shall be considered as included in various Contract items of work; no additional payment shall be made.

C. Submittal and favorable review of Detailed Progress Schedules and their components that meet the requirements of Article 5.05. Progress Schedules in this Section is a condition precedent to making a payment request.

5.06. Temporary Suspension of Work

A. By written order to the Contractor, the Engineer may suspend the Work, wholly or in part, for an indefinite period or for such period as the Engineer may deem necessary, for any of the following reasons:

1. Weather conditions or other conditions that are unfavorable for the proper prosecution of the Work.

2. Failure of the Contractor to carry out orders given or to perform any provisions of the Contract.

3. For the convenience and benefit of the District.

B. Such suspension shall be effective upon receipt by the Contractor of the written order suspending the Work and shall be terminated upon receipt by the Contractor of the written order terminating the suspension.

C. If the Engineer orders a suspension of all or of a portion of the Work that is on a critical path, pursuant to A.1 or A.3 in this Article, this shall be cause for a time extension if it impacts Milestone completion.

5.07. Liquidated Damages

A. If the Work is not finished or completed by the Milestone dates in the Contract, it is agreed that damage shall be sustained by the District and that it is and shall be impracticable and extremely difficult to ascertain and determine actual damage that the District will sustain. It is agreed that the Contractor shall pay to the District the sum(s) set forth in the Special Provisions. Liquidated Damages shall be assessed separately and independently.

B. The Contractor agrees to pay Liquidated Damages herein provided for, and further agrees that the District may deduct the amount thereof from any moneys due, or that may become due, to the Contractor under the Contract. Imposition of Liquidated Damages shall not preclude the District from taking other action as deemed appropriate to ensure performance of the Contract and shall not relieve the Contractor of its responsibility to comply with these Specifications.

SECTION 6. MEASUREMENT AND PAYMENT

6.01. Schedule of Values

6.01.01. Preparation

A. The Contractor shall develop the Schedule of Values (SOV) in the Baseline Progress Schedule.

B. Progress payments shall not be made until the SOV has received a favorable review by the Engineer.

C. Each schedule activity representing a component of lump-sum Bid items shall include a directly proportional amount of the Contractor's overhead and profit. The Contractor's overhead and profit shall be completely distributed among all schedule activities. The Contractor shall provide additional cost documentation to the Engineer when requested so that values can be verified.

D. The Contractor shall list and maintain separately on the SOV and on any Detailed Progress Schedule all values for items of Equipment that will be submitted for on-site Material payment. These Material items shall not be "progressed" as a part of the physical progress assessment.

E. The Contractor shall prepare a Cash Flow Summary and a corresponding Cash Flow "S" Curve indicating the total dollar amount of Work planned for each month of the Project and shall equate the sum of monthly amounts to the Total Bid Price.

6.01.02. Submittal

A. The Contractor shall submit to the Engineer the detailed SOV that conforms to Table 6-1 as part of its Baseline Progress Schedule and Detailed Progress Schedule Update submittals.

B. The SOV submittals shall include a Cash Flow Summary and a Cash Flow "S" Curve.

6.01.03. Revision

A. All construction Change Order authorizations shall be added to updated and revised Detailed Progress Schedules as cost-loaded activities and shall be coded to appropriate SOV line items. Additional cost documentation shall be provided to the Engineer when requested.

B. The Contractor shall not change the final approved SOV without the approval of the Engineer. The SOV has a one-to-one direct relationship to the list of activities on the Contractor's Progress Schedule. Additions or deletions of activities on the Contractor's Detailed Progress Schedules shall require line item additions or deletions in the SOV. Any revision to the SOV shall be submitted with the monthly Detailed Progress Schedule updates.

6.02. Application for Payment

A. Applications for payment shall be based upon actual progress as measured on the accepted Detailed Progress Schedules and as in the SOV.

6.02.01. Preparation

A. Measurement of Quantities and Percent Complete

1. All Work, except Work based on Time and Materials, shall be paid for at the Contract Price(s) per unit of measurement and shall be measured by the Engineer in accordance with the English system of measurement. Unless otherwise specifically provided, the Engineer shall compute quantities by a method that, in the Engineer's opinion, is best suited to obtain an accurate determination. The weights of metalwork, pipe, and other metal parts to be paid for on the basis of weight shall be determined by the Engineer. The District will not provide scales for weighing Material. The Engineer shall determine the weight of each part or item in the most practicable manner and shall use for that purpose manufacturer weights, or in their absence, catalog weights or estimated weights, in that order; weights of nonmetallic coatings shall be excluded.

2. Progress payments shall be based on percent complete for each applicable cost-loaded schedule activity as determined by visual observation of the Project by the Contractor and by the Engineer on a monthly basis. The schedule activity shall be updated to reflect percent complete. The schedule shall roll up activities to an activity code for each SOV and for each Bid Item.

B. Inclusion of Material On-Site

1. Partial payments may be made by the District to the Contractor for Material and Equipment furnished and delivered to the Project site but not yet incorporated into the Work, at the District's sole discretion, and only if the Material and/or Equipment meet all of the following requirements:

a. Material and/or Equipment are fabricated and/or are manufactured goods or Equipment relatively unique to the Project.

b. The Contractor can transfer clear title to the District.

c. If the Contractor does not have Builder's Risk coverage, the Contractor shall, at no additional cost to the District, (i) insure the Material against theft, fire, loss, vandalism, and malicious mischief; (ii) name the District as additional insured; (iii) deliver this policy or certificate of this insurance to the District; and (iv) receive the District's acceptance of the policy or certificate of insurance. Insurance shall not be cancelable for at least 30 Days;

cancellation shall not be effective until certificate thereof is given to the District.

d. Submittals for the Material and/or Equipment have been favorably reviewed by the District.

e. The Material and/or Equipment have been delivered, identified as property of the District, and physically separated from other Material; protected, properly stored, and maintained at the site in accordance with manufacturer requirements.

2. Only the Contractor's actual cost for Material may be paid prior to inclusion in the Work. The Contractor's actual cost for the Material must be supported by Supplier invoices, proof of payment by the Contractor, and other supporting documentation warranting that the Contractor has received and owns the Material or Equipment free and clear of all liens, charges, security interests, and encumbrances.

3. Material delivered to the site fewer than 30 Days prior to their scheduled incorporation shall not qualify for partial payment consideration.

4. Temporary construction material (e.g. shoring) do not qualify for partial payment.

5. Final payment shall be made only for Material or Equipment incorporated into the Work. Upon Acceptance of the Work, all Material remaining for which advance payments had been made shall revert to the Contractor, unless otherwise agreed; partial payments made for these items shall be deducted from the final payment for the Work.

6. Payment for Material on-site does not relieve the Contractor of its obligations pursuant to the Contract.

6.02.02. Submittal of Application for Payment

A. On the 25th of each month, the Contractor shall prepare and submit the Application for Payment to the District. Each progress pay request is to include payment for Work completed up to and including the 25th of the month. The basis for partial payments of lump sum or other unit Contract items shall be determined by agreement between the Engineer and the Contractor.

B. Each Application for Payment shall be transmitted under the signature of the responsible authorized representative of the Contractor.

C. The Contractor's properly submitted Application for Payment request and request for final payment shall include the following substantiating data:

1. Cover letter identifying:

a. the Project name and Project number;

b. application number and date; and

c. a detailed list of enclosures.

2. Contractor monthly Progress Pay Estimate summary sheet.

   a. The pay request submitted by the Contractor shall contain a source document that provides backup information on how the estimate was prepared.

   b. A source document is defined as the basic document used to record or calculate quantities.

   c. The source document must contain the appropriate Contract Bid Item, the location of the installation, the necessary measurement and/or calculations, and the name of the person preparing the document.

3. Request for payment that meets the criteria listed in 6.02.01.B. Inclusion of Materials On-site.

   a. This form requires a description of each specific Material, quantity, value, and submittal review status substantiating evidence of purchase and cost and a completed affidavit.

4. Certified weekly payroll(s) for the pay estimate period in accordance with the Contract Prevailing Wage requirements.

5. Small/Micro Business Enterprise Utilization Report, if required.

6. Favorably reviewed Detailed Progress Schedule update with Cash Flow Summary and Cash Flow “S” Curve.

7. Daily Extra Work Report Form signed by both the District inspector and by the Contractor’s representative, if applicable.

8. Satisfactory evidence that the Engineer has approved the action taken to correct any Noncompliance Notices and a numbered copy of the noncompliance log.

9. Written acknowledgement by the Engineer that the as-built Drawings have been updated that month.

6.02.03. Review of Application for Payment

A. Upon receipt of a payment request, the District shall review the payment request for the purpose of determining that the payment request is a proper payment request. Any payment request determined not to be a proper payment request

suitable for payment shall be returned to the Contractor no later than seven (7) Days after receipt. A payment request returned pursuant to this paragraph shall be accompanied by a letter citing reasons why the payment request is not proper. The following are examples of an improper payment request:

1. The item of Work requested to be paid was not performed.

2. The Work being requested to be paid has already been paid in previous Progress Pay Estimates.

3. The Work performed and requested to be paid was not done in accordance with the Contract (noncompliance).

4. The quality of the finished product is unacceptable.

5. The source documentation is inaccurate.

6. The Daily Extra Work Reports are not properly filled out.

7. There is a failure to submit an approved SBE Utilization Report, if required.

8. There is a failure to submit any of the Substantiating Documentation in Article 6.02.02. Submittal of Application for Payment.

6.02.04. Payment

A. Payment for all items of Work at the unit or lump-sum price shall be considered as full compensation for furnishing all labor, Material, tools, Equipment, and incidentals necessary to complete the item of Work; no additional payment shall be made. Payment for items of Work called for in the Specifications or shown on the Drawings but that are not separately identified in the Proposal Form shall be compensated as part of the Bid price of one or more of the items that are listed; no additional payment shall be made.

B. Non-Waiver: No progress payment made to the Contractor or the Contractor's sureties shall constitute a waiver of the right to assess Liquidated Damages pursuant to the Contract Documents.

C. The District shall pay within 30 Days valid, undisputed amounts, less any retention, withholds required by law or allowed by this Contract.

D. If the District fails to make any progress payment within 30 Days after receipt of an undisputed and properly submitted payment request from the Contractor, the District shall pay interest to the Contractor equivalent to the legal rate set forth in the Code of Civil Procedure, Section 685.010, subdivision (a).

E. The number of Days available to the District to make a payment without incurring interest pursuant to this Section shall be reduced by the number of Days by which the District exceeds the seven (7)-day return requirement set forth in Article 6.02.03. Review of Application for Payment, paragraph A.

F. Unless otherwise indicated in the Special Provisions, the District shall retain five (5) percent of the estimated value of Work done and five (5) percent of the value of the Material so estimated to have been furnished and delivered and unused as aforesaid and shall pay to the Contractor, while carrying on the Work, the balance not retained as aforesaid after deducting there from all previous payments and all sums to be kept or retained under the provisions of the Contract. No estimate or payment shall be required to be made when, in the judgment of the Engineer, the Work is not proceeding in accordance with the provisions of the Contract, or when, in the Engineer's judgment, the total value of the Work done since the last estimate amounts to less than $1,000. No estimate or payment shall be considered to be acceptance of the Work. All progress estimates and payments shall be subject to correction in the final estimate.

G. Escrow in Lieu of Retention

1. At the request of the Contractor, the District shall permit the substitution of securities or certificates of deposit equivalent to the amount of any monies withheld by the District as above provided. The deposit shall, in that event, be with the District or with a State- or Federal-chartered bank in California as the escrow agent.

2. Alternatively, upon written request of the Contractor, the District shall make payments of the retention as it is earned directly to the escrow agent.

3. The Contractor shall bear the expense of the District and of the escrow agent in connection with the escrow deposit made.

4. Securities or certificates of deposit to be placed in escrow shall include those listed in Government Code Section 16430, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and by the District. Unless otherwise permitted by the escrow agreement, securities or certificates of deposit to be placed in escrow shall be of a value at least equivalent to the amounts of retention to be paid to the Contractor pursuant to this Section.

5. When the District makes payment of retentions directly to the escrow agent, the Contractor may direct, subject to approval of the District, the investment of the payments into securities.

6. The Contractor shall enter into an escrow agreement satisfactory to the District; this agreement shall be substantially similar to that specified in Public Contract Code Section 22300.

7. The Contractor shall obtain the written consent of the surety to the agreement.

6.02.05. Withholding from Payments

A. The District may, at its option and at any time, withhold progress payment(s) or retain from any amounts due the Contractor sums sufficient to cover for one (1) or more of the following reasons:

1. Stop-Payment Notice Claims filed pursuant to the Civil and Labor Code.

2. Contractor has failed to comply with State law prompt payment requirements with regard to payments to Subcontractors.

3. Third-party claims have been filed or there is reasonable evidence indicating probable filing of these claims.

4. Liquidated Damages due or expected.

5. The Contract sum has been reduced by Change Orders.

6. Damage has occurred to the District or to another Contractor.

7. The Engineer determines that:

a. the Work cannot be completed for the unpaid balance of the Contract sum;

b. if any Contractor's Detailed Progress Schedule forecasts inexcusable late completion, or if the District determines that the Work will not be completed within the Contract Time(s), and that the current unpaid balance and retention will not be adequate to cover actual or Liquidated Damages for the anticipated Delay;

c. the Contractor persistently fails to perform the Work in accordance with the Contract Documents;

d. the Contractor fails to submit timely Change Order cost proposal breakdowns and documentation in accordance with the Contract Documents;

e. the Contractor fails to timely submit the Preliminary Progress Schedules, or Detailed Progress Schedules, or any updates or revisions to those submittals, and reports in accordance with the Contract Documents;

f. the Contractor fails to maintain detailed, timely, updated as-built documents or closeout items.

g. the Contractor fails to submit certified payroll records in accordance with the Contract Documents and prevailing wage requirements;

h. the Contractor has not submitted an approved SBE utilization report;

i. the Contractor fails to submit a proper payment request in accordance with the Contract Documents;

j. the Contractor fails to comply with the submittal requirements requiring rereview of the submittal;

k. the Contractor fails to submit a fully compliant Quality Control Plan;

l. there has been material noncompliance with the insurance requirements; or

m. the Contractor fails to comply with any other requirements of the Contract Documents.

6.03. Final Payment

A. As soon as practicable after completion of the Work, the Engineer shall prepare in writing and furnish to the Contractor the final estimate of the quantities of Work done and all payments due as part of the Contract; this estimate will show deductions for prior payments and any other amounts to be retained or withheld as part of the Contract. The amount determined due, less the amount retained and/or withheld, shall be paid.

B. The retained amount will not be due or payable until 35 Days after the filing of the Notice of Completion of Contract and Acceptance of Work, subject to any withholds required by law or by the Contract.

C. Prior to release of the retained amount, the Contractor shall furnish the District with a release of all Claims by the Contractor against the District arising by virtue of this Contract. The release of Claims may include disputed Contract Claims in stated amounts as the Contractor may specifically exclude from the operation of the release pursuant to acceptance of Final Payment.

Tesla Update 1 received 6/23/09 | Schedule of Values Detail - Chris Saldon | 07-Jul-09 13:19

Cost Account IDs	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Budgeted Total Cost	Actual Total Cost	Cost % Complete
Total			609.5d	21-Oct-08 A	18-Dec-11	139.5d	$81,420,562.00	$15,995,442.65	19.61%
1.A.1.1			17.0d	10-Nov-08 A	10-Dec-08 A		$1,120,000.00	$1,120,000.00	100%
1.A.1.1	P101040130	30% DESIGN	15.0d	10-Nov-08 A	10-Dec-08 A		$1,120,000.00	$1,120,000.00	100%
1.A.1.2			30.0d	11-Dec-08 A	23-Feb-09 A		$2,140,000.00	$2,140,000.00	100%
1.A.1.2	P101040150	60% DESIGN	30.0d	11-Dec-08 A	23-Feb-09 A		$2,140,000.00	$2,140,000.00	100%
1.A.1.3			87.1d	11-Dec-08 A	28-May-09 A		$1,240,000.00	$878,500.00	70.85%
1.A.1.3	P101040160	SITE CIVIL DESIGN 90%	30.0d	11-Dec-08 A	23-Feb-09 A		$0.00	$0.00	0%
1.A.1.3	P101040190	ARCHITECTURAL 90%	30.0d	11-Dec-08 A	23-Feb-09 A		$0.00	$0.00	0%
1.A.1.3	P101040250	90% DESIGN	48.0d	24-Feb-09 A	28-May-09 A		$1,240,000.00	$878,500.00	70.85%
1.A.1.4			30.0d	10-Nov-08 A	19-Dec-08 A		$100,000.00	$82,190.23	82.19%
1.A.1.4	P101040100	ONSITE GEOTECHNICAL INVESTIG...	28.0d	10-Nov-08 A	19-Dec-08 A		$100,000.00	$82,190.23	82.19%
1.A.1.5			17.0d	10-Nov-08 A	28-Nov-08 A		$25,000.00	$25,000.00	100%
1.A.1.5	P101040110	POTHOLE RESULTS & SITE SURVE...	15.0d	10-Nov-08 A	28-Nov-08 A		$25,000.00	$25,000.00	100%
1.A.2.1			83.0d	01-Jun-09	26-Aug-09	253.0d	$2,824,000.00	$0.00	0%
1.A.2.1	2A01040100	100% DESIGN	35.0d	01-Jun-09	20-Jul-09	48.0d	$2,500,000.00	$0.00	0%
1.A.2.1	2A01040120	ADDRESS REVIEW COMMENTS & ...	5.0d	20-Aug-09	26-Aug-09	244.0d	$324,000.00	$0.00	0%
1.B.1.1			326.0d	21-Oct-08 A	30-Nov-09	9.0d	$2,217,000.00	$2,155,000.00	49.3%
1.B.1.1	SU02574100	SUBMIT STEEL PIPE & FABRICATE...	0.0d	21-Oct-08 A			$1,000.00	$1,000.00	0.05%
1.B.1.1	SU02574110	SUBMIT STEEL PIPE FABRICATION...	5.0d	03-Dec-08 A	17-Dec-08 A		$1,000.00	$972.00	97.2%
1.B.1.1	PR02574100	PROCURE 144" & 84" HEADERS (S....	115.0d	08-Nov-08 A	18-Jun-09	10.0d	$959,461.00	$932,598.09	97.2%
1.B.1.1	PR02574110	PROCURE 120" & 144" PIPE (S.D. - ...	149.0d	08-Nov-08 A	29-Sep-09	4.0d	$491,674.00	$477,907.13	97.2%
1.B.1.1	PR02574120	PROCURE INLET & OUTLET TIE-IN...	231.0d	08-Nov-08 A	30-Nov-09	9.0d	$296,578.00	$288,245.78	97.19%
1.B.1.1	PR02574130	PROCURE 48" BRANCH PIPING (S....	110.0d	08-Nov-08 A	18-Jun-09	38.0d	$467,287.00	$454,279.00	97.22%
1.B.1.10			0.0d	10-Nov-08 A	10-Nov-08 A		$2,594,444.00	$1,028,157.00	39.55%
1.B.1.10	P101040120	BONDS & INSURANCE	0.0d		10-Nov-08 A		$2,594,444.00	$1,028,157.00	39.55%
1.B.1.2			253.0d	03-Nov-08 A	30-Sep-09	8.5d	$757,077.00	$757,077.00	100%
1.B.1.2	SU15100100	SUBMIT 84" & 144" VALVES (S.D. - ...	5.0d	03-Nov-08 A	12-Nov-08 A		$1,000.00	$1,000.00	100%
1.B.1.2	PR15100100	PROCURE 84" VALVES (S.D. - REQ...	149.0d	08-Jan-09 A	29-Sep-09	4.0d	$251,773.00	$251,773.00	100%
1.B.1.2	PR15100110	PROCURE 144" VALVES (S.D. - RE...	185.0d	25-Nov-08 A	30-Sep-09	8.5d	$504,304.00	$504,304.00	100%
1.B.1.3			202.0d	10-Dec-08 A	15-Jan-10	0.6d	$1,102,273.00	$1,051,281.00	95.37%
1.B.1.3	SU15100110	SUBMIT DeZURIK VALVES (S.D. - R...	5.0d	10-Dec-08 A	15-Dec-08 A		$1,000.00	$1,000.00	100%
1.B.1.3	PR15100120	PROCURE 48" DeZURIK VALVES (S....	150.0d	02-Mar-09 A	15-Jan-10	-25.4d	$550,636.00	$525,306.74	95.4%
1.B.1.3	PR15100130	PROCURE 90",78", 66" & 60" DeZUR...	158.0d	02-Mar-09 A	21-Aug-09	100.5d	$550,637.00	$524,974.26	95.34%
1.B.1.4			265.0d	13-Mar-09 A	05-Apr-10	67.0d	$307,500.00	$0.00	0%
1.B.1.4	SU11288100	SUBMIT CO2 SYSTEM	10.0d	13-Mar-09 A	08-Oct-09	65.0d	$1,000.00	$0.00	0%
1.B.1.4	PR11288100	PROCURE CO2 SYSTEM	110.0d	26-Oct-09	05-Apr-10	65.0d	$306,500.00	$0.00	0%
1.B.1.5			102.0d	29-Sep-09	18-Feb-10	44.5d	$109,680.00	$0.00	0%
1.B.1.5	SU11241100	SUBMIT CHEMICAL TANKS	5.0d	29-Sep-09	06-Oct-09	44.5d	$1,000.00	$0.00	0%
1.B.1.5	PR11241100	PROCURE CHEMICAL TANKS	80.0d	21-Oct-09	18-Feb-10	44.5d	$108,680.00	$0.00	0%
1.B.1.6			244.0d	01-Jun-09	06-May-10	49.0d	$1,289,099.00	$184,500.00	14.31%
1.B.1.6	SU16260100	SUBMIT EMERGENCY GENERATO...	5.0d	01-Jun-09	05-Jun-09	47.0d	$1,000.00	$1,000.00	100%
1.B.1.6	PR16260100	PROCURE EMERGENCY GENERAT...	220.0d	23-Jun-09	06-May-10	47.0d	$1,288,099.00	$183,500.00	14.25%
1.B.1.7			269.0d	23-Dec-08 A	15-Jan-10	-27.4d	$75,605.00	$75,605.00	100%
1.B.1.7	SU13420100	SUBMIT 48-IN MAG METERS (S.D. - ...	5.0d	23-Dec-08 A	26-Dec-08 A		$1,000.00	$1,000.00	100%
1.B.1.7	PR13420100	PROCURE 48-IN MAG METERS (S.D...	200.0d	19-Jan-09 A	15-Jan-10	-25.4d	$74,605.00	$74,605.00	100%
1.B.1.8			117.0d	11-Sep-09	23-Feb-10	53.5d	$128,925.00	$0.00	0%
1.B.1.8	SU11240100	SUBMIT CHEMICAL METERING PU...	5.0d	11-Sep-09	18-Sep-09	53.5d	$1,000.00	$0.00	0%
1.B.1.8	PR11240100	PROCURE CHEMICAL METERING P...	95.0d	05-Oct-09	23-Feb-10	53.5d	$127,925.00	$0.00	0%
1.B.1.9			143.0d	06-Aug-09	23-Feb-10	53.5d	$15,750.00	$0.00	0%
1.B.1.9	SU11247100	SUBMIT CHEMICAL TRANSFER PU...	5.0d	06-Aug-09	13-Aug-09	53.5d	$1,000.00	$0.00	0%
1.B.1.9	PR11247100	PROCURE CHEMICAL TRANSFER P...	120.0d	28-Aug-09	23-Feb-10	53.5d	$14,750.00	$0.00	0%
1.B.2.1.1			357.5d	21-Apr-09 A	03-Nov-10	38.5d	$1,289,346.00	$99,175.00	7.81%
1.B.2.1.1	SW02900100	PLANT TREES & TEMP IRR. SYSTEM	15.0d	08-Oct-10	27-Oct-10	34.5d	$90,000.00	$0.00	0%
1.B.2.1.1	SW02900110	HYDROSEED	4.0d	27-Oct-10	03-Nov-10	34.5d	$16,000.00	$0.00	0%
1.B.2.1.1	SW02200110	PREP ROAD SUBGRADE	10.0d	20-Jul-10	03-Aug-10	34.5d	$155,000.00	$0.00	0%
1.B.2.1.1	SW02520100	CONSTRUCT ROADS TO TOP OF S...	15.0d	17-Aug-10	08-Sep-10	54.5d	$167,500.00	$0.00	0%
1.B.2.1.1	SW02770100	CURBS & GUTTERS	15.0d	03-Aug-10	24-Aug-10	54.5d	$87,446.00	$0.00	0%
1.B.2.1.1	SW02510110	PAVE ROADS	10.0d	31-Aug-10	15-Sep-10	68.5d	$161,331.75	$0.00	0%
1.B.2.1.1	SW01500120	RELOCATE DSL LINE (S.D. - REQUI...	15.0d	21-Apr-09 A	11-May-09 A		$14,900.00	$14,900.00	100%

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TABLE 6-1. SCHEDULE OF VALUES SAMPLE

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SECTION 7. SUBMITTAL MANAGEMENT

7.01. Submittal Requirements

A. This Article includes requirements and procedures for preparing and submitting submittals and other information required by the Contract Documents.

B. Drawings listed in the Specifications shall be supplemented by the Contractor with the submittals required throughout the Contract Documents for the prosecution of the Work and for approval of Equipment. Submittals may include shop detail Drawings, fabrication Drawings, falsework and formwork Drawings, pipe layouts, and similar classes of Drawings, calculations, specifications, product data, samples, manuals, spare parts, photographs, survey data, schedules, or similar items required to be submitted to the Engineer by the Contract Documents.

C. These submittals shall be favorably reviewed by the Engineer before any Work involving these submittals is performed. No change shall be made by the Contractor to any submittal after it has been favorably reviewed by the Engineer.

D. Submittals shall contain all required, detailed information at a reasonable scale with enough views to clearly show the Work to be done or the item to be furnished and shall be properly checked.

7.02. Master Submittal List

A. Within 30 Days of the First Chargeable Day of the Contract as specified in the NTP and monthly thereafter, the Contractor shall submit an electronic copy of the Master Submittal List to the Engineer. This list shall be in Microsoft Excel spreadsheet format and shall identify all originally planned submittals. The purpose of this list is to assist in planning for submittal creation and review and to provide a monthly update of submittal review status. Items on this list shall be sorted by Specifications Number and shall include, at a minimum, the following information:

1. Item number.

2. Reference Specification Section number and paragraph.

3. Description of submittal.

4. Type of submittal (e.g., Shop Drawing, catalog, sample, certificate, test data, manual, other).

5. Original preparer of the submittal to include preparer's name, firm name, telephone number, and email address.

6. Estimated date for submission to the Engineer by the Contractor. Dates shall be coordinated with the Contractor's Progress Schedules to ensure sufficient time is allowed for processing submittals and for procurement of

Material prior to the start of a construction activity. The Contractor shall include submittals as activities in the Detailed Progress Schedules.

7. Actual date sent by the Contractor to the District.

8. Actual date returned by the District to the Contractor.

9. Submittal status.

B. The Contractor shall identify in the master submittal list the submittals that may require long-lead times for manufacturing and/or for delivery and that must be submitted early to the Engineer for review.

7.03. Timing of Submittals

A. The Contractor shall make submittals promptly in accordance with the accepted Detailed Progress Schedules and in such sequence as to cause no Delay in the Work. The time allowed by the Contractor for submittal review shall also provide sufficient time for disapproval and resubmission.

B. The sequence of submission of submittals shall be such that all information is available to the Engineer for review of each submittal as it is received. The Contractor is responsible for furnishing submittals in sufficient time for approval action, including resubmittal, without delaying construction.

7.04. Submittal Format

A. One (1) electronic copy and five (5) paper copies of each submittal shall be submitted.

B. All submittals shall be clearly identified by reference to the Project name, Specification Section, Article, paragraph, Drawing number, or detail as applicable. Submittals shall be well organized, clear, and legible, and of sufficient size for clear presentation of the data. Data submitted shall describe the Materials, Equipment, or other items to be furnished, and where applicable, the system in sufficient detail to indicate full compliance with the requirements of these Contract Documents. Data shall consist of complete Materials and Equipment lists accompanied by catalog data sheets, cuts, performance curves, diagrams, or similar descriptive Materials. Materials and Equipment lists shall give, in each case, the name of the manufacturer, trade name, catalog reference, size, finish, and all other pertinent data.

C. All submittals shall be in the English language and per the customary Imperial System units of measure and weight (i.e., feet, inches, pounds, degrees in Fahrenheit, etc.). Metric units may be provided in addition to the customary Imperial System units of measure and weight.

D. All submittals and supporting data, catalogs, schedules, etc., shall be submitted as the instruments of the Contractor, who shall be responsible for their accuracy,

completeness, coordination, and conformance with the Contract Documents. These submittals may be prepared by the Contractor, Subcontractors, or Suppliers; the Contractor shall review and ascertain that submittals meet all of the requirements of the Contract Documents while conforming to structural, space, and access conditions at the point of installation prior to submission to the Engineer. Designation of Work "by others" if shown in submittals shall mean that the Work shall be the responsibility of the Contractor rather than of the Subcontractor or of the Supplier who prepared these submittals. The Contractor shall ensure that there is no conflict with other submittals. The Contractor shall ensure coordination of submittals among the related crafts and Subcontractors.

E. If the submittals show any deviations from the Contract requirements, the Contractor shall include with the submittal a separate written description of such deviations and the reasons therefore. If any deviations from the Contract requirements are not clearly noted and prominently identified on the submittal, the review of the submittal shall not constitute acceptance of such deviations.

F. The Contractor shall review all submittals before submitting them to the Engineer and shall certify on each transmittal letter and on each submittal that the submittal has been checked, is in compliance with the Contract Documents except as specifically noted, and that each deviation from the Contract Documents is specifically noted.

G. Submittals shall include the following:

1. A separate transmittal form shall be used for each specific item, class of Material, Equipment, and items specified in separate, discrete Specification Section or Article, for which a submittal is required. Submittal documents common to more than one (1) piece of Equipment shall be identified with all appropriate Equipment numbers. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or reviewing the group or package as a whole. The Specification Section or Article to which the submittal is related shall be indicated on the transmittal form.

2. A sequential number in chronological order shall be assigned for each submittal and shall be noted on the transmittal form. Submittal numbers shall have the following format: XXX.Y, where XXX is the sequential number (001 to 999) assigned by the Contractor; and Y is the re-submittal number (0 to 9). For each item submitted, the Contractor shall include the applicable Specification number on the submittal and on the transmittal form.

3. A separate written description of deviations from the Contract Documents, if any.

4. The date of submission and the dates of any previous submissions.

5. The District's name and the Project title and number.

6. Contractor identification.

7. The names of the following (as applicable):

   a. Subcontractor

   b. Supplier

   c. Manufacturer

8. Identification of the product with the Specification Section or Article number, page, and paragraph(s).

9. Field dimensions clearly identified as such.

10. Relation to adjacent or critical features of the Work or Material.

11. Applicable standards (e.g., ASTM).

12. Identification of revisions on resubmittals.

7.05. Submittals to be Furnished by the Contractor

A. Shop Drawings

1. Shop Drawings include, but are not necessarily limited to, custom prepared data (e.g., fabrication on erection/installation [working] Drawings, scheduled information, setting diagrams, actual shop work manufacturing instructions, custom templates, special wiring diagrams, coordination Drawings, individual system or Equipment inspection and test reports), including performance curves and certifications, as applicable to the Work.

2. Submittal of shop Drawings by simply annotating copies of the Contract Drawings is subject to rejection.

B. Product Data

1. Product data as specified in the individual Section or Article, includes, but is not necessarily limited to, standard, prepared data for manufactured products (sometimes referred to as catalog data or "cuts"), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliance and applicability, roughing in diagrams and templates, product photographs, standard wiring diagrams, printed performance curves and operational range diagrams, production or quality control inspection and test reports and certifications, mill reports, product

operating and maintenance instructions, recommended spare parts listing, and printed product warranties, as applicable to the Work.

C. Samples

1. Samples specified in individual Sections or Articles, include, but are not necessarily limited to, physical examples of the Work, such as sections of manufactured or fabricated work, small cuts or containers of Material, complete units of repetitively used products, color/texture/pattern swatches and range sets, specimens of coordination of visual effects, graphic symbols and units of work to be used by the Engineer or by others for independent inspection and testing, as applicable to the Work.

D. Concrete Reinforcement Submittals

1. Submittals for concrete reinforcement shall not simply be annotated copies of the Contract Drawings. New scale Drawings shall be prepared showing plans, all vertical structure elevations, sections, and details as required to clearly delineate the reinforcing to be furnished and installed. Submittals shall show and tabulate reinforcement dimensions, sizes, grades, shapes, splices, laps, splice locations, dowel lengths, and all similar information needed for construction, Material takeoffs, and Engineer's review to determine compliance with the structural design. Submittals shall show reinforcement dimensioning and placement that reflect the Contractor's intended and approved concrete placement sequence.

E. Electrical and Instrumentation Equipment Submittals

1. Submittals as described herein shall be provided for all electrical and instrumentation Equipment and systems furnished as part of products and systems specified in these Specifications. These submittals shall include, but are not necessarily limited to, the following:

a. An Equipment list tabulating all components furnished, followed by the manufacturer's name, manufacturer's model number, and a cross-reference to its location on the submittals.

b. A complete conduit riser diagram and conduit schedule shall be prepared and submitted for the interconnection of all electrically powered Equipment. The riser diagram and conduit schedule shall detail conduit identification numbers as shown on the Drawings, as well as size, wires, and location. Where the riser diagram requires either more wires or larger conduits than detailed in the Drawings, the Contractor shall coordinate any required changes with the electrical Subcontractor, if any, before installation begins.

c. Interior and exterior panel elevation Drawings for all panels, consoles, and Equipment enclosures. The elevations shall be drawn to scale and shall detail all Equipment in or on the panel. Nameplates, conduit access locations, mounting provisions, panel construction details, manufacturer's model number, and panel color (or color samples) shall be included.

d. Drawings and descriptive data and brochures of each item of Equipment. Electrical characteristics and requirements, enclosure types, manufacturer, and model number shall be included. Sheets or Drawings showing more than the particular item under consideration shall have crossed out all but the description of the item for which the review is requested.

e. Schematics and connection diagrams. A manufacturer's standard connection diagram or schematic showing more than one (1) scheme of connection shall not be accepted unless it is clearly marked to show the intended, work specific connections; terminal numbers shall be included. A written operation theory shall be included for all complex control schemes.

2. For each instrument furnished with mechanical systems, submittals shall include an Instrumentation, Systems, and Automation Society (ISA) S20 Data Sheet and technical bulletins or brochures. The summary data sheets and the technical bulletins shall include, but shall not necessarily be limited to, the following:

a. tag numbers per the Process and Instrumentation Drawings;

b. the manufacturer's model or other ordering designation;

c. product (item) names used on the Drawings;

d. physical location where installed;

e. input output characteristics;

f. range, size, and graduations as required;

g. physical size with dimensions and mounting details;

h. quantity and quality requirements for electric power, air, and/or water supply;

i. Materials in contact with or otherwise exposed to the process;

j. certified calibration and/or calibration curves where applicable; and

k. Detailed Instrumentation, Systems, and Automation Society (ISA) loop wiring diagrams showing requirements for each instrument that is furnished under this Section. The diagram shall identify all device terminal points, as well as any intermediate terminal blocks. Power supplies, loop grounds, wire/cable number, etc., shall be detailed. Such loop wiring diagrams shall be prepared per ANSI/ISA S5.4. Optional items 1, 3, 4, 6, and 7 from paragraph 5.3 of S5.4 are also required. Note that the District loop numbering protocol used in these documents and required for submittals does not comply with ISA standards.

3. Submittal of motor data for acceptance shall include complete nameplate data in accordance with NEMA Standards and, in addition, the following information for motors typical of the units furnished:

a. Ambient temperature setting.

b. Service factor.

c. Efficiency at ½, ¾, and full load.

d. Power factor at ½, ¾, and full load.

e. Motor outline, dimensions, and weight.

f. Descriptive bulletins, including full description of insulation system.

g. Bearing design data.

h. Special features (i.e., space heaters, temperature detectors, etc.).

7.06. Submittal Review Procedures

A. Review of submittals has as its primary objective the completion of the Work in full conformance with the Contract Documents, unmarred by field corrections and within the construction time provided. In addition to this primary objective, submittal review as a secondary objective shall assist the Contractor in its procurement of Equipment that shall meet all requirements of the Contract Documents; shall fit the structures detailed on the Drawings; shall be completed with respect to piping, electrical, and control connections; shall have the proper functional characteristics; and shall become an integral part of a complete operating facility.

B. For submittals that require the Engineer's review, one (1) copy shall be returned to the Contractor within 20 Days after receipt. The Contractor shall make any necessary corrections and revisions to the returned submittals and shall resubmit the submittals within 20 Days after receipt. The Contractor is responsible for furnishing submittals in sufficient time for approval action, including re-submittal without delaying construction.

C. The Contractor shall be solely responsible for agreement and conformity of submittals with the Contract Drawings and with the Specifications. The review of submittals shall be for general conformance with the design concept and with the Contract Documents. It is expressly understood that the Engineer's review of the Contractor's submittals shall not relieve the Contractor of any responsibility for:

1. accuracy of dimensions and details;
2. coordinating the Work with all other associated Work and trades;
3. selecting fabrication processes;
4. techniques of assembly;
5. departing from details furnished by the Engineer;
6. its obligation to meet safety requirements;
7. its obligation to meet all other requirements of laws;
8. compliance with the Contract requirements; and
9. errors, including details, dimensions, and Material.

D. Favorable review of all submittals (returned "No Exceptions Noted" "In Receipt of" or "Make Corrections as Noted") shall apply in general design only and shall in no way relieve the Contractor of responsibility for errors or omissions contained therein. Favorable review shall not relieve the Contractor of its obligations to meet safety requirements and all other requirements of laws nor shall it constitute a Change Order authorization. Favorable review shall not constitute acceptance by the District of any responsibility for the accuracy, coordination, and completeness of the submittals or for the items of Equipment represented on the submittals, nor shall it constitute a Change Order authorization.

E. If the Contractor submits an incomplete or disorganized submittal, the submittal shall be considered "Rejected" and shall be returned to the Contractor without review. The Engineer may, at its sole discretion, elect to provide a list of, or mark the submittal indicating some or all of, the areas that are incomplete. A complete submittal shall contain sufficient data to demonstrate that items comply with the Contract Documents; shall meet the minimum requirements for submissions cited in the Technical Specifications; and shall include any necessary revisions required for Equipment other than the first named manufacturer. The Engineer's determination of whether a submittal is complete shall be final. The District reserves the right to return a submittal that requires coordination with another or other submittals not yet received by the District.

F. After review by the Engineer of each of the Contractor's submissions, the submittal shall be returned to the Contractor with actions defined as follows:

1. No Exceptions Noted: The favorable review of a submittal is subject to its compatibility with future submissions and with additional partial submissions for portions of the Work not covered in this submission. It does not constitute approval or deletion of specified or required items not shown in the partial submission. The Contractor may proceed with the Work shown in the submittal.

2. Make Corrections As Noted: Same as 1 except that minor corrections as noted shall be made by the Contractor. The Contractor may proceed with the Work, providing corrections have been made; resubmission is not required.

3. Revise and Resubmit: Rejected because of inconsistencies or errors that shall be resolved or corrected by the Contractor prior to subsequent resubmission. The Contractor may not proceed with the Work shown in the submittal.

4. Rejected: Submitted Material does not conform to Drawings and Specifications in major respects (i.e., wrong size, model, capacity, or Material). The Contractor may not proceed with the Work shown in the submittal.

5. In Receipt Of: Receipt of submittal is acknowledged by the Engineer.

G. Resubmittals shall be processed in the same manner as first submittals. On resubmittals, the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop Drawings by use of revision triangles or other similar methods, to revisions from previous submissions. Any such revisions that are not clearly identified shall be made at the risk of the Contractor. If any such revisions are installed, all portions thereof that do not fully conform to the Contract Documents shall be corrected by the Contractor at its expense and as required by the Engineer.

H. The favorable review of submittals (returned “No Exceptions Noted” or “Make Corrections as Noted”) shall be obtained from the Engineer prior to the fabrication, delivery, and construction of items requiring submittals.

I. All resubmittals shall be accompanied by a memorandum or letter from the Contractor that responds to each written review comment provided by the Engineer in the previous submittal. Each response shall describe the corrective action taken or reason for the Contractor’s actions.

J. The Contractor shall make a complete and acceptable submittal to the Engineer at least by the second submission. If a returned submittal is required to be resubmitted more than once due to the Contractor’s failure to comply with submittal requirements, the Contractor may be charged all costs associated with rereview of the submittal. The charges may be deducted from a progress payment due, or that will become due, to the Contractor and shall be based on

actual review hours recorded by the Engineer, District staff, and by the Engineer's consultants, multiplied by their actual, fully burdened labor rates.

7.07. Substitutions

A. Substitutions are considered changes to the Contract. If Materials, Equipment, item, means, method, technique, sequence, or procedure of construction is required by the Contract Documents, the Contractor may furnish or utilize a substitute item, means, method, sequence, technique, or procedure of construction acceptable to the Engineer, unless identified as a sole/single-source item. Substitutions shall be formally submitted as a Request for Substitution. The Contractor must submit sufficient information to allow the Engineer to determine whether the substitution proposed is equivalent to that indicated or as required by the Contract Documents.

B. The Engineer shall respond in writing to the Contractor within ten (10) Days indicating the time necessary to evaluate each proposed substitution.

C. The Engineer shall be the sole judge in this matter. In the event the Engineer rejects the proposed items, the Contractor shall submit the Specified Items.

D. No substation shall be ordered, installed, or utilized without the Engineer's prior written acceptance, which shall be evidenced by either a favorably reviewed Request for Substitution, Change Order, or by a DCO. The District may require the Contractor to furnish, at the Contractor's expense, a special performance guarantee with respect to any approved substitution.

E. The Engineer shall record time required by the Engineer, District staff, and by the Engineer's consultants to evaluate substitutions proposed by the Contractor and to make changes in the Contract Documents occasioned thereby. Regardless of whether or not the Engineer accepts a proposed substitution, the Contractor shall reimburse the District for the charges of the Engineer and for the Engineer's consultants for evaluating each proposed substitution.

F. Cost or time impacts to other items of Work that are caused by any Contractor-initiated Request for Substitution, whether anticipated or unforeseen, shall be the responsibility of the Contractor.

G. Request for Substitution: Submission of items that are proposed as equivalent to any other item, means, method, sequence, technique, or procedure of construction shall be evaluated in accordance with the provisions outlined below. Burden of proof as to the submitted items being equivalent to the items required by the Contract Documents is the responsibility of the Contractor.

1. All provisions and evaluation criteria under Article 7.08. "Or Equal" Items, paragraph E in this Article shall apply to the proposed substitutions.

2. No submission of proposed substitutions shall be accepted or considered by the Engineer prior to Contract award.

3. Other additional provisions and/or criteria as deemed necessary by the Engineer.

4. Substitution(s) of Specified Item(s) item, means, method, sequence, technique, or procedure of construction proposed by the Contractor may require modifications in the Project design, Project schedule, and/or in the construction sequencing. The Contractor shall identify all necessary Project modifications required for the substitution(s). Necessary Project modifications may include, but may not be limited to, electrical, instrumentation, structural, mechanical, architectural, testing, engineering costs, and other related modifications.

5. The Contractor shall be responsible for all costs associated with the substitution(s), including submittal reviews and any Project redesign and modification. Contractor refusal to accept any of these costs shall be just cause for disapproval of the substitution(s).

6. If the proposed items are accepted, 50 percent of all savings shall be credited to the District. Total cost savings shall be less any design costs required for substitution(s) implementation.

7.08. "Or Equal" Items

A. Specified Item: Materials, Equipment, product, thing, or service referenced in the Contract Documents that has been identified by one (1) or more specific brand, manufacturer, Supplier, company, catalog number, or trade name. Whenever such designations shall be deemed to be used for the purpose of facilitating the description of the Specified Item and shall be deemed to be followed by the words "Or Approved Equal," whether explicitly stated or not, unless specifically noted to the contrary, in these instances, the Contractor may presume the specific brands are the only product known to the District that meet the requirements of the Contract Documents; the Contractor may propose the provision of Materials or Equipment that are equal to the Specified Item.

B. Equal Item: Item as referenced in these Contract Documents are those that, to the Engineer's knowledge, meet the requirements of the Contract Documents and are considered equal to the Specified Items.

C. The Contractor shall submit sufficient data, Drawings, samples, literature, calculations, and all other information as requested by the District to demonstrate to the Engineer that the proposed items are equal to the Specified Items.

D. Failure of the Contractor to submit the proposed Equal Item for review in the manner and time described in this Article shall be sufficient cause for rejection by the Engineer of the proposed Equal Item.

E. The Engineer's evaluation of the submitted items proposed as being equivalent to the Specified Items is based on, but is not limited to, the following:

1. Performance.

2. Functionality and efficiency.

3. Durability.

4. Life cycle costs.

5. Ease and economy of maintenance and operation.

6. Construction and physical characteristics as compared to the Specified Items or as delineated in the Contract Documents.

7. Dimensional compatibility with the Material it combined to produce a unified design system.

8. Compatibility with products in use.

9. All aspects of finished appearance, including form, texture, and color, that may affect other design elements.

10. Impacts to Project design, construction schedule, or construction sequencing.

F. The Engineer shall be the sole judge in this matter. In the event the Engineer rejects the proposed items, the Contractor shall submit the Specified Items.

G. The Contractor shall submit to the Engineer, in accordance with Public Contract Code Section 3400, after Contract award, no later than 35 Days after the date of NTP, a proposal for replacing a specified item with an equal item. At the sole discretion of the Engineer, the District may give written consent to the submission of the proposed Equivalent Item after the expiration of a 35-day time limit.

7.09. Sole/Single Source

A. No substitution of designated Sole/Single Source items listed in the Contract Documents shall be allowed.

B. Wherever the District has made a finding and specified in the Contract Documents that a Sole//Single Source is required for one (1) or more of the listed reasons stated in the Public Contract Code Section 3400(c), the Material or Equipment specification shall list only one (1) manufacturer, catalog number, or trade name, followed by the designation “No Equal,” “No Others Acceptable,” “No Alternatives Allowed,” “No Other Manufacturers Accepted,” and/or similar language.

SECTION 8. SAFETY AND SECURITY MANAGEMENT

8.01. Public Safety

A. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during the performance of the Work, except from the District's sole negligence or intentional misconduct. The Contractor's compliance with this requirement is not limited to normal working hours.

B. At all times, the Contractor shall provide for public safety and convenience. The Contractor's operations shall be conducted so as to offer the least possible obstruction and inconvenience to the public along with the greatest safety to the public. At no time shall the Contractor have more Work underway than can be prosecuted with proper regard to these considerations to the public.

C. At all times, the Contractor shall provide sufficient measures, such as, but not limited to, fences, barriers, barricades, railings, lights, signs, and any other warning devices and shall provide flagging and guards as are necessary to give adequate warning of any dangerous condition to the public and to reasonably and prudently provide for the greatest public safety and convenience. The Contractor shall comply with all reasonable requirements of the Engineer or public agency having jurisdiction in interpreting this subparagraph.

8.02. Accident Prevention

A. The Contractor is hereby informed that Work on this Project could be hazardous. The Contractor shall instruct all personnel working in potentially hazardous work areas of the potential dangers and shall provide safety Equipment and instruction as is necessary to prevent injury to personnel and damage to property. Special care shall be exercised relative to Work around high-voltage wires, high-pressure gas mains, high-pressure water pipelines, and other utilities. Temporary supports, as required by the utility company, shall be provided by the Contractor to protect utility facilities.

B. The Contractor shall strictly comply with all applicable City, County, and State Rules, Ordinances, Regulations, and Codes, including, but not limited to, CAL OSHA Labor Code Section 6300 et seq. and California Code of Regulations Title 8, Chapter 4. Nothing in these Specifications shall be construed to permit Work not conforming to governing Codes. When Contract Documents differ from governing Codes, the Contractor shall furnish and install the higher standards called for without additional charge. The Contractor shall also take, or cause to be taken, additional measures as may be necessary for the prevention of accidents.

C. The Contractor shall maintain an accurate record of, and shall report to the Engineer in writing, exposure data and all accidents resulting in death, traumatic injury, occupational disease, or damage to property, Material, supplies, or Equipment incident to Work performed under the Contract.

D. If the Engineer notifies the Contractor of any noncompliance with the foregoing provisions, the Contractor shall, after receipt of this notice, immediately take corrective action. If the Contractor fails or refuses to comply immediately, the matter may be referred to the proper authority. No part of the time lost due to any stop order issued by a proper authority shall be made the subject of a Claim for extension of time or for extra costs or damages by the Contractor.

E. Compliance by Subcontractors with the provisions of this Article shall be the responsibility of the Contractor.

8.03. Explosives and Stream Pollution

A. When the use of explosives is necessary for the prosecution of the Work, the Contractor shall not endanger life or property.

B. The Contractor must obtain and comply with permit(s) from all regulatory agencies for the storage and use of explosives.

C. The Contractor must obtain a permit from the California Department of Fish and Wildlife, if required, in advance of the use of underwater explosives. The Contractor shall comply with all applicable requirements of the Fish and Game Code relating to stream pollution, particularly Section 5650.

8.04. Fires

A. The Contractor must obtain and comply with the permit(s) from all regulatory agencies, including from the Bay Area Air Quality Management District (BAAQMD) if required, for fire-related activities.

8.05. Excavation Safety Plans

A. In accordance with Labor Code Section 6705, Miscellaneous safety Provisions, excavations five (5) feet or more in depth shall not begin until the Contractor has submitted, and the Engineer has returned indicating “In Receipt Of,” the Contractor’s detailed plan for worker protection from the hazards of caving ground during these excavations. The plan may be reviewed by the Engineer for completeness in accordance with Federal, State, and Local regulations. The Engineer shall not be responsible for reviewing the accuracy of assumptions, data and information used, and procedures contained in the plan, or for the adequacy thereof. The plan shall show the details of the design of shoring, bracing, sloping, or other provisions to be made for worker protection during the excavations. The plan shall not allow the use of shoring, sloping, or a protective system less effective than that required by the Construction safety Orders. If the plan varies from the shoring system standards established by the Construction safety Orders, the plan (including calculations) shall be prepared, signed, and stamped by a registered Civil or Structural Engineer and by a registered Geotechnical Engineer in the State of California.

B. These plans shall be accompanied by a copy of a Permit to Excavate that has been issued by the Division of Occupational safety and Health as required by Labor Code Section 6500 et seq.

C. This Article shall be applicable regardless of the Contract Price(s).

D. The Contractor's Engineer shall review the adequacy of the Contractor's work methods, Equipment, bracing, or scaffolding, or safety measures, in, on, or near the construction site.

8.06. Tunnel Construction Safety

A. The Contractor shall comply with all applicable requirements of Labor Code Section 7950 et seq. regarding tunnel safety.

B. The Contractor shall notify the California Division of Occupational Safety and Health and the Engineer before any initial construction may be started at any tunnels.

C. The Contractor shall schedule a pre-job safety conference with representatives of the Division, District, employer, and employees before Work begins as required by Labor Code Section 7955. This conference shall include the employer's review of the construction plan and any special Equipment, practices, and potential safety and health problems. The Engineer shall be notified of the time and place of the conference.

D. The District shall obtain the tunnel classification prepared by the Division of Occupational Safety and Health prior to the request for bids, whenever possible, and make it available to the Contractor. A notice of the classification and any special orders, rules, or regulations to be used in construction, remodeling, demolition, or operation of the tunnel or underground mine shall be prominently posted at the site by the Contractor.

8.07. Confined Space Program

A. The Contractor working in or supporting work in a confined space shall have a Confined Space Program.

B. The Contractor shall submit a copy of its confined space program document to the Engineer. The program document shall be in compliance with all requirements of California Code of Regulations Title 8, Sections 1950 – 1962, and other applicable confined space requirements. Entry into a confined space shall not occur until the Contractor has submitted, and the Engineer has returned, indicating "In Receipt of," the Contractor's Confined Space Program document.

C. The Contractor shall ensure that all of its employees and Subcontractors working in or supporting Work in a confined space have received all training mandated by

Cal/OSHA and meet any other Cal/OSHA requirements related to the Work. All entries into confined spaces shall be coordinated with the Engineer.

D. The Contractor shall provide confined-space rescue services for all Work performed in a permit-required confined space and for all entrants to a permit-required confined space regardless of the entrant's employer.

E. All employees of the Contractor or Subcontractor performing rescue services shall have received previous training, as applicable, in (i) atmospheric monitoring and ventilation; (ii) communication; (iii) emergency, self-rescue, and non-entry rescue operations; (iv) permit systems; (v) signs, symptoms, and consequences of exposure to contaminants; (vi) first aid and CPR; (vii) lockout/tagout; (viii) fall protection; (ix) electrical safety; and (x) respiratory protection.

F. The required training as described in Paragraph E above, shall be per established industry standards (i.e., the latest version of ANSI Z117.1, Safety Requirements for Confined Spaces, American National Standards Institute); and per Cal/OSHA regulations (i.e., California Code of Regulations, Title 8, Sections 1960[b] and 5157[k].) All rescue personnel shall also have practiced making permit space rescues at least once every 12 months by means of simulated rescue operations in which they remove dummies, mannequins, or actual persons from actual permit spaces or from representative permit spaces. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed. This training shall have taken place no more than 12 months before the Work to be performed on this Project begins.

G. Prior to the start of Work, the Contractor or any Subcontractor performing Rescue Services, shall submit to the District for review, a Rescue Training Certification (District Form FC 1767) included at the end of this Section, if/when it becomes necessary for District staff to enter a permit required confined space.

H. Prior to entry, the Contractor shall post the most current copy of its Rescue Training Certification form (without its attachments) at the worksite where rescue services are to be provided.

I. The Contractor shall submit an updated Rescue Training Certification form to the Engineer prior to the performance of each rescue service event. In addition, the Contractor shall submit an updated form to include any personnel not previously identified.

8.08. Temporary Facilities

A. Use construction hoists, elevators, scaffolds, stages, shoring, and similar temporary facilities of ample size and capacity to adequately support and move loads to which they will be subjected. Provide railings, kick plates, enclosures, safety devices, and controls required by law or regulation or for adequate protection of life and property.

B. Staging and falsework: Temporary support (e.g., formwork, falsework, or shoring) shall be designed and constructed in accordance with Construction Safety Orders, California Code of Regulations, Title 8, Sections 1541.1 and 1717. The falsework plan, shoring plan, and any required calculations shall be submitted, and the Engineer has returned indicating "In Receipt of," prior to commencement of any associated work on site.

C. Warning devices and barricades: Identify and guard hazardous areas and conditions by visual warning devices, and, where necessary, by physical barriers per Cal/OSHA requirements; by the latest version of the California Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD); and by State agency permit conditions.

D. Barricades: Place barriers at ends of excavations and along excavations to warn pedestrian and vehicle traffic of excavations. Provide barriers with flashing lights after dark. Keep barriers in place until excavations are entirely backfilled and fully compacted. Barricade excavations to prevent persons from entering excavation areas in streets, roadways, parking lots, or other public or private areas associated with the Project.

E. Temporary enclosures: When sandblasting, spray painting, spraying of insulation, fireproofing, or other activities inconveniencing or dangerous to property or to the health of employees, District staff, or the public are in progress, the area of activity shall be enclosed adequately to contain the dust, over spray, or other hazard. In the event that there are no permanent enclosures of the area or that enclosures are incomplete or inadequate, the Contractor shall provide suitable, temporary enclosures. The Contractor shall submit to the Engineer a temporary enclosure plan for protection of open bodies of water from contamination. Temporary enclosures shall not hinder or adversely affect treatment plant operations.

F. Above-grade protection: On multilevel structures, the Contractor shall provide safety protection that, as a minimum, shall meet the requirements of California Code of Regulations, Title 8 Industrial Relations.

G. Fences: Enclose Work site with fencing adequate to protect the Work as necessary against acts of theft, violence, and vandalism. When entire site or part thereof is to be permanently fenced, permanent fencing may be built to serve as both permanent and temporary protection of the Work site, provided that any damaged or defaced fencing is replaced prior to final acceptance.

8.09. Injury and Illness Prevention Program

A. Work shall not commence until the Contractor has submitted, and the Engineer has returned indicating "In Receipt of," the Contractor's Injury and Illness Prevention Program (IIPP). The IIPP shall comply with Cal/OSHA requirements California Code of Regulations, Title 8, Section 1509 (Construction), Section 3203 (General Industry), and other regulations as applicable. A copy of the

program shall be available at all times at the job site. The Contractor shall designate a Safety Officer who will monitor and enforce the IIPP.

8.10. Safety and Health Program for Hazardous Waste Operations

A. The Contractor shall comply with California Code of Regulations, Title 8, Section 5192 and shall develop and implement a written safety and health program and a site-specific safety and health plan for employees involved in Hazardous Waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards and provide for emergency response for Hazardous Waste operations. In compliance with Title 8, Section 5192, the written safety and health program shall incorporate:

1. an organizational structure;
2. a comprehensive work plan;
3. a Site-Specific Safety and Health Plan;
4. a safety and health training program;
5. a medical surveillance program;
6. the Contractor's standard operating procedures for safety and health; and
7. any necessary interface between general program and site specific activities.

8.11. Site Safety and Health Supervisor

A. The Contractor shall provide a site safety and health supervisor who has the responsibility and authority to develop and implement the site-specific safety and health plan and to verify compliance in accordance with California Code of Regulations.

B. The site safety and health supervisor shall be a qualified and experienced safety and health professional whose sole duty is safety, health, environmental control, and monitoring and who shall be on-site during normal working periods and available 24 hours a day, seven (7) Days a week by telephone or by other approved means. Safety representatives from Subcontractors shall not be substituted for the Contractor's safety representative.

C. The site safety and health supervisor shall meet, at a minimum, the following qualifications: five (5) years of construction project safety management experience on similar projects with OSHA 30-hour certified construction training or certified safety professionals (CSP) with experience in construction-related projects. The safety officer or other competent person shall maintain current training certificates in first aid and in CPR.

8.12. Site-Specific Safety and Health Plan

A. The Contractor shall develop, implement, and verify compliance of a site-specific safety and health plan for Work on this Project.

B. The safety and health plan shall conform to the requirements of all local, state, and federal ordinances, rules, regulations, and guidelines concerning occupational health and safety issues. It shall also include protocol to be utilized in the event unexpected materials or substances are encountered.

C. The safety and health plan shall consist of procedures for the protection of the Contractor's personnel, including Subcontractors, District personnel, consultants, inspectors, and Supplier personnel working with Hazardous Material and the general public from Site-specific hazards.

D. The safety and health plan shall be prepared and signed by a certified industrial hygienist (CIH). The safety and health plan shall identify the site safety and health supervisor who is responsible for the implementation of the plan.

E. Should the types of activities and associated hazards change during the course of work, the Contractor's CIH shall amend the appropriate sections of the safety and health plan to reflect the changed site conditions. The revisions shall address the specific potential hazards to workers and to any others who will be involved in the construction that could result from exposure to the new hazard(s).

F. The Contractor shall keep a copy of the safety and health plan at the job site at all times and shall provide a copy to all personnel working on site. All Contractor personnel performing work on-site shall be required to read the safety and health plan and shall be required to sign an acknowledgment that he/she has obtained and read a copy of the safety and health plan. No worker shall be allowed to perform Work on the site until a copy of his/her signed acknowledgment has been submitted to the Engineer by the Contractor. At a minimum, the safety and health plan shall consist of the following items:

1. Project Organization: To include project manager, project site safety officer, superintendent, forepersons, Subcontractors, any team leaders, and other workers and shall address their roles and responsibilities.

2. Work Plan: Address anticipated Project activities and objectives of the site operations; identify performance tasks for the Project, methods, and activities for accomplishing these tasks, task hazard analysis for each task activity listed in the safety and health plan, personnel requirements, personnel training requirements, and medical monitoring requirements for site personnel.

3. Site Safety Meetings: Include the frequency of the meetings, who will conduct the meetings, time of day meetings will be held, general topics that will be covered at the meetings, and documentation protocol.

4. Employee Training Assignments: Discuss the training elements and the employees who received the training.

5. Review of the Site History for Overall Hazard Characteristics: Discuss physical and health hazards, site characterization, and known and potential exposures to Hazardous Material.

6. Site Control Program: At a minimum, specify the site work zones, site personnel training requirements for each class/type of worker, site protective clothing requirements, safe working practices, and site communication.

7. Personnel Medical Monitoring Requirements: Discuss requirements for each class/type of worker to be on-site and special condition hazards.

8. Personnel Protective Equipment Program: At a minimum, specify selection, personnel training requirements, Equipment storage requirements, Equipment maintenance and repair requirements, Equipment decontamination requirements, and Equipment limitations.

9. Engineering Controls: Specify additional engineering controls to be used for workplace safety, if any.

10. Monitoring: As applicable, at a minimum, specify monitoring methodology, frequency of monitoring, personnel training requirements to monitor, Equipment to be used, Equipment calibration methodology, and documentation protocol.

11. Material Handling: As applicable, specify machinery and Equipment to be used, tools to be used, containers to be used, and personnel training requirements for operators.

12. Decontamination: As applicable, specify procedures for decontamination area construction, personnel decontamination, Equipment decontamination, reinstate control, protective clothing debris control, and decontamination station personnel requirements.

13. Emergency Response Program: At a minimum, specify directions to the nearest medical facility, decontamination procedures for injured workers, and emergency Equipment available on-site.

14. Spill Contamination Contingency Program: Shall include provisions for gases, liquids, and solids.

15. Sanitation Facilities: Identify availability for workers and provisions for different sexes.

16. Illumination: If used during the Project, specify the condition requirements for use, type of illumination to be provided, and illumination locations on site.

17. Confined Space Entry: Discuss personnel protective Equipment, ventilation method and Equipment, illumination method and Equipment, atmosphere testing and Equipment, safety protocol, and documentation protocol.

18. Site Excavation: Discuss types of Equipment to be used, personnel training requirements, safety practices to be utilized, open excavation construction, and personnel entry safety.

19. Safety Inspections: Identify scope of inspections, frequency and time of inspections, personnel qualification of inspector, and communications protocol.

G. The Contractor shall comply with the safety and health plan. Noncompliance with the safety and health plan shall be grounds for temporary suspension of all Work. Suspension of Work for noncompliance shall not be grounds for additional time or compensation.

H. The safety and health plan may be revised and/or amended by the Contractor and the Contractor's CIH as necessary during Work progress and as specified in these Specifications. Revisions and/or amendments to the safety and health plan shall be considered incidental to this item of Work; no additional payment shall be made.

8.13. Safety and Health Plan Implementation

A. Providing for worker safety and personal protection is the Contractor's responsibility and shall be in accordance with the Contractor's safety and health plan. The Contractor is responsible for providing any and all training, monitoring, personal protective Equipment, protective clothing, devices, Equipment, and/or facilities necessary for ensuring worker safety as may be recommended and/or as specified in the Contractor's safety and health plan.

B. The Contractor is responsible for ensuring that its personnel understand and comply with all site health and safety requirements specified in the safety and health plan.

8.14. Submittals

A. This Article summarizes required safety-related submittals. This Article is not intended to be all inclusive. In addition, some submittal requirements specified below may not apply depending on the specific Work under this Contract. Contractor is solely responsible for identifying and submitting to the District and/or to appropriate authorities having jurisdiction all Submittals required by

applicable laws, rules, and regulations. The Contractor shall submit at a minimum the following items:

1. Injury Illness Prevention Program (IIPP): Shall be submitted and favorably reviewed by the Engineer prior to commencement of any Work on site. The District may review or comment on the IIPP. The District's review or comment on the IIPP does not in any way relieve the Contractor of (i) any responsibility or liability for the IIPP, and (ii) being solely, fully, and completely responsible for the safety of all persons and property at the job site.

2. Site-Specific Safety and Health Plan: Shall be submitted and favorably reviewed by the Engineer prior to commencement of any Work on site (if applicable). The District may review or comment on the safety and health plan. The District's review or comment on the plan does not in any way relieve the Contractor of (i) any responsibility or liability for the plan, and (ii) being solely, fully, and completely responsible for the safety of all persons and property at the job site.

3. Names and qualifications (résumés including education, training, experience, and certifications) for the designated site safety and health supervisor and other competent and qualified personnel to be used on the Project in support of job site safety requirements.

4. Completed Activity Hazard Analysis (AHA) or Job Hazard Analysis (JHA) submitted for all significant activities and tasks with a high-risk potential, describing the job steps, hazards associated with each job step, and the controls used to remove or minimize the associated hazards. No hazardous Work shall be allowed without an approved AHA or JHA.

5. Incident Investigation Reports: Submitted to the Engineer within 24 hours of the Project incident.

6. Project-Specific Hazardous Substances Communications Plan: Contractor shall prepare and submit plan and receive favorable review by the Engineer prior to commencement of sitework activities.

7. Safety Meeting Attendance Sheet ("Toolbox" meetings): Submitted to the Engineer within seven (7) working Days of the last working Day of the month.

8. Air Monitoring Results/Reports: Submitted to the Engineer on request (if applicable).

9. Monthly Field Project Report (including man-hours, incident/injury, and property damage reports): Submitted to the Engineer on a monthly basis within seven (7) Days of the last working Day of the month.

10. Heavy Equipment Inspection Forms: Submitted to the Engineer on request (if applicable).

11. Documentation for all Individuals Applicable to Regulatory Medical Surveillance Guidelines and HAZWOPER Training per Cal/OSHA Requirements: Submitted to the Engineer for review prior to beginning any Work associated with these requirements (if applicable).

12. Critical Lift Plans: Submitted to the Engineer on request (if applicable).

13. Crane Inspection Certifications: Submitted to the Engineer on request (if applicable).

14. Crane Operators Certification: Submitted to the Engineer on request (if applicable).

15. Applicable employee training and required medical approval documentation in compliance with Cal/OSHA standards.

16. Copies of detailed and documented quarterly crane inspections conducted by qualified individuals (if applicable).

17. Written crane inspections submitted to the Engineer on a daily basis.

8.15. Security Requirements at Job Site

A. The Contractor shall make adequate provision for the protection of the Work area against fire, weather, theft, and vandalism and for the protection of the public against exposure to injury. All costs arising from theft, fire, or vandalism of the construction Material and Equipment shall be borne by the Contractor.

B. During night hours, weekends, holidays, and during other times when no Work is performed at the site, the Contractor shall provide temporary closures or enlist services of security guards to protect temporary openings.

C. The Contractor shall not allow its staff to stay at the Project site outside of specified hours of Work.

8.16. General

A. The Contractor shall comply with the security requirements specified herein during the entire construction duration. These requirements are not to be construed to relieve the Contractor of its responsibility for the Work as specified in Article 4.11. Contractor's Responsibility for the Work.

B. The Contractor's personnel includes the Contractor's own staff, including, but not limited to, all tiers of Subcontractor staff, manufacturer representatives, technicians, delivery drivers, etc.

8.17. Identification and Badging

A. All Contractor personnel who enter the Project site are required to possess and carry a valid photographic identification. A current driver's license, or identification card issued by the California Department of Motor Vehicles or by other States, or a current passport is considered valid photographic identification. This identification shall be presented to District staff and security guards upon request. Contractor personnel without this identification shall be denied access to or shall be asked to leave the site.

B. The District shall provide Project-specific identification badges for use by Contractor personnel. The District shall issue a photographic identification badge to each person who works at the site for more than five (5) continuous Days and generic (nonphotographic), temporary badges for Contractor personnel who work on an occasional basis (less than five [5] continuous Days.)

C. The Contractor shall submit to the Engineer for approval a list of all Contractor personnel intended to work at the site for more than five (5) continuous Days. The list shall include the name, employer, and work phone number of each person. Upon approval by the Engineer, the Contractor shall complete a District furnished identification badge application for each eligible employee and make arrangements with the Engineer to have Contractor employee photographs taken at the District for the purpose of obtaining District-furnished photographic identification badges. Approved applications and valid photographic identifications shall be required before issuance of District photographic identification badges.

D. Planned, occasional site access. The Contractor shall plan in advance all occasional (less than five [5] continuous Days) site accesses. The Contractor shall notify the Engineer of the name and employer of the Contractor's personnel requiring occasional site access at least one (1) Day in advance of each occasional site access. After sign in, the District's security guard will issue a generic, temporary badge to the occasional visitor. The occasional visitor shall return his/her badge to the security guard upon leaving the site.

E. Emergency or unplanned site access. For emergency or unplanned access, as determined by the Contractor and approved by the Engineer and upon notification by the District's security guard, the Contractor designee shall verify to the District's security guard the identity of the Contractor personnel requiring emergency or unplanned site access. After sign in, the District's security guard will issue a generic, temporary badge to the emergency or unplanned visitor. The emergency or unplanned visitor shall return his/her badge to the security guard upon leaving the site.

F. The Contractor shall ensure that all Contractor personnel display their District issued photographic identification badge or generic, temporary badge in plain view at all times while on-site. Any Contractor personnel who does not display his/her photographic identification badge or generic, temporary badge while on-site shall be required to leave the site.

G. Lost or missing photographic identification badges shall be reported immediately to the Engineer; a generic, temporary badge shall be issued by the District's security guard. The District shall deduct $100 for each lost or missing photographic identification badge from the Contract amount.

H. Lost or missing generic, temporary badges shall be reported immediately to the Engineer; a generic, temporary badge shall be issued by the District's security guard. The District shall deduct $100 for each lost generic, temporary badge from the Contract amount.

I. The Contractor shall maintain a list of Contractor personnel in possession of a photographic identification badge. The Contractor shall record, at a minimum, the following information: employee name, employer, work phone number, badge issuance date, date when employee ceases working at the site, and date when badge was missing, lost, or returned to the District. The Contractor shall submit updated badge lists to the Engineer on or before the fifth Day of each month. The District may deduct from the Contract amount $200 for each badge list not submitted on time. Approved lists shall be the basis for determination of the deductions for photographic badges not returned within the allowed time limit.

J. The Contractor shall collect and return to the District photographic identification badges from all Contractor personnel within 30 Days from the date of their employment termination or when their assignment on-site is complete. If the Contractor fails to return the badges within 30 Days of the employee's termination or assignment completion, the District shall deduct $100 from the Contract amount for each photographic badge not returned on time.

K. At the completion of the Project, the Contractor shall return all District-issued photographic identification badges to the District. The District shall deduct $100 from the Contract amount for each photographic badge unreturned or returned after Project Completion.

8.18. Background Checks

A. The District reserves the right to request and receive this information as allowed by law and as required to complete a background check on any Contractor personnel who must enter the site.

B. The District reserves the right to deny access to the site to any person, as allowed by law.

8.19. Site Access Control

A. The District may maintain a security checkpoint at the gate(s) and facility(ies). The security checkpoint(s) may be staffed by a District security guard during normal working hours, and at other hours, on an as-needed basis. District roving guard(s) may also patrol the property.

B. Unless otherwise specifically required in these Specifications, the entire site perimeter, including all fences and gates, are to remain intact and functional throughout the construction period. Fences and gates that are accidentally breached by the Contractor shall be restored by the Contractor at no additional cost to the District by the end of the workday at the latest. Perimeter breaches shall be secured by the Contractor until the breaches have been closed to the satisfaction of the Engineer. For work requiring perimeter breaches, the Contractor shall work with the Engineer to arrange appropriate measures to secure the perimeter at the Contractor's cost. The Contractor shall promptly inform the District of any accidental perimeter breaches. No unauthorized entries shall be allowed in these breaches, including deliveries and Contractor personnel.

C. All vehicles entering the Project site are subject to search by District guards.

8.20. Mail and Postal Deliveries to the Project Site

A. Unless an exception is granted by the Engineer, the Contractor shall not have United States Postal Service, Federal Express, UPS, or similar mail and package deliveries addressed to any District facility. Under no circumstance shall mail/packages be delivered to the reception area of any District facility.

8.21. Productivity Lost for Noncompliance With Security Measures

A. Costs and delays incurred by the Contractor due to security measures (e.g., deliveries or personnel held at the gate without badges or identification, refusal of package deliveries, etc.) shall not be cause for additional Contract Time(s) or for additional compensation for the Contractor.

B. Failure to comply with these security measures may lead to Delay or to stop of the Work with no additional Contract Time(s) or additional compensation granted to the Contractor.

8.22. Payment

A. Full compensation for doing all Work and furnishing all Material required to comply with site safety and security requirements as specified in these Specifications shall be considered incidental and shall be included in other items of Work; no additional payment shall be made.

Santa Clara Valley Water District

Enter Company Name Here

RESCUE TRAINING CERTIFICATION

FC 1767 (01-31-14)

Contractor shall ensure that all its employees working in or supporting work in a confined space have received all training mandated by Cal-OSHA and meet other Cal-OSHA requirements related to such work.

All employees of the Contractor or subcontractor performing rescue services must have received previous training in **(1)** Atmospheric monitoring and ventilation; **(2)** Communication; **(3)** Emergency, self-rescue, and non-entry rescue operations; **(4)** Permit system; **(5)** Signs; **(6)** First aid and CPR; **(7)** Lockout/tagout; **(8)** Fall protection; **(9)** Electrical safety; and **(10)** Respirator protection.

Rescue services training must have been performed consistent with established industry standards (ANSI Z117.1, Safety Requirements for Confined Spaces, American National Standards Institute and Cal/OSHA regulations). All trained employees must have practiced making permit required confined space rescues at least once every twelve months by means of simulated rescue operations in which they remove dummies, mannequins, or actual persons from actual permit spaces or from representative permit spaces. "Representative permit spaces" must, with respect to opening size, configuration and accessibility, simulate the types of permit spaces from which a rescue could be performed. Such training shall have taken place no more than twelve months before the work to be performed on this Project begins.

With regard to employees of Contractor or any subcontractor performing rescue services, prior to the start of work, Contractor shall submit for review and acceptance by the District all of the following information in the spaces designated below: a certification with the respective employee's name, the name(s) of the trainers, the dates of training, the dates of all rescue practice sessions, and brief descriptions of the rescue practice sessions. Copies of all written materials provided during the training courses or rescue practice sessions shall be attached to this form. **Prior to entry, the Contractor shall post copies of such certifications (without their attachments) at the worksite where rescue services are to be provided.**

PREPARED BY _____ PHONE NO. _____ E-MAIL ADDRESS _____

	EMPLOYEE'S NAME	DATE OF LAST INCLUSIVE TRAINING (1, 2, 3, 4, 5, 6, 7, 8, 9, 10)	DATE OF LAST PRACTICE RESCUE SESSION (ANNUAL)	TRAINER NAME/COMPANY		DESCRIPTION OF THE RESCUE PRACTICE SESSION (BRIEF)	COPIES OF ALL WRITTEN MATERIAL PROVIDED DURING THE TRAINING COURSES OR RESCUE PRACTICE SESSIONS
1							☐ Yes ☐ No
2							☐ Yes ☐ No
3							☐ Yes ☐ No
4							☐ Yes ☐ No
5							☐ Yes ☐ No
6							☐ Yes ☐ No
7							☐ Yes ☐ No
8							☐ Yes ☐ No
9							☐ Yes ☐ No
10							☐ Yes ☐ No

I Certify that the information provided is true and correct:

SIGNATURE _____ PRINT NAME _____ TITLE _____

DATE PREPARED _____ COMPANY ADDRESS _____

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SECTION 9. QUALITY MANAGEMENT

9.01. General Quality Requirements

A. This Section includes quality control (QC) requirements and procedures for Materials, products, Equipment, and workmanship; inspection procedures and limitations; sampling and testing of Materials; and Contractor's quality assurance/quality control (QA/QC) program.

B. The Contractor shall provide and use Construction Equipment and plants capable of producing the quality and quantity of Work required. Construction Equipment shall be identified by readily visible numbers. If ordered, the Contractor shall remove unsatisfactory Construction Equipment and discontinue the operation of unsatisfactory plants.

9.02. District Quality and Environmental Policy Training

A. The following training requirements are minimum requirements. This training is required as part of the District's Quality and Environmental Management System (QEMS) and required for ISO certification. Additional training may be required in accordance with the Special Provisions for environmentally sensitive Projects.

B. The following applies to all Contractor and Subcontractor Project personnel:

1. The Contractor is hereby informed that all supervisory-level personnel must attend QEMS training before Work begins on the Project site. All other Contractor personnel must attend QEMS training within seven (7) Days of beginning Work on the Project site.

2. QEMS training will be administered by the District and will include one (1) 30-minute training session for all staff. It may be necessary to conduct training at the District's headquarters building. All personnel shall sign a acknowledgement that they have attended the subject training.

3. Upon completion of training, personnel will be provided with a QEMS training sticker to be placed on their hard hats. The District may require training on an annual basis.

9.03. Contractor's Quality Control Program

A. The Contractor's Quality Control (QC) program is the successful and systematic execution of a realistic plan to certify that required standards of quality design and construction are met and to preclude problems resulting from poor quality or lack of quality. In performing its QC function, the Contractor develops procedures to manage and control its Material, Equipment, personnel, and work so that the completed Work complies with the Contract requirements. The Contractor, in building to the quality standards in the Contract Documents, controls the quality of the Work.

B. The Contractor shall establish and execute a QC program for services that are procured by the Contractor. The program shall provide the Contractor with adequate measures for verification of and conformance to defined Contract requirements by the Contractor's personnel and lower-tier Subcontractors (including fabricators, Suppliers, and sub-contractors).

C. When required, as stated in the Special Provisions the Contractor shall submit to the Engineer a Project-specific QC plan. The QC plan shall contain a comprehensive account of the Contractor's QC procedures as applicable to this Work. Detailed requirements for this QC plan are delineated in the following paragraphs. The Engineer's review of the Contractor's QC plan shall not relieve the Contractor from any of its obligations for performing the Work. No Work shall start until the Contractor's QC plan has been favorably reviewed by the Engineer. No payments shall be made to the Contractor until the QC plan is favorably reviewed by the Engineer.

D. The QC Plan shall demonstrate that it has qualified QC personnel who meet or exceed the requirements of Special Provisions Article 20.04.02. Contractor's Quality Staffing Requirements. The QC plan shall identify the independent testing firms to be used in accordance with Article 9.09. Testing.

E. The Contractor's QC program shall ensure the achievement of adequate quality throughout all applicable areas of the Contract. The QC plan shall describe the program and include procedures, work instructions, and records. In addition, the Plan shall describe methods relating to areas that require special testing and procedures as noted in the Specifications.

F. Identification and Control of Items and Material: Procedures to ensure that items or Material that have been accepted at the site are properly used and installed shall be described in the QC plan. The procedures shall provide for proper identification and storage and prevent the use of incorrect or defective Material.

G. Inspection and Tests: The Contractor shall have written procedures and checklists defining a program for control of inspections performed; these procedures and checklists shall be described in the QC plan. Procedures shall include specific instructions for observing all Work in process and for comparing this Work with the Contract requirements (organized by Specification section), precluding the covering of deficient or rejected Work, halting or rejecting Work, and resolving differences between the Field QC Representative(s) and the production representative(s).

H. A complete matrix listing all operational, performance, and QC tests and inspections required in the Contract Documents: Each entry in the matrix shall include the Specification Section and paragraph; test/inspection description; procedure used; on/off-site; test frequency and acceptance criteria; and testing firm conducting each test. Below is a sample showing one (1) particular test:

Test and Inspection Plan Table

Spec Section	Test/Inspection Description	Procedure Used	On/Off site	Frequency	Acceptance Criteria	Conducted by	Documentation /Report	Notes
15453. 3.04.B	Hydraulic Pressure Test	15453. 3.04.B	On	After leak test, 2 hours	30 ft	John Smith	Hydro-test Report	

I. The QC plan shall identify all contractual hold/inspection points, as well as any Contractor-imposed hold/inspections points.

J. The QC plan shall include procedures to provide verification and control of all testing provided by the Contractor.

K. Supplier Quality Control (SQC): The QC plan shall include procedures to ensure that procured products and services conform to the requirements of the Specifications. This plan shall include periodic visits to the place of manufacture by the Contractor to perform QA activities. The District shall be notified of all such SQC visits a minimum of two (2) weeks in advance in case it elects to attend the visit. Requirements of these procedures shall be applied as appropriate to lower-tier Suppliers and/or to Subcontractors.

L. Deficient and Nonconforming Work and Corrective Action: The QC plan shall include procedures for handling deficiencies and non-conformances. Deficiencies and non-conformances are defined as documentation, Drawings, Material, Equipment, or Work not conforming to the contractually specified requirements or procedures. The procedures shall prevent non-conformances by identification, documentation, evaluation, separation, disposition, and corrective action to prevent recurrence. Conditions having adverse effects on quality shall be promptly identified and reported to the Contractor's senior-level management and to the Engineer. The cause of conditions adverse to quality shall be determined and documented and measures implemented to prevent recurrence. In addition, at a minimum, this procedure shall address:

1. Personnel responsible for identifying deficient and non-complying items within the Work.

2. The manner/process and the name of personnel by which deficient and noncompliant items are documented "in the field."

3. The personnel and process utilized for logging deficient and noncompliant work into a deficiency log at the end of each Day.

4. Tracking processes and documentation for deficient and noncompliant items.

5. Personnel responsible for achieving resolution of outstanding deficiencies.

6. Once resolved, the manner/process by which the resolutions are documented and by whom.

M. Special Processes and Personnel Qualifications

1. The QC plan shall include detailed procedures for the performance and control of special processes (e.g., welding, soldering, heat treating, cleaning, plating, nondestructive examination, etc.).

2. Personnel performing special process tasks shall have experience, training, and certifications commensurate with the scope, complexity, or nature of the activity. The Contractor shall submit personnel qualifications information to the Engineer before the start of Work on the Project.

N. The Contractor's QC staffing is subject to the Engineer's continued review. The Engineer, at its sole option and without cause, may direct the Contractor to remove and replace the Field QC Representative.

O. Audits: The Contractor's QC program shall provide for documented audits on a quarterly basis to verify that QC procedures are being fully implemented by the Contractor as well as by its Subcontractors and Suppliers. Audit records shall be submitted to the Engineer within five (5) business Days after an audit.

P. The Engineer may perform independent QA audits to verify that actions specified in the Contractor's QC plan have been implemented. No Engineer audit finding or report shall in any way relieve the Contractor from any requirements of this Contract.

9.04. Quality Coordination Meetings

A. The Contractor shall provide, at a minimum, five (5) working Days' advance notice and shall participate in the following three (3) QC coordination meetings. Minutes for each meeting shall be prepared by the Contractor's Field QC Manager and submitted to the Engineer. The meetings shall be mentioned in the Contractors daily inspection report with the minutes attached:

1. Pre-submittal Conference

a. Prior to the Contractor's submittal of the QC plan, the Field QC Manager, its Superintendent, and other relevant personnel shall convene a QC coordination conference with the Engineer to review and discuss the QC plan. During the conference, mutual understanding of the QC plan requirements should be developed.

2. Preparatory Meeting

a. Thirty (30) Days prior to beginning Work on each Definable Feature of Work (e.g., ceramic tile, fencing and gates, masonry, rough-in electrical, etc.), the Contractor's Field QC Manager, Superintendent, other Contractor QC personnel (as applicable), and the foreman responsible for the Definable Feature of Work

shall meet with the District Engineer. The meeting shall cover the following agenda, with minutes documented by the Contractor's Field QC Manager.

1) Review the Contract Plans and Specifications.

2) Review reference Codes and Standards.

3) Confirm that all required submittals have been approved.

4) Review relevant RFIs, field memos, and changes to the design of the Definable Feature of Work.

5) Review QC requirements for the Work, including inspection, testing, and acceptance and tolerance requirements.

6) Review critical installation procedures and quality compliance.

7) Examine Work area to assure that all required predecessor Work has been completed, that all required deficiencies have been corrected and approved, and that all documented, remaining deficiencies shall not impair the construction of the planned Definable Feature of Work.

8) Check availability of required resource and Equipment to perform the Work.

9) Review Activity Hazards to address safety precautions.

10) Determine commencement of the initial meeting.

3. Initial Meeting

a. One (1) workday before the beginning of construction of a Definable Feature of Work, the Contractor's Field QC Manager, Superintendent, other CQC personnel (as applicable), and the foreman responsible for the Definable Feature of Work shall meet with the Engineer. The meeting shall cover the following agenda, with Minutes documented by the Contractor's Field QC Manager.

1) Review minutes of the preparatory meeting.

2) Verify specified Material and Equipment is on-site.

3) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards.

4) Compare with required samples and mockups as appropriate.

5) Verify adequacy of QC for the Work, including availability of test Equipment.

6) Resolve all differences.

7) Indicate exact location of initial phase in the minutes for future reference and comparison with follow-up phases.

8) Repeat the initial phase for each new crew to work on-site or any time accepted or specified quality standards are not met.

9.05. Documented Quality Control Records

A. The Contractor shall establish control methods of Contract Documents that describe how Drawings and Specifications are received and distributed to assure the correct issue of the document is being used. The methods shall also describe how as-built data are documented and furnished to the Engineer.

B. The Contractor shall maintain evidence of activities affecting quality, including operating logs, records of inspections and tests, audit reports, Material analyses, personnel qualification and certification records, procedures, and document review records.

C. Quality records shall be maintained in a manner that provides for timely retrieval, and traceability. Quality records shall be protected from deterioration, damage, and destruction.

D. The Contractor shall provide a list of QC records as specified in the Contract Documents that will be furnished to the Engineer at the completion of activities.

9.06. Inspection and Daily Reports

9.06.01. Inspection

A. The Contractor shall utilize qualified individuals to perform and document inspections and tests. At a minimum, “qualified” shall mean having performed similar QC functions on similar-type projects. Records of personnel experience, training, and qualifications shall be maintained and made available for review by the Engineer upon request.

B. The Engineer shall at all times have access to the Work during its construction and shall be furnished with every reasonable facility for ascertaining that the Material and the quality of performance are in accordance with the requirements and intentions of the Drawings and Specifications. All Work done shall be subject to the Engineer’s inspection as well as by external parties.

C. The day-to-day inspection performed by the various inspectors employed by the District shall not constitute approval or ratification of Work improperly done by the Contractor. The Engineer is the only person authorized to recommend acceptance of Work and Material.

D. The presence or absence of an inspector during performance of the Work shall not relieve the Contractor of any obligation to fulfill the Contract. It shall be the duty of the Contractor to see that all provisions are complied with in detail, irrespective of the inspection given the Work during its progress by the Engineer or by representatives of the Engineer. The District and the Engineer shall assume no responsibility for any plan or method suggested to the Contractor by the Engineer or by an inspector that is not specified or required. Any such suggestion shall be used at the risk and responsibility of the Contractor.

E. Inspection does not waive or alter the requirements or provisions of the Contract Documents. Inspection of the Work or receipt of payment shall not relieve the Contractor of its obligation to fulfill all conditions of the Contract; improper Work shall be subject to rejection.

F. No portion of any Work, installed Material, products, or Equipment shall be covered or concealed in any manner without first being inspected by the Engineer. Whenever the Contractor is ready to backfill, bury, cast in concrete, hide, or otherwise cover any Work under this Contract, the Contractor shall notify the Engineer not less than one (1) Work Day in advance to request inspection before beginning any such Work of covering. Failure of the Contractor to notify the Engineer at least one (1) Work Day in advance of any such inspections shall be reasonable cause for the Engineer to order a sufficient Delay in the Contractor's schedule to allow time for such inspection. If any Work, Material, products, or Equipment is covered prior to inspection or prior to the express approval of the Engineer, that Work, Material, products, or Equipment shall be uncovered at no additional cost to the District. All associated costs, including its impact on other portions of the Work, shall be borne by the Contractor.

G. The Contractor shall not conceal any part of the Work until record Drawing information has been taken and recorded by the Contractor.

H. Should it be considered necessary or advisable by the District at any time before acceptance of the entire Work to make an examination of Work already completed by removing or tearing out same, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and Material. If such Work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or of Subcontractors, the Contractor shall defray all of the expenses of this examination and of satisfactory reconstruction. If, however, the Work is found to meet the requirements of the Contract, an equitable adjustment shall be made in the Contract Price(s) to compensate the Contractor for the additional services involved in the examination and reconstruction, and if completion of the Work has been delayed thereby, the Contractor shall, in addition, be granted a suitable extension of time.

I. Work, Material, products, and Equipment not conforming to the Contract Documents shall be considered defective and shall be corrected or removed and replaced with conforming Work, Material, products, and Equipment at no additional cost to the District.

9.06.02. Daily Inspection Reports

A. The Contractor is required to submit a daily QC inspection report providing factual evidence that required QC activities and/or tests have been performed. These records shall include the Work of Subcontractors and Suppliers and shall be on a form acceptable by the Engineer. Reports shall be made available at the end of each work day or no later than prior to the beginning of the next work day. Such reports shall, at a minimum, include the following:

1. Item(s) inspected.

2. Quality characteristics in compliance.

3. Quality characteristics not in compliance.

4. Corrective/remedial actions taken.

5. Statement of certification.

6. Field QC Representative's signature.

7. Contractor/Subcontractor and its/their area of responsibility.

8. Test and/or control activities performed with results and references to Specification/Drawing requirements.

9. Test reports as attachments.

10. Contractor's completed QC checklists, where applicable.

11. Records of any SQC reports performed off-site as an attachment.

12. Any Noncompliance Notices (NCN) issued.

    a. An NCN shall be issued to document defective Work.

    b. Corrective Action Reports (CAR) shall be completed to close out an NCN. An NCN may not be closed until the CAR is accepted by the Engineer.

    c. A log of the NCN and the corresponding CAR shall be published at the end of each month.

13. A Contractor's verification statement stating that each daily report is a complete, true, and accurate account of that Day's construction activity.

a. These records in report form shall be prepared daily. The records shall be available in the field within 24 hours after the date covered by the report for review by the Engineer; all reports for that week shall be submitted weekly to the Engineer.

b. Reports need not be submitted for Days on which no Work is performed. At a minimum, one (1) report shall be prepared and submitted for every seven (7) Days of no Work and on the last Day of a no-Work period. All Days shall be accounted for throughout the life of the Contract. The first report following a Day of no Work shall be for that Day only.

c. Reports shall be signed and dated by the Contractor Field QC Manager. The report from the Contractor Field QC Manager shall include copies of reports prepared by all subordinate QC personnel.

9.07. Plant Inspection

A. Material and Equipment that become a part of the completed Work shall be subject to inspection at the place of production or manufacture, at the shipping point, or at the site of the Work. Material and Equipment requiring inspection at the place of production or manufacture shall be designated by the Engineer. Where plant inspection is so designated, the Engineer shall be given a 14-day advance notice of the start of manufacture or of production. For international locations and sites outside of the continental United States, a minimum notification of 30 working Days shall be provided. The Contractor's purchase orders for Material and Equipment, for which plant inspection has been designated by the Engineer, shall bear a suitable notation advising Suppliers and Subcontractors of inspection requirements.

B. If the required notification is not given, the District shall schedule the inspection at its convenience, and the activity to be witnessed shall not proceed until the Engineer arrives or until the District notifies the Contractor that it is choosing to waive its witness inspection requirement.

C. The Engineer or an authorized representative shall have free entry at all times to such parts of the plant as concerns the manufacture or production of Material and Equipment for the District. Adequate facilities shall be furnished free of charge to make the necessary inspection.

D. The Engineer may attend scheduled inspections of the off-site plant for Material, Equipment, or software to be incorporated into the Work. The District assumes no obligation to inspect Material or Equipment at the place of manufacture or production or at the shipping point. Unless otherwise noted in the Special Provisions, cost for District representatives to attend off-site inspections shall be borne by the District.

E. In the absence of the Engineer, the District may reject the processes completed to date and require the activity to be redone. Delays resulting from waiting on the witness inspection for the reasons given above shall be considered an Inexcusable Delay. Expenses incurred by Delays or repeat of the Work process shall be borne by the Contractor.

F. Should any inspection attended by the Engineer be delayed, the Contractor shall reimburse the District for the actual salary costs of District staff, consultants, and special inspection firms multiplied by their actual, fully burdened labor rates and shall reimburse the actual cost of other direct costs incurred due to the inspection Delay.

G. The Contractor shall provide safe passage and access for inspection of the Work in any area. Off-site storage areas and warehouse facilities are also subject to inspection.

H. Material, products, and Equipment that are specified to require testing and inspection at the point of origin shall receive and pass such testing and inspection prior to being shipped to the Project site.

9.08. Sampling of Material

A. The Contractor shall furnish samples of Material as specified and as requested by the Engineer at no additional cost to the District. Samples shall be obtained and tested whenever necessary to determine the quality of the Material and compliance with the Contract Documents.

B. The Contractor shall assist the Engineer, District staff, regulatory agency personnel, and third parties in collecting or providing samples.

C. The Contractor shall not use Material specified to be tested in the Work until such testing indicates satisfactory compliance with the Contract Documents.

9.09. Testing

A. Unless otherwise specified, the Contractor is responsible for completing all required testing at no additional cost to the District. All tests shall be performed by independent testing firms accredited by the appropriate authority.

B. The testing firm shall be staffed with experienced personnel, properly equipped, and fully qualified to perform the tests in accordance with the specified standards. The Contractor shall submit documentation demonstrating that the testing firm and its personnel are properly accredited by the appropriate authority.

C. The Engineer has the right to inspect Work performed by the independent testing firm. This may include inspection of the independent testing firm's internal QA records (e.g., QA manual, equipment calibrations, proficiency sample performance, etc.).

D. Testing shall be completed in accordance with the specified standards in effect on the date bids are due. Where no standard is specified, testing shall be completed in accordance with the applicable ASTM and/or the latest published edition of the *State of California Department of Transportation Standard Specifications and Standard Plans* and updates thereto.

E. The Contractor shall submit copies of all manufacturer test reports performed to satisfy the applicable Material standard specification or test standard (e.g., certified mill test reports). Reports shall identify the lot of Material represented by the test. The manufacturer test reports supplement the inspection, sampling, and testing provisions otherwise required by the Contract Documents.

F. Content of Test Reports: Inspection and test results shall be documented and evaluated to ensure that requirements have been satisfied. Individual test records shall contain the following information:

1. Date and time of test.
2. Item tested, item number, and item description.
3. Test designation.
4. Test work sheet, including location the sample was obtained.
5. Test results.
6. Acceptance or rejection.
7. Retest information, if applicable.
8. Control requirements.
9. Tester signature.

G. The Contractor shall immediately inform the Engineer of all test results.

H. Availability and Submittal of Test Reports: All test reports shall be made available to the District's representative for viewing within 24 hours and must be submitted to the Engineer within seven (7) Days after each test is completed, with the Contractor's weekly inspection reports. Each test report for each type of test shall be consecutively numbered. The Contractor shall maintain a copy of all test results on-site.

I. Control of Measuring and Test Equipment: Measuring and/or testing instruments shall be adequately maintained, calibrated, and adjusted to maintain accuracy within prescribed limits. Calibration shall be performed at specified periods against valid standards traceable to nationally recognized standards and documented.

9.10. District Quality Assurance

A. Quality assurance (QA) involves the activities of the District that are separate from, but in coordination and cooperation with, the Contractor to monitor that the level of quality set by the Contract Documents is achieved. Through periodic review, inspections, and tests, the District monitors that the Contractor's QC is working effectively and that the end product complies with the level of quality established by the Contract.

9.10.01 Testing by the District

A. The District may arrange for independent tests at its own cost. In such cases, the Contractor shall cooperate with the District's independent testing firm. This testing by the District shall not relieve the Contractor of its obligation to do the QC testing required under the Contract.

B. If independent testing indicates noncompliance with the Contract Documents, any retesting shall be charged to the Contractor.

C. Upon request, the Engineer will furnish the Contractor with copies of test results.

9.10.02 Defective Work

A. All Work not conforming to the Contract shall be considered defective and subject to rejection by the Engineer regardless of when or where the deficiency is detected. Unless otherwise permitted by the Engineer, rejected Work shall be remedied, removed, or replaced by the Contractor in a manner acceptable to the Engineer and at no additional cost to the District.

B. Noncompliance Notice (NCN): The Engineer may issue a NCN to the Contractor for any detected defective Work or a portion thereof.

C. The Contractor shall provide a written response within five (5) working days after receipt of the NCN. The Contractor's response shall detail either (i) reasons it believes that the Work was performed in accordance with the Contract Documents; or (ii) the corrective action it intends to take to correct the defective Work.

D. If the Contractor disputes issuance of the NCN, the Engineer shall respond after receipt of the dispute by either (i) withdrawing the NCN; or by (ii) directing the Contractor to correct the Work. If the Engineer directs the Contractor to correct the Work, the Contractor shall make such correction within five (5) working days after receipt of such direction from the Engineer or at such other time as may be agreed to with the Engineer.

E. If the Contractor fails to promptly comply with any order of the Engineer to correct the defective Work, the Engineer may terminate the Contractor's right to proceed with the affected Work and cause the defective Work to be removed and replaced at the Contractor's expense.

1. The District shall deduct from the Contractor's progress payment any cost it incurs in correcting the defective Work, including, but not limited to, rectifying the nonconforming Work, removing and storing salvageable Material and Equipment, discarding other Materials and Equipment, administrative costs, and all costs of repair or replacement of the Work of others.

2. If the District self-performs the remediation of the Contractor's nonconforming Work, the Contractor shall also be charged for the District's overhead markup.

3. If the current Contract unpaid balance and retention are insufficient to cover this amount, the Contractor shall reimburse the District.

9.11. Plumbing and Piping Quality

A. The Contractor shall consult with industry and manufacturer representatives for all piping Material being used in the Work. The purpose of this consultation is to ensure that the Contractor's personnel are fully trained and knowledgeable, possess written instructions on proper assembly, and have all recommended tools for quality Work. Consultation shall also include discussions between industry and manufacturer representatives and Contractor management and construction staff on the causes of past plumbing and piping failures and of problems and methods of avoidance. The Contractor shall provide training for its forces as required to produce consistent, high-quality Work without failed tests and warranty problems.

9.12. Control of Materials and Equipment

A. This Article includes general product requirements and requirements for delivery, storage, packing, loading, unloading, transportation, protection, and selection of Material and Equipment. Additional specific requirements for delivery, handling, protection, loading, and unloading may be specified within the Technical Specifications for Materials and Equipment.

B. The Contractor shall furnish Materials and Equipment as specified. Only new Material and Equipment conforming to the requirements of the Contract shall be incorporated in the Work.

9.12.01. Source of Material and Equipment

A. The Contractor shall furnish a list of sources of Material and Equipment to the Engineer in sufficient time to permit proper inspection and testing of Material and Equipment in advance of their use. Inspection and tests shall be made and reports rendered. It is understood that such inspections and tests shall not be considered a guarantee of acceptance of any Material or Equipment that may be delivered later for incorporation in the Work. Any Equipment or Materials that, after has in any way become non-compliant with the Contract, shall not be used in the Work.

B. At the option of the Engineer, the source of supply of each of the Material shall be approved before the delivery is started. All Material proposed for use may be inspected or tested at any time during their preparation and use. If it is determined that sources of supply that appeared satisfactory do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved Material from other sources.

9.12.02. Product Data and Samples

A. The Contractor shall furnish without charge such samples as may be required.

B. No Material or Equipment shall be delivered to the Work without prior approval of submittals by the Engineer.

C. The Contractor shall provide products by the same manufacturer when products are of similar nature, unless otherwise specified; provide identical products when products are required in quantity; and provide products with interchangeable parts whenever possible.

D. The Contractor shall require each Equipment manufacturer to have maintenance facilities meeting the following minimum requirements:

1. Minimum three (3) years' operational experience.

2. Located in the continental United States.

3. Equipment and tools capable of making repairs.

4. Staff qualified to make repairs.

5. Inventory of maintenance spare parts.

E. All Materials, products, and Equipment shall be new, of the specified quality, and free of defects. Where samples have been submitted, the Materials, products, and Equipment incorporated into the Work shall be equal to the samples that have been approved. Should Materials, products, and Equipment required by the Work not be specified or described on the Drawings, the Contractor shall provide Materials, products, and Equipment of high, generally accepted quality standards that are comparable to the Work and that meet the identifiable needs of the Work.

9.12.03. Transportation and Delivery

A. The Contractor shall:

1. Transport and handle items in accordance with manufacturer's instructions.

2. Schedule delivery to reduce long-term, on-site storage prior to installation and/or operation. Under no circumstances shall Equipment be delivered

to the site more than one (1) month prior to installation without written authorization from the Engineer.

3. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged, or sensitive to deterioration.

4. Deliver products to the site in the manufacturer's original sealed containers or other packing systems, complete with Material Safety Data Sheets (MSDS) and instructions for handling, storing, unpacking, protecting, and installing.

B. The Contractor may store Material and Equipment only in those locations approved by the Engineer. The Contractor is responsible for maintaining and restoring any affected areas as required by the Engineer.

C. All items delivered to the site shall be unloaded and placed in a manner that shall not (i) impact the Contractor's normal construction operation or those of Subcontractors and other contractors; (ii) interfere with the flow of necessary traffic; and (iii) interfere with the District's normal operations and maintenance activities. In addition, the Contractor shall:

1. Provide necessary Equipment and personnel to receive, accept, and unload all items delivered to the site.

2. Promptly inspect the shipment to assure that products comply with requirements, quantities are correct, and items are undamaged. For items furnished by others (i.e., the District, other Contractors), perform inspection in the presence of the Engineer and shall notify the Engineer verbally and in writing of any problems.

9.12.04. Storage and Protection of Material

A. Store and protect products in accordance with the manufacturer's instructions with seals and labels intact and legible.

B. Material and Equipment shall be stored to ensure preservation of quality and fitness for the Work. They shall be placed under cover when necessary and shall be stored in a manner that will facilitate prompt inspection.

C. Loose granular Material shall be stored on solid, flat surfaces in a well-drained area. Mixing with foreign matter shall be prevented.

D. Cement, lime, and similar moisture-sensitive Material shall be stored under a roof and off the ground and shall be kept dry at all times. All structural, miscellaneous, and reinforcing steel shall be stored off the ground or to otherwise prevent accumulation of dirt or grease and in a position to prevent accumulation of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete shall be handled and stored in a manner to prevent

accumulation of dirt, standing water, staining, chipping, or cracking. Brick, block, and similar masonry products shall be handled and stored in a manner to reduce breakage, cracking, and spilling to a minimum.

E. Material and Equipment storage areas shall be suitably secured to protect Material and Equipment from damage or from theft.

F. Except as stated in the Contract Documents or as otherwise approved by the Engineer, locations and arrangements for storage sites for Material and Equipment shall be selected and maintained by the Contractor at the Contractor's expense. Full compensation for furnishing such storage sites as may be necessary or as required by the Contractor shall be considered as included in the Bid price; no additional payment shall be made.

G. The storage and handling of potential pollutants and Hazardous Material, including, but not necessarily limited to, gasoline, diesel, oils, paint, and solvents shall be in accordance with all Federal, State, and Local Laws and all other requirements. Temporary special storage enclosures, double-walled tanks, berms, or other protective facilities shall be provided as required by law. All Hazardous Material shall be stored and handled in strict accordance with the MSDS for each product. A copy of each MSDS shall be maintained at the Project site by the Contractor.

H. Any Equipment or Materials that, in the opinion of the Engineer, has become damaged as to be non-compliant with the Contract shall be promptly removed from the site of the Work. The Contractor shall receive no compensation for the Materials or Equipment removed or for removal costs.

9.12.05. Maintenance and Protection of Installed or Stored Equipment

A. All mechanical and electrical Equipment and instruments subject to moisture or corrosive damage by the atmosphere if stored outdoors (even though covered) shall be stored in a weather-tight building and provided with adequate ventilation, as required, to prevent damage. The Contractor shall maintain temperature and humidity within the range required by the Equipment or instrumentation manufacturer. The building may be a temporary structure on the site or elsewhere, must be painted in a neutral color, and must be no larger than required.

B. All Equipment shall be stored fully lubricated with oil, grease, and other lubricants unless otherwise instructed by the manufacturer.

C. Moving parts shall be rotated or otherwise maintained in accordance with the manufacturer's instructions. Upon installation, the Contractor shall periodically exercise the Equipment to ensure that it does not deteriorate from lack of use.

D. Lubricants shall be changed as frequently as required by the manufacturer between installation and acceptance. New lubricants shall be put into the Equipment at the time of acceptance.

E. The Contractor shall maintain a preventive maintenance record for all Material and Equipment installed but not yet accepted that requires preventive maintenance by the manufacturer. A monthly report of all maintenance performed shall be submitted to the Engineer to certify maintenance has been performed as recommended by the manufacturer.

F. The Contractor shall maintain and repair, as recommended by the manufacturer, any Equipment that has been installed but not yet accepted.

G. The Contractor shall clean exposed Material and Equipment just prior to turnover to the District.

H. Prior to the District's use or acceptance, the Contractor shall have the manufacturer inspect any Equipment valued at more than $2,500 and stored longer than three (3) months and certify that its condition has not been detrimentally affected. Such certification must affirm that the Equipment has not been adversely impacted and the Equipment shall be guaranteed as specified. If such a certification is not provided, the Equipment shall be determined to be defective and shall be replaced at the Contractor's expense. Certification does not relieve the Contractor from meeting all testing requirements.

9.13. District-Furnished Material

A. Material furnished by the District shall be available as designated in the Special Provisions. The Contractor shall load, unload, and haul such Materials to the site of the Work at the Contractor's expense. Once received by the Contractor, the Contractor is responsible for all Material furnished and shall pay any damages and storage charges.

9.14. Final Inspection of Work

A. The Engineer shall make the final inspection of the Work in accordance with Section 11. Contract Closeout. The Contractor is directed to Section 11. Contract Closeout regarding the requirements necessary to obtain final inspection by the Engineer.

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SECTION 10. ENVIRONMENTAL

10.01. Good Neighbor Requirements

A. The District is a public entity that takes seriously its responsibility to be a "Good Neighbor." Accordingly, the District seeks to perform its activities, including construction of its facilities, in a manner that takes into consideration the needs of the neighborhood and that is minimally disruptive.

B. The Contractor hereby acknowledges the critical importance of meeting the Contract requirements as set forth in these Specifications regarding "good neighbor requirements," which include, but are not limited to, public safety, working hours, noise pollution and vibration, air pollution, spillage and dust, traffic control, truck haul routes and parking restrictions, and storm water pollution.

C. The Contractor shall adhere to the above "good neighbor requirements" which relate to the lessening of the impact causes by the Work being performed under this Contract. The Contractor acknowledges that its responsibility to observe the restrictions of this Contract relating to the above requirements is significant, critical, and a material provision of this Contract. Any non-compliance with these requirements may be cause for the District to suspend Work.

10.02. Storm Water Pollution Prevention Plan

A. The Contractor shall prepare and submit to the District an electronic and hard copy Storm Water Pollution Prevention Plan (SWPPP) as required under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharge Associated with Construction and Land Disturbance Activities Order No. 2009-009-SWQ, (as amended).

B. The SWPPP shall incorporate all appropriate storm water Best Management Practices (BMPs) and all risk-based requirements to comply with the NPDES General Permit. The BMP descriptions and the template for the SWPPP shall be in accordance with the current California Stormwater Quality Association (CASQA) Construction BMP Handbook/Portal, which can be purchased at http://www.cabmphandbooks.com.

C. The SWPPP shall be written, amended, certified, and stamped by a Qualified SWPPP Developer (QSD). The implementation of BMPs and all pollution control measures shall be overseen by a Qualified SWPPP Practitioner (QSP). The QSD and QSP shall be provided by the Contractor and shall meet the certification requirements as defined under Section VII of the NPDES General Permit.

D. The District shall make available the following: base maps for the Contractor's use in preparing the vicinity and site maps for the General Permit; a copy of preexisting site and site design information; and a copy of the completed Notice of Intent (NOI), if required.

E. Prior to the commencement of any Work at the site(s), the SWPPP shall be favorably reviewed by the Engineer. Review by the Engineer shall not relieve the Contractor of responsibility for the completeness of the SWPPP nor for the accuracy of assumptions, data, and information used and procedures contained in the Contractor's SWPPP or the adequacy thereof.

F. The SWPPP shall be revised and/or amended by the Contractor's QSD as necessary during the progress of Work to comply with Federal, State, and local regulations and the requirements of these Specifications. All revisions and amendments shall be submitted to the Engineer. Revisions and/or amendments to the SWPPP shall be considered incidental to this item of Work; no additional payment shall be made.

G. The Contractor's personnel supervising the earthwork, sitework, erosion control, and sedimentation control and inspecting erosion controls shall be required to read the SWPPP. A copy of the SWPPP shall be maintained at the construction site by the Contractor and shall be available at all times for review by all Contractors, by the District, or by regulatory agency personnel.

10.02.01. Storm Water BMPs

A. The SWPPP shall include appropriate BMPs, as required, to comply with the specified risk level for the Project.

B. The Contractor shall design, construct, operate, inspect, and maintain the BMPs in accordance with the NPDES General Permit and with the instructions provided in the current CASQA Construction BMP Handbook/Portal.

C. The BMPs shall include, but shall not be limited to, the following:

1. Erosion control.
2. Sediment control.
3. Run-on/runoff control.
4. Wind erosion control.
5. Tracking control.
6. Non-stormwater Management.
7. Waste Management and Materials Pollution Control
8. Project-specific Environmental BMPs as specified in the Contract.

10.02.02. Regulatory Fines

A. The Contractor is responsible for any penalties or fines imposed upon the District by the Regional Water Quality Control Board (RWQCB) or by other regulatory

bodies due to the Contractor's noncompliance with the requirements of the NPDES General Permit. The actual cost of such penalties or fines shall be subtracted from the amount due, or that may become due, the Contractor.

10.03. Water Pollution Discharges and Remedies

A. The Contractor shall remedy immediately any public nuisance or deficiency arising from, or in consequence of, the Contractor's failure to perform the Work specified under Article 10.02. Storm Water Pollution Prevention Plan and Article 19.02. Other Discharge Permits.

B. Upon the Contractor's failure to make appropriate and timely remedies as directed by the Engineer in the best interests of the public, the Engineer may employ private or public workforces and Equipment to perform the Work. The Contractor shall be charged all costs associated with such remedy including actual hours recorded by District staff, District consultants, and District services, multiplied by their actual, fully burdened labor rates. Such action(s) taken by the Engineer shall not preclude the Engineer from taking other appropriate actions and shall not relieve the Contractor of responsibility to comply with these Specifications.

10.04. Water Quality

A. The Contractor shall meet all applicable regulatory requirements to ensure that any discharges to surface waters will not cause violation to the State water quality standards or violation of regulatory permits issued by regulatory agencies.

B. The Contactor shall prevent water quality degradation of water bodies and/or of storm drains. Water quality is measured in terms of pollution substances, turbidity, dissolved oxygen, pH, and temperature.

C. Oily, greasy, or sediment-laden substances or other Materials that originate from the Contractor's operation shall not be allowed to enter, or be placed where they may later enter, any reservoir, river, creek, or stream.

D. The Contractor shall comply with the requirements of the following permits, where applicable, and as specified in the Special Provisions, Article 19.04. Water Pollution Discharges:

1. State Water Resources Control Board (SWRCB) and (NPDES), General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities

2. U.S. Army Corps of Engineers CWA Section 404 Permit, and Regional Water Quality Control Board/State Water Resources Control Board CWA Section 401 Water Quality Certification. And/or Waste Discharge Permit.

3. Other individual RWQCB NPDES Permits.

4. Department of Fish and Wildlife 1603 Stream Bed Alteration Agreement.

E. The Contractor shall implement any additional water quality best management practices and mitigation measures described in these Specifications.

10.05. Burial Sites

A. The Contractor shall comply with all applicable laws and regulations pertaining to burial sites, including, but not limited to, Ordinance Code Section B6-18 of the County of Santa Clara and requirements of Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. Upon discovering or unearthing any burial site as evidenced by human skeletal remains, the person making the discovery shall immediately stop work and notify the County Coroner. The Contractor shall also notify the Engineer. The Contractor shall immediately secure the site and protect any human remains from further disturbance.

B. Upon determination by the County Coroner that the remains are Native American, the Coroner may contact the California Native American Heritage Commission and the County Coordinator of Indian Affairs. No further excavation or disturbance within 30 feet of the site or of any nearby area reasonably suspected to overlie adjacent remains may be made except as authorized by the California Native American Heritage Commission and/or by the County Coordinator of Indian Affairs, and by the Engineer.

C. The Contractor is advised that if burials are encountered, it may be necessary to suspend Work on the Project to comply with the above requirements. Payment for a Delay of more than one (1) workday for each occurrence shall be made in accordance with Article 3.07. Change in Contract Price(s) and with Article 3.08. Change in Contract Time(s).

10.06. Cultural Resources (Archeological Discovery)

A. The Contractor is advised that if archeological artifacts are encountered, the Contractor will immediately notify the Engineer; it may be necessary to suspend Work on the Project to comply with this Article.

B. Work at the location of the find will halt immediately within 30 feet of the find. If an archaeologist is not present at the time of the discovery, the Engineer will contact an archaeologist for identification and evaluation pursuant to Public Resources Code Section 21083.2, California Code of Regulations Section 15126.4 (California Environmental Quality Act [CEQA] Guidelines) and to the mitigation measures of the Project CEQA document. If the archaeologist determines that the artifact is not significant, the Engineer will authorize the Contractor to resume construction.

C. If the archaeologist determines that the artifact is significant, the archaeologist will determine if the artifact can be avoided and, if so, will detail avoidance procedures. The Contractor will comply with these avoidance procedures.

D. If the artifact cannot be avoided, the archaeologist will develop an action plan that will include provisions to minimize impacts and, if required, a data recovery plan for recovery of artifacts in accordance with Public Resources Code Section 21083.2 and CEQA Guidelines Section 15126.4.

E. The Contractor shall delay Work until the action plan and, if required, the data recovery plan, are favorably reviewed by the Engineer. Once the action plan and the data recovery plan are favorably reviewed, the Contractor shall comply with the requirements of these plans.

10.07. Noise Pollution and Vibration

A. The Contractor shall be responsible for ensuring that noise produced by construction activities does not exceed the applicable local noise ordinance standards and is in compliance with the performance standards set forth in Section 18. Permits and Regulations of the Special Provisions.

B. At a minimum, the Contractor shall exercise precautionary measures listed below. Implementation of these measures shall in no way relieve the Contractor of the responsibility of compliance with the noise criteria.

1. Air compressors and internal combustion engines shall be in good operating condition that meet or exceed original factory specifications and shall be equipped with high grade mufflers, air inlet silencers (where appropriate), and noise suppressers.

2. All mobile or fixed noise-producing machinery and Equipment, including “package” Equipment (e.g., fans, cranes, arc welders, air compressors, electrical operators, etc.), shall be suitably housed, enclosed, shielded, and equipped with noise-control features or muffled to meet the noise limits specified in the Special Provisions.

3. All mobile or fixed noise-producing Equipment used by the Contractor that is regulated for noise output by Federal, State, or local law shall comply with this regulation while in use. This shall include vehicles licensed for use on public highways.

4. Electrically powered Equipment instead of pneumatic- or internal-combustion-powered Equipment shall be used where feasible.

5. The use of noise producing signals, including horns, whistles, alarms, and bells, shall be for safety warning and emergency purposes only.

6. No music system, including personal or vehicle radio, tape, CD players, or the like, shall be audible at the Project right-of-way line.

7. Trucks or other mobile Equipment shall not use engine decompression (“Jake Brakes”) for deceleration on grades where feasible.

C. The Contractor shall take all necessary precautions during its operations to limit peak particle velocities from vibratory compaction or percussion Equipment so that they do not become a public nuisance or result in property damage.

D. Any Equipment causing noncompliance with the noise or vibration criteria shall be removed from the job site as directed by the Engineer.

10.08. Air Pollution

A. The Contractor shall comply with all applicable requirements of the applicable air quality management or control district and California Air Resources Board regulations.

B. Idling of internal combustion engines shall be held to an absolute minimum. All vehicles with internal combustion engines shall be fitted with spark arrestors.

C. The Contractor shall not use any of the listed Materials banned by BAAQMD Regulation 8, Rule 15.

D. Serpentine Materials that have average asbestos content greater than five (5) percent as determined by an aggregate bulk sample analysis pursuant to Air Resources Board Test Method 435 or an alternate method approved by the Air Resources Board or BAAQMD (see also California Code of Regulations, Title 17, Section 93106) shall not be used for surfacing.

E. Except as provided by law, idling of heavy-duty diesel trucks with gross vehicular weight ratings of greater than 10,000 pounds shall be no more than five (5) minutes per California Code of Regulations, Title 13, Section 2485.

F. The Contractor shall implement any additional air quality best management practices and mitigation measures described in these Specifications.

10.09. Spillage and Dust Control

A. Care shall be taken to prevent spillage when hauling is done. Spillage resulting from hauling operations along or across any public-traveled way shall be removed immediately by the Contractor. The Contractor shall pay all expenses for removal of spillage.

B. The Contractor shall control dust nuisances originating from the Contractor's operations either inside or outside the right of way.

C. The Contractor shall provide all necessary precautionary measures to control dust and to prevent spillage on public-traveled ways. At a minimum, the Contractor shall provide the measures listed below and shall also implement additional dust control best management practices and mitigation measures described in these Specifications. Implementation of these measures shall in no way relieve the Contractor of the responsibility to comply with these Specifications.

1. Active maintenance areas, unpaved access roads, and staging areas shall be kept sufficiently moist and watered as necessary or shall be applied with nontoxic soil stabilizers to control dust generation.

2. Trucks hauling sediments and other loose Material shall be covered and shall maintain at least six (6) inches of freeboard.

3. Tailgates of trucks shall be sealed.

4. Trucks shall be brushed down before leaving the site.

5. Paved site access roads shall be swept using vacuum-powered street sweepers when visible soil Material is carried onto the roadway.

6. During high winds, the excavation and grading activity shall be watered or the activity suspended, if necessary, to control dust.

7. Inactive areas shall be sprayed with soil stabilizers or shall be seeded to avoid erosion or dust.

8. Exposed stockpiles shall be watered, enclosed, covered, or sprayed with soil stabilizers.

9. Traffic speeds within the Project right of way shall be limited to 15 mph. For off-site restriction, comply with local agency requirements.

10. Sandbags or other bank protections shall be installed to prevent silt runoff to roadways.

D. The Contractor shall immediately remedy any spillage and dust nuisance or deficiency arising from, or in consequence of, the Contractor's failure to perform the Work specified in these Specifications.

E. Upon the Contractor's failure to make timely remedies determined by the Engineer to be necessary and in the best interests of the public, the Engineer may employ private or public workforces and Equipment to perform the Work. The Contractor shall be charged all costs associated with such remedy including actual hours recorded by District staff, District consultants, and District services, multiplied by their actual, fully burdened labor rates. Such action(s) taken by the Engineer shall not preclude the District from taking other actions as deemed appropriate and shall not relieve the Contractor of responsibility to comply with these Specifications.

10.10. Traffic Control

A. Traffic control shall consist of all work and Materials necessary to maintain safe vehicular, pedestrian, and cyclist traffic during construction and to perform "best management practices" to mitigate high-peak and high-volume construction traffic, prevent idling and queuing, establish site access limitations and mitigation

measures, identify haul routes, and provide overall control of all construction traffic entering, exiting, and operating within the Project site.

B. All traffic control Work shall be performed in accordance with the requirements of the local agency having jurisdiction and California Department of Transportation requirements, if applicable. If required, the Contractor shall prepare a traffic control plan and submit said plan to the Engineer and to the appropriate agency having jurisdiction for favorable reviews in advance of the Work at the site.

C. The Contractor shall cooperate with the local agency having jurisdiction relative to handling traffic around the construction area. The Contractor shall make its own arrangements relative to keeping the Work area clear of parked vehicles to maintain sight visibility and access to adjacent properties. Existing road signs shall not be blocked at any time.

D. Truck traffic and haul routes shall be in compliance with local permits and ordinances. The Contractor shall obtain, at the Contractor’s expense, any required haul route permit from the local authority having jurisdiction for transporting to and from the Project site construction Material and the disposal of surplus Material.

E. The Contractor shall conduct its operations and schedule cleanups that cause the least possible obstruction and inconvenience to traffic, pedestrians, cyclists, and adjacent property owners.

F. Damage done by the Contractor during the course of its Work to adjacent city, town, county, or private property shall be repaired or replaced in kind and as directed by the Engineer.

G. Personal vehicles of the Contractor's employees and the Contractor's Equipment and vehicles shall not, at any time, be parked on the traveled way, shoulders, medians, or lanes that have not been approved for closure. When entering or leaving roadways carrying public traffic, the Contractor's Equipment, whether empty or loaded, shall in all cases yield to public traffic and shall travel in the direction of the traffic. Flaggers and traffic signs may be required to control this activity. No driveways or private roads shall be blocked. Safe access must be maintained for pedestrian traffic throughout the Work areas at all times.

H. Those parts of public streets, right of ways, and sidewalks that are allowed to be occupied by the Contractor shall be immediately vacated by the Contractor and returned to public use when the Contractor’s use thereof is no longer necessary for the construction Work.

I. The Contractor shall comply with and pay for all costs associated with Public Convenience Section 7-1.03; Public Safety Section 7-1.04; and Temporary Traffic Control Section 12 of the State Specifications; and Article 8.01. Public Safety, of these Standard Provisions Specifications. Nothing in these Specifications shall be construed as relieving the Contractor from its

responsibility as provided in Public Safety Section 7–1.04 of the State Specifications.

J. The Contractor shall coordinate with the appropriate local agencies having jurisdiction to receive their approval in the event any temporary lane closures on public streets are needed for the Contractor's operation. Any traffic signing and flaggers as approved by the local agencies for said lane closures shall be in place prior to closing the lane to traffic.

10.11. Regulated Material Management

A. Regulated Material includes, but shall not be limited to, Hazardous Material and Hazardous Waste.

B. The Contractor is responsible for and shall obtain all required permits and pay all fees and taxes for satisfying the requirements of any regulatory agency for the storage, monitoring, usage, transportation, safety, and reporting, or for any other requirements regarding the management of Regulated Material on and off the Project site(s).

C. The Contractor shall not allow Regulated Materials to spill on District property or on easements or on other public or private right of ways. Any spillage of Regulated Materials resulting from the Contractor’s operation shall be removed immediately by the Contractor at the Contractor’s expense.

D. The Contractor shall immediately notify the Engineer of any potentially Hazardous Materials or Hazardous Waste encountered at the worksite and shall take all necessary action to prevent exposure of personnel until all material is identified and proper action can be taken.

10.11.01. Storage of Regulated Material

A. Prior to the storage or use of any Regulated Materials, the Contractor shall submit to the Engineer a Regulated Materials Storage and Use Plan (Plan). The Plan shall include (i) an inventory of all Regulated Materials to be stored or used at the Project site that equals or exceeds any of the following separate material phases: 55 gallons liquid, 200 cubic feet of compressed gas, or 500 lbs. solid; (ii) the maximum quantity of Materials to be stored; (iii) purpose of the Materials; (iv) the MSDS for each Material; (v) a detailed description of how the Materials will be stored (including secondary containment where required by applicable regulatory agencies); (vi) a site plan drawn to scale; (vii) storage area maps drawn to scale; (viii) a detailed description of how the Materials will be monitored; (ix) a detailed description of how wastes from the Materials will be stored and/or disposed; and (x) a detailed description of the procedures to be followed in the event of an uncontrolled release of the Regulated Materials.

B. The Plan shall be submitted to the Engineer and favorably reviewed at least 30 days prior to the storage or use of any Regulated Materials. The Plan shall be updated and submitted to the Engineer by the Contractor upon the addition of

new Regulated Materials not listed previously or upon a 100 percent (or greater) increase in quantity of a Regulated Materials that is listed in the plan.

10.11.02. Regulated Material Discharges or Releases

A. The Contractor is responsible for all discarded or abandoned Material, including Regulated Materials and Hazardous Waste, generated as a result of the Contractor's operations unless specifically noted otherwise in these Specifications. The Contractor shall comply with Article 3.09. Differing Conditions.

B. In the event of a discharge or release of a Regulated Materials from the Contractor's operation, the Contractor is responsible for notifying the proper authorities, providing containment of the material, identifying the contaminants, investigating the extent of all contaminants, testing and removing contaminated materials, disposing of contaminated materials, and verifying the removal of all contaminated materials. These activities shall be performed to the satisfaction of the Engineer at the Contractor's cost. The Contractor shall perform any Work and provide any and all documentation required by the District and by all Federal, State, and local agencies. The Contractor shall provide to the Engineer copies of all correspondence and reports related to these activities. All Work performed to accomplish these activities shall be in accordance with Federal, State, and local regulations.

C. In the event of a discharge or release of Regulated Material, the Contractor shall notify the Engineer immediately. Immediate notifications may be verbal. The Contractor shall submit a detailed written report to the Engineer within 24 hours of the discharge or release. The written report shall include; a description of events leading to the discharge or release, action taken to prevent or control the discharge or release, a description of the discharge or release, the quantity of Material discharged or released, method used to determine the quantity discharged or released, type of Material discharged or released, MSDS for the Material(s) involved, a description of the area affected by the discharge or release, agencies notified and date and time of notification, and status of the cleanup. The report shall also include the proposed investigation, cleanup, and verification sampling activities.

D. All expenses incurred by the Contractor as a result of or to remedy the discharge or release of Regulated Materials shall be borne solely by the Contractor; no additional compensation shall be made. The Contractor shall be responsible for signing the Nonhazardous Waste Manifests and the Hazardous Waste Manifests and for paying the State Superfund fees, the generator's fees, and other costs of disposal of these wastes unless specifically stated otherwise in these Specifications. The Contractor shall be identified as the owner and generator of the wastes associated with unauthorized releases or discharges.

10.11.03. Hazardous Waste

A. The Contractor shall manage the Hazardous Waste generated from this operation in accordance with the Specifications below:

1. Labeling: The Contractor shall completely fill out and affix a “Hazardous Waste” label to each Hazardous Waste container for the Contractor’s operations. Each Hazardous Waste label shall contain, at a minimum, (i) the words “HAZARDOUS WASTE”; (ii) information on the generator (i.e., name, address, phone number); (iii) EPA identification number for the waste stream; (iv) EPA and/or California Waste Code; (v) waste accumulation starting date; (vi) identification and content of the waste; (vii) the physical state of the waste (i.e., solid or liquid); (viii) and the hazardous property (i.e., flammable, toxic, corrosive, reactive, etc.). If the primary container is placed inside a secondary container, then the Contractor shall also prepare and affix another Hazardous Waste label on the secondary container.

2. Secondary containment: The Contractor shall provide appropriate secondary containment for all storage areas for Hazardous Materials and Hazardous Waste. In the case of an installation with one (1) primary container, the secondary containment shall contain at least 110 percent of the volume of the primary container. In the case of an installation with multiple primary containers, the secondary containment shall contain 150 percent of the volume of the largest container or ten (10) percent of the aggregate internal volume of all primary containers in the storage facility, whichever amount is greater. If the storage facility or storage system is open to rainfall, then the secondary containment must be able to additionally accommodate the volume of a 24 hour rainfall as determined by a 25 year storm history.

3. Accumulation time limit: The Contractor shall properly haul and dispose of all Hazardous Waste within 90 Days from the accumulation starting date identified on each Hazardous Waste label or on the completion date of the Contract, whichever event comes first. The waste accumulation starting date for each waste stream begins when the first drop of the waste is placed in the container.

4. Hauling and disposal of waste: The Contractor shall be responsible for using appropriate Hazardous Waste haulers and disposing of all Hazardous Waste in accordance with Federal, State, and local regulations.

B. Waste Manifests: Prior to issuance of the Project Completion letter, the Contractor shall submit copies of all Hazardous Waste Manifests signed by disposal facilities and certificates of disposal to prove that the Contractor has legally disposed of such materials. The Contractor shall submit four (4) copies of each manifest.

10.12. Non-regulated Materials

A. Non-regulated Material is any substance that is not required by any Federal, State, or local regulations to have special management, storage, disposal, or handling practices.

B. Non-regulated Material may be disposed at State-permitted, non-hazardous waste landfills.

C. For non-regulated material to be reused or disposed of on-site or at a site other than a State-permitted landfill, the Contractor must obtain all required permits, agency approvals, and property owner agreements and pay all fees and taxes for all services and Materials required in conjunction with the management, transportation, disposal, and reuse of non-regulated materials.

10.12.01. Disposal at Other than State-Permitted Landfills

A. The Contractor shall enter into an agreement with the property owner prior to disposal of materials and submit a copy thereof to the Engineer conveying a written consent from the property owner receiving the materials providing:

1. a written authorization from the property owner to accept materials at duly noted quantities, types of materials (e.g., soils, debris, etc.), and the disposal property location address; and

2. a written release from the property owner fully absolving the Santa Clara Valley Water District from any and all responsibility and legal liability toward any damage to life and environment in connection with the disposal of the materials on the property.

B. Prior to the disposal of materials, the Contractor shall provide:

1. copies of all applicable regulatory agency permits, approvals, licenses, and environmental clearances;

2. site specific health and ecological risk assessment and/or compliance with applicable regulatory agency regulations or guidelines, including, but not limited to, the Environmental Screening Levels per the latest guidelines from the San Francisco Bay RWQCB;

3. copies of documentation of communication made by the Contractor with appropriate regulatory agencies on evaluation of regulatory requirements and regulatory agency approvals for disposal of materials; and

4. copies of laboratory testing reports for the materials to be disposed.

C. Within 15 Days after the disposal of materials at the property location, the Contractor shall submit an acknowledgement duly signed by the property owner certifying the date of receipt of the materials, including quantity and types of

materials received (e.g., soils, debris, etc.), to prove that the Contractor has disposed of the materials at the location designated in the agreement.

D. Waste Manifests: Prior to issuance of the Project Completion letter, the Contractor must submit copies of all Non-hazardous Waste Manifests signed by disposal facilities and certificates of disposal to prove that the Contractor has legally disposed of such materials. The Contractor shall submit four (4) copies of each manifest.

10.13. Imported Earthfill Material

A. The Contractor shall not import earthfill material that is contaminated with Regulated Materials.

B. If imported earthfill Material is, or is found to be, contaminated by Regulated Materials, the Contractor shall immediately remove the contaminated material and dispose of it in accordance with all applicable laws, ordinances, and regulations; conduct necessary sampling and monitoring to verify that all contaminated material has been removed; and verify to the satisfaction of the Engineer and/or to the appropriate regulatory agencies that any surrounding areas, materials, soils, or waters have not been impacted by the contaminated materials. The subsequent disposal of the contaminated material shall be the responsibility of the Contractor. No compensation shall be made to the Contractor by the District for removal, disposal, replacement, or chemical analysis, or for any other costs associated with the removal, disposal, and replacement of the contaminated material.

C. For each imported earthfill material to be used on the Project, the Contractor shall submit to the Engineer completed Imported Materials Certification Form; copies of this form are available from the Engineer. If the imported earthfill materials are to be obtained from more than one (1) source, the Contractor shall submit a separate form for each source of earthfill material. This form shall be submitted at least 30 Days prior to the delivery of the earthfill material to the construction site and shall receive favorable review prior to delivery.

D. The Engineer may obtain soil samples from the site and test them to monitor the Contractor's compliance with these Provisions.

10.14. Migratory Birds

A. The Contractor shall comply with all applicable Federal and State laws, rules, and regulations related to the protection of migratory birds, including, but not necessarily limited to, the Federal Migratory Bird Treaty Act (16 USC 703-712 50 CFR Part 21 and 50 CFR Part 10) and the California Department of Fish and Game Code Sections 2000, 3503, 3503.5, 3513, and 3800.

B. The Contractor shall carry out all activities in a manner consistent with the U.S. Fish and Wildlife Service's Migratory Bird Program. The Contractor shall not pursue, hunt, take, capture, kill, attempt to take, or posses any migratory bird

listed in 50 CFR 10.13, or any part, nest, or egg of any such bird. Active nests are those containing either an egg (or eggs) or young and/or nests used by birds of prey, regardless of the presence of eggs or of young. To determine the occupancy of nests, the Contractor shall rely upon the professional expertise of a Qualified Biologist. See Section 19. Environmental.

C. The Contractor shall coordinate several measures, including (i) awareness and training of the Contractor's personnel on which bird species are protected, their nesting seasons, and seasonal variability; (ii) surveys to determine the presence of nesting birds in the Project area; (iii) establishment, maintenance, and removal of protective buffer zones around nests; (iv) installation and maintenance of exclusion devices; (v) nest prevention activities; and (vi) monitoring to ensure the adequacy of the compliance measures.

10.14.01. Scope of Work

A. The Contractor shall be aware of migratory bird nesting seasons (generally from January 15 to August 31) and variability; provide training to all Contractor personnel on the Project; monitor the Project site; perform preventative and deterrence measures to prevent birds from nesting; preserve and protect pre-established protective buffer zones; perform surveys to determine the potential for protected species to be in the Project area; establish new protective buffer zones around un-prevented nests, as required; install and/or maintain exclusion devices, such as netting and/or wire mesh screens; monitor to assure the adequacy of the compliance measures; and perform any other Work as specified herein to comply with all applicable statutes.

B. The Qualified Biologist shall monitor regulatory compliance, train Contractor personnel, and coordinate with the Engineer in conformance with (i) this Article; (ii) the Project specific Mitigation Monitoring and Reporting Program (MMRP) requirements relating to this Article; and (iii) all applicable permit conditions. The Qualified Biologist shall:

1. Provide bird nesting awareness training for all personnel working on the Project, including all sub contractors.

2. Monitor the Project site for nest starts and occurrences of active bird nests.

3. Document the location, status, and species of bird for each active nest.

4. Monitor the Work to ensure that protected birds are not disturbed in a manner that could result in noncompliance.

5. Establish protective buffer zones around active nests as specified herein.

6. Ensure protective buffer zones are maintained and nests are not disturbed. Advise when protective buffer zones are no longer needed and can be removed.

7. Monitor the maintenance and effectiveness of bird exclusion devices.

8. Provide recommendations concerning vegetation management, installation of additional exclusion devices, and maintenance of such devices to prevent bird nesting. Advise when exclusion devices are no longer needed and can be removed.

C. Within 14 Days of the First Chargeable Day, the District will release the site to the Contractor. Prior to the release, the Engineer and the Contractor shall assess the site to determine the presence of nesting birds and any existing protective buffer zones and exclusion devices within or near the construction areas. In no case shall the District maintain responsibility for the site for more than 14 Days after the First Chargeable Day. Upon release of the site, the Contractor assumes complete responsibility for the site, including Work site monitoring, existing protective buffer zones, and exclusion devices and shall perform all required Work as specified herein.

10.14.02. Migratory Bird Surveys

A. The Qualified Biologist shall perform migratory bird surveys prior to any Project related activity that could pose the potential to affect migratory birds.

B. The Contractor shall include activities for Qualified Biologist surveys on Project Schedules with assurance that the appropriate migratory bird surveys have been coordinated with the Qualified Biologist and will be performed in advance of activities.

10.14.03. Migratory Bird Monitoring

A. The Contractor is responsible for ongoing monitoring to ensure that migratory birds, their active nests, eggs, and young are not harmed in any way.

B. The Contractor and Qualified Biologist shall inspect all areas that may be affected by Project activities, including all vegetation, grounds, structures, and bridge(s), with sufficient frequency as needed to identify any new and partially built bird nests.

C. At the direction of the Engineer and the Qualified Biologist, the Contractor shall be responsible for the removal of any inactive or partially built bird nests with the exception of raptor nests. No birds, nests with eggs, or nests with hatchlings shall be disturbed, nor shall raptor nests be removed unless specified in the Special Provisions Article 19. Environmental.

10.14.04. Protective Buffer Zones

A. Existing protective buffer zones, if any, are shown on the Drawings or shall be communicated to the Contractor prior to the District releasing the site. In addition to District-established buffer zones, new protective buffer zones shall be required if a nest is established or discovered during the Contractor's activities. In the

event that an active nest is discovered in the Project area, or in adjacent areas considered to have the potential to be disturbed by the Contractor's activities, the Contractor shall notify the Engineer and establish a protective buffer zone around the nest. The exact location of the boundaries of protective buffer zones shall be established by the Qualified Biologist and approved by the Engineer. The Contractor shall install temporary fencing at the boundary of each new protective buffer zone except as otherwise directed by the Engineer. The fencing shall be Type ESA Temporary Fence per Caltrans Article 14-1.03. The Contractor shall attach signs labeled "Nesting Bird – Access Prohibited" at least every 50 feet along the fencing. The Contractor shall exclude Project activities to preserve and protect all protective buffer zones, including existing ones, at all times.

B. In the event that an active nest is discovered by the Qualified Biologist, the Biologist shall immediately notify both the Contractor and the Engineer of the active nest and of the applicable protective buffer zone.

C. The Qualified Biologist shall inspect all active nesting-bird protective buffer zones(s) on at least a weekly basis until such time as the nest is no longer active as confirmed by the Qualified Biologist. Once a nest is no longer active, the protective buffer zone shall be removed.

D. The Contractor shall be responsible for any added costs or schedule Delays as a result of the establishment of new nests or of new protective buffer zones due to the Contractor's failure to perform bird exclusion responsibilities.

E. The Contractor shall monitor protective buffer zone operations during the Project. Requirements for the protection of active nests may vary depending on the location and the species involved. The following are general guidelines to be followed by the Contractor when an active nest is encountered:

1. Stop any activities that may harm the nest.

2. Contact the Engineer immediately.

3. Only the Qualified Biologist should approach the nest and only if necessary.

4. The Contractor shall inform personnel of the presence of an active nest and take steps, described above, to avoid disturbing it.

5. Until inspected by the Engineer or Qualified Biologist, a 20-foot-radius protective buffer zone shall be established around the nest of any non-raptor, ground nesting bird, and a 50-foot-radius protective buffer zone around nests established in shrubs, trees, on structures, on Equipment, etc., except for raptor nests. Furthermore, the protective buffer zone shall be 250 feet for nesting raptors (including hawks), owls and burrowing owls, falcons, eagles, herons, and egrets. The Qualified Biologist may recommend, for approval by the Engineer, modification of these zones.

6. Refer to Section 19. Environmental for additional specific buffer zone requirements.

10.14.05. Exclusion Devices

A. The Contractor shall install nesting exclusion devices to prevent potential establishment or occurrence of a nest in the Project area during Project activities. The Contractor shall maintain all nesting exclusions devices, including existing ones, throughout the nesting season or until completion of Work in an area makes the devices unnecessary. The Contractor shall be responsible for the maintenance, repair, or replacement of exclusion devices until all of the Work is complete. The Contractor shall remove and dispose of all exclusion devices, including those installed by the District, when Work in the area is complete.

B. Bird exclusion devices shall be installed during the non-nesting season (generally September 1 through January 14). The Contractor shall obtain favorable review from the Engineer when installing bird exclusion devices during the nesting season (generally January 15 through August 31). At a minimum, all exclusion devices shall be inspected daily by the Contractor and weekly by the Qualified Biologist to ensure integrity of the devices and to prohibit birds from nesting without causing them harm.

10.14.06. Nest Prevention

A. The Contractor is hereby notified that all areas to be cleared of vegetation may be suitable nesting habitat for migratory birds. The Contractor shall perform all necessary clearing prior to the nesting season if at all possible. If clearing must occur during the nesting season, the Contractor shall obtain prior approval from the Engineer. If vegetation must be cut and maintained to prevent birds from nesting, it must be cut to less than six (6) inches in height and removed.

B. The Contractor shall inspect and monitor bare areas and gravel areas prior to commencement of the nesting season and as frequently as necessary thereafter and provide deterrence measures if necessary to prevent ground-nesting birds, such as killdeer, from establishing a nest.

C. Removal of vegetation (trees, shrubs, grasses, and herbaceous plants) shall be limited to areas shown on the Drawings designated for vegetation removal unless approval is obtained from the Engineer to remove vegetation from additional areas. No vegetation shall be trimmed back unnecessarily, including trees and/or shrubs growing near the right of way that overhang onto the worksite. Such overhanging foliage shall be protected and tied back if necessary. Landscaped areas and irrigation systems outside of the construction areas shall be preserved and protected from damage by the Contractor’s activities.

D. Pre-established Vegetation Management Areas: Some areas of vegetation removal, clearing, and eradication may be established and cleared by the District prior to the First Chargeable Day. In these areas, the Contractor shall be responsible for the continued clearing and eradication of all re-sprouts.

10.14.07. Submittals

A. Submit a résumé of qualifications of the Qualified Biologist for the Engineer's favorable review. The Qualified Biologist's qualifications must meet the minimum requirements as specified for the Qualified Biologist listed in Section 19. Environmental. The résumé shall be submitted and must be favorably reviewed by the Engineer prior to any Work.

B. Submit migratory bird survey reports to the Engineer within two (2) Days upon completion of the survey and at least two (2) Days prior to commencement of Project related activities.

C. Submit the Qualified Biologists' training materials for favorable review by the Engineer, prior to presenting bird nesting awareness training to personnel.

D. Submit to the Engineer no later than 15th Day of each month a monthly report prepared and signed by the Qualified Biologist that documents the activities of the Contractor, including, at a minimum, the status of awareness trainings provided, the installation, maintenance, or removal of any bird exclusion devices or protective buffer zones and their locations and monitoring results, and report the current status of previously documented bird nests.

E. When requested by the Engineer, maintain and submit a log of weekly documentation (including photo-documentation) of the time, date, condition of the nests, and any nest-prevention actions taken during inspections.

F. Submit to the Engineer product data for nesting exclusion devices, fencing for protective buffer zones, and any shop Drawings as deemed appropriate by the Engineer.

G. If the Contractor wishes to modify the dimensions of any protective buffer zone or modify any bird exclusion device, a written proposal of such modification must be submitted and favorably reviewed by the Engineer. The submittal must contain the Qualified Biologist's written justification for the proposed modification and shall include a description of the anticipated effects on the active nest and on nesting birds.

10.15. Other Wildlife and Fish Species

A. The Contractor shall comply with all regulatory and permit requirements pertaining to other wildlife and fish species as identified in Section 19. Environmental.

10.16. Sensitive Plants and Vegetation

A. The Contractor shall comply with all regulatory and permit requirements pertaining to sensitive or listed plants and vegetation communities as indentified in Section 19. Environmental.

10.17. Proper Pruning Techniques for Woody Vegetation Removal

A. An International Society of Arboriculture (ISA) Certified Arborist or Tree Worker is to be present at all times during pruning. Contractor shall comply with the following:

1. All pruning shall be in accordance with the most current editions of the Best Management Practices for Pruning (International Society of Arboriculture) and the American National Standard for Tree Care Operations (ANSI booklet Z133.1) and Pruning (ANSI booklet A300).

2. Pruning for clearance: Selectively remove only branches required for passage and movement of construction equipment.

3. Remove stubbed branches at the point of origin, outside the bark branch ridge.

4. No more than 25% of live foliage shall be removed from any tree at any one time (or in a given year).

5. Branch removal or reduction cuts (thinning cuts) are to be employed rather than heading cuts. Trees shall not be topped or headed back.

6. All cuts shall be distal to the branch bark ridge or, if present, the branch collar. The cuts shall be close to but shall not injure the branch collar. All final cuts shall be in one plane, with no torn bark.

7. Pruning cuts larger than 4 inches in diameter, except for dead or stubbed branches, shall be avoided.

8. Pruning operations shall be conducted in a manner that does not damage surrounding understory plants, if present.

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SECTION 11. CONTRACT CLOSEOUT

11.01. Project Completion and Acceptance

11.01.01. Use Before Acceptance

A. The District has the right to utilize or to place into service any item of Equipment or other usable portion of the Work before Acceptance of the entire Project. The District's exercise of said right shall hereinafter be referred to as Use Before Acceptance.

B. Where Use Before Acceptance is identified in the Contract Documents, it shall be considered part of the Work; no additional compensation or payment shall be made.

C. Should the District desire Use Before Acceptance that has not been identified in the Contract Documents, the Engineer shall notify the Contractor in writing, identifying the specific portion or portions of the Work proposed for Use Before Acceptance.

D. The Contractor shall provide written notice within ten (10) Days after a request for Use Before Acceptance by the District stating whether the proposed portions of Work are suitable for Use Before Acceptance and if there are any associated costs, constraints, or other impacts.

E. Until Use Before Acceptance, the Contractor is responsible for all care and maintenance of all items or portions of the Work.

F. Unless the Engineer requires the Contractor to execute a Use Before Acceptance Guaranty as provided in Article 11.02.03. Use Before Acceptance Guarantee, upon the District's issuance of written notice of Use Before Acceptance, the District accepts responsibility for the protection and maintenance of all such items or portions of the Work described in the written notice, with the exception of any injury or damage resulting from the Contractor's actions or from negligence.

G. If, by reason of the District's unidentified Use Before Acceptance, the premium for the Contractor's bodily injury and property damage insurance is increased, the District shall reimburse the Contractor for the additional amount necessarily incurred, allocable to the area and the period of the District's use up to the date of Acceptance of the Work.

H. The District's Use Before Acceptance does not constitute Acceptance of the Work, or of any portion of the Work, by the District, nor does it relieve the Contractor of responsibility for correcting defective and/or deficient Work or Material found at any time before Acceptance of the Work or during the guarantee period after the District's Acceptance. Notwithstanding any Use Before Acceptance, the Contractor retains full responsibility for fulfilling all of the requirements of the Contract Documents.

11.01.02. Contractor's Responsibility to Manage Incomplete and Deficient Work

A. The Contractor is responsible for identifying and managing incomplete and deficient Work. Incomplete and deficient Work includes, but is not limited to, noncompliance items, rework items, and nonconforming tests; deficiencies relating to inspections by the building official; administrative requirements; and items of Work not complete per the Contract.

B. The preliminary final and final inspections shall not be conducted until:

1. the entire Work of the Milestone/Project is complete;

2. cleaning has occurred pursuant to Standard Provisions Article 11.04. Final Cleaning and to Special Provisions Article 22.06. Final Cleaning; and

3. deficient Work identified in all outstanding noncompliance notices and/or deficiency lists has been corrected.

C. For each Milestone Completion, the Contractor must include activities for conducting the preliminary final inspection, completion of deficiency list, and final inspection in the Contractor's Detailed Progress Schedules.

D. The District may withhold the estimated cost of the incomplete and deficient Work and consequences thereof until it is completed in accordance with the requirements of the Contract Documents.

11.01.03. Milestone Completion Preliminary Final Inspection

A. When the Contractor believes the Work of a Milestone or Project is complete, including final cleaning of the Work area associated with the Milestone, the Contractor shall submit to the Engineer a written certification that the Work of the Milestone is complete and shall request a preliminary final inspection of the work of the Milestone by the District.

B. Prior to requesting the inspection, the Contractor shall furnish the following Milestone Completion Certification to District:

"To the best of my knowledge, all Work of Milestone (#) has been completed, inspected, and tested and is in full compliance with the requirements of the Contract."

Certified by Contractor: _____ *Date:* _____
(Signature)

C. Within seven (7) Days of receipt of the Contractor's certification that all Work of a Milestone/Project is complete, the Engineer shall conduct a preliminary final inspection with the Contractor.

D. If the Engineer determines that, based on the results of the preliminary final inspection, the incomplete/deficient Work identified is greater in substance and/or volume than can be appropriately declared on a Deficiency List, then the Work is not complete enough to complete the preliminary final inspection. The Contractor shall be so notified in writing. The Contractor must complete the Work and reinitiate procedures for another preliminary final inspection. Any costs to the District for more than two (2) preliminary inspections may be charged to the Contractor.

E. If the results of the preliminary final inspection are satisfactory to the Engineer, a Deficiency List shall be prepared and issued to the Contractor. Neither the District's preparation of the Deficiency List, nor any omission from the Deficiency List of items of incomplete and/or deficient Work relieves the Contractor from completing all the Work required by the Contract.

11.01.04. Milestone Completion Final Inspection

A. Prior to requesting the milestone completion final inspection, the Contractor shall furnish the following milestone completion certification to the District:

"The work of Milestone (#) has been completed, inspected, and tested and is in full compliance with the requirements of the Contract. All Deficiency List items identified during the Preliminary Final Inspection have been completed."

Certified by Contractor: _____ *Date:* _____
(Signature)

B. Upon delivery of this certification to the Engineer and if the Engineer agrees with the Contractor's certification, a final inspection shall occur within ten (10) Days of the Contractor's delivery of the milestone completion certification.

C. If the Engineer determines the Work is deficient, the Contractor shall again be furnished with a Deficiency List identifying the observed deficiencies in the Work. After all deficiencies have been corrected, the Contractor must initiate procedures for another final inspection. If more than two (2) final inspections are required, any costs to the District for additional final inspections may be charged to the Contractor.

D. After Acceptance of the Contractor's milestone completion certification following the final inspection, the Engineer shall issue a milestone completion letter to the Contractor. This letter will establish the date of the completion of the milestone. The assessment of Liquidated Damages, if applicable, shall cease accruing as of the date of the milestone completion.

E. The Contractor's Detailed Progress Schedules must include activities for final inspection of milestones.

11.01.05. Project Completion

A. The Contractor shall certify that the entire Work of the Project is complete. Completion of the Project includes submission to and acceptance by the District of all milestone completion submittals. Article 22.05. Submission Closeout Items, describes in greater detail the submittal requirements for Contract Closeout.

B. Prior to the Engineer issuing the Project completion letter, the Contractor shall furnish the following Project completion certification to the District. This certification is in addition to any intermediate Milestone completion certifications:

"*The entire Work of the Project has been completed, inspected, and tested and is in full compliance with the requirements of the Contract Documents. All Deficiency List items have been completed. All Deficiency List items have been completed. All items on the rework list have been completed. All Closeout Documents required by Article 22.05. Submission of Closeout Items, have been submitted to and accepted by the Engineer."*

Certified by Contractor: _____ *Date:* _____
(Signature)

C. The Contractor's certification shall also include the completion of all Deficiency List Work and the correction of all rework.

D. After acceptance of the Contractor's final certification, the Engineer shall issue a Project completion letter to the Contractor. This letter shall establish the date of the completion of Project. The assessment of Liquidated Damages, if any, shall cease accruing as of the date of Project completion.

11.01.06. Acceptance of Work

A. After issuing the Project Completion letter, the Engineer shall recommend that the District Board of Directors formally accept the Work.

B. Acceptance of Work shall be made by the District Board of Directors and only after the Engineer has recommended acceptance.

C. After the Board of Director's formal Acceptance of Work, the Clerk of the Board shall record a Notice of Completion of Contract and Acceptance of Work.

D. The District's Acceptance of Work establishes conformity with the Contract except for Delays in completion, latent defects, fraud, or such gross errors as amount to fraud, willful misconduct, or gross negligence, and are subject to any guarantee and warranty, express or implied. Determinations by the Engineer that the Work is complete or Acceptance of Work by the Board of Directors does not bar any action by the District against the Contractor pursuant to Article 11.02. Guarantee and Guaranty Bond.

11.02. Guarantee and Guaranty Bond

11.02.01. Guarantee

A. The guarantee period for any item of Equipment or usable portion of the Work that the District utilizes or places into service shall commence on the date of the Notice of Completion of Contract and Acceptance of Work.

B. The Contractor hereby agrees to make, at its own expense, all repairs or replacements necessitated by defects in Material or workmanship supplied or constructed under the terms of this Contract and to pay for any damage to other Work resulting from such defects that becomes evident within a minimum of three (3) years after the date of Notice of Completion of Contract and Acceptance of Work or within such period of time as may be prescribed by law. The Contractor further assumes responsibility for a similar guarantee for all Work and Materials provided by Subcontractors or by manufacturers of packaged Equipment components. The Contractor also agrees to indemnify, defend, and hold the District harmless from liability of any kind arising from damage due to said defects.

C. The Contractor-furnished Guarantee and Guaranty Bond specified herein shall be in addition to any Equipment, workmanship or Material warranties specified elsewhere in the Contract or as provided by the manufacturer. The Contractor shall provide copies of all warranties required of the Specifications in addition to the Guarantee and Guaranty Bond.

D. The Contractor shall execute and submit to the Engineer a completed guaranty form for the Work in the format provided below.

E. The Contractor shall, upon receipt of notice in writing from the District, promptly make all repairs arising out of defective Materials, workmanship, or Equipment. If the Contractor has failed to make the repairs with due diligence within ten (10) Days after giving this notice to the Contractor, the District is hereby authorized to make such repairs. In case of emergency, where, in the opinion of the District, Delay could cause serious loss or damage, repairs may be made without notice sent to the Contractor. The Contractor and its Surety shall be liable for any expense in connection with repairs performed by the District or by its agents.

F. Prior to the expiration of the guaranty period, the District reserves the right to hold a meeting and require the attendance of the Contractor and relevant Subcontractors and Suppliers at no cost to the District. The purpose of the meeting is to review guaranties, bonds, and maintenance requirements and to determine the required repair or replacement of defective items.

G. For the purpose of this Article, Acceptance of the Work or a portion of the Work by the District shall not extinguish any covenant or Agreement on the part of the Contractor to be performed or fulfilled under this Contract that has not, in fact, been performed or fulfilled at the time of such acceptance. All covenants and

agreements shall continue to be binding on the Contractor until they have been fulfilled.

11.02.02. Guaranty Bond

A. The Contractor shall furnish a written guaranty bond in the format provided below prior to issuance of the Project Completion letter. The guaranty bond shall be executed by both the Contractor and the surety (who must be an admitted surety in accordance with California Code of Civil Procedure Section 995.670). This guaranty bond shall be for a period of three (3) years after the date of Notice of Completion of Contract and Acceptance of Work and shall cover all Work.

B. The amount of the guaranty bond shall be no less than 15 percent of the total Contract Price(s).

SANTA CLARA VALLEY WATER DISTRICT

GUARANTY FORM

Guarantee for

(Project Name and Project Number)

City, State

We hereby guarantee the Project commonly known as _____ has been completed in accordance with the requirements of the Contract Documents and further agree that the Work to be free of defects in workmanship, Materials, and Equipment and to remain free of such defects for a period of three (3) years from the date of Acceptance of Work by the District's Board of Directors.

We agree that if any defects in Materials, workmanship, or Equipment become evident, we shall, within ten (10) Days after written notice of such defects, commence to repair or replace the same together with any other Work that may be damaged or displaced in so doing.

In the event of our failure to comply with the above-mentioned conditions within a reasonable time after being notified, or should the emergencies of the case require repairs or replacements to be made before we can be notified or respond to notification, we do hereby authorize the Santa Clara Valley Water District to proceed to have the defect repaired and made good at our expense; we shall pay the cost therefor upon demand.

The Guaranty provided herein shall not be in lieu of, but shall be in addition to, any warranties or other obligations otherwise imposed by the Contract Documents and by law.

Contractor: _____

Signature: _____

Title: _____

Date: _____

SANTA CLARA VALLEY WATER DISTRICT

GUARANTY BOND

BE IT KNOWN BY THESE PRESENTS: That

WHEREAS, the Santa Clara Valley Water District, State of California, has awarded to _____ (hereinafter designated as "Principal") a Contract for _____; and

WHEREAS, said Principal is required under the terms of said Contract to furnish a Guaranty Bond for the faithful performance of said Contract's Guaranty.

NOW, THEREFORE, we, the Principal and

_____ as Surety, are held and firmly bound unto the Santa Clara Valley Water District (hereinafter called "District") in the sum of

_____

Dollars ($_____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the above Principal, or heirs, executors, administrators, successors, or assigns shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said Contract and any alteration thereof made as therein provided, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the District, its officers, agents, and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

And the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the Work to be performed thereunder or to the Specifications accompanying the same shall in any way affect its obligation on this bond, and does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to the Work or to the Specifications.

In the event suit is brought upon this bond by the District and judgment is recovered, Surety shall pay all costs incurred by the District in such suit, including a reasonable attorney's fee to be fixed by the Court.

IN WITNESS WHEREOF two identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ Day of _____, 2_____.

_____ (Seal) _____ (Seal)
_____ (Seal) _____ (Seal)
_____ (Seal) _____ (Seal)

Principal *Surety*

Address: _____
_____

NOTE: Signature of those executing for Surety must be properly acknowledged.

11.02.03. Use Before Acceptance Guarantee

A. For Equipment or components of Equipment or other usable portions of the Work utilized or placed into service for the District's benefit during the progress of the Work and prior to Acceptance of Work, the Contractor shall submit the guarantee/warranty certificate below on the Contractor's letterhead.

(Contractor's Letterhead)

USE BEFORE ACCEPTANCE GUARANTY

FOR

EQUIPMENT OR OTHER USABLE PORTION OF THE WORK INSTALLED BY CONTRACTOR

AND

USED BY DISTRICT BEFORE ACCEPTANCE OF WORK

We (Name of Contractor), agree to maintain and repair as recommended by the manufacturer the following described Equipment (system) or other usable portion of the Work that has been utilized or placed into service by the personnel of the District prior to Acceptance of Work. The Guaranty provided herein shall not be in lieu of, but shall be in addition to, any warranties, performance bond, payment bond, or other obligations otherwise imposed by the Contract Documents and by law.

Owner: Santa Clara Valley Water District

Description of Equipment or other portion of the Work: _____(Include manufacturer name, model number, serial number, and such other information as needed to positively identify the Equipment/system or portion of Work.)

Location of Equipment: _____

Installed under: (Contract Number and Contract Title)

Date Installed:_____

Date of first utilization or placement into service by the District:_____

This guaranty/warranty is effective upon date shown herein under, and shall remain effective until the District's Acceptance of Work.

Name of Contractor:_____

By: _____

Address: _____

Phone: _____

License No. _____

Date: _____

11.03. Submission of Closeout Items

11.03.01. As-Built Drawings

A. At completion of construction and prior to issuance of the Project Completion letter by the District, the Contractor shall deliver the following documents to the Engineer in the following form:

1. One original set of As-Built Drawings.

2. Field Test Records (two [2] copies): Unless required to be submitted elsewhere in the Specifications, field test records shall be submitted as a closeout item bound into three ring vinyl binders with clear plastic spine label pockets with all pages numbered. A complete, neat, word processed table of contents for each binder with page numbers for each entry must be provided.

3. Field survey record documentation.

B. Accompany the closeout document submittal with a transmittal letter in duplicate containing the following:

1. Date.

2. Santa Clara Valley Water District Project name and Project number.

3. Contractor's name and address.

4. Title and number of each document.

5. Certification that each document as submitted is complete and accurate.

6. Signature of Contractor.

11.03.02. Closeout Documents

A. At completion of construction and prior to the issuance of the Project Completion Letter by the District, the Contractor shall deliver the following closeout documents to the Engineer:

1. Evidence of compliance with and approval of Contractor obtained permits and associated inspections of authorities issuing the permits.

2. Copies of all special guarantees, warranties, and bonds.

3. Evidence of release of all liens and stop-payment notices.

4. Release of Claims in accordance with Article 6.03. Final Payment.

5. Records indicating the District's receipt and acceptance of all tools, spare parts, and extra Material as specified in these Specifications.

6. Records indicating the District's receipt and acceptance of all O&M manuals as specified in these Specifications.

7. Any and all administrative paperwork required for closeout.

11.03.03. Keys

A. The Contractor shall turn over all keys to new and existing facilities to the Engineer. This includes keys that were loaned (if any) to Contractor staff by the District for use during the construction period. The Contractor shall provide a written description or schedule describing which keys correspond to which doors, gates, or other feature.

11.04. Final Cleaning

11.04.01. Scope and Schedule for Final Cleaning

A. Final cleaning is separate Work from cleaning done throughout the Project to maintain the Project site in a safe and presentable condition. Final cleaning shall be a comprehensive cleanup of all new and existing facilities affected by the Work prior to and finished within 30 Days of the District's approval for continuous use and occupancy. Final cleaning may be performed separately by structure or area at different time periods only if approved by the Engineer.

B. Completion of this Work shall be planned and scheduled to accommodate the operational requirements of this District facility.

11.04.02. Final Cleanup

A. Before final inspection, the Contractor shall clean the premises and, unless otherwise specified, remove from the worksite and areas adjacent to the worksite, all building Material, rubbish, debris, unused Material, concrete forms, falsework, temporary structures, and other Material and Equipment used during the construction. All parts of the Work shall be left in a neat and presentable condition to the satisfaction of the Engineer.

11.04.03. Structures

A. Structures shall have the interiors and exterior surfaces cleaned by a professional industrial janitorial service fully knowledgeable in proper and effective cleaning methods.

B. The structures shall be thoroughly cleaned and shall include, but shall not be limited to, the following cleaning activities:

1. Paint, glazing compounds, and other Material shall be removed from glazing and skylights. Glazing and skylights shall be washed and

polished on both sides. Care shall be exercised so that the glazing is not scratched or damaged.

2. Interior surfaces, including walls, ceilings, light fixtures, doors, jambs, sills, piping, ducts, Equipment, electrical panels and conduits, handrails, guardrails, gratings, pipe trenches, drains, and miscellaneous fixtures shall be cleaned. Stains, spots, dirt, and dust shall be removed.

3. Temporary floor protections shall be removed; floors shall be vacuumed and washed; floors other than concrete shall be waxed and buffed.

4. Door and window hardware shall be cleaned and polished after all traces of stains, dirt, paints, and blemishes are removed.

5. Casework and plastic laminate surfaces shall be cleaned and polished.

6. Marks, stains, fingerprints, soil, and blemishes shall be removed from painted, decorated, or stained interior surfaces.

7. Spots, soil, paint, grout, plaster, concrete, and similar substances shall be removed from tile and the tile shall be washed.

8. Exterior walls, doors, and louvers shall be washed.

9. All interior and exterior signage shall be cleaned.

C. All concrete decks and floors shall be swept and washed. Stains, including oil stains, metal rust, and weld splatter shall be removed. Spills of construction Materials, including paint, concrete, grout, adhesives, insulating Materials, chemicals, and similar Materials shall be removed and the underlying surfaces cleaned.

11.04.04. Streets, Roadways, Concrete Slabs, Sidewalks, and Paved Areas

A. Streets, roadways, concrete slabs, sidewalks, and paved areas shall be cleaned and pressure washed so that they are free of debris, soil, and paint or construction Material spills. Painted construction markings on concrete and pavement shall be removed.

B. All access roads and maintenance roads shall be graded, removing wheel tracks and smoothing up such roads, and restored to their specified condition, or if none specified, to the condition then existing prior to the start of construction.

11.04.05. Storm Drainage Facilities

A. All gutters, V ditches, swales, storm drain pipe inlets, catch basins, drop inlets, and manholes shall be cleaned of soil, vegetation, and debris.

11.04.06. Unpaved Areas

A. Unpaved areas between new facilities and between new and existing facilities shall be cleaned of all debris and construction Material. These areas shall be graded or raked to a smooth uniform surface without leaving holes, depressions, or tire tracks.

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SECTION 12. WORK AND CONTRACT TIME(S)

12.01. Summary of Work

A. The Work to be completed under this Contract shall consist of furnishing all tools, equipment, non-District furnished materials, supplies, and manufactured articles, and all labor, transportation and services, including fuel, power, water, and essential communications, and for performing Work or other operations required to construct the Project.

B. Any quantities provided with Article 12.01. Summary of Work are approximate. Should there be a discrepancy between the quantities included herein and elsewhere in the Contract documents, those quantities specified elsewhere on the Contract shall govern.

C. The Work includes, but not limited to, the following:

1. Parallel East Pipeline

   a. Locate, identify and field verify existing utilities crossing and adjacent to all proposed piping and appurtenances.

   b. Perform work on treated water transmission pipeline appurtenances at sixteen (16) sites. See the Pipeline Maintenance Tables on sheet 7G-05 of the Project drawings for the appurtenance work to be completed at each site.

   c. Leak and pressure test all newly installed piping and appurtenances.

   d. Furnish, install and test all cathodic protection systems and associated components.

   e. Prepare and coat all in-vault and exposed pipeline appurtenances and associated piping assembly components on Parallel East Pipeline.

   f. Restore all impacted work sites to a condition equal to or better than that existing prior to construction.

2. Central Pipeline

   a. Completely drain and remove all water from the Central Pipeline.

   b. Perform work on the raw water transmission pipeline appurtenances at sixty-three (63) sites. See the Pipeline Maintenance Tables on sheets G-06 through G-11 of the Project drawings for the appurtenance work to be completed at each site.

c. Install a new line valve at the Guadalupe Line Valve Vault and associated valves, piping, electrical services, and control systems.

d. Provide logistical support for and participate in the manned internal visual and electromagnetic inspection of the Central Pipeline by the District and its third-party consultant.

e. Provide logistical support for the installation of the Acoustic Fiber Optic (AFO) monitoring system for the Central Pipeline by the District's third-party consultant.

f. Clear and grub as needed for access to perform the Work.

g. Perform internal pipeline repair work as specified and as needed should deteriorated pipe sections be identified during the internal pipeline visual and electromagnetic inspection, including carbon fiber reinforcement of Pre-stressed Concrete Cylinder Pipe.

h. Prepare and coat all in-vault and exposed pipeline and tunnel appurtenances and associated piping assembly components.

i. Coordinate and install supervisory control and data acquisition (SCADA) system components.

j. Furnish, install and test all cathodic protection systems and associated components.

k. Furnish and install vault manholes, hatches, ladders, and corrosion control test stations.

l. Provide environmental support and BMP management.

m. Restore all impacted work sites to a condition equal to or better than that existing prior to construction.

D. The Project has one (1) shutdown scheduled for the shutdown-required work as required for Central Pipeline. The Contractor shall complete all shutdown required work within the shutdown period scheduled. The District expects multiple crews to be deployed to complete the shutdown-required work. The Contractor is referred to Article 16.01.01 for shutdown constraints.

12.02. Drawings

A. The Drawings, entitled "Map and Construction Plan for the Central Pipeline Inspection and Rehabilitation Project and Parallel East Pipeline Rehabilitation Project – Phase II" accompany these Specifications and are part thereof.

B. Locations of proposed Parallel East Pipeline ventilation structures can be found in Appendix J – Parallel East Pipeline Ventilation Structure Locations. Locations shown are for reference only. Actual site conditions may vary based on the time of when these photos were taken.

12.03. Contract Time(s)

A. The Contractor shall complete all Work required under this Contract before the expiration of **305** Days from the first chargeable Day of the Contract. The first chargeable Day of the Contract shall be defined in the NTP issued by the District.

1. The Contractor shall complete **Milestone 1 – Immediate Submittals and Parallel East Pipeline Site Preparation Work** before the expiration of **30** Days from the first chargeable Day of the Contract. See Article 12.03.E for the Milestone 1 scope of work.

2. The Contractor shall complete **Milestone 2 – Parallel East Pipeline Ventilation Pipe Appurtenance Work** before January 1, 2021. See Article 12.03.E for the Milestone 2 scope of work.

3. The Contractor shall complete **Milestone 3 – Parallel East Pipeline Site Restoration Work** the expiration of **43** Days from the first day that the Contractor completes Milestone 2. See Article 12.03.E for the Milestone 3 scope of work.

4. The Contractor shall complete **Milestone 4 – Central Pipeline Preconstruction Coordination and Site Preparation Work** before the first day that the raw water system is taken out of service. See Article 12.03.E for the Milestone 4 scope of work. See Article 16.01.01. for shutdown constraints.

5. The Contractor shall complete **Milestone 5 – Central Pipeline Dewatering Work** before the expiration of **15** Days from the first day that the raw water transmission system is taken out of service. See Article 12.03.E for the Milestone 5 scope of work.

6. The Contractor shall complete **Milestone 6 – Central Pipeline Internal Inspection Work** before the expiration of **16** Days from the first day that the Contractor completes Milestone 5. See Article 12.03.E for the Milestone 6 scope of work.

7. The Contractor shall complete **Milestone 7 – Central Pipeline Internal Repair, Debris Removal, and AFO Preparation Work** before the expiration of **51** Days from the first day that the raw water transmission system is taken out of service. See Article 12.03.E for the Milestone 7 scope of work.

    a. The allowable time for the completion of Milestone 7 work will be re-evaluated based on the findings of the internal visual and electromagnetic inspection and the extent of the resulting internal repairs as specified in Article 12.03.C.

8. The Contractor shall complete **Milestone 8 – Central Pipeline AFO Appurtenance Installation and AFO Installation Support Work** before

the expiration of **64** Days from the first day that the raw water transmission system is taken out of service See Article 12.03.E for the Milestone 8 scope of work.

a. Milestone 8 work requires extensive coordination between the Contractor and the District's third-party consultant. The allowable time for the completion of Milestone 8 work may be re-evaluated based on the progress of the installation of the Acoustic Fiber Optic monitoring system by the District's third-party consultant as specified in Article 12.01 – 'Summary of Work'.

9. The Contractor shall complete **Milestone 9 – Central Pipeline Shutdown Required Work to Replace and Install CYV and GRV Valves** before the expiration of **75** Days from the first day that the raw water transmission system is taken out of service. See Article 12.03.E. for the Milestone 9 scope of work.

10. The Contractor shall complete **Milestone 10 – Central Pipeline Shutdown Required Appurtenance Work** before the expiration of **82** Days from the first day that the raw water transmission system is taken out of service. See Article 12.03.E. for the Milestone 10 scope of work.

11. The Contractor shall complete **Milestone 11 – Central Pipeline Refill, Pressurization, and Bringing the Pipeline Online** by the end of the scheduled shutdown date. See Article 12.03.E. for the Milestone 11 scope of work. See Article 16.01.01. for shutdown constraints.

12. The Contractor shall complete **Milestone 12 – Central Pipeline Non-Shutdown Required Appurtenance Work** before the expiration of **120** Days from the first day that the raw water transmission system is returned to service. See Article 12.03.E for the Milestone 12 scope of work.

13. The Contractor shall complete **Milestone 13 – Project Completion and Close-out Work** before the expiration of **22** Days from the first day that the Contractor completes Milestone 12. See Article 12.03.E. for the Milestone 13 scope of work. See Article 16.01.01. for shutdown constraints.

B. The schedule as identified in Table 12.03-1 – 'Tentative Schedule of Work' is based on California Code of Regulations as applicable to Parallel East Pipeline and based on the indicated Central Pipeline shutdown dates. Due to uncertain water supply and/or construction related issues with concurrent projects and their system-wide and/or inter-agency operational impacts, the shutdown dates and all related project activities may be rescheduled.

C. Should rescheduling be required, a revised 'Tentative Schedule of Work', reflecting the milestone requirements listed in Article 12.03.A, will be issued. The

Contractor will be notified a minimum of twenty (20) Days in advance of the current project start date, should such rescheduling be required. No additional compensation will be made to the Contractor for District generated changes to the schedule.

D. The Contractor is advised that dry conditions may not exist and that flow in various watercourses encountered in this Project may occur. In no case shall any extension of time be granted if the basis of a Claim is water flowing in a watercourse. No extension of time shall be given because of rain, or because of results of rain, except set forth in these Specifications.

E. The Contractor shall complete all work, as outlined under the following Milestones and as defined in these Specifications and the Drawings, within the specified time allowances, so that the District can meet its existing raw water supply commitments. Work shall include the following Milestones:

1. The scope of work to be completed under **Milestone 1: Immediate Submittals and Parallel East Pipeline Site Preparation Work**.

    a. All work required to prepare and submit Immediate Submittals. Refer to Article 20.01.02.

    b. All work required to prepare for Parallel East Pipeline construction operations for including, but not limited to:

        (1) Prepare and mobilize for construction activities.
        (2) Finalize City of San Jose Encroachment Permit

2. The scope of work to be completed under **Milestone 2: Parallel East Pipeline Ventilation Pipe Appurtenance Work**.

    a. All work to completely rehabilitate and upgrade air release valve appurtenances on the Parallel East Pipeline as shown on the Drawings including, but not limited to:

        (1) Locate existing utilities.
        (2) Remove existing ventilation structures.
        (3) Install new ventilation piping
        (4) Test new ventilation piping and appurtenances

3. The scope of work to be completed under **Milestone 3: Parallel East Pipeline Site Restoration Work**.

    a. All additional work to provide cathodic protection and coat appurtenances on the Parallel East Pipeline as shown on the Drawings including, but not limited to:

        (1) Install and test cathodic protection system
        (2) Coat new ventilation piping and appurtenances.

(3) Coat existing pumpout riser piping and appurtenances.

b. All work to restore to restore all impacted work sites to a condition equal to or better than that existing prior to construction.

4. The scope of work to be completed under **Milestone 4: Central Pipeline Preconstruction Coordination Work and Site Preparation Work**.

a. All work required to prepare for construction operations for Central Pipeline construction including, but not limited to:

(1) Prepare and mobilize for construction activities.

(2) Finalize City of San Jose, City of Campbell, Town of Los Gatos, County of Santa Clara Encroachment Permits, Caltrans Encroachment Permit, and Caltrans Encroachment Permit.

b. All work required to facilitate access to all sites along Central Pipeline:

(1) The Contractor shall prepare and weatherize as necessary all unpaved access roads to facilitate the transport of materials and equipment to and from the sites, based on the potential weather conditions and the capabilities of the Contactor's equipment.

(2) The Contractor shall clear and grub vegetation around all of the existing vaults and dissipation structures as necessary to facilitate the execution of all work, based on the potential weather conditions, the Contractor's proposed means and methods and the capabilities and dimensions of the Contractor's equipment.

c. All work required to install BMPs and discharge control measures necessary to drain and remove all water from the Central Pipeline.

d. All work required to stage pipeline draining and dewatering equipment in preparation for the removal of all water from the Central Pipeline.

e. All work required to stage material and equipment, as necessary, in preparation for the appurtenance replacement and rehabilitation work at each site.

(1) The Contractor shall be responsible for sorting and amassing all District furnished materials by vault, appurtenance and/or work site. The Contractor shall sort all District furnished materials in advance of their

scheduled installation. Should District furnished material deficiencies be identified during the Contractor's sorting work, the Contractor shall notify the District with sufficient advanced notice to allow the District to procure the deficient materials prior to their scheduled installation.

f. Conduct all coordination meetings with District staff. Refer to Article 15.01.03.

5. The scope of work to be completed under **Milestone 5 – Central Pipeline Dewatering Work** includes:

a. All work required to drain and remove all water from Central Pipeline.

b. All work required to remove all in-vault pipeline blowoff, pumpout riser and air release valve appurtenances in preparation for the manned internal visual and electromagnetic inspection of the Central Pipeline.

(1) All in-vault blowoff, pumpout riser and air release valve appurtenance components shall be disassembled as necessary and removed from the vaults to provide internal pipeline ingress and egress.

(2) All in-vault pipeline nozzles and laterals shall be covered with plywood to mitigate debris and animal infiltration to prevent water infiltration into the pipeline. If water enters the pipeline for any reason, the Contractor shall pump the water out at no additional charge to the District.

6. The scope of work to be completed under **Milestone 6 – Central Pipeline Internal Inspection Work** includes:

a. All work required to support and participate in the manned internal visual and electromagnetic inspection of the Central Pipeline.

(1) The Contractor shall provide push-pull forced air ventilation for the manned internal visual and electromagnetic inspection. The following vaults will be used for ventilation and the Contractor shall remove the appurtenances to provide ventilation:

CPL Suggested Ventilation Locations		
Vault	**Station**	**Detail**
CP-1	00+67.00	C-29
CP-24	156+90.00	C-25
CP-53	348+60.80	C-25

CPL Suggested Ventilation Locations		
Vault	**Station**	**Detail**
CP-74	508+94.00	C-27
CP-99	665+22.00	C-28

(2) The following appurtenances shall be removed to provide suitable internal pipeline ingress and egress:

CPL Suggest Ingress and Egress Locations		
Vault	**Station**	**Detail**
CP-3	13+00.00	C-29
CP-9	54+22.00	C-32
CP-11	71+00.00	C-33
CP-15	103+00.00	C-33
CP-18	126+20.00	C-25
CP-20	141+40.00	C-27
CP-29	186+25.00	C-30
CP-34	191+19.00	C-34
CP-41	264+20.00	C-25
CP-45	273+24.00	1C-01-1C-05
CP-49	317+80.84	C-25
CP-51	332+24.87	C-33
CP-56A	371+24.52	C-33
CP-57	386+62.00	C-26
CP-64	440+65.00	C-25
CP-66	450+99.80	C-28
CP-68	465+68.64	C-28
CP-72	496+20.00	C-29
CP-76	522+95.00	C-27
CP-79	536+31.88	C-27
CP-81	552+13.89	C-31
CP-85	584+43.37	C-25
CP-93	646+00.00	3C-01-3C-04
CP-97	659+75.00	C-25

(3) The Contractor shall provide appropriately trained and equipped personnel to participate in the manned internal visual and electromagnetic inspection to directly observe and document potential Supplemental Internal Repair Work.

(4) The Contractor shall setup, maintain, monitor and relocate all materials and equipment necessary to establish

push-pull forced air ventilation to facilitate all manned internal inspection activities. See Article 32.22 – 'Support for Internal Pipeline Work'.

(5) Location of ventilation and ingress and egress locations are subject to change.

7. The scope of work to be completed under **Milestone 7 – Central Pipeline Internal Repair, Debris Removal, and AFO Preparation Work** includes:

a. All work required to complete the Supplemental Internal Repair Work for the Central Pipeline. Supplemental Internal Repair Work will be based on the findings of the visual and electromagnetic inspections. The Contractor may be required to:

(1) Perform internal pipeline repairs and debris removal work. See Article 32.23 – 'Internal Pipeline Work & Debris Removal.

(2) Install internal weko-seals identified during the inspections. See Article 32.21 – 'Weko-Seal Installation'.

b. Install internal Carbon Fiber Reinforcement in deteriorated sections of the existing Prestressed Concrete Cylinder Pipe. See Article 32.24 – 'Internal CFRP Liner Repair of Distressed PCCP'.

c. The Contractor shall install the CFRP repairs following the inspections and analysis of the electromagnetic inspection results. The installation of the AFO system will follow the CFRP repair work and depends on the completion of the repairs.

8. The scope of work to be completed under **Milestone 8 – Central Pipeline AFO Appurtenance Installation and AFO Installation Support Work** includes:

a. All work required to support the installation of the Acoustic Fiber Optic monitoring system for the Central Pipeline by the District's third-party consultant.

(1) The Contractor shall coordinate and schedule its work to facilitate the installation of the Acoustic Fiber Optic monitoring system by the District's third-party consultant. Contractor shall support the delivery and handling of the District's third party consultant AFO equipment.

(2) The Contractor shall provide push-pull forced air ventilation for the manned internal pipeline work required for the

installation of the Acoustic Fiber Optic monitoring system by the District's third-party consultant.

(3) The following appurtenances located at the following vaults shall be removed for access and ventilation:

CPL Suggested Ventilation Locations		
Vault	**Station**	**Detail**
CP-1	00+67.00	C-29
CP-24	156+90.00	C-25
CP-53	348+60.80	C-25
CP-74	508+94.00	C-27
CP-99	665+22.00	C-28

(4) The Contractor shall install the following appurtenances in preparation for the installation of the AFO monitoring system:

Splice Point #	Vault	Station	Assembly	Detail
SP-1	CP-101	666+09.00	Springline Design US of LV	6C-03
SP-2	CP-89	618+01.43	24" Manhole	C-33
SP-3	CP-83	567+39.37	24" Manhole	C-33
SP-4	CP-70	496+20.00	8" CARV W/ 24" Manhole	C-34
SP-5	CP-62	424+22.00	24" Manhole	C-33
SP-6	CP-56A	371+24.52	24" Manhole	C-33
SP-7	CP-51	332+24.87	24" Manhole	C-33
SP-8	CP-45	273+24.00	Springline Design DS of LV (GRV)	1C-03
SP-8	CP-45	273+24.00	Springline Design US of LV (GRV)	1C-03
SP-9	CP-34	215+17.75	4" CARV W/ 24" Manhole	C-34
SP-10	CP-22-23	154+85.00	24" Manhole in Manhole in Coyote Creek Blowoff	5C-02
SP-11	CP-15	103+00.00	24" Manhole	C-33
SP-12	CP-11	71+00.00	24" Manhole	C-33
SP-13	CP-0	-00+21.00	Springline Design DS of LV	C-32

(5) The existing appurtenance vaults adjacent to the splice point shall be removed to provide suitable ingress and egress for District's third-party consultant. The proposed appurtenances shall not be installed until the fiber optic acoustic monitoring system has been installed and tested by the District's third-party consultant.

(6) The following scheduled is tentative and shall be confirmed with the District's third-party consultant during Project Site Preparation period.

Run	From (Vault)	From (STA)	To (Vault)	To (STA)	Tentative Date
1	CP-101	666+09.00	CP-89	618+01.43	Thursday, February 25, 2021
2	CP-89	618+01.43	CP-83	567+39.37	Friday, February 26, 2021
3	CP-83	567+39.37	CP-70	496+20.00	Saturday, February 27, 2021
4	CP-70	496+20.00	CP-64	440+65.00	Sunday, February 28, 2021
5	CP-64	440+65.00	CP-56A	371+24.52	Monday, March 1, 2021
6	CP-56A	371+24.52	CP-45	273+24.00	Tuesday, March 2, 2021
7	CP-45	273+24.00	CP-34	215+17.75	Wednesday, March 3, 2021
8	CP-34	215+17.75	CP-24	156+90.00	Thursday, March 4, 2021
9	CP-24	167+50.00	CP-11	71+00.00	Friday, March 5, 2021
10	CP-11	71+00.00	CP-0	-00+21.00	Saturday, March 6, 2021

(7) The Contractor shall furnish and install all conduit, structures, and modifications as shown on the Drawings to support the AFO system. This work includes:

(a) Modifications to platforms, installation of new platforms, handrails, toeboard, ladders, ventilation ducts at CP-101.

(b) Support structure and conduits for DAQ system and DAQ AC Unit at CP-101.

9. The scope of work to be completed under **Milestone 9 – Central Pipeline Shutdown-Required Work to Replace and Install Valves and Piping at Coyote Blowoff (CYV) and Guadalupe River Vault (GRV)** includes:

a. All shutdown required work related to replacing all valves in CYV and GRV as shown on the Drawings.

(1) The Contractor shall temporarily open the vault roof hatch to replace existing appurtenances in CYV and GRV as specified in the Drawings. Roof hatches at CYV and GRV, shall be closed and locked at the end of each day to provide coverage of the vault and site safety and security.

(2) The Contractor shall install all electrical, control system, and SCADA conduit and cable to install the motor operated valves.

(3) The District will perform the final connection for the controls and SCADA connections. Refer to Article 16.01.02.C.

(4) The Contractor shall coordinate with the Engineer on scheduling District Control System Engineering staff after the valves and actuators are installed to program the motor operated valves and RTU control panels. Control System Engineering staff require at least one week to connect and program the actuators and the Contractor shall schedule accordingly to allot adequate time for District staff to complete the connection of the valves. Contractor shall provide dedicated electrical, control, programming support during the entire duration that District staff is working to make final connections for startup and troubleshooting efforts. The valves shall be commissioned and tested before the pipeline is brought back online.

(5) The Contractor is informed that only single isolation along South Bay Aqueduct (SBA) will be provided as part of the lock-out tag-out plan for pipeline dewatering. The Contractor can provide other forms of isolation such as a bladder ball that comply with CAL/OSHA regulation and is acceptable to the Contractor's policies and procedures.

(6) All exposed pipe sections that require pipe supports shall remain supported at all times. The Contractor shall install temporary pipe supports as needed to perform valve and appurtenance replacement work. Permanent pipe supports equivalent to pre-existing supports shall be reinstalled after line valve and appurtenance work is completed.

10. The scope of work to be completed under **Milestone 10 – Central Pipeline Shutdown-Required Appurtenance Work** includes:

a. All shutdown related work required to rehabilitate and restore the Central Pipeline to service.

(1) The Contractor shall complete the work as depicted in the Drawings and as specified in the Pipeline Maintenance Tables on sheets G-06 through G-11 of the Drawings, except as noted.

(2) The Contractor shall install the stem extensions on the valves located in appurtenance vaults prior to the refilling of the pipeline for operation.

11. The scope of work to be completed under **Milestone 11 – Central Pipeline Refill, Pressurization, and Bringing the Pipeline Online** includes:

    a. All related work required to support District staff in pre-fill, inspecting, refilling, pressurizing, post-fill inspecting and bringing the pipeline back online.

        (1) The Contractor shall inspect all shutdown required work along Central Pipeline to confirm all appurtenances are ready for the pipeline to be brought back online.

        (2) The Contractor shall support District staff in the District's inspection of all shutdown required work along Central Pipeline.

            (a) The Contractor shall inspect all appurtenances prior to filling the pipelines to confirm all valves are:

                i) installed per the Specifications and manufacturer's recommendations;

                ii) functional; and

                iii) in the proper open or closed position as appropriate for proper pipeline operation.

            (b) If any work is identified by District staff during the District inspection that is required to be remediated prior to refill, the Contractor shall complete the District's inspection listed action items prior to the initiation of bringing the pipeline online.

        (3) The Contractor shall support District staff as needed in deisolation, lock out tag out removal, and pressurization of the pipeline system.

        (4) After the pipeline is brought back online for repairs, the Contractor shall inspect all shutdown required work for repairs.

            (a) The Contractor shall inspect all appurtenances following filling and pressurizing the pipelines to confirm that all connections do not leak and that all valves are operational and in the proper (open or closed) position as appropriate for proper pipeline operation.

12. The scope of work to be completed under **Milestone 12 – Central Pipeline Non-Shutdown Required Appurtenance Work** includes:

    a. All non-shutdown related work required to completely rehabilitate and upgrade all pipeline appurtenances and vaults.

        (1) All related work required to rehabilitate and restore the following appurtenances at the following locations as shown in the Drawings:

            (a) LLG
            (b) KDT
            (c) PDT
            (d) VPS

        (2) Install all vault and appurtenance access assemblies (i.e., ladders, hatches, stairs, platforms, manholes, etc.) as depicted in the Drawings.

        (3) Reconstruct and repair all facility components that were adversely impacted by construction operations.

        (4) Prepare and paint all existing and new in-vault and exposed exterior pipeline, appurtenance and associated component surfaces at all work sites.

        (5) Restore all impacted work sites to a condition equal to or better than existing prior to construction.

        (6) Complete final site cleanup.

13. The scope of work to be completed under **Milestone 13 – Project Completion and Close-out Work** includes:

    a. All work required to Complete and Close-out the Project for Parallel East Pipeline and Central Pipeline.

        (1) Participate in project walk-thru with District and applicable agency representative and assist with the development of a project punch list.

        (2) Complete project punch list items.

        (3) Complete all remaining project closeout work required under the Contract.

F. The District furnished parts and materials will be available for pick-up by the Contractor. The Contractor shall schedule with the Engineer and District for

pick-up. The Contractor's attention is directed to Article 14.07 - "District Furnished Materials and Equipment" for further information.

G. Site availability for the start of the Contractor's shutdown required appurtenance work will be based on the pipeline isolation, lockout-tagout, dewatering, internal inspection and acoustic fiber optic monitoring installation activities.

1. The Engineer will provide two advance notices confirming the pipeline isolation, lockout-tagout, internal inspection and acoustic fiber optic monitoring installation schedule:

   a. Ten (10) days before site availability,
   b. Two (2) days before site availability

2. The Contractor shall participate in all pipeline isolation and lockout-tagout activities.

3. The Contractor shall participate in and provide logistical support and force air ventilation for all internal pipeline inspection activities.

4. The Contractor shall coordinate and provide logistical support, force air ventilation, and appurtenance installation support for acoustic fiber optic monitoring system that is to be installed by the District's third-party consultant.

5. The all pipeline isolation, lockout-tagout, dewatering, internal inspection, internal repair and acoustic fiber optic monitoring installation activities shall be incorporated into the Contractor's schedule and sequence of work.

H. All internal pipeline repair and debris removal work shall be coordinated with, performed in the presence of, and documented by the District's inspection staff. The Contractor shall provide a minimum of two (2) working days advance notice to the District specifying the type, site, date, and time for internal repair and debris removal work.

I. Pipeline access points shall remain open until all internal pipeline work (weld-o-let patching, manned internal pipeline inspection, lining and joint repair, debris removal work, CFRP Lining work, etc.) has been completed, inspected, documented and accepted by the District.

J. Site availability for the end of the Contractor's shutdown required appurtenance work will be based on the pipeline de-isolation, fill and return-to-service activities.

1. The Engineer will provide a ten (10) day and a two (2) day advanced notice confirming the pipeline de-isolation, fill, and return-to-service schedule.

2. The Contractor shall participate in all pipeline de-isolation, fill, pressurization, and appurtenance inspection activities.

3. The Contractor shall have multiple crews available to assist during filling, pressurization and inspection of the pipelines. Each crew to be equipped with pumps, hoses, filter bags, ladders, generators, tools and all necessary equipment and material to respond to field corrective actions. Hours of work during fill, pressurization and inspection may be 8-12 hour shifts.

4. The pre- and post- fill and pressurization inspections facilitates acceptance of the Contractor's work. The Contractor shall participate in the pre- and post- fill and pressurization appurtenance inspections and shall incorporate them into their schedule and sequence of work.

K. Following fill and pressurization, no internal pipeline work shall occur. The District will depressurize the pipeline, as required, to allow the Contractor to make external repairs resulting from work deficiencies identified during the appurtenance inspection under operational conditions; however, no other shutdowns and/or extensive dewatering of the pipeline will be made during this Contract. All pipeline appurtenances shall be functional and leak-tight before the pipeline is filled.

L. The start of the Contractor's non-shutdown required appurtenance and vault rehabilitation and upgrade, site restoration and project close out work will be based on the successful completion and inspection of all work required to return the pipelines to service under operational conditions.

M. The dates shown in Table 12.03-1 are tentative and may vary. No additional compensation will be made to the Contractor for District generated changes to the schedule shutdown period that may impact the Contractor's work.

TABLE 12.03-1
Tentative Schedule of Work

Description	Duration (Work Days)	Start Date	End Date
Milestone 1: Immediate Submittals and Parallel East Pipeline Site Preparation Work	30	Tuesday, October 20, 2020	Wednesday, November 18, 2020
Milestone 2: Parallel East Pipeline Ventilation Pipe Appurtenance Work	73	Tuesday, October 20, 2020	Thursday, December 31, 2020
Milestone 3: Parallel East Pipeline Site Restoration Work	43	Friday, January 1, 2021	Friday, February 12, 2021

Description	Duration (Work Days)	Start Date	End Date
Milestone 4: Central Pipeline Preconstruction Coordination and Site Preparation Work	74	Tuesday, October 20, 2020	Friday, January 1, 2021
Milestone 5: Central Pipeline Dewatering Work	15	Monday, January 4, 2021	Friday, January 22, 2021
Central Pipeline Isolation, LOTO & Initial District Pipeline Gravity Draining	5	Monday, January 4, 2021	Friday, January 8, 2021
Milestone 6: Central Pipeline Internal Inspection Work	4	Tuesday, January 19, 2021	Friday, January 22, 2021
Analysis of Electromagnetic Inspection	12	Saturday, January 23, 2021	Wednesday, February 4, 2021
Milestone 7: Central Pipeline Internal Repair, Debris Removal, and AFO Preparation Work	20	Thursday, February 4, 2021	Tuesday, February 23, 2021
Milestone 8: Central Pipeline AFO Appurtenance Installation and AFO Installation Support Work	49	Tuesday, January 19, 2021	Monday, March 8, 2021
Milestone 9: Central Pipeline Shutdown Required Work to Replace and Install CYV, GRV, and VPS Valves	60	Tuesday, January 19, 2021	Friday, March 19, 2021
Milestone 10: Central Pipeline Shutdown Required Appurtenance Work	67	Tuesday, January 19, 2021	Friday, March 26, 2021
Milestone 11: Central Pipeline Refill, Pressurization, and Bringing the Pipeline Online	8	Friday, March 26, 2021	Friday, April 2, 2021
Milestone 12: Central Pipeline Non-Shutdown Required Appurtenance Work	120	Friday, April 2, 2021	Friday, July 30, 2021
Milestone 13: Project Completion and Close-Out Work	19	Monday, August 2, 2021	Friday, August 20, 2021

12.04. Inclement Weather

A. The time allowance for completion of Work is based upon the inclusion of fourteen (14) Days for inclement weather, which, pursuant to Standard Provisions. Article 3.08.02, Inclement Weather may be excusable.

B. The Contractor shall comply with Standard Provisions Article 3.08.02. Inclement Weather.

12.05. Liquidated Damages

A. In accordance with Standard Provisions Article 5.07. Liquidated Damages, the District may assess as Liquidated Damages the following amounts:

1. **$3,300** per Day for failure to complete all Work of **Milestone 1 – Immediate Submittals and Parallel East Pipeline Site Preparation Work** within the time limit allowed.

2. **$3,300** per Day for failure to complete all Work of **Milestone 2 – Parallel East Pipeline Ventilation Pipe Appurtenance Work** within the time limit allowed.

3. **$3,300** per Day for failure to complete all Work of **Milestone 3 – Parallel East Pipeline Site Restoration Work** within the time limit allowed.

4. **$3,300** per Day for failure to complete all Work of **Milestone 4 – Central Pipeline Preconstruction Coordination and Site Preparation Work** within the time limit allowed.

5. **$23,100** per Day for failure to complete all Work of **Milestone 5 – Central Pipeline Dewatering Work** within the time limit allowed.

6. **$7,300** per Day for failure to complete all Work of **Milestone 6 – Central Pipeline Internal Inspection Work** within the time limit allowed.

7. **$7,300** per Day for failure to complete all Work of **Milestone 7 – Central Pipeline Internal Repair, Debris Removal, and AFO Preparation Work** within the time limit allowed.

8. **$7,300** per Day for failure to complete all Work of **Milestone 8 – Central Pipeline AFO Appurtenance Installation and AFO Installation Work** within the time limit allowed.

9. **$11,000** per Day for failure to complete all Work of **Milestone 9 – Central Pipeline Shutdown Required Work to Replace and Install CYV, GRV, and VPS** within the time limit allowed.

10. **$11,000** per Day for failure to complete all Work of **Milestone 10 – Central Pipeline Shutdown Required Appurtenance Work** within the time limit allowed.

11. **$11,000** per Day for failure to complete all Work of **Milestone 11 – Central Pipeline Refill, Pressurization, and Bringing the Pipelines Online** within the time limit allowed.

12. **$3,300** per Day for failure to complete all Work of **Milestone 12 – Central Pipeline Non-Shutdown Required Appurtenance Work** within the time limit allowed.

13. **$3,300** per Day for failure to complete all Work of **Milestone 13 – Project Completion and Close-out Work** within the time limit allowed.

14. **$250** per Day for failure to submit the Preliminary Progress Schedules, any Progress Schedules, or master submittal list within the time limits allowed.

15. **$500** per Day for failure to submit each of the immediate submittals as listed within the time limits allowed.

12.06. Bonus

A. No Special Requirements.

12.07. Changes

A. Any request by the Contractor for an increase or decrease in the Contract Price(s) or Contract Time(s) shall be based on written notice delivered promptly by the Contractor to the Engineer, but in no event delivered later than **_5_** Days after the Day of the occurrence of the event giving rise to the request and stating the general nature of the request.

B. The Change Order Request by the Contractor shall be substantiated within **_15_** Days after submittal of the written notice with a cost proposal quantifying the cost and schedule impacts associated with the request with supporting data, unless the Engineer allows an additional period of time for the Contractor to ascertain more accurate data in support of the request.

C. The Engineer shall review the Contractor's Change Order Request within **_10_** Days after receipt of the cost proposal and supporting documents and render its determination in writing. If the Engineer requires a longer period for its determination, the Engineer shall provide written notice to the Contractor within the initial **_5_** Day period. If the Engineer does not issue a determination within the initial or extended period, the request shall be deemed rejected.

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SECTION 13. GENERAL REQUIREMENTS

13.01. Abbreviations and Acronyms

A. In addition to the abbreviations provided under Section 1 of the Standard Provisions, the following abbreviations and acronyms shall apply for this Project:

AASHTO	American Association of State Highway and Transportation Officials
AFO	Acoustic Fiber Optic
ARV	Air Release Valve or Combination Air/Vacuum Valve
AVP	Almaden Valley Pipeline
AWWA	American Water Work Association
BAAQMD	Bay Area Air Quality Management District
BFV	Butterfly Valve
BMP	Best Management Practices
BV	Ball Valve
CAL OSHA	California Department of Industrial Relations Division of Occupational Safety and Health
CARV	Combination Air Release Valve
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CPL	Central Pipeline
CYV	Coyote Creek Blowoff
EIR	Environmental Impact Report
EM	Electromagnetic
EPL	East Pipeline
FCA	Flange Coupling Adapter
GRV	Guadalupe Line Valve Vault
GV	Gate Valve
ICBO	International Conference of Building Officials
KDT	Kirk Ditch Turnout
LLG	Lower Los Gatos Turnout
LV	Line Valve
MMRP	Mitigation, Monitoring & Reporting Program
NACE	National Association of Corrosion Engineers
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NSF	National Sanitation Foundation
PCCP	Prestressed Concrete Cylinder Pipe
PEP	Parallel East Pipeline
PG&E	Pacific Gas & Electric
PWTP	Penitencia Water Treatment Plant
PDT	Page Ditch Turnout
PMP	Pipeline Maintenance Program
RDJ	Restrained Dismantling Joint
RWQCB	Regional Water Quality Control Board
RWTP	Rinconada Water Treatment Plant

SCVWD/ District	Santa Clara Valley Water District
SSPC	Steel Structure Painting Council
STWTP	Santa Teresa Water Treatment Plant
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
USBR	United States Bureau of Reclamation
VPS	Vasona Pumping Station
VTA	Valley Transportation Authority
VVY	Vasona Valve Yard
VW	Valley Water

13.02. Definition of Key Terms

A. Operational Facility Shutdown: The period of time when the normal, intended use of the facility cannot take place or when the facility is operating at less than its normal, intended production capability.

B. Unscheduled Operational Facility Shutdown: Operational Facility Shutdowns initiated by or due to action by the Contractor that are beyond that anticipated or allowed in the Contract. Causes of unscheduled shutdowns could include, but are not limited to, actions causing a power outage; contaminating water such that State water quality regulations are violated or are in imminent danger of violation; and impeding chemical feed systems, water quality monitoring, or process operations.

C. Operational: To be considered Operational, a facility or facility component must be functional in all manners intended for its use at its rated capacity and through its entire operation range. Operational facilities may require transmission facilities, storage facilities, process facilities, and support systems (e.g., chemicals, water, power, communication) to be fully functional and accessible. For a new facility to be considered operational, it must be installed and tested and District personnel must have received specified training by the Contractor in the facility's operation and maintenance.

D. Continuous Operation: A completed system operating continuously, 24 hours a Day, without interruption, and without the need for intervention other than normal Operational adjustments by the District's operating personnel.

13.03. Site Investigation

A. The Contractor shall not be entitled to any adjustment in the Contract Price(s) or in Contract Time(s) if the existence of the condition that caused the alleged impact:

1. could have been reasonably discovered or revealed as a result of examination, investigation, exploration, test, or study of the site and of

contiguous areas required by the Contract Documents to be conducted by or for the Contractor prior to commencing the Work; or

2. could have been inferred from the presence of other visible features, such as boulders, buildings, meters, and junction boxes on or adjacent to the site.

13.04. District-Furnished Reports

A. No Special Requirements.

13.04.01. Geotechnical Reports

A. Geotechnical investigations for Parallel East Pipeline were carried out for the District. The results of the soil samples and laboratory test analyses are provided in the following report:

1. "Geotechnical and Contamination Investigation, Parallel East Pipeline, East Reservoir and Delivery Main" by Woodward-Clyde Consultants, dated 1993

2. "Soil Investigation Portions of Proposed Central Pipeline" by Robert S. Cooper & Associates, dated 1964

3. "Soil Investigation for Central Pipeline Project Morse Avenue to the Vasona Valveyard" by Gribaldo, Jacobs, Jones and Associates, dated 1964

B. Electronic versions of the geotechnical reports are available on the District's Construction Administration webpage: www.valleywater.org/Construction.

13.04.02. Environmental Report

A. A copy of the District's Pipeline Maintenance Program Environmental Impact Report is available for request in electronic (PDF) format at www.valleywater.org/Construction on the District's Construction Administration webpage. See Appendix D for a list of Best Management Practices and Mitigation Measures that shall be implemented during construction.

13.04.03. Hazardous Material Investigation Report

A. No Special Requirements.
B. See 13.04.01. *Geotechnical Reports*.

13.04.04. Cultural Resources Report

A. No Special Requirements.

13.04.05. As-Built Documents

A. The as-built Drawings are available by request to the Engineer in electronic (PDF) format only; **due to the County of Santa Clara Health Officer's Order of DATE, the District offices remain closed to the public until further notice.**

1. Map and Construction Plans for Central Pipeline Zone W-1 (As-Built); Santa Clara County Flood Control and Water Conservation District; 1966

2. Map and Construction Plan for the Relocation of Central Pipeline at Guadalupe River; Santa Clara Valley Water District; Dated: 1994

3. Map and Construction Plan for the Parallel East Pipeline Stage I, along White Road from 240' North of Aborn Road to 170' North of Ocala Avenue and the Patt Avenue Line Valve Facility located 50' South of the intersection of White Road and Patt Avenue, 1997.

B. The as-built or record documents referenced represent the District's knowledge of the existing facilities relevant to the planned Work areas for the Project. The as-built or record documents are for reference only; the District does not guarantee their completeness or correctness. The District makes no representation, either expressed or implied, that the conditions indicated in the Drawings, documents, or records are representative of those existing at the Site, or that different conditions may not occur or Material other than that indicated or in proportions different from those indicated may not be encountered.

C. Requirements for the Contractor to field-verify existing conditions are as specified in the Contract Documents.

D. Other subsequent, undocumented improvements may also be present and would not be reflected in the as-built or record documents. Contractor's overall understanding shall be based on the Drawings and on a reasonable understanding of the facilities from a general field inspection.

E. CAD files of the Drawings and Specifications will not be provided to the Contractor. The Contractor may request PDF copies of Drawings. If the Contractor uses the Drawings for any other purpose except as-builts for the Project, all title block information and authors of the Drawings shall be removed.

13.05. Contractor's Engineering and Design

A. The Contractor shall provide engineering and design of the following Work components:

1. Traffic Control Plans

2. Excavation safety plans

3. Control of Water and Dewatering Plan

4. Structure maintenance platforms, ladders, stairways, handrails, and guardrails

5. Precast Concrete structures

6. Anchorage of mechanical and electrical equipment

   a. Includes the structural design of DAQ unit supports and DAQ A/C unit supports. See 13.05.01 – Seismic Design Criteria.

7. Other structures or items as specified herein or as indicated on the Drawings

B. See Technical Provisions for additional information.

13.05.01. Seismic Design Criteria

A. Building structures, non-structural components, and non-building structures to be furnished under this Contract shall be designed, constructed, and installed in accordance with the following codes and standards:

1. California Building Code 2019

2. ASCE/SEI 7-16 Minimum Design Loads for Buildings and Other Structures

3. ACI 318 Building Code Requirements for Structural Concrete

4. PCI MNL 120, PCI Design Handbook – Precast and Prestressed Concrete

5. AWS D1.1, D1.3, and D1.4, Structural Welding Code

13.05.02. Wind Design Criteria

A. No Special Requirements.

13.05.03. Hydraulic Design Criteria

A. No Special Requirements.

13.05.04. Truck Loading

A. All products used shall be designed for H20-44 truck loading.

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SECTION 14. SPECIAL REQUIREMENTS

14.01. Engineer

A. The Engineer is the Deputy Operating Officer of the Water Utility Capital Division.

14.02. Project Signs

A. No Special Requirements.

14.02.01. Payment

A. No Special Requirements.

14.03. Office Facilities

14.03.01 Engineer's Office

A. The Contractor shall provide and maintain office facilities as described for the exclusive use of the Engineer and of representatives of the Engineer. The location and condition of the office facilities shall be as approved by the Engineer. The Contractor shall furnish weekly janitorial services in connection with the office for the duration of the Work.

B. Office facilities and furniture shall be clean and in good condition, consistent with common professional offices, and shall be approved by the Engineer.

C. The Contractor shall provide a broadband Internet service connection for the exclusive use of the District's Engineer and of authorized representatives.

1. Broadband Internet Service

a. The broadband connection shall consist of any of the following technologies:

(1) Wireless, which is typically made up of on-the-ground, antenna-to-antenna systems, commonly called "fix-wireless" systems. At least three (3) hotspot devices shall be provided for wireless internet.

(2) Satellite, which is provided by direct broadcast satellite (DBS) companies focusing only on Internet connections.

b. The internet service shall provide a minimum download speed of 150 Mbps and a minimum upload speed of 50 Mbps with an internet provider of the Engineer's choice.

c. The service connection shall include all necessary software and hardware, such as Ethernet cards and modems, and will be

compatible with latest supported Microsoft Windows 10 Professional operating system.

D. The building or trailer shall be specifically designed for office facilities including the conference table and chairs (for up to twelve people) and shall not be less than 12 feet x 60 feet in the plan, with side walls not less than 8 feet high. The Contractor shall perform temporary site grading for installation of the Engineer and Contractor's office trailers, if necessary. Contractor to provide adequate stairs for entry.

E. The Contractor shall furnish and install one (1) table or counter for use in viewing full size Drawings; four (4) desks with a top dimension of not less than 4 feet x 2.5 feet each; four (4) swivel chairs; one (1) wall-mounted, underwriter-laboratory-approved fire extinguisher 10# (ABC type); one (1) 16-unit first aid kit (the contents replenished as used); and three (3) two-drawer legal-size file cabinet. Adequate heat, light, electricity and outlets, ventilation, including air conditioning, hot and cold drinking water, broadband Internet services, and toilet facilities shall be provided.

F. The Contractor shall provide a unisex toilet facility, with water connections, and a holding tank drain and waste system for the toilet room. The toilet room shall contain a flush-type water closet, a lavatory sink with hot and cold water, a mirror, an electric 5-gallon water heater, toilet and paper towel dispensers, and a waste receptacle. The Contractor shall maintain and replenish the supply of toilet paper and paper towels during the duration of the work. The Contractor shall pump the holding tank empty whenever it is 75% full during the work and keep it adequately charged with chemicals.

G. The Contractor shall clean the Engineer's office on a regular basis, at least weekly, for the duration of the work.

H. The Contractor shall furnish the following new equipment which will be transferred over to the District at the completion of the project:

1. For field access to EADOCS system, the Contractor shall provide for the exclusive use of the Engineer throughout the duration of the work, a total of two, for the use of the construction staff, 256 GB Apple iPad Air 10.5" (WiFi + Cellular) with Logitech Slim Combo with Detachable Keyboard case or equal, within 21 days of the notice to proceed. Contractor shall provide and pay for monthly cellular access (14 GB/mo. min.) on any network for the specified duration of the project.

I. Besides the aforementioned items, the following equipment and furnishings shall be provided and installed by the Contractor for the exclusive use of the Engineer throughout the duration of the work. These items shall be provided at the same time that the Engineer's office is provided. The Contractor shall be responsible for all maintenance, repair, and technical support required for the supplied

equipment. The Contractor shall retain ownership of this equipment and furnishings after Final Completion.

1. Bottled drinking water “cooler” with hot and cold water, paper cup dispenser, provide three 5-gallon water battles and 60 paper cups each month for duration of work. Electric coffee maker. 4.5 Cu. Ft. compact refrigerator. Countertop Microwave. Three office telephones (three (3) lines) with a phone-answering system for messages. All calls pertaining to the job made from telephones provided shall be at the Contractor’s expense. Three waste receptacles. One garment rack with top storage shelf, umbrella holder, and space for a minimum of 6 clothes hangers. Three LED desk lamps that can be table mounted, each with adjustable arm for changing fixture location and angle.

2. A color printer, scan and copy machine capable of the following:

   a. At minimum, able to copy 30 ppm for black copies and 10 ppm for color copies. Up to 11” x 17” paper size capability. Document feeder—minimum 25 sheet capacities. Scanning capability into a pdf format, which allows wireless transmission capability. Ability to serve as a network printer, with capability to print wirelessly from all computers that are connected to the broadband system.

J. All Contractor-furnished equipment for the Engineer’s office shall be new.

K. The office shall be fully operational within 21 days from the Notice to Begin Work. For any days, if the office does not have the specified items and/or items not in working condition, the District will deduct the prorated amount from the progress payments and no less than $100 per day.

L. Contractor shall assume installation of green screen fencing around the trailer area, as required, at any time until Project Completion. If required, Contractor shall install such fencing at own cost and paid for under the lump sum bid price for MOBILZATION.

14.03.02. Contractor’s Office

A. The Contractor shall provide and maintain at the project site a suitable trailer office for Contractor’s use. Location of Contractor and sub-contractor office trailers shall be at the Contractor’s staging area and shall be as approved by the Engineer. At this office shall be kept project copies of the Contract Documents, project progress records, project schedule, submittals, and other relevant documents which shall be accessible to the Engineer and other District employees during normal working hours.

14.03.03. Removal and Disposal

A. Prior to issuance of the Project Completion letter by the District, the Contractor shall remove and dispose of its temporary facilities, Material, and Equipment and restore the site to its original or better condition.

14.03.04. Payment

A. Full compensation for doing all Work necessary to provide office facilities, including operating and maintenance costs as specified herein, shall be included in the lump sum price Bid for mobilization.

14.04. Use of District Facilities

A. Materials have been set aside at the Coyote Pump Station (18300 Peet Road, Morgan Hill, California, 95037) for the Contractor to inventory and pickup District furnished parts and materials. The area is outdoors and the Contractor will not have access to utilities. The Coyote Pump Station is a functioning facility. The Contractor may not impede District work activities and must accommodate all District requests regarding the use of this site. The Contractor may not perform any work outside of the normal working hours at this site, as stated in Article 18.02 – 'Hours of Work'.

B. The Contractor's employees shall not use District restrooms, offices, lunchrooms, parking spaces, Work rooms, or similar facilities.

C. The Contractor shall not be allowed to use any other District Equipment in the facility, including cranes, forklifts, and manlifts.

14.05. Temporary Utilities

A. Temporary Electrical Power: All electrical power for the Contractor's construction operations, offices, storage spaces, lighting, testing, heating, cooling, ventilating, and security and to support other temporary utilities and facilities described herein shall be provided and paid for by the Contractor. The Contractor shall arrange with the Local electrical utility, at no additional cost to the District, the provision and removal of adequate, temporary electrical service and/or the provision of a temporary electrical generator. The location of the temporary electrical service Equipment will be subject to the approval of the Engineer.

B. Temporary Lighting: The Contractor shall provide temporary lighting in all Work areas sufficient to maintain a lighting level during working hours not less than the lighting level required by California OSHA standards. As permanent lighting facilities are completed, these may be used in lieu of temporary facilities, provided, however, that bulbs, lamps, or tubes of such facilities used by the Contractor are replaced immediately prior to final Acceptance of the work. All temporary exterior lighting shall be shielded and directed downward and toward the interior of the treatment plant to minimize its effects on treatment plant neighbors.

C. Temporary Heating, Cooling, and Ventilation: The Contractor shall provide means for heating, cooling, and ventilating all Work areas as may be required to protect the Work from damage by freezing, high temperatures, and weather or to provide a safe environment for workers. Unvented, direct-fired heaters shall not be used in areas where freshly placed concrete will be exposed to the combustion gases until at least two (2) hours after the concrete has attained its initial set.

D. Temporary Water: The Contractor shall (i) pay for and construct facilities necessary to furnish potable water for human consumption and non-potable water for use during construction; (ii) provide backflow-prevention devices properly sized for use on the metered, potable water connection; and (c) post ample signs throughout the Work area warning of the usage of non-potable water if non-potable water is being used.

E. Temporary Sanitary Facilities: Sanitary facilities for the Contractor and all Subcontractors shall be provided by the Contractor. Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view wherever possible. At least one (1) toilet shall be provided for every 20 workers.

F. Solid and Liquid Waste Disposal: The Contractor shall provide a sufficient number of waste receptacles, dumpsters, and bins to contain all solid and liquid waste generated from construction operations. Existing waste receptacles owned by the District shall not be used by the Contractor. Waste receptacles shall be emptied weekly at a minimum and more frequently when full.

G. Temporary Fire Protection: The Contractor shall provide portable, UL-rated, 20#, Class-A fire extinguishers at temporary Contractor, Engineer, and similar office spaces. In all other areas of construction operations, provide UL-rated, 20# or larger, Class-ABC, dry-chemical extinguishers or a combination of NFPA-recommended classes for the exposure. Comply with NFPA 10 and 241 for classification, extinguishing agent, and size required by location and class of fire exposure. Comply with the Uniform Fire Code and Cal/OSHA regulations for the number of fire extinguishers.

H. Temporary Propane Service: If required for construction operations and temporary facilities, the Contractor shall arrange with a Local propane vendor, at the Contractor's own cost, to provide adequate, temporary propane service. The Contractor shall also obtain and pay for all required permits and fees from authorities having jurisdiction. The Contractor shall pay all charges from the utility or vendor, including charges associated with the removal of the service at the end of the Work. The location of the temporary propane service Equipment shall be mutually agreeable to the Contractor and to the Engineer. The Contractor shall provide all gas distribution system piping, regulators, and other incidentals necessary for safe service. Comply with NFPA 54, 55, and 58 as applicable to this Work.

I. Temporary Compressed Air: The Contractor shall provide compressors for compressed air for construction operations as required. Use of existing or new plant air compressor systems for construction operations is prohibited.

14.05.01. Payment

A. Full compensation for doing all Work necessary to provide temporary utilities shall be included in the lump sum price Bid for mobilization.

14.06. Staging Area

A. The Contractor shall be responsible for locating and acquiring any and all staging areas required for the Project.

1. Potential Staging Areas that may be coordinated with the District include:

a. Piedmont Valve Yard

(1) APN: 591-16-061

(2) Location: Near intersection of Piedmont Road, San Jose, CA and Maxey Road, San Jose, CA

(3) Approximate Area Available: 10,000 sq. ft.

b. Vasona Pump Station

(1) APN: 424-08-076

(2) Location: At terminus of Central Pipeline near intersection of Oka Road, Los Gatos, CA and Fremont Court, Los Gatos, CA

(3) Approximate Area Available: 15,000 sq. ft.

B. Staging areas that are not already paved or covered with compacted aggregate base and that are used for parking vehicles and trailers; or for workshops, maintenance areas, Equipment, piping, formwork, rebar; or for storing masonry on pallets and metal product storage shall be graded, as required, and surfaced with a minimum of three (3) inches of compacted, aggregate-base rock over a high-modulus, woven, soil-separation geotextile. Areas storing aggregate base or other rock products shall also be placed on this same geotextile. The objective is to maintain separation between native and construction Material. Areas storing soils and sand are not required to be surfaced with aggregate-base course.

C. Aggregate base shall be removed from all staging areas prior to Project Completion; surfaces shall be regraded to their original grades or to matching surrounding conditions as directed by the Engineer.

D. Any soils contaminated with petroleum product or other Hazardous Material by the Contractor shall be removed by the Contractor and disposed of in accordance with Federal, State, and Local laws.

E. The Contractor is responsible for weed control in staging and Material storage areas.

F. The District may require installation of temporary posts, marks, or barricades. Staging areas are subject to inspection by District staff.

14.06.01. Payment

A. Full compensation for doing all Work necessary to provide staging areas as specified herein shall be included in the lump sum price Bid for mobilization.

14.07. District-Furnished Material and Equipment

A. The Contractor is referred to the “Pipeline Data and Maintenance Table” of the Central Pipeline Drawings on sheets G-06 to G-11 for District furnished materials by site.

B. The Contractor shall provide all other materials and equipment not explicitly listed or referenced provided by the District.

C. The District will make the District-furnished materials available for pick-up seven (7) days prior to the pipeline shutdown. Contractor shall pick up the District furnished materials at the Coyote Pump Station (18300 Peet Road, Morgan Hill, California, 95037). Arrangement to inspect and pick up the materials shall be made at least two (2) working days in advance of the date when the materials are to be inspected and picked up. To arrange inspection and pick-up of materials, the Contractor shall obtain the appropriate contact information from the Engineer to coordinate with District staff. The Contractor shall inventory, document, sign for and assume responsibility for all District-furnished materials.

D. The Contractor shall provide all equipment and labor necessary to load, transport and unload all District furnished material for all pick-up and delivery activities.

E. The Contractor shall be responsible for the transportation of District furnished materials to the jobsite and to ascertain all information, dimensions, connections, and appurtenances required to provide for satisfactory installation of all District furnished materials.

F. The Contractor shall be responsible for storing and maintaining the District furnished materials in a manner such that they stay in the condition in which they were received. Any damage to or loss of materials while in the Contractor’s possession shall be repaired and/or replaced at no cost to the District.

G. Upon project completion, the Contractor shall deliver the unused District furnished material to the Coyote Pump Station (18300 Peet Road, Morgan Hill,

California, 95037). The Contractor shall obtain the contact number from the Engineer for storage/warehouse services and notify the facility that will store the materials at least 1 week in advance of delivery. To arrange for the return of surplus materials, the Contractor shall obtain the appropriate contact information from the Engineer to coordinate with District staff.

14.07.01. Assignment of Contract for District-Procured Material

A. No Special Requirements.

14.08. Salvaged Material and Equipment

A. The District may salvage specific pipeline appurtenance components and materials. During construction, the District will inform the Contractor of which items will be salvaged by the District.

B. The Contractor shall salvage the following equipment and materials and deliver the salvaged Material to the District's Coyote Pump Station Facility, 18300 Peet Road, Morgan Hill, CA 95037. The Contractor shall notify Joseph Aguilera at (408) 630-3911 at least one (1) week in advance of delivery. The Contractor shall provide all Equipment and labor necessary to load, deliver, and unload the salvaged Material.

1. Equipment and Materials to be salvaged:

   a. RTU cabinets
   b. Electric actuators

2. Unless otherwise specified, full compensation for doing all work to salvage materials and equipment shall be included in the Lump Sum bid price for the Bid Items associated with the work involved.

C. All other non-salvaged materials removed and/or demolished in the course of the Contractor's operation shall become the property of the Contractor and shall be properly disposed of by the Contractor at no additional cost to the District.

14.09. Tools and Spare Parts

A. The Contractor shall collect and store all spare parts received per Section 9.12.04 – Storage and Protection of Material. Unless otherwise specified or approved by the Engineer, spare parts shall be transferred to the District at end of Project. The Contractor is responsible for the spare parts until such time as accepted by the Engineer. The spare parts shall include a complete inventory list with a description of all parts.

B. The Contractor shall furnish special tools and spare parts specified in the Technical Provisions, or at a minimum, all special tools and spare parts recommended by the manufacturer for normal operation and maintenance of Equipment. This includes special tools, instruments, accessories required for

proper “in-plant” adjustment, maintenance, overhaul, and operation. Tools shall be high-grade, smooth, forged, alloy tool steel, or non-sparking Material as is appropriate.

C. Special tools are considered to be those tools that, because of their limited use, are not normally available but that are necessary for the particular Equipment, whether identified in the manufacturer's standard manual or not.

D. The Contractor shall collect and store all spare parts required. All spare parts shall be carefully packed in sealed, weather-resistant cartons and all tools packed in metal toolboxes with locking clasps, each labeled with indelible markings, and shall be adequately treated for a minimum five (5)-year period of storage. Complete ordering information, including manufacturer's name and address; part ordering information, including manufacturer, part number, part name, and Equipment name and number(s) for which the part is to be used shall be supplied with the required spare parts. A list of spare parts, respectively, shall be placed in each storage container and a duplicate list included with the O&M manuals.

E. Unless otherwise specified or approved by the Engineer, tools and spare parts shall be transferred to the District at the end of Project. The Contractor is responsible for the tools and spare parts until such time as accepted by the Engineer. Upon collection of all required tools and spare parts, as verified by the Engineer, the Contractor shall turn over all tools and spare parts to the Engineer with a complete inventory list. The inventory list shall include a description of all spare parts, the Equipment they are associated with, the applicable Specification sections, the name and address of the supplier, and the delivered cost of each item. Copies of the actual invoice for each item shall be furnished with inventory to substantiate the delivery.

F. Special tools and spare parts shall be new and shall not be utilized by the Contractor.

G. The Contractor shall furnish all tools recommended by the manufacturer for installation of equipment, valves, pipe, piping, and fittings.

14.10. Operation and Maintenance Documents

14.10.01. Scope of Work

A. The Work specified in this Special Provisions Article includes providing operation and maintenance (O&M) documents as specified herein.

B. O&M documents shall include the O&M manual for the complete system and/or the Equipment maintenance data for pieces of Equipment that operate on its own or as part of the complete system. The Equipment maintenance data for each piece of Equipment shall include booklets, literature, cut sheets, and any instructions that are packed with the Equipment. The Contractor shall include

information on all motors supplied with Equipment and complete Equipment maintenance summary sheets for every piece of Equipment and instrumentation with an Equipment number or tag number as specified herein.

14.10.02. Submittal Schedule

A. Contractor shall submit Draft and Final O&M documents as required below in accordance with Section 7. Submittal Management.

B. The Draft O&M documents shall be submitted only after a favorable review of the shop Drawings.

C. Draft O&M documents shall be favorably reviewed at least 3 weeks prior to:

1. Functional Testing; and
2. training of each piece of Equipment or system.

D. Make two (2) copies of draft O&M documents available at the Project site for use by construction personnel and by the District.

E. Make additions and revisions to the O&M documents in accordance with the Engineer's review comments.

F. Final O&M documents shall be favorably reviewed within four (4) weeks after operator training (if applicable) or after final approval of Equipment installation. This should include three (3) copies of electronic files of shop drawings that accompany the O&M manuals or the equipment maintenance data.

14.10.03. Document Contents

A. Contents for each unit of Equipment and system as appropriate.

1. Description of unit and component parts.

a. Function, normal operating characteristics, and limiting conditions.

b. Performance curves, engineering data, and tests.

c. Complete nomenclature and commercial number of replaceable parts.

d. A listing of all Equipment and their weights for all items weighing more than 100 pounds. A motor and speed reducer mounted on a common base shall be considered both individually and together in the listing. Other similar assemblies shall be similarly considered.

2. Operating Procedures

    a. Start-up, break in, routine, and normal operating instructions.

    b. Regulation, control, stopping, shutdown, and emergency instructions.

    c. Summer and winter operating instructions.

    d. Special operating instructions.

3. Maintenance Procedures

    a. Routine and preventative maintenance operations.
    b. Guide to “troubleshooting.”
    c. Disassembly, repair, and assembly.
    d. Alignment, adjusting, and checking.

4. Servicing and Lubrication Schedule: List of lubricants required, including time intervals for lubrication, adjustments, etc., on all new Equipment furnished under this Contract and a list of all required lubricants, including a notation as to lubricant used initially in each item of Equipment. For each required lubricant, a list of acceptable equivalents from at least one (1) different major manufacturer whose products are locally available near the Project site shall be provided.

5. Manufacturer’s printed operating and maintenance instructions.

6. Original manufacturer’s parts list, illustrations, assembly drawings, and diagrams required for maintenance.

    a. Predicted life of parts subject to wear.
    b. Items recommended to be stocked as spare parts.

7. Each Contractor’s coordination Drawings as-installed, color-coded piping diagrams.

8. List of original manufacturer’s spare parts to be left with the District at completion of construction; manufacturer’s current prices; address, phone number, and FAX number of authorized repair facilities; address of factory; and recommended quantities to be maintained in storage.

9. Other data as required under pertinent sections of these Specifications.

B. Contents for each electrical and electronic system as appropriate.

1. Description of System and Component Parts

   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data, and test data.
   c. Complete nomenclature and commercial data.

2. Circuit Directories of Panel Boards

   a. Electrical service.

3. As-installed, color-coded wiring diagrams.

4. Operating Procedures

   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Special operating instructions.

5. Maintenance Procedures

   a. Routine and preventative maintenance operations.
   b. Guide to “troubleshooting.”
   c. Disassembly, repair, and assembly.
   d. Adjustment and checking.

6. Manufacturer’s printed operating and maintenance instructions.

7. List of original manufacturer’s spare parts, manufacturer’s current prices, address, phone number, FAX number, and recommended quantities to be maintained in storage.

8. As-installed control diagrams by controls manufacturer. For each control device, provide a hard copy printout of the control program, annotated to describe all logic sequences. Provide a detailed description for modifying the control program.

C. The Contractor shall be required to fill out the Mechanical equipment summary sheet, electrical equipment summary sheet, and instrumentation/controls equipment summary sheet electronically. The District shall provide electronic copies of the forms to the Contractor at the beginning of construction. The electronic forms currently reside in the District’s form control system (FC 1792). Examples of the forms are included at the end of this Article.

D. O&M documents shall be applicable to Equipment actually furnished with general sections related to other models deleted. Manuals shall be rejected if not satisfactorily marked.

E. Such other information as may be required to provide comprehensive information on all systems, subassemblies, and components to enable operation, service, maintenance and repair shall also be provided.

F. If, at the time of the Project Bid, any manufacturer, supplier, or Subcontractor offers for use or sale an electronic copy of operations and/or maintenance information, it shall be provided with the paper information.

14.10.04. Document Format

A. General Requirements: Information and data shall be provided in the English language and per the customary Imperial System units of measure and weight (feet, inches, pounds, degrees in Fahrenheit, etc.). Supplemental metric units shall be included unless noted otherwise.

B. Paper: white 20-pound bond minimum for typed pages.

C. Size: 8½ inches X 11 inches.

D. Binders

1. Commercial quality post or ring-type binders with durable plastic covers.

2. Minimum spine size of 1 inch.

3. When multiple binders are used, correlate data into related consistent groupings.

E. Text: Manufacturer's printed data or neatly word-processed information.

F. Drawings

1. Provide reinforced-punched binder tab; bind in with text.

2. Fold larger drawings to size of text pages and include in clear plastic pockets.

G. Provide fly leaf for each separate product or for each piece of operating Equipment.

1. Provide typed description of the product and major component parts of Equipment.

2. Provide indexed tabs for each product and piece of Equipment.

H. Provide electronic files for all non-preprinted text (Word); spreadsheets (Excel); or CAD drawings (AutoCAD) included in the O&M manuals. These files shall become the property of the District for use in a master plan O&M manual, training

programs, and other uses. The electronic file shall be a fully-indexed, complete version of the O&M Manual in a portable document format (pdf).

I. Depending upon the content of the O&M documents, the cover shall include appropriate titles as follows:

1. For complete systems, “O&M Manual and Equipment Maintenance Data”; for individual Equipment, “Equipment Maintenance Data.”

2. Project name.

3. District name.

4. Equipment, product, or system name as appropriate.

5. Applicable tag number.

6. Date.

7. Manufacturer’s name and address.

J. Table of Contents

1. Neatly word-processed Table of Contents for each volume, arranged in systematic order.

2. List of each Equipment piece or product included and indexed to the content of volume. Reference all District Equipment numbers.

K. List with each product the name, address, telephone number, fax, and website URL (if available) of the following, and identify the area of responsibility for each:

1. Subcontractor or installer.

2. Maintenance Contractor, as appropriate.

3. Local source of supply for parts and replacement and list of recommended spare parts

L. Identify each product by product name and other identifying symbols as shown on the Drawings and as specified herein, including nameplate information and shop order numbers for each item of Equipment furnished.

M. Product Data

1. Include only those sheets that are pertinent to the specific products.

2. Annotate each sheet to:

   a. clearly identify specific product or part installed;
   b. clearly identify data applicable to installation; and
   c. delete references to inapplicable information.

N. Drawings

1. Supplement product data with Drawings as necessary to clearly illustrate:

   a. relations of component parts of Equipment and systems;

   b. control and flow diagrams; and

   c. coordinated drawings to ensure correct illustration of completed installation.

O. Written text as required to supplement product data for particular installation.

1. Organize in consistent format under separate headings for different procedures.

2. Provide logical sequence of instructions for each procedure.

P. Copy of each warranty, bond, and/or service contract issued, as applicable.

Q. Provide an information sheet for the District's personnel indicating:

1. proper procedures in event of failure; and
2. instances that might affect validity of warranties

14.10.05. Equipment, Products, and Systems Requiring O&M Documents

A. O&M documents shall be provided as specified in the Technical Provisions of these Specifications

14.10.06. Payment

A. Full compensation for doing all Work required to provide O&M documents as specified herein shall be by the specified amount per each set of O&M documents as listed above.

B. Payment for each O&M document shall be made progressively in the following manner:

1. Forty (40) percent of the amount stated in the list above after the Contractor submits a draft O&M document that has been favorably reviewed by the District according to Special Provisions Article 14.10.02. Submittal Schedule, paragraph C.

2. Sixty (60) percent of the amount stated in the list above after the Contractor submits a final O&M document that has been favorably reviewed by the District according to Special Provisions Article 14.10.02. Submittal Schedule, paragraph F.

14.11. Maintenance of Record Documents

A. The Contractor shall maintain at the site the following record documents:

1. As-Built Drawings (half size)

2. Specifications and Addenda

3. Favorably reviewed submittals, including shop Drawings, product data, samples, calculations, and other submittals

4. PCOs, Change Orders, DCOs, field orders, and other Contract modifications

5. Field and shop testing records

6. Survey record.

7. Correspondence

8. Permits

B. The Contractor shall provide for the orderly storage of the documents; maintain the documents in clean, dry, legible condition, and make all documents and samples available during regular business hours for inspection and reproduction by the Engineer.

C. The Contractor shall keep the record documents current with construction in progress. Completed construction Work shall not be permanently concealed until required information has been recorded on the As-Built Drawings.

D. The Contractor shall label each record document (except correspondence) “PROJECT RECORD” in neat, large, printed letters.

14.11.01. As-Built Drawings

A. The Contractor is required to keep on-site and available for inspection at any time an accurately marked, legible, up-to-date set of Contract Drawings (as-built Drawings) for the Work installed. The Contractor shall record as the Work progresses changes to the original Contract Drawings, including, but not limited to, the following items:

1. Field changes or adjustments in the final location or in the final dimensions or details of the Work.

2. Changes resulting from RFIs, Change Orders, DCOs, and other Contract modifications.

3. Locations of underground and above-ground utilities and appurtenances referenced to permanent, accessible features of the Work.

4. Details not included in the original Contract Drawings but incorporated into the Work, referenced to approved shop Drawings, product data, samples, calculations, or other submittals.

5. Location of items embedded or concealed from view (e.g., conduits, cables, junction boxes, piping, etc.).

B. Changes shall be clearly described on the Drawings by note as required.

C. All entries shall be dated, calling attention to the entry by a “cloud” drawn around the area or areas affected.

D. The as-built Drawings shall be kept in a safe place and protected from damage by weather and manhandling. As-built Drawings shall be stored apart from documents used for performing the Work and shall be kept in a dry, legible condition and in good order. Do not use as-built Drawings for construction at the job site.

E. Changed Work or conditions of the Work covered up or concealed by the Contractor in advance of recordation on the as-built Drawings shall be uncovered to allow accurate recordation of the change then re-covered all at the Contractor’s expense.

F. Changes shall be marked directly on the Contract Drawings in accordance with instructions provided in Appendix I. If there is insufficient space on a Drawing to mark up the change, the Contractor shall draw additional sketches to completely show the change and shall attach the sketches to the Drawing.

G. The Engineer has the right to review the Contractor’s as-built Drawings at any time to ascertain that they are being kept up to date and that they show sufficient detail. Should the Contractor’s as-built Drawings not be up to date or should they lack necessary detail per the as-built guidelines, the Engineer may withhold five (5) percent from each monthly progress payment until the Drawings are deemed acceptable by the Engineer. Such review by the Engineer shall not relieve the Contractor of its responsibility for keeping the as-built Drawings current and complete.

H. The construction as-built Drawings shall be stamped “As-Built” and shall be, at completion of construction, signed and dated by the Contractor and submitted as required in Article 11.03.01. As-Built Drawings.

14.12. Emergency Work

A. The Contractor shall have personnel available on call for emergency Work connected with those improvements, tie-ins, and modifications being completed as part of this Work. Contractor on-call personnel shall be able to be on-site within two (2) hours of verbal notice, 24 hours a day, seven (7) days a week. Telephone numbers for these individuals shall be provided to the Engineer and shall be kept current.

14.13. Dispute Review Board

A. A Dispute Review Board (DRB) process is not required.

14.13.01. Payment

A. No Special Requirements.

14.14. Escrow Bid Documents

A. Escrow Bid Documents are not required.

14.15. Partnering

A. Professionally Facilitated Project Partnering (PFPP) is not required but may be requested by the Contractor. The Contractor's attention is directed to Standard Provisions Article 3.15.02. Professionally Facilitated Project Partnering.

14.15.01. Payment

A. No Special Requirements.

14.16. Insurance

A. Without limiting the Contractor's indemnification of, or liability to, the District, the Contractor must provide and maintain at its own expense during the term of this Contract or as may be further required herein the following insurance coverages and provisions.

1. The Contractor must provide its insurance broker(s)/agent(s) with a copy of these requirements and warrants that these requirements have been reviewed by the Contractor's insurance agent(s) and/or broker(s) who have been instructed by the Contractor to procure the insurance coverage required herein.

2. In addition to certificates, the Contractor must furnish the District with copies of original endorsements affecting coverage required herein. The certificates and endorsements shall be signed by a person authorized by the insurer to bind coverage on its behalf. All endorsements and certificates are to be received and approved by the District before the

Contract commences. In the event of a Claim or dispute, the District has the right to require the Contractor's insurer to provide complete, certified copies of all required, and pertinent insurance policies, including endorsements affecting the coverages required herein.

B. The Contractor must, at its sole cost and expense, procure and maintain during the entire period of this Contract through Acceptance of the Work by the District's Board of Directors the following insurance coverage(s).

14.16.01. Required Coverages

A. Commercial general/business liability insurance with coverage as indicated.

1. **$10,000,000** per occurrence/**$10,000,000** aggregate limits for bodily injury and property damage.

2. **$10,000,000** products/completed operations aggregate to be maintained for at least three (3) years following acceptance of the Work by the District.

3. General liability insurance must include the following:

a. Coverage at least as broad as found in standard ISO Form CG 00 01.

b. Premises and operations.

c. Contractual liability expressly including liability assumed under this Contract.

d. If the Consultant shall be working within 50 feet of a railroad or light rail operation, any exclusion as to performance of operations within the vicinity of any railroad bridge, trestle, track, roadbed, tunnel, overpass, underpass, or crossway must be deleted or a railroad protective policy in the above amounts provided.

e. Owners and contractors' protective liability.

f. Severability of interest.

g. Explosion, collapse, and underground hazards, (X, C, and U).

h. Broad form property damage liability.

i. If the standard ISO form wording for "Other Insurance" or other comparable wording is not contained in the Consultant's liability insurance policy, an endorsement must be provided that states the insurance will be the primary insurance and that any insurance or self-insurance maintained by the District, its Directors, officers,

employees, agents, or volunteers will be in excess of the Consultant's insurance and will not contribute to it.

B. Business auto liability insurance with coverage as indicated.

1. **$10,000,000** combined single limit for bodily injury and property damage per occurrence, covering all owned, non-owned, and hired vehicles.

C. Builders' risk (course of construction) insurance.

1. Covering all risks of loss less policy exclusions for an amount equal to the completed value of the Project with no coinsurance penalty provisions. Builder's Risk policy shall name Santa Clara Valley Water District as the loss payee.

D. Workers' compensation and employer's liability insurance.

1. Statutory California workers' compensation coverage covering all Work to be performed for the District.

2. Employer liability coverage for not less than **$1,000,000** per occurrence.

E. Surety bonds

1. The Contractor shall provide the following surety bonds:

a. A Bid bond as specified in the Notice to Bidders.
b. A performance bond as required by the Notice to Bidders
c. A payment bond as required by the Notice to Bidders.

F. Environmental Pollution Liability: In the event that Hazardous, contaminated Material is discovered during the course of the Work and the Contractor or its Subcontractor is required to perform abatement or disposal of such Material, then the Contractor or its Subcontractor who performs abatement of Hazardous or contaminated Material removal shall maintain in force, throughout the term of this Contract, the Contractor's pollution liability insurance with limits not less than **$1,000,000** for each occurrence combined single limit (true occurrence form), including coverages for on-site or off-site third-party claims for bodily injury and property damage.

14.16.02. General Requirements

A. Additional Insured Endorsement(s): The Contractor must provide an additional insured endorsement for commercial general/business liability and business automobile liability coverage naming the Santa Clara Valley Water District, its Directors, officers, employees, and agents, individually and collectively**,** as additional insured and must provide coverage for acts, omissions, etc. arising out

of the named insureds' activities and Work. The following shall also be added to the additional insured endorsement:

1. City of San Jose
2. City of Campbell
3. Town of Los Gatos
4. County of Santa Clara

B. Primacy Clause: The Contractor's insurance must be primary with respect to any other insurance that may be carried by the District, its officer, agents, and employees; the District's coverage must not be called upon to contribute to or share in the loss.

C. Cancellation Clause Revision: The Certificate of insurance must provide a 30-day notice of cancellation (10-day notice for nonpayment of premium). **NOTE**: The standard wording in the ISO certificate of insurance is not acceptable. The following words must be crossed out or deleted from the standard cancellation clause: ". . . endeavor to . . ." AND ". . . ; failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents, or its representatives."

D. Acceptability of Insurers: All coverages must be issued by companies admitted to conduct business in the State of California that hold a current policyholder's alphabetic and financial size category rating of not less than A-V according to the current *Best's Key Rating Guide* or to a company of equal financial stability that is approved by the District's risk management administrator.

E. Self-Insured Retentions or Deductibles: Any deductible or self-insured retention must be declared to and approved by the District. At the option of the District, either (i) the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the District, its officers, officials, employees, and volunteers; or (ii) the Contractor shall provide a financial guarantee satisfactory to the entity guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

F. Subcontractors: The Contractor must require each of its Subcontractors of any tier to carry the aforementioned coverages, or the Contractor may insure Subcontractors under its own policies.

G. Amount of Liability Not Limited to Amount of Insurance: The insurance procured by the Contractor for the benefit of the District must not be deemed to release or limit any liability of the Contractor. Damages recoverable by the District for any liability of the Contractor must, in any event, not be limited by the amount of the required insurance coverage.

H. Coverage to be Occurrence Based: All coverage must be occurrence-based coverage. Claims-made coverage is not allowed.

I. Waiver of Subrogation: The Contractor agrees to waive subrogation against the District to the extent that any loss suffered by the Contractor is covered by any commercial general liability policy, automobile policy, workers' compensation policy, or builders' risk policy described in Article 14.16.01. Required Coverages. The Contractor agrees to advise its broker/agent/insurer about this provision and obtain any endorsements, if needed, necessary to ensure the insurer agrees.

J. Noncompliance: The District reserves the right to withhold payments to the Contractor in the event of Material noncompliance with the insurance requirements outlined above.

K. The Contractor shall mail or deliver the certificates and endorsements to:

- Capital Program Planning & Analysis
- Unit Manager
- Santa Clara Valley Water District

See District website (http://www.valleywater.org/ContactUs.aspx) for appropriate address to mail, express mail, or hand carry.

L. The certificate of insurance must include the name of the Project.

M. For any questions, the Contractor's insurance broker is advised to call the District Risk Management Administrator at (408) 630-2213.

14.17. Web-Based Construction Document Management

14.17.01. Summary

A. The Contractor, and its subcontractors and suppliers shall utilize EADOC for submission of all data and documents throughout the duration of the Contract, unless specified otherwise in the Contract Documents. The term "Copy" or "Copies" shall refer to electronic copies unless a hard copy is specified. Where a hard copy is specified, both electronic and paper versions shall be submitted:

1. EADOC is a web-based construction management application hosted by EADOC LLC. EADOC is a registered trademark of EADOC LLC.

2. EADOC is paid for by the District.

3. EADOC will be made available to all Contractor's personnel, subcontractor personnel and suppliers working under the Contract.

4. EADOC will be made available to all Contractor's personnel, subcontractor personnel and suppliers working under the Contract.

5. EADOC shall be the primary means of project information submission and management.

B. Related Sections:

1. Article 7.01, Submittal Requirements.
2. Section 20, Submittal and Quality Requirements

C. The Engineer will establish the Contractor's access to EADOC by allowing access and assigning user profiles to accepted Contractor personnel. User profiles will define levels of access into the system, and determine assigned function-based authorizations and user privileges to enter and access information in EADOC. Subcontractors and suppliers will be given access to EADOC by and through the Contractor. Entry of information exchanged and transferred between the Contractor and its subcontractors and suppliers on EADOC shall be the responsibility of the Contractor.

D. Within five (5) work days after receiving the Notice to Begin Work, the Contractor shall submit:

1. List of Contractor's personnel responsible for EADOC administration, as well as that for the Contractor's subcontractors and suppliers.

2. Include descriptions of key personnel's roles and responsibilities for this project. Contractor shall also identify its organization's administrator on the list.

E. Data entered in a collaborative mode (entered with the intent to share as determined by permissions and workflows within the EADOC system) by the Engineer and the Contractor will be jointly owned.

F. The Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. The District's acceptance via automated system notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the Contractor's submitted information.

14.17.01. Computer and Connectivity Requirement

A. The Contractor shall use computer hardware and software that meets the requirements of EADOC system as recommended by EADOC LLC and as described herein to access and utilize EADOC. As recommendations are modified by EADOC, the Contractor shall upgrade its system(s) to meet or exceed the recommendations. Upgrading of the Contractor's computer systems shall not be justification for a cost or time modification to the Contract.

B. The Contractor shall ensure that connectivity to the EADOC system is accomplished through DSL, cable, T-1 or wireless communications systems. The minimum bandwidth requirement for using the system is 128 kb/s. It is recommended that a faster connection be used when uploading pictures and files-into the system;

C. EADOC currently supports Mozilla's Firefox v3.0-3.6, Apple's Safari v3.0-5.0, and Microsoft's Internet Explorer v7.0-8.0 web browsers for accessing the application.

D. EADOC is a web-based environment and therefore, subject to the inherent speed and connectivity limitations of the Internet. The Contractor is responsible for its own connectivity to the Internet. EADOC response time is dependent on the Contractor's equipment, including processor speed, Internet access speed, etc., and current traffic on the Internet. The District will not be liable for any delays associated from the usage of EADOC including, but not limited to: slow response time, down time periods, connectivity problems, or loss of information. The Contractor shall ensure connectivity to the EADOC system (whether at the home office or job site). Under no circumstances will usage of EADOC be grounds for a time extension or cost adjustment to the Contract.

14.17.02. Computer and Connectivity Requirement

A. The Contractor shall use computer hardware and software that meets the requirements of EADOC system as recommended by EADOC LLC and as described herein to access and utilize EADOC. As recommendations are modified by EADOC, the Contractor shall upgrade its system(s) to meet or exceed the recommendations. Upgrading of the Contractor's computer systems shall not be justification for a cost or time modification to the Contract.

B. The Contractor shall ensure that connectivity to the EADOC system is accomplished through DSL, cable, T-1 or wireless communications systems. The minimum bandwidth requirement for using the system is 128 kb/s. It is recommended that a faster connection be used when uploading pictures and files-into the system;

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D. EADOC is a web-based environment and therefore, subject to the inherent speed and connectivity limitations of the Internet. The Contractor is responsible for its own connectivity to the Internet. EADOC response time is dependent on the Contractor's equipment, including processor speed, Internet access speed, etc., and current traffic on the Internet. The District will not be liable for any delays associated from the usage of EADOC including, but not limited to: slow response time, down time periods, connectivity problems, or loss of information. The Contractor shall ensure connectivity to the EADOC system (whether at the home office or job site). Under no circumstances will usage of EADOC be grounds for a time extension or cost adjustment to the Contract.

14.17.03. Contractor Responsibility

A. Contractor shall be responsible for scanning or otherwise converting to electronic format all project submittals and Contractor correspondence, drawings, sketches, etc., and uploading them to the EADOC website.

B. The Contractor shall be responsible for the validity of its information placed in EADOC.

C. Accepted users shall be knowledgeable in the use of computers, including Internet Browsers, email programs, CAD drawing applications, and Portable Document Format (PDF) document distribution program.

D. The Contractor shall utilize the existing forms in EADOC to the maximum extent possible. If a required form does not exist in EADOC, the Contractor shall include a form of its own or one provided by the Engineer (if available) as an attachment to a submittal.

E. PDF documents shall be created through electronic conversion rather than optically scanned whenever possible. If optically scanned, the document shall be converted through an OCR (Optical Character Reader) so that all documents are searchable. If the documents have multiple sections then the Contractor shall provide a “bookmark” for each section. The Contractor is responsible for the training of its personnel in the use of EADOC (outside what is provided by the District) and the other programs indicated above as needed. The Contractor shall disable all security so that copying and pasting of information from the PDF document is enabled.

F. The Contractor shall provide a list of key EADOC personnel for the Engineer’s acceptance. Contractor is responsible for informing the Engineer of additional personnel, subcontractors and suppliers to be added to the system, or of personnel, subcontractors and suppliers to be removed from the system. The Engineer reserves the right to perform a background check on all potential users.

14.17.04. Training

A. The District will provide training consisting of two web-based seminars in conjunction with a conference call. Additionally, one classroom training seminar may also be required. The training seminars are 2 hours each.

B. Contractor shall arrange and pay for the facilities and hardware/software required to facilitate the Contractor’s own training.

14.17.05. EADOC Utilization

A. EADOC shall be utilized in connection with all document and information management required by these Contract Documents. Documents and information to be submitted electronically include, but are not limited to, the documents described below.

B. Submittals:

1. Submittals shall be in accordance with Article 7.05—Submittals to be Furnished by the Contractor and Article 20.01—Additional Submittal Requirements.

2. In addition to electronic copies transmitted via EADOC, the Contractor shall provide one hard copy of each favorably reviewed submittal. Favorable Review consists of those submittals returned to the Contractor with action marked as “No Exceptions Noted,” “Make Corrections as Noted,” or “In Receipt Of.”

C. Administrative documents: All correspondence shall be submitted using EADOC. Examples include, but are not limited to:

1. Written correspondence (letters, memos, etc.).
2. Requests for Information (RFI).
3. Certified Payroll.
4. Compliance documentation (test reports, QA/QC reports, certifications).

D. Schedules:

1. All schedules and associated updates shall be submitted in accordance with Article 5.05—Progress Schedules.

2. All schedules and associated updates shall be submitted as specified in these Contract Documents and as a native backed-up file of the scheduling program being used. The schedule shall be posted as a PDF file in the format specified in these Contract Documents and as a backed-up file.

E. Operations and Maintenance Documents:

1. Operations and Maintenance Documents shall be submitted in accordance with Article 14.10—Operations and Maintenance Documents.

2. In addition to electronic copies transmitted via EADOC, the Contractor shall provide hard copies of each final favorably reviewed Operations and Maintenance submittal. The number of hard copies to be provided shall be as required in Article 14.10—Operations and Maintenance Documents.

F. Financial Documents:

1. Schedule of Values.

2. Monthly Applications for Payment.

3. Change Order Requests and Proposals.

4. Change Order supporting documentation, including Daily Extra Work Reports.

5. Requirements for Financial Documents shall be in accordance with Section 21—Payment Procedures. Supporting material for Financial Documents shall be submitted on EADOC utilizing both the EADOC Schedule of Costs format and as PDF attachments.

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SECTION 15. GENERAL COORDINATION

15.01. Meeting Requirements

A. This Article includes requirements for scheduling, attending, and conducting Project meetings for the purpose of addressing issues related to the Work and for reviewing and coordinating progress of the Work. Project meetings include the preconstruction meeting, progress meetings, coordination meetings, and special meetings as specified herein.

B. Qualifications of meeting participants: Representatives of firms and organizations participating in each meeting shall be qualified and authorized to act on behalf of the firm or organization they represent.

15.01.01. Preconstruction Meeting

A. The purpose of the preconstruction meeting is to review the Project, designate responsible personnel, and inform the Contractor of the District's Contract administrative procedures, correspondence communication protocol, and other special requirements of the Contract. The Contractor shall come prepared to discuss its staffing, how it will successfully perform the Work, and discuss its plan for temporary utilities, safe Work environment, environmental compliance, emergency response, and any tie-ins, outages, or shutdowns. The Contractor shall also be prepared to review and discuss the Contractor's markup breakdown, Change Order pricing structure, the Standards to be used on the Project, and what the Contractor must provide as backup for Change Orders or for extra Work pricing.

B. The Engineer will arrange the preconstruction meeting and will notify the Contractor regarding the meeting time, date, and place. The meeting shall be attended by the Contractor and its Superintendent and all representatives of Subcontractors or suppliers whom the Contractor may desire to invite or whom the District may request with the intent being a full understanding of the issues discussed by all parties. The Engineer shall prepare the agenda, preside at the meeting, and record meeting minutes.

15.01.02. Progress Meetings

A. The Engineer shall conduct progress meetings on a regular weekday and at a time mutually agreed to by the Contractor and by the Engineer. The purpose of the progress meetings is to review construction progress; submittal status; Potential Change Order, Change Order, and DCO status; construction safety issues and concerns; conflicts; environmental compliance; public/neighborhood issues; progress payments; and any other subject as deemed appropriate.

B. The Contractor shall allow for one (1) meeting a week.

C. Subject to the Engineer's approval, the frequency of the progress meetings may be reduced at the beginning and at the end of the construction period.

D. The Contractor's superintendent, suppliers, and Subcontractors shall attend the meetings as required. Third parties, such as agency representatives and utilities, may be invited by the Engineer to attend as deemed appropriate.

E. Typical agenda: Typical agenda items can include:

1. Review and approval of previous meeting minutes.

2. Review of progress since the previous meeting.

3. Contractor's Progress Schedules, including Look-Ahead Schedules.

   a. Review of off-site fabrication and delivery schedules.

   b. Problems that may affect the Contractor's schedule performance.

   c. Corrective measures to recover from forecasted Delays whether Excusable or Inexcusable.

   d. Updates and/or revisions to the Contractor's Detailed Progress Schedules.

4. Interface with operations.

5. Safety and security.

6. Review of submittals schedule.

7. Status of RFIs.

8. Field observations, problems, and conflicts.

9. Status of QC inspections and corrections.

10. Environmental issues.

11. Housekeeping.

12. Status of submittal review.

13. Status of PCOs.

14. Status of COs.

15. Other business.

16. A review of the monthly billing once per month.

15.01.03. Coordination and Special Meetings

A. The Engineer shall conduct other coordination and special meetings in addition to progress meetings when appropriate. The purpose of these meetings is to discuss and coordinate shutdowns, outages, utility tie-ins, and any other special issues as deemed necessary.

B. The Contractor shall schedule meetings with suppliers and installers of major units of construction that require coordination between Subcontractors. Major units of construction that require pre-installation meetings include:

1. Parallel East Pipeline

    a. No Special Meetings

2. Central Pipeline

    a. Environmental and Biological Monitoring

    b. Isolation, Lockout, and Tagout

    c. Pipeline Dewatering and Discharges

    d. Visual and Electromagnetic Inspection for Prestressed Concrete Cylinder Pipe

    e. Acoustic Fiber Optic Monitoring System for Prestressed Concrete Cylinder Pipe

    f. Carbon Fiber Reinforcement for Prestressed Concrete Cylinder Pipe

    g. Electrical, Control System, and SCADA work

    h. Completion of Shutdown Required Work

    i. Refill, Pressurization and Bringing Central Pipeline Online

    j. Coating for Appurtenances

C. Date, time, and location for coordination and special meetings shall be as mutually agreed to by the Engineer and by the Contractor. The Contractor shall ensure attendance of appropriate Contractor staff, Subcontractors, and suppliers.

D. The Engineer shall record meeting minutes as needed and shall distribute the agenda and recorded minutes in advance of the meeting.

15.02. Integration and Coordination with District Operations

15.02.01. Overview of Existing Systems and Facilities

A. Parallel East Pipeline

1. The Parallel East Pipeline is a potable water transmission pipeline that is a major source of treated water for Santa Clara County. The pipeline is located within the jurisdictions of the City of San Jose.

2. The pipeline is approximately two (2) miles long and is comprised of 54-inch diameter Welded Steel Pipe.

3. The Project includes fourteen (14) sites along South White Road from Aborn Road to Ocala Avenue in the City of San Jose.

B. Central Pipeline

1. The Central Pipeline is a raw water transmission pipeline that is a major source of raw water for Santa Clara County. The pipeline is located within the jurisdictions of the City of San Jose, City of Campbell, Town of Los Gatos, and Santa Clara County.

2. The pipeline is approximately thirteen (13) miles long and is comprised of primarily of 66-inch diameter Prestressed Concrete Cylinder Pipe. Sections of the system include steel pipe.

3. The Project includes the entire pipeline and the associated appurtenances from the District's Piedmont Valve Yard, near the intersection of Piedmont Road and Whitman Way in San Jose, CA, to the District Vasona Pump Station in Los Gatos, CA.

15.02.02. Requirements of an Operational Facility or System

A. The Parallel East Pipeline is a vital component of the potable water conveyance systems that provide a regular source of potable water to a large portion of the Santa Clara County. This facility will not be isolated or dewatered and is to remain in service for the duration of this Project.

B. The Central Pipeline is vital component of the raw water conveyance systems that provide a regular source of raw water to a large portion of the Santa Clara County. This facilities will be isolated and dewatered for the specified period of time to allow the Contractor to complete the work, as specified in the Drawings and these Specifications.

15.03. Coordination of Work Activities

A. The Contractor shall coordinate daily work activities with the designated on-site supervising District representative prior to the start of each workday. Daily

coordination meetings shall be brief and informal. The Contractor shall briefly summarize the intended work to be accomplished that day.

15.03.01. Work by Others

A. The Contractor shall coordinate its Work with the planned or ongoing Work of the District or of other District Contractors within or adjacent to the limits of the Contract Work in accordance with Article 4.15. Cooperation with Others. No additional payment shall be made or Claims considered for Delay caused due to the Contractor's failure to coordinate the Work.

B. The Contractor shall complete the following activities as requested by the Engineer to assist in the coordination of Contract Work with Work by others: attend planning meetings; review and comment on Project documents relative to coordination aspects; schedule Work to promote efficient installation of all improvements; move Equipment, Material, or vehicles to allow Work by others to proceed; provide traffic control; and other reasonable activities.

1. The following Work will be done by the District's third-party consultant:

a. Electromagnetic Inspection
b. Acoustic Fiber Optic Monitoring System Installation

C. The Contractor is advised that maintenance, additional improvements and Work by others will take place during the Work of this Contract:

1. District staff will be completing miscellaneous minor improvements, servicing, and repairs to several appurtenances during the course of this Work.

2. The District shall contract with a variety of firms during the course of this Work to complete inspections, confined space entries, and improvements that are outside the scope of this Work.

3. District staff shall complete certain Work related to this Project as described under Special Provisions Article 16.01.02 – 'Work Completed by District Staff'.

D. District's third-party consultant, Royal Communications, will pull the ethernet cable to the DAQ unit.

15.03.02. Coordination With Others

A. The Contractor is advised that a third-party consultant for the District will be installing an Acoustic Fiber Optic cable monitoring system within the Central Pipeline. Following the internal pipeline visual inspection, electromagnetic inspection and repair work, if required, the District's third-party consultant will commence the installation of the Acoustic Fiber Optic cable monitoring system.

B. The District's third-party consultant will require logistical and construction support for the installation of the Acoustic Fiber Optic cable monitoring system. Logistical and construction support includes, but is not limited to, the coordinated installation of multiple appurtenances at the proposed cable splice points; readily available ingress and egress locations through the appurtenances immediately adjacent to the proposed cable splice point appurtenances; providing force air ventilation for all internal pipeline installation work; and the coordinated installation of the data acquisition units.

C. Refer to the Pipeline Maintenance Tables on sheets G-06 through G-11 of the Drawings for the cable splice point appurtenances. The Contractor shall plan, coordinate, and schedule its work and logistical support to facilitate the efficient installation of the AFO cable monitoring system.

D. The District's third-party consultant will require logistical and construction support for the installation of the Acoustic Fiber Optic cable monitoring system. Logistical and construction support includes, but is not limited to, the coordinated installation of multiple appurtenances at the proposed cable splice points; readily available ingress and egress through the appurtenances immediately adjacent to the proposed cable splice point appurtenances; force air ventilation for all internal pipeline installation work; traffic control; and the coordinated installation of the data acquisition units (DAQ).

E. For the AFO cable monitoring system installation, it is expected that there will be two (2) to four (4) installation teams from the third-party consultant working in the pipeline. The Contractor shall communicate and coordinate with the third-party consultant to avoid performing work on vaults where the third-party consultant is installing the AFO cable monitoring system or vaults used for AFO installation ingress and egress.

F. The Contractor is advised that a fourth-party contractor for the District may be installing Carbon Fiber Reinforced Polymer on the Central Pipeline. The amount and locations for this internal repair work may vary depending on the results of the visual and electromagnetic inspections. The Contractor shall coordinate with fourth-party Contractor to ensure there are no conflicts with each other's work.

15.04. Construction Survey

A. The Contractor shall be solely responsible for the measurement and layout of all of its Work. Any questions regarding the interpretation of project layout shall be resolved by the Engineer.

B. The Contractor shall survey and/or GPS all points of connection to existing structures or underground utilities prior of beginning the installation of new facilities to confirm the actual locations and grades. Significant deviations shall be reported in writing to the Engineer prior to proceeding with the installation of new facilities.

C. The Contractor shall not remove or disturb survey monuments and permanent markers unless otherwise approved by the Engineer and the District has recorded and referenced the locations. The Contractor shall be charged at a reasonable rate for the restoration or replacement of survey monuments and permanent markers by the District.

15.05. Public Notification

A. The Engineer is responsible for all written and oral communication with the public, neighbors and property owners. The Contractor shall provide the Engineer with its planned start and finish dates for major construction operations three (3) weeks in advance of their occurrence to allow the District time to provide adequate notification. The Contractor shall include in the submittals major Milestones, descriptions of the Work activities, and the start and end date(s) of each activity.

B. The Engineer shall provide the above information to all property owners and tenants of or adjacent to the Project sites and to others potentially impacted by the construction activities. If, for any reason, any construction activity is anticipated to be delayed or advanced for more than one (1) week than that shown in the above submittals, the Contractor shall notify the Engineer immediately; submit the revised planned start and finish dates; and explain the causes for the Delay or advancement. Notice shall be given to the Engineer no later than one (1) week prior to performing the activity.

C. All payments for coordinating the Work and for providing submittals as specified shall be considered incidental and shall be included in the other items of Work; no additional payment shall be made.

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SECTION 16. WORK CONSTRAINTS AND SITE RESTRICTIONS

16.01. General Work Constraints

A. The Work will be conducted on public and private properties within the City of San Jose, City of Campbell, and Town of Los Gatos. The Contractor shall comply with all ordinances, regulations, permits, and requirements of the applicable jurisdictions having authority.

B. Unless otherwise stated, City, County and State Specifications and Standard Plans referred to in these Specifications shall be the latest edition in effect at the time that bids are received by the District, insofar as they apply. Said Specifications and Standard Plans are herein referred to as the City, County and State Specifications, respectively, and are by reference made a part of these Specifications the same as though set out in full. In the event of conflict between the City, County and State Standards and the Standard, Special, and Technical Provisions of these Specifications or Drawings, these Specifications and Drawings shall apply.

C. Excavations in the public right-of-way, as shown in the Drawings and as specified in these Specifications, shall remain open until visual inspection of all completed work under fully pressurized and operational conditions is complete. The Contractor shall provide, install, and maintain sheeting, shoring, bracing, trench plating, traffic control and any other such site security and safety measures, as specified by the jurisdiction having authority, to accommodate the extended exposure.

D. The Contractor shall take all precautionary measures as necessary to not cause any disruption of District operations. The activities discussed below do not include all items potentially affecting the Districts operations, but are intended to describe certain actions that could disrupt the normal function or cause a shutdown of the facility:

1. Contractor removing from service, restricting, or impeding the function of any utility such as water, electrical, gas, telephone, compressed air, sanitary sewer, storm drain, and instrumentation system.

2. Contractor removing from service, restricting, or impeding the function of any portion of District's SCADA (supervisory control and data acquisition) and telemetry system.

3. The Contractor's attention is directed to Article 16.02.02—"Protection of Existing Utilities".

4. Contractor delaying or denying access to any District structure or area needed by District staff to complete their work assignments.

E. Equipment and materials used for construction activities shall not be stored on or within vaults.

16.01.01. Shutdown Constraints

A. The Project has one (1) scheduled shutdown starting from Monday January 4, 2021 to Friday, April 2, 2021 for the shutdown-required items of work.

B. No additional pipeline shutdowns or outages of any kind will be allowed, except as specified in these Specifications.

16.01.02. Work Completed by District Staff

A. The District will plan, coordinate and manage the isolation and lock-out/tag-out of the raw water transmission system as required for the completion of the Project. Following system isolation and lockout/tagout, the District will initiate the gravity draining of the Central Pipeline. The gravity draining of the Central Pipeline should take approximately three (3) days to complete.

1. The Contractor shall coordinate and schedule its discharge site preparation work to allow for the completion of this work.

2. The Contractor shall have the Contractor Biologist conduct biological clearances at discharge sites prior to gravity drain of the pipe. The Contractor is referred to Article 19.08.03.

B. Pipeline Dewatering: The maximum rate at which pipelines can be dewatered will depend upon the existing valves, drain piping, appurtenances, receiving water bodies and regulatory discharge requirements. The water remaining in the pipeline, following the District's initial gravity draining due to localized low-points in the pipeline's profile, shall be removed by the Contractor as required for the completion of the Work. The Contractor shall coordinate and schedule its discharge site preparation and localized low-point dewatering work with the District in advance of such operations so that the Contractor's work can be coordinated with District capabilities and environmental discharge permit requirements (e.g., biological monitoring). The Contractor shall assume that all existing valves have significant leakage (e.g., requiring barriers, pumping and water control). It will be the Contractor's responsibility to drain any water resulting from valve leakage.

C. The electrical, telemetry, communication, SCADA and process piping work components, demolition and installation, for the valves and flow meters in the turnout facilities shall be completed by the Contractor in coordination with and under the supervision of District staff. The Contractor shall coordinate and schedule vault access to allow for the completion of this work. The Contractor shall deenergize and disconnect the existing equipment, install new cables and conduits to the valves and remote terminal units as shown on the Drawings, and connect the new equipment to power. District staff will inspect the installation done by the Contractor.

D. Pipeline Filling and Pressurization: The maximum rate at which the pipeline can be filled will depend upon the system's capability. The Contractor and Engineer shall coordinate and schedule the pre-filling inspections, filling and post-filling inspections of the pipeline in advance of such operations so that the Contractor's work can be coordinated with District capabilities.

E. The Contractor shall be available to repair any leaks found during the refilling process. See Special Provisions Article 22.04.02 – 'Water Tightness Testing'.

F. The District work to install vent piping on PEP:

1. The District shall manage the isolation and lock-out/tag-out of the treated water distribution system.

2. The District shall observe appurtenance and vent piping disinfection and flushing activities.

a. The District shall collect bacteriological samples after disinfection.

16.02. Utilities

A. The Contractor's attention is directed to Standard Provisions Article 4.10 – 'Preservation of Property' and Article 4.25 – 'Coordination with Utilities'.

B. Various existing utilities, both above and below ground, may be encountered during construction. The Contractor shall perform all Work in such a manner to avoid damage to existing utilities. The Contractor is responsible for any damage due to failure to exercise due care.

C. The Contractor shall notify underground service alert (U.S.A.) a minimum of five (5) working Days prior to the start of excavation or demolition in accordance with California Government Code requirements. The Contractor is responsible for coordinating the U.S.A. notification according to the Contractor's schedule; any delay due to utility markings through the U.S.A. process is the responsibility of the Contractor.

D. The Contractor shall verify the exact location of all indicated or field marked utilities and shall make a sufficient number of exploratory excavations of all utilities that may interfere with the Work in advance of construction. The Contractor shall promptly notify the Engineer when such exploratory excavations show the utility location as shown on the Drawings to be in error.

E. The Contractor shall not interrupt the service function or disturb the support of any utility without authority from the utility owner or an order from the Engineer. All valves, switches, vaults, and meters shall be maintained and readily accessible for emergency shutoff.

16.02.01. Utility Coordination

A. The Contractor is responsible for coordination of Work near utilities and for the protection of the utility during construction.

B. The telephone numbers of owners of known utilities that may be encountered are:

U.S.A. Dig North	1-800-277-2600
AT&T	1-408-493-8770
County of Santa Clara	1-408-494-2700
City of Campbell	1-408-866-2150
City of San Jose	1-408-793-5307
Comcast Cable, Inc.	1-408-918-3200
Crown Castle	1-724-416-2181
Pacific Bell	1-510-645-2929
PG&E	1-800-743-5000
	1-408-494-1700
	1-408-640-6204
San Jose Water Company	1-408-279-7900
Town of Los Gatos	1-408-399-5771
Verizon/MCI World	1-800-483-5000
	1-408-354-6374

C. The District and the owners of utilities, or their authorized agents, reserve the right to enter upon the right-of-way at all times for the purpose of operations and maintenance of their facilities or for making necessary connections or repairs to their properties. The Contractor shall cooperate with the District and with the affected utilities engaged in such Work to avoid any unnecessary Delay or hindrance to such Work.

16.02.02. Protection of Existing Utilities

A. The Contractor is responsible for doing all Work and furnishing all Materials required for protecting in place or restoring all existing above- and below-ground utilities disturbed or damaged during construction to a condition equal to or better than that existing prior to construction. Payment for complying with this provision shall be considered as included in the price paid for other items of Work; no additional payment shall be made.

B. The Contractor shall protect all utilities that may be impacted by the Work. All exposed utilities shall be supported firmly and uniformly conforming to the utility requirements. No utilities shall be left exposed for a period exceeding eight (8) hours unless approved by the utility and by the Engineer. Unless otherwise shown on the Drawings, all utilities shall be backfilled with at least 12 inches of select imported backfill around the utility.

C. All utility pole and guy anchors shall be protected, and, where the walls of a trench are within five (5) feet of a pole or anchor, lateral support to the pole shall be provided by the Contractor.

D. The Contractor shall immediately notify the utility owner and the Engineer if any existing utilities have sustained damage prior to excavation or if the Contractor disturbs or damages the existing utility during the excavation. The Contractor shall bear the cost of repair or replacement of any utility damaged as a result of construction operation.

E. In no case shall any service (e.g., gas, water, electricity, telephone, etc.) be interrupted. If it is impractical to support the utility across trench excavations, the Contractor may remove the services, provided a temporary bypass has been installed and is operational prior to the removal, and is approved by the utility.

F. In addition to the protection of utility mains, the Contractor shall also be responsible for maintaining service laterals in operating condition during project construction.

G. Telemetry cables are critical to the operations of District water supply facilities. Therefore, advance notice from the Contractor in writing is required for any scheduled telemetry cable service interruptions.

1. The Contractor shall notify the Engineer two (2) weeks in advance of any activities that will result in cutting or splicing of a telemetry cable. The Contractor shall confirm this cutting or splicing to the Engineer the Day before it occurs and the Day when it occurs.

2. The Contractor shall exercise care to prevent accidental cutting of telemetry cables. Locating cables shall be performed by hand digging or by other nondestructive means.

3. The Contractor is responsible for any direct or indirect damages caused by its operations. In the event of accidental telemetry cable service interruption resulting from Contractor activities, the Engineer may use District forces to make the repairs or direct the Contractor to make the repairs at no additional cost. If directed by the Engineer to do the repairs, the Contractor shall complete the repairs within four (4) hours.

   a. If District forces make the repairs, the Contractor shall reimburse the District for all direct and indirect costs resulting from the loss of telemetry cable service and repairs.

   b. If the Contractor makes the repairs, the cost damages resulting from the loss of telemetry cable service shall be deducted from the monies that are due or that may become due the Contractor.

      (1) District staff shall inspect and test the repairs conducted by the Contractor.

H. Any cathodic protection wires that are partially or completely damaged shall be replaced from junction box to junction box by the contractor to the satisfaction of the Engineer. Damaged wires shall not be spliced.

I. The Contractor shall be responsible for notifying, as appropriate, impacted waste management companies, if construction activities will interrupt trash and/or recycling pickup.

J. The Contractor shall be responsible for notifying, as appropriate, the Santa Clara Valley Transportation Authority for the coordination of alternate bus stops, if the existing bus stops are to be blocked by construction activities.

16.02.03. Utility Installation/Relocation by Others

A. No Special Requirements.

16.03. Protection of Existing Improvements

A. The Contractor's attention is directed to Standard Provisions Article 4.10. – Preservation of Property.

B. Contractor shall take special care to protect in place the Parallel East Pipeline and East Pipeline facilities. Any damage to these facilities during construction shall be replaced or repaired to existing or better condition at no extra expense to the District.

C. Contractor shall take special care to protect in place existing fence lines, landscaping and other such improvements of adjacent property owners. Any damage to adjacent properties during construction shall be replaced or repaired to existing or better condition at no extra expense to the District to the satisfaction of the property owner.

16.03.01. Survey Monuments

A. No survey monuments, permanent markers for the District right of way, or District survey control points shall be removed or disturbed until the Engineer has recorded the locations thereof and a permit for such removal has been received from the agency having jurisdiction. When the construction Work has been completed, the Contractor shall replace the monuments accurately in the locations as referenced by the Engineer.

B. If any marker or monument is destroyed by the Contractor without prior written approval of the Engineer, the Contractor shall be responsible for the accurate replacement of the marker or monument (i) by a land surveyor licensed by the State of California; (ii) in accordance with the California Business and Professions Code Chapter 15 Land Surveyors, Section 8771; and (iii) at no expense to the District.

C. Installation of survey monuments shall be in accordance with initial monument installation as shown on the City of San Jose's Standard Plan Details for Public Works Construction, pages R-16, R-17, and R-18, and on the City of San Jose's Standard Specifications for Public Works Construction, Section 81.

D. The Contractor shall provide new monuments at locations noted on the Drawings. The Contractor shall perform and submit a record of survey for the new monuments provided for all roadway alignments. The record of survey shall be examined by the county surveyor and recorded by the County Clerk-Recorder's Office.

16.04. Preconstruction Surveys

16.04.01. Preconstruction Survey Within the Project Limits

A. After the Contract has been awarded and before commencement of the Work, the Contractor shall conduct a thorough examination of the Work areas within the Project limits only after notification and coordination with the Engineer.

B. The Contractor shall inspect the condition of all areas that may have potential impacts, including, but not limited to, existing improvements, levees, ramps, buildings, landscape planting, architectural finishes, the size of structural cracking or settlement, the rate of leakage, and any other conditions deemed appropriate. The presence of the Engineer shall in no way relieve the Contractor of the responsibility for completely and accurately documenting all existing conditions.

C. Records of all observations shall be prepared by the Contractor; every copy of all documents shall be signed by the authorized representative of the Contractor and provided to the Engineer. Photographs and videos with dates shall be made by the Contractor and included in the record of observations. One (1) signed

copy of every document, photograph, and video will be kept on file in the office of the Engineer.

D. The above records, photographs, and videos are intended for use as evidence in ascertaining the extent of any damage that may occur as a result of the Contractor's operations during the prosecution of the Work.

E. The Contractor biologist(s) shall conduct preconstruction environmental surveys at Project sites per Section 19.

F. Structural surveys, if required, shall be conducted by a licensed civil or structural engineer.

16.04.02. Surveys of Properties in the Vicinity of the Work

A. The Contractor is advised that there are residential or commercial properties in the immediate vicinity of the Work. The Contractor is responsible to protect those properties from damage. Any damage to the adjacent properties shall be addressed in accordance with Standard Provisions Article 4.10. Preservation of Property.

B. The Contractor shall perform structural surveys on all properties as shown on the Drawings to be surveyed. Structural surveys shall consist of all structural survey Work necessary to establish and document the existing structural condition of the properties adjacent to the construction Project before and after construction.

C. The District has obtained right of entries to perform the structural surveys and shall provide these to the Contractor.

D. The Contractor shall employ a licensed civil or structural engineer registered in the State of California to conduct the structural surveys and to prepare reports documenting the survey results. The Contractor shall submit to the Engineer a copy of the preconstruction survey reports prior to the field Work and a copy of the post-construction survey reports one (1) month prior to the issuance of the Project Completion letter by the Engineer.

E. Scope of Work:

1. Preconstruction Survey

a. Prior to the start of construction, the Contractor shall survey and document the existing condition of the structures and grounds of each of the residential or commercial properties as shown on the Drawings. The Contractor shall submit inspection reports to the Engineer with photographs, including videotaping with verbal description, of the existing condition for each property being inspected. All photographs submitted in the inspection reports shall be mounted on 8½ X 11-inch sheets. The Contractor shall

notify each property owner by phone or by mail at least 48 hours in advance of its visit to perform these surveys.

2. Post-Construction Survey

a. Post-construction Work shall consist of the survey Work necessary to document the condition of the existing structures and grounds of each of the residential or commercial properties included in the preconstruction survey after the construction has been completed. The Contractor shall submit inspection reports to the Engineer with photographs, including videotaping with verbal description, of the existing condition for each property being inspected. All photographs submitted in the inspection reports shall be mounted on 8 ½ X 11-inch sheets. The Contractor shall notify each property owner by phone or by mail at least 48 hours in advance of its visit to perform these surveys.

16.05. Rights of Way

A. Work sites will be accessed from public streets, highways and rights of way in the City of San Jose, City of Campbell, Town of Los Gatos, County of Santa Clara, District easements, and in District-furnished rights of way. In the performance of the Work within the City of San Jose, City of Campbell, Town of Los Gatos, and the County of Santa Clara, the Contractor shall comply with the ordinances, regulations, and all other requirements of the authorities having jurisdiction.

B. The District has obtained conditional permits as required by the ordinance and regulations of the City of San Jose, City of Campbell, Town of Los Gatos, County of Santa Clara, and Caltrans. The Contractor shall complete and obtain all encroachment permits started by the District. The Contractor shall comply with the conditions as stated in the permits. See Appendix E for copies of the conditional permits started by the District and the associated requirements.

16.05.01. District-Furnished Right of Way

A. The District has provided all rights of way as shown on the Drawings. The Contractor has full use of this right of way for construction staging except for the limitations specified in these Specifications and as noted on the Drawings.

16.05.02. Contractor-Furnished Right of Way

A. Any additional rights of way desired by the Contractor for its convenience shall be acquired by the Contractor at no expense or obligation to the District. The Contractor shall provide the Engineer with copies of any agreements between the Contractor and property owners regarding disposal of excess Materials generated by the Contractor's activities, storage of Materials, or any use of property in conjunction with this Project. The agreement shall state that the agreement is solely between the Contractor and the property owner and that the

District is not a party to the agreement and not responsible for compliance with any conditions stated in the agreement.

B. The Contractor shall obtain and pay for, at no cost to the District, all permits required to acquire and/or enter Contractor-furnished right of way

16.05.03. Temporary Construction Easements

A. No Temporary Construction Easements have been or will be obtained by the District for this Project.

16.06. Access to Properties Owned by Others

A. The Contractor shall conduct the construction operations per Article 10.01 – Good Neighbor Requirements.

B. Convenient access to driveways, houses, buildings, and businesses along the Work shall be maintained in operational condition; temporary approaches to crossings or to intersecting streets shall be provided and kept in good condition.

C. When construction operation is directly within the driveway area, temporary access shall be provided. The existing access shall not be closed until the temporary replacement access is usable. Once construction is completed, access shall be restored to a condition equal to or better than the existing condition prior to the Contractor's operation.

D. The Contractor shall comply with California Vehicle Code Sections 22500 Prohibited Stopping Standing or Parking and 22500.1 Additional Prohibited Stopping Standing or Parking Fire Lane regarding stopping, parking, or leaving any vehicle in front of a public or private driveway.

16.07. Access to the Job Site

A. The Project location is shown on a map included in the Drawings. The Contractor may use the existing roads to access and perform the Work subject to the restrictions specified herein.

B. It is the Contractor's responsibility to obtain any and all permits that may be required from all applicable regulatory agencies to move Materials and Equipment to the job site, dispose of excess Material created by the Contractor's operation, and for traffic control to, from, and on the Project sites.

C. All pipeline appurtenance vaults are located on District owned property or on property where the District maintains access easements. However, some areas are most practicably accessed through private driveways, fields, or other areas with limited or restricted access. The contractor shall coordinate with the District to determine if access through private property is allowed in each instance and comply with any special requirements established by private agreements with respective landowners.

16.08. Access Roads Within the Job Site

A. The Contractor shall maintain access roads to all staging, office trailer, storage areas, and to other areas to which frequent access is required. The Contractor shall maintain access to all other existing facilities on the site, including access for delivery of Materials and for maintenance and operation.

B. The Contractor is responsible for damages to buried utilities resulting from loads imposed on temporary roads constructed by the Contractor or other access routes used by the Contractor.

C. The Contractor shall maintain on-site access roads to be free of mud or dirt. Under no circumstance shall vehicles leaving any site track mud or dirt off the site onto public rights of way.

D. The Contractor may be required to use unpaved, rural roads or undeveloped land to access appurtenances. Based on weather conditions or other unforeseeable condition, the Contractor shall improve and maintain access to roads and/or undeveloped land as needed to complete the Work. The Contractor's equipment capabilities and materials required to complete the work at each site, unpaved road, and/or undeveloped rural land shall be required to facilitate access, material transportation, and equipment transportation. The Contractor is responsible for determining and installing all access upgrades as required for execution of the Work.

E. The Contractor shall schedule and perform its Work such that there are no unscheduled disruptions to facility operations and access. Access to the facility and all portions of the facility shall be maintained at all times for the staff and for all other delivery vehicles.

F. Access roads from the public rights of ways and between properties have access gates. Access gates shall be closed immediately after passage or use.

16.09. District Use of Facilities/Premises Within the Work Area

A. The District reserves the right to access and use the project premises during performance of the Work to conduct operations and maintenance of District facilities.

B. The Contractor shall coordinate all construction operations with the District to avoid conflict and to facilitate the District's use, inspection, and maintenance of the facilities.

C. Unless otherwise altered by the Work, the Contractor shall restore the premises to pre-existing condition or better to the satisfaction of the District Engineer and shall immediately repair any damages to the premises caused by the Contractor's operations.

D. The District and its third-party consultants reserve the right to perform work on the facilities concurrently with the Contractor's work.

SECTION 17. SAFETY AND SECURITY

17.01. Safety

A. The Contractor is hereby informed that work on this Project could be hazardous. The Contractor shall instruct all personnel working in potentially hazardous work areas of the potential dangers and shall provide such safety equipment and instruction as is necessary to prevent injury to personnel and damage to property. Special care shall be exercised relative to work around high-voltage wires, high-pressure gas mains, high-pressure water pipelines, and other utilities. Temporary supports, as required by the utility company, shall be provided by the Contractor to protect utility facilities.

B. All work and materials shall be in strict accordance with all applicable City, County and State Rules, Ordinances, Regulations, and Codes. The Contractor shall comply with CAL-OSHA Labor Code Section 6300 et seq. and with Chapter 4 of Title 8 of the California Administrative Code. Nothing in these Specifications shall be construed to permit work not conforming to governing codes. When Contract Documents differ from governing codes, the Contractor shall furnish and install the higher standards called for without extra charge.

C. For projects involving hazardous waste operations, the Contractor shall develop and implement a written Safety and Health Program and a site-specific Safety and Health Plan, and designate a Site Safety and Health Supervisor who has the responsibility and authority to develop and implement the site-specific safety and health plan and verify compliance, in accordance with Title 8 CCR Section 5192 (Hazardous Waste Operations and Emergency Response).

   1. The Contractor shall comply with the Safety and Health Plan. Noncompliance with the Safety and Health Plan shall be grounds for temporary suspension of all work. Suspension of work for noncompliance shall not be grounds for additional time or compensation.

D. Prior to start of work, the Contractor shall submit an Injury and Illness Prevention Program in accordance with CAL-OSHA requirements, Title 8, CCR Section 1509 (Construction), In addition, the Injury Illness Prevention Program shall comply with title 8, CCR Section 3203 (General Industry) and/or Section 8406 (Tunnel) as deemed necessary. A copy of the program shall be available at all times in the Contractor’s jobsite trailer. The Contractor shall designate a safety officer who will monitor and enforce the Injury and Illness Prevention Program.

E. At all times the Contractor shall provide sufficient measures, such as, but not limited to: barricades, railings, lights, fences, and any other warning devices, to reasonably and prudently provide for the greatest public safety and convenience.

F. Contractor shall provide and require the use of personal protective life saving equipment, clothing, and devices for all its personnel working in or about the project site.

G. Every Contractor and subcontractor on a District project whose employees will be working in or supporting work in a Confined Space (i.e., a pipeline or vault) shall have a Confined Space Program. Every such Contractor shall submit a copy of its Confined Space Program document for the District's review for compliance with all pertinent requirements of Title 8 California Code of Regulations, Section 5157 (Permit-Required Confined Spaces) and/or Title 8 California Code of Regulations, section 5158 (Other Confined Space Operations), as applicable to the project, prior to the start of work. Every such Contractor shall ensure that all its employees and subcontractors working in or supporting work in a Confined Space have received all training mandated by Cal-OSHA and meet any other Cal-OSHA requirements related to such work. All entries into District confined spaces shall be coordinated with the Engineer.

H. Portions of the Contractor's work shall require confined space entry and confined space work. All confined space work shall be in accordance with applicable Cal/OSHA regulations.

1. Confined space rescue services for the Contractor's work in confined spaces shall be provided by the Contractor in accordance with applicable CAL/OSHA regulations.

2. The Contractor shall be responsible for all staff, including subcontractor's staff, having the proper personal protective equipment and training prior to entering a confined space.

3. The Contractor shall provide confined space documentation, air monitoring, forced air ventilation, and all other necessary materials, labor, and equipment for work in all spaces classified as a confined space.

4. Ventilation required for confined space entry shall be provided by the Contractor. The Contractor shall provide ventilation fans that are rated NFPA Class 1, Division 1, Explosion Proof.

5. The Contractor must coordinate all confined space entries with the District's Engineer.

6. The following information is provided for reference only: Internal pipeline space is classified as a Permit-Required Confined Space. Entry into a Permit-Required Confined Space means the action by which a person passes through an opening into the confined space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

7. No separate payment will be made for complying with the confined space entry provisions. Payment will be considered as included in the item of work requiring confined space entry.

I. Portions of the Contractor's work shall be performed on high-angled sections of pipeline requiring the use of rope access equipment. Pipeline slopes of twenty (20) degrees or greater are considered high-angled. The Contractor's personnel participating in the internal pipeline visual inspection and personnel, equipment and materials required for internal pipeline repair work on high-angled portion of the pipeline shall be attached to rigging lines or equal while navigating and working in said sections. The Contractor's personnel performing work that requires the use of rope access support shall be trained per Cal/OSHA Title 8 3270.1.

J. The Contractor shall submit to the Engineer for review a Rope Access Program for their personnel to complete work on high-angled portions of the pipeline.

K. Prior to Contract Award, the selected Contractor shall complete and submit the Contractor Safety Qualification Packet and Rescue Training Certification Form for review. See Appendix B for a copy of the Contractor Safety Qualification Packet and Rescue Training Certification Form. Favorable review of the Safety Qualification Packet and Rescue Training Certification Form is required for Contract award.

L. The Contractor shall submit to the Engineer for review, in accordance with Article 20.01 – 'Additional Submittal Requirements', Material Safety Data Sheets (MSDS) for all chemicals to be use in the Contractor's operations. Favorable review by the Engineer is required prior to commencement of work by the Contractor.

17.02. Safety and Health Program

A. Refer to Santa Clara County Public Health Officer's safety orders for latest requirements on Novel Coronavirus COVID-19.

17.03. Security Requirements at Job Site

A. Contractor shall make adequate provision for the protection of the work area against fire, weather, theft, vandalism, and for the protection of the public against exposure to injury. All costs arising from theft, fire, or vandalism of the construction materials and equipment shall be borne by the Contractor.

B. The Contractor shall not allow his/her staff to stay at the project site outside of normal hours or authorized work hours.

17.03.01. General

17.03.02. Identification and Badging

A. To access the Vasona Pump Station and the Coyote Pumping Plant, a badge is required, refer to Standard Provisions Section 8 Article 8.17 for Identification and Badging.

17.03.03. Background Checks

A. No Special Requirements.

17.03.04. Site Access Control

A. Refer to Article 8.19 Site Access Control for requirements.

B. The Contractor may use the badge operated Vasona Pump Station access gate.

C. Refer to Special Provisions Article 16.07 Access to the Job Site for additional requirements.

17.03.05. Mail and Postal Deliveries to the Project Site

A. No Special Requirements.

SECTION 18. PERMITS AND REGULATIONS

18.01. Permits and Agreements

18.01.01. District-Obtained Permits

A. The District has obtained permits for Work on this Project from the following agencies having jurisdiction:

1. NPDES General Permit (see Standard Provisions)

2. Statewide National Pollutant Discharge Elimination System (NPDES) Permit for Drinking Water System Discharges to Waters of the United States. See copy of the Notice of Applicability issued by the State in Appendix D.

3. Valley Habitat Plan (a combination Habitat Conservation Plan/Natural Communities Conservation Plan)

   a. See Appendix D for a list of conditions and avoidance and minimization measures from the Santa Clara Valley Habitat Plan that must be adhered to during construction.

   b. For Chapter 6 of the VHP, see attached link: http://scv-habitatagency.org/178/Santa-Clara-Valley-Habitat-Plan

4. California Department of Fish and Wildlife 1602 Lake or Streambed Alteration Agreement

   a. See Appendix D for a copy of the agreement. The Contractor shall submit requisites documents required by the agreement.

   b. The Contractor shall adhere to the requirements of the Lake or Streambed Alteration Agreement.

5. City of San Jose Encroachment Permit:

   a. District has obtained two (2) individual draft encroachment permits from the City of San Jose for this Work per Pipeline facility. See Appendix E. The Contractor shall submit the requisite documents (CA Contractor License, City of San Jose Business License, Proof of Insurance with endorsements, traffic control plans, etc.) to the City of San Jose in order to finalize the encroachment permits.

   b. The District will pay the required permit and inspection fees directly.

6. City of Campbell Encroachment Permit:

    a. District has obtained a draft encroachment permit from the City of Campbell for this Work. See Appendix E. The Contractor shall submit the requisite documents (CA Contractor License, County of Santa Clara Business License, Proof of Insurance with endorsements, traffic control plans, etc.) to the City of Campbell in order to finalize the encroachment permit.

    b. The District will pay the required permit and inspection fees directly.

7. Town of Los Gatos Encroachment Permit

    a. District has obtained a draft encroachment permit from the Town of Los Gatos for this Work. See Appendix E. The Contractor shall submit the requisite documents (CA Contractor License, County of Santa Clara Business License, Proof of Insurance with endorsements, traffic control plans, etc.) to the Town of Los Gatos in order to finalize the encroachment permit.

    b. The District will pay the required permit and inspection fees directly.

8. County of Santa Clara Encroachment Permit

    a. District has obtained a draft encroachment permit from the County of Santa Clara for this Work. See Appendix E. The Contractor shall submit the requisite documents (CA Contractor License, County of Santa Clara Business License, Proof of Insurance with endorsements, traffic control plans, etc.) to the County of Santa Clara in order to finalize the encroachment permit.

    b. The District will pay the required permit and inspection fees directly.

9. Caltrans Encroachment Permit

    a. District has obtained a draft encroachment permit from Caltrans for this Work. See Appendix E. The Contractor shall submit the requisite documents (CA Contractor License, County of Santa Clara Business License, Proof of Insurance with endorsements, traffic control plans, etc.) to Caltrans in order to finalize the encroachment permit.

    b. The District will pay the required permit and inspection fees directly.

B. The Contractor shall comply with other conditions of the above permits as listed below:

1. Section 19—Environmental

18.01.02. Contractor-Obtained Permits

A. The Contractor shall be responsible for obtaining all permits required by the applicable authorities having jurisdiction for all Work to be performed by the Contractor, its subcontractor, its sub-subcontractor, material supplier, etc. The Contractor is responsible for determining the need for and obtaining the requisite permits.

B. The Contractor shall submit two (2) final signed copies of all Contractor obtained permits to the Engineer prior to beginning any work.

C. Once obtained, the Contractor shall be responsible for complying with all permit conditions.

18.01.03. Operation Regulations

A. All work is subject to the requirements of the Pipeline Maintenance Program and the associated Environmental Impact Report. The Contractor's attention is directed to Article 13.04.02 — "Environmental Reports" for additional information regarding the Pipeline Maintenance Program Environmental Impact Report. Applicable BMP's and Mitigation Measures from the Pipeline Maintenance Program are included in Appendix D.

B. The Contractor shall adhere to the BMPs and Mitigation Measures listed in Appendix D during the performance of the work. If the Contractor's execution or performance of the BMPs or Mitigation Measures is deemed deficient to the Engineer, the Contractor must stop the work requiring the BMP or Mitigation Measure until a remedy is made to the satisfaction of the Engineer.

C. Additional requirements from the regulating agencies, such as CDFW and National Marine Fisheries Service, may be imposed on this work. The Contractor shall comply with all additional requirements from the regulating agencies should they be imposed. The Contractor's attention is directed to Section 19—Environmental.

18.02. Hours of Work

A. Unless noted otherwise, no Work, including material hauling to/from the site and Equipment movement, shall be performed during the Days and hours restricted by and set forth in this Article.

B. A typical shift is expected to be eight (8) work hours per day.

C. Unless otherwise indicated, normal working hours within the City of San Jose and County of Santa Clara roadways shall be during the following hours:

1. Monday through Friday, 8:15 a.m. to 4:15 p.m., excluding holidays and weekends on Minor streets.

2. Monday through Friday, 8:30 a.m. to 3:30 p.m., excluding holidays and weekends on Major streets.

3. Monday through Friday, 9:00 a.m. to 3:00 p.m. excluding holidays and weekends for work within 100 feet of and at a signalized intersection.

4. Night work, 8:00 p.m. to 5:00 a.m.

5. Weekends, 9:00 a.m. to 6:00 p.m.

D. Work hours for this Project within the City of Campbell and Town of Los Gatos are tentatively scheduled to be from 8:15 am to 4:15 pm. The Contractor may negotiate an alternate work schedule with the Engineer prior to the start of work and shall provide a minimum of one (1) week advanced notice of any requested changes to the work schedule.

E. Work hours within public right of ways will vary based on encroachment permit requirements. The Contractor shall see encroachment permit requirements for any restrictions related to work hours within public right of ways.

F. No construction will occur on a site located within 500 feet of a residential unit before 8:00a.m. or after 5:00 p.m., Monday through Friday, or at any time on weekends.

G. The Contractor shall observe restricted hours for traffic lane closures. The hours of restriction for each authority having jurisdiction can be found the applicable encroachment permit. Conditional encroachment permits can be found in Appendix E.

H. Unless noted otherwise on the Drawings or in these Specifications or as approved in writing by the Engineer, no Work shall be performed on Saturdays or Sundays or on any holiday listed below.

I. If any of the following listed holidays should fall on a Sunday, the following Monday shall also be considered a holiday. If a holiday should fall on a Saturday, the previous Friday shall also be considered a holiday.

- New Year’s Day
- Martin Luther King’s Birthday
- Memorial Day
- Independence Day
- Labor Day

- Thanksgiving Day
- Friday after Thanksgiving
- Christmas Day

J. For additional restrictions to hours of Work refer to Article 16.01. General Work Constraints.

18.03. Noise Pollution and Vibration

18.03.01. Noise

A. The Contractor shall be responsible for ensuring that noise produced by construction activities does not exceed the applicable local noise ordinance standards and complies with the performance standards set forth in these Specifications.

B. In no case shall the noise levels produced by the Contractor exceed any of the following maximum levels at the Project rights-of-way line:

Single- and Two-Family Dwelling Residential Areas	
Weekdays: 7 a.m. to 7 p.m.	75 dBA
Weekdays: 7 p.m. to 7 a.m.	50 dBA
Saturdays, Sundays, and Holidays	50 dBA

Multifamily Dwelling Residential Area	
Weekdays: 7 a.m. to 7 p.m.	80 dBA
Weekdays: 7 p.m. to 7 a.m.	55 dBA
Saturdays, Sundays, and Holidays	55 dBA

Commercial and Industrial Areas	
Weekdays: 7 a.m. to 7 p.m.	85 dBA
Weekdays: 7 p.m. to 7 a.m.	60 dBA
Saturdays, Sundays, and Holidays	60 dBA

C. For areas where construction activities are adjacent to more than one (1) land zone, the Contractor shall comply with the more restrictive noise criteria.

D. Steady, audible tone of Equipment or machinery that must be left on continuously shall not exceed the above standards minus 5 dBA.

E. No individual piece of equipment shall produce a noise level exceeding 85 dBA at a distance of feet 50; or

F. The noise level at any point outside the project right of way shall not exceed 75 dBA.

G. The Contractor shall comply with BMPs listed in Appendix D of these Specifications. Installation of these measures shall in no way relieve the Contractor of the responsibility to comply with these Specifications.

18.03.02. Noise Monitoring

A. The Engineer will occasionally take sound readings with a hand-held noise-level meter during construction activities and operations of any noise-producing Equipment to monitor the Contractor's compliance with the noise criteria. Any Equipment causing noncompliance with the noise criteria shall be removed from the job site as directed by the Engineer.

B. The District will conduct noise monitoring to monitor the Contractor's compliance with the noise criteria. The monitoring procedures will be in accordance with the United States Federal Highway Administration's Technical publication titled Measurement of Highway-Related Noise, Section 7 "Construction Equipment Noise Measurements for Highway-Related Projects," dated May 1996, http://www.fhwa.dot.gov/environment/noise/measure/chap7.htm.

18.03.03. Vibration Monitoring

A. The Contractor shall take all necessary precautions during its operations to limit peak particle velocities from vibratory compaction or percussion equipment so that they do not become a public nuisance or result in property damage. The Contractor shall refer to local ordinances on vibration monitoring requirements.

18.04. Air Pollution

A. The Contractor's attention is directed to the Bay Area Air Quality Management District and California Air Resource Board regulations. No burning will be allowed on this Project. Idling of internal combustion engines shall be held to an absolute minimum. All vehicles with internal combustion engines shall be fitted with spark arresters.

B. The Contractor shall adhere to the Applicable BMPs (Air Quality) and Mitigation Measures listed in Appendix D during the performance of the work.

C. Except as provided by law, idling of heavy duty diesel trucks with gross vehicular weight ratings of greater than 10,000 pounds shall be no more than five (5) minutes per Title 13 CCR Section 2485.

18.05. Spillage and Dust

A. The Contractor shall provide all necessary precautionary measures to control dust and to prevent spillage on public traveled ways. As a minimum, the Contractor shall comply with BMPs listed in Appendix D of these Specifications. Installation of these measures shall in no way relieve the Contractor of the responsibility to comply with these Specifications.

B. Dust controls shall be implemented such that visible dust plumes are retained within the property lines. Dust controls include watering and other measures, such as preventing trackout, paving unpaved roads, covering or treating stockpiles, etc., with the extent of controls varying with the size of the Project.

18.06. Traffic Control

A. The Contractor prepared traffic control plans shall be signed and stamped by professional civil engineer registered in the State of California.

B. Traffic control work shall be planned and performed in accordance with these Drawings and Specifications, State Specifications and/or requirements of the authority having jurisdiction.

C. The traffic control plans shall address all traffic control measures as shown on the Drawings and as specified in these Specifications.

D. The Contractor's attention is directed to the following regarding additional traffic control requirements:

1. Article 8.01, "Public Safety", of these Standard Provisions Specifications and Article 28.01, "Traffic Control" of these Technical Provision Specifications.

2. Nothing in these Specifications shall be construed as relieving the Contractor from his/her responsibility as provided in said Section 7-1.04, "Public Safety" of the most recent State Specifications.

E. Traffic control Work shall include, but shall not be limited to, removing and replacing traffic control systems; fencing, railing, barricades, and crash cushions; channelizers; AC pavement; driveways, curbs, gutters, and sidewalk and pavement markings; construction area signs necessary for traffic staging on public streets adjacent to or near the Project area; and any other miscellaneous Work necessary to complete the traffic control as specified in these Specifications and as directed by the Engineer.

F. If any component in the traffic control system is displaced or ceases to operate or function as specified during the progress of the Work, the Contractor shall immediately repair the component to its original condition or replace the component and shall restore the component to its original location.

G. No stockpiling of Materials or parking of Equipment will be allowed on streets and sidewalks.

H. All construction signs shall be placed in the field, shall be visible to drivers, and shall not be covered or blocked by trees or by other fixed objects.

I. The Contractor shall verify any sprinkler system conflicts before installing construction area signs in planting strips. The Contractor shall replace

landscaping upon removal of construction area signs, if needed, and as directed by the Engineer.

J. The Contractor shall ensure levels of operation acceptable to the Engineer and the jurisdiction with authority, as well as perform inspections of traffic control zones on a daily basis.

K. All streets and sidewalk areas shall be swept clean in accordance with these Specifications.

L. During delivery and export of construction Materials and Equipment, the Contractor shall provide traffic flaggers and signs along the access route, as directed by the Engineer.

M. Flag persons provided for the Project shall be trained and experienced in the proper techniques for flagging and traffic control. The flag person shall comply with Caltrans standards for control of traffic through work zones as described in the current Caltrans traffic manual. If a flag person is not performing its duties to the satisfaction of the City of Campbell, Town of Los Gatos, City of San Jose, County of Santa Clara, State of California, or any other applicable authority having jurisdiction, the Contractor shall be required to replace the flag person with a police or highway patrol officer at the Contractor's expense.

18.07. Truck Traffic and Hauling

A. The Contractor shall obtain, at Contractor's expense, all applicable Haul Route Permit(s), as required, from the authority having jurisdiction.

B. Truck traffic and haul routes shall comply with applicable regulatory permits, ordinances and as further specified herein.

18.07.01. Truck Arriving Early, Truck Idling, and Queuing

A. The District actively seeks to avoid or minimize unnecessary disturbance of the neighborhood from construction activities. Accordingly, all deliveries shall be coordinated to ensure that no delivery vehicles arrive at the site before 8:00 a.m. to prevent disruption of the neighborhood.

B. Idling, queuing, and hauling shall comply with local permits and ordinances and as further specified herein. Idling, queuing, and hauling shall be modified at the Contractor's expense in response to complaints by residents and commercial establishments.

C. No idling or queuing shall take place on any residential street in the surrounding neighborhood except for reasons noted below:

1. Idling when the vehicle must remain motionless due to an official traffic control device, traffic control signal, or at the direction of a peace officer or traffic conditions over which the driver has no control.

2. Idling when being forced to remain motionless due to adverse weather conditions or due to mechanical difficulties over which the driver has no control.

3. Idling to verify that the vehicle is in safe operating condition as required by Law.

4. Idling at the site entrance for security checks or for searches by District guards.

5. Idling as allowed by local, State, and Federal laws.

D. Contractor vehicular traffic shall be coordinated to avoid or minimize disruptions at the work sites and access paths to the work sites.

18.08. Parking

A. Trucks and Contractor personnel vehicle parking and access shall be in compliance with local permits and ordinances and as further specified herein. Parking shall be modified at the Contractors expense in response to complaints by residents, commercial establishments and/or local officials.

B. Personal vehicles of the Contractor's employees, and the Contractor's equipment and vehicles shall not be parked on the traveled way, shoulders, medians or lanes, which have not been approved for closure, at any time.

C. The Contractor shall make his/her own arrangements relative to keeping the working area clear of parked vehicles to maintain sight visibility and access to adjacent properties.

18.09. Discovery of Archeological Artifacts and Human Remains

A. No known archeological sites were discovered on the site. If, however, burials or archeological artifacts are encountered during construction, the Contractor shall halt the Work immediately within fifty (50) feet of the find. A "No Work" zone shall be established utilizing appropriate flagging to delineate the boundary of this zone. The Contractor shall secure and protect the zone from vandalism. The Contractor's attention is directed to Article 10.05. Burial Sites and Article 10.06. Cultural Resources (Archeological Discovery) for additional requirements.

18.10. Aesthetic Requirements

A. The District is a public entity, which takes seriously its responsibility to be a "Good Neighbor." Accordingly, the District seeks to perform its activities, including construction of its facilities, in a manner that takes into consideration the needs of the neighborhood, and is minimally disruptive.

B. The Contractor acknowledges that the District requires it to perform work under this Contract with that responsibility in mind. The Contractor hereby acknowledges the critical importance of meeting the Contract requirements as set forth in this Section relative to: the hours during which work may be performed; the required health and safety measures; traffic control measures; parking restrictions; dust, noise, and storm water pollution measures.

C. The Contractor agrees to ensure the faithful and assiduous adherence to the provisions of this section which relate to the lessening of the impact which the work being performed under this Contract, might otherwise have upon the surrounding neighbors. The Contractor acknowledges that its responsibility to observe the restrictions of this Contract relating to the provisions of this section is significant, critical, and material provisions of this Contract. Therefore, any breach of any provision of this section constitutes a material breach of this Contract, which shall give rise to the right on the part of the District to immediately terminate this Contract, without any further showing of cause.

D. No decision, action or inaction on the part of the District with respect to one such violation may be deemed to be a waiver of any remedy available to the District in the event of any other violation of the provisions of this Contract, including the right to terminate this Contract at any time and at any stage of the work should a material breach occur.

18.11. Recreation

A. The Contractor shall comply with BMPs listed in Appendix D of these Specifications. Installation of these measures shall in no way relieve the Contractor of the responsibility to comply with these Specifications.

18.12. Utilities and Service System

A. Utilities and facilities shall remain active during the project.

18.13. Payment

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements under Special Provisions Section 18 Permits and Regulations shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

SECTION 19. ENVIRONMENTAL

19.01. Compliance With NPDES General Permit

A. The Contractor shall prepare and submit Storm Water Pollution Prevention Plan (SWPPP) as required under NPDES General Permit. The SWPPP shall be in accordance with Section XIV SWPPP Requirements of the NPDES General Permit. Reference is made to Standard Provisions Article 10.02. Storm Water Pollution Prevention Plan.

B. The Contractor shall comply with the **Linear Underground/Overhead Project (LUP) Risk Level Type 2** requirements of the NPDES General Permit.

C. All discharges are prohibited except for the storm water and non-storm water discharges specifically authorized by the NPDES General Permit.

D. Among the discharges prohibited by the NPDES General Permit include:

1. Non-storm-water discharges such as improper dumping or leakage;

2. All discharges which contain a hazardous substance in excess of reportable quantities established in 40 C.F.R §§ 117.3 and 302.4;

3. Any debris from construction site;

4. Other discharges as identified in the NPDES General Permit.

E. Certain non-storm water discharges may be authorized such as fire hydrant flushing, irrigation and vegetation erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water from dewatering, providing all the conditions are met as noted in the general NPDES permit.

19.01.01. SWPPP

A. The SWPPP shall be written, amended, certified, and stamped by an independent third party Qualified SWPPP Developer (QSD). The implementation of BMPs and all pollution control measures shall be overseen by an independent third party Qualified SWPPP Practitioner (QSP). The QSD and QSP shall be provided by the Contractor and shall meet the certification requirements as defined under Section VII of the NPDES General Permit.

19.01.02. Storm Water BMPs

A. Risk Level 2 Requirements

1. The Contractor shall comply with all Risk Level 2 requirements as outlined below in accordance with Attachment D of the NPDES General Permit.

a. Effluent Standards

b. Narrative

c. Numeric Effluent Standard:

(1) pH NAL of 6.5 to 8.5; turbidity NAL of 250 NTU

d. Good Site Management “Housekeeping”

e. Non-Storm Water Management

f. Erosion Control

g. Sediment Control

h. Run-on and Runoff Controls

i. Inspection, Maintenance and Repair

j. Rain Event Action Plan

k. Risk Level 2 Monitoring and Reporting Requirements

(1) Construction Site Monitoring Program Requirements

(2) Objectives

(3) Risk Level 2 – Visual Monitoring (Inspection) Requirements for Qualifying Rain Events

(4) Risk Level 2 – Water Quality Sampling and Analysis

(5) Risk Level 2 – Storm Water Discharge Water Quality Sampling Locations

(6) Risk Level 2 – Visual Observation and Sample Collection

(7) Risk Level 2 – Storm Water Sample Collection and Handling Instructions

(8) Risk Level 2 – Monitoring Methods

(9) Risk Level 2 – Analytical Method

(10) Risk Level 2 – Non-Storm Water Discharge Monitoring Requirements

(11) Risk Level 2 – Non-Visible Pollutant Monitoring Requirements

(12) Risk Level 2 – Watershed Monitoring Option

(13) Risk Level 2 – Particle Size Analysis for Project Risk Justification

(14) Risk Level 2 – Records

(15) Submit monthly to the Engineer records of inspections and finding.

(16) Inspection records must available for onsite review by Regional Water Quality Control Board and District.

(17) Risk Level 2 – NAL Exceedance Report

I. Annual Reporting Requirements:

(1) The Contractor shall comply with the Annual Reporting Requirements per Section XVI of the NPDES General Permit.

19.01.03. Payment

A. Full compensation for doing all Work necessary to comply with the NPDES General Permit, including the preparation and implementation of the SWPPP; all Materials, labor, Equipment, service, supervision, documentation, and submittals shall be included in the lump sum price Bid for compliance with Bid item _2_ NPDES General Permit.

19.02. Other Discharge Permits

A. The Contractor shall not violate any discharge prohibition contained in the California Regional Water Quality Control Board San Francisco Bay Basin Water Quality Control Plan (Basin Plan). For a copy of the Basin Plan, see attached link: http://www.swrcb.ca.gov/rwqcb2/water_issues/programs/basin_plan/docs/basin_plan07.pdf

B. The Contractor's attention is directed to Article 18.01.01 — "District Obtained Permits", Article 23.05 — "Control of Water" and Article 23.07 — "Pipeline Dewatering".

C. The Contractor shall meet all applicable regulatory requirements to ensure that any discharges to surface waters will not cause violation of the quality objectives or violation of regulatory permits issued by the applicable regulatory agencies.

D. The Contactor shall prevent water quality degradation of surface water. Water quality is measured in terms of pollution substances, turbidity, dissolved oxygen, pH, and temperature.

E. Unless more stringent requirements are specified in the environmental documentation, applicable permits, or other requirements from the regulating agencies, the Contractor shall take all necessary precautions to limit the increase in turbidity of any water course past the discharge site as follows:

1. Where existing turbidity is between 0 and 50 Nephelometric Turbidity Units (NTU), increases shall not exceed 5 NTU;

2. Where existing turbidity is greater than 50 NTU, increases shall not exceed 10 percent.

3. For cases in which the receiving water body is a dry creek bed or storm drain, waters in excess of 50 NTU shall not be discharged from the Contractor's operation.

F. The Contractor shall monitor the water for turbidity changes. The discharge water measurements shall be made 100 feet downstream of the Contractor's discharge point. Existing stream turbidity measurement shall be made in the receiving water at least 100 feet upstream of the project discharge site. Existing stream turbidity measurement shall be made prior to initiation of project discharges.

G. Oily, greasy, or sediment laden substances or other materials that originate from the Contractor's operation and may degrade the quality of surface water or adversely affect aquatic life, fish, or wildlife shall not be allowed to enter, or be placed where they may later enter, any reservoir, river, creek, or stream.

H. The Contractor shall complete and submit the District's discharge forms to the Engineer for draining the pipeline at the beginning of the project. See Appendix C for a copy of the discharge forms.

19.03. BMP Action Plan

A. No Requirements

19.04. Water Pollution Discharges

A. The Contractor shall remedy immediately any public nuisance or deficiency arising from, or in consequence of Contractor's failure to perform the work specified in these Specifications.

B. Upon the Contractor's failure to make appropriate and timely remedies as directed by the Engineer in the best interests of the public, the Engineer may employ private or public work forces and equipment to perform the work. The actual cost of employing such forces and equipment shall be doubled and then

subtracted from the monies due, or that may become due, to the Contractor. Such action(s) taken by the Engineer shall not preclude the Engineer from taking other appropriate actions, and shall not relieve the Contractor of responsibility to comply with these Specifications.

19.05. Regulated Material Management

A. The Contractor's attention is directed to Article 10.11-Regulated Material Management; Article 10.12-Non-regulated Materials and Article 10.13-Imported Earthfill Material.

B. Regulated material includes, but not be limited to, hazardous material and hazardous waste. See Section 1 of the Standard Provisions for the definition of regulated material, hazardous material, and hazardous waste.

C. The Contractor is responsible for, shall obtain all required permits for and shall pay all fees and taxes for, the regulatory requirements associated with the storage, monitoring, usage, transportation, disposal, safety, reporting, or any other requirements regarding the management of regulated materials on and off the project site(s).

D. The Contractor shall not allow regulated materials to spill on District property or easements or other public or private right of way. Any spillage of regulated materials resulting from the Contractor's operation shall be removed immediately by the Contractor at the Contractor's expense.

E. The Contractor shall immediately notify the Engineer of any potentially hazardous materials or hazardous waste encountered at the work site and shall take all necessary action to prevent exposure of personnel until all material is identified and proper action can be taken.

19.05.01. Asbestos Management

A. The Contractor shall be aware that the structures, facilities, and utilities scheduled for demolition and disposal as a part of the Project were constructed in the 1960's and may have been constructed using asbestos-containing construction materials. The Contractor shall test, demolish, and dispose of the structures in accordance with applicable regulatory requirements.

B. The Contractor shall immediately notify the Engineer of any asbestos materials encountered at the work site and shall take all necessary action to prevent exposure of personnel until all material is identified and proper action can be taken.

C. The Contractor is responsible for, shall obtain all required permits for and shall pay all fees and taxes for, the regulatory requirements associated with the storage, monitoring, usage, transportation, disposal, safety, reporting, or any other requirements regarding the management of asbestos materials.

19.05.02. Lead Management

A. The Contractor shall be aware that the appurtenances along Central Pipeline as a part of the Project were constructed in the 1960's and shall assume that the project was painted/coated using lead containing materials. The Contractor shall test for the presence of lead and shall conduct all work in accordance with applicable regulatory requirements.

B. The Contractor shall perform work in accordance with Title 8 CCR Section 1532.1 (Lead in Construction), and applicable local, state, federal regulations concerning working with lead paint. Contractor shall submit a Lead Compliance program that meets the requirements of Title 8 Section CCR 1532.1 (Lead in Construction) to the Engineer and shall receive favorable review prior to commencement of any work activities in the field.

C. The Contractor shall prepare a site-specific safety and health plan for employees involved in Hazardous Waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards and provide for emergency response for Hazardous Waste operations in compliance with Title 8, Section 5192.

D. Payment: Full compensation for Work involved in complying with all requirements per this Article and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

19.06. Solid Materials Management

A. Nonregulated materials are any substances that are not required by any federal, state, or local regulations for special management, storage, disposal or handling practices.

B. Nonregulated materials may be disposed at state-permitted, nonhazardous waste landfills.

C. For nonregulated material to be reused, or disposed on site or at a site other than a state-permitted landfill, the Contractor must obtain all required permits, agency approvals, property owner agreements, and pay all fees and taxes for all services and materials required in conjunction with the management, transportation, disposal and reuse of nonregulated materials.

19.06.01 Definitions

A. Certified Facility: A reuse, recycling, composting, or Materials recovery facility meeting the required Diversion percentages set forth in this Specification, which the Engineer (i) has determined can accept diverted Material; (ii) has obtained all applicable Federal, State, and Local permits; and (iii) is in full compliance with all applicable regulations for reuse, recycling, composting, and/or Materials recovery.

B. Construction Waste: Building and site improvement Materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste does not include any of the above specified Material/solid waste that contains contaminated or hazardous substances. Construction waste does not include excavated soil or groundwater.

C. Demolition Waste: Building and site improvement Materials resulting from demolition or selective demolition operations. Demolition waste does not include any of the above specified Material/solid waste that contains contaminated or hazardous substances.

D. Disposal: Removal off site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in a landfill or an incinerator acceptable to authorities having jurisdiction.

E. Divert/Diversion: Use of Materials for any lawful purpose other than disposal in a landfill or in a transformation facility.

F. Post-Consumer Recycled Content: The percentage of a new product that contains Materials that were recycled from product that was used by the end consumer and then collected for recycling.

G. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for use in some other form.

H. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in the same form in another facility.

I. Transformation Facility: A facility whose function is to convert, combust, or otherwise process solid waste by incineration, pyrolysis, destructive distillation, or gasification or to chemically or biologically process solid waste for the purpose of volume reduction, synthetic fuel production, or energy recovery. A composting facility is not a transformation facility.

19.06.02. Construction and Demolition Waste Management

A. The Contractor shall submit a solid Materials management plan identifying procedures to be used for management of construction and demolition Waste generated by the Work, including the facilities to be used for both disposal and recycling/salvaging and the estimated quantities and percentages (by weight) of construction demolition waste disposed and recycled/salvaged categorized by waste type. For each facility listed in the waste management and recycling plan, the Contractor shall provide the facility name and address, facility owner name, and contact information. This submittal shall be approved by the Engineer prior to commencement of any Work on the Project site.

B. The Contractor is directed to the City of San Jose's Construction and Demolition Deposit Program Certified Facility List (http://www.sjRecycles.org/business/PDF/cddd_certified_list.PDF) for Local

construction and Demolition Waste recycling service provider listings. Additional recycling resources are available at www.ciwmb.ca.gov/condemo/ and www.crra.com/cdc/index.html.

C. At the conclusion of the Project, the Contractor shall complete and submit a solid Materials management report form, which documents Materials recycled/salvaged and disposed and demonstrates compliance with the requirements specified herein, facilities utilized, and weights of construction and demolition waste generated by the Project. Receipts shall be attached as well that verify Materials and quantities disposed and recycled/salvaged. The Contractor shall complete and submit the form with the request for final payment; the form is included in Appendix C.

D. Full compensation for completing the Solid Materials Management Plan and for completing the solid Materials management report form shall be considered as included in the Contract Price(s) for various items of Work involved; no additional payment shall be made.

19.06.03. Post-Consumer Recycled Content Requirements

A. At the conclusion of the Project, the Contractor shall list Materials furnished/installed that contains PCRC and document the percent content for each Material item listed. This information shall be included in the solid Material management report form specified in Article 19.06. Solid Material Management.

B. Full compensation for documenting the above specified information in the solid material management report form shall be considered as included in the Contract Price(s) for various items of Work involved; no additional payment shall be made.

19.07. Migratory Birds

A. Refer to Standard Provisions Article 10.14. Migratory Birds for additional requirements.

B. The Contractor shall be aware of migratory bird nesting seasons and variability; provide training to all Contractor personnel on the project; monitor the project site; perform preventative and deterrence measures to prevent birds from nesting; preserve and protect pre-established protective buffer zones; perform surveys to determine the potential for protected species to be in the project area; establish new protective buffer zones around unprevented nests, as required; maintain and install exclusion devices, such as netting and/or wire mesh screens; periodically monitor to assure the adequacy of the compliance measures; and perform any other work as specified herein to comply with all applicable statutes.

C. Prior to the District releasing the site to the Contractor, the Engineer and the Contractor shall assess the site to determine the presence of nesting birds protected by all applicable statutes, as well as the existing protective buffer zones and exclusion devices within or near the construction areas.

D. The Contractor shall provide a District-approved biologist to monitor regulatory compliance, train Contractor personnel, and to coordinate with the Engineer, in conformance with: (i) this Article; (ii) the project-specific Mitigation Monitoring and Reporting Program (MMRP) requirements relating to this Article; and (iii) all applicable permit conditions.

E. Upon accepting the site, the Contractor shall assume complete responsibility for the site, including vegetation management, existing protective buffer zones and exclusion devices, and shall perform all required work as specified herein.

19.07.01. Regulatory Requirements

A. The Contractor shall comply with all applicable federal and state laws, rules and regulations related to protection of migratory birds. The Contractor's attention is directed to the federal Migratory Bird Treaty Act (16 USC 703-712 50 CFR Part 21 and 50 CFR Part 10), and the California Fish and Game Code Sections 2000, 3503, 3503.5, 3513, and 3800, that protect migratory birds, their nests, and their eggs from disturbance or destruction.

B. The Contractor shall carry out all activities in a manner consistent with the Migratory Bird Permit Memorandum (Appendix G), issued by the U.S. Fish and Wildlife Service dated April 15, 2003. Except as may be noted elsewhere in this Article, active nests are those containing either an egg (or eggs) or young, and/or nests used by birds of prey (i.e., members of the orders Falconiformes and Strigiformes, known as raptors) regardless of the presence of eggs or young; whereas inactive or partially-built nests of species other than raptors do not contain any eggs or young. To determine the occupancy of nests, the Contractor shall rely upon the professional expertise of a qualified biologist. See Article 19.07.03

C. The Contractor shall coordinate several measures, including; environmental awareness and training of Contractor's personnel of which migratory bird species are protected, their nesting seasons and seasonal variability; surveys to determine the presence of nesting birds in the project area; establishment of protective buffer zones around nests; installation and maintenance of exclusion devices; and periodic monitoring to assure the adequacy of the compliance measures.

1. Environmental awareness training and surveys shall also include special status plant and animal species listed in Appendix H – Central Pipeline Biological Report.

19.07.02. Qualified Biologist

A. The Contractor shall employ a biologist meeting the qualifications of a Qualified Biologist as listed in Article 19.07.02. paragraph B and Appendix F. to supervise all biological resource Work for the Project. At any time during the Contract, the District reserves the right to request a replacement biologist due to

nonperformance or for reasons outlined in Standard Provisions Article 3.04. Character of Workers.

B. The Qualified Biologist shall have the training, experience and qualifications to perform the migratory bird compliance describe in the Article and to supervise all migratory bird-related activities under Article 19.07. Migratory Birds. The Qualified Biologist shall possess educational and professional training in ornithology, habitat assessment, and migratory bird regulations; and shall be familiar with the species of birds and bird resources likely to be encountered on the Project. The Qualified Biologist shall have experience to implement protocols, collect and organize ornithological data and be capable of making appropriate decisions in the field. A minimum of one year of experience is required in performing biological, ecological or related scientific research.

C. The Contractor Biologist shall:

1. Provide biological sensitivity and bird nesting awareness training for all Contractor personnel working on the project, including all subcontractors.

2. Monitor the project site for nest starts and occurrences of active bird nests.

3. Document the location, status, and species of bird for each active nest.

4. Monitor the Contract Work to ensure that protected birds are not disturbed in a manner that could result in non-compliance.

5. Establish additional protective buffer zones around active nests, as specified herein.

6. Ensure protective buffer zones are maintained and nests are not disturbed. Advise when protective buffer zones are no longer needed and can be removed.

7. Monitor the maintenance and effectiveness of bird exclusion devices.

8. Provide recommendations concerning vegetation management, installation of additional exclusion devices and maintenance of such devices to prevent bird nesting.

D. The Contractor's Biologist shall also prepare a monitoring plan for review and approval by the Engineer in accordance with Article 20.01. The monitoring plan shall identify the how the monitoring plan shall discuss the various project areas to be monitored, the frequency of monitoring, the proposed documentation and reporting format.

19.07.03. General Nesting Seasons

A. The bird nesting season in the Project area is generally considered to be from January 15 through August 31. However, annual variation in climatic conditions can alter these periods by several weeks.

19.07.04. Protective Buffer Zones

A. Existing protective buffer zones, if any, are shown on the Drawings or will be communicated to the Contractor prior to District releasing the site. In addition to District established buffer zones, new protective buffer zones will be required if a nest is established or discovered during the construction period. In the event that an active nest of a protected species is discovered in the construction area during construction, or in adjacent areas considered to have the potential to be disturbed by construction, the Contractor shall notify the Engineer and establish a protective buffer zone around the nest at the direction of the Engineer. The exact location of the boundaries of protective buffer zones shall be established by the Engineer. The Contractor shall install temporary fencing at the boundary of each new protective buffer zone, except as otherwise directed by the Engineer. The fencing hall be Type ESA Temporary Fence per Caltrans Article 14-1.03. The Contractor shall attach signs labeled “Nesting Bird—Access Prohibited” at least every 50 feet along the fencing. The Contractor shall preserve and protect all protective buffer zones, including existing ones, at all times.

B. In the event that an active nest is discovered by the Contractor Biologist, the Biologist shall immediately notify both the Contractor and the Engineer of the active nest and applicable protective buffer zone.

C. The Contractor Biologist shall inspect all active nesting bird protective buffer zones(s) on at least a weekly basis.

D. The Contractor shall be responsible for any added costs or schedule delays as a result of establishment of new nests or new protective buffer zones due to the Contractor’s failure to perform the bird exclusion responsibilities as specified under this Article.

E. The Contractor shall monitor protective buffer zone operations during construction. Requirements for the protection of active nests may vary depending on the location and the species involved. The following are general guidelines to be followed by the Contractor when an active nest is encountered:

1. Stop any activities that may harm the nest.

2. Contact the Engineer immediately.

3. Only the Contractor’s biologist should approach the nest, and only if necessary.

4. The Contractor shall inform employees of the presence of an active nest and take steps, described above, to avoid disturbing it.

5. Until inspected by the Engineer, a 20-foot radius protective buffer zone shall be established around the nest of any non-raptor, ground-nesting bird, and a 50-foot radius protective buffer zone around nests established in shrubs, trees, on structures, on equipment, etc., except for raptor nests. Furthermore, the protective buffer zone shall be 250 feet for hawks, owls (including burrowing owls), herons, and egrets. The Contractor's biologist may recommend, for approval by the Engineer, modification of these perimeters.

19.07.05. Exclusion Devices

A. The Contractor shall install nesting exclusion devices to prevent potential establishment or occurrence of a nest during the construction period. The Contractor shall maintain all nesting exclusions devices, including existing ones, throughout the nesting season, or until completion of work in an area makes the devices unnecessary. The Contractor shall be responsible for the maintenance, repair, or replacement of exclusion devices until all of the work is complete. The Contractor shall remove and dispose of all exclusion devices when work in the area is complete. Any exclusion devices installed by the District prior to construction start must also be removed and disposed of by the Contractor when completion of work in the area makes the devices unnecessary, and no additional compensation will be provided therefor.

B. Bird exclusion devices shall be installed during the non-nesting season (September 1 through January 31). The Contractor shall obtain approval from the Engineer when installing bird exclusion devices during the nesting season (February 1 through August 31). All exclusion devices shall be inspected daily by the Contractor and weekly by the Contractor Biologist to ensure integrity of the devices, and to prohibit birds from nesting without causing them harm.

19.07.06. Nest Prevention

A. Cutting and removing vegetation in channels during the rainy season from October 15 through April 15 and as specified in the Project-specific permit conditions (Appendix D and E) shall be as specified in the Special Provisions and be limited to hand tools, unless approved otherwise by the Engineer. Refer to Standard Provisions Article 10.14 – 'Migratory Birds' for additional requirements.

B. Monitoring:

1. The Contractor is responsible for ongoing monitoring to assure that migratory birds, their active nests, eggs, and young are not harmed in any way.

2. Prior to the beginning of the nesting season, the Contractor shall inspect all project areas that may be impacted by construction and, at the direction of the Engineer, remove any inactive bird nests, with the exception of raptor nests. During the nesting season, the Contractor shall inspect all project areas that may be impacted by construction, including all vegetation, grounds, and bridge(s), with sufficient frequency as needed, to identify any new and partially-built nests.

3. The Contractor shall be responsible for the removal of any partially-built nests, with the exception of raptor nests. No birds, nests with eggs, or nests with hatchlings shall be disturbed, nor shall raptor nests be removed.

19.07.07. Submittals

A. No Special Requirements.

19.07.08. Payment

A. Work involved in complying with the requirements of this Article shall be considered as included in the Contract Price(s) paid for under the lump sum bid price for Environmental Monitoring and Compliance; no additional time or payment shall be made.

19.08. Other Wildlife and Fish Species

A. The Contractor shall adhere to the Santa Clara Valley Habitat Plan Conditions, BMPs and Mitigation Measures from the Pipeline Maintenance Program EIR.

19.08.01. Regulatory Requirements

A. The Contractor shall comply with all applicable federal and state laws, rules and regulations related to protection of wildlife and fish species.

B. To determine the presence of wildlife and fish species, the Contractor shall rely upon the professional expertise of a qualified biologist. See Article 19.07.02.

C. The Contractor shall coordinate several measures, including; environmental awareness and training of Contractor's personnel of which wildlife and fish species are protected; surveys to determine the presence of wildlife and fish species in the project area; establishment of protective buffer zones; installation and maintenance of exclusion devices; and periodic monitoring to assure the adequacy of the compliance measures.

D. See Appendix H for Central Pipeline Biological Report.

19.08.02. Scope of Work

A. The Contractor shall be aware of wildlife and fish species variability; provide training to all Contractor personnel on the project; monitor the project site; perform preventative measures to preserve and protect pre-established protective buffer zones; perform surveys to determine the potential for protected species to be in the project area; establish new protective buffer zones, as required; maintain and install exclusion devices, such as netting and/or wire mesh screens; periodically monitor to assure the adequacy of the compliance measures; and perform any other work as specified herein to comply with all applicable statutes.

B. Prior to the District releasing the site to the Contractor, the Engineer and the Contractor shall assess the site to determine the presence of wildlife and fish species protected by all applicable statutes, as well as the existing protective buffer zones and exclusion devices within or near the construction areas.

C. The Contractor shall provide a District-approved biologist to monitor regulatory compliance, train Contractor personnel, and to coordinate with the Engineer, in conformance with: (i) this Section; (ii) the project-specific BMPs and Mitigation Monitoring and Reporting Program (MMRP) requirements; and (iii) all applicable permit conditions.

D. Upon accepting the site, the Contractor shall assume complete responsibility for the site, including vegetation management, existing protective buffer zones and exclusion devices, and shall perform all required work as specified.

19.08.03. Contractor Biologist

A. The Contractor shall employ a biologist meeting the qualifications of “Qualified Biologist” as listed in Appendix F to supervise all work under this Article.

B. The Contractor Biologist shall:

1. Provide biological sensitivity and wildlife and fish species awareness training for all Contractor personnel working on the project, including all subcontractors.

2. Monitor the Contract Work to ensure that protected wildlife and fish species are not disturbed in a manner that could result in non-compliance.

3. Establish additional protective buffer zones around areas where wildlife and fish species are active, as specified herein.

4. Ensure protective buffer zones are maintained and wildlife and fish species are not disturbed. Advise when protective buffer zones are no longer needed and can be removed.

5. Monitor the maintenance and effectiveness of wildlife and fish species exclusion devices.

6. Provide recommendations concerning vegetation management, installation of additional exclusion devices and maintenance of such devices to prevent establishment of wildlife and fish species from taking place.

C. The Contractor's Biologist shall also prepare a monitoring plan for review and approval by the Engineer in accordance with Article 19.08.03.01. The monitoring plan shall identify the various areas to be monitored, the frequency of monitoring, the proposed documentation and reporting format.

19.08.03.01. Environmental Monitoring Plan

A. The Contractor's Biologist shall prepare and submit an Environmental Monitoring Plan to identify the Contractor's plan on complying with the environmental and biological requirements specified in these Specifications. The monitoring plan shall identify and discuss the various project areas to be monitored, the frequency of monitoring, the proposed documentation and reporting format.

B. The Environmental Monitoring Plan shall include:

1. Scope of work for monitoring and complying to environmental and biological requirements specified in these Specifications

2. List of Staff conducting surveys and monitoring

   a. Roles and responsibilities
   b. Resumes confirming required qualifications

3. Results of pre-construction environmental surveys

4. How Project areas are to be monitored and by whom

5. Schedule of frequency for surveys and monitoring of permit compliance controls, BMPs and mitigation measures

6. Action plan for site restoration and unplanned surface disturbance

7. Documentation and reporting format for monitoring reports

C. Monitoring reports shall be submitted to the Engineer on at least a monthly basis

19.08.04. Protective Buffer Zones

A. Existing protective buffer zones, if any, are shown on the Drawings or will be communicated to the Contractor prior to District releasing the site. In addition to District established buffer zones, new protective buffer zones will be required if

wildlife or fish species are discovered during the construction period. In the event that wildlife or fish species are discovered in the construction area during construction, or in adjacent areas considered to have the potential to be disturbed by construction, the Contractor shall notify the Engineer and establish a protective buffer zone around the wildlife and fish species at the direction of the Engineer. The exact location of the boundaries of protective buffer zones shall be established by the Engineer. The Contractor shall install temporary fencing at the boundary of each new protective buffer zone, except as otherwise directed by the Engineer. The fencing hall be Type ESA Temporary Fence per Caltrans Article 14-1.03. The Contractor shall attach signs labeled “Protected Wildlife —Access Prohibited” at least every 50 feet along the fencing. The Contractor shall preserve and protect all protective buffer zones, including existing ones, at all times.

B. In the event that wildlife or fish species are discovered by the Contractor Biologist, the Biologist shall immediately notify both the Contractor and the Engineer of the wildlife or fish species and applicable protective buffer zone.

C. The Contractor Biologist shall inspect all protective buffer zones(s) on at least a weekly basis.

D. The Contractor shall be responsible for any added costs or schedule delays as a result of establishment of new protective buffer zones due to the Contractor’s failure to perform the wildlife and fish species exclusion responsibilities as specified under this Article.

E. The Contractor shall monitor protective buffer zone operations during construction. Requirements for the protection of wildlife and fish species may vary depending on the location and the species involved. The following are general guidelines to be followed by the Contractor when wildlife and fish species are encountered:

1. Stop any activities that may harm the wildlife or fish species.

2. Contact the Engineer immediately.

3. Only the Contractor’s biologist should approach the wildlife or fish species, and only if necessary.

4. The Contractor shall inform employees of the presence of wildlife or fish species and take steps, described above, to avoid disturbing.

5. Until inspected by the Engineer, a 20-foot radius protective buffer zone shall be established around any detected nest and a 50-foot radius protective buffer zone around nests established in shrubs, trees, on structures, on equipment, etc. The Contractor’s biologist may recommend, for approval by the Engineer, modification of these perimeters.

19.08.05. Installation and Maintenance of Exclusion Devices

A. The Contractor shall install nesting exclusion devices to prevent potential establishment or occurrence of a nest during the construction period. The Contractor shall maintain all nesting exclusions devices, including existing ones, throughout the nesting season, or until completion of work in an area makes the devices unnecessary. The Contractor shall be responsible for the maintenance, repair, or replacement of exclusion devices until all of the work is complete. The Contractor shall remove and dispose of all exclusion devices when work in the area is complete. Any exclusion devices installed by the District prior to construction start must also be removed and disposed of by the Contractor when completion of work in the area makes the devices unnecessary, and no additional compensation will be provided therefor.

19.08.06. Monitoring

A. The Contractor is responsible for ongoing monitoring in accordance with the approved biological monitoring program to assure that wildlife and fish species, their active nests, eggs, and young are not harmed in any way.

B. The Contractor shall inspect all project areas that may be impacted by construction and, at the direction of the Engineer, remove any inactive nests. The Contractor shall inspect all project areas that may be impacted by construction, including all vegetation, grounds, and bridge(s), with sufficient frequency as needed, to identify any new and partially-built nests.

19.09. Plants and Vegetation

A. The Qualified Biologist shall have the experience, education and training necessary to perform the tasks of this Article. At any time during the Contract, the District reserves the right to request a replacement biologist due to nonperformance or for reasons outlined in the Standard Provisions Article 3.04. Character of Workers.

19.10. Proper Pruning Techniques for Woody Vegetation Removal

A. The Contractor's attention is direct to Article 10.17 – 'Proper Pruning Techniques for Woody Vegetation Removal' and Article 23.02 – 'Clearing and Grubbing' for additional information.

19.11. Plant Pathologen Management

A. No Special Requirements.

19.12. Payment

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements under Special Provisions Section 19 Environmental shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time or payment shall be made.

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SECTION 20. SUBMITTAL AND QUALITY REQUIREMENTS

20.01. Additional Submittal Requirements

A. This Article includes any additional submittal requirements. Also see Standard Provisions Section 7 Submittal Management.

B. The District utilizes EADOC to manage construction projects, track change orders, and review submittals. The Contractor shall utilize the District's EADOC (Web-Based Construction Document Management) system for submittals, requests for information, and contract change orders.

20.01.01 General Requirements

A. Submittals shall be in accordance with Standard Provisions Article 7.05. Submittals to be Furnished by the Contractor unless otherwise modified herein.

20.01.02. Immediate Submittals

A. Physical construction Work cannot begin until the following immediate submittals have been favorably reviewed by the Engineer. These immediate submittals shall be submitted no later than ten (10) Days after the date of issuance of the First Chargeable Date.

1. Section 03, 05, 08 – Résumé/qualifications of proposed Project Superintendent, Scheduler, Safety & Heath Supervisor
2. Article 5.05 – Preliminary Progress Schedule
3. Section 08 – Injury and Illness Prevention Plan
4. Section 08 – Site Security and Protection Plan
5. Section 09 & Article 20.04 – Quality Control Plan
6. Section 10 – BMP Action Plan or Storm Water Pollution Prevention Plan
7. Article 19.08.03.01, Environmental Monitoring Plan
8. Article 21.02 – Schedule of Values
9. Article 28.01 – Traffic Control Plans
10. Article 18.01.02 – Contractor-Obtained Permits
11. Section 34 – Valve
12. Article 32.05 – Flange Coupling Adapters and Restrained Dismantling Joints

B. These immediate submittals shall be submitted no later than thirty (30) Days after the date of the issuance of the First Chargeable Date.

1. Article 5.05, Baseline Progress Schedule
2. Section 8, Site-Specific Safety and Health Plan
3. Section 8, Job Hazard Analysis
4. Article 8.07, Confined Space Program
5. Article 16.04, Preconstruction Survey Documentation
6. Article 17.01, Rope Access Program
7. Article 19.05.02, Lead Management Plan
8. Article 23.02, Clearing and Grubbing Plan
9. Article 23.04, Control of Water and Dewatering Plan

20.01.03. Special Review Cycle

A. Each submittal appropriately submitted in accordance with this Article will be returned within **ten (10)** Days following receipt of the submittal by the Engineer. The number of Days for submittal review by the District described herein supersedes the number of Days allowed in Standard Provisions Article 7.05 Submittals to be Furnished by the Contractor.

20.02. Exclusive Testing by the District

A. The Engineer shall have the right to inspect work performed by the independent testing laboratory both at the Project and at the laboratory. This shall include inspection of the independent testing laboratory's internal quality assurance records (quality assurance manual, equipment calibrations, proficiency sample performance, etc.).

20.03. Additional Testing Certifications

A. Testing Services furnished by Contractor: Unless otherwise specified, and in addition to all other specified testing requirements, the Contractor shall obtain independent testing services to complete the following testing at no additional cost to the District. Test reports shall be submitted in accordance with Article 9.09 – 'Testing'. Testing shall be completed in accordance with the specified standards. Where no standard is specified, testing shall be completed in accordance with the applicable ASTM standards.

1. Asphalt and concrete materials and mix designs

2. Concrete air content, slump, compressive strength, shrinkage, and other properties

3. Masonry mortar and grout compressive strength

4. Weld inspection and testing

5. Quality control testing of all precast concrete

6. Painting and Coating inspection and testing

7. Wet and dry film Coating thicknesses

8. Water quality testing for control of water

9. All other tests and engineering data required for Engineer's review of materials and equipment proposed to be used in the work

10. Other testing as required in the Contract Documents

B. For roadway Work, the Contractor's laboratory shall also be AASHTO accredited in ASTM C1077 "Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation"; ASTM D3740 "Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design/Construction"; and ASTM D3666 "Specifications for Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials."

C. Materials in contact with potable water shall be NSF61 certified.

20.04. Contractor's Quality Control

20.04.01. Quality Control Plan

A. The Contractor is not required to prepare and submit a Project –Specific Quality Control plan.

B. However, the Contractor is required to comply with its Quality Control program as outlined in Article 9.03. Contractor's Quality Control Program.

20.04.02. Contractor's Quality Control Staffing Requirements

A. The Contractor shall have a qualified Field QC Representative responsible for QC who is on-site whenever permanent Work is being performed. This Field QC Representative shall report directly to a senior manager of the Contractor to ensure organizational freedom, identify quality problems, and initiate and recommend solutions. The QC plan submittal shall include a letter signed by a principal officer of the Contractor's firm designating the Field QC Manager and specifying the authority delegated to the Field QC Manager to direct cessation or removal and replacement of defective Work. The Contractor shall maintain QC over suppliers, manufacturers, products, services, site conditions, and workmanship to produce Work of specified quality. Testing and inspection shall not relieve the Contractor of its responsibility for quality of Material in place.

20.04.03. Payment

A. Full compensation for doing all Work necessary to provide quality control shall be included in the Contract Price(s) for various items of Work involved; no separate payment shall be made.

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SECTION 21. PAYMENT PROCEDURES

21.01. Bid Items

21.01.01. General Requirements

A. Refer to Bid Documents Bid Form No. 1 Bid items for the listing of Bid items.

B. Unless otherwise indicated, all Bid Items include labor, Material, Equipment, and incidentals in accordance with the Drawings and Specifications to complete the Work.

C. No separate payment will be made for any Work included in the Drawings and/or Specifications but not specifically set forth in the listing of Bid items. All costs shall be included in a Bid item.

D. Where there is an overlap in the Work paid for under different Bid items, the Work will be paid for only once under the appropriate Bid item(s), as determined by the Engineer.

21.01.02. Description of Bid Items

A. **Bid Item No. 1**—Mobilization

1. Scope of Work: This Bid item shall include the preconstruction meeting, all preparatory Work, and appurtenant preconstruction operations, including, but not limited to, those necessary for the movement of personnel, Equipment, supplies, and incidentals to the Project site; establishing any temporary construction and staging areas; other Work and operations that must be performed or costs incurred prior to beginning Work on the various Contract items on the Project site; and other Work as specified in these Specifications.

2. Measurement and Payment: Full compensation for furnishing all Work and Material for mobilization shall be included in the Lump Sum price Bid for Bid Item No. 1, Mobilization. Progress payments will be made in accordance with Section 9 Payment of the State Specifications.

B. **Bid Item No. 2**—NPDES General Permit Requirements

1. Scope of Work: This bid item shall include doing all work, preparing, submitting and executing the Storm Water Pollution Prevention Plan (SWPPP) as required under NPDES General Permit. The SWPPP shall be in accordance with Section XIV SWPPP Requirements of the NPDES General Permit. Reference is made to Standard Provisions Article 10.02. Storm Water Pollution Prevention Plan. The Contractor shall comply with the risk level 2 requirements of the NPDES General Permit.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all materials required for the work specified in these Specifications and as shown on the Drawings shall be included in the Lump Sum bid price for this Bid Item.

C. **Bid Item No. 3**—Environmental Monitoring and Compliance

1. Scope of Work: This bid item shall include doing all work, providing all equipment, and furnishing all materials required to protect, monitor, and restore all environmental conditions as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all materials required for the work as specified in these Specifications and as shown on the Drawings shall be included in the Lump Sum bid price for this Bid Item.

D. **Bid Item No. 4**—Painting and Coating

1. Scope of Work: This bid item shall include doing all work, providing all equipment and furnishing all non-District furnished materials required to prepare, coat, and line all internal, external, in-vault, and exposed pipeline, appurtenances, and associated component surfaces as specified in these Specifications and as shown on the Drawings. For lead abatement scope of work, refer to Article 19.05.02 of these Specifications.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all non-District furnished materials required for the work as specified in these Specifications and as shown on the Drawings shall be included in the Lump Sum bid price for this Bid Item.

E. **Bid Item No. 5**—Work as Specified for Pipeline Dewatering

1. Scope of Work: This bid item shall include doing all work, providing all equipment and furnishing all materials required to remove all water from the pipeline and associated appurtenances as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all Work necessary to comply with the NPDES General Permit, including the preparation and implementation of the SWPPP; all Materials, labor, Equipment, service, supervision, documentation, and submittals shall be included in the lump sum price Bid for this bid item.

F. **Bid Item No. 6**—Support for Internal Pipeline Work

1. Scope of Work: This bid item shall include doing all work, providing all equipment, and furnishing all materials required to support the District's third-party consultants while conducting an internal visual inspection, electromagnetic inspection, and general internal condition assessment as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all materials required for the work as specified in these Specifications and as shown on the Drawings shall be included in the Lump Sum bid price for this Bid Item.

G. **Bid Item No. 7**—Completion of Encroachment Permits with Cities, County, Town, and Agency

1. Scope of Work: This bid item shall include doing all work, providing all equipment, and furnishing all materials required to complete, obtain, and comply with all City, County, Town, and Agency encroachment permits required for all work (excluding traffic control, see Bid Item No. 8) as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: All bidders shall bid the amount shown on the bid form for Completion of Encroachment Permits with Cities, County, and Town. This amount is an estimate only, and the Bid Item will be used to reimburse the Contractor. Compensation shall be limited to actual fees paid by the Contractor to the Cities, County, Town, and Agency without markup.

H. **Bid Item No. 8**—Developing and Implementing Traffic Control Plans

1. Scope of Work: This bid item shall include doing all work, providing all equipment, and furnishing all materials required to develop, implement, and maintain traffic control plans as needed for obtaining encroachment permits and for all work requiring traffic control as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all materials required for the work specified in these Specifications and as shown on the Drawings shall be included in the Lump Sum bid price for this Bid Item.

I. **Bid Item No. 9**—Clearing and Grubbing

1. Scope of Work: This bid item shall include doing all work, providing all equipment, and furnishing all materials required for clearing and grubbing as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all materials required for the work specified in these Specifications and as shown on the Drawings shall be included in the Lump Sum bid price for this Bid Item.

J. **Bid Item No. 10**—Exploratory Utility Investigation

1. Scope of Work: This bid item shall include furnishing all supervision, labor, materials, tools, equipment, and incidentals necessary to perform exploratory excavations (potholes) to locate and verify all existing pipelines, utilities and other buried facilities prior to submittal preparation, demolition, trenching and general excavations.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all materials required for the work specified in these Specifications and as shown on the Drawings shall be included in the Lump Sum bid price for this Bid Item.

K. **Bid Item No. 11**—Sheeting, Shoring, and Bracing

1. Scope of Work: This bid item shall include furnishing all supervision, labor, materials, tools, equipment, and incidentals necessary to provide temporary shoring or sloping necessary to support the sides of the excavation and trenches. This includes stabilizing or preventing movement of the adjacent roadway, adjacent structures, or any other obstacle to trenching and excavation as needed to complete the work as shown on the Drawings and as specified in these Specifications.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all materials required for the work specified in these Specifications and as shown on the Drawings shall be included in the Lump Sum bid price for this Bid Item.

L. **Bid Item No. 12**—Pavement Restoration

1. Scope of Work: This bid item shall include furnishing all supervision, labor, materials, tools, equipment, and incidentals necessary to restore asphalt concrete pavement, traffic stripes, pavement markings, sidewalks, driveways, curbs, gutters, and all other such incidentals required to complete the work as shown on the Drawings and as specified in these Specifications.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all materials required for the work specified in these Specifications and as shown on the Drawings shall be included in the Lump Sum bid price for this Bid Item.

M. The following Scope of Work and Measure of Payment shall be applicable for Bid Items No. **13** through **89** at the specified station:

1. Scope of Work: These bid items shall include doing all work, providing all equipment, and furnishing all non-District furnished materials required to complete the work for the referenced site as a shown on the Drawings and as specified in these Specifications.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all non-District furnished materials required for the work at this site as specified in these Specifications and as shown on the Drawings shall be included in the Lump Sum bid price for these bid items.

3. **Bid Item No. 13** - Work as Specified for CPL Station 273+24 - Guadalupe Line Valve (GRV)

4. **Bid Item No. 14** - Work as Specified for CPL Station 523+70 - Los Gatos Turnout (LLG)

5. **Bid Item No. 15** - Work as Specified for CPL Station 646+00 - Page Ditch Turnout (PDT)

6. **Bid Item No. 16** - Work as Specified for CPL Station 656+58 - Kirk Ditch Turnout (KDT)

7. **Bid Item No**. **17** – Work as Specified for CPL Station 154+85 – Coyote Creek Blowoff (CYV)

8. **Bid Item No**. **18** – Work as Specified for CPL Station 665+82 – Vasona Pump Station (VPS)

9. **Bid Item No. 19** - Work as Specified for CPL Station 00+67 - 8” CARV with 24” Manhole Assembly

10. **Bid Item No. 20** - Work as Specified for CPL Station 13+00 - 24” Manhole Assembly

11. **Bid Item No. 21** - Work as Specified for CPL Station 27+00 - 24” Manhole Assembly

12. **Bid Item No. 22** - Work as Specified for CPL Station 41+00 - 24” Manhole Assembly

13. **Bid Item No. 23** - Work as Specified for CPL Station 54+22 - 36” Manhole Assembly

14. **Bid Item No. 24** - Work as Specified for CPL Station 71+00 - 24” Manhole Assembly

15. **Bid Item No. 25** - Work as Specified for CPL Station 87+00 - 24” Manhole Assembly

16. **Bid Item No. 26** - Work as Specified for CPL Station 103+00 - 24” Manhole Assembly

17. **Bid Item No. 27** - Work as Specified for CPL Station 117+99 - 24” Manhole Assembly

18. **Bid Item No. 28** - Work as Specified for CPL Station 126+20 - 24” Manhole Assembly

19. **Bid Item No. 29** - Work as Specified for CPL Station 141+40 - 4” CARV with 24" Manhole Assembly

20. **Bid Item No. 30** - Work as Specified for CPL Station 156+90 - 24” Manhole Assembly

21. **Bid Item No. 31** - Work as Specified for CPL Station -00+21 - Piedmont Valve Yard Vault

22. **Bid Item No. 32** - Work as Specified for CPL Station 170+10 - 4” CARV with 24” Manhole Assembly

23. **Bid Item No. 33** - Work as Specified for CPL Station 173+57 - 4” CARV with 24” Manhole Assembly

24. **Bid Item No. 34** - Work as Specified for CPL Station 186+25 - 12” Pumpout Riser with 24” Manhole Assembly

25. **Bid Item No. 35** - Work as Specified for CPL Station 191+19 - 6” CARV with 24” Manhole Assembly

26. **Bid Item No. 36** - Work as Specified for CPL Station 204+93 - 24” Manhole Assembly

27. **Bid Item No. 37** - Work as Specified for CPL Station 215+17 - 4” CARV with 24” Manhole Assembly

28. **Bid Item No. 38** - Work as Specified for CPL Station 228+96 - 12” Pumpout Riser with 24” Manhole Assembly

29. **Bid Item No. 39** - Work as Specified for CPL Station 243+96 - 24” Manhole Assembly

30. **Bid Item No. 40** - Work as Specified for CPL Station 259+47 - 4” CARV with 24” Manhole Assembly

31. **Bid Item No. 41** - Work as Specified for CPL Station 264+20 - 30” Manhole Assembly

32. **Bid Item No. 42** - Work as Specified for CPL Station 283+40 - 24” Manhole Assembly

33. **Bid Item No. 43** - Work as Specified for CPL Station 298+54 - 24” Manhole Assembly

34. **Bid Item No. 44** - Work as Specified for CPL Station 317+80 - 24” Manhole Assembly

35. **Bid Item No. 45** - Work as Specified for CPL Station 332+24 - 24” Manhole Assembly

36. **Bid Item No. 46** - Work as Specified for CPL Station 348+60 - 24” Manhole Assembly

37. **Bid Item No. 47** - Work as Specified for CPL Station 367+06 - 6” CARV with 24” Manhole Assembly

38. **Bid Item No. 48** - Work as Specified for CPL Station 371+24 - 24” Manhole Assembly

39. **Bid Item No. 49** - Work as Specified for CPL Station 380+55 - 4” CARV with 24” Manhole Assembly

40. **Bid Item No. 50** - Work as Specified for CPL Station 386+62 - 24” Manhole with Tri-Cock Assembly

41. **Bid Item No. 51** - Work as Specified for CPL Station 400+40 - 24” Manhole Assembly

42. **Bid Item No. 52** - Work as Specified for CPL Station 418+55 - 6” CARV with 24” Manhole Assembly

43. **Bid Item No. 53** - Work as Specified for CPL Station 424+22 - 24” Manhole Assembly

44. **Bid Item No. 54** - Work as Specified for CPL Station 440+65 - 24” Manhole Assembly

45. **Bid Item No. 55** - Work as Specified for CPL Station 450+99 - 6” CARV with 24” Manhole Assembly

46. **Bid Item No. 56** - Work as Specified for CPL Station 465+68 - 6” CARV with 24” Manhole Assembly

47. **Bid Item No. 57** - Work as Specified for CPL Station 481+98 - 24” Manhole Assembly

48. **Bid Item No. 58** - Work as Specified for CPL Station 488+12 - Meter Box

49. **Bid Item No. 59** - Work as Specified for CPL Station 496+20 - 8” CARV with 24” Manhole Assembly

50. **Bid Item No. 60** - Work as Specified for CPL Station 508+94 - 4” CARV with 24” Manhole Assembly

51. **Bid Item No. 61** - Work as Specified for CPL Station 517+10 - 4” CARV with 24” Manhole Assembly

52. **Bid Item No. 62** - Work as Specified for CPL Station 522+95 - 4” CARV with 24” Manhole Assembly

53. **Bid Item No. 63** - Work as Specified for CPL Station 525+85 - 12" Pumpout Riser with 24” Manhole Assembly

54. **Bid Item No. 64** - Work as Specified for CPL Station 536+31 - 4" CARV with 24” Manhole Assembly

55. **Bid Item No. 65** - Work as Specified for CPL Station 552+13 - 12” Pumpout Riser with 12” Plug Valve Assembly

56. **Bid Item No. 66** - Work as Specified for CPL Station 567+39 - 24” Manhole Assembly

57. **Bid Item No. 67** - Work as Specified for CPL Station 584+43 - 24” Manhole Assembly

58. **Bid Item No. 68** - Work as Specified for CPL Station 599+28 - 24” Manhole Assembly

59. **Bid Item No. 69** - Work as Specified for CPL Station 618+01 - 24” Manhole Assembly

60. **Bid Item No. 70** - Work as Specified for CPL Station 631+20 - 8” CARV Assembly

61. **Bid Item No. 71** - Work as Specified for CPL Station 636+44 - 24” Manhole Assembly

62. **Bid Item No. 72** - Work as Specified for CPL Station 658+30 - 8” CARV Assembly

63. **Bid Item No. 73** - Work as Specified for CPL Station 659+75 - 24” Manhole Assembly

64. **Bid Item No**. **74** - Work as Specified for CPL Station 661+35 - Post Mounted Test Station

65. **Bid Item No. 75** - Work as Specified for CPL Station 665+22 - 6” CARV with 24” Manhole Assembly

66. **Bid Item No. 76**- Work as Specified for PEP Station 11+75 – 10” CARV Assembly

67. **Bid Item No. 77** - Work as Specified for PEP Station 23+22 – 2” ARV Assembly

68. **Bid Item No. 78** - Work as Specified for PEP Station 28+30 – 10” CARV Assembly

69. **Bid Item No. 79** - Work as Specified for PEP Station 47+40 – 2” ARV Assembly

70. **Bid Item No. 80** - Work as Specified for PEP Station 57+60 – 10” CARV Assembly

71. **Bid Item No. 81** - Work as Specified for PEP Station 61+90 – 2” ARV Assembly

72. **Bid Item No. 82** - Work as Specified for PEP Station 69+90 – 10” CARV Assembly

73. **Bid Item No. 83** - Work as Specified for PEP Station 73+70 – 2” ARV Assembly

74. **Bid Item No. 84** - Work as Specified for PEP Station 84+90 – 10” CARV Assembly

75. **Bid Item No. 85** - Work as Specified for PEP Station 89+75 – 2” ARV Assembly

76. **Bid Item No. 86** - Work as Specified for PEP Station 95+00 – 10” CARV Assembly

77. **Bid Item No. 87** - Work as Specified for PEP Station 113+50 – 2” ARV Assembly

78. **Bid Item No. 88** - Work as Specified for PEP Station 120+46 – 2” ARV Assembly

79. **Bid Item No. 89** - Work as Specified for PEP Station 133+70 – 10” CARV Assembly

N. **Bid Item No. 90** – Carbon Fiber Reinforcement for PCCP – SUPPLEMENTAL WORK

1. Scope of Work: This supplemental bid item shall include doing all work, providing all equipment and furnishing all materials required to install Carbon Fiber Reinforcement for Prestressed Concrete Cylinder Pipe as needed based on results from the condition assessments revealed by the internal visual, sounding and electromagnetic inspections, as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all materials required for the work as specified in these Specifications and as shown on the Drawings shall be included in the per pipe section price for the Bid Item.

3. Number of Sections: 8

O. **Bid Item No. 91** – Cement Mortaring for Internal Pipeline Repairs – SUPPLEMENTAL WORK

1. Scope of Work: This supplemental bid item shall include doing all work, providing all equipment and furnishing all non-District furnished materials required to perform internal pipeline cement mortar repairs as needed resulting from the conditions revealed by the remote video inspections, as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all non-District furnished materials required for the work as specified in these Specifications and as shown on the Drawings shall be included in the per square foot bid price for the Bid Item.

3. Number of Square Feet: 500

P. **Bid Item No. 92** – Welding for Internal Pipeline Repairs – SUPPLEMENTAL WORK

1. Scope of Work: This supplemental bid item shall include doing all work, providing all equipment and furnishing all non-District furnished materials required to perform internal pipeline welding repairs as needed resulting from the conditions revealed by the remote video inspections, as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all non-District furnished materials required for the work as specified in these Specifications and as shown on the Drawings shall be included in the per linear inch bid price for the Bid Item.

3. Number of Linear Inches: 100

Q. **Bid Item No. 93** – Internal Pipeline Debris Removal Work – SUPPLEMENTAL WORK

1. Scope of Work: This supplemental bid item shall include doing all work, providing all equipment and furnishing all non-District furnished materials required to perform internal pipeline debris removal work as needed resulting from the conditions revealed by the remote video inspections, as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all non-District furnished materials required for the work as specified in these Specifications and as shown on the Drawings shall be included in the per cubic foot bid price for the Bid Item.

3. Number of Cubic Feet: 150

R. **Bid Item No. 94** – Internal Pipeline Weko-Seal Installation – SUPPLEMENTAL WORK

1. Scope of Work: This supplemental bid item shall include doing all work, providing all equipment and furnishing all non-District furnished materials required to install Weko-Seal Internal Pipeline Joint Seals as needed resulting from the conditions revealed by the remote video inspections, as specified in these Specifications and as shown on the Drawings.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all non-District furnished materials required for the work as specified in these Specifications and as shown on the Drawings shall be included in the per unit bid price for the Bid Item.

3. Number of Seals: 5

S. **Bid Item No. 95**– Additional Potholing to Locate Utilities – SUPPLEMENTAL WORK

1. Scope of Work: This bid item shall include furnishing all supervision, labor, materials, tools, equipment, and incidentals necessary to locate utilities that cannot be inferred by the drawings, not shown on the Drawings, and as specified in the Specifications.

2. Measurement and Payment: Unless otherwise specified, full compensation for doing all work and furnishing all non-District furnished materials required for the work as specified in these Specifications and as shown on the Drawings shall be included in the per unit bid price for the Bid Item.

3. Estimated number of additional potholes: 10 each

21.01.03. Supplemental Work

A. All bidders shall bid on the amount shown on the bid form for each Supplemental Bid Item. These amounts are based on estimates. Final payment shall be based on the actual amount of work performed by the Contractor as authorized and approved by the Engineer under these bid items.

B. The actual quantity required for the Supplemental Bid Items will directly depend on the findings of the internal pipeline visual and electromagnetic inspection, scheduling, coordination, and/or construction-related issues at the discretion of the Engineer.

C. Supplemental Bid Item work may or may not be required, as determined by the Engineer. Performance of Supplemental work item is subject to prior authorization and approval in writing by the Engineer.

D. Supplemental Bid Items may be deleted entirely or in part, by deductive change order(s), at the sole discretion of the District.

21.02. Progress Payments and Schedule of Values

A. This Article includes additional requirements for the preparation, format, and submission of the Schedule of Values.

21.02.01. Preparation

A. Prepare preliminary and final Schedule of Values identifying costs of all bid items. For lump sum bid items, include costs of all major components of work under that bid item. No component of lump sum bid items shall have a duration exceeding 5 days except concrete curing, submittal review, equipment fabrication, and deliveries, or a value greater than $10,000.

B. Assign prices to major components of lump sum bid items totaling the bid item price. Base prices on costs associated with scheduled activities based on the Progress Schedule for each major component of work. Each bid item and each component of lump sum bid items shall include a directly proportional amount of the Contractor's overhead and profit. The Contractor's overhead and profit shall be completely distributed among all bid items of work, including components of lump sum bid items. Provide additional cost documentation to the Engineer when requested so that values can be verified.

C. Submit the preliminary Schedule of Values within ten (10) days from the date of the Notice to Begin Work and revise to incorporate Engineer's comments until a final Schedule of Values is agreed upon. This information shall be used in the preparation of the Schedule of Values under Section 6.

21.02.02. Submittals

A. Submit corrected Schedule of Values within ten (10) days upon receipt of reviewed Schedule of Values comments, but no later than ten (10) days prior to anticipated submittal of the first Application for Payment.

21.02.03. Preliminary Schedule of Values

A. Table 21.02-1 is an acceptable form for the Preliminary Schedule of Values.

B. The preliminary and final Schedule of Values shall be prepared into a Microsoft Excel format onto 8½-inch by 11-inch paper. Each item shall be broken down in increments showing maximum duration of 5 days and with values less than $10,000.00. Identify the schedule with:

1. District's Name, Project Name and Project No.
2. Name and address of Contractor.
3. Date of submission.

TABLE 21.02-1
Preliminary Schedule of Values

Item No.	Description of Item	Approximate Quantity / Unit	Unit Price	Total
1	Mobilization	LS / LS		
2	Work as Specified for Pipeline Dewatering	LS / LS		
3	Work as Specified for Support of Internal Pipeline Work	LS / LS		
4	Work as Specified for CPL Station 00+67 – 8" Combo ARV Assembly	LS / LS		
5	Bid Item No. 13 - Work as Specified for CPL Station 273+24 - Guadalupe Line Valve	LS / LS		

21.02.04. Applications for Payment

A. Applications for payment shall be based upon actual progress as measured on the Progress Schedule developed under Section 6.

B. When change order authorizations are executed, add each such authorization to the applicable bid items, or separately at end of listing of Schedule of Values items, as appropriate.

1. Identify the change order authorization by number and description.
2. Provide the value of change order authorization in appropriate column.

21.03. Progress Payment Retention

A. Contract Retention—The Board finds that this Project is substantially complex and establishes the Contract retention at ten (10) percent of the Contract Price(s). All other provisions of Standard Provisions Article 6.02.04. Payment by District remain unchanged.

SECTION 22. CONTRACT CLOSEOUT

22.01. Project Completion and Acceptance

22.01.01. Use Before Acceptance

A. Should the District elect to partially occupy or use portions of the Work prior to Acceptance, the Contractor shall execute and submit to the Engineer a completed Use Before Acceptance Warranty form provided below. The Contractor must perform final cleaning as described in Article 11.04. Final Cleaning for those portions of the Work prior to their being so occupied or used.

22.01.02. Milestone Completion Preliminary Final Inspection

A. No Special Requirements.

22.02. Guarantee and Guaranty Bond

A. Refer to Standard Provisions. See Article 11.02, Guarantee and Guaranty Bond.

22.03. Training

A. No Special Requirements.

22.03.01. General Requirements

A. No Special Requirements.

22.03.02. Submittals

A. No Special Requirements.

22.04. Testing and Facility Start-Up

A. This Article includes requirements for Materials, Equipment, instrumentation, structure, and process system testing and start-up.

22.04.01. Testing and Start-Up Overview

A. Certain portions of the Work will be modified and completed at scheduled interim dates before completion of the Project. Consequently, testing and start-up activities shall take place throughout much of the duration of the Work.

B. See other provisions in these Specifications for detailed testing requirements that shall be completed in the framework of the testing and start-up overview described herein.

C. The general sequence of testing and start-up will proceed as follows. Variations to this general sequence may be authorized by the Engineer where necessary to

meet constraints described in these Contract Documents and permits from authorities having jurisdiction.

1. General construction testing. For example: soils compaction and moisture content, welding, concrete properties, coating application, carrier piping pressure, dielectric flange isolation, double containment piping pressure, etc.

2. Special construction testing. For example: HVAC balancing, pump vibration, pump flow and head measurements, fire sprinkler system testing, Equipment noise testing, etc.

3. Water containing structure water tightness testing. For example: water basins, containment areas, storage tank areas, etc.

4. Submittals. All submittals relevant to installation practices, Equipment, piping, anchorage calculations, instrumentation, Material, and testing plans have been submitted to the Engineer and have received favorable review status.

5. Factory testing. Where required prior to the shipment of Equipment to the site, complete factory testing. Such testing may be both unwitnessed and witnessed by the Engineer and/or by District staff as specified and at their discretion.

6. O&M manuals. O&M manuals for Equipment shall be submitted and shall receive favorable review status.

7. Construction complete. Construction is complete so that the facility is ready to be used for its intended purposes. Signage is posted.

8. Electrical testing. Testing, calibration, and setting of electrical conductors, Equipment, protective devices, grounding, and other components as specified in the Technical Provisions prior to Equipment start-up. This also includes jogging all motors to verify the direction of rotation.

9. Mechanical Equipment and valve testing. Individual inspection and testing to ensure and demonstrate that Equipment and valves operate properly and reliably. Equipment that is capable of automatic or remote operation shall be tested first in manual mode. Manufacturer's representatives shall confirm that all Equipment and valves are properly installed before first operation and shall conduct/oversee the initial operation and testing. Limit switches shall be set and adjusted on all valves so equipped. Set points on all pressure-regulating, pressure-relief, vacuum-relief, and other valves with set points shall be confirmed and reset as directed by the Engineer.

10. Training. Train District staff as specified for Equipment and facility operation and maintenance before each associated system is placed into service.

11. Instrumentation wiring ring out. Test each conductor, fiber-optic cable, and other wiring components for proper installation, termination, and identification.

12. Calibration and adjustment of instrumentation. Test, calibrate, and complete reports for each field instrument.

13. Operational readiness test (ORT). Complete the operational readiness test for the process in question as specified in these Specifications. Correct deficiencies noted in the ORT; retest until all deficiencies are corrected.

14. Control system configuration and testing. Complete the control system configuration and testing for each area of Work before start-up. Remaining configuration work must be completed to the point that unscheduled disruptions to systems placed into service do not occur.

15. Functional test (FT). Complete the FT for the process in question as specified in these Specifications. Correct deficiencies noted in the FT; retest until all deficiencies are corrected.

16. Regulatory agency approvals. Conduct inspections by and tests for regulatory agencies (fire marshals, Department of Environmental Health, BAAQMD, etc.) and receive approvals needed to operate system. Provide written information required by regulatory agencies. This may also include the receipt of authorization by the State Department of Health Services to amend the treatment plant operating permit to allow the new/modified process.

17. Confirm facility or plant readiness to accept new process systems. In some cases, chemicals may need to be purchased and loaded into new facilities. A comprehensive testing plan and meeting scheduled completion dates are vital to allowing the start-up of new and modified process systems.

18. Prior to system commissioning testing, the Contractor shall submit the Use Before Acceptance Guaranty in accordance with Article 11.02.03. Use Before Acceptance Guarantee. The Project guaranty period for the Work starts on the date of the Notice of Completion of Contract and Acceptance of Work.

19. System commissioning test (SCT). After satisfactory completion of the FT and acknowledgement of District readiness to operate the system, the system shall be placed into normal operation. This test shall be

completed and shall be judged as defined in these Specifications. This test may last significantly longer than the number of Days specified if deficiencies are found and the test is restarted one (1) or more times.

20. Removal of replaced system. In some cases after the successful completion of the system commissioning test, a replaced system exists that is subsequently removed.

D. Contractor is required to maintain equipment through the duration of various stages of testing and start-up during periods between ORT, FT, and SCT.

E. Contractor is required to maintain appropriate staffing through duration of ORT, FT and SCT to maintain and repair equipment, troubleshoot issues, and provide cleanup due to spills caused by malfunctioning equipment.

22.04.02. Water Tightness Testing

A. Due to the nature of the work and the schedule constraints, it will not be possible to conduct a hydrostatic field test of the pipe, fittings and appurtenances installed under this Contract prior to the District bringing the Pipeline(s) back into full operation and resuming delivery of water.

B. Prior to, during and after the refilling process and throughout the period that the pipeline is brought up to operating pressure, the Contractor, accompanied by District representatives, shall inspect for leaks at all sites where work under this Contract was completed. The Contractor shall employ sufficient resources to complete inspection at multiple work sites simultaneously.

C. If leakage is observed, the Contractor shall determine the point of leakage, develop a repair plan, and make the necessary repairs. All repairs shall be made subject to the approval of the Engineer. All costs associated with completing repairs required due to defective work by the Contractor shall be paid for by the Contractor and no additional compensation will be allowed therefor.

D. If it is determined that any portion of the system cannot be brought back into operation due to defective work by the Contractor, and, as a result, the Contractor does not complete applicable Milestone work as specified, liquidated damages will be assessed as specified in Article 12.05 – ‘Liquidated Damages’.

22.04.03. Operational Readiness Testing

A. Demonstrate proper rotation, alignment, speed, flow, pressure, vibration, sound level, adjustments, and calibration. Perform initial checks in the presence and with the assistance of the manufacturer’s representative.

B. Demonstrate proper operation of each instrument loop function, including alarms, local and remote controls, instrumentation, and other Equipment functions. Generate signals with test Equipment to simulate operating conditions in each control mode.

C. Complete Items C.1. to C.13. per Special Provisions Article 22.04.01. Testing and Start-Up Overview.

D. Certificate of Proper Installation

1. At completion of operational readiness testing (ORT) and prior to functional testing (FT): Contractor shall furnish a written report prepared and signed by the manufacturer's authorized representative certifying that Equipment:

a. has been properly installed, adjusted, aligned, and lubricated;

b. is free of any stresses imposed by connecting piping or anchor bolts;

c. is suitable for satisfactory, full-time operation under full load conditions;

d. operates within the allowable limits for vibration; and

e. controls, protective devices, instrumentation, and control panels furnished as part of the Equipment package are properly installed, calibrated, and functioning.

22.04.04. Functional Testing

A. The pipeline shall be brought into a mode of operations sufficient to perform the functional testing (FT) to be completed by the Contractor within the FT period following the completion of the ORT.

B. The duration of the FT period shall be 3 working days.

C. The District will provide operations personnel, power, and fuel for the duration of the FT.

D. All Contractor-supplied Equipment and systems shall operate for a continuous 72 hours without failure before this test will be considered successful.

E. Prior to commencing system commissioning testing (SCT) the Contractor shall provide a certificate of completion of FT certifying that equipment and systems are ready for commissioning.

22.04.05. System Commissioning Testing

A. District staff will perform the system commissioning testing (SCT) for 7 consecutive Days following satisfactory completion of the FT.

1. The District will monitor Equipment or systems for performance within the normal modes of operation and parameters. The District will log and notify the Contractor of any abnormalities.

2. The District will monitor basins, containment areas, pipelines, conduits, and water and air systems for any leakage. The District will log and notify the Contractor of any leakage detected.

3. For each malfunction or failure or multiple malfunction(s) or multiple failure(s) occurring during a 24-hour period that requires a system or the plant to be taken out of service, the District will restart the entire SCT period.

    a. If any installed Equipment fails to operate properly during the testing period, the test may be stopped. The Contractor shall assist the District in determining the cause of the problem. If the cause of the problem is Contractor-supplied Equipment, then the Contractor shall fix the problem at no additional cost to the District. After the problem has been fixed by the Contractor, the Engineer will determine if the entire test will be repeated from the beginning or if the test period can resume from the point at which it was stopped.

22.04.06. Submittals

A. Submit the following documentation a minimum of five (5) days prior to submission of Milestone Completion and Project Completion certifications.

    1. Completed test forms and records after testing is completed.

    2. If repairs are completed by the Contractor during the water-tightness testing, description of the location of the observed leak, a summary of the repair work completed, and pictures of the repair work completed.

B. Contractor shall receive a favorable review of a testing and start-up submittal at least two (2) weeks prior to the first scheduled testing and start-up activity for a new facility or an existing process system. Submittal shall include the following documentation:

    1. Individual testing plans for each major new facility and modified existing process system. Testing plans should summarize all planned Work leading to the start-up and SCT of each modified and new process system.

    2. Blank test forms and checklists showing data to be recorded and checkout procedures prior to each test, whether factory or on site.

C. Final record of testing shall be submitted four (4) weeks after completion of the SCT.

22.05. Submission of Closeout Items

A. At completion of construction and prior to issuance of the Project Completion letter by the Engineer, the Contractor shall deliver to the Engineer the closeout Documents described in Standards Provisions Section 11 Contract Closeout.

B. In addition to the Contract Closeout record documents described in Standards Provisions Article 11 Contract Closeout, the Contractor shall deliver the following Contract record documents to the Engineer in the following form:

1. Marked-up Contract Drawings (2 copies): Bound into sets of convenient size for ease of handling.

2. Marked-up Specifications (2 copies): Bound into 3-ring vinyl binders with clear plastic spine label pockets.

3. Field Test Records (2 copies): Bound into 3-ring vinyl binders with clear plastic spine label pockets. Number all pages. Provide a complete, neat, word-processed table of contents for each binder, with page numbers for each entry.

4. Field survey record documentation.

5. Material (concrete, carbon fiber reinforcement, coatings, etc.) certifications tags.

6. As-built dimensioned drawings of all new pipeline assemblies and components installed under this Contract.

22.06. Final Cleaning

A. Final cleaning is separate work from the cleaning done throughout the Project to maintain the project site in a safe and presentable condition. Final cleaning shall be a comprehensive cleanup of all facilities and shall be begun and finished within fourteen (14) days of District's acceptance of the work. Final cleaning may be performed separately by structure or area at different time periods only if approved by the Engineer.

B. Structures that are to be cleaned by a professional industrial janitorial service as specified in Standards Provisions Article 11 — "Contract Closeout" include:

1. Coyote Blowoff blockhouse and vault
2. Guadalupe Line Valve Vault
3. Lower Los Gatos Blockhouse and Vault
4. Page Ditch Turnout Blockhouse and Blockhouse basement
5. Kirk Ditch Turnout Blockhouse and Blockhouse basement
6. 48" BFV Vault at Vasona Pumping Plant
7. 30" Cone Valve vault at Vasona Pumping Plant

C. In addition to the Final Cleanup, the Contractor shall:

1. Pressure wash, as applicable, the interior and exterior surfaces, including appurtenances and hatch assemblies, of all buried and above grade pipeline appurtenance vaults.

2. Remove all unused construction materials, debris, dirt, mud, silt, sand, dust, spider webs and the like from the interior of the pipeline appurtenance vaults, including the vaults sumps.

3. Remove all standing water from the interior appurtenance vault structures.

TECHNICAL PROVISIONS

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TECHNICAL PROVISIONS

ARTICLE 23.01
MOBILIZATION SECTION 23

PART 1 GENERAL

1.01 SUMMARY

A. The work specified in this Article includes payment for bonds and insurance and all preparatory work and materials necessary for construction operations, including, but not limited to those necessary for the movement of personnel, equipment, supplies, and incidentals to the project sites; for the establishment and removal of field offices, temporary buildings, and other temporary facilities necessary for work on the project; cleanup of the site; other work and operations which must be performed or costs incurred prior to beginning work on the various contract items on the project site; and other work as specified in these Specifications.

1.02 REFERENCES

A. Related Articles:

1. Article 14.03—Office Facilities
2. Article 14.06—Staging Area
3. Section 21—Payment Procedures

1.03 SUBMITTALS

A. As Required.

1.04 MEASUREMENT AND PAYMENT

A. Full compensation for furnishing all work and materials for Mobilization shall be included in the lump sum price bid for Bid Item entitled “Mobilization.”

B. Refer to Article 21.01, Bid Items.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall refer to the following articles:

1. Article 14.03—Office Facilities
2. Article 14.06—Staging Area

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The work specified in this Article includes the removal of all existing objectionable materials over and adjacent to the areas to be graded, excavated, trenched, filled, or as otherwise shown on the Drawings and as specified in these Specifications.

B. The project area shall be cleared and grubbed only to the extent necessary to accommodate the work and in conformance with the notes and details shown on the Drawings and as specified in these Specifications.

C. Clearing and grubbing shall be completed in accordance with the applicable provisions of Section 17-2 of the State Specifications, the notes and details shown on the Drawings, and in accordance with these Specifications.

D. Clearing and grubbing shall also include the removal of abandoned utilities and plugging of abandoned utilities which are severed and not included in other items of work.

E. Clearing and grubbing shall also include the removal and replacement of all miscellaneous fencing not included in other items of work.

F. Any holes or depressions caused by clearing and grubbing operations shall be flattened by backfilling with Type ‘A’ backfill or approved on-site materials and compacting to at least 90% relative compaction, as obtained by the ASTM D1557 test procedure.

G. All cleared material shall become the property of the Contractor and shall be disposed of off-site by the Contractor in accordance with applicable local and state regulatory requirements.

H. The Contractor is advised that some work may require the removal and replacement of interfering landscaping including plants, ground cover, and irrigation systems. Damage to these facilities due to the Contractor’s operation shall be repaired or replaced in kind by the Contractor to the satisfaction of the Engineer, and the area restored to a condition similar to, or better than, that existing before construction. Irrigation systems shall be replaced within 5 days of removal.

1.02 REFERENCES

A. Related Articles:

1. Article 4.10—Preservation of Property
2. Section 10—Environmental

3. Section 24—Earthwork
4. Article 23.03—Demolition
5. Article 24.12—Type ‘A’ backfill
6. Article 14.08—Salvaged Material and Equipment
7. Section 19—Environmental

B. State of California Department of Transportation Standard Specifications, latest edition (CalTrans Standard Specifications):

1. Section 17-2—Clearing and Grubbing

1.03 DEFINITIONS

A. Clearing: Consists of removal of natural obstructions and existing foundations, buildings, fences, lumber, walls, stumps, brush, weeds, rubbish, trees, boulders, utility lines, and any other items which interferes with construction operations or are designated for removal.

B. Clearing for structures and vaults: Consists of the removal and disposal of all above-ground trees, stumps, downed timber, slash, snags, brush, vegetation, loose stones and any other debris within the area of not less than two (2) feet beyond the foundation of the structure or vault.

C. Grubbing: Consists of the removal and disposal of wood or root matter below the ground surface remaining after clearing and includes stumps, trunks, roots, or root systems greater than 1 inch, but less than 2 inches, in diameter or thickness to a depth of 6 inches below the ground surface.

D. Grubbing for structures and vaults: Consist of the removal, below ground, of all roots, stumps, slash, wood and any other unsuitable or objectionable materials within the area of not less than two (2) feet beyond the structure’s or vaults foundation and to a depth of not less than three (3) feet below the bottom of the structure’s or vault’s foundation.

E. Stripping: Includes the removal and disposal of all organic sod, topsoil, grass and grass roots, and other objectionable material remaining after clearing and grubbing from the areas designated to be stripped. The depth of stripping is estimated to be 6 inches, unless modified by the Engineer.

1.04 SUBMITTALS

A. Within 30 days after the first chargeable day, the Contractor shall submit copies of their clearing and grubbing plan. The Contractor’s clearing and grubbing plan shall:

1. address all aspects of the clearing and grubbing effort,

2. provide descriptions, specifications, and quantities for all equipment,

3. describe materials and labor to be used,

4. provide estimates for site-specific vegetation removal,

5. provide details of tree protection,

6. provide a description of the procedural methodology, and

7. provide a comprehensive schedule for all clearing and grubbing activities illustrating the Contractor ability to complete the work on schedule.

B. Prior to any fence removal, Contractor shall submit as-current photo documentation with station references, material type and construction, dimensions, and length of fencing to be removed for Engineer's approval.

C. Prior to any tree trimming, Contactor shall submit as-current photo documentation with station references, tree type and scope or extent of trimming to be performed for Engineer's approval.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements:

B. Verify and comply with applicable regulations regarding those governing noise, dust, nuisance, drainage and runoff, fire protection, and disposal.

C. Pre-Construction Meetings:

1. Prior to the start of any clearing and grubbing work the contractor shall meet with the Engineer to discuss the order, method, and extent of the work to be performed.

1.06 DELIVERY, STORAGE AND HANDLING

A. Waste Management and Disposal:

1. All cleared material shall become the property of the Contractor and shall be disposed of offsite by the Contractor, at the Contractor's expense and in accordance with applicable regulatory requirements.

1.07 PROJECT/SITE CONDITIONS

A. Project/Site Environmental Conditions:

1. See Article 13.04.02—Environmental Report
2. See Article 13.04.03—Hazardous Materials Investigation Report

1.08 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. All existing utilities and facilities not specifically designated on the Drawings to be removed or relocated shall remain in their original condition and location undisturbed. Existing facilities which are to remain in place shall be protected in accordance with the provisions of Article 4.10, “Preservation of Property.”

B. All existing utilities and facilities, including but not limited to utility poles, property fences, barricades, or other improvements not specifically designated on the Drawings to be removed or relocated shall remain in their original condition and location undisturbed. However, upon written permission by the Engineer, fences and other existing improvements may, for the convenience of the Contractor and at the Contractor’s expense, be removed and temporarily relocated during construction and shall be replaced in their original location in as good or better condition as when the Contractor entered upon the work site.

C. If it is necessary to cut tree branches and roots, they shall be pruned by a certified arborist possessing a license issued by the State of California. Additional tree branches shall be removed, as approved by the Engineer, in such a manner that the tree will present a balanced appearance. The certified arborist shall also remove, as approved by the Engineer, an approximately equal amount of branches in order to compensate for any roots removed. Scars resulting from the removal of branches and roots shall be treated with a heavy coat of commercially available water base asphalt emulsion tree sealing compound.

D. Contractor shall immediately notify the District if tree roots 2 inches or greater in diameter are encountered during trenching and excavation activities. Under direction of a certified arborist, Contractor shall saw cut evenly perpendicular to the longitudinal axis of the root. Tree roots shall be covered with wet burlap and maintained wet until recovered with soil.

E. Any tree roots 2 inch or less in diameter which have to be removed or are damaged during construction operations shall be saw cut evenly at right angles to the longitudinal axis of the root and shall be treated with a heavy coat of commercially available water base asphalt emulsion tree sealing compound.

F. The Contractor shall make every effort to avoid removing trees unnecessarily. The Contractor may remove only those trees that are designated to be removed on the Drawings.

G. All trees, stumps, brush, bushes, roots, debris, and other unacceptable material shall be cut, grubbed, removed, and disposed of from areas to be occupied by pipelines, fills, conduits, engineered fills, and any other areas to be stripped. Stockpile areas shall be cleared before use.

H. Areas outside the limits of clearing shall be protected and no equipment or materials shall be stored in or allowed to damage these areas.

3.02 EXAMINATION

A. Examine site and verify existing conditions for beginning work.

B. Prior to any tree trimming or tree removal, the Engineer shall review the requested trimming or tree removal. Approval of the Engineer shall be required before any trimming or removal is done.

3.03 PREPARATION

A. Protect existing improvements from damage by site preparation work.

B. Trees and landscaping that are not to be removed shall be fully protected from injury by the Contractor at the Contractor's expense. Trees shall be removed in such a manner as to not injure standing trees, plants, and other items which are to be preserved.

C. Protect trees or bushes from damage by all construction operations by erecting suitable barriers, or by other means. Suitable barriers shall be placed at or beyond the drip lines of trees and bushes in the vicinity of the Work.

D. The project area shall be cleared and grubbed only to the extent necessary to accommodate the work and in conformance with the notes and details shown on the Drawings. No vegetation shall be removed unnecessarily.

E. The Contractor shall make every effort to avoid removing trees unnecessarily. The Contractor may remove only those trees that are designated to be removed on the Drawings.

F. If the Contractor proposes to remove trees which are not designated to be removed on the Drawings, the Contractor shall obtain written approval from the Engineer prior to tree removal.

3.04 SEQUENCES OF OPERATIONS

A. Clearing:

1. Clear areas where construction is to be performed and other areas as indicated on the Drawings, or specified in this Section, of fences, lumber, walls, stumps, brush, roots, weeds, trees, shrubs, rubbish, and other objectionable material of any kind which, if left in place, would interfere with proper performance or completion of the work, would impair its subsequent use, or form obstructions.

2. Do not incorporate organic material from clearing and grubbing operations in fills and backfills. All organic material from clearing and grubbing shall be disposed of offsite in accordance with applicable regulations at the Contractor’s expense.

3. Contractor's temporary construction facilities: Fill or remove pits, fill, and other earthwork required for erection of facilities, upon completion of the work, and level to meet existing contours of adjacent ground.

B. Grubbing:

1. From excavated areas: Grub stumps, roots, and other obstructions 3 inches or over in diameter to depth of not less than 18 inches below finish grade.

2. In embankment areas or other areas to be cleared outside construction area: Do not leave stumps, roots, and other obstructions higher than the following requirements:

Height of Embankment Over Stump	Depth of Clearing and Grubbing
0 feet to 2 feet	Grub stumps or roots 3 inches or over in diameter to 18 inches below original grade. Cut others flush with ground.
2 feet to 3 feet	Grub stumps 1 foot and over in diameter to 18 inches below original grade. Cut others flush with ground.

3. Backfill and compact cavities left below subgrade elevation by removal of stumps or roots to density of adjacent undisturbed soil.

C. Stripping:

1. Remove soil material containing sod, grass, or other vegetation to depth of 6 inches from areas to receive fill or pavement and from area within 5 feet outside foundation walls.

2. Deposit stripped material in accordance with following requirements:

   a. At locations acceptable to Engineer.

   b. Use accepted material in top 6 inches of areas to be used for future planting.

3. Replace topsoil where indicated on the Drawings.

D. Material reuse and recycling:

1. One hundred (100) percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled at offsite locations.

2. Contractor shall provide Engineer with list of local markets and salvage sites for reuse of clearing debris.

3.05 RESTORATION

A. Any holes or depressions caused by the clearing and grubbing operations shall be flattened by backfilling with Type ‘A’ backfill or approved on-site materials and compacting to at least 90 percent relative compaction, as obtained by the ASTM D1557 test procedure.

B. Following the Clearing and Grubbing all loose or soft soils shall be removed to prepare a firm, uniform subgrade for the structure. Immediately before placing fill materials, the entire subgrade surface shall be moisture conditioned to within 3 percent of the optimum moisture content, and compacted to at least 90 percent relative compaction, as obtained by the ASTM D1557 test procedure. Following this subgrade preparation, the surface shall be kept moist to prevent excessive shrinkage due to moisture loss.

C. No stumps, trees, limbs, debris, or brush shall be buried in any fills or embankments.

D. The Contractor is advised that some work may require the removal and replacement of interfering landscaping including plants, ground cover, and irrigation systems. Damage to these facilities due to the Contractor’s operation shall be repaired or replaced in kind by the Contractor to the satisfaction of the Engineer, and the area restored to a condition similar to or better than that existing before construction. Irrigation systems shall be replaced within 5 days of removal. Payment for removal and replacement of interfering landscaping and irrigation systems shall be incidental and included in the bid price for the item of work requiring landscaping or irrigation system removal and replacement.

3.06 DISPOSAL OF MATERIALS

A. All surface soils, tree trunks, roots, brush and other vegetation, conduits, concrete, construction materials, and other buried utilities which are cleared, grubbed, or stripped shall be hauled to a suitable landfill or offsite disposal site, in compliance with local and state laws.

B. Burning of cleared and grubbed materials will not be permitted.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The work specified in this Article includes demolishing, modifying, reinstalling, and disposing existing pavement, fencing, and miscellaneous items as required for the construction of the improvements as shown on the Drawings and as specified.

B. The work specified in this Article also includes the protection, support, and maintenance of buried and above grade utilities, site work facilities, roadways and pavements, and miscellaneous structures and items surrounding the demolition work free from damage or harmful effects.

1.02 REFERENCES

A. Related Articles:

1. Article 23.02—Clearing and Grubbing
2. Article 14.08—Salvaged Material and Equipment
3. Section 19—Environmental

1.03 SUBMITTALS

A. Submit documentation to the Engineer showing proposed start and finish dates, durations, and detailed descriptions of demolition work a minimum of 14 days in advance of such work. Include such work on all construction schedules.

B. If requested by the Engineer, provide documentation on recycling of construction materials and disposal locations of materials.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 PROTECTION

A. Protect all vegetation and landscaping except in areas designated for removal or within the footprints of new construction.

B. Maintain free and safe passage for all personnel and the public at all times.

C. Protect existing structures, utilities, equipment, and adjacent work which are to remain free from damage. Cut finish surfaces, such as concrete or metals, by methods which will terminate or join work in a straight line at an appropriate point of division.

D. Cease operations and notify the Engineer immediately if the safety of any structure or utility appears to be endangered. Take additional precautions to properly support such structure(s) and do not resume demolition operations until safety is restored.

E. Utility locations shown on the Drawings are approximate and may vary from where they are shown. The Contractor shall contact Underground Service Alert (800-642-2444) and obtain field marking to determine the exact locations of utilities owned by agencies. Record, preserve and protect the field markings.

F. Blasting and the use of explosives shall not be permitted for any demolition work. Burning of wastes is not permitted.

G. Promptly repair any damage caused to facilities or landscaping by demolition operations as directed by the Engineer and at no additional cost to the District. The minimum quality of repair shall be equal to that which existed prior to the start of the Contractor's work.

3.02 SCHEDULING

A. If required, perform location and marking of underground utilities and exploratory excavations (potholing) at least 30 days prior to the scheduled work activities in those areas. Report pothole results promptly. Identify conflicts determined by potholing to the Engineer in writing within 10 days of each exploratory excavation completion.

3.03 SEQUENCE OF WORK

A. The sequence of demolition and the modifications of existing facilities shall be in accordance with the Standard and Special Provisions.

B. The Contractor shall mark all facility components to be demolished in advance of demolition for the Engineer's review. The purpose of this requirement is to provide an opportunity to avoid unnecessary or erroneous demolition. The Contractor remains responsible for demolition as shown on the Drawings and as specified in these Specifications.

C. The Contractor shall schedule a meeting and meet with the Engineer at the site of the proposed demolition in advance of the start of demolition. Contractor shall ensure that subcontractors are present if necessary or requested by the Engineer.

3.04 DISPOSAL OF MATERIAL REMOVED BY DEMOLITION WORK

A. All materials removed by demolition work shall become the property of the Contractor as soon as actual demolition is initiated unless specifically identified to be salvaged by the District. The Contractor shall remove demolition materials as soon as possible but in no case shall Contractor store materials removed by demolition on the project site longer than 10 working days. Demolition materials other than concrete and soil shall be properly contained in covered waste disposal bins. Concrete and soil shall be tightly stockpiled and covered until removal.

B. The Contractor shall properly dispose of all Regulated and Non-regulated materials in accordance with all applicable Federal, State and Local laws, ordinances and regulations.

3.05 DEMOLITION MATERIALS RETAINED BY THE DISTRICT

A. The District reserves the right to retain ownership of miscellaneous materials and pieces of equipment immediately prior to demolition. Such items may include, but is not limited to, motors, instrumentation equipment, valves, actuators, meters, and miscellaneous metals.

B. During construction, the Engineer shall inform the Contractor of which materials and/or equipment the District wishes to retain. Contractor shall package, label, and transport said materials to a specified location.

C. Contractor's attention is directed to Article 14.08— 'Salvaged Materials and Equipment' of the Special Provisions.

3.06 REMOVAL OF MECHANICAL FACILITIES AND EXISTING PIPING

A. Mechanical facilities removal includes, but are not limited to, the dismantling, preparation, and removal of existing piping and valves, flow meters, fixtures, supports, anchorages, and other appurtenances as required for the completion of the work.

B. All anchor bolts, screws, supports, studs, rails, and other fastening devices that cannot be re-used or not shown in the plans to be re-used or utilized are remaining after mechanical facilities are removed shall be removed. In the case of such cast devices fastening into concrete, the concrete shall be chipped back one (1) inch and the device shall be cut below the plane of the finished surface. The area shall be patched with non-shrink grout and finished to match the surrounding surface.

C. Removal work includes the plugging and sealing of wall, floor, ceiling, roof, and partition penetrations created by the removal of mechanical facilities. Plugging shall be completed using materials identical to the structural element and finish materials. Plugs shall be coated using materials compatible to the existing

coatings. Generally, plugging and sealing of penetrations are not individually shown on the Drawings.

D. Existing piping which will attach to new piping shall be cut at the appropriate point which will allow the new piping to properly join, align, and be secured. New fittings, pipe, supports, and incidentals shall be provided to make up the connection or modification.

3.07 REMOVAL AND ABANDONMENT OF BURIED PIPING

A. Buried piping shall be removed as noted on the Drawings or as specified by the Engineer.

B. Existing buried pipeline assemblies and components, including valves and couplings, are encased in concrete, slurry, or CDF. Chipping, jackhammering, and other mechanical means shall be used to remove the encasement.

C. Remove loose or broken concrete.

3.08 CLEAN-UP

A. The Contractor shall remove from the site all debris resulting from the demolition operations as it accumulates. Upon completion of the immediate demolition work, the Contractor shall thoroughly clean each area, including dusting, vacuuming, sweeping, wash down, and window cleaning as required.

END OF ARTICLE

ARTICLE 23.04
ABANDONMENT, REMOVAL, SALVAGE, AND RELOCATION OF EXISTING FEATURES SECTION 23

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

Abandonment in place of existing pipelines and manholes, when indicated on the Drawings for abandonment.

B. Related Sections:

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s). Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1. Section 24 – Earthwork
2. Section 30 – Concrete

1.02 REFERENCES

A. ASTM C150 – Standard Specification for Portland Cement.

B. ASTM C494 – Standard Specification for Chemical Admixture for Concrete.

C. ASTM C618 – Standard Specification for Fly Ash and Raw or Calcinated Natural Pozzolan for use as Mineral Admixture in Portland Cement Concrete.

D. ASTM C940 – Standard test Method for Expansion and Bleeding of Freshly Mixed grout for Replaced Aggregate Concrete in the Laboratory.

E. ASTM C1017 – Standard Specification for Chemical Admixture for Use in Producing Flowing Concrete.

F. ASTM C1107 – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink).

1.03 DEFINITIONS

A. Pipeline Abandonment: Pipeline abandonment consists of filling or plugging portions of existing pipelines with flowable fill or grout plugs, as indicated on the Drawings.

B. Manhole Abandonment: Manhole abandonment consists of removing cylinders, rings and lids above the depth indicated on the Drawings, and filling the remainder with flowable fill.

C. Backgrouting: Secondary stage pressure grouting to ensure that voids have been filled within abandoned pipes. Backgrouting will only be required at critical locations indicated on the Drawings or if there is evidence of incomplete flowable fill placements.

1.04 SYSTEM DESCRIPTION

A. Design Requirements

1. Flowable Fill Performance Requirements:

a. Refer to Article 24.02.

1.05 SUBMITTALS

A. Product Data:

1. Refer to Article 24.02.

2. Submit technical information for equipment and operational procedures including projected injection rate, grout pressure, method for controlling grout pressure, bulkhead and vent design and number of stages for grout application.

PART 2 PRODUCTS

2.01 MATERIALS

A. Flowable Fill:

1. Refer to Article 24.02.

2. Grout Plugs:

a. Cement-based dry-pack grout conforming to ASTM C1107, Grade B or C.

PART 3 EXECUTION

3.01 PREPARATION

A. Protection:

1. Provide safe working conditions for employees throughout demolition and removal operations. Observe safety requirements for work below grade.

2. Maintain safe access to adjacent property and buildings. Do not obstruct roadways, sidewalks, or passageways adjacent to the work.

B. Preparation:

1. Notify inspector at least 24-hours in advance of grouting with flowable fill.

2. Select fill placement equipment and follow procedures with sufficient safety and care to avoid damage to existing underground utilities and structures.

3. Operate equipment at pressure that will not distort or imperil portions of the work, new or existing.

4. Cut and cap portions of the piping system to remain, as shown on the Drawings. Drain water mains to be abandoned.

5. Perform demolition work prior to starting fill placement. Clean placement areas for pipes and manholes of debris that may hinder fill placement. Remove excessive amounts of sludge and other substances that may degrade performance of the fill. Do not leave sludge or other debris in place if filling more than 2 percent of placement volume. Dispose of waste material in accordance with applicable codes and regulations.

6. Remove free water prior to fill placement.

3.02 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION

A. Sequences of Operation

1. General Requirements:

a. Mix flowable fill in automated batch plant and deliver it to site in ready-mix trucks. Performance additives may be added at placement site if required by mix design.

b. Use concrete or grout pumps capable of continuous delivery at planned placement rate.

2. Demolition of Manholes Prior to Abandonment:

a. Remove manhole frames and covers and castings and dispose or recycled as applicable. Obtain District approval before reusing frames and covers within the work.

b. Demolish and remove precast concrete rings to the depth indicated on the plans. Minimum depth of removal shall be 4-feet below finished grade, or 12-inches below any crossing utility, whichever is greater.

3. Installation of Flowable Fill:

    a. Place flowable fill equal to volume of pipe being filled. Continuously place flowable fill from manhole to manhole with no intermediate pour points, but not exceeding 500 linear feet of pipe per fill segment.

    b. Perform operation with experienced crews with equipment to monitor density of flowable fill and to control pressure.

    c. Temporarily plug or cap pipe segments which are to remain in operation during filling to keep lines free of flowable fill.

    d. Pump flowable fill through bulkheads or use other suitable construction methods to contain flowable fill in lines to be abandoned.

    e. Place flowable fill under pressure flow conditions into properly vented open system until flowable fill emerges from vent pipes. Pump flowable fill with sufficient pressure to overcome friction. Fill sewers from the downstream end to vent at upstream end.

    f. Backfill excavations per Section 24, Earthwork.

    g. Collect and dispose of excess flowable fill material and debris.

    h. Abandon manholes by filling the portion not removed with flowable fill.

4. Installation of Grout Pugs:

    a. Abandon pipelines of diameter 8-inches and below, as required in Part 3, Paragraph A, by cutting and placing grout plugs.

    b. Clean inside surface of pipe at least 12-inches from ends, achieving firm bond and seal grout plug to pipe surface. Similarly, clean and prepare exterior surface if manufactured cap is to be used.

    c. Place temporary plug or bulkhead approximately 12-inches inside pipe. Fill pipe end completely with dry-pack grout mixture.

    d. Backfill excavations per Section 24, Earthwork.

    e. Collect and dispose of excess grout material and debris.

3.03 FIELD QUALITY CONTROL

A. Site Tests, Inspection:

1. Provide batch plant tickets for each truck delivery of flowable fill. Note on tickets addition of admixtures at site.

2. Check flow characteristics and workability of fill as placement proceeds.

3. Obtain at least three test cylinders for each placement area for determination of 56-day compressive strength and bleeding. Acceptance of placement will be based on average strength of three tests.

4. Record volume of flowable fill placement to demonstrate that voids have been filled. If voids exceed 10% of pipeline volume, injection grouting may be required at the direction of the Engineer.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. The Contractor shall design, furnish, install, and operate all materials and equipment as required to remove and dispose of potable and non-potable water remaining in the existing pipes during the performance of the work.

2. The Contractor shall design, furnish, install, and operate all materials and equipment as required to remove and dispose of potable and non-potable water as required to dewater excavation sites.

3. Contractor must comply with all federal, state and local laws for disposal of waters of the dewatering process. The Contractor's attention is directed to Section 19 for permissible discharges of construction-related water.

4. If Contractor discharges construction dewatering as defined as Other Discharges in Section 19 into the storm drain system, then Contractor shall be required to notify, obtain, and pay for necessary permits from the Regulatory Agency(ies) having jurisdiction. Contractor shall provide all copies of applications for permit(s), permits acquired, and fill out and provide the District with a "Notice of Temporary Discharge (Notice)," Appendix C. A hard copy of the Notice is attached for use in the Appendices. An electronic version of the form may be transmitted to the Contractor upon request. The form must be filled out and sent via email to the Engineer for review. The Notice must be submitted three (3) working days prior to discharge. Failure to submit a Notice shall be grounds for temporary suspension of all or a portion of the work in accordance with Article 5.06. Suspension of Work for noncompliance will not be grounds for additional time or compensation. A Notice shall be submitted for each occurrence, unless specifically approved otherwise by the Engineer.

5. Contractor shall remove all water which accumulates in excavation sites as work progresses so that all work can be done in dry conditions. Excavated areas shall be kept free from water while the piping and structures are constructed, while the concrete is setting, and until backfill has been placed to a sufficient height to anchor the work against possible flotation or leakage.

6. In areas where excess moisture content would prevent proper installation of pipe and appurtenances (including placement and compaction of pipe bedding on an otherwise suitable sub-grade foundation), drain rock and

non-woven filter fabric may be utilized in accordance with details shown on the Drawings or as approved in writing by the Engineer.

7. The Contractor shall, at all times, have on the project site sufficient pumps and power generator facilities for immediate use, including standby pumps for use in case other pumps become inoperable. Water shall be disposed of to avoid injury to public or private property or threaten public health.

8. The Contractor is advised that the appurtenance vaults along the pipeline system may be submerged with water due to groundwater intrusion. The Contractor shall prepare and provide equipment to dewater the vault prior to work in case vaults are submerged with water.

B. Related Sections:

1. Section 19 – Environmental
2. Article 19.04 – Water Pollution Discharges

C. Payment Procedures:

1. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work.

2. Refer to Article 21.

1.02 REFERENCES

A. Applicable Federal, State and Local laws, ordinances, regulations, and permits regarding the proper control of water.

B. State of California Department of Fish & Wildlife (CDFW) Lake-Stream Alteration Agreement

C. State of California Regional Water Quality Control Board NPDES General Permit

1.03 SUBMITTALS

A. Quality Assurance/Control

1. Submittals

a. Prior to implementation, the Contractor shall submit the proposed BMP Action Plan/SWPPP and the methods of control of water.

b. The daily record of discharge water turbidity, chlorine, pH, and temperature as specified below.

1.04 MEASUREMENT AND PAYMENT

A. Full compensation for furnishing all work and materials for Control of Water shall be included in the lump sum price bid for Bid Item entitled “Work as Specified for Control of Water and Pipeline Dewatering”

B. Refer to Article 21.01 – Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

A. Drain rock shall be 1 1/2 inch x 3/4 inch coarse aggregate conforming to Section 90-1.02 C (1), 90-1.02 C (4), and 90-1.01 C (2) of the State Specifications.

B. Filter fabric shall be non-woven filter fabric conforming to Section 88-1.02 B of the State Specification and shall be Mirafi 140NSL, AMOCO 4545, Typar Style 3401, or equal, and shall be wrapped around the drain rock.

PART 3 EXECUTION

3.01 GENERAL

A. Provide labor, material, equipment, techniques, and methods to remove an dispose of water in a manner compatible with construction methods, site conditions and regulatory requirements. Monitor effectiveness of the installed system and its effect on adjacent structures and properties.

B. Install, operate, and maintain systems in accordance with the proposed methods for the control of water. Notify the Engineer in writing of any changes made to accommodate field conditions and changes to the Work.

C. As applicable, provide for continuous system operation, including nights, weekends, and holidays. Arrange for appropriate backup if electrical power is the primary energy source for dewatering system.

D. Monitor operations to verify that the systems are functioning as required for the proper execution of the work.

E. Contractor must implement the dewatering operation in adherence of these Specifications and under the conditions set forth by permits obtained and paid for by the Contract from the agencies having jurisdiction.

F. Dewatering hose routing shall minimize impact to pedestrian and vehicular traffic. Hose ramps shall be utilized when dewatering hoses do interfere with pedestrian and vehicular traffic.

G. Water to be discharged to storm drain system:

1. As a minimum, meet the following requirements:

a. Only uncontaminated water from dewatering operations is allowed to be discharged into the storm drain system provided the discharge does not:

(1) Create a nuisance condition.

(2) Exceed 50 Nephelometric Turbidity Units (NTU) for a dry stream.

(3) Exceed 110 percent of the ambient stream turbidity for a flowing stream for ambient turbidities are greater than 50 NTU and no more than 5 NTU above ambient turbidity for ambient turbidities which are less than or equal to 50 NTU (ambient turbidity is measured 100 feet downstream of the point of discharge).

(4) Contain levels of chlorine above 0.08 milligrams per liter (this level is equal to the detection limit of the instrument to be used).

(5) Create an erosion problem at the outfall to the creek.

(6) Have the pH outside the range of 6.5 to 8.5.

(7) Cause an increase in temperature greater than 2 degrees F in the creek 100 feet downstream of the point of discharge.

(8) Exceed more stringent conditions set by San Francisco Bay RWQCB for permitting such discharges by the Contractor.

2. Contractor must implement the dewatering operations in adherence of the Contractor's BMP Action Plan or SWPPP as defined in Section 19.

H. All excavations and trenches shall be kept free from water and all construction shall be in dry conditions.

1. The presence of groundwater or seepage from water requires dewatering operations. The Contractor shall furnish, install, maintain, and operate all necessary pumping and other equipment for dewatering operations. Provide sufficient pumping equipment for immediate use, including standby pumps and standby power supply for use in case other pumps become inoperable or there is loss of power.

2. Provide a sufficient number of pumps and dewatering points so as to hold the groundwater at an elevation of not less than three feet below the lowest elevation of the sub-grade penetration, concrete, pipe, or other material to be placed. Provide continuous dewatering operations:

    a. During excavation.

    b. While concrete is setting and achieves full strength.

    c. Until backfill has been placed to a sufficient height to anchor the work against possible floatation.

3. Continue dewatering during backfilling operations such that the groundwater or seepage is at least three feet below the level of compaction effort at all times. No compaction of saturated materials will be allowed.

I. The Contractor shall take every precaution against the flotation of any existing pipe or the new pipe due to water in the trench whether from the operations of the Contractor or any other reason. This shall include, but is not limited to:

1. Preventing flotation while compacting or consolidating backfill or during any other construction operation while the adjacent existing pipeline is empty.

2. Removing, repairing or replacing any new or existing pipe that is disturbed or damaged due to flotation to the satisfaction of the Engineer at the expense of the Contractor.

J. In areas where excess moisture content would prevent proper installation of pipe and appurtenances (including placement and compaction of pipe bedding on an otherwise suitable subgrade foundation), drain rock and non-woven filter fabric may be utilized in accordance with details shown on the drawings at no additional cost.

K. The non-woven filter fabric shall be installed in accordance with manufacturer's written specifications.

3.02 SEDIMENT REMOVAL

A. Best Management Practices: Provide dewatering devices and/or processes to adequately filter and/or remove fines from the extracted groundwater to meet regulatory water quality discharge requirements.

B. Coordinate space requirements for sediment removal devices or processes within the Project boundaries shown on the Drawings.

3.03 FIELD QUALITY CONTROL

A. Site Tests, Inspection

1. Contractor's discharges to the storm drain and/or creek are subject to the following testing requirements, unless noted otherwise in these Specifications:

a. The Contractor shall measure the water for turbidity at the point where the discharge water exits the Contractor's water control system. Measurements shall be made with a Portable Turbidimeter, Model No. DRT-15CE, by HF Scientific, Fort Meyers, Florida, or equivalent method. Turbidity measurements shall be performed on a sample immediately after the sample is collected per instrument manufacturer's specifications. The procedure used for performing turbidity measurements shall be documented in the BMP Action Plan.

b. Discharge sampling shall be performed for chlorine residual, turbidity, temperature, and pH at 1-hour intervals for 4 hours for the first day of discharge and twice daily thereafter for potable water. If groundwater is discharged, sampling shall be performed for turbidity, temperature, and pH at 1-hour intervals for 4 hours for the first day of discharge and twice daily thereafter. If samples taken indicate the discharge exceeds one of the criterions the discharge will be suspended immediately and the Engineer notified, until the water can meet all of the discharge criteria.

c. Contractor shall conduct visual monitoring at the creek outfall through which water is discharged to ensure erosion is not occurring. If erosion of the stream channel banks or bottom is evident, the Contractor shall adjust the discharge flow rate or modify the discharge system to eliminate the effects of erosion. Notify Engineer of any erosion.

d. Contractor shall conduct any required baseline testing and monitoring prior to and during the discharge operation of watercourse conditions, i.e., turbidity, temperature, pH and chlorine levels where discharges from construction would be routed to.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. Erosion control shall consist of installing straw mulch as indicated and furnishing all labor, materials, and equipment necessary to perform erosion control work in unpaved areas as shown on the Drawings, as specified by these Specifications, and as directed by the Engineer.

B. Erosion control work shall conform to the applicable provisions of Section 21 of the State Specifications and these Specifications.

C. Erosion control work shall not begin until after the pipe and related appurtenances are installed and the finish grading completed except as required to be in compliance with SWPPP non-point sources erosion requirements.

D. The Contractor shall be responsible for any damage and erosion caused by his/her construction operations. The Contractor shall take all necessary measures to prevent erosion. Erosion control shall include control of erosion due to rainfall, flow in adjacent creeks, and water due to dewatering of excavations.

1.02 REFERENCES

A. Related Articles:

1. Article 23.04—Control of Water
2. Section 19—Environmental
3. Appendix D—Best Management Practices and Mitigation Measures

B. State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order # 2009-0009-DWQ)

C. State of California Department of Transportation Standard Specifications, latest edition (CalTrans Standard Specifications):

1. Section 21—Erosion Control
2. Section 13-6—Temporary Sediment Control

1.03 SUBMITTALS

A. Testing and submittals shall conform to the applicable provisions of Section 21 of the State Specifications and these Specifications.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. All sediment and erosions control materials shall be in accordance with State of California Department of Transportation Standard Specifications, latest edition (CalTrans Standard Specifications).

B. Straw shall be new threshed straw of rice, wheat, or barley, and shall be dry, weed-free, and mold-free.

PART 3 EXECUTION

3.01 GENERAL

A. Provide labor, material, equipment, techniques and methods for the implementation, maintenance, and monitoring for sediment and erosion control in a manner compatible with construction methods, site conditions and regulatory requirements.

B. Contractor is responsible for and must implement all storm water controls prior to any site work within the project area. Controls must remain in place until after the completion of permanent restoration and erosion control measures.

C. Comply with applicable requirements of all governing authorities having jurisdiction. The Specifications and the Plans are not represented as being comprehensive, but rather to convey the intent to provide complete slope protection and erosion control for both the Owner's and adjacent property.

D. All land-disturbing activities shall be planned and conducted to minimize the size of the area to be exposed at any one time and to minimize the time of exposure. Areas where the Work is completed shall be stabilized, restored and revegetated as soon as possible, as work continues in other areas.

E. Surface water runoff originating upgrade of exposed area shall be controlled to reduce erosion and sediment loss during the period of exposure.

F. When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving ditch or stream, the Contractor shall install measures to control both the

velocity and rate of release so as to minimize accelerated erosion and increased sedimentation of the stream.

G. All land-disturbing activities shall be planned and conducted so as to minimize off-site sedimentation.

H. The Contractor shall be responsible for periodically cleaning out and properly disposing of all sediment once the storage capacity of the drainage feature or structure receiving the sediment is reduced by one-half. The Contractor shall also be responsible for cleaning out and properly disposing of all sediment at the time of final completion of the Work.

3.02 INSTALLATION

A. Special Techniques:

1. In areas where straw mulch is to be placed, the top 2-inch layer of backfill shall be uncompacted. Straw shall be applied per Section 21-2.02H of the State Specifications.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. Scope of Work: This Article specifies the furnishing of equipment; labor and materials necessary to remove all water from inside the pipeline in accordance with the requirements set forth in these Specifications, and as shown on the Drawings.

1. This scope of work includes dewatering 12.6 miles of 66-inch diameter pipeline from Central Pipeline beginning at the Piedmont Valve Yard to the Vasona Valve Yard which is estimated to be approximately 12.5 million gallons of water.

a. Volumes indicated on the Drawings are estimates and are for reference only. Actual volumes may vary based on the discharge sequencing. The Contractor shall establish the pipeline dewatering operations and sequencing and shall estimate the volumes to be discharged as a part of the Contractor's Control of Water and Dewatering Plan.

2. Pipeline dewatering is required to facilitate internal manned visual inspection, specialty electromagnetic inspection, and pipeline repair activities.

a. Internal manned visual and specialty electromagnetic inspection activities require dewatering to less than 12-inches of standing water along the entire length of the pipeline.

b. Internal pipeline repair activities require the complete removal of all standing water from the portions of the pipeline specified for internal repair.

3. Pipeline dewatering will be initiated by the District. The Contractor is referred to Section 12 of these Specifications for milestone dates.

a. The District will perform lock-out tag-out procedures and operate the valves for the gravity discharge of the pipelines for the Contractor. It is estimated that approximately 8.5 million gallons of water with be gravity discharged. The Contractor shall provide necessary equipment including generators, pumps, hoses, fittings, flowmeters, and associated material for dewatering efforts.

b. Liquidated Damages will be assessed for any section of pipeline not dewatered sufficiently to perform the requisite work.

c. See Article 12.05— ‘Liquidated Damages’ for liquidated damages assessments.

4. Contractor will need to perform pipeline dewatering activities at existing blowoff and pumpout riser appurtenances, as shown on the Drawings.

a. In general terms, the pipeline dewatering activities at each site will consist of:

(1) Installing discharge and erosion control measures,

(2) Gravity draining the water out of pipeline through the existing blowoff energy dissipater structure or pumpout riser appurtenance,

(3) Pumping water out of the pipeline through the existing blowoff energy dissipater structure or pumpout riser appurtenance,

(4) Disassembling and removing the in-vault blowoff or pumpout riser appurtenance assembly,

(5) Pumping water out of the pipeline through the in-vault blowoff or pumpout riser appurtenance nozzle,

(6) Entering the pipeline to place the pumping equipment intake at the local pipeline low point at the adjacent appurtenance near the blowoff or pumpout riser appurtenance nozzles,

(7) Pumping water out of the localized pipeline low point, and

(8) Removing discharge control measures and pumping equipment.

b. The volume of water removed at each site depends on discharge sequencing. The duration of the dewatering effort at each site depends on the volume of water to be removed and the discharge flow rate. The Contractor’s pipeline dewatering plan shall provide information regarding site discharge sequencing and removal volumes, flow rates and scheduling estimates.

c. Horizontal and vertical distances between the local pipeline low point and the adjacent appurtenance are provided for reference only in the profile Drawings. The distances are approximate. The Contractor is responsible for reviewing applicable as-built drawings to determine the actual distances and pipeline slopes between the appurtenances and the local pipeline low points.

5. Contractor shall install discharge and erosion control measures prior to both District-led gravity draining and contractor-led dewatering processes. Contractor shall monitor the discharges to ensure that installed discharge and erosion control measures are functional and effective. Contractor shall be prepared to modify and/or repair the discharge and erosion control measures as necessary to assure proper performance. Contractor shall remove and dispose of all discharge control measures following the completion of the dewatering activities and shall restore the sites to pre-discharge conditions.

    a. Discharge and erosion control measures shall be developed by the Contractor and specified in the Contractor's Control of Water and Dewatering Plan.

    b. The purpose of the discharge and erosion control measures is to minimize the amount of pipeline sediment, debris and aquatic life that is discharged to the local environment and to minimize the ground saturation in the work area in and around the appurtenance vault resulting from discharged water.

    c. The Contractor shall install sediment and debris removal systems on the discharge outlets of all pumping equipment to minimize the discharge of pipeline sediment, debris, and aquatic life to the local environment.

6. Contractor shall discharge the water to the local environment at a rate and in a manner such that excessive flooding and erosion impacts are avoided. Maximum discharge flow rates will be determined based onsite specific environmental and discharge control conditions. A maximum of three (3) CFS discharge flow rate shall be assumed as a baseline at each site, unless otherwise specified.

7. Contractor shall design, furnish, install, operate, maintain, secure, remove and dispose of, as applicable, all equipment and materials required to remove all water from the pipeline.

8. Contractor shall disassemble and remove existing appurtenance components (spool pieces, valves, blind flanges, etc.) as needed for internal pipeline local low point dewatering activities.

    a. Internal pipeline local low point dewatering activities require confined space entry. See Article 17.01— 'Safety' for additional information.

    b. Internal pipeline local low point dewatering activities may require high angle equipment and personnel access rope support for the placement of the pumping system intake at the local pipeline low points.

c. Contractor shall comply with all Local, State and Federal Safety requirements regarding the execution of this type of work.

9. Contractor shall develop and submit, within 30 days after the first chargeable day a pipeline dewatering plan for approval. See Section 7— 'Submittal Management' for additional information. In addition, the contractor must notify the Project Engineer a minimum of 72 hours prior to any planned dewatering.

1.02 RELATED REQUIREMENTS

A. Section 19—Environmental

B. Article 23.05—Control of Water

C. Appendix D—Best Management Practices and Mitigation Measures

D. Applicable federal, state and local laws, ordinances, regulations, and permits regarding the proper control of water

E. State of California Department of Fish & Wildlife (CDFW) Permit

F. State of California Regional Water Quality Control Board Permit

1.03 SUBMITTALS

A. Within 30 days after the first chargeable day, the Contractor shall submit copies of their pipeline dewatering plan as part of the Contractor's Control of Water and Dewatering Plan. The Contractor's pipeline dewatering plan shall:

1. address all aspects of the pipeline dewatering effort,

2. provide descriptions, specifications and quantities for all equipment, materials, and labor to be used,

3. provide details of planned BMPs for discharge,

4. provide estimates for site specific water volume removal, discharge flow rates and discharge durations based on the proposed discharge sequencing,

5. provide a description of the procedural methodology,

6. provide a comprehensive schedule for all pipeline dewatering activities illustrating the Contractor ability to complete the work on schedule, and

7. provide a pipeline dewatering discharge plan.

B. The daily record of discharge water quality parameters as specified below.

C. Discharge forms completed by the Contractor for each discharge location. The "Planned Discharge Monitoring Form for Raw Water" and "Planned Discharge Type and BMPs" forms can be found in Appendix C.

1.04 MEASUREMENT AND PAYMENT

A. Full compensation for furnishing all work and materials for Pipeline Dewatering shall be included in the lump sum price bid for Bid Item entitled "Work as Specified for Control of Water and Pipeline Dewatering."

B. Refer to Article 21.01—Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

A. As required.

PART 3 EXECUTION

3.01 GENERAL

A. Contractor must implement the dewatering operation in adherence of these Specifications and under the conditions set forth by permits obtained and paid for by the District and Contractor from the agencies having authority.

B. **Erosion and Sediment Control**—The purpose of the erosion and sediment control is to minimize the amount of sediment that is discharged from the blowoff locations to the storm drains and creeks.

C. For exposed soils, the Contractor shall cover, drain, or otherwise protect the surfaces to minimize erosion. Erosion measures may include, but are not limited to: screens, non-woven filter fabric, jute matting, protective sheets, water bars, sediment barriers such as straw bales, silt fences, sand bags, and appropriate surface contouring as needed. The non-woven filter fabric shall be installed in accordance with manufacturer's specifications.

D. Contractor shall conduct any required baseline testing and monitoring prior to and during the discharge operation of watercourse conditions, i.e., turbidity, temperature, and pH where discharges from construction would be routed to. A log of the monitoring and sampling results shall be provided to the Engineer daily.

E. Contractor must implement the dewatering operations in adherence of the Contractor's SWPPP, or BMP Action Plan as defined in Section 19.

F. Contractor must comply with all federal, state and local laws for disposal of waters from the dewatering process. The Contractor's attention is directed to Section 19 for permissible discharges of construction-related water.

3.02 TESTING

A. Contractor's discharges to the storm drains and creeks are subject to the following testing requirements, unless noted otherwise in these Specifications:

1. The Contractor shall measure the water for turbidity at the point where the discharge water exits the Contractor's water control system.

2. Measurements shall be made with a Portable Turbidimeter, Model No. DRT-15CE, by HF Scientific, Fort Meyers, Florida, or equivalent method. Turbidity measurements shall be performed on a sample immediately after the sample is collected per instrument manufacturer's specifications.

3. The procedure used for performing turbidity measurements shall be documented in the Control of Water and Dewatering Plan.

4. Chlorine shall be measured using a Hach Company portable chlorimeter or equivalent instrument by the Contractor. Instruments shall have a detection limit of 0.08 mg/L or less.

5. Discharge sampling shall be performed for chlorine residual, turbidity, temperature, and pH at 1-hour intervals for 4 hours for the first day of discharge and twice daily thereafter. If groundwater is discharged, sampling shall be performed for turbidity, temperature, and pH at 1-hour intervals for 4 hours for the first day of discharge and twice daily thereafter. If samples taken indicate the discharge exceeds one of the criterions the discharge will be suspended immediately and the Engineer notified, until the water can meet all of the discharge criteria.

6. Contractor shall conduct visual monitoring at the creek outfall through which water is discharged to ensure erosion is not occurring. If erosion of the stream channel banks or bottom is evident, the Contractor shall adjust the discharge flow rate or modify the discharge system to eliminate the effects of erosion. Notify Engineer of any erosion to the creek.

7. Contractor shall conduct any required baseline testing and monitoring prior to and during the discharge operation of watercourse conditions, i.e., turbidity, temperature, pH and chlorine levels where discharges from construction would be routed to.

8. Only uncontaminated water from dewatering operations is allowed to be discharged provided the discharge does not:

    a. Create a nuisance condition.

    b. Exceed 50 Nephelometric Turbidity Units (NTU) for a dry stream.

    c. Exceed 110 percent of the ambient stream turbidity for a flowing stream for ambient turbidities are greater than 50 NTU and no more than 5 NTU above ambient turbidity for ambient turbidities which are less than or equal to 50 NTU (ambient turbidity is measured 100 feet downstream of the point of discharge).

    d. Contain levels of chlorine above 0.08 milligrams per liter (this level is equal to the detection limit of the instrument to be used). This requirement is for chlorinated water discharges only.

    e. Create an erosion problem at the outfall to the creek.

    f. Have the pH outside the range of 6.5 to 8.5.

    g. Cause an increase in temperature greater than 2 degrees F in the creek 100 feet downstream of the point of discharge.

    h. Exceed conditions set by San Francisco Bay RWQCB and CDFW for permitting such discharges by the Contractor.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The work specified in this Article includes all excavation and backfill as required for the relocation and/or installation of all project facilities, as shown on the Drawings and as specified herein, including but not limited to:

1. The Contractor shall be responsible for providing and adhering to excavation safety plans, prepared and reviewed as specified herein, to protect existing utilities, as well as the project facilities. The Contractor is referred to Article 8.05.

2. The Contractor is referred to Article 13.04.01—Geotechnical Reports for the Project Geotechnical Report and Addendum Memorandum. The Contractor shall review the Geotechnical Reports, Addendums and associated Soil Boring Logs and shall draw their own conclusions.

3. The Contractor is referred to Article 16.02.02—Protection of Existing Utilities. The Contractor shall protect and maintain all underground and aboveground utilities encountered.

4. Structure Excavation and Backfill:

a. Structure excavation shall consist of furnishing all labor, materials and equipment and performing all operations necessary to excavate for structures and related facilities, other than pressure pipe, as shown on the Drawings and as specified in these Specifications.

(1) Structure excavation shall include the saw cutting and removal of pavement and other such hard scape materials.

b. Structure backfill shall consist of furnishing all labor, materials and equipment and performing all operations necessary to furnish and install structure backfill material around all structures and related facilities, other than pressure pipe, as shown on the Drawings and as specified in these Specifications.

5. Trench Excavation and Backfill:

a. Trench excavation shall consist of furnishing all labor, materials and equipment and performing all operations necessary to excavate for the installation of pressure pipe and related components as shown on the Drawings, as specified in these Specifications, and as specified by the Engineer.

(1) Trench excavation shall include the saw cutting and removal of pavement and other such hard scape materials.

b. Trench backfill shall consist of furnishing all labor, materials and equipment and performing all operations necessary to furnish and install specified backfill materials for pressure pipe and related components as shown on the Drawings and as specified in these Specifications.

6. Over-excavation and subgrade stabilization may be required prior to backfill. The Engineer will review soil conditions encountered and determine the need and limits of over-excavation and subgrade stabilization. If required, over-excavation will consist of an additional 12 to 24 inches of excavation, as determined by the Engineer. Subgrade stabilization backfill shall be drain rock and nonwoven filter fabric up to 6 inches below the bottom of the pipe, as shown on the Drawings and as specified.

7. Disposal of Excavated Soils: All excess backfill materials or excavated materials not acceptable for backfill shall become the property of the Contractor, shall be removed from the project site, shall be tested by a certified laboratory and disposed of in accordance with all applicable regulations, unless otherwise specified in these Specifications. See Article 13.04.03—Hazardous Material Investigation Report for “Soil Quality Testing Reports”.

1.02 REFERENCES

A. Related Articles

1. Article 24.02—Controlled Density Fill
2. Article 24.03—Exploratory Investigation
3. Article 24.16—Shoring and Bracing

B. California Department of Transportation (CalTrans)

1. Standard Specifications Latest Revision

C. American Society of Testing and Methods (ASTM)

1. ASTM D 698—Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort

2. ASTM D1556—Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method

3. ASTM D 1557—Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort

4. ASTM D 2487—Standard Practice for Classification of Soils for engineering Purposes (Unified Soil Classification System)

5. ASTM D6938—Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

6. ASTM D4318—Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.03 SUBMITTALS

A. Submittals shall be in accordance with Article 7.05 regarding submittals.

B. The Contractor's attention is directed to Article 8.05 regarding excavation safety plans.

C. Prior to commencement of any work, the Contractor shall submit complete calculations, and design drawings, showing a plan layout and shoring detail of all shoring systems for the Engineer's review. The calculations and Drawings will be signed and stamped by civil or structural engineer registered in State of California. Construction shall not proceed without the Engineer's review of the Contractor's calculations and Drawings.

D. Submittal shall be in accordance with Article 8.05, "Excavation Safety Plans," and 7.05, "Submittals to be Furnished by the Contractor," of these specifications for accomplishing the Structure and Trench Excavation and Backfill work in accordance with the Drawings, Specifications, and recommendations from the manufacturers for the various products and materials to be installed.

E. Submit Drawings and digital photos showing the location, approximate station and size of all utilities encountered during excavation.

F. Submit soil data and test results for all excavated materials that are to be reused for trench and structure backfill.

G. Submit the source and soils data for all imported materials. The Contractor shall submit an "Imported Materials Certification Form" for each borrow source of backfill material. Imported Materials Certification Form can be found in Appendix B.

H. Submit source, gradation, and testing data for aggregate base materials.

I. Submit test results of soil analyses to indicate that the materials meet these specifications, prior to delivering or using the material on site.

J. Submit compaction test results for all structure and trench backfill.

K. Field test reports shall be submitted within 24 hours of the completion of the test and uploaded by the end of the month for work related to the pay application, and noted in Contractor's Daily Report.

1.04 QUALITY CONTROL AND ASSURANCE

A. The Contractor shall retain an independent testing laboratory or testing firm acceptable to the District for preliminary review of materials, compaction (field density and moisture) and CDF testing. The Contractor shall submit proposed CDF testing lab certifications prior to District acceptance in accordance with Article 7.05. All materials proposed for incorporation into the Work shall be tested prior to their use for compliance to these Specifications. The Contractor shall provide access to the materials and work area and shall assist the laboratory as needed in obtaining representative samples. The Contractor shall be responsible for the cost of such quality control tests as required by the Contract.

B. Required Tests. For planning and bidding purposes, the following guidelines shall be used for frequency of field tests. Additional tests shall be performed as necessary for job conditions, number of failed tests or as determined by the District. In the event that a lift fails a compaction test, all costs for retesting for compliance shall be the Contractor's responsibility. Test results shall be submitted as indicated in Article 7.05.

1. Two (2) initial gradation tests shall be made for each type of material, and one additional test shall be made for each additional 500 tons of each material proposed for use on the Project.

2. Two (2) initial compaction characteristics tests in accordance with ASTM D1557 shall be made for each type of material proposed for use on the Project.

3. In-place field density and moisture tests at intervals of 300 feet maximum for each lift along the trench.

4. One in-place field density and moisture test for every 200 cubic yards of structure backfill.

5. One in-place density and moisture test whenever there is a suspicion of a change in the quality of moisture control or effectiveness of compaction.

6. Additional gradation, compaction characteristics, and maximum index density tests whenever the source or quality of material changes.

7. The in-place density and moisture content shall be determined by any one or combination of the following methods at the discretion of the Engineer:

   a. ASTM D1556—Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method

   b. ASTM D2216—Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

c. ASTM D6938—Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

C. The District may request additional testing to be performed by an independent testing laboratory for his guidance and quality assurance of the Work. Payment for such tests will be the responsibility of the District. Testing by the District is for the sole benefit of the District and shall not be considered a substitute for the specified testing by the Contractor. The Contractor shall cooperate with District's quality assurance testing work. The Contractor shall backfill quality assurance test areas at the Contractor 's expense. The District may test any lift of fill at any time, location, or elevation.

1.05 DELIVERY AND STORAGE

A. Excavated materials to be used for backfill may be deposited in stockpiles at points convenient for re-handling the material during the backfilling process. The location of stockpiles must be within the staging areas or other locations coordinated and submitted by Contractor. The location of stockpiles is subject to the approval of the District.

1.06 MEASUREMENT

A. Structure Excavation and Backfill:

1. No measurement will be made for structure excavation and backfill. Structure excavation and backfill for all above and below grade structures, vaults and related appurtenances, laterals, facilities and utilities shall be considered incidental to and included in the various items of work. Above and below grade appurtenances shall include, but are not limited to, air release valve assemblies, combination air release and vacuum valve assemblies, blowoff and pumpout riser assemblies, isolation valve assemblies, turnout assemblies, pressure reducing assemblies, and other ancillary assemblies.

B. Trench Excavation and Backfill:

1. For purposes of payment, the volume of trench excavation for pressure pipe shall be measured in cubic yards and calculated based on the neat line dimensions at the existing ground profile at the pipe centerline as shown on the profiles and typical trench sections in the Drawings. The longitudinal limit of trench excavation for pressure pipe shall be measured along the pipe axis, exclusive of structure excavations. Trench sections are considered to have sides as shown on the Drawings.

2. The volume of trench excavation includes that quantity of pavement, sidewalk, and curb and gutter which must be removed as described in these Specifications and as shown on the Drawings. No distinction will be made between earth, rock, pavement, sidewalks, curb and gutter,

structures, or any other material. No payment will be made for overexcavation or reexcavation unless unsuitable material is encountered and the Engineer directs the Contractor to remove the unsuitable material.

3. For purposes of payment, the volume of Type “A” Backfill for pressure pipe shall be measured in cubic yards and calculated based on the neat line dimensions at the existing ground or finish grade profile at the pipe centerline as shown on the profiles and the typical trench sections on the Drawings. The longitudinal limit of Type “A” backfill for pressure pipe material shall be measured along the pipe axis, exclusive of structure backfill. Trench sections are considered to have sides as shown on the Drawings.

4. The measurements for the removal and replacement of quantities of unsuitable trench subgrade material shall be made in the field by the Engineer.

C. No measurement will be made for the removal and restoration of concrete sidewalks, wheelchair ramps, driveway aprons, and curbs and gutters. Area excavated beyond designated limits shall be restored in accordance with the applicable provisions of these Specifications at the Contractor’s expense.

1.07 PAYMENT

A. Structure Excavation and Backfill:

1. Full compensation for furnishing all materials and doing all work to provide suitable Structure Excavation and Backfill shall be included in the items of work that require Structure Excavation and Backfill and no additional payment shall be made therefore.

2. Payment for removal and replacement of unsuitable Structure subgrade material shall be considered as incidental to the work and shall be included in the item of work that requires Structure Excavation and Backfill and no additional payment shall be made therefore.

B. Trench Excavation and Backfill

1. Full compensation for furnishing all materials and doing all work to provide suitable Trench Excavation and Backfill shall be included in the items of work that require Trench Excavation and Backfill and no additional payment shall be made therefore.

2. Payment for removal and replacement of unsuitable subgrade material shall be considered as incidental to the work and shall be included in the item of work that requires Trench Excavation and Backfill and no additional payment shall be made therefore.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials shall not be corrosive, contain hazardous materials, debris, or vegetation, or be by-products of mineral mining, glassmaking, or other manufacturing processes.

B. All sieve sizes referenced are to be U.S. Standard sieve size unless otherwise noted. All percentages for amount passing a certain sieve are shown as a percentage of the total sample's dry weight.

C. When lumber is used in shoring elements, the Contractor shall furnish structural grade planks, beams, and posts as defined and specified for stress-grade lumber in the American Lumber Standards for particular application. Lumber may be rough, untreated, in random lengths, and shall be of standard dimensions.

Structural Steel: When structural steel is used for sheet piling or other shoring elements, the Contractor shall provide sheet pile manufactured from steel conforming to ASTM A-328, or form steel conforming to ASTM A-572, Grade 42.

D. Pressure pipe bedding and encasement shall be Controlled Density Fill (CDF) as specified in Article 24.02.

E. Trench Backfill

1. Trench backfill shall consist of all backfill required to restore excavated trenches for pressure pipe to a finished grade that conforms to the surrounding existing ground or to the subgrade elevations shown on the Drawings within paved roadways. In the event a section of the pipe is backfilled with an option not originally bid, said backfill shall conform with the appropriate details of the Drawings and these Specifications, but no additional quantities or payment will be considered over that which would be paid using the original bid unit price, unless otherwise specified.

2. The components of trench backfill shall consist of:

a. Controlled Density Fill (CDF)

b. Backfill—Type "A" backfill

c. In Paved Areas

(1) Roadway Base—Per requirements of Authority Having Jurisdiction (AHJ)

(2) Pavement—Per requirements of Authority Having Jurisdiction (AHJ)

3. Telemetry and Fiber optic conduits shall be as specified in Section 37—Electrical.

4. Tracing wire shall be #12 AWG Copper Clad Steel, High strength, totally annealed 1055 steel with 452 lb. break load and 30 ml HDPE coating color coded per APWA standard. Tracing wire shall be laid along the top of the pipe and held in place with tape, satisfactory to the Engineer, spaced not more than 8 feet apart. Terminate the wires in the valve boxes, vaults, turnouts or other structures as shown on the Drawings.

5. **Warning Tape**—The Contractor shall furnish and install detectable underground warning tape. The tape shall be installed as shown on the Drawings.

   a. The detectable underground warning tape shall be a minimum 12-inch-wide and minimum 5.0 mil overall thickness; five-ply composition; ultra-high molecular weight; 100% virgin polyethylene; acid, alkaline and corrosion resistant. The tape color shall be blue and shall bear the continuously printed nonfading legend:

      "CAUTION TREATED WATER BURIED BELOW

      Call Santa Clara Valley Water District

      1-(408)-265-2600"

   b. The underground warning tape shall be Detectable Marking Tape as manufactured by Christy's or equal.

6. Trench Backfill above pressure pipe CDF Bedding and Encasement.

   a. Trench Backfill material above pressure pipe CDF bedding and encasement shall be CDF, type "A" backfill, or select backfill.

   b. Trench backfill above pressure pipe shall be CDF.

   c. Type "A" Backfill

      (1) See Article 24.12—Type A Backfill

   d. Select Backfill

      (1) Select Backfill shall consist of imported, well-graded, granular material. The select backfill shall conform to the following graduation and be within the boundary created by a straight-line interpolation between points:

Sieve Sizes	Percent Passing by Weight
3/4 inch	100
No. 4	25 – 90
No. 200	0 – 12

(2) Select backfill shall also conform to the following requirements:

Test	Test Method No. California	Individual Test Result	Moving Average
Resistance (R-value)	301	78 Minimum	–
Sand Equivalent	217	28 Minimum	31 Minimum

(3) If Sand Equivalent exceeds 35, the R-value requirement shall be waived.

e. Controlled Density Fill

(1) See Article 24.02—Controlled Density Fill

F. Structure Backfill

1. Structural backfill shall be controlled density fill. See Article 24.02 – Controlled Density Fill

G. Aggregate Base Course:

1. Aggregate Base shall be Class 2, 3/4-inch maximum Aggregate Base in conformance with Section 26-1.02B, Class 2 Aggregate Base, of the State Specifications.

PART 3 EXECUTION

3.01 GENERAL

A. The work performed under this Section shall be constructed to the lines, grades, elevations, slopes and cross sections shown on the Drawings and as specified. The Contractor shall be responsible for setting and maintaining grade stakes. Graded surfaces shall present a neat, uniform appearance upon completion of the Work.

B. It shall be the Contractor's responsibility to maintain adequate safety measures and working conditions and to take measures necessary during the performance of the Work to protect areas affected by the Work.

C. The Contractor shall be solely responsible for structural safety and providing shoring systems as indicated as required in accordance with Article 24.16, "Shoring and Bracing," of these Specifications.

D. Inconvenience to traffic and work by others shall be avoided as much as possible.

E. The Contractor shall provide the necessary storm water pollution prevention measures so as to prevent siltation of waterways and drainage courses.

F. Prior to start of construction, the Contractor shall communicate with all local representatives of utility companies, including but not limited to oil, gas, telephone, communications, water and sewer, as well as local municipalities in the location of the proposed construction area. The Contractor shall call USA North 811 to locate all existing utilities shown or not shown on the Drawings. Existing utility lines and structures which are to remain in service shall be protected from damage during construction. Where utility lines, underground pipes and conduits, or structures not shown on the Drawings are encountered, the Contractor shall report them to the District where needed for revised line and grade approval. The Contractor shall bear the cost of repair or replacement of utility lines or structures which are broken or damaged by his operations.

G. It is the Contractor's responsibility to support or temporary relocate, and protect existing utilities across trenches and other narrow structural excavations.

H. Blasting or other use of explosives for excavation shall not be permitted.

I. Safe and suitable access including bracing, supporting, pumping, and draining shall be provided for all excavation in accordance with CAL-OSHA. Any damage proven to result from improper installations shall be the responsibility of the Contractor.

J. No excavation shall be left open during periods when the Contractor is not at the site of Work without proper barricades, trench plates, and other protections as otherwise specified and as authorized by the Engineer.

K. The Contractor shall establish existing (original) and final grades along the pipeline alignment. Unless otherwise shown on the Drawings, final grades shall be the same as existing grades.

3.02 EXCAVATION

A. When performing excavation, the Contractor shall take all reasonable care to protect free from damage any foundations, walls, projecting reinforcement, water stops, pipes, utilities, and any other items encountered. The Contractor shall

promptly notify the Engineer any conditions that may prevent him/her from providing such protection.

B. Care shall be exercised to prevent any excavation beyond designated limits as shown on the Drawings. All area excavated beyond the designated limits shall be backfilled and compacted to a depth and width extending to undisturbed side slopes with material as shown on the Drawings.

C. The Contractor, as a minimum, shall have a “spotter” at all times when excavating within 10 feet of any known utility (either shown on the Drawings, reference Drawings, or marked in the field as a USA marking). The purpose of the spotter is to observe the progress of the excavation, communicate with the excavation equipment operators, and look for signs of buried utilities and structures so that damage to such utilities and structures is avoided.

D. The bottom of the excavations shall be rendered firm and dry.

E. Structure Excavation

1. Conform to elevations and dimensions shown on the Drawings within a tolerance of plus or minus 0.10 foot and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and inspection.

2. In excavating for footings and foundations, take care not to disturb bottom of excavation. Trim bottoms to required lines and grades to leave solid base to receive structural fill or concrete. The bottom of excavation shall be inspected by the District to ensure adequate bearing for the structure. No concrete or other work shall be placed until District's acceptance has been obtained.

F. Trench Excavation

1. Trenches shall be excavated in conformance with Article 8.05, “Excavation Safety Plans,” of these Specifications.

2. The Contractor is solely responsible for excavation safety, including support to all adjacent improvements. The Contractor is solely responsible for trench dewatering as set forth in Article 23.04, ”Control of Water,” of these Specifications.

3. Trench Walls: The practice of undercutting at the bottom will not be permitted. The trench walls shall remain vertical to a depth of at least one foot above the top of the pipe.

4. Trenches shall be excavated to a minimum of 6 inches below the final pipe invert. Trenches shall be excavated to allow proper compaction of pipe bedding and backfill.

5. Minimum Width of Trench: Trenches shall be excavated to the minimum trench widths shown on the Drawings. Trenches shall be excavated to a width which will provide adequate working space and sidewall clearances for proper pipe installation, jointing, bedding and backfilling. Bell holes are required for joint installation and shall provide adequate clearance for tools and methods used for installing pipe. To prevent point loading, no part of any bell or coupling shall be in contact with the trench bottom, trench walls, or bedding when the pipe is jointed. Excavation shall be made as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.

6. Maximum Width of Trench. The maximum allowable width of trench shall be as shown on the Drawings.

7. Maximum Length of Open Trench: Except with special permission by the District, only that amount of pipe construction shall be permitted which can be completed in one day, including excavation, construction of pipeline, and backfill in any one location. Maximum length of open trench shall never exceed 400 feet. This length shall include open excavation, pipe laying, and appurtenant construction and backfill which has not been temporarily resurfaced.

8. Rock and/or boulders shall be removed to a minimum clearance of 6 inches at the bottom and sides of all the pipes being installed.

3.03 BACKFILL

A. Excavation for construction of structures, installation of pipes and ducts and underground storage tank and valves removal shall be made to such widths and depths indicated on the Drawings.

B. Jetting or ponding to achieve compaction will not be permitted.

C. Structural Backfill

1. Unless CDF is used as structural backfill, Structure Backfill shall conform to Section 19-3.03 and 19-5.03 of the State Specifications except as modified herein or on the Drawings.

2. No structure backfill shall be placed until all forms and unsuitable material have been completely removed from the void to be backfilled around the structures and until the concrete surfaces are found to be acceptable by the Engineer.

3. Structure backfill adjacent to vertical walls shall extend at least 12 inch beyond the outside face of walls unless a pay limit is otherwise stated or shown on the Drawings.

4. Structure Backfill shall extend at least 12-inch horizontally beyond the edges of the concrete structure to be placed. Unless CDF is used as structural backfill, Structure Backfill material shall be mixed and processed to a homogeneous mixture, spread, and compacted to a relative compaction of not less than 95 percent and plus or minus 2 percent of optimum moisture content as per ASTM D1557.

5. In areas upon which concrete for structures, such as under foundation, floors, or base slabs are to be placed, the underlying base material shall be compacted to a relative compaction of not less than 90 percent and plus or minus 2 percent of optimum moisture content per ASTM D1557 upon which a minimum compacted thickness of 6 inch of Structure Backfill shall be placed to the final structure subgrade and compacted to a relative compaction of not less than 95 percent unless otherwise specified.

6. When the structure is within the existing pavement, sidewalks, curb and gutter, or shoulder area, the roadway base shall be installed as described in these Specifications except that the payment shall be included in the requiring structure backfill.

7. Finish grade for structural backfill shall be as shown on the Drawings or as required to conform to adjacent ground elevations.

D. Trench Backfill

1. In all stages of the backfilling operation, the Contractor shall limit both method and equipment so as to not damage the integrity of the pipe or related facilities or induce a diametrical variation of greater than plus or minus 0.5 percent.

2. After completion of the trench excavation and proper preparation of the trench bottom, bedding material shall be placed.

3. All pipe shall be installed in such a manner as to ensure full support of the pipe barrel over its entire length and under appurtenances.

4. As soon as practicable after pipe has been installed and joined, embedment material shall be placed around and over the pipe to the limits as shown on the Drawings.

5. The Contractor shall provide an adequate subgrade foundation in areas where excess moisture content, as determined by the Engineer, would otherwise prevent the proper installation of the pipe bedding. One such approved method is to install drain rock as shown on the Drawings. The Contractor may use alternate measures to provide an adequate subgrade foundation in areas of excess moisture subject to written approval of the Engineer.

6. When backfilling utility crossings with less than 1 foot of clearance from wall to wall, the Contractor shall use controlled density fill to backfill and cover the utility. The crossing utility shall have at least a minimum of 6 inches of controlled density fill surrounding the pipeline. Controlled density fill shall conform to Article 24.02.

7. As the pipe is being installed, a minimum of 90 feet shall be maintained between the end of the new pipeline and the end of the trench being excavated (except where trenching reached the end of the design alignment) or from any visible obstructions. The purpose of this stipulation is to permit the Contractor and District representative to see in advance whether any horizontal or vertical adjustments in the pipe alignment will be required to avoid conflicts.

8. The maximum length of on-site trench excavation in advance of the pipe laying operations shall be **200** feet, and the maximum amount of trench remaining open without backfill shall be **200** feet.

E. Unsuitable Material

1. Unsuitable material is any debris, concrete, pavement, exposed tree roots, lumber, or other objectionable materials and shall be removed, by the Contractor, from the excavated area to be backfilled.

2. Unsuitable subgrade material shall be defined as material the Engineer determines to be of such unstable nature as to be incapable either of providing a firm base for pipe installation or of being compacted in accordance with the requirements of these Specifications. Examples of unsuitable subgrade material may include, but are not limited to, high plasticity clays, logs, materials with high organic content or other debris.

3. Subgrade materials removed due to excess moisture content, which would otherwise be acceptable as backfill, may be used as backfill after drying to an extent approved by the Engineer. Excess moisture content shall not be a factor in determining unsuitable backfill material.

4. If unsuitable subgrade material is encountered, the Contractor shall remove a minimum of 12 inch and a maximum of 24 inch as determined by the Engineer and replace it. The Contractor may replace the unsuitable material with drain rock or flowable fill. Prior to placing drain rock, a nonwoven filter fabric shall be placed at the bottom of the subexcavation. The ends of the nonwoven filter fabric shall then be overlapped on top of the drain rock for a minimum distance of 24 inch for pipe diameters over 10 inch and 12 inch for pipe diameters 10 inch and under.

5. Unsuitable materials removed shall be removed from the right of way within 24 hours.

6. Loose materials shall be removed from all cut surfaces. Exposed soils shall be scarified to a minimum depth of 6 inches and moistened (dried) to 2 to 3 percent above optimum moisture content, and re-compacted to a minimum of 95 percent relative compaction based on ASTM D1557 prior to placing any required backfill or base course.

7. Unsuitable soils for foundations of trenches and fills shall be removed and replaced with backfill. Unsuitable soils include topsoil, soft clays or silts, soils containing organic material, debris, or other deleterious materials.

8. All excavated materials not acceptable for backfill shall become the property of the Contractor and shall be removed from the project site and disposed of at the Contractor's expense in accordance with all applicable regulations, unless otherwise specified.

9. All excess and unsuitable excavated material shall be recycled. Material that cannot be recycled shall be removed from right of way and legally disposed of by the Contractor. Excavated materials that are temporarily stored on site shall be placed at a distance greater than the trench depth away from the top of the slope, or at a minimum distance of five (5) feet from the top.

F. Finish Grading

1. Finish grading in preparation for placing of paving, sidewalks, slabs, and appurtenances shall be performed at all places that are indicated on the Drawings, to the lines, grades, and elevations shown and otherwise as acceptable to the Engineer. During the process of grading, the subgrade shall be maintained in a well-drained condition. Finish grading for areas underlying paving, walks, structures, and slabs on grade shall be to plus or minus 0.04 feet of the designated grade.

2. If at the time of grading it is not possible to place any material in its proper section of the permanent embankment, fill, or excavation, such material shall be stockpiled for later use in designated staging areas. No extra payment will be made for the stockpiling or double handling of excavated material.

3. Stones or rock fragments larger than 3 inches in their greatest dimensions will not be permitted in the top 6 inches of the finished subgrade of fills or embankments.

4. In cuts, all loose or protruding rocks or boulders on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings.

3.04 COMPACTION

A. General

1. Where referred to in the Specifications, “compaction” or “relative compaction” shall refer to in-place dry density of soil expressed as a percentage of the maximum dry density of the same material as determined by ASTM D1557.

2. Inconvenience to traffic and work by others shall be avoided as much as possible.

3. Care shall be exercised to prevent any excavation beyond designated limits as shown on the Drawings. All areas excavated beyond the designated limits shall be backfilled and compacted to a depth and width extending to undisturbed side slopes with material as shown on the Drawings.

4. Prior to the general placement of any materials and during such placement, the Engineer may select areas within the limits of any work for testing the degree of compaction obtained. The Contractor shall arrange and pay for soil tests to be made by an independent testing laboratory. Testing results shall be submitted to the Engineer. Testing shall be in accordance with the applicable ASTM standards.

B. Compaction

1. Compaction of backfills, subgrade soils, aggregate base, aggregate subbase, and other soil materials shall be accomplished to the following relative compaction criteria in horizontal lifts of thicknesses noted, or if not noted, as compatible with the compaction equipment used.

Material	Minimum Percent Relative Compaction (ASTM D1557)	Maximum Compacted Lift Thickness (Inches)
Subgrade soil (minimum of 12-inch depth) below roads, parking lots, sidewalks, foundation and slabs	95	6
Base and subbase fill for pavement support	95	8
Base course below asphalt or concrete pavement	95	8
Utility bedding and embedment	95	6
Non-structural backfill in utility trenches	95	6
Structural backfill in utility trenches	95	6
Unpaved Non-structural fills/backfills	90	8
Unpaved Structural fills/backfills	95	8

2. When backfill material is required to be compacted to a percent relative compaction, the percent relative compaction shall be determined and controlled in accordance with the requirements of ASTM Standard Test Method D1557 as determined by the Engineer.

3. The field density shall be determined in accordance with the requirements of either ASTM Standard Test Method D1556 or ASTM Standard Test Method D6938 or as determined by the Engineer.

4. The Contractor shall perform field density tests in the utility trench backfill for every vertical lift, at an approximate longitudinal spacing of no greater than 300 feet.

5. Individual test results shall be used to determine whether compaction of an area meets the minimum requirements in lieu of an averaging method as stated in Caltrans Test Method No. 231(Part II).

6. The Contractor, through its approved independent testing consultant, will conduct compaction testing as specified during the progress of the work to determine compliance with the compaction requirements specified herein.

7. When backfilling utility crossings with less than 1 foot of clearance from wall to wall, the Contractor shall use controlled density fill to backfill and cover the utility. The crossing utility shall have at least a minimum of 6 inches of controlled density fill surrounding the pipeline. Controlled density fill shall conform to Article 24.02.

8. When using Drain Rock, relative compaction shall not be tested. Drain Rock shall be field compacted using vibration methods per 6-inch uncompacted lifts.

9. To reduce impact damage on the pipe during compaction operation, there shall be at least 12 inch of cover over the pipe before using walk behind compaction equipment and at least 30" of cover before using ride-on equipment. Use vibration or lightweight handheld compaction equipment within 12 inch above pipe.

10. When performing compaction, the Contractor shall take all reasonable care to protect free from damage any foundations, walls, projecting reinforcement, water stops, pipes, utilities, and any other items encountered. The Contractor shall promptly draw to the notice of the Engineer any conditions that may prevent him/her from providing such protection.

11. The Contractor shall remove material as required by the Engineer in any area where compaction of the material, when tested, does not fully comply with these Specifications. The unsatisfactorily compacted material shall be promptly removed, after notification, and reworked or

replaced with material that will conform to the specified requirements. All additional costs for such required removal, reworking or replacing, and recompaction of material including costs paid by the District to its authorized testing consultant for retesting to verify compliance shall be borne by the Contractor.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The work specified in this Article includes furnishing and installing controlled density fill (CDF) and sand pads, as shown on the Drawings and as specified herein. The terms control density fill, soil cement, controlled low strength material, and flowable fill are synonymous in these Drawings and Specifications.

B. Unless otherwise specified, CDF shall be used to bed the pipe and to backfill the trench to the depth as shown on the Drawings. The space between the bottom of the trench and the bottom of the pipe shall be as shown on the Drawings and shall be large enough to allow the flowable fill to flow to both sides of the pipe.

1.02 REFERENCES

A. Related Articles:

1. Article 24.01 – Excavation and Backfill

B. American Society of Testing and Materials (ASTM):

1. C 94 – Specification for Ready-Mixed Concrete
2. C 150 – Specification for Portland Cement
3. C 260 – Specification for Air-Entraining Admixtures for Concrete
4. C 403 – Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance
5. C 494 – Standard Specification for Chemical Admixtures for Concrete
6. C 618 – Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
7. D5971 – Standard Practice for Sampling Freshly Mixed Controlled Low-Strength Material
8. D6023 – Standard Test Method for Density (Unit Weight), Yield, Cement Content, and Air Content (Gravimetric) of Controlled Low-Strength Material (CLSM)
9. D6024 – Standard Test Method for Ball Drop on Controlled Low Strength Material (CLSM) to Determine Suitability for Load Application

10. D6103 – Standard Test Method for Flow Consistency of Controlled Low Strength Material (CLSM)

1.03 SUBMITTALS

A. Mix Design: Prior to beginning work, the Contractor shall submit to the Engineer for review, the mix designs which shall show the proportions, gradations, and test results of all materials proposed for each class and type of CDF to be used to show compliance with this Specification.

B. Certificate of Compliance: Certificates of Compliance shall be provided for all products and materials proposed to be used under this Article.

C. Ready-mix plant certification.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Controlled Density Fill (CDF)

1. CDF shall be a mixture of cement, pozzolan, coarse and fine aggregate, admixtures, and water batched by a ready mix concrete plant in accordance with ASTM C94.

2. The mixture shall produce a cementitious, flowable, hand excavatable material.

3. Mix design requirement: The Contractor and its supplier shall determine the materials and proportions used to meet the specified requirements.

B. Properties

1. Wet density: between 115 PCF and 145 PCF.

2. Flowability: 6 to 8 inches tested per ASTM D6103.

3. Compressive strength at 28 days for flowable CDF shall be between 50 psi minimum and 125 psi maximum.

C. Cement

1. Cement shall be Type II in accordance with the requirements of ASTM C150.

D. Pozzolan

1. Pozzolan shall be Class C or F fly ash in accordance with the requirements of ASTM C618. Limit to maximum 70 percent of the total cementitious material weight.

E. Aggregate

1. Aggregate shall consist of a well graded mixture of sand with or without pea gravel with a maximum size aggregate of 1/2 inch. 100 percent shall pass the 3/4-inch sieve. Not more than 30 percent shall be retained by the 3/8-inch sieve (pea gravel) and not more that 10 percent shall pass the No. 200 sieve.

2. Aggregate shall be free of clay, organics, and other deleterious materials.

F. Admixtures

1. Admixtures shall not contain chloride ions and shall not cause delayed strength gain.

2. Air entraining: ASTM C260. Air content shall not exceed 30 percent.

3. Accelerating admixtures: ASTM C494.

G. Water

1. Potable.

H. Sand pads

1. Sand pads shall be a mixture of approved soil and cement. The cement content shall be the same as in the CDF mixture.

PART 3 EXECUTION

3.01 INSTALLATION

A. Delivery, Storage, and Handling

1. CDF shall be delivered to the work in standard transit mix trucks.

2. CDF shall be delivered in place by means of tailgate discharge, conveyor belts, pumped in place, or other means acceptable to the Engineer.

B. Batching equipment shall be utilized to obtain the proper weights of CDF components. All measuring devices shall be accurate to a 2 percent variation above or below the actual weights required. Volumetric batching may be used provided the same accuracy required for weight batching is maintained.

C. The mixers used for mixing the CDF shall be designed and operated so that the CDF as discharged from the mixer is uniform in composition and consistency throughout each batch, except where changes are required, and will flow without segregation.

D. CDF shall be continuously placed against undisturbed in-situ earth material unless otherwise approved by the Engineer. Where new CDF must be placed against existing CDF, the placement shall be clean of all loose and foreign material. The surface of the existing CDF shall be soaked a minimum of one hour before placement of new CDF. No standing water will be allowed before starting placement of new CDF.

E. Take measures to prevent pipe float. Recommended methods include, but are not limited to the following:

1. Place CDF in lifts below the pipe spring line. Allow each lift to harden before subsequent placement.

2. Place sand bags over the pipe.

3. Provide straps around the pipe anchored into the soil.

4. Use a faster-setting CDF placed at strategic locations over the pipe.

F. CDF shall be deposited in such a way that it will not disturb the pipe trench or cause foreign material to become mixed with the CDF.

G. The pipe shall be laid on sand pads spaced to support the pipe to match adjoining existing piping and place CDF as shown on the Drawings. When necessary, earth plugs consisting of select backfill material shall be compacted at each end of the pipe to contain the CDF completely within the pipe trench. This operation shall follow as closely behind pipe laying operations as possible.

H. Control of groundwater removal from the trench section shall be maintained at least until the CDF has reached the initial set.

I. No equipment or traffic shall be allowed on the CDF until it can withstand the weight of the equipment or traffic as determined by one of the following methods:

1. Penetrometer reading per ASTM C403 – minimum 650 psi taken alongside the trench/excavation. Note this is the penetration resistance and does not equal the compressive strength.

2. Drop ball test per ASTM D6024 – maximum ball indentation not exceeding 3 inches.

3.02 QUALITY ASSURANCE

A. All testing of trial mixes, to determine adequacy of the mixture and approved mixes prior to placement and during the work, shall be performed by the Contractor's third-party testing laboratory approved by the Engineer. Alternatively, submit results statistics of satisfactory mix designs if available from prior projects.

B. The flowability of the material shall be determined in accordance with ASTM D6103. Test every 50 CY and each sample used for strength tests.

3.03 QUALITY CONTROL

A. In case the tests of the CDF show non-compliance with the Specifications, the Contractor shall accomplish such remedy as may be required to insure compliance. Subsequent testing and inspection to show compliance shall be at the Contractor's expense without any cost to the District.

B. Obtain samples for testing in accordance with ASTM D5971.

C. The installed density of the material shall be determined in accordance with ASTM D6023.

D. Cast six 6"x12" cylinders for each 100CY or each day if less than 100CY per day. Test two at 7 days, two at 28 days, one at 90 days and one kept as spare that may be tested in the event of questionable results from one of the scheduled tests.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall perform exploratory excavations (potholes) to locate existing pipelines and other utilities prior to relevant submittal preparation, demolition, trenching and general excavations.

B. On the Drawings and in these Specifications “potholing,” “exploratory excavations,” and similar terms have the same meaning.

C. The objective of the exploratory excavations is to reduce the number of field changes due to unforeseen alignment, grade and location conflicts, to allow design adjustments prior to submittal preparation and submission to the Engineer, to record data on existing utilities, and to aid the Contractor in completing new improvements.

D. Prior to commencing the exploratory excavation scope of work, the Contractor and the District will jointly analyze the existing utilities and the proposed improvements to determine the exact number, location and depth of the exploratory excavations required with this scope of work.

E. The Contractor shall be responsible for exploratory excavations as it deems necessary to determine the exact locations and depths of utilities that may impact its work. All such exploratory excavations shall be performed prior to production of any pipe and, in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor’s progress. The Contractor shall assume full responsibility and shall make no claim against the District on account of any damage to any pipes, conduits and/or other structures or for any inconvenience or added cost of performing the work which may be attributed in any degree to inaccuracy of (or lack of) information furnished relative to the location of such structures. The Contractor shall notify the Engineer when such exploratory excavations indicate that the utility location as shown on the Drawings to be in error and/or in conflict with the proposed improvements.

F. The number of exploratory excavations required shall be sufficient enough to confirm the constructability of the improvements considering the proposed alignments, grades, and locations.

G. Perform exploratory excavation on the following existing utilities shown on the Drawings or identified through Underground Service Alert (USA) field markings that are shown crossing or interfering with the proposed pipe alignment or other work and any other locations as directed by the Engineer.

1.02 REFERENCES

A. Related Articles:

1. Article 23.02—Clearing and Grubbing
2. Article 23.03—Demolition
3. Article 23.05—Control of Water
4. Article 24.01— Excavation and Backfill

1.03 SUBMITTALS

A. Exploratory excavation data shall be submitted to the Engineer in accordance with the Standard Provisions within five working days of completion of individual exploratory excavations and also shall be repeated with other relevant fabrication and product submittals. Exploratory excavation data shall be submitted on separate forms using the Table 24.03-1 form.

1.02 MEASUREMENT AND PAYMENT

A. Full compensation for furnishing all work and materials for Exploratory Investigation shall be included in the lump sum price bid for Bid Items entitled “Exploratory Utility Investigation” and “Additional Potholing to Locate Utilities”.

B. Refer to Article 21.01 - Bid Items.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

A. Contact all affected utility owners and request them to locate their respective utilities prior to the start of potholing procedures. Provide utility owners 7 days written notice prior to commencing potholing. If a utility owner is not equipped to locate its utility, the Contractor shall locate it. Paint the location of all affected utilities on the pavement or identify the location with suitable markers if not on pavement.

B. Excavations in paved areas shall be repaired as required by the authorities having jurisdiction. The Contractor shall survey underground utilities as part of the exploratory excavation and report apparent size and type, top of utility elevation, bottom of utility elevation, and surveyed horizontal location (with northing and easting coordinates to the project coordinate system). In paved areas, the thickness of asphalt pavement or concrete, and the underlying aggregate base rock shall be reported.

C. All exploratory excavations shall be conducted in accordance with all applicable regulatory requirements. The Contractor shall contact and coordinate with the authority or agency having jurisdiction for the utilities in question prior to any exploratory excavation work. The contractor shall comply with all conditions,

requirements and/or procedures of the utility owner. The Contractor shall obtain all permits necessary.

D. All exploratory excavations shall be backfilled and repaired in accordance with the requirements of the authority have jurisdiction, unless otherwise noted. Repair excavations in paved areas with a minimum of 2-inches of hot asphalt in asphalt pavement areas and 4-inches of concrete in concrete pavement areas.

TABLE 24.03-1
Exploratory Excavation Report Form

Firm Completing Excavation:

Date of Excavation:_____ Assigned Excavation Number: _

Description of Utility: _

Diameter or Dimensions of Utility: _

Apparent Utility Material (example—mortar covered steel, PVC, concrete encased duct bank, ductile iron, galvanized steel, steel CMP, VCP):

Adjoining Ground Surface Elevation (feet):

Top of Utility or Structure Elevation (feet):

Bottom of Utility or Structure Elevation (feet):

Surveyed Horizontal Location of Utility Excavation:

Northing: _____

Easting: _____

Utility Horizontal or Vertical Location Found to Be Significantly Different From Contract Documents? _____ YES _____ NO

NOTE: ATTACH ANNOTATED PORTION OF CONTRACT DRAWING SHOWING UTILITY AND EXCAVATION LOCATION TO THIS FORM

Comments on Excavation (examples - thickness of pavement and road base, groundwater found):

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. Article includes Type "A" Backfill requirements and information.

1.02 REFERENCES

A. Related Articles

1. Article 24.01 – Excavation and Backfill
2. Article 24.02 – Controlled Density Fill

B. California Department of Transportation (CalTrans)

1. 2018 Standard Specifications

C. American Society of Testing and Methods (ASTM)

1. C 136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

2. D 2487 – Standard Practice for Classification of Soils for engineering Purposes (Unified Soil Classification System)

3. D 4318 – Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer for review, in accordance with Article 7.05 – 'Submittals to be Furnished by the Contractor', product data and documentation of the implementation of quality control. Included with this submittal shall be the following information:

B. Product Data

1. "Imported Materials Certification Form" if imported materials are proposed as Type "A" backfill.

a. Gradation (ASTM C136) for imported materials

b. USCS Soil Classification (ASTM D2487)

c. Liquid Limit, Plastic Limit, and Plasticity Index of Soil (ASTM D4318)

C. Quality Assurance/Control

1. Test Reports

a. Submit test results of the gradation (ASTM C136) to indicate that the materials meet these specifications, prior to using the material on site.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Type “A” Backfill

1. Type “A” backfill shall be suitable material from trench excavation or structure excavation which is processed and graded to ensure that all vegetation, portland cement concrete, asphaltic concrete, or other debris has been removed.

2. Type “A” backfill shall be well graded material.

3. Material larger than ¾ inch shall not exceed 20 percent by volume and no particles larger than 1½ inch in largest dimension will be allowed.

4. Plastic clay with Plasticity Index (per ASTM D 4318) greater than 20 should not be used as Type “A” backfill either.

5. Native soils may be reused as Type “A” Backfill if determined acceptable by the geotechnical report, but must be tested and approved prior to placement.

6. Type “A” backfill may be substituted with Class 2 aggregate base per State Specifications, Class I material, Class II material, or select backfill per these Specifications at the Contractor’s decision at no additional cost to the District.

PART 3 EXECUTION

3.01 INSTALLATION

A. Structural excavation shall be in accordance to Article 24.01 – Excavation and Backfill.

B. Type “A” backfill material shall be placed in accordance to Article 24.01 – Excavation and Backfill.

C. The loose thickness of each layer of Type “A” backfill material shall not exceed 8 inch, if mechanically compacted, or 4 inch, if hand compacted, and shall be placed simultaneously on both sides of the pipe.

D. Type “A” backfill material shall be compacted in accordance with Article 24.01 – Excavation and Backfill.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide temporary shoring or sloping necessary to support the sides of the excavation and trenches and to stabilize or prevent movement of the existing concrete channel lining, adjacent roadway, adjacent structures, and existing railroad tracks and embankment. The shoring system shall be designed to prevent limited ground movement as specified in this Article, including movements at existing walls and slabs, in order to prevent damage to the adjacent roadway, underground utilities, properties, or structures; to prevent delay of the work; and to protect workers' life and safety during construction. The Contractor shall evaluate and design the appropriate shoring system; install the appropriate shoring system; monitor movements of adjacent structures and roadway grades; report results of the monitoring; and maintain temporary shoring or sloping as required by CAL/OSHA and other applicable governmental regulations and agencies.

B. Falsework and vertical shoring shall be designed and constructed in accordance with the requirements in Section 48 and Section 51-1.03 of the State Specifications and Section 17.17 of the Construction Safety Orders, Title 8, California Administrative Code, and as modified herein.

C. The Contractor's attention is directed toward Article 8.05, "Excavation Safety Plans," Article 4.10, "Preservation of Property," Article 4.11, "Contractor's Responsibility for the Work," and Article 16.05, "Rights of Way," of these Specifications, and Section 7-1.02K(6), Occupational Safety and Health Standards of the State Specifications.

D. This Section requires the Contractor to employ California registered professional engineers and land surveyors.

1.02 REFERENCES

A. Related Articles:

1. Article 8.05 – Excavation Safety Plan
2. Article 13.04.01 – Geotechnical Reports
3. Article 23.05 – Control of Water
4. Article 24.01 – Excavation and Backfill

B. American Institute of Steel Construction, Inc. (AISC):

1. Manual of Steel Construction Allowable Stress Design.

C. American Society of Civil Engineers (ASCE):

1. Guidelines of Engineering Practice for Braced and Tied-Back Excavations.

D. California Code of Regulations (CCR):

1. Title 8—Industrial Regulations.

E. California Labor Code (CLC).

F. Department of the Navy Naval Facilities Engineering Command (NAVFAC):

1. NAVFAC Design Manual 7.2—Foundations and Earth Structures.

2. NAVFAC Design Manual 7.3—Soil Dynamics and Special Design Aspects.

G. International Conference of Building Officials (ICBO) and State of California:

1. California Building Code (CBC).

H. State of California Department of Transportation (CALTRANS):

1. CALTRANS California Trenching and Shoring Manual.

I. United States Steel Corporation (USS):

1. USS Steel Sheet Piling Design Manual.

1.03 SYSTEM DESCRIPTION

A. Where General Engineering Design Practice is specified, provide drawings and signed calculations and have the design performed by a civil or structural engineer registered in the State of California:

1. Provide design calculations that clearly disclose assumptions made, criteria followed, and stress values used for the materials being used.

2. Furnish references acceptable to the Engineer substantiating the appropriateness of design assumptions, criteria, and stress values.

B. Design and Qualifications Requirements:

1. General:

a. Design the means for safe and stable excavations in accordance with local, State, and Federal law and for more conservative practices specified herein.

b. Design shoring for an excavation depth of at least 3 feet deeper than the depth depicted on the Drawings for each structure to allow for possible over-excavation of soils.

c. Design steel members in accordance with the California Building Code and the AISC Manual of Steel Design.

d. Design shoring involving materials other than steel in accordance with California Building Code.

e. When electing to design with material stresses for temporary construction higher than allowable stresses prescribed in the Manual of Steel Construction and the California Building Code, increase in such stresses shall not exceed 10 percent of value of prescribed stresses.

f. Generally acceptable references for the design of shoring and excavations are as follows:

(1) CALTRANS California Trenching and Shoring Manual.

(2) NAVFAC Design Manual 7.2.

(3) NAVFAC Design Manual 7.3

(4) USS Steel Sheet Piling Design Manual.

(5) Guidelines of Engineering Practice for Braced and Tied-Back Excavations

C. Excavation Support and Protection Performance Requirements:

1. General:

a. Support faces of excavations and protect new and existing structures and improvements in vicinity of excavations from damage and loss of function due to settlement or movement of soils, alterations in groundwater level caused by such excavations, and related operations.

b. Additional Requirements:

(1) Nothing herein shall substitute or diminish the obligations of Contractor for the furnishing of a safe place of work pursuant to provisions of the Occupational Safety and Health Act of 1970 and its subsequent amendments and regulations and for protection of the Work, structures, and other improvements.

2. Provide safe and stable excavations by means of sheeting, shoring, bracing, and other means and procedures, such as draining and recharging groundwater and routing and disposing of surface runoff, required to maintain the stability of soils and rock.

3. Provide support for trench excavations for protection of workers from the hazard of caving ground.

4. Provide shoring whenever any of the following conditions exist:

    a. Where, as a result of excavation work and analysis performed pursuant to general engineering design practice:

        (1) Excavated face or surrounding soil mass may be subject to slides, caving, or other types of failures.

        (2) Stability and integrity of existing and new structures and other improvements may be compromised by settlement or movement of soils, or changes in soil load on structures and other improvements.

    b. For trenches 5 feet and deeper.

    c. For trenches less than 5 feet in depth, when there is a potential for cave-in.

    d. Where indicated on the Drawings.

    e. Where required to keep all access roads and access to structures continuously open. All access roads and access to structures shall be maintained open except as noted otherwise.

    f. Where otherwise required by law.

5. For safe and stable excavations, use appropriate design and procedures for construction and maintenance to minimize settlement of supported ground and to prevent damage to structures and other improvements, including:

    a. Using stiff support systems.

    b. Following the appropriate construction sequence.

    c. Preventing soil loss through or under support system.

    d. Providing surface runoff collection, routing, and discharge away from excavations.

e. Where dewatering by well points is necessary, recharge groundwater as necessary to prevent settlement in area surrounding excavation.

f. Beneath excavation, maintain groundwater levels at least 3 feet beneath bottom of excavation.

g. Where sheet piling is used, use interlocking type sheets. The sheet piles shall be continuous and driven in interlock. If the bottom of the excavation is located below the water table, use "thumb and finger" type interlock.

h. Not applying shoring loads to existing structures and other improvements.

i. Not changing existing soil loading on existing structures and other improvements.

j. Where shoring is used, horizontal and vertical settlement shall be limited to ½ inch. Fill voids between shoring and cuts to prevent cave-in or surface cracks.

1.04 SUBMITTALS

A. It is the Contractor's sole responsibility to design a shoring system and falsework, where required. The District shall not be liable for use of the shoring system and falsework. The shoring plan and falsework shall be designed by a registered Civil or Structural Engineer in the state of California and shall include supporting design calculations, earth pressure diagrams, and a plan for shoring and falsework installation. The shoring plan and falsework plan shall be submitted to the Engineer in accordance with Article 8.05, "Excavation Safety Plans," of these Specifications.

B. Prior to the installation of any shoring or falsework, the Contractor shall submit six sets of detailed design calculations, one set of sepias, and eight sets of working drawings, for showing a plan layout and detail of all shoring and falsework systems for the Engineer's review. The plan shall include shoring and falsework locations, details of control points, and method of measurement with initial elevations and locations. Copies of field notes pertinent to the shoring monitoring, which show the just-after or baseline shoring location and condition, and subsequent required measurements and relative movements, shall be furnished to the Engineer. The calculations and Drawings shall be signed by a registered civil or structural engineer in the State of California. Construction shall not proceed without the Engineer's review and approval of the Contractor's calculations and Drawings, as well as, the shoring plan. Submittals shall be in accordance with Article 8.05 and Article 7.01, of these Specifications.

C. Review by the Engineer of the calculations and Drawings or inspection performed by the Engineer will in no way relieve the Contractor of full responsibility for the sheeting, shoring, falsework and/or bracing systems.

1.05 MEASUREMENT AND PAYMENT

A. Full compensation for furnishing all work and material for Shoring and Bracing shall be included in the lump sum price bid item entitled “Shoring and Bracing”.

B. Refer to Article 21.01 – Bid Items.

C. Any delays to the schedule, as a result of a shoring system that does not meet the specified performance requirements, and for resubmitting a revised shoring system, shall be at the Contractor’s sole expense.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 TRENCHING AND EXCAVATION SAFETY PLANS

A. Develop, provide, and implement trench excavation and excavation safety plans as required by the California Labor Code, Construction Safety Orders, and other relevant law.

3.02 INSTALLATION AND REMOVAL

A. Install the means for providing safe and stable excavations.

B. All shoring shall be removed by completion of the Work unless otherwise noted. Exceptions include rock anchors and soil nails that are at least 5 feet below existing and proposed underground infrastructure. Select shoring system and method of removal which will minimize the creation of voids and the creation of settlement. To prevent settlement caused by pulling shoring, fill voids with sand, pea gravel, or pressure injected grout if specifically approved by the Engineer. The methods used shall prevent settlement.

3.03 MAINTENANCE

A. Where loss of soil occurs, plug gap in shoring and replace lost soil with compacted structural fill, Class 2 aggregate base, or low density concrete backfill material.

B. Shoring shall be inspected no less frequently than weekly and needed repairs shall be completed as soon as required due to safety and the potential for damage.

C. The Contractor shall provide shoring design calculations as necessary to specify the maximum allowable ground movement near the top facing and ground surface behind the temporary excavation support. Where measurements and

observations indicate the possibility of failure or excessive movement of excavation support, or damage to existing structures and utilities, take appropriate action immediately. Appropriate action by the Contractor shall include, but not be limited to, placement of additional excavation supports, additional shoring design calculations, exploratory excavations, expediting work to complete and backfill excavations, repair of damage to existing structures and utilities, soil stabilization, greater ground and surface water control, and associated work.

D. Movement of existing structures and utilities (due to nearby work by the Contractor) equal to or greater than 0.02 feet in any direction is considered excessive and damage, as is distress in piping or electrical conduits, shifting of openings (e.g., doors, windows), structural cracking, the creation of leaks from groundwater, surface water, or rainfall, and similar defects. In addition, observed movement in any direction near the top facing and ground surface behind the excavation supports equal to or greater than the specified allowable movement defined by the authority having jurisdiction is also considered excessive and damage.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The work in this Article includes:

1. Removal and replacement of existing asphaltic concrete pavement as required, as shown on the Drawings and specified in these Specifications.

2. Removal and replacement or repair of existing asphaltic concrete pavement that is damaged by Contractor during the construction.

1.02 RELATED REQUIREMENTS

A. Section 19.06 – Solid Materials Management

B. Standard Specifications and Drawings of the agency (city, county, etc.) having authority

C. State of California, Department of Transportation (Caltrans) Standard Specifications, most recent edition

D. American Society for Testing and Materials (ASTM)

1.03 SUBMITTALS

A. Product information for aggregate materials, asphaltic concrete mix design, and prime and tack coats.

1.04 MEASUREMENT AND PAYMENT

A. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work.

B. Refer to Article 21.01– Schedule of Bid Items

PART 2 PRODUCTS

2.01 MATERIALS

A. The materials used in the construction and/or restoration of asphalt concrete pavements shall conform to the more stringent requirements of the Caltrans Standard Specifications, Standard Specifications and Drawings of the agency having authority, or these Specifications.

B. Prime (tack) coat shall be Type SC-70 liquid asphalt conforming to the requirements of the Caltrans Standard Specifications Section 93.

C. Mineral aggregate shall be Grade A, Type A, 3/4-inch maximum gradation, medium class conforming to the most stringent requirements of the Caltrans Standard Specifications, Standard Specifications and Details of the agency (city, county, etc.) having authority, or these Specifications.

D. Fog seal shall be an SS-1 asphaltic emulsion or cationic maltenes emulsion conforming to the most stringent requirements of the Caltrans Standard Specifications, Standard Specifications and Details of the agency (city, county, etc.) having authority, or these Specifications.

PART 3 EXECUTION

3.01 PAVEMENT REMOVAL

A. Existing asphaltic pavements to be removed shall be saw cut without damaging adjacent pavement.

B. The trimmed edges shall be painted with a coating of prime coat immediately prior to constructing the new abutting asphaltic pavements.

C. All removed aggregate and asphaltic pavement material shall become the property of the Contractor and shall be disposed of off-site. See Section 19.06 – Solid Materials Management.

3.02 PAVEMENT INSTALLATION

A. The construction and/or restoration of asphalt concrete pavements shall conform to the most stringent requirements of the Caltrans Standard Specifications, Standard Specifications and Details of the agency (city, county, etc.) having authority, or these Specifications.

B. The Contractor shall not pass equipment over any pipe, drain, utility line, duct or structure before it is protected by ample fill material and properly compacted. Any damage to such facilities shall be promptly repaired by the Contractor at no expense or obligation to the District.

C. Upon completion, the pavement shall be true to grade and cross sections.

D. Base and sub-base materials shall be bladed to a smooth surface and properly compacted. Subgrade for pavement shall not vary more than 0.05 feet (1.5 cm) from the specified road grade.

E. Following proper compaction, asphaltic concrete shall have:

1. a minimum overall thickness as shown on the Drawings,

2. a thickness that matches the existing roadway section thickness, or

3. a minimum thickness in accordance to the most stringent requirements of the Caltrans Standard Specifications, Standard Specifications and Details of the agency (city, county, etc.) having authority, or these Specifications.

F. Fog seal shall be applied over all new finish AC surfaces. Fog seal shall be applied before final stripping and pavement delineations are placed.

G. When asphaltic concrete is to be applied over existing pavement and local irregularities in the existing surface would result in a course of more than specified thickness, the surface of the existing pavement shall be brought to uniform contour by patching with asphaltic concrete, thoroughly tamped or rolled until it conforms to the surrounding surface, and a prime coat applied.

H. When asphaltic concrete is to be applied over existing pavement, existing surfaces adjoining gutters and other permanent features shall be ground to create smooth transitions and to maintain surface water flow lines.

I. Potholes and depressed areas in existing pavements to be overlaid with new asphaltic concrete shall be saw cut and completely removed, subgrade and aggregate base course prepared, and patched with new asphaltic concrete before the installation of new pavement overlays.

J. When asphaltic concrete is laid against vertical surfaces such as gutters, the face of the vertical surface shall be roughened for proper bonding, cleaned, and then painted with a light coating of asphalt cement or emulsified asphalt.

K. At terminations of new surface course, the asphaltic concrete shall be feathered into the existing surface over such a distance as may be required to produce a smooth riding transition. Existing pavements to be over-laid shall be ground or removed as required to avoid feather edges.

3.03 RESURFACING

A. In all existing pavement areas where the surface is removed, broken or damaged by Contractor's equipment or in which the ground has caved in or settled due to construction, the installation of the improvements, or areas designated to be repaved, resurfaced, or modified, the surface shall be restored to the original grade by the Contractor.

B. Restoration of asphaltic concrete pavement shall be to the same section thickness as the existing roadway or to the minimum thickness conforming to the most stringent requirements of the Caltrans Standard Specifications, Standard Specifications and Details of the agency (city, county, etc.) having authority, or these Specifications.

C. Wherever asphaltic concrete pavement does not terminate against a curb, gutter, or another pavement, the Contractor shall provide and install a ground contact rated, pressure treated Douglas-fir, No. 2 or better, 2” x 6” header board, securely staked and fastened in place.

3.04 PAVEMENT MARKING REPAIR

A. All traffic markings and signs painted on areas which are covered with new or repair pavement shall be replaced in kind.

3.05 SPECIAL REQUIREMENTS

A. The restoration of all surfaces, as described herein, disturbed by the installation or repair to underground facilities shall be completed as soon as is reasonable and practical.

B. Areas trenched by the Contractor and designated to be resurfaced shall be temporarily paved with 1-inch thick (minimum) layer of cold asphalt mix within three (3) working days after they are backfilled. After all major work that might damage pavement is completed, complete resurfacing of the entire specified area shall be performed.

C. Monuments encountered shall conform to the most stringent requirements of the Caltrans Standard Specifications, Standard Specifications and Details of the agency (city, county, etc.) having authority, or these Specifications.

3.06 CLEAN-UP

A. After all installation, repair, and restoration of pavement has been completed, all excess asphalt, dirt, rock and other construction-related debris shall be removed from the roadways. Adjoining curbs, gutters, structures, and other surfaces over-sprayed or splattered shall be cleaned of all asphalt concrete products.

3.07 REPAIR OF PAVEMENT SURFACE

A. Following Final Completion, the Contractor shall repair caved in or settled pavement over trenches, excavation, or backfill placed as part of this Work during the period of the warranty of the Work.

B. All materials and labor required for the repair of paving shall be supplied by the Contractor and the work shall be done in a manner satisfactory to the Engineer.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. Asphaltic concrete pavement for roadways, re-surfacing, ramps, grade adjustments, and other AC pavement replacement as shown on the Drawings.

B. Removal, preparation, and replacement or repair of existing asphaltic concrete pavement that is damaged by Contractor's operations during the construction of the Work.

C. Temporary asphaltic concrete pavements until the permanent pavements can be constructed.

1.02 REFERENCES

A. Related Articles:

1. Article 24.01 – Excavation and Backfill
2. Article 26.01 – Asphalt Paving
3. Article 30.01 – Concrete - General

B. State of California, Department of Transportation (Caltrans):

1. 2018 Standard Specifications

C. American Society for Testing and Materials (ASTM):

1. D 1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort

2. D 5581 – Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

D. Standard Specifications and Details of the authority having jurisdiction (County of Santa Clara, City of San Jose, City of Campbell, and Town of Los Gatos)

E. Curb, Gutter, Sidewalk, and Driveway Restoration Details of the authority having jurisdiction (County of Santa Clara, City of San Jose, City of Campbell, and Town of Los Gatos)

1.03 SUBMITTALS

A. Submittals shall be in accordance with Article 7.05 regarding submittals.

B. Product information for aggregate materials, asphaltic concrete mix design, and prime and tack coats. Minimum information shall include source of aggregates

and asphalt, asphalt content, proposed recycled asphalt products content, gradation, unit weight of mix design, gradation, air void content, oils used, stabilometer values, other test results, and method of placement needed for comparison with Caltrans Standard Specifications.

C. Copies of delivery tickets showing materials, quantities, source, date, mix design, and other relevant information.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Prime (tack) coat shall be Type SC-70 liquid asphalt conforming to the requirements of the 2018 Caltrans Standard Specifications Section 39.

B. Asphaltic concrete surfacing for roadways, parking areas, ramps, grade adjustments, and walkways shall conform to the requirements of Caltrans Standard Specifications Section 39. Mineral aggregate shall be 1/2-inch maximum size, Type B. That asphalt concrete material placed more than two inches below the finished asphaltic concrete surface may be 3/4-inch or 1/2-inch maximum size, Type B.

C. Asphalt to be mixed with the aggregate shall meet the requirements of Caltrans Standard Specifications Section 92, PG-64-10 refined paving asphalt.

D. Recycled asphalt products content shall be the lower of that allowed by Caltrans Standard Specifications and a maximum of 15 percent of the aggregate weight.

E. Glass shall not be used.

F. Slurry seal shall conform to Caltrans Standard Specification Section 37-03, Type I.

G. Asphalt or asphaltic concrete component quantities not defined herein or specifically defined in the Caltrans Standard Specifications shall be those typically used for high quality pavement products.

H. All finished asphalt concrete mixes shall be such so as to provide a smooth, solid surface, and shall be free of voids as determined solely by the Engineer.

I. Temporary asphalt concrete shall be a cold product designed for such use and capable of sustaining vehicle and pedestrian traffic.

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall conform to the requirements of Sections 37 and 39 of the State Specifications.

B. The Contractor shall conform to the requirements of the City's Technical Specifications and Standard Details. If the Drawings and Specifications should be found to be contradictory to the City Specifications in any part, the City requirements shall govern.

C. Bike paths, footpaths, sidewalks, asphalt, concrete curbs and gutters, and driveways shall be replaced in kind.

3.02 CUTTING PAVEMENT

A. Existing asphaltic pavements to be removed shall be cut by a wheel cutter, clay spade, or other device capable of making a neat, reasonably straight and smooth cut without damaging adjacent pavement that is not to be removed. In public right-of-ways, comply with the requirements of the authority having jurisdiction.

B. The existing pavement shall be saw cut and trimmed off a minimum of an additional six inches on each side of the trench or pavement joint after placement of required base course material and just prior to placement of asphaltic concrete for pavement replacement, and the trimmed edges shall be painted with a coating of prime coat immediately prior to constructing the new abutting asphaltic pavements.

C. Existing asphaltic concrete pavement that has not been excavated or trenched and is shown on the Drawings to be replaced shall be cold ground to a minimum of 2-inches prior to re-surfacing. Greater depths of pavement shall be cold ground where necessary to provide smooth transitions between surfaces.

D. Protect all vaults, valve boxes, and other structures in the pavement surface from damage.

E. Damaged structures shall be replaced by the Contractor at no additional cost to the District.

F. The Contractor shall grind AC pavement on both sides of the trench and shall key AC surface to existing AC pavement as shown on the Drawings. This will be considered as an incidental item of work and no separate payment will be made therefore.

G. The cold grinding or planning machine shall be specifically designed and built for grinding flexible pavements and shall have the ability to plane Portland cement concrete patches when encountered in bituminous pavement.

H. The grinding machine shall be self-propelled and shall have the means for removing materials without tearing or gouging the underlying surface.

I. The machine shall be adjustable as to crown and depth.

J. Those areas of pavement that cannot be ground shall be removed by other means approved by the Engineer.

K. The ground surface shall be acceptable to traffic use in the event resurfacing is delayed.

L. The grinding shall be squared off for the full width of the traveled way at the end of each work day.

M. Clean the ground surfaces prior to application of tack coat or pavement replacement.

N. All removed asphaltic pavement materials is the property and disposal responsibility of the Contractor.

3.03 PAVEMENT INSTALLATION

A. The construction of pavements of asphaltic concrete shall conform to the requirements of the Caltrans Standard Specifications and upon completion; the pavement shall be true to grade and cross sections.

B. The Contractor shall not pass equipment over any pipe, drain, utility line, or structure before it is protected by ample fill material, properly compacted. Any damage to such facilities shall be promptly repaired by the Contractor at no additional cost to the District.

C. The subgrade shall be brought to the required grades and cross sections by grinding, excavating, filling, blading, and compacting as specified.

D. Asphaltic concrete shall be constructed only when the surface is dry, when the atmospheric temperature in the shade is 40 degrees F and rising or above 50 degrees F if falling.

E. No asphaltic concrete shall be placed when the weather is foggy or rainy or when the base on which the material is to be placed is in a wet or frozen condition.

F. Base and subbase materials shall be bladed to a smooth surface and shall be compacted to 95 percent relative compaction as determined by ASTM D1557. Subgrade for pavement shall not vary more than 0.05 feet from the specified road grade. Subgrades may also be Portland cement concrete and existing asphalt as shown on the Drawings.

G. Asphaltic concrete shall be plant mix having a minimum overall thickness of four inches unless greater thicknesses are shown is required by authorities having jurisdiction or greater thicknesses are shown on the Drawings. Compact the

asphaltic concrete to at least 95 percent of the relative compaction achieved by a specimen of the same mix design subjected to 75 blows per ASTM D5561.

H. All existing asphaltic pavement and concrete surfaces to be paved over or against shall receive a tack coat at a minimum rate of 0.1 gallons per square yard.

I. The total width of the accepted aggregate base material shall receive a bituminous prime coat at the minimum rate of 0.25 gallons per square yard. Application shall conform to Caltrans Standard Specifications. Adjacent ground, structures, gutters, curbing, and fencing shall be protected from spraying operations.

J. When asphaltic concrete is to be applied over existing pavement and local irregularities (with only very minor damage) in the existing surface would result in a course of more than specified thickness, the surface of the existing pavement shall be brought to uniform contour by patching with asphaltic concrete, thoroughly tamped or rolled until it conforms with the surrounding surface, and a prime coat applied.

K. When asphaltic concrete is to be applied over existing pavement, existing surfaces adjoining gutters and other permanent features shall be ground to create smooth transitions and to maintain surface water flow lines. Also grind existing asphaltic concrete as required where indicated or shown on the Drawings to maintain existing finish grades.

L. Potholes and depressed areas in existing pavements to be overlaid with new asphaltic concrete shall be saw cut and completely removed subgrade and aggregate base course prepared, and patched with new asphaltic concrete before the installation of new pavement overlays.

M. Spreading shall be as nearly continuous as possible. When asphaltic concrete is laid against vertical surfaces such as gutters, the face of the vertical surface shall be roughened for proper bonding, cleaned, and then painted with a light coating of asphalt cement or emulsified asphalt.

N. All AC surface and AC base courses shall be machine-placed.

O. At terminations of new surface courses, the asphaltic concrete shall be feathered into the existing surface over such a distance as may be required to produce a smooth riding transition. Existing pavements to be over-laid shall be ground or removed as required to avoid feather edges less than 1-inch in depth.

P. Grind all edges with concrete swales and gutters to provide minimum 1-inch depth at transition and to maintain original drainage flow lines between new and existing surfacing unless otherwise noted.

Q. The finished surface shall be of uniform texture. When tested with a 10-foot straightedge laid on the surface parallel with the centerline of the road, the

variation of the surface from the testing edge of the straightedge shall not be more than 1/4 inch (0.63 cm) except at grade changes.

R. All existing valve boxes, manholes, handholes, pull boxes, grounding boxes, vaults, and other flush utility features shall be raised or lowered to the new finish grade.

S. The top of pavement shall match utility surface features such as valve boxes, corrosion protection test station boxes, electrical and telephone pull boxes, utility vaults, etc. Wherever possible drainage should be directed away from such utility structures, except drainage structures such as curb inlets and drop inlets.

3.04 ROADWAY SURFACE REMOVAL

A. All pavement cuts shall be neat and straight to provide an unfractured and level pavement joint for bonding existing surfacing with pavement replacement. Pavement cuts shall be parallel or at right angles to the road or area centerlines. All cut edges shall provide clean, solid, vertical faces free from all loose material.

B. All existing crushed aggregate and asphaltic concrete removed, and any excess new material shall be hauled away from the project site and legally disposed of by the Contractor.

3.05 RESURFACING

A. In all existing pavement areas where the surface is removed, broken or damaged by Contractor's equipment or in which the ground has caved in or settled due to the installation of the improvements, or areas designated to be repaved, resurfaced, or modified, the surface shall be restored to the original grade by the Contractor.

B. Prior to resurfacing, the existing surfacing shall be removed as provided above.

C. All broken and jagged edges of the pavement edge shall be straight.

D. Areas to be cut shall be indicated until these edges have been sawed.

E. If during the initial removal of the existing pavement a method of removal was used which disturbed the adjoining pavement, or if during general construction operations the adjacent pavement was disturbed, then this adjoining pavement must also be removed and replaced.

F. Where irregular surfaces are to be surfaced, existing pavement shall be cut parallel to the alignment of the pipe or to the centerline of the roadway.

G. Asphaltic concrete pavement shall be saw cut to a minimum depth of two inches at a point not less than six inches outside the limits of excavation or the previous pavement cut (made by pneumatic tools), whichever limits are the greater. The

additional surfacing so cut shall be removed and disposed of by the Contractor prior to resurfacing.

H. Restoration of asphaltic concrete pavement shall be to the same section as the existing roadway/paved area or a minimum thickness of 2-inches, whichever is greater.

I. Wherever asphaltic concrete pavement does not terminate against a curb, gutter, or another pavement, the Contractor shall provide a ground contact rated, pressure treated hem-fir, No. 2 or better, 2 by 6 header board, securely staked and backfilled in place.

3.06 PAVEMENT MARKING REPAIR

A. All existing traffic markings and signs painted on areas which are covered with new or repair pavement (e.g., parking lot lines) shall be replaced in kind. The Contractor shall refer to the City's standard details, technical specifications, and general guidelines.

3.07 SLURRY SEAL

A. Slurry seal shall be applied to all new asphalt concrete pavement surfaces near the completion of all work after pavement has been restored but before final stripping and pavement delineations are placed and after all heavy construction traffic is finished.

B. The slurry seal shall be an asphaltic emulsion "fog seal" and shall be applied in accordance with Caltrans Standard Specification 37-2, Seal Coats, with the exception of subsections 37-2.03I and 37-2.04. Attention is especially directed to the requirements for prior pavement cleaning and protection of facilities in Section 37-2.03D.

3.08 TEMPORARY PAVEMENT

A. Temporary pavement shall be placed at the time the trench is backfilled.

B. A 4-inch temporary AC surface shall be installed on backfilled trenches flush with the surrounding pavement.

C. The temporary pavement shall remain in place and be maintained by the Contractor for a minimum of 30 calendar days and a maximum of 60 calendar days or as directed by the Engineer, to allow for trench settlement.

D. Temporary pavement shall be maintained as frequently as necessary to provide safe traffic movement as required by the Engineer.

E. Permanent pavement shall be constructed upon removal of temporary pavement.

3.09 SPECIAL REQUIREMENTS

A. The restoration of all surfaces, as described herein, disturbed by the installation or repair to underground facilities shall be completed as soon as is reasonable and practical.

3.10 CLEAN-UP

A. After all installation, repair and restoration of paving has been completed, all excess asphalt, dirt, rock and other debris shall be removed from the roadways. Adjoining curbs, gutters, structures, and other surfaces over-sprayed or splattered shall be cleaned of all asphalt concrete products.

3.11 REPAIR OF PAVEMENT SURFACES

A. Following Project completion, the Contractor shall repair settled pavement over trenches, excavation, or backfill placed as part of this Work during the period of the warranty of the Work.

B. All materials and labor required for the repair of paving shall be supplied by the Contractor and the work shall be done in a manner satisfactory to the Engineer.

END OF ARTICLE

ARTICLE 26.03
CURB, GUTTER, SIDEWALK, AND DRIVEWAY RESTORATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes

1. The work specified in this Article includes the removal and installation of concrete curbs, gutters, sidewalks, wheelchair ramps, median islands, driveways, v-ditches, and valley intersections.

B. Related Sections

1. Article 24.01 - Excavation and Backfill
2. Article 26.02 - Roadway Restoration
3. Article 30.01 - Concrete General

C. Payment Procedures

1. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work.

1.02 REFERENCES

A. California Department of Transportation (CalTrans)

1. Standard Specification

B. American Concrete Institute (ACI)

C. City of Morgan Hill

1. Standard Details and Specifications

D. City of San Jose

1. Standard Details and Specifications

E. City of Campbell

1. Standard Details and Specifications

F. Town of Los Gatos

1. Standard Details and Specifications

1.03 SYSTEM DESCRIPTION

A. Design Requirements

1. All concrete restoration work shall be completed in accordance with the applicable provisions of the Standard Specifications and Details of the agency (city, county, etc.) having authority, as shown on the Drawings, and as specified in these Specifications.

1.04 SUBMITTALS

A. As required by the regulatory agency, city or county.

1.05 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete:

1. The concrete shall be in accordance with Article 30.01 – 'Concrete General' of these Specifications.

B. Form Release Material:

1. Light oil or other releasing agent of type which does not discolor concrete or interfere with finishing curb tops and faces shall be used.

C. Joint Materials:

1. Expansion: Bituminous Fiber Type, Tammstech, Inc., Hornboard/Fiber; or Burke Concrete Accessories Inc., Fiber Expansion Joint; or equal.

2. Construction: Steel dividers or plastic inserts.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of conditions

1. Verify and document field conditions, including subgrade condition, lines and grades, and interferences before beginning the work described in this

Article. The Contractor shall notify the Engineer if there are interferences that may influence concrete installation and performance.

3.02 PREPARATION

A. Surface Preparation:

1. Subgrade:

a. Construct and compact true to grades and lines as required, in accordance with the Standard Specifications and Details of the agency (city, county, etc.) having authority.

b. Remove soft or unsuitable material to depth of not less than six (6) inches below subgrade elevation and replace with satisfactory aggregate base material, in accordance with the Standard Specifications and Details of the agency (city, county, etc.) having authority.

2. Forms and Subgrade:

a. Water immediately and compact subgrade in advance of placing concrete.

3.03 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION

A. Existing concrete curbs, gutters, sidewalks, wheelchair ramps, median islands, and/or driveways shall be removed by saw cutting without damaging adjacent portions that are not to be removed.

B. The entire area contained within the limits of the existing construction joints, expansion joints, and/or score joints of the portions of concrete curbs, gutters, sidewalks, and/or driveways to be removed shall be removed.

C. Forms:

1. Carefully set to line and grade and securely stake in position forms conforming to dimensions of items to be constructed.

2. Thoroughly clean prior to each use and coat with form releasing material.

D. Expansion and Contraction Joints:

1. Expansion Joints:

a. Construct vertically, and at right angles to centerline of street and match joints in adjacent pavement or sidewalks.

b. Constructed at radius points, driveways, and at adjoining structures.

c. Finish concrete adjacent to expansion joints with an edger tool.

d. Fill joints with expansion joint filler material to match surface contour of concrete.

2. Contraction Joints:

a. Contraction joints shall be constructed per Section 73 per State Specifications

b. Constructed not more than fifteen (15) feet apart.

c. Tool or saw cut joints to a depth of approximately 1 inch and match joints in adjacent pavement or sidewalks.

3. Score Joints:

a. Tool joints approximately 5 feet on center to a depth of approximately ¼-inch. Match joints in adjacent pavement or sidewalks.

E. Concrete:

1. Placing:

a. Thoroughly spade concrete away from forms so that no rock pockets exist next to forms and so that no coarse aggregate will show when forms are removed.

2. Compacting:

a. Compact by mechanical vibrators.

b. Continue tamping or vibrating until mortar flushes to surface and coarse aggregate is below concrete surface.

3. Form Removal:

a. Front Form Faces: Do not remove before concrete has taken initial set and has sufficient strength to carry its own weight.

b. Gutter and Rear Forms: Do not remove until concrete has hardened sufficiently to prevent damage to edges. Take special care to prevent damage.

4. Finishing and Curing: Comply with requirements as specified except as modified here:

   a. As soon as curb face forms are stripped, trowel the top and face of curb to a smooth, even finish. Finish with fine haired broom in direction of work.

   b. Where curb is installed without integral gutter, extend finish two (2) inches below grade.

   c. Edge concrete at expansion joints to 1/4-inch radius.

   d. Flow lines of gutters shall be troweled smooth four (4) inches out from curb face for integral curb and gutter and four (4) inches on both sides of flowline for gutters without curbs.

3.04 REPAIR/RESTORATION

A. The Contractor shall repair portions of concrete damaged while stripping forms or, when damage is severe. Replace such work at no additional cost to the Contract. Evidence of repairs shall not be noticeable in the finished product.

B. The Contractor shall remove and replace sections of deficient work, not conforming to requirements indicated on the Drawings and specified in the Specifications at no additional cost to the Contract.

C. All materials and labor required for the repair and replacement work shall be supplied by the Contractor and the work shall be done in a manner satisfactory to the Engineer.

3.05 FIELD QUALITY CONTROL

A. Site Tests, Inspection

1. Curbs and Gutters:

   a. Test face, top, back, and flowline with 10-foot straightedge or curve template longitudinally along surface.

   b. Correct deviations in excess of 1/4-inch.

2. Gutters:

   a. Frequency of Testing: When required by the Engineer, where gutters have slope of 0.8 foot per hundred feet or less, or where unusual or special conditions cast doubt on capability of gutters to drain.

   b. Test Method: Establish flow in length of gutter to be tested by supplying water from hydrant, tank truck, or other source.

c. Required Results:

(1) One (1) hour after supply of water is shut off, inspect gutter for evidence of ponding or improper shape.

(2) In event water is found ponded in gutter to depth greater than 1/2-inch, or on adjacent asphalt pavement, correct defect or defects in manner acceptable to the Engineer without additional cost.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The work in this Article includes all equipment, materials, and labor required to regulate traffic. The Contractor shall provide all labor, equipment, and materials to install, maintain, and remove traffic control as required to perform all Work.

B. Traffic control shall consist of all work and materials necessary to maintain safe vehicular, pedestrian, and cyclist traffic during Work and to perform “best management practices” to mitigate high peak and high volume construction traffic, prevent idling and queuing, establish site access limitations and mitigation measures, identify haul routes, and provide overall control of all construction traffic entering, exiting and operating within the project site. Traffic control shall include, but is not limited to, the installation, removal, maintenance, and replacement of traffic control systems, fencing, railing, signage, barricades, crash cushions, channelizers, pavement markings and construction area signage necessary for traffic staging on public streets adjacent to or near the project area, and any other miscellaneous work necessary to complete the traffic control as specified by the authority having jurisdiction (County of Santa Clara and City of Campbell, Town of Los Gatos, and City of San Jose), these Specifications, and as directed by the Engineer.

C. The Contractor shall conduct the work in a manner that causes the least possible obstruction and inconvenience to the public. The Contractor’s attention is directed to Articles 10.09, 10.10, and 10.13.

D. The Contractor shall finalize and/or obtain all necessary permits and comply with the requirements of said permits. Contractor’s attention is directed to Article 4.07– ‘Permits and Licenses’ of the Standard Provisions and Article 18.01 – ‘Permits and Agreements’ of the Special Provisions.

E. The Contractors attention is directed to Article 18.06 for additional general traffic control requirements.

1.02 RELATED REQUIREMENTS

A. Related Articles:

1. Article 4.07 – Permits and Licenses
2. Article 4.09 – Interference with Fire Hydrants, Highways, and Fences
3. Article 8.01 – Public Safety
4. Article 8.02 – Accident Prevention
5. Article 4.10 – Preservation of Property
6. Article 18.06 – Traffic Control

B. Standard Specifications and Details of the authority having jurisdiction (County of Santa Clara, City of San Jose, City of Campbell, and Town of Los Gatos)

1. Traffic Control Requirements of the authority having jurisdiction (County of Santa Clara, City of San Jose and City of Morgan Hill)

C. State of California Department of Transportation Standard Specifications, latest edition (CalTrans Standard Specifications)

1. State of California, Department of Transportation (Caltrans) Manual of Traffic Controls for Construction and Maintenance Work Zones, Most Recent Edition

D. Work Area Traffic Control Handbook Committee

1. Work Area Traffic Control Handbook – BNI Publication, Inc.

1.03 SUBMITTALS

A. Submittals shall be in accordance with Article 7.05 regarding submittals.

B. The Contractor shall submit traffic control plans for all proposed Work in advance of any Work at the site. Traffic control plans shall be approved by the respective Authorities Having Jurisdiction prior to submission to the Engineer.

C. At a minimum, traffic control plans shall comply with the following:

1. Traffic Control Plans are required to be site specific (i.e. the use of a generic Caltrans traffic plan shall not be permitted).

2. The plan sheets shall be no larger than 11” x 17” and no smaller than 8.5” x 11”.

3. Show a North arrow and scale or “NOT TO SCALE” (N.T.S.).

4. The plans shall be prepared using drafting standards. If the sketch cannot be clearly understood, it will be returned for revision and resubmittal.

5. Show all streets within the area of work (approximately 1,000 foot radius). This area around the work zone is required to establish the following:

a. Location and placement of advance warning signs

b. Creation of a pedestrian diversion plan, if the sidewalk area is part of the construction zone

6. All affected streets within the 1,000 foot radius of the work zone shall show the following:

   a. Existing curb, gutter and sidewalk, or edge of pavement if there is no curb or gutter

   b. All width dimensions of existing lane lines

   c. Potential conflicts (bus stops, bike lanes, driveways, etc.)

   d. All crosswalks and traffic islands

   e. Indicate if intersection is signalized

   f. Indicate lane configurations (i.e. protected left turns, free right turns, shared through and turning lanes etc.) at intersections

1.04 MEASUREMENT AND PAYMENT

A. Full compensation for furnishing all work and materials for Traffic Control shall be included in the lump sum price bid for Bid Item entitled “Develop and Implement Traffic Control Plan”.

B. Refer to Article 21.01, Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

A. Construction Signs, Lights, Barricades, and Delineators—Unless otherwise specified herein or detailed on the Drawings, all construction signs, lights, barricades, and delineators shall be in accordance with the latest version of the California Manual of Uniform Traffic Control Devices (CA MUTCD). The numbers, types, and placement of signs, lights, barricades, and delineators shall be in accordance with the requirements of the authority having jurisdiction, and these Specifications. Construction sign size may be modified per “Work Area Traffic Control Handbook” published by Building News, Inc., Los Angeles, California.

   1. The Contractor shall provide electric arrow boards for each direction of travel for the entire duration of all lane reductions, traffic diversions, and detours. Arrow boards left overnight shall be powered from solar charged power source or battery cells. A generator powered arrow board shall not be allowed during night hours.

   2. All traffic control devices used during hours of darkness shall be retroreflective as specified in the CA MUTCD.

   3. Temporary pavement markers shall comply with Article 12-8 of the State Specifications.

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall conduct the work in a manner that causes the least possible obstruction and inconvenience to traffic.

B. Access to private properties and recreational facilities shall be maintained at all times. Unless otherwise specifically indicated in these Specifications or as shown on the Drawings, the blocking of industrial, commercial or residential driveways or private roads shall not be allowed. Convenient access shall be maintained at all times to permit the movement of vehicular and pedestrian traffic to and from such properties.

C. As construction progresses, the Contractor shall restore, as soon as practicable, the public right of way to a condition equal to or better than that existing prior to commencement of Contractor's operations.

3.02 INSTALLATION, MAINTENANCE AND REMOVAL

A. The Contractor's traffic control measures shall conform to the approved traffic control plans, the applicable sections of the referenced standards, standard specifications and details of the authority having jurisdiction, encroachment permit requirements of the authority having jurisdiction and these Specifications.

B. The Contractor shall provide advance notification of construction operations within the public right of way in accordance with the requirements of the authority having jurisdiction. The Contractor is responsible for coordinating with the applicable authorities having jurisdiction and determining the advance notification requirements.

C. Existing signs that do not conflict with the traffic control operations shall not be blocked or obstructed during construction. Existing signs that conflict with the traffic control operations shall be removed or covered, and restored immediately thereafter.

D. Unless otherwise specified, no street shall be temporarily closed at any time unless prior written authorization from the authority having jurisdiction.

E. Excavation shall be secured during working and non-working hours, in accordance with the standard specifications and details of the authority having jurisdiction and these Specifications.

F. Unless otherwise specified herein, all trench excavation shall be steel plated to accommodate use of the right of way after working hours or when the excavation is left unattended. In all cases, the steel plating shall be installed in accordance with the standard specifications and details of the authority having jurisdiction and these Specifications. Steel plates in vehicular traveled ways and bike lanes on all streets shall be countersunk flush with the adjacent grade to provide a

smooth transition. Steel plate located outside the vehicular traveled way shall be held in place by placing temporary asphalt around all edges. All steel plates shall be rated for the intended application and shall have a non-skid surface.

G. The use of steel plating must comply with the conditions set forth in TR-0157 State of California – Department of Transportation.

H. Open, non-steel plated, excavations, not in vehicular-traveled ways and bike lanes, shall be enclosed by Type CL-6 safety fencing each night and at all other times when the excavation is unattended. “K” rail, as required, shall be relocated close to the perimeter of the safety fence after working hours and at all other times way the open un-plated excavation is unattended.

I. No equipment or materials are allowed to be stored within the public right of way.

J. The Contractor shall do all necessary detour striping, striping removal, and final striping including the installation of pavement markers, in accordance with Sections 84 of the State Specifications.

K. Sandblasting shall be used to remove the existing or detour striping, including pavement markers. The Contractor shall be responsible for controlling and removing the sand used for sandblasting. Cleanup operations shall immediately follow sandblasting.

L. Raised pavement markers that are removed shall be replaced in kind in accordance with Section 84 of the State Standard Specifications.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. This section covers chain link fencing and gates. Fencing shall be provided in the alignment indicated on the Drawings.

B. Chain link fences shall conform to Section 80-3 of the State Specifications unless specified herein.

1.02 REFERENCES

A. California Department of Transportation (CalTrans)

1. Standard Details and Specifications

B. American Society for Testing and Materials (ASTM)

1. ASTM A-392-11A – Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric

2. ASTM A-491-11 – Standard Specification for Aluminum Coated Steel Chain-Link Fence Fabric

3. ASTM A-824 – Standard Specification for Alloy Structural Steel Plates

4. ASTM F-626-14 – Standard Specification for Fence Fittings

5. ASTM F-1043-17A – Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework

1.03 SUBMITTALS

A. Complete detail drawings and specifications for the fence, gates, and accessories shall be submitted in accordance with the Special Provisions Submittals Procedures section.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fence Types

1. Fencing shall be of the type specified herein.

B. Plant Fencing

1. Fencing shall consist of fabric as specified herein, with a top rail, bottom tension wire, and three strands of barbed wire mounted on 45-degree extension arms. The upper strand of barbed wire shall be approximately the 18 inches [0.5 m] out from the fence and the same distance above the top of the fabric. Posts shall be set in concrete or sleeves as indicated on the Drawings.

C. Fencing Fabric and Heights

1. Fencing heights, unless otherwise specified on the Drawings, shall be as follows:

Fabric	Height
Galvanized steel	6 ft

D. Fence posts shall be set in earth with concrete foundations.

E. Steel Fencing

1. All steel or malleable iron parts and accessories shall be as follows hot-dip galvanized or aluminum coated after fabrication.

Steel Fencing	
Fabric	11 gage thick, 2-inch mesh. Galvanized per ASTM A392, Class 2, or aluminum coated per ASTM A491.
Fabric Finish	Knuckled both edges for fabric widths of 60 inches or less. Knuckled one edge and twisted one edge for fabric widths of 72 inches or more.
Posts	Steel pipe, ASTM F1043, Group IC, with ASTM F1043, Type B or D interior and Type B exterior protective coating.
Line Posts	
For 6-foot and 7-foot fencing	2-3/8 inch OD pipe, 3.12 lb/ft.
Terminal Posts (End, corner, and pull posts)	
For 6-foot and 7-foot fencing	2-7/8 inch OD pipe, 4.64 lb/ft.

Steel Fencing	
Gate Posts	
For gate or leaf 6 feet or less	2-7/8 inch OD pipe 4.64 lb/ft.
For gate or leaf wider than 6 feet	4 inch OD pipe, 6.56 lb/ft.
For gate or leaf wider than 13 feet	6-5/8 inch OD pipe,18.97 lb/ft.
For gate or leaf wider than 18 feet	8-5/8 inch OD pipe, 28.55 lb/ft.
Top Rails	1-5/8 inch OD pipe, 1.40 lb/ft.
Rail Couplings	Sleeve type, 6 inches long, ASTM F626.
Bracing, required when fence height is greater than 6 feet	Pipe brace same as top rail, with 3/8-inch diameter steel rod truss and tightener.
Post Tops (with barbed wire)	Pressed steel, malleable iron with pressed steel extension arm, or one piece aluminum casting, ASTM F626.
Post Tops (without barbed wire)	Pressed steel, malleable iron, or cast aluminum, ASTM F626.
Barbed Wire	Each strand shall consist of two 12.5 gage steel wires with four-point barbs; galvanized per ASTM A121, Class 3, or aluminum coated per ASTM A585, Type I.
Stretcher Bars	Steel, ASTM F626, 1/4 by 3/4 inch, or equivalent area.
Fabric Ties	Aluminum bands or wire, ASTM F626.
Gate Frames	Steel tubing, 1-7/8 inch OD, 2.28 lb/ft.
Tension Wire	ASTM A824, galvanized or aluminum coated coil spring wire, 7 gage.
Handrail-Setting Cement	Minwax “Super Por-Rok Cement” or Master Builders “Set 45”.

F. Padlocks

1. The District will provide padlocks for gates. The Contractor shall coordinate with the Engineer to obtain the padlocks.

G. Gates

1. Gates shall be swing type, hinged to swing an angle of 180 degrees from closed to open, complete with frames, latches, hinges, braces, three strands of barbed wire if specified for fencing, and fabric. Stops, keepers, and padlocks shall be provided where specified.

2. Gate leaves shall have intermediate members and diagonal truss rods where necessary for rigid construction and shall be free from sag or twist. When adjacent fence is topped with barbed wire, gates shall be fitted with vertical extension arms or shall have frame end members extended to carry barbed wire. Joints between frame members shall be made by welding or by means of heavy fittings, and shall be rigid and watertight.

Gate fabric shall be same as fence fabric and shall be attached to frame ends by stretcher bars, bolt hooks, or other mechanical means.

3. Hinges shall be of heavy pattern, with large bearing surfaces, and shall not twist or turn under the action of the gate. Latches shall be plunger bar type, full gate height, and arranged to engage the gate stop, except single gates less than 10 feet wide shall be provided with a forked latch.

4. Latches shall be arranged for padlocking, with the padlock accessible from both sides of the gate. Stops shall consist of a roadway plate with anchor set in concrete and arranged to engage the plunger. Stops shall be installed at all gate locations.

5. Keepers shall consist of mechanical devices for securing and supporting the free end of the gates when in the fully open position. Keepers shall be installed at the all gate locations.

6. Padlocks shall be installed at all gate locations.

PART 3 EXECUTION

3.01 INSTALLATION

A. The installed fence shall conform to the alignment and finished grade indicated. All posts shall be plumb. Unless otherwise indicated on the drawings, posts shall be spaced approximately 6 feet apart for perimeter fencing. Where necessary, the fence grade shall be adjusted to fit the ground contour by slipping the fence fabric links. Ground surface irregularities shall be graded to maintain not more than 2-inch clearance below the bottom of the fence fabric.

B. Where posts are set in earth, concrete foundations 36 inches deep shall be provided. If bedrock is encountered, post excavation shall be continued to the 36-inch depth or 18 inches into the rock, whichever is less. Concrete foundations shall be circular in horizontal section, not less than 10 inches in diameter for line posts, and with a diameter not less than the post OD plus 9 inches for terminal and gate posts, except that foundations in bedrock shall be at least 6 inches larger than the outside dimension of the post. Foundations shall extend above the ground surface and shall be crowned approximately 1 inch. Concrete for foundations shall conform to structural concrete requirements. Each foundation shall be cured for at least 72 hours before further work is done on the post.

C. Top rails and bottom tension wires shall be installed before the fabric. Top rails shall be furnished in at least 18 foot lengths and shall be securely connected to gate and terminal posts. Tension wires shall be installed approximately 6 inches above grade and shall be attached to each post and securely anchored at terminal and gate posts. Straight runs between braced posts shall not exceed 1,500 feet. A terminal post shall be provided at each change in slope.

D. Fabric shall be attached to the top rail and bottom tension wire at 24-inch centers, and to the line posts at 15 inch centers. Barbed wire, when necessary, shall be fastened to each extension arm by internal clips or external fabric ties. Stretcher bars shall be provided at each gate post and terminal post. Each stretcher bar shall be threaded through the fabric and anchored to the post at 15-inch centers by positive mechanical means. When necessary, each gate post and terminal post shall be braced by a horizontal pipe brace and an adjustable truss extending to an adjacent line post. Corner posts shall be braced in both directions.

E. Fabric shall be stretched taut and anchored so that a pull of 150 lbs. at the middle of a panel will not lift the bottom of the fabric more than 6 inches.

F. Gates shall be installed so that they cannot be removed without disassembly of the hardware. Hardware attachment bolts shall be peened so that removal will be difficult.

G. Interior and exterior surfaces of aluminum which will be in contact with concrete, mortar, or dissimilar metals shall be given a heavy coat of coal tar paint. The end of each aluminum post to be set in concrete shall be dipped in a container of coal tar paint before installation.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. Section includes requirements for furnishing and installation of welded wire mesh fencing and gates (personal, and swing or sliding gates).

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM International):

1. A 36 Specification for Carbon Structural Steel
2. A 116 Specification for Metallic-Coated Steel Woven Wire Fence Fabric
3. A 121 Specification for Metallic-Coated Carbon Steel Barbed Wire
4. A 123 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
5. A 500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
6. A 501 Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
7. A 702 Specification for Steel Fence Posts, Hot Wrought
8. F 626 Standard Specification for Fence Fittings
9. F 1083 Standard Specification for Pipe, Steel, Hot-Dipped Zinc Coated (Galvanized) Welded, for Fence Structures
10. D 2201 Practice for Preparation of Zinc-Coated and Zinc-Alloy-Coated Steel Panels for Testing Paint and Related Coating Products

B. California Department of Transportation

1. Standard Specifications

1.03 SUBMITTALS

A. Complete detail drawings and specifications for the fence, gates, and accessories shall be submitted in accordance with the Special Provisions Submittals Procedures section.

1. Submit shop drawings showing plan layout, grid, spacing of components, accessories, fittings and hardware.

2. Submit manufacturer's product data.

3. Submit manufacturer's installation instructions.

4. Submit manufacturer's color palette to the Engineer for approval.

B. Submit manufacturer's certificates of compliance for fence materials.

C. Qualifications: Submit name, business address and telephone number of manufacturer's field representative. Include certification by the manufacturer that proposed field representative is qualified to provide specified services.

D. Certification of Installation: Subject affidavit by the manufacturer's field representative certifying that the installation of the welded wire mesh fence meets the Contract requirements.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. FENCE TYPES

1. **Type WM:** Wire mesh fence consisting of wire mesh fabric and 1 line of barbed wire. Fencing shall be of the type specified herein.

2.02 FENCING FABRIC AND HEIGHTS

A. Fencing heights, unless otherwise specified on the Drawings, shall be as follows:

Fabric	Height
Welded Wire Mesh	5 ft

B. METAL POSTS AND BRACES

1. Line posts must comply with ASTM A 702 except packaging of posts is not required. Each post must be Class B steel. You may omit the anchor plate if the post is set in a concrete footing with a minimum

cross sectional dimension of 6 inches and a depth equal to the full penetration of the post.

2. Each end, latch, pull, and corner post must have:

   a. Minimum resisting section modulus of 0.32 cubic inch in any direction

   b. Length of at least 7 feet

   c. Weight of at least 3.1 lb/ft

3. Each brace and brace post must have:

   a. Length of at least 7 feet
   b. Weight of at least 1.93 lb/ft

C. Barbed Wire

1. Barbed wire must:

   a. Comply with ASTM A 121

   b. Have 2 point barbs

   c. Be one of the following:

      (1) 12-1/2 gage, Class 1

      (2) 13-1/2 gage, Class 3

      (3) 15-1/2 gage, Class 3

D. Wire Mesh

1. Wire mesh must:

   a. Comply with ASTM A 116, Class 1
   b. Be 48 inches wide
   c. Have 10 horizontal wires with vertical stays spaced 6 inches apart

2. The top and bottom wires must be 10 gage.

3. The intermediate wires and vertical stays must be 12-1/2 gage.

E. Hardware

1. Galvanized bolts and nuts for attaching braces and straps to metal posts and galvanized devices for holding barbed wire and wire mesh in position must be commercial quality.

2. Wire used to fasten barbed wire and wire mesh to metal posts must be galvanized and at least 11 gage. Clips and hog rings used for metal posts must be at least 9 gage.

F. Gateways

1. Fence materials and end post bracing must comply with the specifications and plans for the fence type in which the gateway is constructed.

2. Except for length, end bars must comply with the line post specifications and plans.

3. Vertical stays for gateways must be:

   a. Pretwisted
   b. 9.5-gage galvanized wire
   c. Evenly spaced between end bars at 66-inch maximum intervals

4. Wire loops must be 6-gage galvanized wire.

5. The chain for the latching device must be commercial quality short link steel coil chain. The latching bar for the latching device must be commercial quality steel pipe. Bolts and nuts for attaching the chain to the end posts and latching bar must be commercial quality and galvanized.

G. Padlocks

1. A padlock shall be provided for each gate latch and shall be Schlage "45-102-26D", with two keys. All padlocks shall be keyed alike.

H. Gates

1. Gates shall be swing type, hinged to swing an angle of 180 degrees from closed to open, complete with frames, latches, hinges, braces, one strand of barbed wire if specified for fencing, and fabric. Stops, keepers, and padlocks shall be provided where specified.

2. Drive gates must be at least 48 inches and at most 58 inches high. Walk gates must be 4 feet wide. A gate greater than 8 feet in length must have vertical stays such that no panel exceeds 8 feet in length.

3. A gate frame must be made with pipe at least 1-1/2 in diameter. Interior vertical stays must be made with pipe at least 1 inch in diameter. Pipe must comply with specifications for metal posts and braces. Each gate frame panel must be cross trussed with adjustable truss rods at least 3/8 inch in diameter.

4. Fasten and reinforce each corner of a gate frame with a malleable iron or pressed steel fitting or by welding.

5. Each pressed steel fitting must:

   a. Have a nominal thickness before galvanizing of at least 0.135 inch
   b. Be fastened to develop the strength of connected members

6. Welds must be smooth and develop the strength of the connected member.

7. Gate fabric shall be same as fence fabric and shall be attached to frame ends by stretcher bars and tie wires as specified for fence construction.

8. Hinges shall be of heavy pattern, with large bearing surfaces, and shall not twist or turn under the action of the gate. Latches shall be plunger bar type, full gate height, and arranged to engage the gate stop, except single gates less than 10 feet wide shall be provided with a forked latch. Latches shall be arranged for padlocking, with the padlock accessible from both sides of the gate. Stops shall consist of a roadway plate with anchor set in concrete and arranged to engage the plunger. Stops shall be installed at all gate locations.

9. Keepers shall consist of mechanical devices for securing and supporting the free end of the gates when in the fully open position. Keepers shall be installed at the all gate locations

10. Padlocks shall be installed at all gate locations.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Excavate high points that interfere with placing fence fabric to the clearance shown.

B. Brace adjacent line posts at alignment angles with diagonal tension wires unless impractical. If impractical, brace as specified for bracing corner posts.

C. Set each metal diagonal brace and metal corner, end, latch, gate, and pull post in a concrete footing.

D. You may drive metal line posts.

E. Attach barbed wire and wire mesh fabric to the private property side of posts.

F. Attach the wire mesh fabric to each post by fastening the top and bottom wires and alternate longitudinal wires with at least 5 fasteners.

G. At each grade depression, snub or guy the fencing by means of a double 8-gage or a double 9-gage galvanized wire connected to:

1. The horizontal line of barbed wire or to the top and bottom of wire mesh fabric

2. A deadman weighing about 100 lb and buried in the ground at least 2 feet

H. Stretch and fasten the fencing before snubbing or guying.

I. Hang each gate with at least 2 steel or malleable iron hinges at least 3 inches in width such that the gate is securely clamped to the gate post and permits the gate to be swung back against the fence. The bottom hinge must have a socket to take the ball end of the gate frame.

J. Construct stops to hold gates open and a center rest with catch.

3.02 INSTALLATION

A. The installed fence shall conform to the alignment and finished grade indicated. All posts shall be plumb. Unless otherwise indicated on the drawings, posts shall be spaced approximately 10 feet apart. Where necessary, the fence grade shall be adjusted to fit the ground contour by slipping the fence fabric links. Ground surface irregularities shall be graded to maintain not more than 2-inch clearance below the bottom of the fence fabric.

B. Where posts are set in earth, concrete foundations 36 inches deep shall be provided. If bedrock is encountered, post excavation shall be continued to the 36-inch depth or 18 inches into the rock, whichever is less. Concrete foundations shall be no less than 8 inches in width. Concrete foundations for braces shall be 8” x 1’-6” x 1’-6”. Concrete for foundations shall conform to the Cast-In-Place Concrete Section. Each foundation shall be cured for at least 72 hours before further work is done on the post.

C. Straight runs between braced posts shall not exceed 500 feet. An end post shall be provided at each change in slope.

D. Fabric shall be stretched taut and anchored so that a pull of 150 lbs at the middle of a panel will not lift the bottom of the fabric more than 6 inches.

E. Gates shall be installed so that they cannot be removed without disassembly of the hardware. Hardware attachment bolts shall be peened so that removal will be difficult.

3.03 QUALITY ASSURANCE

A. Obtain the services of fencing manufacturer’s field representative to provide the following services:

1. Supervise the entire installation of the welded wire mesh fence.

2. Render advice and assistance on the installation of the welded wire mesh fence panels, fasteners and bracing; and clip installation and fastening to post.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. Contractor shall provide all labor, materials and installation requirements for precast concrete and cast-in-place structural concrete, minor concrete and textured/colored concrete as shown on the Drawings and as specified in these Specifications.

B. Concrete for thrust blocks, curbs, gutters, sidewalks, and driveways shall be minor concrete, all other concrete shall be structural concrete.

C. Falsework and vertical shoring shall be designed and constructed in conformance with the requirements in Section 51 of the State Specifications and Title 8, Section 1717 of the Construction Safety Orders and as modified herein.

1.02 REFERENCES

A. Related Articles:

1. Article 24.01 – Excavation and Backfill
2. Article 26.02 – Roadway Restoration
3. Article 30.07 – Precast Concrete Structures

B. City of San Jose

1. Standard Details and Specifications

C. City of Campbell

1. Standard Details and Specifications

D. Town of Los Gatos

1. Standard Details and Specifications

E. County of Santa Clara

1. Standard Details and Specifications

F. American Concrete Institute (ACI)

1. ACI 301-10 Specifications for Structural Concrete

2. ACI 304-00 Guide for Measuring, Transporting, and Placing Concrete

3. ACI 311 Guide for Concrete Plant Inspection and Testing of Ready Mixed Concrete

4. ACI 318-11 Building Code Requirements for Structural Concrete and Commentary

5. ACI 315-99 Details and Detailing of Concrete Reinforcement

G. American Society for Testing and Materials (ASTM)

1. ASTM C 31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.

2. ASTM C 33 – Standard Specification for Concrete Aggregates.

3. ASTM C 39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

4. ASTM C 40 – Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.

5. ASTM C 42 – Standard Test Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

6. ASTM C 88 – Standard Test Method of Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

7. ASTM C 94 – Standard Specifications for Ready-Mixed Concrete

8. ASTM C 114 – Standard Test Methods for Chemical Analysis of Hydraulic Cement.

9. ASTM C 117 – Standard Test Method for Materials Finer that 75-m (No. 200) Sieve in Mineral Aggregates by Washing.

10. ASTM C 123 – Standard Test Method for Lightweight Particles in Aggregate.

11. ASTM C 131 – Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

12. ASTM C 136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

13. ASTM C 142 – Standard Test Method for Clay Lumps and Friable Particles in Aggregate.

14. ASTM C 143 – Standard Test Method for Slump of Hydraulic-Cement Concrete.

15. ASTM C 150 – Standard Specification for Portland Cement.

16. ASTM C 156 – Standard Test Method for Water Loss from a Mortar Specimen Through Liquid Membrane-Forming Curing Compounds for Concrete.

17. ASTM C 157 – Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

18. ASTM C 171 – Standard Specifications for Sheet Materials for Curing Concrete.

19. ASTM C 172 – Standard Practice for Sampling Freshly Mixed Concrete.

20. ASTM C 173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

21. ASTM C 260 – Standard Specification for Air-Entraining Admixtures for Concrete.

22. ASTM C 289 – Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).

23. ASTM C 295 – Standard Guide to Petrographic Examination of Aggregates for Concrete.

24. ASTM C 309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

25. ASTM C 311 – Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete.

26. ASTM C 494 – Standard Specification for Chemical Admixtures for Concrete.

27. ASTM C 618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

28. ASTM C 856 – Standard Practice for Petrographic Examination of Hardened Concrete.

29. ASTM D 75 – Standard Practice for Sampling Aggregates.

30. ASTM D 2103 – Standard Specification for Polyethylene Film and Sheeting

31. ASTM D 1752 – Standard Specifications for Preformed Sponge Rubber Cork and Recycled PVC Expansion for Joint Fillers for Concrete Paving and Structural Construction

H. California Department of Transportation (Caltrans)

1. Standard Details and Specifications

I. American Welding Society (AWS)

1. AWS D1.4 – Structural Welding Core – Reinforcing Steel

1.03 SUBMITTALS

A. Concrete Mix Design:

1. Concrete mix design for each formulation of concrete proposed for use including constituent quantities per cubic yard, water-cementitious materials ratio, concrete slump, type and manufacturer of cement. Provide the following for each mix design proposed.

a. The curve of water-cementitious materials ratio versus concrete cylinder strength for each formulation of concrete proposed based on laboratory tests.

b. Admixture product data including but not limited to catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, retarding effect, slump range and conformity to ASTM standards. Identify proposed locations of use.

c. Curing compound product data including catalogue cut, technical data and conformity to ASTM standards. Identify proposed locations of use.

d. Test results from a certified testing laboratory, attesting that the proportions selected will produce concrete meeting the requirements of these Specifications.

e. Material Safety Data Sheets (MSDS) for all concrete components and admixtures.

B. Shop Drawings:

1. Proposed locations of construction joints.

2. Shop Drawings showing placing plans and elevations, bar list, schedules, bending details, placing details, size, location, and marking of concrete reinforcement in accordance with ACI 315. No concrete reinforcement shall be fabricated or placed prior to approval of shop Drawings.

C. Certification from the manufacturer that the grout (where required) is appropriate for the intended application.

D. Submit Quality Assurance/Control documents as listed below:

1. Test Reports

a. Fine aggregates — sieve analysis, physical properties, and deleterious substance.

b. Coarse aggregates — sieve analysis, physical properties, and deleterious substances.

c. Cements — chemical analysis and physical properties for each type.

d. Pozzolans — chemical analysis and physical properties.

e. Proposed concrete mixes — compressive strength, slump, shrinkage, and air content.

2. Certifications

a. Certify admixtures used in the same concrete mix are compatible with each other and the aggregates.

E. Falsework/Vertical Shoring System - Regardless of structure height or span, the Contractor shall submit to the Engineer detailed design calculations and working drawings approved, signed, and stamped by a Civil or Structural Engineer currently registered in California and employed by the Contractor for review in accordance with Article 9.02 regarding conformance to the requirements of Section 51-1.06 of the State Specifications and Section 1717 of the Construction Safety Orders.

1. After construction of the falsework or vertical shoring system enumerated above and prior to placement of concrete, a Civil or Structural Engineer employed by the Contractor, currently registered in California, shall inspect the falsework or vertical shoring system for conformity with the working Drawings. The person performing the inspection shall certify in writing that the falsework or vertical shoring system substantially conforms to the working Drawings and that the material and workmanship are satisfactory. This certification shall be given to the Engineer for approval prior to the placement of concrete.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Structural concrete and minor concrete shall be in conformance with applicable provisions of Sections 51, 52, 73, and 90 of the State Specifications and ASTM C94 (Standard Specs for Ready-Mixed Concrete) unless otherwise noted or shown on the Drawings or specified in these Specifications.

B. Textured and colored concrete surfaces shall comply with Sections 73-4 and 78-4 of the State Specifications unless otherwise noted or shown on the Drawings or specified in these Specifications.

C. Concrete mix proportioning:

1. Maximum water-cement ratio shall be 0.45.

2. Structural concrete shall be in compliance with Sections 51 and 90-1 of the State Specifications. Minor concrete in compliance with Section 90-2 of the State Specifications.

3. Air content (as determined in accordance with ASTM C173 or C231): 5±1 percent.

   a. An air-entraining agent shall be used in accordance with the provisions of Section 90-1.02E(3) of the State Specifications.

4. Slump (as determined in accordance with ASTM C143): 4 inches maximum.

D. Unless otherwise noted, the 28-day compressive strength of structural concrete shall be greater than or equal to 4,000 psi. The 28-day compressive strength of minor concrete shall be greater than or equal to 3000 psi. Concrete with lesser strength shall be rejected. Concrete work which is rejected shall be completely removed and reconstructed at the Contractor's expense.

E. No admixtures, other than air entraining agent, shall be used unless authorized in writing by the Engineer. Admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures.

F. Fine Aggregates: Washed inert natural sand conforming to the requirements of ASTM C33.

G. Coarse Aggregate: Well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33.

H. Water: Clean and potable water free from injurious amounts of oils, acids, alkalis, salts, organic matter or other deleterious substances

I. Reinforcing bars shall be deformed billet-steel bars for concrete reinforcement of Grade 60 conforming to ASTM A615 or A706, unless noted otherwise.

J. Dowel bars for expansion joints shall be plain steel, Grade 60, conforming to ASTM A615 or A706, unless noted otherwise.

K. Rebars shall be substantially free from mill scale, rust, dirty grease or other foreign matter.

L. Unless otherwise noted on the Drawings, hooks, bends, laps, and all steel fabrication shall conform to the applicable portions of the ACI 318 Building Code Requirements for Reinforced Concrete. Detail reinforcing shall be in accordance with ACI 315.

M. No reinforcing steel bars shall be welded either during fabrication or erection unless specifically shown on the Drawings or specified herein, or unless prior written approval has been obtained from the Engineer. All bars that have been welded, including tack welds, without such approval shall be immediately removed from the work. When welding of reinforcement is approved or called for, it shall comply with AWS D1.4.

N. Drill and bond dowels shall conform to Section 51-1.03(E), “Drill and Bond Dowels,” of the State Specifications and these Specifications.

O. Mechanical couplers for reinforcement are permitted and shall be the sleeve threaded type conforming to the requirements of Section 52-6.03C(2), “Mechanical Splices,” of the State Specifications and these Specifications. Galvanized couplers as indicated on the drawings per requirements of ASTM A767, “Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.”

P. Premolded expansion joint filler for structures – Self expanding cork, premolded joint filler shall conform to ASTM D1752, Type III. Thickness shall be ¾ inch unless otherwise shown on the Drawings.

Q. Compressible joint filler for expansion joints

1. The joint filler shall be a non-extruded watertight strip material.

2. The material shall be capable of being compressed at 40 percent for 70 hours at 68 degrees F and subsequently recovering at least 20 percent of its original thickness in the first ½ hour after unloading.

3. Compressible joint filler shall be Evazote 380 E.S.P, by E Poxy Industries, Inc., Ravena, NY or equal.

R. Bond breaker – Bond breaker for concrete shall be a nonstaining type bond prevention coating such as Super Bond Breaker WB by Burke Co.; Silcoseal 87 by Nox-crete Inc; or equal.

S. Concrete sealer – Concrete sealer shall be Spartan-Cote WB Cure-Seal Hardener by Burke Co.; Kure-N-Seal WB by Sonneborn, Minneapolis, MN; or equal.

T. Water repellents – Rainguard, BLOK-LOK, or equal.

U. Air blown mortar will not be allowed.

V. Concrete forms shall be provided in plywood, Exterior Grade, Douglas Fir, Class I, not less than ¾" thick. Smooth metal forms may be used in lieu of plywood.

W. Concrete shall have a minimum compressive strength of 75% the design strength prior to loading.

PART 3 EXECUTION

3.01 INSTALLATION

A. Before placing fresh concrete, the entire surface of each construction joint shall be thoroughly cleaned of surface laitance, curing compound, or other material foreign to the concrete to expose the coarse aggregate. Surfaces of fresh concrete in place no more than 8 hours may be cleaned with air and water jets, but concrete surfaces in place for more than 8 hours must be cleaned by abrasive blast methods.

B. Plywood or smooth metal forms shall be required for all exposed surfaces unless otherwise noted or shown on the Drawings or specified in these Specifications. Form work shall be rigidly braced to prevent distortion during placement of concrete.

C. Exposed textured and colored concrete surfaces shall comply with Sections 73-4 and 78-4 of the State Specifications unless otherwise noted or shown on the Drawings or specified in these Specifications.

D. On buried surfaces, ordinary surface finish shall be required in accordance with Section 51-1.03F(2) of the State Specifications. All exposed surfaces shall be provided with a Class 1 surface finish in accordance with Section 51-1.03F(3) of the State Specifications, unless noted otherwise.

E. "Curing" of concrete shall conform to the provisions of Section 90-1.03B of the State Specifications.

F. The curing compound shall not be petroleum hydrocarbon resin base or chlorinated rubber base.

G. The curing compound shall be nonpigmented curing compound with fugitive dye except when specified otherwise in these Specifications.

H. Placement of concrete shall be in accordance with Section 4.2, ACI 301 and ACI 304, unless otherwise noted in these Specifications. The Contractor shall have the option to place concrete by pumping. Pumping concrete through aluminum or magnesium pipes shall not be permitted.

I. Cold joints or joints in the concrete due to stopping work shall be avoided.

J. The concrete in each integral part of the structure shall be placed continuously and the Contractor shall not be permitted to commence work on any part unless facilities are on hand and the forces are sufficient to complete the part without interruption in the placing and finishing of the concrete.

K. The Contractor shall provide for the continuation of concrete placements in the event of plant or equipment breakdowns.

L. Backup concrete placing equipment shall be available for use within 30 minutes in the event the primary placing equipment breaks down.

M. The Contractor shall identify the sources and location of backup concrete placing equipment in the submittals.

N. Construction joints shall be located only at locations shown on the Drawings. Contractor shall obtain Engineer's approval prior to placing construction joints at different locations.

O. All construction joints shall have waterstops unless otherwise approved by the Engineer. Waterstops shall be placed in accordance with Section 51-1.14 of the State Specifications and the manufacturer's instructions. Overlapping of waterstops will not be allowed.

P. The flatness tolerance for the tank pad shall be ± 1 inch when checked with a 10-foot straightedge placed anywhere on top of the tank pad in any direction.

Q. Except as otherwise indicated on the Drawings, the minimum concrete cover of reinforcement shall be as follows:

1. Concrete cast against and permanently exposed to earth: 3 inch

2. Concrete exposed to soil, water, sewage, sludge and/or weather: 2 inch (including bottom cover of slabs over water or sewage)

3. Concrete not exposed to soil, water, sewage, sludge and/or weather:

   a. Slabs (top and bottom cover), walls and joists: 1 inch
   b. Beams and columns (principal reinforcement): 2 inch

R. All concrete corners shall have a 3/4-inch chamfer.

S. Reinforcing steel interfering with the location of other reinforcing steel, conduits or embedded items, may be moved within the specified tolerances or one bar diameter, whichever is greater. Greater displacement of bars to avoid interference, shall only be made with the approval of the Engineer. Do not cut reinforcement to install inserts, conduits, mechanical openings or other items without the prior approval of the Engineer.

T. Securely support and tie reinforcing steel to prevent movement during concrete placement. Secure dowels in place before placing concrete. Wire tie ends shall be bent away from the outer surface of all concrete elements.

U. Reinforcing steel bars shall not be field bent except where shown on the Drawings or specifically authorized in writing by the Engineer. If authorized, bars shall be cold bent around the standard diameter spool specified in the CRSI. Do not heat bars. Closely inspect the reinforcing steel for breaks. If the reinforcing steel is damaged, replace, Cadweld or otherwise repair as directed by the Engineer. Do not bend reinforcement after it is embedded in concrete.

V. Reinforcing steel bars shall have minimum clearance of 2-in from all metal items such as rebar, wire, or plates used to support pipe penetrations and pipe embedments.

W. Reinforcing steel bars shall be cleaned before concrete placement. Reinforcing substantially (as determined by the Engineer) covered in rust shall be sandblasted clean prior to concrete placement.

X. Concrete forms installation and removal are to comply with provisions of ACI 318 and 347.

Y. Epoxy-coated reinforcing steel shall be indicated on the Drawings and shall conform to the provisions in Section 52-2.02, “Epoxy-coated Reinforcement” of the State Specifications. The Contractor shall verify that the epoxy coating has not been damaged prior to placement. If damaged, the Contractor shall repair the epoxy coating prior to placement at Contractor’s expense.

3.02 QUALITY ASSURANCE / QUALITY CONTROL

A. Contractor shall perform testing of compressive strengths of concrete during construction to verify compliance with the Contract requirements. District may arrange for independent tests at its own cost. Contractor shall cooperate with the District in obtaining concrete samples for District’s independent tests.

B. Contractor shall perform the following testing during construction:

1. Strength Test Procedure

a. Four cylinders, 6-inch diameter by 12-inch high will be taken from each sample per ASTM C172 and C31.

b. Cylinders will be tested per ASTM C39

(1) One at 7 days
(2) Two at 28 days
(3) One at least 56 days, if necessary

2. Strength Test Frequency

a. Not less than one test each day concrete is place

b. Not less than one test for every 50 cubic yards or fraction thereof placed in one day.

c. Not less than one test for each concrete structure exceeding 2 cubic yards in volume.

3. Slump Test per ASTM C143

a. Determine the slump for each strength sample taken.
b. Additional slump tests may be taken as directed by the Engineer.

4. Air Content per ASTM C231, C173, and C138.

a. Determine the air content for each strength sample taken.

5. Temperature shall be determined for each strength sample taken.

C. Evaluation of Tests

1. Strength tests results shall average the compressive strength of the cylinders and meet or exceed the value as stated in this Article.

D. Acceptance of Concrete

1. Strength level of concrete shall be considered satisfactory if both of the following requirements are met:

a. Average of all sets of three consecutive strength tests equal or exceed the required specified 28-day compressive strength

b. No individual strength test falls below the required specified 28-day compressive strength by more than 500-psi.

2. If tests fail to indicate satisfactory strength level, the Contractor shall perform additional tests and/or corrective measures as directed by the Engineer at no additional cost to the District.

E. Testing of the grout shall be in accordance with the manufacturer's recommendations.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The precast concrete structures shall consist of doing all work and furnishing all materials necessary to furnish and install the precast concrete structures including, but not limited to, meter boxes, valve boxes, traffic boxes, test station boxes, and precast concrete utility vaults, or manholes, cover, structure excavation, structure backfill, and other miscellaneous items necessary to furnish and install the precast concrete structures as shown on the Drawings and as specified in these Specifications. Covers shall be lettered as shown on the Drawings.

B. For field painting, refer to Article 40.02 – Painting and Coating.

1.02 REFERENCE

A. Related Articles:

1. Section 24 – Earthwork
2. Article 30.01 – Concrete – General
3. Article 30.11 – Joints, Water Stops and Sealants
4. Article 30.16 – Grout
5. Article 40.02 – Painting and Coating

B. American Concrete Institute (ACI)

1. ACI 318/318R – (2014) Building Code Requirements for Structural Concrete and Commentary

C. American Association of State Highway and Transportation Officials (AASHTO):

1. AASHTO Standard Specifications for Highway Bridge

D. American Society for Testing and Materials (ASTM)

1. ASTM A 36 – Standard Specification for Carbon Structural Steel

2. ASTM A 82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement

3. ASTM A 185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

4. ASTM A 496 – Standard Specification for Deformed for Concrete Reinforcement

5. ASTM A 615/A 615M – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

6. ASTM A 706/A 706M – Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

7. ASTM C 33 – Standard Specification for Concrete Aggregates

8. ASTM C 150 – Standard Specification for Portland Cement

9. ASTM C 478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections

10. ASTM C 618 – Standard Specification for Fly Ash

11. ASTM C 857 – Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures

12. ASTM C 858 – Standard Specification for Underground Precast Concrete Utility Structures

13. ASTM C 890 – Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures

14. ASTM C 891 – Standard Practice for Installation of Underground Precast Concrete Utility Structures

15. ASTM C 923 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals

16. ASTM C 1037 – Standard Practice for Inspection of Underground Precast Concrete Utility Structures

E. National Precast Concrete Association (NCPA):

1. NPCA Quality Control Manual (2010) Quality Control Manual for Precast Concrete Plants

1.03 SUBMITTALS

A. Prior to the installation of the precast concrete structures, the Contractor shall submit drawings showing the vault manufacturer and all dimensions of vaults, covers, location, openings and type of lifting and handling inserts and details of reinforcement and joints, ventilation structures and components, and a copy of the engineering calculations supporting the design to the Engineer per Article 9.02 for favorable review. The vault design and construction shall comply with the specified design load conditions and referenced ASTM specifications (e.g., ASTM C 857 and C 858). For all precast items which are manufactured, the Contractor shall also submit a list of the design criteria used by the manufacturer.

B. Verification of compressive strength shall be submitted to the Engineer. Such verification may be laboratory trial batch test results with a minimum of three test cylinders or a series of production compression tests with a minimum of 20 sets of test data which fall within the elevation and acceptance criteria specified herein. Such tests must have been made within the previous 2 years on the identical concrete mix submitted.

C. Prior to placement of any waterproofing material, the Contractor shall submit to the Engineer for favorable review, per Section 7 of these Specifications, manufacturer data and recommended methods of placement.

D. Quality Assurance/Control

1. Submit manufacturer's catalog data, descriptive literature, and installation instructions for waterproofing material.

2. Manufacturer's Certificate: The manufacturer shall supply a certificate indicating items furnished under work of this section comply with requirements.

3. Material Certificates: The manufacturer shall supply copies of:

a. Cementitious materials
b. Admixtures
c. Reinforcing materials
d. Aggregates

1.04 MEASUREMENT AND PAYMENT

A. No measurement is needed.

B. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. The precast concrete structures shall be precast concrete vaults of the size indicated on the Drawings and shall be as manufactured by Utility Vault Co., 1901 Isabel Avenue, Livermore, California 94550; Oldcastle Precast Inc., 3786 Valley Ave. Pleasanton, CA 94566-0868; Jensen Precast Co., 12404 Locke Road, Lockford, CA 95327; or equal.

B. Concrete used for manufactured precast concrete structures shall have a minimum 4,000 psi compressive strength. Concrete Design Mixtures: Proportion normal mixes to provide the following properties:

1. Minimum Water-Cementitious Materials Ratio: 0.49 maximum.

2. Air Content: 5.5 to 7.5 percent for concrete exposed to freezing and thawing

3. Concrete Mixing: Comply with NPCA Quality Manual

C. Precast concrete structures shall be in conformance with Section 90-4 “Precast Concrete” of the State Standards

D. Unless noted otherwise, precast concrete structure shall have galvanized steel lids, which are bolted to galvanized steel frames with stainless steel bolts. The frames and lids shall be provided by the precast concrete structure manufacturer. Covers shall have lifting handles. When leveling bolts are used to set the precast concrete structure top sections, the Contractor shall insure that the load on the precast concrete structure will be transferred through the mortar to the precast concrete structure, and will not be carried by the leveling bolts.

E. Where precast concrete structures are in areas which may be subjected to vehicular traffic, the structure and lids shall be designed for H-20 traffic loading in addition. All precast concrete structures shall be designed for lateral loads, hydrostatic loads, and for uplift.

F. Construction joints between the sections of the precast concrete structures shall be made watertight with RAM-NEK preformed plastic gasket, as manufactured by K.T. Snyder Company, Inc.; Quik-Seal, as manufactured by Quikset Utility Vaults, or equal.

G. Structure backfill shall conform to Section 24 “Excavation and Backfill”.

H. Precast Concrete Risers:

1. Precast concrete grade rings and cones shall comply with ASTM C 478, except that the wall thickness shall be 6 inches minimum. Provide interlocking keyways on rings and cones. Provide cones with cast in place inserts for the manhole frame.

2.02 MANUFACTURED UNITS

A. Precast Concrete Vault Structures: The structure shall be designed in accordance with ASTM C 857, Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.

PART 3 EXECUTION

3.01 INSTALLATION

A. Following installation, the walls of all precast structures shall be waterproofed in accordance with Section 54 of the State Specifications.

B. Preformed flexible plastic gasket material shall be placed between the individual sections of the precast vault in accordance with the manufacturer's recommendations.

C. Excavation and backfill, pavement removal and restoration, and roadway base shall conform to Section 24.

D. The above-mentioned precast items shall be installed in accordance with the manufacturer's recommendations, unless otherwise required by the Drawings. All joints shall be sealed by the use of preformed sealant and mortar or nonshrink grout so as to be watertight.

3.02 DELIVERY, STORAGE, AND HANDLING

A. Handling and transport precast concrete units in a position consistent with shape and design to avoid stresses resulting in cracking or damage. All material of precast concrete shall be store on ground level. Dunnage shall be placed vertically in-line with underlying dunnage as additional pieces are placed on each stack of material.

B. Lift and support precast concrete units at designated points shown on Shop Drawings or Lifting and Handling Insert Details.

3.03 QUALITY ASSURANCE/QUALITY CONTROL

A. Manufacturer Qualifications

1. Precast concrete manufacturer listed in this section or manufacturer approved by Engineer prior to bid in accordance with project bidding requirements, with minimum 5 years' experience in manufacture of comparable work to that specified, that assumes responsibility for design and engineering of precast concrete components, including preparation of shop drawings and engineering analysis. Precast concrete manufacturer should have prior experience working with fiberglass liner systems and provide project references for projects in the state of California.

2. Manufacturing company shall at all times prior to bid and during construction have and maintain a Class B – California General Contractors License.

3. Manufacturer's Engineer: Qualified professional engineer experienced in designing Work of this Section and licensed in Project state.

B. Certifications

1. Manufacturer's Certification: verification of current NPCA plant certification program, with minimum 3-year record of certification program audits, and with ongoing quality control program.

3.04 WARRANTY

A. Manufacturer shall provide a full warranty against defects in workmanship and material. This warranty shall be for a minimum of 20 years.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. Forms and Falsework shall consist of the structural design, work and materials necessary to support the placement of the concrete and furnish and place joints in the concrete as shown on the Drawings and as specified in these Specifications.

1.02 REFERENCE

A. Related Articles:

1. Article 30.01 – Concrete – General

1.03 SUBMITTALS

A. The Contractor shall submit details and layout of the joints and the design and working Drawings of Falsework.

1.04 MEASUREMENT AND PAYMENT

A. Form and Falsework will not be measured.

B. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Forms shall conform to the provisions in Section 51-1.03C(2), “Forms,” of the State Specifications.

B. Falsework shall conform to the provisions in Section 48-2, “Falsework,” of the State Specifications.

PART 3 EXECUTION

3.01 QUALITY ASSURANCE

A. No special requirement.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Bar supports.
2. Reinforcing bars.
3. Thread bars.
4. Tie wires.
5. Welded wire fabric reinforcement.

1.02 REFERENCES

A. American Concrete Institute (ACI):

1. 318 - Building Code Requirements for Structural Concrete and Commentary.

2. 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary.

3. SP-66 – ACI Detailing Manual.

4. 315 -Details and Detailing of Concrete Reinforcement

B. American Welding Society (AWS):

1. D1.4 - Structural Welding Code - Reinforcing Steel.

C. ASTM International (ASTM):

1. A 185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

2. A 615 - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.

3. A 706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

1.03 DEFINITIONS

A. Give away bars: Bars that are not required by Contract Documents, but are installed by the Contractor to support the required reinforcing bars.

1.04 SYSTEM DESCRIPTION

A. Design Requirements

The Drawings contain general notes concerning amount of reinforcement and placing, details of reinforcement at wall corners and intersections, and details of extra reinforcement around openings in concrete.

1.05 SUBMITTALS

A. Shop Drawings

1. Changes to reinforcing steel contract drawing requirements:

a. Indicate in separate letter submitted with shop drawings any changes of requirements indicated on the Drawings for reinforcing steel.

b. Such changes will not be acceptable unless the Engineer has accepted such changes in writing.

2. Reinforcement shop drawings:

a. Review of reinforcement shop drawings by the Engineer will be limited to general compliance with the Contract Documents.

b. Submit reinforcement shop drawings in a complete package for each specific structure. Partial submittals will be rejected.

B. Samples

1. Bar support chairs: Submit samples of chairs proposed for use along with letter stating where each type of chair will be used.

C. Quality Assurance/Control

1. Submittals:

Procedures: Welding procedures conforming to AWS D1.4 for reinforcement designated to be field welded.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping:

1. Deliver bars bundled and tagged with identifying tags.

B. Acceptance at site:

1. Reinforcing bars: Deliver reinforcing bars lacking grade identification marks accompanied by manufacturer's guarantee of grade.

1.07 SEQUENCING

A. Bar supports: Do not place concrete until samples and product data for bar supports have been accepted by the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Bar supports:

1. Reinforcing bars to be embedded in concrete:

a. Hot-dip galvanized steel bar support chairs with plastic tips:

(1) Support reinforcing for concrete placed on ground using bar support chairs with hot dip galvanized plates for resting on ground welded to the chairs.

2. Wire bar supports located between mats of reinforcing bar:

a. Steel bar supports.

B. Reinforcing bars:

1. Reinforcing bars to be embedded in concrete:

a. ASTM A 615 Grade 60 deformed bars, except for locations specified in the following paragraphs:

(1) Actual yield strength based on mill tests of reinforcement provided shall not exceed the minimum yield strength specified in this Section by more than 18,000 pounds per square inch.

(2) Ratio of the actual ultimate tensile strength to the actual tensile yield strength of the reinforcement shall not be less than 1.25.

2. Reinforcing bars that are required to be welded:

a. Low alloy ASTM A 706 Grade 60 deformed bars.

3. Reinforcing bars that are required to resist earthquake-induced flexural and axial forces in concrete frame members and in concrete shear wall boundary members:

   a. Low alloy ASTM A 706 Grade 60 deformed bars.

4. Thread bars:

   a. Provide thread bars having continuous rolled-in pattern of thread-like deformations along entire length.

   b. Provide hex nuts and couplers for the thread bars that develop 125 percent of yield strength of bar.

   c. In accordance with to ASTM A 615 Grade 60.

   d. Manufacturers: One of the following or equal:

      (1) DYWIDAG Systems International, DYWIDAG Threadbar

C. Do not substitute cut threads on regular reinforcing bars for thread bars. C. Tie wires: Annealed steel.

D. Welded wire fabric reinforcement:

1. In accordance with ASTM A 185.

2. Fabric may be used in place of reinforcing bars if accepted by the Engineer.

3. Provide welded wire fabric in flat sheet form.

4. Provide welded wire fabric having cross-sectional area per linear foot of not less than cross-sectional area per linear foot of reinforcing bars indicated on the Drawings.

2.02 FABRICATION

A. Shop assembly:

1. Cut and bend bars in accordance with provisions of ACI 318, ACI 350, and ACI SP-66.

2. Bend bars cold.

3. Provide bars free from defects and kinks and from bends not indicated on the Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions

1. Reinforcing bars and welded wire fabric reinforcement: Verify that reinforcement is new stock free from rust scale, loose mill scale, excessive rust, dirt, oil, and other coatings which adversely affect bonding capacity when placed in the work.

3.02 PREPARATION

A. Surface preparation:

1. Reinforcing bars: Thin coating of red rust resulting from short exposure will not be considered objectionable. Thoroughly clean any bars having rust scale, loose mill scale, or thick rust coat.

2. Cleaning of reinforcement materials: Remove concrete or other deleterious coatings from dowels and other projecting bars by wire brushing or sandblasting before bars are embedded in subsequent concrete placement.

3.03 INSTALLATION

A. Special Techniques

1. Reinforcing bars:

a. No field bending of bars will be allowed. If authorized, bar shall be cold-bent around a standard diameter spool as specified within CRSI. Do not heat bar.

b. Hoop bars shall be rolled to the radius of the structure.

c. Welding:

(1) Weld reinforcing bars where indicated on the Drawings or acceptable to the Engineer.

(2) Perform welding in accordance with AWS D1.4 and welding procedures accepted by the Engineer:

(a) Conform to requirements for minimum preheat and interpass temperatures

(3) Submit welding procedures.

(4) Do not tack weld reinforcing bars.

2. Placing reinforcing bars:

   a. Accurately place bars to meet tolerances of ACI 318 and adequately secure them in position.

   b. Lap bars at splices as indicated on the Drawings or specified:

      (1) Unless specifically otherwise indicated on the Drawings, install bars at lap splices in contact with each other and fasten together with tie wire.

      (2) Where reinforcing bars are to be lap spliced at concrete joints, ensure that bars project from first concrete placement a length equal to or greater than the minimum lap splice length indicated on the Drawings.

      (3) Where lap splice lengths are not indicated on the Drawings, provide lap splice lengths in accordance with ACI 318 and ACI 350.

   c. Bar supports:

      (1) Provide a sufficient number to prevent sagging, to prevent shifting, and to support loads during construction; but in no case less than quantities and at locations as indicated in ACI SP-66.

      (2) Do not use brick, broken concrete masonry units, spalls, rocks, wood or similar materials for supporting reinforcing steel.

      (3) Do not use give away bars that have less cover than required by the Contract Documents. Do not adjust location of reinforcement required by the Contract Documents to provide cover to the giveaway bars.

   d. If not indicated on the Drawings, provide protective concrete cover in accordance with ACI 350 and ACI SP-66.

   e. Closely inspect the reinforcing steel for breaks. If the reinforcing steel is damaged, replace or otherwise repair as directed by the Engineer.

3. Tying of bar reinforcement:

   a. Fasten bars securely in place with wire ties.
   b. Tie bars sufficiently often to prevent shifting.

c. Provide at least 3 ties in each bar length:

(1) Do not apply to dowel lap splices or to bars shorter than 4 feet, unless necessary for rigidity.

d. Tie slab bars at every intersection around periphery of slab.

e. Tie wall bars and slab bar intersections other than around periphery at not less than every fourth intersection, but at not greater than following maximum spacings:

Bar Size	Slab Bar Spacing Inches	Wall Bar Spacing Inches
Bars Number 5 and Smaller	60	48
Bars Number 6 through Number 9	96	60
Bars Number 10 and Number 11	120	96

f. After tying wire ties, bend ends of wire ties in towards the center of the concrete section:

(1) The cover for wire ties shall be the same as the cover requirements for reinforcing bars.

4. Welded wire fabric reinforcement:

a. Install necessary wiring, spacing chairs, or supports to keep welded wire fabric in place while concrete is being placed.

b. Bend fabric as indicated on the Drawings or required to fit work.

c. Unroll or otherwise straighten fabric to make flat sheet before placing in the Work.

d. Lap splice welded wire fabric as indicated on the Drawings.

e. If lap splice length is not indicated on the Drawings, splice fabric in accordance with ACI 318 and ACI 350.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. Expansion Joints, Waterstops and Sealing Joints shall consist of work and materials necessary to furnish and place these items in concrete as shown on the Drawings and as specified in these Specifications.

1.02 REFERENCE

A. Related Articles:

1. Article 30.01 – Concrete – General

1.03 SUBMITTALS

A. Three pieces of 12-inch long samples of each type of water-stop being used and three pieces of each accessory used in the construction shall be submitted along with manufacturer's literatures, installation procedures and warranties shall be submitted for District's review and written response.

1.04 MEASUREMENT AND PAYMENT

A. Expansion joints will not be measured.

B. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Joint Waterproofing material and construction shall be per details indicated on plans, as approved by the District from Contractor submitted material(s), procedures and warranties and shall conform to the provisions in Section 51-2, "Joints," of the State Specifications.

B. Furnishing and installation of waterstops shall conform to the requirements as stated in paragraph above and in Section 51-2.04, "Waterstops," of the State Specifications.

C. Furnishing and installation of neoprene strip shall conform to the requirements for strip water stops as provided in Section 51-2.05, "Strip Waterstops," of the State Specifications.

D. Expansion joints and construction shall be provided at intermediate locations as called out and detailed on the Drawings. Weakened plane joints shall not be allowed, unless specifically shown on Drawings.

E. All joints shall be sealed in conformance with the details shown on the Drawings and the provisions in Section 51, “Concrete Structures,” of the State Specifications.

PART 3 EXECUTION

3.01 QUALITY ASSURANCE

A. No special requirements on testing.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. This item of work shall consist of doing all work and furnishing materials necessary to place grout for cement mortar grout, nonshrink grout, and cement mortar as shown on the Drawings and as specified herein.

1.02 REFERENCES

A. Related Articles:

1. Article 32.01 – General Requirements – Piping
2. Section 40 – Coating, Lining, and Painting

B. American Society for Testing and Materials (ASTM)

1. ASTM C144 – Standard Specifications for Aggregate and Masonry Mortar
2. ASTM C150 – Standard Specifications for Portland Cement

C. American Water Works Association

1. C104 – Cement Mortar Lining of Ductile Iron Pipe and Fittings

1.03 SUBMITTALS

A. Prior to placement of the grout or cement mortar, certification from the manufacturer that the material meets the specified requirements and is appropriate for the intended purpose and instructions and recommendations on the mixing, handling and placement shall be submitted to the Engineer by the Contractor in accordance with Article 7.05.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cement mortar grout for field repair shall consist of 1 part of Portland cement and two parts of clean sand by volume, with sufficient water to obtain workable consistency.

B. Grout for tunnels shall be in proportions such that it will readily flow without segregation throughout the length and cross-section space to be filled.

Nonshrink grout shall be Five Star Epoxy Grout as manufactured by U.S. Grout Corporation, Thermal-Chem Mortar Resin, Product No. 3 as manufactured by Thermal-Chem, Inc., Concresive 1463 with 1533 sand as manufactured by Adhesive Engineering Company, or equal.

C. Cement mortar for joints shall consist of one part Portland cement and two parts of clean masonry sand by weight, and shall contain only sufficient moisture to permit packing and troweling without crumbling.

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation and mixing of the compound shall be in conformance with the manufacturer's specifications.

3.02 QUALITY ASSURANCE

A. Testing of the grout or cement mortar shall be in accordance with the manufacture's recommendations.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The work specified in this Article includes general requirements for piping and related items, including methods and materials.

B. The words “pipe” or “piping” shall refer to pipe, pipe sections, fittings, and appurtenances unless otherwise noted.

C. The total quantity of pipe for each diameter, design pressure, and design depth of cover shall be as shown on the Drawings and as stated in these Specifications.

D. The Contractor shall refer to the Drawings for flange class and ratings for existing appurtenances.

E. “Above Ground Piping” is piping above grade or in vaults and utility structures.

F. “Buried Piping” is piping that is buried in soil or cast in concrete below grade.

G. The Engineer reserves the right to inspect the material, pipe, and fittings at the manufacturer’s plant. Only pipe manufactured to these Specifications shall be permitted on the project.

1.02 REFERENCES

A. Section 12 – Work and Contract Time

B. Section 24 – Earthwork

C. Article 32.05 – Miscellaneous Piping and Piping Specialties

D. Article 32.12 – Welded Steel Pipe

E. Article 32.18 – Tension Anchorage

F. Article 32.19 – Pipe Disinfection

G. Section 39 – Corrosion Control

H. Section 40 – Coating, Lining, and Painting

I. American Water Work Association (AWWA):

1. C 206 – Standard for Field Welding of Steel Water Pipes.

2. C 210 – Liquid-Epoxy Coating Systems for the Interior & Exterior of Steel Water Pipelines.

3. M11 Steel Pipe – A Guide for Design and Installation

J. AISC Manual of Steel Construction, Most Recent Edition

K. ASME Boiler and Pressure Vessel Code

L. American Welding Society (AWS):

1. Structural Welding Code, Most Recent Edition.

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer in accordance with Article 7.05 a certified affidavit of compliance stating that all pipe, special fittings and other products and materials furnished comply with the applicable requirements of the AWWA and ASTM Standards including the following supplemental requirements:

1. Physical and chemical properties
2. Hydrostatic test reports
3. Results of production weld tests
4. Sustained pressure test reports
5. Burst strength test reports

B. The Contractor shall submit to the Engineer in accordance with Article 7.05 test reports and manufacturer's statement, as outlined in applicable AWWA standards.

C. The Contractor shall furnish dimensioned shop drawings and calculations covering the details of all pipe, fittings, special sections, including reinforcement joint details, and miscellaneous items to be furnished and fabricated for the pipelines. Dimensions, tolerances, wall thickness, coating, lining, and other pertinent information shall be shown. Shop drawings shall include pipe manufacturer's allowable joint deflection limits of gasketed joint pipe for unstressed joints and for joints stressed to the manufacturer's maximum permissible amount without leakage. Material properties of the lining, cylinder, and coating materials to be used shall be included in sufficient detail to determine compliance with the Contract Documents. These shall be submitted to the Engineer for review prior to fabrication in accordance with Article 7.05.

D. The shop drawings to be submitted by the Contractor shall clearly indicate the method(s) of excavation selected by the Contractor and the actual trench excavation dimensions. Changes in the trench dimension and/or configuration may result in an increased cylinder thickness being required. If the dimensions or configuration vary from those shown on the Drawings, the Engineer may reevaluate the pipe design.

E. For pipe 8 inch and larger, blowoff and CARV assemblies, service turnouts, and the shop drawings shall include a tabulated line layout schedule, and marking diagrams, with reference to the stationing and profile gradeline and all elements of curves and bends, both in horizontal and vertical alignment shown on the Drawings. The schedule shall show the location of each pipe section and each special section with each piece numbered or designated in sequence. The schedule shall show steel cylinder thickness for steel pipe, pressure class and thickness for ductile iron pipe, and cement-mortar lining and coating thickness and dielectric coating type and thickness. The line layout shall include the pipe station and invert elevation at all changes in grade or horizontal alignment or to which the bell end of each pipe will be laid. The layout schedule shall be prepared with sufficient clarity and detail to facilitate ease of construction staking. The Contractor shall submit a schedule showing the size and location of shop and field welds and the limits of each reach of restrained joints for all pipe sizes.

F. The Contractor shall submit for favorable review to the Engineer, per Article 7.05, the proposed test methods and procedures and recording procedures and forms to be used during the manufacturing, coating, and lining of all pipe, specials, and fittings to ensure that the requirements of these Specifications are met.

G. The proposed test methods and procedures shall, as a minimum, address the following items of work and areas of concern.

1. *Welding*—Manual and Automatic Machines with Operator(s): Qualifications, Testing, Production Testing, Frequency of Test and Requalification, Reporting.

2. *Inspection Report of Joints*—Shall include final weld sizes.

3. *Hydrostatic Testing*—Sustained Pressure, Reporting.

4. *Retesting, Welds, Hydrostatic, and Polyethylene Coating*—Causative Evaluation, Procedures, Limit(s) to Repair, Pipe Location Identification, Reporting.

5. *Cement Mortar Lining*—Mortar Mix (by batches), Application (test cylinders), Reporting.

6. *Tolerances*—Pipe, Bell, Spigot, Mortar Lining.

7. *Polyethylene Coating*—Layer Accounting and Inspection, Electrical Testing, Reporting, Repair and Location Identification.

8. *Physical and Chemical Properties*

9. *Burst Strength Testing*

H. To facilitate the review of the testing information being submitted on the pressure pipe, it shall be prepared and presented in an orderly format to the Engineer for favorable approval. The format shall be such that it provides for the following:

1. Defines the quality control/assurance procedures and reporting system on the manufacture of the pressure pipe and all its component parts.

2. Includes a summary of all test results.

3. Includes a representative sample of detailed test results.

4. Includes an explanation of the method of selection of the representative sample of detailed test results.

5. The maintenance by the Contractor of all records is necessary to assure that, for each separate fabricated section of pipe, complete traceability is established for all materials, testing, fabrication procedures, history of repairs, and machine/operator identification. The Engineer reserves the right to review and/or obtain copies of any or all of these records.

6. Documentation including the description of the proposed means of accurately measuring the amount of water used during the hydrostatic testing.

1.04 SCHEDULE

A. Contractor's attention is directed to Section 12 regarding the schedule and scope of work requirements.

1.05 ARRANGEMENT OF EQUIPMENT

A. Unless specifically noted otherwise, the piping as shown on the Drawings is diagrammatic, approximate with regards to size and not intended to show exact dimensions. The piping configurations depicted in the Drawings may require some alterations to accommodate actual material and equipment installation dimensions and requirements. Structural supports, footings, fixtures, piping and valve supports, electrical, telemetry, cathodic protection, and instrumentation connections indicated may have to be altered to accommodate the furnished materials and/or existing conditions. No additional payment will be made for such revisions and alterations.

1.06 QUALIFICATIONS/QUALITY CONTROL

A. All equipment shall be installed in accordance with the manufacturer's requirements, these Specifications and as shown in the Drawings.

B. The Contractor shall have the sole responsibility for proper installation of the equipment in accordance with the manufacturer's requirements and as specified in herein.

C. All installed equipment shall operate in accordance with the manufacturer's requirements and to the satisfaction of the Engineer.

D. The Contractor shall submit to the Engineer welding procedures specifications prior to any welding. The Contractor shall refer to Article 20.03. for additional testing certifications for weld inspection and testing.

1.07 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS GENERAL

A. All materials furnished by the Contractor shall be of standard quality and proven ability as required for the given application and as specified herein.

B. The fabrication procedures and the materials used in the production and manufacturing of all pipe, specials, and fittings shall be subject to inspection by the Engineer at the plants where the pipe, specials, and fittings are fabricated and again in the field.

C. Unless otherwise specified, all special sections and fittings shall be the same cylinder thickness, pressure class, or dimension ratio as the adjacent pipe.

D. All ferrous pipes shall be bonded for electrical continuity. All ferrous plate and all other ferrous components shall be bonded and connected to anodes as shown on the Drawings and as specified in Section 32.

E. Coatings on all portions of the pipeline and its appurtenances that are electrically interconnected must be compatible throughout. Insulating joints shall be installed at the locations as specified in Section 39.

F. All steel special sections or fittings required for pipeline bends, tees, closures, nozzles, etc., shall be fabricated in accordance with AWWA Standard C200 as shown on the Drawings and specified herein. Dimensions shall be in accordance with AWWA Standard C208 for steel pipe.

G. Steel pipe shall have the same coating throughout including the portions within thrust blocks, concrete encasements, and structure walls, unless specifically indicated otherwise. The Contractor is directed to Section 40 for coating and lining requirements.

H. All ductile iron special sections, fittings, and appurtenances shall be in accordance to AWWA Standard C110.

I. Unless otherwise specified, all pipe, special sections, and fittings shall be clearly marked on the interior and top exterior surfaces as follows:

1. Pipe with beveled ends shall be marked to show the degree of bevel and the location of the field top.

2. An arrow pointing in the direction of increasing pipeline stationing.

3. The sequence of the pipe unit. All units shall be numbered in sequence in accordance with the laying schedule and marking diagram.

4. All special sections and fittings shall be marked at each end with top field centerline. A mark indicating the vertical axis of the special section or fitting shall be placed on the top and bottom.

J. The Contractor's attention is directed to Article 14.07 – 'District Furnished Materials and Equipment' of the Special Provisions for further information.

2.02 FLANGED JOINTS MATERIALS

A. Flanges

1. Unless otherwise indicated for steel pipe, pipe flanges shall be in accordance to the Drawings conforming to the requirements of AWWA Standard C207 for steel ring type pipe flanges.

2. Unless otherwise indicated for ductile iron pipe, pipe flanges shall conform to the requirements of AWWA Standard C115.

3. Flange faces shall be flat and shall be faced smooth after flanges have been welded to pipe or flange skirt.

4. Flange skirts shall be a minimum 12 inch long, unless stated otherwise.

5. Flanges 24 inch or smaller may be forged flanges conforming to ANSI B16.5 for steel pipe, and may be faced prior to welding to pipe, unless stated otherwise.

6. Where required, flanges and couplings shall be of the insulated type.

B. Gaskets

1. Gaskets shall be full face type for flanged joints and of suitable type for other joints.

2. Gasket material shall be rubber suitable for potable water and in accordance with AWWA C207 – Standard for Steel Pipe Flanges for Waterworks Serice-Seizes 4 Inches Through 144 Inches.

C. Bolts, Nuts, and Washers

1. All bolts, nuts, washers, studs, and other required hardware shall be provided by the Contractor for flanged connection of piping and appurtenances.

2. Bolts, nuts, and washers shall be carbon steel.

3. Bolts, nuts, and washers shall, respectively, be ASTM A193 B7, A194 Grade 2H and F436 or A354 BD Heavy Hex, A563 DH Heavy Hex and F436.

4. Studs shall be of the same quality and material as the bolts.

5. All other hardware shall be of the size, type, and number as required and recommended by the piping or fitting manufacturer and as specified herein.

6. All threads on bolts shall be protected with an anti-seize lubricant

7. Except as otherwise specified herein, steel for bolts, anchor bolts, and cap screws shall be in accordance with the requirements of ASTM A307 Grade A or B for Class B, D, E, and F flanges, and ASTM Standard A193, Grade B7 for Class E or F Blind flanges or better; bolts shall be furnished with unfinished heavy hexagon heads and nuts; threads shall be Class 2 fit as specified in ANSI Standard B1.1; washers shall be of forged or rolled steel conforming to ASTM Standard A36.

8. All bolts, anchor bolts, and washers which are buried, submerged, or below the top of the wall inside any hydraulic structure shall be of ASTM A240 Type 316 stainless steel, with bronze nuts or cap screws (where screwed into stainless steel), of copper-silicon alloy, conforming to ASTM B98, alloy C 65100, designation H04, or alloy C 65500, designation H04. Wherever stainless steel bolts and nuts are specified, it shall refer to the above mentioned combination, unless specifically excluded.

9. Where stainless steel bolts are not in contact with water, stainless steel nuts may be used provided that an anti-seizing compound is applied to the threads. Where stainless steel bolts (excluding anchor bolts) in contact with water can be cut and replaced, nuts for bolts larger than 1 inch diameter may be stainless steel but anti-seizing compound shall not be used.

10. The bolt and nut material shall be free-cutting steel. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. All bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series. The length of all bolts shall be such that after joints are made up, each bolt shall extend through the entire nut, but in no case more than ½ inch beyond the nut.

2.03 THREADED JOINTS MATERIALS

A. Threaded rod shall be stainless steel ASTM A240, Type 316.

B. Screwed joints shall be made up with standard industrial quality “Teflon” type joint tape. After having been set up, a joint must not be backed off unless the joint is completely broken, the threads cleaned, and new tape applied. All joints shall be air tight.

2.04 WARNING TAPE:

A. The underground warning tape shall be a minimum of twelve (12) inches wide and 3½ mils thick, constructed of polyethylene.

B. The underground warning tape color shall be blue and shall bear the continuously printed non-fading legend in black printing: “CAUTION WATER LINE BURIED BELOW”.

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall sufficiently protect all existing pipeline materials, equipment, appurtenances and associated structures.

B. The Contractor shall locate, verify, and expose all existing and new pipeline, piping and connection points, as required, to complete the work as specified in the Drawings and these Specifications.

3.02 TRANSPORTATION, DELIVERY, AND STORAGE

A. Pipe shall be strutted, loaded, and transported to protect pipe coatings and linings.

B. The Contractor shall load and haul the pipe to the site of the work. During loading, transportation, and unloading, every precaution shall be taken to prevent damage to the pipe, its coating, and lining.

C. Coated pipe shall not be placed directly on rough ground.

D. No metal tools or heavy objects shall be permitted to come into unnecessary contact with the finished lining or coating. Workers will be permitted to walk upon

the coating only when necessary, in which case they shall wear shoes with rubber or composition soles and heels. All pipe and fittings shall be examined before installation, and no piece shall be installed which is found to be damaged or defective.

E. Rolling or dragging the pipe will not be permitted. Any pipe section that becomes damaged shall be repaired at the expense of the Contractor as directed by the Engineer if, in their opinion, a satisfactory repair can be made; otherwise, it shall be replaced with an undamaged section of pipe at the sole expense of the Contractor.

F. The openings of all pipe, fittings and specials shall be protected with polyethylene end wrap or other suitable cover or plug to prevent unauthorized access by persons, animals, water or any undesirable substance.

G. All dirt and other foreign matter shall be removed from the pipe barrel and the pipe ends shall be thoroughly cleaned and maintained in a clean condition prior to the laying operation.

3.03 SITE CONDITIONS

A. There may be existing groundwater leakage or wet conditions in the pipeline, excavation, utility box and/or vault sites. Contractor shall take measures necessary to perform work under these conditions including activities related to work site dewatering.

B. Remove water, dirt, and debris from structures and areas where work is to be performed. Dispose of dirt and debris offsite according to local and state regulations. Discharge water in accordance with applicable regulations and agreements.

C. The isolation valves of the pipeline may leak. The District will make every effort to minimize the intrusion of water from these isolation points. However, the Contractor shall plan and take measures necessary to perform work inside the pipeline and vault sites under these conditions.

3.04 INSTALLATION

A. The Contractor shall inspect and verify the compatibility of all piping connections.

B. Concrete thrust blocks shall be provided at the locations and in the sizes as shown in the Drawings and as specified herein.

C. All pipes shall be laid to the lines and grades shown on the Drawings or as established by the Engineer. All pipe laying and jointing operations shall conform to the applicable “good practice procedure” requirements set forth in AWWA Manual M11 for steel pipe and as noted on the Drawings and in accordance with these Specifications. All elevations and locations of new piping and existing piping shall be surveyed by the Contractor and shown on the Record Drawings.

D. All pipe and fittings shall be thoroughly cleaned before installation and shall be kept clean until they are used in the work.

E. At all times when the work of installing pipe is not in progress, all openings into the pipe, piping and the ends of pipe in the trenches shall be kept tightly closed to prevent entrance of foreign materials. The Contractor shall maintain the inside of the pipe free from foreign materials and in a clean and sanitary condition until its acceptance by the District.

F. The Contractor shall regulate its equipment and construction operations such that the loading on the pipe does not exceed the loads for which the pipe is designed and manufactured.

G. Backfill material shall be placed and compacted around and under the pipe in sufficient quantity and manner to assure proper line and grade while the joint is being made and coated.

H. The Contractor shall provide all necessary equipment to perform work.

I. Unless otherwise specified, blocking may be used to assist in the alignment of the pipe during the laying operation and shall be placed only at the ends of the pipe section and shall be removed before the adjoining section is placed.

J. The trench shall be carefully graded and the bedding prepared in accordance with Section 24.

K. At suitable intervals in the progress of the pipeline maintenance operation and after all work inside the pipe has been completed, all debris created from the maintenance and installation activities or other work shall be removed and the entire interior left thoroughly clean. In the event any debris or water enters the opened pipeline, the Contractor shall clean up the pipe to the Engineer's satisfaction at no expense to the District.

L. No backfill shall be placed over the pipe until after the pipe has been inspected and approved by the Engineer.

3.05 WELDING – GENERAL

A. The Contractor shall provide welds at the steel patches, collars, nozzles and pipe fittings as shown on the Drawings and as specified herein.

B. Contractor shall remove just enough lining and coating of the piping to perform the welding and repair work.

C. Surface shall be free of moisture, paint, oil, grease, dirt, dust, and other contaminants before welding.

D. Welding shall be done in accordance with the latest edition of the AWS Structural Welding Code for steel (D1.1) or sheet steel (D1.3), as appropriate, and shall only be done where shown, specified, or permitted by the Engineer.

E. All welding shall be done by certified welders who have the adequate experience in the method and materials to be used and have pipeline welding experience with similar pipe size. Welders shall be qualified by an independent approved testing agency not more than one (1) year prior to commencing work.

F. In areas where only seal welds are required for either welded steel pipe, the weld size shall conform to Table J2.4 of the AISC Specification.

G. Welds shall be cleaned. All slag and spatter shall be removed.

H. As soon as practicable, after welding, the Contractor shall subject all welds to testing and all test results shall be submitted to the Engineer.

1. Single Welds:

a. All single welds shall be tested by the liquid penetrant test or by the magnetic particle test conforming to Section V, Articles 6 and 7, of the ASME Boiler and Pressure Vessel Code by an AWS certified welding inspector provided by the Contractor.

2. Double Welds:

a. All double welds are subject to testing by a leak test method conforming to Section V, Article 10, of the ASME Boiler and Pressure Vessel Code by an AWS certified welding inspector provided by the Contractor. The Contractor shall drill and tap the necessary holes to perform the test and shall plug weld the holes after satisfactory completion of the test.

3. The Contractor shall provide all apparatus and materials to perform weld tests. The Contractor shall perform and document the test and provide certified results to the Engineer.

4. The Contractor shall repair any welding defects disclosed by the test by grinding out the defective weld and re-welding the section, after which the same test shall be reapplied. This procedure shall be repeated until satisfactory test results are obtained.

I. Following acceptable weld testing, the Contractor shall apply wire mesh reinforcement and cement mortar linings and coatings as shown on the Drawings and as specified herein.

3.06 WELDED JOINTS – GENERAL

A. Field welded steel pipe joints shall be constructed and tested in accordance with AWWA C206 – Standard for Field Welding of Steel Water Pipes. Field welded joints shall be of sufficient type, size, strength and quality to withstand, to the limit of the adjacent pipe-wall strength, any longitudinal extension loading caused by settlement, washout and other disjointing forces. All pipe joints shall be watertight.

B. Joint welds shall be in accordance with Section J2 of the AISC Specification for Structural Steel Construction—Allowable Stress Design and as hereby modified. Joint welds designated by actual dimension shall be of the size indicated.

3.07 FLANGED JOINTS – GENERAL

A. The Contractor shall confirm that the flange class and drilling pattern of any new flanged connection including, but not limited to: piping, valves, blind flanges, flange coupling adapters, dismantling joints, and spool pieces are compatible with existing flanged connection prior to installation.

B. Unless otherwise specified or shown on the Drawings, the interior surface of all existing flanges that are to be removed and reinstalled shall be cleaned and the mating portion of the flange wire brushed prior to reinstallation.

C. Unless otherwise specified or shown on the Drawings, all flanges that are removed shall be reinstalled with new hardware and gaskets.

D. Flanged joints shall be made with gasket and bolt studs with a nut on each end or studs with nuts where the flange is tapped. The number and size of bolts shall conform to the same Standard Specifications as the flanges.

3.08 THREADED JOINTS – GENERAL

A. Teflon tape and/or thread compound approved for the service shall be applied to all threaded fittings and hardware

3.09 .STEEL PLATES – GENERAL

A. Sites inside the pipeline other than those shown on the drawings that require steel plate patching will be determined by the Engineer or District representative during the internal pipeline inspection. The Contractor's attention is directed to Article 32.22 – 'Support for Internal Pipeline Work' of the Technical Provisions for further information.

B. The steel plates for internal pipeline steel patching shall be sized and centered, so that the minimum distance between the edge of the hole and the edge of the plate is two (2) inches.

C. The Contractor shall provide labeled pre- and post-photographic documentation for all internal pipeline steel plate repairs. In addition, the Contractor shall provide the following steel plate repair data:

1. A unique repair location identification number, to be referenced on all accompanying records.

2. Location of the repair referenced longitudinally along the pipeline from an existing appurtenance and referenced laterally to a clock face facing downstream per the pipeline station numbers.

3. Size of the hole in the pipeline to be repaired, length and width.

4. Size of the plate used to repair the hole, length, width and thickness.

5. Dimension and length of welds use to secure the steel plate.

6. Weld test results.

All of the above referenced documentation shall be submitted to the onsite District Representative at end of each work day. The Contractor shall review quantities and dimensions of welds with the District's inspection staff prior to submission.

3.10 FIELD COATINGS AND LININGS

A. Field coatings and linings for steel pipe shall be in accordance with all applicable AWWA and NSF standards, as shown on the Drawings and as specified herein.

B. Steel pipe, fittings, valves, and nozzles which are exposed to atmosphere inside structures or above ground shall be field coated in accordance with Article 40.02 – 'Painting and Coating' of the Technical Provisions.

C. Steel pipe, fittings, valves, and nozzles that are buried shall be field coated in accordance with Article 40.02 – 'Painting and Coating'.

D. Wax tape coating systems shall be applied where shown on the Drawings and to all buried metal piping, fittings, nozzles and appurtenances including, but not limited to, buried mechanical and restrained joints, joint bolts, grooved end couplings, flexible couplings, joint harnesses, flanges and valve in accordance with Article 32.05 – Miscellaneous Piping and Piping Specialties.

E. Steel pipe, fittings, valves, nozzles, cement mortar lining and coating repair and patching shall be performed in accordance with the cement mortar product manufacturer's requirements, as shown on the Drawings.

3.11 SAFETY – GENERAL

A. Contractor shall provide the requisite safety measures, in accordance with applicable regulatory requirements, when welding inside the pipeline, an excavation or a vault. The Contractor, at the minimum, shall provide the following:

1. Pre-entry and continuous atmospheric monitoring

2. Forced air ventilation, directed to the welder's immediate area, providing an adequate air supply that shall not increase the hazards inside the confined space.

3. Fire extinguishing equipment and a fire-watch. The fire-watch must be trained in the proper use of the fire extinguishing equipment and shall remain at the vault or excavation site for at least thirty (30) minutes following completion of the welding.

4. Active participation and contribution to all project-related pipeline isolation and lockout/tagout procedures.

5. All labor, materials and equipment necessary for Confined Space Entry support.

B. The Contractor shall provide Confined Space Rescue and/or forced air ventilation, as required, for all applicable project activities.

3.12 FIELD TESTING AND CORRECTION OF DEFICIENCIES

A. If leaks are discovered during filling, the piping and related items shall be repaired by the Contractor as part of the work of installing this pipe and appurtenances as approved by the Engineer and at no expense to the District.

B. No visible leakage will be permitted.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The work specified in this Article includes furnishing and installing the permanent support and anchorage of above ground and in structure piping and associated appurtenances as shown on the Drawings or as specified herein.

B. Unless otherwise noted, the word “piping” as used herein shall mean pipe, pipe sections, tubing, fittings, and appurtenances.

C. The word “support” as used herein shall mean all manner and type of piping supports as used in the mechanical trades including overhead and wall hangers, brackets, clamps, rods, concrete inserts, struts, miscellaneous metals and non-metallic fabrications, anchorages, and appurtenances for the permanent installation of piping.

D. All piping supports and anchorages are typically not shown on the Drawings.

1.02 RELATED REQUIREMENTS

A. Article 32.01 – General Piping Requirements

B. American Society of Testing and Materials (ASTM):

1. A 123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

2. A 153 – Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

3. A 385 – Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)

C. International Code Council (ICC):

1. California Building Code, Most Recent Edition

2. California Mechanical Code, Most Recent Edition

3. California Plumbing Code, Most Recent Edition

4. As a minimum, piping supports shall comply with the requirements of the above codes and with stricter criteria herein.

D. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems, Most Recent Edition

1. As a minimum, steel piping shall be provided with braces that satisfy the Seismic Restraint Manual Guidelines for Mechanical Systems, Seismic Hazard Level A, Connection Level 1.

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Cut-sheets, fabrication details and installation requirements/instruction for all items specified herein and as shown on the Drawings.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 PIPE SUPPORTS

A. All materials furnished by the Contractor shall be of standard quality and proven ability as required for the given application and as specified in herein.

B. Pipe supports and hardware shall be fiberglass reinforced plastic, stainless steel or galvanized steel, as required for the given application and as indicated on the Drawings.

C. Pipe supports and hardware shall be the appropriate applicable models as manufactured by: Anvil International, Carpenter and Paterson Inc., Unistrut, Powerstrut or equal.

D. Preformed channel protective caps shall be plastic and designed to fit over the ends of channels to guard against personal injury or damage to clothing.

E. Protective caps shall be sized to fit channels and shall be Unistrut series P 2860, Power-Strut series PS 6153, or equal.

2.02 OVERHEAD HANGERS

A. Overhead hangers shall be capable of at least 1-1/2-inch vertical adjustment with the pipe installed, unless otherwise noted or acceptable to the Engineer.

2.03 SUPPORTS FROM BELOW

A. Floor supports shall be supplied with preformed framing systems and base plates as indicated on the Drawings or as acceptable to the Engineer. They shall be capable of at least one (1) inch of vertical adjustment with the pipe installed, unless otherwise noted or acceptable to the Engineer.

2.04 HANGER RODS AND STRUCTURAL ATTACHMENTS

A. Hanger rods shall be machine threaded with the strength based on the root diameter. Hanger rods shall be Type 304 or Type 316 stainless steel.

1. Hanger rods shall be supported from beams or concrete as required.

B. Beam clamps shall be utilized for attaching all hanger rods to structural steel beams where structurally adequate, as specified herein or as acceptable to the Engineer.

PART 3 EXECUTION

3.01 SUPPORT AND ANCHORAGE DESIGN CRITERIA

A. All piping shall be properly and adequately supported and anchored so as to maintain the supported loads in proper position under all operation conditions without unnecessary movement or strain on any piece of equipment.

B. The working factor of safety for supports shall be a minimum of five (5) times the ultimate pipe load, assuming water-filled pipe is being supported at the maximum spacing as specified.

C. The minimum factor of safety for thrust anchorage design shall be 1.5. Thrust design shall utilize working pressure plus water hammer; or 1.5 times working pressure; or test pressure; whichever is highest or as noted on the Drawings, and as acceptable to the Engineer.

If the test pressure is not noted on the Drawings, it shall be assumed to be 300 psig or 250 percent of working pressure of piping, whichever is greater.

3.02 QUALIFICATIONS/RESPONSIBILITY

A. The supports specified under this section shall be furnished by a manufacturer who is fully experienced, reputable, qualified, and has been regularly engaged in the manufacture (or fabrication) of the items to be furnished for at least five (5) years.

3.03 INSTALLATION

A. All required piping, tubing, fittings, valves, and appurtenances shall be rigidly supported from the structures by acceptable supports, hangers, inserts, or clamps, with adequate provisions for expansion and contraction. A minimum of

1-inch clearance (greater as required) shall be provided between all valves, unions, and fittings and walls, piping, equipment, and other obstructions to allow removal and repair. Support shall be provided at, or near, changes in direction, hubs, joints, valves, appurtenances, branches and elsewhere within 3 feet of couplings in accordance with the manufacturer's recommendations, as shown on the Drawings, and as specified herein.

B. Additional supports and anchors where required by criteria other than the type of pipe or by joints shown on the Drawings shall be the Contractor's responsibility and as acceptable to the Engineer.

C. Piping shall not be supported from other piping or from metal stairs, ladders, or walkways, unless specifically approved by the Engineer.

D. Piping three (3) inches and larger shall be a minimum distance of 1-1/2 inches from finished floors, walls, or ceilings unless otherwise shown on the Drawings or specified herein.

E. Supports shall provide firm support but not so firm as to prevent longitudinal pipe movement due to thermal contraction and expansion. In addition, point loading shall be avoided for soft or non-metallic piping.

F. Each section of piping shall be laid out and all connections (cemented, welded, screwed, flanged, couplings, etc.) made while the pipe is held in temporary supports. After completion of connections, the pipe shall be clamped in position. When piping is correctly installed on its permanent supports, temporary clamp or pipe supports shall be loosened and removed without displacement of the piping.

G. All pipe supports shall be free of sharp edges, burrs, and rough edges, especially at cut surfaces.

3.04 COATING

A. After fabrication and before installation all metal surfaces of pipe supports, hangers, anchors, rods, support pipes, brackets, nuts, bolts, washers, and other metal used, shall be galvanized conforming to ASTM A123, A153, and A385, as applicable (except cast or ductile iron and stainless steel).

3.05 PROTECTIVE CAPS ON PRE-FORMED CHANNELS

A. All pre-formed channels shall have their ends de-burred, smoothed, and shall be fitted with protective caps.

3.06 FIELD INSPECTION, TESTING, AND CORRECTION OF DEFICIENCIES

A. Hangers, supports, and anchors installed on the piping system shall operate satisfactorily as specified in Paragraph 1.02 during the testing of the respective systems. The hangers, supports, and anchors shall maintain piping in position without evidence of bending, sagging, warping, vibration, or stress.

B. All materials and work shall be accessible and subject to inspection by the Engineer.

END OF ARTICLE

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ARTICLE 32.05
MISCELLANEOUS PIPING AND PIPING SPECIALTIES SECTION 32

PART 1 GENERAL

1.01 SUMMARY

A. Article includes:

1. Miscellaneous piping specialties such as, but not limited to, blind flanges, flange coupling adapters, restrained dismantling joints, wax tape protective systems, unions, flexible couplings, and steel couplings.

2. The installation of new and the modification of existing special sections and fittings, for steel pipe including, but not limited to, pipe couplings (flanged or non-flanged), harness assembly, flange coupling adapters, flexible coupling, pipe joints, grooved end couplings, restrained dismantling joints required for steel piping as shown on the Drawings and as specified herein.

3. The preparation and application of field applied cement mortar coating and lining materials for existing and new installations.

1.02 REFERENCES

A. Related Articles

1. Article 32.01 – General Piping Requirements
2. Section 34 – Valves and Acuators

B. American Water Works Association (AWWA)

1. C115 – Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges

2. C200 – Steel Water Pipe 6 Inch and Larger

3. C207 – Steel Pipe Flanges for Waterworks Service, Sizes 4 In. through 144 In.

4. C208 – Dimensions for Fabricated Steel Water Pipe Fittings

5. C213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings

6. M11 Steel Pipe: A Guide for Design and Installation, Fifth Edition

C. American Society of Testing and Materials (ASTM)

1. A36 – Carbon Structural Steel

2. A53 –Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

3. A193 – Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications

4. A234 – Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

5. A240 – Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

6. A307 – Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength

7. A325 – Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

8. A516 – Pressure Vessel Plates, Carbon Steel, for Moderate-and Lower Temperature Service

9. B98 – Copper-Silicon Alloy Rod, Bar and Shapes

10. D395 – Standard Test Methods for Rubber Property – Compression Set

11. D2240 – Standard Test Methods for Rubber Property – Durometer Hardness

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Refer to Article 32.01 – General Piping Requirements for other piping submittal requirements.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 GENERAL

A. The Contractor's attention is directed to Article 14.07 regarding District Furnished Material and Equipment.

2.02 BLIND FLANGE

A. Blind flanges shall be in accordance to the Drawings conforming to AWWA C207 for steel pipe.

2.03 MANHOLE COVERS

A. Manhole covers shall be traffic-rated and shall be oriented to maximize access to vault ladder

B. Inner manhole openings shall have a 22” clear opening with a 6” offset from center.

2.04 FLANGE COUPLING ADAPTERS (3-INCHES TO 12-INCHES)

A. Follower

1. Ductile Iron 65-45-12 per ASTM A536

B. Sleeve

1. Steel conforming to ASTM Standard A36, ASTM Standard A53, or ASTM Standard A283C.

2. Ductile Iron 65-45-12 per ASTM A536

C. Flange

1. Steel per ASTM A36

2. AWWA C207 Class E Steel Ring Flat Face Flange, compatible with ANSI Class 125 and 150 bolt circles

D. Gasket

1. Compounded for water service, meeting requirements per ASTM D2000
2. Sized in accordance with AWWA C111

E. Nuts and Bolts

1. High-Strength Low-Allow Steel per AWWA C111

2. Rolled Threaded Bolts

F. Coating

1. Fusion Bonded Epoxy per AWWA C213

G. Restraint

1. Anchor pins where required

H. Flange Coupling Adapters (3-inch to 12-inch) shall be:

1. Model 913 Steel Flanged Coupling Adapter as manufactured by Smith-Blair, Inc., or;

2. FCA501 as manufactured by ROMAC Industries, Inc.

2.05 FLANGE COUPLING ADAPTERS (14-INCHES OR GREATER)

A. Sleeve

1. Steel conforming to ASTM Standard A36, ASTM Standard A53, or ASTM Standard A283C.

B. Flange

1. Steel per ASTM A36

2. AWWA C207 Class E Steel Ring Flat Face Flange, compatible with ANSI Class 125 and 150 bolt circles

C. Gasket

1. Compounded for water service, meeting requirements per ASTM D2000
2. Sized in accordance with AWWA C111

D. Nuts and Bolts

1. High-Strength Low-Allow Steel per AWWA C111
2. Rolled Threaded Bolts

E. Coating

1. Fusion Bonded Epoxy per AWWA C213

F. Restraint

1. Anchor pins where required

G. Flange Coupling Adapters (14-inch and greater) shall be:

1. FC400 Steel Flange Coupling Adapter as manufactured by ROMAC Industries, Inc., or;

2. Model 911 Steel Flanged Coupling Adapter as manufactured by Smith-Blair, Inc., or;

3. Model 913 Steel Flanged Coupling Adapter as manufactured by Smith-Blair, Inc.

2.06 RESTRAINED DISMANTLING JOINT

A. Followers

1. Cast Follower (3” – 12”)

   a. Cast using Ductile Iron 65-45-12 per ASTM A536.

2. Steel Follower – (14” and Larger)

   a. Carbon Steel C1020 per ASTM A576 and A36.

3. Integral bolt head pocket for one wrench installation.

4. Marked with part number and pipe size range for proper selection

B. Sleeve Weldment

1. Sleeve

   a. 3” – 5” nominal pipe size(s) = Carbon Steel per ASTM A513 or A53
   b. 6” and larger nominal pipe sizes = Carbon Steel per ASTM A283C

2. Flange

   a. Carbon Steel per ASTM A36

   b. AWWA Class E Steel Ring Flange, compatible with ANSI Class 125 and 150 bolt circles.

C. Gasket

1. Compounded for water service, meeting requirements per ASTM D2000
2. Sized in accordance with AWWA C111

D. Anchor Loop shall be Carbon Steel per ASTM A36

E. Bolts

1. Stainless Steel Type 316 per ASTM A240
2. 5/8” – 11UNC, 4.50”, Oval Neck Track Head
3. Rolled Threads

F. Restraint Rod

1. Stainless Steel Type 316 per ASTM A240
2. Restraint rods shall be rolled and all threaded.

G. Coating shall be fusion bonded epoxy coated

H. Restrained Dismantling Joints shall be:

1. DJ400 Dismantling Joint as manufactured by ROMAC Industries, Inc., or
2. Model 975 Dismantling Joint as manufactured by Smith-Blair, Inc.

2.07 MISCELLANEOUS ADAPTERS

A. Between different types of pipe and/or fittings special adapters may be required to provide proper connection. Some of these may be indicated on the Drawings or specified with individual types of pipe or equipment. However, it is the Contractor's responsibility to ensure proper connection between various types of pipe, to structures and between pipe and valves, fittings and other appurtenances regardless of who supplies the materials. These adapters shall generally be of the same materials as the joining piping or tubing. The Contractor shall provide all adapters as required, whether specifically noted or not. Examples of adapters include reducers, bushings, Swagelock fittings, compression fittings, reducing flanges, unions, and soldered fittings.

B. Link Type Seals: Link type seals shall be the modular mechanical type, consisting of interlocking neoprene or synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening. Assemble links solely with stainless steel bolts and nuts to form a continuous rubber belt around the pipe. Provide a stainless steel or glass reinforced nylon pressure plate under each bolt head and nut. Isolate pressure plate from contact with wall sleeve. Link seals shall be by Thunderline Corporation, Link-Seal, Calpico, Inc., or equal.

2.08 WAX TAPE PROTECTIVE SYSTEM

A. Wax tape coating systems shall be applied where shown on the Drawings and to all buried metal piping, fittings, nozzles and appurtenances including, but not limited to, buried mechanical and restrained joints, joint bolts, grooved end couplings, flexible couplings, joint harnesses, flanges and valves.

B. The wax tape protective wrapping shall be protected by a primer, mastic, wrapping, and overwrapping system, Denso, Trenton, or equal.

2.09 UNIONS

A. Unions shall be steel unions for joining ferrous pipe. When joining dissimilar metals (ferrous to nonferrous), an insulated union shall be used.

2.10 FLEXIBLE COUPLING

A. Flexible couplings shall be of the triple-arch molded type. Neoprene and nylon construction, integral cuffs for clamp on connections, and reinforced with internal and external stainless steel rings between arches.

B. Couplings to be rated for at 1" compression, ½" extension, and 75 psi at 150°F.

C. Couplings shall be provided with stainless steel T-bolt clamps for attachment to pipe. Flexible couplings shall be style “Metra-201" as manufactured by The Metraflex Company®, Chicago, IL or equal.

2.11 STEEL COUPLINGS

A. Steel couplings shall be application specific model as manufactured by the Smith Blair Company or equivalent. The coupling shall have a steel sleeve made of carbon steel with a minimum yield strength of 30,000 PSI.

B. The flanges shall be AISI C1020 steel.

C. The coupling shall have bolts and nuts made of high strength, low-alloy steel.

D. The coupling shall have plain wedge-style gaskets that are Nitrite (Buna N) NSF 61 listed.

PART 3 EXECUTION

3.01 GENERAL

A. All pipeline appurtenances shall be installed as required and in accordance with the manufacturer's recommendations, as acceptable to the Engineer.

B. All pipe joints and connections shall be made in such a manner as to produce a minimum of strain at the joint.

C. All dirt, scale, weld splatter, water and other foreign matter shall be removed from the inside and outside of all pipe and sub-assemblies prior to installing.

D. Weld sizes for special sections or fittings shall be as shown on the Drawings. In the event of a conflict between the requirements of AWWA C208 and the Drawings, the latter shall govern.

E. The minimum outside pipe diameter shall be determined using the method specified by the manufacturer to prevent the shipment of undersize, out-of-round pipe which, if measured diametrically through the maximum diameter or checked with a No-Go ring gauge, might appear within the specified tolerance.

3.02 PREPARATION – GENERAL

A. All dirt, scale, weld splatter, water and other foreign matter shall be removed from the inside and outside of all pipe and sub-assemblies prior to installing.

B. All pipe joints and connections shall be made in such a manner as to produce a minimum of strain at the joint.

C. Teflon tape and/or thread compound approved for the service shall be applied to all threaded fittings and hardware.

D. All pipeline appurtenances shall be installed as required and in accordance with the manufacturer's recommendations, as acceptable to the Engineer.

3.03 INSTALLATION

A. Install all piping specialties in accordance with the manufacturer's written instructions, these Specifications and as shown in the Drawings.

B. Flange Coupling Adapters: All flange coupling adapters shall be installed in accordance with manufacturer's instructions with bolts tightened to the manufacturer's recommended torque. Precautionary measures shall be taken to prevent damage to the coupling, the coupling gaskets, and the exterior of the pipe during installation. The installed flanged coupling adapter shall provide a joint with no visible leaks.

C. Grooved End Couplings: All Grooved End Couplings shall be installed in accordance with manufacturer's instructions with bolts tightened to manufacturers recommended torque. Special roll grooving equipment, pipe specifications, and manufacturer installation training requirements must be adhered to by the Contractor.

D. Dismantling Joints: All dismantling joints shall be installed in accordance with manufacturer's instructions with bolts tightened to the manufacturer's recommended torque. Precautionary measures shall be taken to prevent damage to the joints, and the exterior of the pipe during installation. The installed dismantling joint shall provide a joint with no visible leaks.

E. Couplings: All Flexible Couplings for Steel Pipe shall be installed in accordance with manufacturer's instructions with bolts tightened to manufacturers recommended torque. Precautionary measures shall be taken to prevent damage to the coupling, the coupling gaskets and the exterior of the pipe during installation. The installed coupling shall provide a joint with no visible leaks.

1. Pipe entering the flexible coupling shall be sufficiently free from indentations, projections, or roll marks for a minimum of 8-inches, or as required by the manufacturer from the end of the pipe to make a tight joint with the rubber-gasket type coupling.

   a. Contractor shall verify that welded on spool pieces are of sufficient length so as not to have welds interfere with the joint seal of the flexible coupling.

2. The selected coupling shall be appropriately sized for the outside diameter of the pipe as required by the manufacturer and shall permit the passing of a ring gauge which has a bore specified by the manufacturer that is larger than the nominal outside diameter of the pipe for a distance of at least 8-inches measured from the end of the pipe or as required by the manufacturer.

F. Wax Tape Protective System

1. Surfaces shall be clean and free of all dirt, grease, water, and other foreign material prior to the application of the primer and wax tape.

2. Apply primer by hand or brush to all surfaces to be wrapped, including overlapping adjacent dielectric and cement mortar coatings by 4 inches minimum. Apply the primer into all crevices and completely cover all exposed metal surfaces.

3. Apply profiling mastic to all discontinuous or irregularly shaped surfaces to be wrapped to eliminate the voids or gaps under the tape.

4. Apply the wax tape immediately after the mastic application. Wrap the wax tape spirally around the pipe and fittings. Use a minimum overlap of 55 percent of the tape width. Apply per manufacturer's recommendations.

5. Tightly wrap the tape into the crevices and contours of irregularly shaped surfaces and smooth out so that there is a continuous protective layer with no voids or spaces under the tape.

6. Wrap the completed wax tape installation with the plastic wrapper. Wrap spirally around the pipe and fittings. Use a minimum overlap of 55 percent of the wrapper. Secure plastic wrapper to pipe with adhesive tape.

G. Cement Mortar Repair and Patching

1. Cement mortar repair work shall be performed in accordance with the Manufacturer's recommendations and specifications.

2. All surfaces to be repaired and/or patched shall be cleaned and prepared in accordance with the requirements specified by the overlay or repair material. All contaminated, loose, or deteriorating materials shall be removed. Any foreign material that would interfere with the new cement mortar bonding shall be removed. Areas to be repaired must be clean, sound, and free of contaminated, loose, or deteriorating materials.

3. The edges of the existing cement mortar coating and lining at repair and patch locations shall be under-cut and roughened to provide an interlock with the new cement mortar patch or repair.

4. All cement mortar coating and lining repairs shall be reinforced with welded wire fabric that is tack-welded to the pipe and/or the associated butt-straps, closure pieces or steel patches in accordance with applicable AWWA C303 requirements.

5. The Contractor shall provide quick-setting cement mortar and bonding agent. A bonding agent shall be applied before the cement is placed. All materials shall be AWWA and NSF approved for use with potable water. Substitutes for the cement mortar must be approved by the Engineer.

6. The cement mortar shall be thoroughly mixed prior to its application in accordance with the manufacturer's specifications.

7. The Contractor shall apply the bonding agent and cement mortar overlay or repair material in accordance with the manufacturer's specifications.

8. All materials and associated preparation and application methods shall be subject to inspection by the Engineer or District Representative. Materials and preparation and application methods not conforming to the applicable requirement shall be considered defective. All such materials shall be removed and replaced in accordance with these specifications.

9. Where butt-straps, closure pieces or steel patches are used, both the interior and exterior surfaces, as applicable, shall be given a coating equivalent to the factory-applied coating of the adjoining or surrounding pipe sections.

10. Sites inside the pipeline other than those shown on the Drawings that require cement mortar patching will be determined by the Engineer or District Representative during the internal pipeline inspections. See Article 32.22 – 'Support for Internal Pipeline Work' of the Technical Provisions for further information.

11. Cement mortar lining shall be the same thickness as existing or a minimum of ¾ inch whichever is greater. The surface of the repair shall be smoothed and blended in with the original surface.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. This section covers field hydrostatic pressure and leakage testing of piping. The term “piping” shall be used in this section to refer to piping systems, pipelines, or sections thereof.

B. The Contractor shall be responsible for coordinating testing and providing adequate and safe access to all pipeline segments.

C. Cleaning and disinfection of piping is covered in Article 32.19.

D. Unless otherwise specified, testing of piping shall be completed prior to final cleaning and disinfection.

E. Contractor shall notify federal, state, and local regulatory agencies to determine if any special procedures or permits are required for disposal of water used for pressure and leakage testing and to identify acceptable locations for disposal of the water. All requirements and costs associated with notifications and obtaining any discharge permit or approvals shall be responsibility of Contractor. Engineer or Engineer’s representative shall be present during testing and shall be notified of the time and place of testing at least 3 days prior to commencement of the work. All work shall be performed to the satisfaction of Engineer.

1.02 REFERENCES

A. Related Articles:

1. Article 32.01 – Pressure Pipe – General
2. Article 32.12 – Welded Steel Pipe
3. Article 32.17 – Special Sections, Fittings, and Appurtenances
4. Article 32.19 – Pipe Disinfection

B. American Water Works Association (AWWA)

1. Manual of Water Supply Practices - M11, Fourth Edition, Steel Pipe – A Guide for Design and Installation

C. American Society for Testing and Materials (ASTM)

1. F2164-13, Standard Practice for Field Leak Testing of Polyethylene (PE) and Crosslinked Polyethylene (PEX) Pressure Piping Systems Using Hydrostatic Pressure

1.03 SUMITTALS

A. The Contractor shall submit all submittals to the Engineer in accordance with Article 7.05.

B. A testing schedule, including proposed plans for water source and conveyance control, and disposal.

C. Written pressure and leakage test procedures, required pipeline appurtenances, and testing personnel qualifications. The test procedures shall establish the limits of the piping to be tested, the positions of all valves during testing, the locations of temporary bulkheads, and all procedures to be followed in performing the testing.

D. Certified test reports documenting the results of the hydrostatic pressure and leakage tests.

E. Gauges and water meter calibration reports.

1.04 MEASUREMENT AND PAYMENT

A. Full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all work required for hydrostatic pressure and leakage testing as specified in these Specifications, shall be included in the lump sum price bid for HYDROSTATIC TESTING.

B. Refer to Article 21.01, Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

A. All necessary connections between the piping to be tested and the water source, together with pumping equipment, water meter, pressure gauges, and all other equipment, materials, and facilities required to perform the specified tests, shall be provided by the Contractor. All required flanges, valves, bulkheads, bracing, blocking, and other sectionalizing devices shall also be provided. All temporary sectionalizing devices shall be removed upon completion of testing. Vents shall be provided in test bulkheads where necessary to expel air from the piping to be tested.

B. Test pressures shall be applied by means of a force pump sized to produce and maintain the required pressure without interruption during the test.

C. A calibrated test pressure gauge with a range of 0 to 200 psig shall be provided by the Contractor for testing. The test gauge shall allow accurate readings to 1 psig or less.

D. Pressure gauges and continuous recording devices shall be calibrated for accuracy by an authorized licensed agency within 45 calendar days of the hydrotest. Tags of such calibration shall be affixed to the devices.

E. Permanent gauge connections shall be installed at each location where test gauges are connected to the piping during the required tests. Drilling and tapping of pipe walls will not be permitted.

F. The Contractor shall equip the gauge assembly with a ¾ inch I.P.T. nipple and an isolation valve for installation of a second gauge by the Engineer.

G. Upon completion of testing, each gauge connection shall be fitted with a removable plug or cap acceptable to the Engineer.

H. Suitable connections shall be provided for filling the line with water, expelling the air, and applying the pressure from the pump

I. The District reserves the right to test pressure gauges for accuracy

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall conduct all safety precautions under ASTM F2164.

B. A testing schedule and test procedure shall be submitted to Engineer for review and acceptance not less than 21 days prior to commencement of testing. The schedule shall indicate the proposed time and sequence of testing of the piping. The testing procedure shall establish the limits of the piping to be tested, the positions of all valves during testing, the locations of temporary bulkheads, and all procedures to be followed in performing the testing.

C. The entire system may, at the option of the Contractor and approval by the Engineer, be divided into convenient sections.

D. The Contractor shall submit the proposed filling rate for each section to be hydrostatically tested.

E. The Contractor shall be responsible for furnishing the water for filling, depressurizing and testing the piping, including makeup water. The water for hydrotesting shall be potable water. Following completion of testing, the water shall be disposed of in a manner acceptable to Engineer. Unless otherwise permitted, the water shall be kept out of the remainder of the piping.

F. Once a portion of the pipeline has been laid and backfilled, and prior to hydrostatic testing, the pipelines shall be swept, flushed, and/or blown out clean as appropriate.

G. No section of the pipeline shall be tested until all field-placed concrete or mortar has attained an age of 3 days.

H. Testing shall not be performed against existing valves.

I. All testing shall be completed in the presence of the Engineer and test reports shall be prepared for each test. Test reports at a minimum shall include the date, time, names of test participants and witnesses, define the piping tested, define the starting and ending test pressures, and test outcome.

3.02 FILLING AND VENTING

A. Before filling the piping with water, care shall be taken to ensure that all air release valves and other venting devices are properly installed and in the open position.

B. Hand-operated vent valves shall not be closed until an uninterrupted stream of water is flowing from each valve.

C. The Contractor shall provide sufficient temporary air tappings in the pipelines to allow for evacuation of all entrapped air in each pipe segment to be tested. After completion of the tests, such taps shall be permanently plugged.

D. Testing shall be performed by slowly filling the piping system at the lowest point in the system, expelling entrapped air from all high points. The rate of filling the piping with water must not exceed the venting capacity of the installed air vent valves and devices.

E. Filling shall be at a reasonable velocity and all the air within the pipeline shall be properly purged.

3.03 BLOCKING AND BACKFILLING

A. Piping shall be adequately blocked, anchored, and supported before the test pressure is applied.

B. Underground piping shall be tested before the joints are covered.

C. The Contractor shall be responsible for ascertaining that all bulkheads are suitably restrained to resist the thrust of the test pressure without damage to, or movement of, the adjacent pipe.

D. Any unharnessed sleeve-type couplings, expansion joints, or other sliding joints shall be restrained or suitably anchored prior to the test to avoid movement and damage to piping and equipment. After testing, all supplementary items used for anchorage shall be removed and shall become the property of the Contractor.

3.04 PRESSURE TESTING – GENERAL

A. Prior to testing, the pipelines shall be supported in an approved manner to prevent movement during the tests. All pipe systems shall be flushed clean and then subjected to a hydrostatic pressure test. Contractor shall be aware that

several days of purging and refilling of pipes are required to expel all air bubbles prior to beginning the hydrostatic test.

B. The hydrostatic test pressure shall be 125 percent of the design pressure.

C. The amount of water required to maintain the test pressure shall be measured accurately by means approved by the Engineer and a record of the amount of water required during the test period shall be submitted with the field test results.

D. The Contractor shall be responsible for performing all work required by regulatory agencies, including, but not limited to, testing of the hydrostatic test water.

E. During filling and testing, the Contractor shall monitor the pipeline alignment for signs of leaks. If leaks are found, the testing shall be halted until the leaks are repaired.

F. Water damage due to testing operations shall be corrected at the Contractor's expense including leakage, runoff and erosion to areas outside of the pipeline easement or leakage that may cause damage to installed facilities. The Contractor shall maintain equipment on site, including earthmoving equipment, to mitigate and repair any damage from leaks

G. Special devices that cannot be tested at the specified pressure shall be removed for testing, with suitable blind flanges, caps, or plugs added for testing.

H. With all air expelled, the pipe shall be allowed to soak for 24 hours at a positive gauge pressure continuously held equal to the design pressure at the low point for the fill water and section to equalize to a common temperature and/or allow the lining material to absorb as much water as possible. During this period, bulkheads, valves, and connections shall be examined for leaks. If leaks are found, corrective measures satisfactory to the Engineer shall be taken.

I. Find and replace all faulty joints, fittings, gaskets, and pipe as required to obtain a successful pressure test. Retest after repairs are made.

J. All pipelines and directly connected appurtenant piping shall have no visually detectable leakage during the test period. If leakage is detected by testing or by visual inspection, determine the cause of the leakage, take corrective measures necessary to repair the leaks, and again test the pipelines until satisfactory results are obtained at no additional cost to the District. Water due to leakage shall be discharged in the same manner as described in Article 23.04.

K. A continuous recording pressure chart shall be made during the tests and shall be submitted to the Engineer with the field test results.

L. All hydrostatic test results shall be provided to the Engineer. The test is complete only at such time as the Engineer accepts and approves the hydrostatic test results.

3.05 HYDROSTATIC TESTING FOR STEEL PIPE

A. After installation, steel piping shall be hydrostatically tested for defective workmanship and materials. Hydrostatic leak testing shall comply with the latest edition of AWWA M11 and this Section.

B. Once the system has been filled and soaked, the test pressure shall then be raised slowly until the pressure at the lowest elevation of the section of pipe being tested reaches a test pressure of not less than 110 percent of design pressure.

C. The pressure shall be maintained for six (6) consecutive hours and shall not be permitted to drop below the test pressure during the 6-hour test period. A continuous recording pressure chart shall be made during the test period and shall be submitted to the Engineer with the field test results.

D. The allowable limit for apparent leakage shall not exceed 10 gallons per inch of internal diameter per mile per 24 hours for pipe with rubber gasket (including “O” ring and mechanical joints).

E. No leakage is allowed for piping with welded joints.

F. If the test section of pipeline is made up of rubber gasket joints and welded joints, the apparent leakage rate shall be prorated according to the percentage of each type joint in the test section.

G. When a test section includes a previously tested length of pipe, the apparent leakage rate shall be calculated on the untested portion of pipe only; the amount of apparent leakage of the previously tested portion of the test section shall be deducted from the total apparent leakage of the combined test section. The remainder shall be the total apparent leakage for the untested portion of the combined test section.

H. Pinhole leaks shall be repaired by welding and not peening.

I. If the apparent leakage rate exceeds the allowable limit, or if actual leakage is observed, the Contractor shall determine the point of leakage and make the necessary repairs. All such repairs shall be made subject to the approval of the Engineer and all damage to the protective coating or lining of the pipe and appurtenances shall be completely repaired. The above process shall be repeated until the pipeline passes the hydrostatic test.

J. If for any reason appurtenances such as temporary bulkheads or other apparatuses need to be removed, the Contractor shall remove them and repair lining.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. This article includes the fabrication and installation of pipe fittings, couplings (flanged or unflanged), slope adapter couplings, pipe joints, all special sections and fittings and associated coatings and linings, as required. Unless otherwise noted, the word “piping” is intended to cover pipe, fittings, and appurtenances.

B. The steel wall thickness shall be increased, as required, at all bends, fittings, and anchorage locations where thrust is transmitted by the pipe.

C. The design stress shall not exceed 50 percent of the yield stress of the steel.

D. The minimum yield stress of the steel shall not be less than 36,000 psi.

1.02 REFERENCES

A. Related Articles:

1. Article 32.01 – General Piping Requirements
2. Article 32.06 – Hydrostatic Testing
3. Section 40 – Coating, Lining, and Painting

B. American Society of Testing and Materials (ASTM)

1. ASTM A 36 – Specification for Carbon Structural Steel

2. ASTM A 1011 – Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

3. ASTM A 1018 – Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy With Improved Formability, and Ultra-High Strength

4. ASTM A 572 – Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel

C. American Water Works Association (AWWA)

1. AWWA C200 – Steel Water Pipe 6” and Larger

2. AWWA C205 - Cement–Mortar Protective Lining and Coating for Steel Water Pipe 4 In. (100 mm) and Larger—Shop Applied

3. AWWA C206 – Field Welding of Steel Water Pipe

4. AWWA C208 – Dimensions for Fabricated Steel Water Pipe Fittings

5. AWWA C213 – Fusion Bonded Epoxy Coatings and Linings for Steel Water Pipelines

6. AWWA M11 – Steel Pipe – A Guide for Design and Installation

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Refer to Article 32.01 – General Piping Requirements for other piping submittal requirements.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. PIPE AND FITTINGS

1. Unless otherwise indicated on the Drawings, the pipe cylinder shall be manufactured from steel sheet conforming to ASTM Designation ASTM A1011 or ASTM A1018 Grade 36 or steel plate conforming to ASTM Designation A36. The Contractor may use other steels upon written approval of the Engineer. Decreases in the minimum thickness shown on the Drawings will not be allowed. Steels having different chemical compositions will not be allowed in electrically interconnected reaches.

2. Physical properties of the pipe material shall be determined from tests on specimens taken from fabricated pipe. The Contractor may purchase steel plates on a chemical basis only and furnish certified test reports, in lieu of mil test reports, covering the chemical and physical properties of the steel.

3. Flanges, where required, shall be steel flat-face ring flanges, conforming to AWWA C207 and as specified. The Contractor shall verify that all flange drilling matches interfacing fittings and appurtenances.

4. All nuts, bolts, and washers for joining flanged pipe, fittings, and appurtenances shall conform to AWWA C207 requirements. Flanged joints shall be torqued in accordance with AWWA M11 recommendations.

5. Unless otherwise specified, flange gaskets shall be 1/8 inch-thick, full face, cloth inserted rubber, corrosive acid and alkali free conforming to ANSI B16.21 and AWWA C207.

6. Unless otherwise shown on the Drawings, all joints with beveled ends greater than 5 degrees plus allowable pull angle shall be welded.

7. In tension areas, joints shall be welded. Tension area joint welds shall conform to Article 32.18

8. Where steel pipe crosses under a sanitary sewer or over a potable water main, all joints within 10 feet on each side of the sewer or water shall be welded joints. Where the horizontal clearance between the steel pipe and a parallel sanitary sewer is 10 feet or less, or a parallel potable water main is 5 feet or less, all joints shall be welded.

9. Welded joints for steel pipe shall be either lap or butt strap joints as shown on the Drawings. Field welding of joints shall conform to AWWA Standard C206.

B. SHOP COATINGS AND LININGS

1. Shop coatings and linings for fabricated steel pipe shall be in accordance with all applicable AWWA and NSF standards.

2. Unless otherwise noted, shop coatings and linings for fabricated steel pipe shall have cement mortar coatings and linings.

3. All steel pipe in vaults and boxes shall be liquid epoxy-coated, or polyethylene-coated in accordance with these Specifications and painted to provide uniform color after assembly.

4. Cement mortar shall conform to AWWA Standard C205.

C. APPURTENANCES AND ADDITIONAL PIPE JOINTS

1. Restrained joints shall be installed where indicated on the Drawings, or as directed by the Engineer. Restrained joints in manufactured pipe (with external lugs) shall be made by field welding of the joint unless harnessed mechanisms are used, such as across couplings.

2.02 TESTING

A. All double welded lap joints, butt-strap joints, wrapper plates, and other joints shall be leak tested in conformance with AWWA Standard C206. Leak testing may also be used in lieu of hydrostatic testing of welded joints in the nozzles

which are attached to pipe sections, after completion of the shop hydrostatic testing of the pipe sections.

B. Each length of pipe shall be hydrostatically tested in accordance with AWWA Standards C200 for steel pipe.

1. Specials and fittings shall be tested to the pressure specified for the section of adjacent pipe in accordance with AWWA Standards and as hereby modified. The pipe in the tension anchorage areas shown on the Drawings may be considered as specials for testing purposes. Specials fabricated from previously hydrostatically tested pipe may be tested by a liquid penetrant test or by a magnetic particle test conforming to Section V, Articles 6 and 7, of the ASME Boiler and Pressure Vessel Code. Pipe sections that cannot be tested in a hydrostatic testing machine may also be tested by a liquid penetrant test or by the magnetic particle test if approved by the Engineer. Test results shall be provided to the Engineer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Steel pipe shall be installed in accordance with the applicable “good practice procedure” requirements set forth in AWWA Manual M11, and as noted on the Drawings and in accordance with these Specifications.

1. Joint welds, designated by letter size, as noted and shown on the Drawings, are the same size as the thinner of two sections being welded. These sizes are for identification only. Joint welds shall be in accordance with Section J2 of the AISC Specification for Structural Steel Construction—Allowable Stress Design and as hereby modified. Joint welds designated by actual dimension shall be of the size indicated.

2. In areas where only seal welds are required for steel pipe, the weld size shall conform to Table J2.4 of the AISC Specification.

3. Tension area joint welds shall conform to the requirements of Article 32.18.

B. Special care shall be taken in placing the pipe and making the field joints. Bumping of the pipe in the trench will not be permitted. Fabric slings shall be used for handling coated pipe, and sandbags or cradles shall be used to support the pipe when stockpiled.

C. Unless otherwise shown, all joints in welded steel pipe shall be circumferentially welded in the field using butt straps. Minimum fillet weld leg shall equal the thickness of the adjacent steel cylinder. Field welding of joints shall conform to the requirements of AWWA C206 and American Welding Society.

3.02 QUALITY ASSURANCE

A. The manufacturer is responsible for the performance of all fabricated components, as specified herein. In addition, all pipe and fittings to be installed under this Contract may be inspected for compliance with these Contract Documents by the Engineer and an approved independent testing laboratory.

B. Inspection of the pipe and fittings may also be made by the Engineer or other representatives of the District after delivery. The pipe shall be subject to rejection at any time due to failure to meet Contract Documents requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be immediately removed from the job site.

C. In the presence of the Engineer, the Contractor shall hydrostatically field test (hydrotest) the completed pipeline including all the pipe, fittings, and appurtenances which are installed and specified under this Contract. The entire system may, at the option of the Contractor and approval by the Engineer, be divided into convenient sections. The Contractor shall also submit the proposed filling rate for each section to be hydrostatically tested. The Contractor shall hydrotest the pipe shown on the Drawings.

D. All of the steel pipe and fittings shall be furnished by a manufacturer who is fully experienced (for at least five (5) years), reputable, qualified, and regularly engaged in the fabrication of the materials to be furnished.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The longitudinal force in the pipe wall created by bends, bulkheads, valves, and tapers in the pipeline has been equated to the friction force resulting from resistance to sliding of the pipe on the pipe bedding and backfill. The resulting required minimum cylinder thicknesses and weld dimensions for steel pipe and pipe schedules have been tabulated on the Drawings and specified herein.

B. Where other thickness requirements do not govern, the Contractor shall, in tension anchorage reaches, provide the following to resist longitudinal tensile forces in the pipeline created by a bend, bulkhead, valve, or taper:

1. Sufficient steel plate/sheet cylinder wall thickness and weld thickness for steel pipe.

1.02 REFERENCES

A. Related Articles:

1. Article 32.01 – Pressure Pipe – General Requirements
2. Article 32.17 – Special Sections and Fittings

1.03 SUBMITTALS

A. Not Applicable.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. The dimension of a fillet weld, as used herein, shall be the dimension of the leg/size of the fillet unless otherwise indicated. The throat dimension of a fillet weld shall not be less than 70.7 percent of the shortest leg dimension of the weld.

PART 3 EXECUTION

3.01 PLACEMENT

A. Within reaches of tension anchorage, the minimum thickness of the steel pipe cylinder and the minimum joint weld thickness at any particular point shall be a straight line interpolation between the stations tabulated on the Drawings. Tension anchorage welds shall be continuous fillet welds along the entire circumference. Fillet welds may be made on the inside, outside, or on both the inside and the outside of the pipe if necessary to provide the required weld thickness, except as noted on the Drawings.

3.02 TESTING

A. Testing of field welds shall conform to the requirements of these Specifications.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

Materials and procedures for local cleaning and disinfecting new and existing pipeline, piping and associated appurtenances installed, modified and/or contaminated in the course of the Contractor's work.

B. Related Sections:

1. Article 23.05 – Control of Water
2. Article 32.01 – General – Pressure Pipe

C. Payment Procedures

1. Work shall be considered incidental and compensation shall be included in the Contract prices paid for the various items of work.

2. Refer to Article 21.01, Schedule of Bid Items.

1.02 REFERENCES

A. American Water Works association (AWWA)

1. AWWA C651 Standard for Disinfecting Water Mains
2. AWWA B300 Standard for Hypochlorite

B. National Sanitation Foundation (NSF)

1. NSF Standard 60 Drinking Water Treatment Chemical Program

1.03 SUBMITTALS

A. Product data

PART 2 PRODUCTS

2.01 MATERIALS

A. 1 to 5 percent Sodium Hypochlorite solution, conforming to the requirements of AWWA B300 and NSF 60, for swabbing surfaces.

PART 3 EXECUTION

3.01 ERECTION, INSTALLATION, APPLICATION, AND CONSTRUCTION

A. Sequence of Operation

1. The Contractor shall follow procedures as described in AWWA C651.

2. The Contractor shall make every effort to prevent the entry of contaminating materials into the pipeline, piping and associated appurtenances during the execution of this work.

3. The Contractor shall clean and disinfect the interior surfaces of all new piping, valves, fittings and associated appurtenances prior to installation.

4. The Contractor shall thoroughly clean and disinfect all affected interior pipeline surfaces:

   a. Pipeline Cleaning:

      (1) The Contractor shall remove all loose dirt, debris and foreign materials accumulated in the pipeline during construction. Dirt, debris and foreign materials shall be removed from the pipeline by vacuuming or other suitable means.

      (2) The Contractor shall thoroughly clean all affected interior pipeline surfaces with potable water and clean swabs.

   b. Pipeline Disinfection:

      (1) The Contractor shall swab the, previously cleaned, affected interior pipeline surfaces with a 1 to 5 percent Hypochlorite Solution.

   c. The Contractor shall handle and dispose of all disinfecting materials and water in accordance with applicable regulatory requirements and as specified herein.

3.02 FIELD QUALITY CONTROL

A. Site Tests, Inspection

Contractor shall notify Engineer a minimum of two (2) working days in advance of all localized pipeline cleaning and disinfection activities. The Contractor shall allow the District to observe and inspect the affected interior of the pipeline surfaces prior to and following the cleaning and disinfection process.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. This section includes all work related to the installation of internal pipeline joint seals.

B. The Contractor shall furnish all labor, materials and equipment required to install the pipeline joint seals in accordance with the product manufacturer's specifications.

C. The need for the installation of the internal joints will be determined based on the observations and findings of the internal pipeline inspections. See Article 32.22 – 'Support for Internal Pipeline Work' of the Technical Provisions for further information

D. The District shall provide the requisite number and size of Miller Pipeline Corporation's "Weko-Seal" Internal Joint Seals and accessories. The District will provide all functional Weko-Seal components. The Contractor shall provide all consumable materials and equipment required for the installation of the District furnished products.

1.02 RELATED REQUIREMENTS

A. Article 32.01 – General Piping Requirements

B. Article 32.17 – Special Sections and Fittings

C. Article 32.22 – Support of Internal Pipeline Work

D. American Water Works Association (AWWA)

1. M 28 – Rehabilitation of Water Mains

E. National Sanitation Foundation (NSF):

1. NSF 61—Drinking Water System Components – Health Effects

F. Miller Pipeline Corporation, Weko Seal Product and Installation Specifications

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Installation data:

1. List and description of equipment and materials to be used in the installation process.

2. Product/technical data of the equipment and materials to be used in the installation process, including material safety data sheets and application instructions.

3. Acknowledgement of compliance that the equipment and materials meet the requirements of the referenced standards.

4. Detailed installation methods and procedures to be implemented including, but not limited to:

   a. Cleaning
   b. Joint Preparation
   c. Surface Preparation
   d. Seal Positioning
   e. Retaining Band Positioning
   f. Testing

C. Minimum of three (3) references of comparable internal joint seal installations within the last five (5) years. Reference information shall include:

1. Organization
2. Project site location
3. Contact person with contact information
4. Brief description of services provided

D. Safety Training documentation for the internal joint seal installer.

1. Reference Section 17 – Safety and Security

E. After the internal joint seal installation is complete, the Contractor shall submit a confirmation of successful installation and testing. Labeled Photographs shall be included in this submittal.

F. After the internal joint seal installation is complete, the Contractor shall submit a copy of the Warranty.

1.04 QUALIFICATIONS

A. The Contractor, or subcontractor, shall be fully experienced and properly qualified, licensed, equipped and organized to perform the work specified.

1. The internal joint seal installer shall have at least five (5) years of experience with installing internal joint seals and in the work described in this section.

2. All personnel participating in the internal joint seal installation shall have completed internal joint seal installation training.

1.05 MEASUREMENT AND PAYMENT

A. Progress payments will be made on a contract lump sum price basis for the corresponding bid item 'Internal Pipeline Weko-Seal Installation – SUPPLEMENTAL WORK', which payment will include all labor, materials, equipment, and incidentals to conduct the efforts necessary to complete the required work per the Drawings and these Specifications.

B. Refer to Article 21.01 – Bid Items.

PART 2 PRODUCTS

2.01 GENERAL

A. The Contractor's attention is directed to Article 14.07 – 'District Furnished Materials and Equipment' of the Special Provisions for further information.

B. "Weko-Seal" is a proprietary product of the Miller Pipeline Corporation. Materials and methods used in the installation of this product shall be in strict accordance with the manufacturer's specifications and instructions.

C. The District will furnish all functional Weko-Seal components including the joint liners, bands, shims, and set screws.

D. The Contractor shall provide all other materials and equipment required for product installation in accordance with the manufacturer's specifications including, but not limited to, cement mortar, liquid joint lubricant, band expansion equipment, etc.

PART 3 EXECUTION

3.01 GENERAL

A. All work shall comply with the applicable Federal, State, local and District regulatory codes, standards and polices.

B. All work shall be performed in accordance with the manufacturer's installation recommendations and specifications.

3.02 WARRANTY

A. Guarantee all work performed under this article for a period of at least one (1) year after the date of the owner's approval of the work. Warranty shall be jointly signed by the internal joint seal installer and the joint manufacturer.

3.03 TESTING

A. Testing shall be performed in accordance with the manufacturer's specifications and instructions.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide ready access and push-pull forced air ventilation for all internal pipeline inspection, installation, and repair activities. The Contractor shall provide ladders to facilitate access into vaults and pipeline through nozzles. The Contractor shall schedule and coordinate its internal pipeline support work with the District and the District's third-party consultants for the efficient and effective execution of all work.

B. The following is a summary of the internal pipeline work that the Contractor shall support:

1. The District, it's third-party consultant, and the Contractor will conduct an internal visual inspection, electromagnetic inspection, and condition assessment of Central Pipeline to determine the location and extent of needed internal maintenance, repair, and debris removal.

2. The District's third-party consultant will install an internal pipeline acoustic fiber optic (AFO) cable monitoring system in Central Pipeline.

3. The Contractor shall install Carbon Fiber Reinforced Polymer (CFRP) in structurally deficient pipe sections as identified during the internal pipeline inspection.

C. The Contractor shall support all internal pipeline work by:

1. Coordinating, scheduling, and incorporating all internal pipeline inspection, installation, and repair work into the Contractor's Progress Schedules as required and specified in Article 5.05 – Progress Schedules.

2. Internal pipeline access shall be provided through open appurtenance nozzles that the Contractor will remove during their pipeline dewatering work.

3. Furnishing all labor, materials, and equipment required to provide push-pull force air ventilation for all internal pipeline work.

4. The Contractor shall provide ladders for access into vaults and into the pipeline.

1.02 RELATED SECTIONS:

A. Section 15 – General Coordination
B. Section 16 – Work Constraints and Site Restrictions

C. Article 32.21 – Weko-Seal Installation
D. Article 32.23 – Debris Removal

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Product data sheets for all equipment to be used for push-pull forced air ventilation.

1.04 MEASUREMENT AND PAYMENT

A. Full compensation for furnishing all work and materials for Support for Internal Pipeline Work shall be included in the lump sum price bid for Bid Item entitled "Support for Internal Pipeline Work".

B. Refer to Article 21.01 – Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

A. The Contractor shall provide enough force air ventilation equipment to establish push-pull forced air ventilation for each internal pipeline work activity. In addition, the Contractor shall have ready access to additional equipment should the intended equipment malfunction or fault.

B. The ventilation fans shall be appropriately sized for the diameter and length of pipeline to provide and maintain air velocities of 1 to 3 feet per second measured at the centerline of the pipe. If air velocities drop below 1 foot per second, then the Contractor shall take immediate corrective action to increase air velocities.

C. The generators shall be rated and appropriately sized for the associated ventilation fans given the duration of the internal pipeline work to be performed.

D. The District will furnish and operate the radio communications and air monitoring equipment for use during the internal pipeline inspection and condition assessment work. The District's third-party consultant will furnish and operate the radio communications and air monitoring equipment for use during the internal pipeline acoustic fiber optic cable work.

PART 3 EXECUTION

3.01 GENERAL

A. All pipeline appurtenances shall be disassembled and removed from the vaults as a part of the Contractor's pipeline dewatering work. All pipeline appurtenance nozzles shall be available to serve as internal pipeline access and/or forced air ventilation sites.

B. For all internal pipeline work, the Contractor shall furnish, setup, maintain, monitor, and relocate, as necessary, all equipment required to establish push-pull forced air ventilation for the section(s) of pipeline in which the work is to be performed.

C. Ventilation equipment shall be setup at each end of the planned internal pipeline work area to establish push-pull forced air ventilation. Ventilation equipment shall be setup and located to facilitate internal pipeline ingress and egress.

D. A tentative schedule of internal pipeline work activities is provided in Article 12.03 – Contract Time(s) in the Special Provisions. Additional internal pipeline work coordination and scheduling information will be provided as the inspection and installation work is better defined.

1. The initial visual and electromagnetic inspection and condition assessment of Central Pipeline is scheduled to occur over the shutdown period during normal business hours.

2. The internal repair work, based on the results of the visual and electromagnetic inspection, is scheduled to occur over the shutdown period during normal business hours

E. The Contractor shall plan and coordinate their daily work activities to minimize conflicts and interference with the internal pipeline work. Due to the uncertain nature of the internal pipeline work and the unknown condition in the pipeline, the work schedule and/or daily timetable is subject to revision. The District will promptly notify the Contractor of schedule revisions.

3.02 VENTILATION EQUIPMENT

A. Ventilation equipment shall be tested prior to use each day that internal pipeline work occurs.

B. At the beginning of each internal pipeline workday, the Contractor shall verify the pipeline section where work is to be performed and the corresponding vault location(s) for the ventilation equipment with the Engineer. The ventilation equipment shall be set at the specified vault(s) at the beginning of each internal pipeline workday. Ventilation equipment shall be removed from the vault(s) and taken off-site at the end of each day.

C. The District will notify the Contractor if the push-pull forced air ventilation is not providing adequate air flow for the internal pipeline work. The Contractor shall make operational adjustments to the forced air ventilation system, as necessary, to provide adequate air flow per the District's request.

D. All appurtenance nozzles are expected to be open and available to serve as ventilation fan sites. The exact locations of the ventilation fan sites will be determined prior to the execution of the internal pipeline work.

E. Due to the uncertain nature of the internal pipeline and the unknown condition of the pipelines, the ventilation fan sites are subject to revision.

3.03 INSPECTION AND AFO ACCESS SITES

A. At the beginning of each internal pipeline workday, the Contractor shall verify that the requisite appurtenance nozzles that will serve as pipeline access sites for that day's internal pipeline work are open and available for ingress and egress.

B. All appurtenance nozzles are expected to be open and available to serve as inspection access sites. The exact locations of the inspection access sites will be determined prior to the execution of the internal pipeline work.

C. Due to the uncertain nature of the internal pipeline work and the unknown condition of the pipelines, the inspection access sites are subject to revision.

3.04 INTERNAL PIPELINE INSPECTIONS

A. Qualified staff, as applicable, of the Contractor shall participate in all internal pipeline inspection and condition assessment activities. The presence and active participation of the Contractor's staff facilitates the Contractor's internal pipeline repair work.

B. For the pipeline inspection, it is expected that there will be a total of 8-10 people from the third-party consultant, the District, and other agencies in the pipeline.

3.05 TESTING

A. As required.

END OF ARTICLE

ARTICLE 32.23
INTERNAL PIPELINE WORK AND DEBRIS REMOVAL SECTION 32

PART 1 GENERAL

1.01 SUMMARY

A. The District will be conducting internal pipeline inspections to assess the condition of the Central Pipeline. The internal pipeline inspections and condition assessments will be the basis for the development of the Contractor's internal pipeline repair and maintenance scope of work.

B. This section specifies the Contractor's internal pipeline repair and maintenance scope of work as it relates to the installation of steel plates, repair of the cement mortar lining, installation of joint seals and debris removal.

C. The scope and extent of the internal pipeline work shall be based on the observations from the internal condition assessment which will not be available until the internal condition assessment has been completed.

D. The Contractor shall furnish all labor, materials and equipment required to complete the internal pipeline work. The District will furnish steel plates for the welding repair work. For the Weko-seal installation, refer to Article 32.21—Weko-Seal Installation

E. Related Sections:

1. Article 30.16 -- Grout
2. Article 32.21—Weko-Seal Installation
3. Article 32.22—Support for Internal Pipeline Work

1.02 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Submit product data and application instructions for the cement mortar.

C. After the Debris Removal is complete, the Contractor shall submit labelled photographs.

1.03 MEASUREMENT AND PAYMENT

A. All internal pipeline repair work & debris removal are designated as Supplemental Work Items, which payment will include all labor, materials, equipment, and incidentals to conduct the efforts necessary to complete the required work according to the Drawings and these Specifications.

B. Refer to Article 21.01—Bid Items

PART 2 PRODUCTS

2.01 MATERIALS

A. The Contractor's attention is directed to Article 14.07—District Furnished Material and Equipment.

B. Cement Mortar

1. SikaTop123 or approved equal.

PART 3 EXECUTION

3.01 INTERNAL PIPELINE WORK—CEMENT MORTAR REPAIR

A. General

1. Cement mortar repair work shall be performed in accordance with the Manufacturer's recommendations and specifications.

2. All surfaces to be repaired and/or patched shall be cleaned and prepared in accordance with the requirements specified by the overlay or repair material. All contaminated, loose, or deteriorating materials shall be removed. Any foreign material that would interfere with the new cement mortar bonding shall be removed. Areas to be repaired must be clean, sound, and free of contaminated, loose, or deteriorating materials.

3. The bonding agent shall be applied before the cement mortar is applied.

4. Cement mortar lining shall be the same thickness as existing. The surface of the repair shall be smoothed and blended in with the original surface.

B. Testing and Inspection

1. All surface preparation, materials and associated preparation and application methods shall be subject to inspection by the Engineer or District Representative.

2. Testing shall be performed in accordance with the Manufacturer's recommendations and specifications.

3. The Contractor shall provide labeled pre and post photographic documentation for all internal pipeline cement mortar repairs. In addition, the Contractor shall provide the following repair data:

a. A unique repair location identification number, to be referenced on all accompanying records.

b. Location of the repair referenced longitudinally along the pipeline from an existing appurtenance and referenced laterally to a clock face facing downstream according to the pipeline station numbers.

c. Size of the area in the pipeline to be repaired, including the thickness.

d. Volume of cement mortar used to complete the patch.

All of the above referenced documentation shall be submitted to the onsite district representative at end of each work day. The Contractor shall review all quantities of the cement mortar repair work with the district's inspection staff prior to submission.

3.02 INTERNAL PIPELINE WORK—WELDING REPAIR

A. General

1. The steel plates shall be sized and centered, so that the minimum distance between the edge of the hole and the edge of the plate is one (1) inch or as specified by the Engineer.

2. The Contractor shall verify the size of steel plates required to perform the weld repair. Steel plates may need to be cut and machined prior to performing the pipeline repair.

3. Contractor shall remove just enough of the pipeline lining to perform the welding and repair work.

4. Plates and surface to be welded shall be free of moisture, paint, oil, grease, dirt, and other contaminants before welding.

5. Field welding shall be done only where shown or specified and only by welders qualified for the procedures used. Weld only in accordance with approved welding procedures which are to be available to welders and inspectors during the production process. No welding shall be done when surfaces are wet, exposed to rain or wind, or when welders are exposed to inclement conditions that will hamper good workmanship.

6. Welds shall be cleaned. All slag and spatter shall be removed.

7. The District will discuss welding repair work further with the Contractor after the internal pipeline inspection is complete and if internal weld repairs are needed. It is difficult to speculate on the sort of welding until the extent of the damage is known. Weld repairs may involve the use of steel plates that are 4-6 inches in diameter and 3/8 inches thick.

B. Testing and Inspection

1. As soon as practicable, after the welding, the Contractor shall subject all welds to testing and all test results shall be submitted to the Engineer.

   a. All single welds shall be tested by the liquid penetrant test or by the magnetic particle test conforming to Section V, Articles 6 and 7, of the ASME Boiler and Pressure Vessel Code by an AWS certified welding inspector provided by the Contractor.

   b. The Contractor shall provide all apparatus and materials for performing the tests. The Contractor shall perform and document the test and provide certified results to the Engineer.

   c. The Contractor shall repair any welding defects disclosed by the test by grinding out the defective weld and rewelding the section, after which the same test shall be reapplied. This procedure shall be repeated until satisfactory test results are obtained.

2. All materials and associated preparation and welding methods shall be subject to inspection by the Engineer or District Representative.

3. The Contractor shall provide labeled pre- and post-photographic documentation for all internal pipeline steel plate repairs. In addition, the Contractor shall provide the following repair data:

   a. A unique repair location identification number, to be referenced on all accompanying records.

   b. Location of the repair referenced longitudinally along the pipeline from an existing appurtenance and referenced laterally to a clock face facing downstream according to the pipeline station numbers.

   c. Size of the hole in the pipeline to be repaired, length and width.

   d. Size of the area to be repaired.

   e. Dimension and length of welds use to secure the steel plate.

   f. Weld test results.

   All of the above referenced documentation shall be submitted to the onsite district representative at end of each work day. The Contractor shall review all quantities of the cement mortar repair work with the District's inspection staff prior to submission.

3.03 INTERNAL PIPELINE WORK—WEKO-SEAL INSTALLATION

A. General

1. Refer to Article 32.21—Weko-Seal Installation

B. Testing and Inspection

1. Refer to Article 32.21—Weko-Seal Installation

3.04 INTERNAL PIPELINE WORK—DEBRIS REMOVAL

A. General

1. The Contractor shall furnish all materials, labor, equipment, safety tools, and incidentals required to complete the debris removal.

2. The Contractor shall verify quantities with the Engineer or District Representative at the end of each day of debris removal work.

B. Testing

1. Not applicable.

END OF ARTICLE

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ARTICLE 32.24
INTERNAL CFRP LINER REPAIR OF DISTRESSED PCCP SECTION 32

PART 1 GENERAL

1.01 SUMMARY

A. Contractor shall perform all Work in accordance with the Drawings and these Specifications. Work includes furnishing all materials, equipment, services, training and supervision for installation, inspection and testing of CFRP composite repairs of PCCP in accordance with the Drawings and this Specification, and Federal and State safety requirements.

B. Contractor will mobilize and demobilize all required labor, equipment and materials to and from the Work site.

C. Contractor will provide all necessary equipment and personnel to complete the work in a timely manner and in accordance with applicable safety, engineering, and schedule requirements.

1.02 RELATED REQUIREMENTS

The following references are incorporated into these Specifications. The ACI and ICRI references are not developed for concrete pipe and are applicable only to the extent referenced. These written Specifications take precedence over incorporated references. The Installer shall be familiar with the contents of the latest version of the following references.

A. ACI 440.3R – Guide Test Methods for Fiber-Reinforced Polymers (Fraps) for Reinforcing or Strengthening Concrete Structures.

B. ACI 546R – Concrete Repair Guide.

C. ASTM A240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

D. ASTM D570 – Standard Test Method for Water Absorption of Plastics.

E. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.

F. ASTM D695 – Standard Test Method for Compressive Properties of Rigid Plastics.

G. ASTM D696 – Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics between -30 Degree C and 30 Degree C with a Vitreous Silica Dilatometer.

H. ASTM D790 – Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Insulating Materials.

I. ASTM D792 – Density and Specific Gravity (Relative Density) of Plastics by Displacement.

J. ASTM D2240 – Standard Test Method for Rubber Property Durometer Hardness.

K. ASTM D2247 – Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

L. ASTM D2583 – Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barco Impresser.

M. ASTM D3039 – Test Method for Tensile Properties of Polymer Matrix Composite Materials.

N. ASTM D3045 – Standard Practice for Heat Aging of Plastics without Load.

O. ASTM D6641 – Standard Test Method for Compressive Properties of Polymer Matrix Composite Materials with Unsupported Gage Section by Shear Loading.

P. ASTM D4065 – Standard Practice for Plastics: Dynamic Mechanical Properties: Determination and Report of Procedures.

Q. ASTM D4473 – Standard Test Method for Plastics: Dynamic Mechanical Properties: Cure Behavior.

R. ASTM D4541 – Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Tester.

S. ASTM D7290 – Standard Practice for Evaluating Material Property Characteristic Values for Polymeric Composites for Civil Engineering Structural Applications.

T. ASTM D7616 – Standard Test Method for Determining Apparent Overlap Splice Shear Strength Properties of Wet Lay-Up Fiber-Reinforced Polymer Matrix Composites Used for Strengthening Civil Structures.

U. ASTM E104 – Standard Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions.

V. ASTM E2160 – Standard Test Method for Heat of Reaction of Thermally Reactive Materials by Differential Scanning Calorimetry.

W. ICC-ES – Acceptance Criteria for Inspection and Concrete and Reinforced and Unreinforced Masonry Strengthening Using Externally Bonded Fiber-Reinforced Polymer (FRP) Composite Systems (AC125)," International Code Council Evaluation Service, Inc.

X. ICRI Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

Y. NSF/ANSI 61 – Drinking Water System Components – Health Effects.

1.03 SUBMITTALS

A. The Contractor shall submit all items listed in this section in accordance with Article 7.05.

B. Manufacturer Submittals:

1. Documents indicating conformance of the Manufacturer to the experience requirements in these Specifications.

2. Product data sheets for all materials to be used in the CFRP and GFRP systems.

3. All material data required as specified in these Specifications.

4. Material Safety Data Sheets for all materials to be used.

5. Documentation of previous satisfactory applications or thermal test results indicating satisfactory curing performance of the epoxy under the curing schedule recommended by the Manufacturer.

6. Letter from the Manufacturer indicating the allowable time windows between application of primer and thickened epoxy for each layer of the CFRP system, and between completion of the CFRP layers and application of the topcoat considering the likely temperatures in the pipeline during construction.

7. Warranty as required in these Specifications.

8. Delivery, storage, handling, and application instructions and general recommendations for each material to be used.

C. Installer Submittals

1. Documents indicating conformance of the Installer to the experience requirements in these Specifications.

2. Documents indicating compliance of the Installer's Safety Program with the OSHA mining and tunneling division.

3. Detailed work schedule, step-by-step installation procedure, details of curing schedule, and equipment to be used.

4. Working drawings detailing the type, locations, dimensions, number of layers, and orientations of all CFRP materials to be installed.

5. Document indicating agreement of the Installer to have at least two field QC inspectors throughout the project execution as required in these Specification.

6. Documents indicating the details of the proposed quality control program and compliance of the field QC inspectors with the experience and training required.

7. Plan and details of proposed noise abatement measures.

D. Submittals Required Post-Installation

1. All quality control forms completed throughout the construction, including post- installation corrective actions, if any.

2. As-built repair drawings indicating all CFRP liner details and end terminations installed.

E. Qualifications and Experience

1. Contractor shall submit resumes for key personnel that are going to be involved with the CFRP repair project (Project Manager, Field Superintendents, and Safety Manager).

2. Key personnel changes must be approved by the District.

3. CFRP Manufacturer

a. The Manufacturer shall be specialized in the manufacturing of the products specified herein with documented experience.

b. The CFRP system shall have documented in-service history of over 10 years and a minimum of one hundred field installations in civil structural applications.

c. The CFRP system shall have documented in-service history of over 5 years and a minimum of fifty PCCP segments of 48 in. diameter and above in five or more repair and strengthening projects.

4. The Contractor shall have successful installation of Internal CFRP composite systems for pipe upgrade similar to those described in these Specifications and shown on the included Drawings, using the wet lay-up technique, on a minimum of 20 pressurized PCCP segments from a minimum of five separate projects, within the last 3 years, documented with client contact information and a summary of work performed in each project.

5. The Contractor’s crews for each area of work, including pipe surface preparation, mixing of materials, impregnation of fabrics, and installation of impregnated fabrics, shall include at least one crew member per crew (crew supervisor) with a minimum of 3 years of experience and a

minimum of five projects in internal CFRP upgrade of PCCP. The Contractor shall provide a list of reference projects for all crew members.

6. All crew members shall have received training from the Manufacturer.

7. The Contractor shall have a quality control program and shall agree to have at least two field QC inspectors (referred to herein as Contractor's Inspectors) on site throughout the project execution (one at the material preparation site above ground, and one at the application site inside the pipe). Contractor's Inspectors shall be qualified according these Specifications.

8. The Contractor shall have a confined space entry procedure, calibrated gas meters in the pipeline for all phases of work at all times, and a health and safety plan. The confined space entry procedure and health and safety plan shall meet the District's requirements specified in the contractual terms and conditions.

9. The Contractor shall have a noise abatement plan for equipment needed to support ventilation and dehumidification of the pipeline throughout the CFRP installation and curing. The Contractor shall comply with jurisdictional requirements for acceptable decibel levels within specified distances from occupied dwellings.

10. Contractor's Inspectors shall have completed the training program supported by the Manufacturer on the installation of bonded CFRP systems and shall have experience on at least five projects involving CFRP application in confined spaces.

11. Any change of Contractor's Inspectors is subject to the same qualifications.

F. Material Data for Submission and Qualification

1. The Contractor shall submit Manufacturer's product data sheets indicating physical, mechanical, and chemical characteristics of all materials used in the CFRP system. As a minimum, the District shall be provided with the mechanical properties of the CFRP laminate listed in Table 1, durability of the CFRP laminate based on the environmental conditions in Table 2, and the physical properties of the resin listed in Table 3. Reported properties shall be based on the listed standards and the number of tests required in these tables. Reporting of strength and modulus properties of CFRP laminate shall comply with provision of these Specifications.

TABLE 32.24-1
Mechanical Property Tests Required for CFRP Laminate

Material Property	ASTM Test Method	Min. No. of Tests
Longitudinal tensile strength and modulus	D3039	50
Longitudinal compressive strength and modulus	D6641	10
Longitudinal flexural strength and modulus	D790	10
Overlap splice shear strength	D7616	10
Shear bond strength between CFRP and steel	D7616	10

TABLE 32.24-2
Minimum Environmental Durability Requirements for CFRP Laminate

Environmental Durability Test	ASTM Test Method	Test Condition	Test Duration (hrs)	Required % Retention of Tensile Properties per ASTM D3039
Water Resistance	D2247 E104	100% RH, 100±2°F	1,000 3,000 10,000	90 85 80
Salt Water Resistance	D1141	Immersion at 73±2°F	1,000 3,000 10,000	90 85 80
Alkali Resistance	C581	Immersion in $Ca(CO_3)$ at pH=9.5 and 73±3°F	1,000 3,000	90 85
Temperature Resistance	D3045	140±5°F	1,000 3,000	90 85

TABLE 32.24- 3
Physical Property Tests Required for Resin

Material Property	ASTM Test Method	Min. No. of Tests
Glass transition temperature	D4065	20
Water absorption	D570, Sec. 7.4	5
Longitudinal coefficient of thermal expansion	D696	5
Transverse coefficient of thermal expansion	D696	5
Shore D hardness	D2240	10
Volatile organic compound (VOC)	D2369	2

2. The test reports shall indicate clearly the commercial names of the products used, batch ID, sample dimensions, number of samples tested, number of fabric layers used, load and strain measurement techniques, failure modes, and obtained strength, modulus, and ultimate elongation for each sample tested. Any deviation from the specified ASTM standards shall be clearly reported.

3. The proposed CFRP lining system shall have an approved and valid International Code Council (ICC) Evaluation Service Report. Products that do not have an ESR number shall provide all durability tests defined in ICC AC125 to validate the durability of the proposed lining.

4. The environmental durability data provided by the Manufacturer shall be based on tests conducted on samples made with the same fabric and impregnating resin, and similar fiber content as the laminate to be used during the upgrade work.

5. The Contractor shall submit the Manufacturer's results of creep rupture tests on a similar laminate constructed by the proprietary method of the Contractor. A minimum of eighteen specimens shall be tested at the maximum operating temperature defined by the District by subjecting them to different stress levels less than the short-term tensile strength until failure, and the time to failure shall be recorded. The stress is then plotted against the time to failure in a log-log plot and the strength is extrapolated to 50 yrs.

6. The Contractor shall provide Manufacturer's test data indicating percent completion of cure (ASTM E2160) versus temperature and duration, and percent completion of cure versus Shore D (ASTM D2240) hardness. (Completion of cure is characterized by flattening of the exothermic portion of the thermogram obtained by differential scanning calorimetry.)

7. The Contractor shall provide Manufacturer's documents indicating that all materials meet OSHA, EPA, and local ordinances for health and safety including VOC compliance.

8. Manufacturer's Safety Data Sheets (SDS) for all materials to be used.

9. Application instructions, delivery, storage and handling instructions, and general recommendations regarding each material to be used.

G. Warranty

1. This section provides the technical requirements of the warranty. The length of the warranty shall be specified in a resulting commercial contract.

2. The Contractor shall provide a warranty for the CFRP system used for strengthening of the pipe. The CFRP system strengthening warranty

shall include, but not be limited to interfacial peel-off of CFRP layers and debonding from concrete substrate unless it was specifically stated in the design documents by the CFRP manufacturer's engineer that debonding could be expected and tolerated without compromising the design capacity.

H. Training Support

1. The Manufacturer shall support a training program to instruct the Installer in the installation of their CFRP composite system presented to meet this Specification.

I. Evaluation and Conditions of Acceptance by the Engineer

1. Submission of the documents required in these Specifications is needed for qualification of Contractor's Subcontractor (the Manufacturer).

2. Contractor on-site PM/Superintendent must complete a documented daily report and a provide a copy to the Engineer.

3. The submitted test data required in Table 1 will be evaluated statistically by the Engineer to determine the characteristic values. (The characteristic value of a strength or modulus property corresponds to the 5th percentile value with 80% confidence. It is determined from a sample size of ten or more according to ASTM D7290.

   a. For each property, outliers will be removed from each data set. Any remaining data set with fewer than five samples will be discarded.

   b. Statistical tests will be performed to determine whether the remaining data sets can be combined. If all data sets cannot be combined, several combined data sets will be formed with the maximum possible number of samples, but not fewer than ten. If no combined data sets can be formed with ten or more samples, data will be rejected. In the case of more than one combined set with a comparable number of samples, the smallest characteristic value will be selected as the overall characteristic value of the material property.

4. The CFRP upgrade design is based on the characteristic values of strength and modulus of the CFRP laminate properties. While conformance with these properties qualifies the materials for the design shown on the drawings, nonconformance does not necessarily disqualify the materials. In the case of nonconformance on strength and modulus, a greater number of CFRP layers than shown on the drawings may be required and may need to be provided by the Contractor.

5. The laminate shall retain its tensile strength and modulus according to Table 2 where percent retained strength or modulus is the ratio of the value obtained for conditioned specimens to the characteristic value for that property obtained for unconditioned specimens.

6. The extrapolated tensile strength at 50 years based on creep-rupture tests on a log-log plot of stress versus time to failure shall be greater than 55% of the characteristic short-term tensile strength.

7. The average glass-transition temperature shall be at least 40°F greater than the maximum operating temperature of 135°F, with a coefficient of variation less than 10%.

8. The long-term water absorption shall be less than 2% with a coefficient of variation less than 10%.

9. The resin shall retain its glass-transition temperature according to the water resistance test and the corresponding retention values in Table 2.

1.04 MEASUREMENT AND PAYMENT

A. Payment will be made on a contract unit price for the corresponding bid item 'Carbon Fiber Reinforced Polymer Repairs', per pipe section which price will include all support, labor, materials, equipment, and incidentals to conduct the efforts necessary to complete the required work according to the Drawings and these Specifications.

B. Refer to Article 21.01 – Schedule of Bid Items

PART 2 PRODUCTS

2.01 DESIGN REQUIREMENTS

A. Design Approach

1. The CFRP liner shown on the upgrade drawings accompanying this specification was designed to satisfy all limit states related to at least one of the following two systems

   a. CFRP liner acting as a stand-alone buried flexible pipe (i.e., CFRP separated from the inner core with the outer concrete core cracked)

   b. CFRP liner and inner core concrete acting as a composite system.

2. No contribution from the steel cylinder or prestressing wires was considered.

3. The design includes load factors, resistance factors, material adjustment factors, and time-effect factors selected for long-term loads, short-term loads, and buckling.

4. End Termination: CFRP shall be terminated with end details that prevent water from getting behind the CFRP liner.

2.02 CFRP SYSTEM

A. The CFRP system shall consist of epoxy primer, thickened epoxy (i.e., putty), tack coat (i.e., epoxy specially formulated for overhead applications) if required by the Manufacturer, unidirectional carbon fabric, impregnating epoxy resin, and topcoat of thickened epoxy. Resin types other than epoxy (e.g., polyester, vinyl ester) shall not be used as any of these components.

B. Primer

1. The concrete substrate shall be primed with an epoxy material, which shall penetrate the pore structure of the substrate. The primer shall be 100% solids, epoxy resin.

2. The glass-transition temperature requirements of these Specifications and the water absorption requirement of these Specifications also apply to the primer.

C. Thickened Epoxy

1. Thickened epoxy shall have a high enough viscosity to fill all voids in the concrete substrate and provide a smooth base for the subsequent CFRP laminates.

2. Thickened epoxy shall either be pre-formulated and brought to site in pre--proportioned containers, or prepared on site by mixing the impregnating resin with Cab-O-Sil TS-720 treated fumed silica to achieve the required viscosity. If prepared on site with Cab-O-Sil, the Contractor shall obtain the Contractor's Inspectors' and District's Inspector's approval prior to any use.

3. The glass-transition temperature requirements of these Specifications and the water absorption requirement of these Specifications also apply to the thickened epoxy.

D. Tack Coat

1. Tack coat, if recommended by the Manufacturer, shall be a high-viscosity epoxy that is specially formulated for overhead applications.

2. The glass-transition temperature requirements of these Specifications and the water absorption requirement of these Specifications also apply to the tack coat.

E. Impregnating Resin

1. All fabrics shall be impregnated with 100% solids, low-viscosity epoxy resin.

2. The impregnating resin shall meet the glass-transition temperature requirements and the water absorption requirement of these Specifications.

F. Unidirectional Carbon Fiber-Epoxy Laminates

The following CFRP Laminate materials have been determined to meet the requirements of these Specifications. The Contractor shall not use other CFRP Laminate materials, or different batches of the approved material, unless documentation demonstrating compliance is submitted for District review and the Engineer approves their usage.

1. 0.08 in. V-Wrap C400H (38 oz/sq yd), Batches 23692, 24072
2. 0.08 in. Tyfo SCH-41-2x (40 oz/sq yd)

G. Required Properties of Unidirectional Carbon Fiber-Epoxy Laminates:

1. The unidirectional carbon fiber-epoxy laminate shall meet the requirements of these Specifications and as shown on the Drawings.

2. The tensile properties of the CFRP lamina to be used in design shall be determined according to ASTM D3039 and statistically analyzed according to ASTM D7290 to determine the characteristic values.

3. The CFRP designs shown on the drawings accompanying this Specification are based on the characteristic properties for one layer of CFRP. CFRP systems other than those shown on the drawings shall be approved by the District, and used to calculate the required number of layers.

4. The characteristic values for multi-layer laminates shall be based on the reduction in strength due to the strength variability and redistribution of stresses of a failed lamina among other layers using strain compatibility.

2.03 GFRP (GLASS FIBER-REINFORCED POLYMER) LAYER

A. The laminate shall include a GFRP system used as insulator between the steel substrate and the CFRP layer and may include a second system for watertightness.

B. The GFRP composite systems shall be a proprietary system consisting of all associated fiber reinforcement and polymer adhesives/resins. All components of the GFRP composite systems shall be provided by the same Manufacturer of CFRP system.

C. The GFRP composite layer shall be used as insulator between any steel components and CFRP to avoid possible galvanic corrosion, and shall have a total nominal thickness of a single GFRP lamina of not be less than 0.034 in. (V-Wrap EG50-B bidirectional GFRP and Tyfo Web were included in the Drawings for use as dielectric barrier between any steel components and CFRP; other GFRP composite systems shall have equivalent satisfactory performance and shall be approved by the District.)

D. The GFRP system used for watertightness shall be successfully tested with the design laminate or a laminate that is part of the design laminate.

2.04 PROTECTIVE COATING (TOP COAT)

The Contractor shall ensure the following:

A. The CFRP system shall be top-coated with a coating recommended by the CFRP system Manufacturer and in conformance with the following:

1. The topcoat shall consist of the same thickened epoxy used between the CFRP layers or potable water coating, if needed.

2. Seams in fabric and edges shall be smoothened with thickened epoxy prior to application of the topcoat.

3. The topcoat material shall have been used successfully as a finished assembly on a minimum of five past documented PCCP pipe strengthening projects.

B. Topcoat shall be installed in accordance with the Manufacturer's published installation instructions. The duration elapsed between the application of the last CFRP layer and the topcoat shall not exceed the time specified by the Manufacturer.

2.05 OTHER MATERIALS

A. Epoxy Mortar

1. The Contractor shall ensure that epoxy mortar consists of five parts epoxy resin mixed with one part sand or equivalent demonstrated to have the ability to bond to concrete, steel, and CFRP in overhead and all other positions. The Contractor shall obtain the Contractor's Inspectors' and District's Inspector's approval on the consistency of the epoxy mortar prior to any use.

B. Bond Breaker

1. Where indicated on the drawings accompanying this specification, the Contractor shall provide a bond-breaker material consisting of one of the following:

   a. 100% acrylic elastomeric coating.
   b. Paraffin wax.
   c. Approved equivalent of the above.

C. Steel Expansion Ring

1. WEKO-Seal stainless steel expansion ring, or approved equivalent with a 1/4 in. rubber strip using the equipment and jacking pressures recommended by the manufacturer. All expansion rings, wedges, and shims shall be 316 stainless steel and shall conform to ASTM A240. The installer of the expansion rings shall be trained and certified by the Contractor.

2.06 DELIVERY, STORAGE, AND HANDLING OF ALL MATERIALS

The Contractor shall ensure the following:

A. Delivery

1. The products shall be delivered in original, unopened containers. Containers shall be clearly marked with legible and intact labels listing the Manufacturer’s name, brand name, product identification, batch number, storage conditions, mixing ratios, and shelf life.

B. Storage

1. All Contractor materials and equipment shall be stored in areas designated by the District and using access locations designated by the District.

2. Contractor shall ensure that materials are stored at temperatures that conform to Manufacturer's written recommendations and instructions.

3. Stored fiber reinforcement and resins shall be protected from dust, moisture, and chemical exposure.

4. Resin components shall be stored separately and in tightly closed containers, away from direct sunlight, flame sources, or other hazards.

5. In the event that the work is to be completed during winter or in temperatures below freezing, the fiber reinforcement and resins shall not be exposed to freezing temperatures during transport, storage, preparation, installation, or curing. To achieve protection against freezing

temperatures, the Contractor shall provide temporary portable heat sources reviewed and approved by the District prior to use.

C. Handling

1. The fabric reinforcement shall not be handled roughly. Care shall be taken not to damage the fibers.

2. Fabric reinforcement may be stored either in rolls of 3-inch diameter or greater or stacked after cutting.

Consult the Manufacturer's SDS for specific handling hazards of resin components.

PART 3 EXECUTION

3.01 GENERAL PROCEDURES

A. Work only in areas permitted by District-approved schedule.

B. Remove all tools, buckets, and materials from work areas and store neatly at a designated location daily at the end of work.

C. Protect adjacent areas from damage, stains, and spillage during delivery of material to upgrade areas. Repair all damage as a result of the work of this Specification to its condition at the start of work, or if such cannot be determined, to its original condition. Clean all stains by means approved by the District.

D. Protect the work from damage such as impact, marring of the surfaces, and other damage.

E. Materials may be skin irritants or sensitizers. Accordingly, advise system installer to avoid contact with eyes and skin, inhalation of vapors, and ingestion. Use protective and safety equipment on site. Heed all label warnings by manufacturers. Make application in accordance with applicable safety laws.

F. The Contractor, his Subcontractor(s), suppliers, consultants, and workers shall maintain a safety program that is at a minimum compliant with the safe work practices prescribed by the District and with OSHA and other safety laws and regulations.

G. Prevent hazardous accumulations of dusts, fumes, mists, vapors, or gases in areas occupied during construction. Provide local exhaust ventilation to prevent harmful dispersal of hazardous substances into atmosphere of occupied areas. Dispose in a manner that will not result in harmful exposure to persons. Ventilate storage spaces containing hazardous or volatile materials. Provide dust and fume control, including, but not limited to, temporary protection and confinement barriers, ventilation equipment and procedures, and air-quality-monitoring equipment and procedures. Monitor air quality in the work area, and inside the

pipeline. Comply with the requirements of all local governing regulatory agencies.

H. Ventilation inside the pipeline shall be per all OSHA and District requirements, including, but not limited to, OSHA and District confined space entry and underground construction requirements.

3.02 INSPECTION OF HOST PCCP

A. The Contractor's Inspectors shall examine the existing conditions to verify dimensions/geometry shown on drawings, assess quality of concrete substrate, document any cracks, ovality, or surface irregularities in the pipe, identify any leaks near upgrade areas and evaluate water retention plans (as necessary) of the Contractor, and evaluate risk of exposure of CFRP to water prior to cure. The concrete shall be sound and without standing water.

B. The Contractor's Inspectors shall also examine the aboveground conditions under which materials will be stored, mixed, and transported into the pipe and specify corrective actions as necessary.

C. The District's Inspector will report the observed pipe condition to the Engineer prior to commencement of upgrades.

D. The Contractor shall correct all unsatisfactory conditions and obtain the Contractor's Inspectors' and District's Inspector's approval prior to commencement of upgrades.

3.03 PREPARATION

A. The Contractor's Inspectors shall examine the existing conditions to verify dimensions/geometry shown on Drawings, assess quality of concrete substrate, document any cracks, ovality, or surface irregularities in the pipe, identify any leaks near upgrade areas and evaluate water retention plans (as necessary) of the Contractor, and evaluate risk of exposure of CFRP to water prior to cure. The concrete shall be sound and without standing water.

B. The Contractor's Inspectors shall also examine the above-ground conditions under which materials will be stored, mixed, and transported into the pipe and specify corrective actions as necessary.

C. The District's Inspector will report the observed pipe condition to the Engineer prior to commencement of upgrades.

D. The Contractor shall correct all unsatisfactory conditions and obtain the Contractor's Inspectors' and District's Inspector's approval prior to commencement of upgrades.

3.04 PREPARATION

The Contractor shall ensure the following:

A. Environmental Conditions

1. Do not install CFRP when the ambient temperature is outside the range required by the Manufacturer, the relative humidity is outside the range required by the Manufacturer, and the concrete surface temperature is less than 5°F above the dew point. In cold conditions, auxiliary heat may be applied to raise the ambient temperature to a suitable level. If heating is used, direct-fired gas or kerosene salamander-type heaters shall not be permitted. Only electric or indirect-fired heaters shall be permitted, to avoid contaminating the substrate with carbonation.

2. The presence of water inhibits the adhesion of epoxy to the substrate. Do not install CFRP when surface moisture is present. Use dehumidifiers to keep the relative humidity within the range required by the Manufacturer. There shall be no standing water in the pipe.

3. If water leakage exists through cracks or joints, water flow shall be stopped prior to CFRP installation.

B. Site Conditions

1. The Contractor shall comply with the District's Confined Space entry procedure.

2. The Contractor shall maintain control of concrete chips, dust, and debris due to mortar lining upgrade or surface preparation in each area of work. The Contractor shall clean up and remove such material at the completion of work each day.

3.05 INSTALLATION

The Contractor shall ensure the following:

A. Substrate Upgrade

1. All problems associated with the condition of the original concrete and the concrete substrate that can compromise the integrity of the CFRP system shall be addressed before surface preparation begins. ACI 546R and ICRI Guideline No. 310.2 detail methods for the upgrade and surface preparation of concrete. The Contractor shall ensure adherence to Manufacturer's requirements regarding compatibility of the CFRP system with materials used for upgrading the substrate. The Contractor shall provide supporting information regarding compatibility to the District for review and approval prior to proceeding with substrate upgrade.

2. Voids in the substrate shall be filled. Small voids no more than 0.50 in. in depth shall be filled with a thickened epoxy and larger voids with epoxy mortar.

B. Surface Preparation for Concrete and Steel Substrates

1. The Contractor shall first prepare a representative sample area. The sample area shall be prepared in accordance with the requirements of this Specification and the Manufacturer's written instructions, and shall be used as a reference standard depicting a satisfactorily prepared substrate. The concrete surface shall be profiled using hydro surface profiling or other abrasive blasting to remove all contaminants (laitance, surface lubricants, broken mortar pieces, etc.) and to achieve a minimum profile of ICRI CSP 3 (refer to ICRI Guideline No. 310.2 and molded replicas of surface textures that can be obtained from ICRI).

2. The concrete or upgraded surfaces to which the CFRP system is to be applied shall be freshly exposed and free of loose or unsound materials, and shall be allowed to dry prior to CFRP installation.

3. Localized out-of-plane variations, such as form lines, sharp edges, and protrusions, shall not exceed 0.25 inches. Such out-of-plane variations can be removed by grinding or abrasive blasting, or can be smoothed over using thickened epoxy if variations are very small.

4. All debris and dust generated during surface preparation shall be removed by air blasting or other approved means to achieve a dust-free concrete surface.

5. At areas where the GFRP systems will be adhered directly to the steel, such as spigot and bell ends, prepare the surface for length specified to SP10 near-white surface with a minimum surface profile of 2 mils prior to installing the CFRP system.

C. Mixing of Resins

1. The resin and its catalyst shall be kept in tightly closed containers at all times except for the time of mixing to prevent absorption of carbon dioxide and moisture, which could lead to amine blush. The mixing technique shall not cause air entrainment in the resin system.

2. All resins shall be mixed according to the Manufacturer's instructions. All resin components shall be at a proper temperature and mixed from pre-proportioned and pre-packaged containers until there is a uniform and complete mixing of components. On-site proportioning of resin components is not allowed. Resins shall be mixed for the Manufacturer's prescribed mixing time and visually inspected for uniformity of color.

3. Mixed resin that exceeds the pot life specified by the Manufacturer shall not be used.

D. Application of CFRP System

1. The application of the CFRP system shall be performed in accordance with the Manufacturer's published installation instructions.

2. The CFRP system primer shall be applied to all areas on the existing concrete surface where the CFRP system is to be placed. The primer shall be placed uniformly on the prepared surface at the Manufacturer's specified rate of coverage. Subsequent materials shall be applied within the time window specified by the Manufacturer.

3. Following the primer, all voids in the substrate shall be filled to achieve a smooth surface.

4. All fabrics shall be impregnated using an impregnation machine that does not cause fast setting of the resin and require frequent clean up. Manual impregnation is not allowed.

5. The impregnated fabric shall be pressed onto the concrete surface to achieve intimate contact. Entrapped air between layers shall be released or rolled out before the resin sets.

6. A thin layer of thickened epoxy shall be applied between all consecutive CFRP layers, over the entire surface.

7. For areas requiring that the CFRP system that is not adhered to the substrate, apply the selected bond breaker material prior to commencing with the installation of CFRP layers. For these areas the application of primer and thickened epoxy, described in Items 2 and 3 above, is not required. If the elastomeric coating is used as bond breaker material, follow the Manufacturer's recommendations for installation procedure and curing time before installing the CFRP systems.

E. Project Sequencing

1. All components of the lining system, including the primer, thickened epoxy, tack coat (if used), CFRP and GFRP layers, and topcoat, shall be applied within the allowable time windows recommended by the Manufacturer. If a project delay causes violation of the recommended allowable time windows, the surface of the previously applied layer shall be prepared according to the Manufacturer's recommendations, and as a minimum scuff-sanded, all dust shall be removed by compressed air and/or vacuum, and the surface shall be wiped clean with a manufacturer-recommended cleaning agent before resuming work with application of the subsequent materials and layers.

F. Preparation of Test Samples and Areas

1. The standard of workmanship shall be measured prior to construction through pull-off (bond) testing on representative mockup areas, and after construction through tension tests performed on samples cut from witness panels.

2. Representative Mockups for Pull-off (Bond) Testing Prior to Construction

a. The Contractor shall install two layers of CFRP in at least 2 ft by 2 ft areas in at least two different representative locations as specified in the included Drawings to be used as mockups of the installed CFRP system. The locations shall be representative and selected by the Engineer. The locations may be on adjacent pipes that are not within the scope of upgrades provided that surface preparation is the same as that to be used for the pipe upgrade. Mockups shall be prepared on each type of concrete substrate or for each surface preparation technique used if variations in such conditions exist.

b. The Contractor shall perform at least three pull-off tests in the presence of the District's Inspector in each mockup area according to ASTM D7234 and using testers with documented calibration.

c. The minimum value of pull-off strength is 300 psi. The Contractor's Inspectors shall evaluate the results as follows:

(1) Failure within CFRP or at the CFRP-concrete interface with pull-off strength greater than 300 psi: Acceptable.

(2) Failure within concrete (through aggregate) with pull-off strength less than 300 psi: The CFRP liner is rejected except for CFRP liners designed as a standalone system, at which point it is accepted at the discretion of the Engineer.

(3) Failure at the concrete surface (not through aggregate) with pull-off strength less than 300 psi: Rejected. The Contractor shall improve the surface preparation and prepare and test new mockup areas.

(4) Failure within CFRP with pull-off strength less than 300 psi: Rejected. The Contractor shall improve the quality of construction and prepare and test new mockup areas.

(5) Do not start work until the Contractor's Inspectors and District's Inspector (with Engineer's approval if necessary) have approved the mockups unless the District allows by

written agreement to Contractor commencement of work prior to testing of mockups.

3. Witness Panels for Tension Testing in Accordance with these Specifications after Construction

   a. The Contractor shall prepare at least one CFRP panel per day per work shift, minimum 24 in. wide and 14 in. long, made of one layer of CFRP using the same material and techniques used in the actual field installation. The preparation of the witness panels shall be witnessed by the Contractor's Inspectors and District's Inspector.

   b. Place a plastic sheet on a smooth flat horizontal surface (a plastic plate on plywood). Cover the plastic plate with a thin polyethylene film as a release agent. The fabric shall be resin coated on the plastic surface using the same amount of resin per unit area as would be applied in the actual installation. Eliminate trapped air in the CFRP laminate using the same tools (e.g., putty knives) used during pipe upgrades, as needed. The samples shall be stored on a rigid level surface in the pipeline or in an area representative of the temperature and humidity conditions in the CFRP upgrade areas during the curing period or the end of the upgrade work.

   c. Cured witness plates shall be obtained from the job site and handled only by the approved Testing Agency retained by the Contractor.

G. Curing

1. All CFRP areas shall be cured using the curing schedule recommended by the Manufacturer in writing and approved by the District prior to construction.

2. The Contractor's work schedule shall allow sufficient time between completion of upgrades and refilling of the pipeline so that all CFRP completes at least 85% cure before being exposed to water based on the cure temperature versus time relationship provided by the Manufacturer, or laboratory testing of epoxy samples collected from the surface of the installed CFRP liner according to ASTM E2160.

3. The Contractor shall not demobilize until the approved third-party testing agency verifies that the specified degree of cure has been achieved.

4. The Contractor's Inspectors shall perform a preliminary check of the cure progress by performing hardness tests on the CFRP system and based on the percent completion versus Shore D hardness relationship provided by the Manufacturer, and inform the District's Inspector of any

nonconformance. This does not constitute verification of cure, as such verification shall be provided by the Engineer based on laboratory testing.

5. The District's Inspector, with Engineer's approval, may specify a revised curing schedule during construction, if needed, based on the cure progress.

6. Perform curing in a dry environment. If heating is used, direct-fired gas or kerosene salamander-type heaters shall not be permitted. Only electric or indirect-fired heaters shall be permitted.

7. Perform curing at elevated temperatures to reduce the required curing time and to increase the glass transition temperature of the epoxy. Satisfactory performance of the curing schedules used shall be proven by the Manufacturer with documentation of previous satisfactory applications or thermal test results indicating the curing behavior of the epoxy.

8. Exhaust fumes from vehicles or equipment shall be kept away from CFRP-applied areas during curing.

H. Installation of Joint Seals

1. Install steel expansion rings in joints at each end of CFRP upgrade at least 24 hrs after CFRP installation. Select jacking pressure for expansion ring in strict accordance with to the manufacturer's recommended procedures.

3.06 INSPECTION DURING INSTALLATION

A. The Contractor shall monitor and document all phases of the construction, including material preparation, impregnation of all fabrics, application of all CFRP and GFRP layers, end termination details, curing, and the environmental conditions under which materials were stored and applied. Such inspections shall be performed during all shifts of work.

B. The Contractor's Inspectors shall inspect the fabric impregnation procedure periodically and perform a weight test at the beginning of each shift where CFRP installation takes place, as requested by the District's Inspector, following any substantial break in CFRP installation (e.g., lunch breaks where no CFRP material saturation is taking place), and at random intervals during all shifts of work. A weight test consists of weighing an approximately 1 ft x 1 ft piece of fabric before and after impregnation in the impregnation machine, and ensuring that the fabric-to-resin weight ratio is within the range recommended by the Manufacturer. The Contractor shall adjust the impregnation machine as necessary if specified by the Contractor's Inspectors or the District's Inspector.

C. The Contractor's Inspectors shall witness preparation of all witness panels by the Contractor and monitor the conditions under which they are stored. The District's Inspector will also witness this task.

D. The Contractor's Inspectors shall enforce the curing schedule specified by the Engineer.

E. The Contractor's Inspectors shall specify corrective actions as necessary, and reinspect all items to be corrected.

F. The Contractor's Inspectors shall inform the District's Inspector, who in turn reports to the Engineer, the results of all inspections required in this specification with traceable records, notes, measurements, and photographs. Reported results of bond tests performed on mockup areas shall indicate the location of test samples, pull-off test equipment used, and failure mode and test result for each sample tested.

3.07 POST-INSTALLATION INSPECTION AND REPAIR OF DAMAGED OR DEFECTIVE AREAS

A. Inspection for Voids and Delaminations

1. The Inspector shall inspect each upgrade pipe after the CFRP liner has become tack free to identify imperfections such as voids, delaminations, wrinkles, and raised fabric edges, and to specify corrective actions to be taken by the Contractor as necessary. Voids and delaminations shall be identified by dragging a coin or small piece of metal across the CFRP surface and tapping at areas for change in sound, or automated methods approved by the Engineer.

2. Voids requiring corrective action shall be marked and upgraded in accordance with these Specifications, and as shown on Drawings.

3. The Inspector shall also inspect all joints filled with epoxy mortar where CFRP is terminated and check for any sagging or hollow-sounding areas. If needed, the corrective action for hollow-sounding epoxy mortar shall be removal and replacement.

B. Repair of Delaminated Areas of Installed CFRP Reinforcement

1. Small delaminations less than 2 sq in. each do not require corrective action, as long as the total delaminated area is less than 5% of the total laminate area and there are no more than ten such delaminations per 10 sq ft. If there are more than the allowed amount of voids of this size, contact Engineer for corrective action.

2. Moderate delaminations between 2 sq in. and 25 sq in. shall be repaired by filling the delamination by low-pressure injection of the epoxy, followed by application of a GFRP patch, as detailed in the included Drawings.

3. For large delaminations, contact Engineer for corrective actions. Such cases will be addressed on a case by case basis.

4. Repair procedures for conditions that are not specifically addressed in this Specification shall be submitted for approval by the Engineer prior to the repair work.

5. All areas of corrective actions shall be re-inspected and approved by the Inspector and District's Inspector.

C. Inspection Report

1. The inspection report submitted by the Inspector to the District's Inspector at the end of the construction shall include the location and extent of all defects found during the post-installation inspection and the corrective actions taken.

3.08 TESTING OF CFRP WITNESS PANELS

A. Testing

1. After the construction, tension tests shall be performed by a Testing Agency retained by the District on coupons cut by the Contractor from the witness panels prepared during construction in conformance with these Specifications.

2. Witness plates shall be cured for the manufacturer-recommended duration as a minimum before tensile testing. The test coupons shall not be preconditioned prior to testing.

3. Sample preparation and testing shall comply with ASTM D3039 except that the thickness of the panel shall be taken as the nominal value and not the actual thickness. Coupons shall be tested with or without end tabs as long as failure at the grips is avoided.

4. At least ten specimens shall be tested from each witness panel. If the CFRP installation duration is longer than one week, the number of test specimens per panel may be reduced to five by Engineer. All test specimens shall be properly instrumented to determine the tensile modulus and tensile elongation.

B. Testing Report

1. The Testing Agency shall submit a detailed test report to the Engineer indicating the witness panel ID, sample dimensions, number of samples tested, number of fabric layers, load and strain measurement techniques, failure modes, and obtained strength, modulus, and ultimate elongation for each sample tested. Any deviation from the recommended ASTM D3039 practices shall be clearly reported.

C. Evaluation of Test Results

1. The Engineer will identify all valid tests, analyze the test results statistically, and calculate the average strength and modulus for each witness panel.

2. Pooling of all test results into a combined data set shall be allowed only if justified by statistical pooling methods.

3. The average strength and modulus shall be greater than the characteristic values calculated based on the test data provided by the Manufacturer prior to construction and used in design. Otherwise, the Engineer will check the design with the average test values, and recalculate the factors safety for each limit state. If the revised factors of safety are still above those required by the design, the CFRP witness panels will be approved. If not, the Contractor shall propose a method to supplement the CFRP liner to address the deficiency in its material properties.

3.09 QUALITY CONTROL AND QUALITY ASSURANCE

A. Prequalification of Contractor, Contractor’s Manufacturer, and Inspectors

1. The Contractor, Contractor’s Subcontractor (the Manufacturer), and Inspectors shall be prequalified in accordance with these Specifications.

B. Pre-Installation Conference

1. A preinstallation conference will be held with the representatives of the District, Engineer, Inspector, Contractor, Contractor's field supervisor, Contractor’s Inspectors, and all other parties involved to discuss the conduct of the work in this Specification.

C. Quality Control Prior to, During, and After Installation

The Contractor shall ensure the following:

1. All materials shall be inspected prior to execution to ensure conformity with contract requirements, and that all materials are new and undamaged.

2. Procedures shall be established for executing the work prior to the start of work by a review and approval process established between the Contractor and the District.

3. The qualifications of installers shall be verified prior to construction according to these Specifications.

4. All phases of the upgrade work shall be inspected by the Contractor’s Inspectors and will be verified by the District’s Inspector to ensure that

work is done in accordance with project drawings and specifications, established procedures, Manufacturer's instructions, specific instructions by the Engineer, if given, or recommended practices as given in the references of these Specifications.

5. All completed work shall be inspected according to these Specifications and defective work, if any, shall be corrected as specified therein.

6. CFRP witness panels prepared by the Contractor during construction shall be tested by a Testing Agency retained by the District after construction according to these Specifications, and the results shall be evaluated by the Engineer as specified therein.

3.10 SAFETY REQUIREMENTS

A. Materials may be skin irritants or sensitizers. Accordingly, advise system installer to avoid contact with eyes and skin, inhalation of vapors, and ingestion. Use protective and safety equipment on site. Heed all label warnings by manufacturers. Make application in accordance with applicable safety laws.

B. The Contractor, his Subcontractor(s), suppliers, consultants, and workers shall maintain a safety program that is at a minimum compliant with the safe work practices prescribed by the District and with OSHA and other safety laws and regulations.

C. All contractor personnel shall successfully complete the OSHA 10 hr course and all contractor supervisors/safety oversight personnel shall successfully complete the OSHA 30 hr course prior to starting work on site.

D. Contractor shall conduct documented daily Pre-Job/Safety Briefs for the duration of the project.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to furnish and install all valves and appurtenances as shown on the Drawings and specified herein. The Contractor is referred to Article 14.07 – District Furnished Material and Equipment.

B. The work of this section shall include the furnishing, installation, and testing of all valves and appurtenances as specified herein, shown on the plans, and as required to make the pipeline operable and complete.

C. The Contractor shall furnish and install manual operators with handwheels or valve stem extensions, valve stem extension sleeves, valve stem extension support brackets, valve boxes and covers for all butterfly and gate valves as shown on the Drawings.

1.02 REFERENCES

A. Related Articles:

1. Section 32 – Piping
2. Section 39 – Corrosion Control
3. Section 40 – Coating, Lining, and Painting

B. American Water Works Association (AWWA)

1. AWWA C 207 – Steel Pipe Flanges for Waterworks Service, Sizes 4-In Through 144-In

2. AWWA C 213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings

3. AWWA C 504 – Rubber-Seated Butterfly Valves

4. AWWA C 507 – Ball Valves

5. AWWA C 509 – Resilient-Seated Gate Valves for Water Supply Services

6. AWWA C 512 – Air Release, Air/Vacuum, and Combination Air Valves for Water and Wastewater Service

7. AWWA C 515 – Standard for Reduced-Wall, Resilient Seated Gate Valves for Water Supply Service

8. AWWA C 550 – Protective Interior Coatings for Valves and Hydrants

C. ASTM International (ASTM)

1. ASTM A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

2. ASTM A 276 – Standard Specification for Stainless Steel Bars and Shapes

3. ASTM A 564 – Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless-Steel Bars and Shapes

D. American Society of Mechanical Engineers (ASME)

1. ASME Boiler and Pressure Vessel Code

2. ASME B16.1 – Pipe Flanges and Fittings Package

3. ASME B18.2.1 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)

1.03 SUBMITTALS

A. The Contractor shall submit to the Engineer for review, in accordance with Article 7.05, the following documents:

1. Equipment manufacturers and model numbers

2. Manufacturer's product data sheets and cut sheets verifying adherence to these specifications and current AWWA, ANSI, and NSF 61 standards.

3. Dimensioned shop drawings and/or cut sheets

4. Materials of construction, including all components and associated materials and coatings/linings, as applicable.

5. Warranty documents

a. The Contractor shall warrant its products to be free from defects in materials, workmanship, and performance for a period of one (1) year from the date of delivery. Upon notice by the District, any damage or defect found during the warranty period shall be promptly repaired or replaced by the Contractor at no cost to the District

6. Operations and Maintenance Manuals for all equipment. The manuals shall include installation instructions, maintenance procedures and operational parameters

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

B. Refer to Article 21.01, Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

A. All valves shall be provided as shown in the plans and as specified herein. Unless otherwise specified, all valves shall be suitable for buried service. All valve assemblies shall be furnished complete and shall include all essential components for proper installation and operation.

B. All parts of all valves shall be designed to withstand, without being structurally damaged, (1) an internal test pressure of twice the rated design working pressure of the valve and (2) the full rated internal working pressure when the closure member is cycled once from fully open to a fully closed position against the full rated unbalanced working water pressure.

C. Valves shall be sized in accordance with the adjoining pipe.

D. Unless otherwise specified, valve ends shall be flat-faced flanged. Refer to the Drawings for flange drilling patterns.

E. The Contractor shall confirm that the flange class and drilling pattern of any new flanged connection including, but not limited to: valves, blind flanges, flange coupling adapters, dismantling joints, and spool pieces are compatible with existing flanged connection prior to installation.

F. Unless otherwise specified, valves shall open by turning the handwheel or square nut in a counterclockwise rotation.

G. Unless otherwise specified, valves shall be provided with protective coatings conforming to AWWA C550. See Section 40 of these Specifications.

H. Equipment Identification Plate: 16- gauge stainless steel with 1/4-inch die stamped equipment tag securely mounted in a readily visible location with manufacturer name, model number, serial number, size of valve, design pressure, operational data, and date of manufacture.

PART 3 EXECUTION

3.01 INSTALLATION

A. Valves shall be installed with sufficient clearance for proper operation of any external mechanisms, and with sufficient clearance to dismantle the valve for in-place maintenance. Installation shall be in accordance with the valve manufacturer's recommendations.

B. Valves and valve supports shall be in true alignment and grade in accordance with the procedures submitted with the shop and erection drawings. All adjustments and operating settings of the valves shall be made in accordance with the procedures and details presented in the erection drawings.

C. Earth backfill shall be carefully tamped around each valve vault on all sides to the undisturbed face of the trench wall. Valves shall have their interiors cleaned of all foreign matter before installation. The valves shall be inspected in opened and closed positions to ensure that all parts are in working condition.

D. Valves shall be rigidly held in place using supports as shown in the plans. The stem orientation of valves shall be as shown on the Drawings. Supports shall be provided for all valves located in vaults. Supports shall be of rugged construction providing at least 120 degrees under support for the valve body. All supports shall be anchored to concrete foundations using type 316 stainless steel anchor bolts.

E. Valves shall have their operating stems and handwheels oriented to facilitate the most practicable operation, as shown on the Drawings.

F. Lifting Lugs shall be provided for any piece of equipment weighing over 100 pounds.

G. All butterfly valves shall be installed with the valve shafts horizontal unless otherwise shown on the Drawings. The Contractor shall verify the settings of the full open and closed stops and adjust them if necessary. The seat side (flat side of disc) of the valve shall be placed on the upstream side of the flow.

H. Valves shall be installed with flanged coupling adapters or dismantling joints, as applicable, to provide for valve removal.

I. All valves shall be provided with protective coatings conforming to AWWA C550 and Section 40 of these Specifications.

J. All buried service valves assemblies shall be wrapped with a 3-part wax tape system and encased in CDF.

K. Manual Operators shall be installed per manufacturer's recommendation.

L. The number of turns required the operate the valve from the fully open to the fully closed position shall be stamped on the top of the valve box.

3.02 QUALITY ASSURANCE

A. Valves shall be hydrostatically tested along with the pressure pipe as outlined in Article 32.06

B. Valves shall be tested as required in AWWA C504, C509 and C515. Operation of valves shall be exercised three times by the Contractor in the presence of the Engineer such that the valve can be visually verified to move from a 100 percent open position to a 100 percent closed position.

C. All combination air release valves and air release valves shall be exercised in the presence of the Engineer while under pressure in accordance with the manufacturer's procedures and checked for leakage. The rate of air release shall be adjusted as required to avoid water hammer conditions in piping it serves.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to furnish and install all butterfly valves as shown on the Drawings and specified herein. The Contractor is referred to Article 14.07 – District Furnished Material and Equipment.

B. The work of this section shall include the furnishing, installation, and testing of butterfly valves as specified herein, shown on the plans, and as required to make the pipeline operable and complete.

C. The Contractor shall furnish and install manual operators with handwheels or valve stem extensions, valve stem extension sleeves, valve stem extension support brackets, valve boxes and covers for all butterfly valves as shown on the Drawings and specified herein.

1.02 REFERENCES

A. Related Articles:

1. Section 32 – Piping
2. Article 34.01 – Valves and Actuators - General
3. Section 40 – Coating, Lining, and Painting

B. American Water Works Association (AWWA)

1. AWWA C 207 – Steel Pipe Flanges for Waterworks Service, Sizes 4-In Through 144-In

2. AWWA C 213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings

3. AWWA C 504 – Rubber-Seated Butterfly Valves

4. AWWA C 550 – Protective Interior Coatings for Valves and Hydrants

C. ASTM International (ASTM)

1. ASTM A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

2. ASTM A 276 – Standard Specification for Stainless Steel Bars and Shapes

3. ASTM A 564 – Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless-Steel Bars and Shapes

D. American Society of Mechanical Engineers (ASME)

1. ASME Boiler and Pressure Vessel Code

2. ASME B16.1 – Pipe Flanges and Fittings Package

3. ASME B18.2.1 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)

1.03 SUBMITTALS

A. Certified drawings showing the orientation of the valve, operator, spur and/or miter gear (if applicable), valve stem extension assemblies (if applicable) and the direction of flow shall be submitted by the Contractor to the Engineer for review as specified in AWWA Standards C504 and C509.

1. Dimensioned shop drawings for each valve showing actuator orientation. Drawings shall show: flow direction, hand wheel or 2” key, actuator controls, valve disk position indicator, space required to remove actuator covers; and weight.

2. Cut sheet showing manufacturer’s recommendation for use of manual and electric actuator with the valve. Build sheet showing number of turns required to close and suitability for buried service use

B. The Contractor shall provide to the Engineer records of all tests specified in AWWA Standards C504 and C509.

C. An affidavit of compliance shall be furnished by the manufacturer or vendor as specified in AWWA Standards C504 and C509 and submitted to the Engineer.

D. The Contractor shall provide clearly dimensioned and scaled drawings of the valve, operator and operator extension (if required) assemblies that demonstrate the spatial relationships of the assembly components and that adequate clearances are provided for assembly/disassembly of the components without valve removal from within the piping system. These drawings shall consist of, as minimum, a plan view along with side and end projections. The orientation of the valve seating shall be identified and shown to be compatible with the drawings.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. AWWA C504 Butterfly Valves

1. All butterfly valves shall comply with AWWA C504 and C509.

2. All butterfly valves shall be short-body with flat-faced flanged ends.

3. Unless indicated otherwise, valve seats shall be mounted in the valve body or valve disc. Butterfly valves that are 20 inches in diameter and larger, the seats shall be field adjustable and replaceable.

4. Valves shall be of the size and class as shown in the Drawings and as specified in these Specifications.

5. Valves shall have minimum cold water rated working pressure as specified in Part 1 of this Article, or as shown in the Drawings.

6. Valves shall be for continuous duty/operation and shall have a normal velocity range of 0 to 16 feet per second. The valves shall be suitable for bi-directional flow and capable of withstanding the rated pressure on both sides of the valve disc in the fully closed position.

7. Valves shall be of the tight closing, rubber seat type suitable for either underground or above ground installation. Valves shall have a full uninterrupted 360-degree sealing surface and shall shut-off bubble-tight at the rated design pressure in either direction of flow. Valves should be suitable for very infrequent operation after extended periods of activity.

8. Valves shall have a stainless steel plate stamped with valve reference data including type, serial number, brand, and equipment record number.

9. See Section 40 – Coating, Lining, and Painting for coating requirements.

10. All butterfly valves shall have a minimum fully open flow coefficient (C_v) equal to or greater than the value listed below. Lower C_v values are not acceptable. Published values shall be used.

    a. 4” – 575
    b. 6” - 1,294
    c. 8” - 2,300
    d. 10” - 4,458
    e. 12” - 6,420
    f. 14” - 8,738
    g. 16” - 11,412
    h. 18” - 14,444
    i. 20” - 17,832
    j. 24” - 25,380

k. 30” - 39,657
l. 36” – 61,900

11. Valves shall be Mueller Lineseal XP/XPII, Pratt HP250/250II, or equal.

12. Valve Body

    a. Valve body shall be short-body design and constructed of ASTM 536, Gr. 65-45-12 ductile iron.

    b. Flanges shall be fully flat-faced and the flange class shall be as shown in the Drawings and as specified in these specifications

13. Valve Shaft and Bearings

    a. Valve shaft shall be made of stainless steel ASTM A-564 type 630 condition H-1150. The shaft seals shall be “V” type packing. Shaft seals shall be of a design allowing replacement without removing the valve shaft. No O-ring or “U” cap packing shall be allowed.

    b. Valve bearings shall be sleeve type that is corrosion resistant and self-lubricating. No metal-to-metal thrust bearings in the flow stream shall be allowed.

    c. The bearing shall be a stainless steel backed Teflon material. Bearing load shall not exceed 1/5 of the compressible strength of the bearing or shaft material.

14. Valve Actuator

    a. Refer to Article 34.15 – Valve Actuators

B. Triple Offset Metal Seated Butterfly Valves

1. Butterfly valves shall be of the high-performance design and shall be rated for water working pressures of up to the maximum design pressure. The valves shall incorporate a triple-offset shaft design with an inclined conical seat and seal geometry which shall create a torque seating operation which shall provide bi-directional zero leakage shut-off and be designed in accordance with ASME B16.34 and B31.1. Valves shall be of the metal seat design which shall be capable of bi-directional seating against pressures up to the maximum design pressure applied to one side of the disc, with zero pressure applied to the other side of the disc, which in the CLOSED position, with zero drop leakage, and without damage or permanent deformation to any part of the valve body, seat, disc, shaft, bearings, or actuator.

2. Valve Identification– The country of origin of all castings and an identifying serial number shall be stamped on a corrosion-resistant plate attached to the valve body.

3. All valves shall be ANSI/NSF Standard 61 certified and listed by NSF for use in potable water systems. The listing by NSF, or equivalent accredited agency, must be submitted prior to approval of any submittals.

4. Valves Design– Design shall be Triple Eccentric (offset) Metal Seated Butterfly Valve, tight closing butterfly valves. Valves shall be bi-directional with zero allowable leakage at full rated pressure, and shall be suitable for applications involving throttling service, On/Off service and for application requiring valve actuation after long periods of inactivity.

5. Valve Body – Valve body and disc shall be cast from carbon steel per ASTM A216 Grade WCB, complying with applicable ASME B16.34 specifications. Fabricated bodies and discs shall not be permitted. The valve seating edge shall be located within the valve body fully protected from the flow stream. The trunnion area shall be enclosed and sealed with a 316 stainless steel shroud attached to the valve trunnion to repel backfill materials from contact with the shaft and packing gland. The shaft diameter shall be reduced at the actuator connections so as to put the weakest point outside the valve above the packing. Disc attachment to the shaft shall be by means of Monel parallel keys. Pins of any kind shall not be used for torque transmission.

6. Valve seating design shall be laminates of 316 stainless steel and PTFE seating to Stellite overlay 2.5mm in the finished condition.

7. Seal Ring - Valves shall have a field replaceable “laminated” seal ring retained on the disc. The seal ring shall be constructed of laminates of 316 stainless steel and PTFE. No elastomers shall be used in the sealing system. Seal ring design shall also include the following parameters:

    a. The seal ring shall be accessible (replaceable) by positioning the disc in a proper orientation and removing an adjacent pipe spool piece without removing or disassembling the valve.

    b. The seal ring shall be machined in an inclined conical shape to match the companion surface in the body. The overall geometry of the seal ring shall be formed into an elliptical shape to provide resilient seating.

    c. Each seal ring shall be identical and interchangeable for valves of the same size.

    d. The seal ring shall be held securely in place by a retaining ring bolted in place.

    e. A spiral wound gasket shall be provided to prevent leakage around the seal ring. Flat static gaskets shall not be used.

f. The seal ring shall be indexed and keyed to assure exact and proper installation or reinstallation without shims.

g. No special tools shall be required to install the seal ring.

8. Packing shall be self-adjusting and shall be provided by a minimum of four studs for precision adjustment and compression of the packing. A minimum of five packing rings shall be provided.

9. Valve packing shall be a combination of graphite die-formed rings and braided graphite rope anti-extrusion rings. Packing gland and end-cap shall be type 304 or 316 stainless steel.

10. Rubber Parts - Rubber parts exposed to water shall be made of a peroxide-cured EPDM rubber compound that is resistant to free chlorine and monochloramine concentrations up to 10 mg/L in the fluid conveyed.

11. Valve Disc– All valve discs shall be constructed of stainless steel in accordance with ASTM A351 CF8M. Disc and shaft connection shall be made with stainless steel pins.

12. Valve Shaft– Valve shafts shall be one-piece stainless-steel construction and shall be designed in accordance with the requirements of API 609. Valve shaft material shall be high strength stainless steel, such as ASTM 182 gr. F6a material, and shall meet the requirements of ASTM A564 Type 630, H1150M (17-4 PH).

13. Valve Bearing – Valve bearings shall be 316 stainless steel with hard chrome plating. Bearings shall be sealed from the ingress of particulates of contaminants. Wetted bronze parts shall be in conformance with ASTM B148 / B548.

14. Flanges– Valve body shall be double flanged, flat faced, which shall be able to withstand induced pipe loads without distortion and effect on the movement of the valve disc and seating operation. Flange thickness shall be designed in accordance with ASME Section VII flange design requirements and shall be suitable for mating to connecting pipe flanges conforming to flange dimensions depending on the pressure class of the valve . Face to face dimensions of the valve shall conform to AWWA C504.

15. Valve bottom flange bolting must be in compliance with ASME B31.1 and B31.3, and shall use at least four (4) retaining bolts. Material of bolting to be ISO 3506 A2 gr. 304 SS

16. Triple Offset (eccentric) Resilient Seated Butterfly Valves shall be as manufactured by, and meeting these specifications:

    a. Dae Han Controls Company, LTD.,
    b. Or equal

PART 3 EXECUTION

3.01 INSTALLATION

A. Refer to Article 34.01 Valves and Actuators – General

B. Triple Offset Metal Seated Butterfly Valves

1. Before installation, the Contractor shall have an approved drawing showing the side of the line on which the operator is to be installed.

2. Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the pipeline.

3. Prepare pipe ends and install valves in accordance with the pipe manufacturer's instruction for the joint used.

4. The Contractor shall not deflect the pipe-valve joint. The Contractor shall minimize bending stresses in the valve end connections.

5. The Contractor shall not use the valve to lock down or anchor piping. The Contractor shall provide temporary pipe supports and anchoring to support the piping and valves.

6. The Contractor shall use air purging to clean the flange faces that will contact the valve. If there is rust or other foreign material sticking to a flange face, clean it with a suitable cleaning fluid such as alcohol.

7. During installation, the valve disc shall be kept in the completely closed position.

8. When suspending the valve, use nylon string and suspend it from its "neck section" if the valve has no eye bolts. The Contractor shall not suspend the valve from drive member parts such as the gear handle.

9. The Contractor shall install and tighten bolts per the manufacturer's recommendation and instructions in order apply equal strength as the Contractor gradually tighten each nut. The Contractor shall be careful not to tighten the nuts on one side too much or too little in order to prevent distortion and unequal stresses.

10. The Contractor shall install insulating kits between the valve and piping. Refer to Section 39.

11. After installation, the Contractor shall open and close the valve to verify that the disc does not hit the piping or gasket.

3.02 QUALITY ASSURANCE

A. Triple Offset Metal Seated Butterfly Valves

1. An authorized representative of the manufacturer of the valves and actuators will need to be scheduled to visit the site of the Work and inspect, check, adjust, if necessary, and approve the equipment installation by the Contractor. The manufacturer representative must be present when the valves and actuators are disassembled and reassembled on site and when placed in operation. The Contractor shall coordinate with a valve vendor representative to schedule the representative to be on site to conduct their inspections.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to furnish and install all ball valves and appurtenances shown on the Drawings and specified herein.

B. The work of this section shall include the furnishing, installation, and testing of all valves and appurtenances as specified herein, shown on the plans, and as required to make the pipeline operable and complete.

1.02 REFERENCES

A. Related Articles:

1. Section 32 – Piping
2. Article 32.20 – Coating System for Pipe Appurtenances and Valves
3. Article 34.01 – Valves and Actuators - General
4. Section 40 – Coating, Lining, and Painting

B. American Society of Mechanical Engineers (ASME):

1. B16.1 – Pipe Flanges and Fittings Package
2. B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through 24.

C. American Water Works Association (AWWA):

1. C507 - Standard for Ball Valves 6 Inch Through 48 Inch.

D. ASTM International (ASTM):

1. A48 - Standard Specification for Gray Iron Castings.

2. A216 - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.

3. A351 - Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.

E. Manufacturers Standardization Society (MSS):

1. SP-72 – Ball Valves with Flanged or Butt-Welding Ends for General Service

1.03 SUBMITTALS

A. Refer to Article 34.01 Valves and Actuators - General

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Unless otherwise specified, ball valves shall be flat-face flanged, Class 150 or Class 300 as shown on the Drawings. Valves shall be pressure compatible with mating flanges and piping.

B. Valve to Piping Connections: Unless otherwise shown on the Drawings, valves shall have the following ends:

1. 2-inch and larger: flat-faced flanged ends
2. Smaller than 2-inch: threaded ends for steel piping

C. Ball valves shall conform to Manufacturers Standardization Society of the Valve and Fittings Industry MSS SP-72.

D. Ball valves body design shall be uni-body. Dual/split body will not be accepted.

E. Ball valves shall have the following material:

1. Body Material: Carbon steel, ASTM A216 WCB
2. Seats: UHMWPE for Class 150 valves and Reinforced PTFE for Class 300 valves
3. Stem: Type 316 stainless steel
4. Ball: Stainless steel, vented
5. Port: Full port
6. Flanges: Flat-faced

F. Flanged Class 150 ball valves shall be Apollo 88A-240 Series with additional configurations as specified, or equal.

G. Flanged Class 300 ball valves shall be NIBCO F-530-CS-R-66-FS with additional configurations as specified, or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Refer to Article 34.01 Valves and Actuators – General

3.02 QUALITY ASSURANCE

A. Refer to Article 34.01 Valves and Actuators – General

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to furnish and install all gate valves on the Drawings and specified herein.

B. The work of this section shall include the furnishing, installation, and testing of all gate valves as specified herein, shown on the plans, and as required to make the pipeline operable and complete.

C. The Contractor shall furnish and install manual operators with handwheels or valve stem extensions, valve stem extension sleeves, valve stem extension support brackets, valve boxes and covers for all gate valves as shown on the Drawings and specified herein.

1.02 REFERENCES

A. Related Articles:

1. Section 32 – Piping
2. Article 34.01 – Valves and Actuators – General
3. Article 34.15 – Valve Actuators
4. Section 40 – Coating, Lining, and Painting

B. American Water Works Association (AWWA)

1. AWWA C 207 – Steel Pipe Flanges for Waterworks Service, Sizes 4-In Through 144-In

2. AWWA C 213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings

3. AWWA C 509 – Resilient-Seated Gate Valves for Water Supply Services

4. AWWA C 515 – Standard for Reduced-Wall, Resilient Seated Gate Valves for Water Supply Service

5. AWWA C 550 – Protective Interior Coatings for Valves and Hydrants

C. ASTM International (ASTM)

1. ASTM A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Application

D. American Society of Mechanical Engineers (ASME)

1. ASME Boiler and Pressure Vessel Code

2. ASME B16.1 – Pipe Flanges and Fittings Package

3. ASME B18.2.1 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)

1.03 SUBMITTALS

A. Refer to Article 34.01 Valves and Actuators - General

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. All exterior valve body bolting shall be type 304 stainless steel and shall be provided with hexagonal heads, with dimensions conforming to ANSI/ ASME B18.2.1. Metric size and/or socket head cap screws or bolts, are not allowed. All body gaskets shall be of the pressure energized O-ring style design.

B. Gate valves shall be suitable for occasional operation and shall have a normal velocity range of 1 to 20 feet per second with a maximum velocity of 40 feet per second. The valves shall be designed to close at any flow through velocity up to 40 feet per second. The valves shall be suitable for bidirectional flow and be capable of withstanding the rated pressure on both sides of the valve in the fully closed position.

C. Valves shall be of the size, body style, and class as shown in the Drawings and as specified in the Specifications.

D. For actuator info, see Article 34.15 – Valve Actuators

E. Valves shall be in conformance with AWWA/ANSI C515 unless as modified herein. They shall be UL listed, FM approved and certified to ANSI/NSF 61 & 372.

F. Valves shall have an AWWA/UL/FM 350 psig working pressure. Each valve shall be factory seat tested to 525 psig and shell tested to 700psig.

G. Valves shall be watertight at the rated pressure in either direction. Valve shall be shop tested and certified for leakage in accordance with AWWA C515.

H. All cast ferrous components shall be ductile iron and shall be manufactured in compliance with the latest edition of AWWA/ANSI C515. The valve shall have the marking “D.I.” or “Ductile Iron” cast on the body.

I. Valves shall have a smooth, unobstructed, and oversize waterway, free of pockets, cavities, and depressions in the seat area.

J. Valve wedges shall be encapsulated in permanently bonded EPDM rubber. Valve stems shall be sealed with three O-rings. Two of the O-rings shall reside above the thrust collar. One of the O-rings shall reside below the thrust collar. O-rings set in a cartridge shall not be allowed. The valve shall also be equipped with thrust washers above and below the stem thrust collar for reduction of operating torque. Valves shall be non-rising stem.

K. Valves shall have a stuffing box with bolts in line with flow and be O-ring sealed. Stuffing box shall have two integrally cast lifting lugs. Two O-rings shall be placed above and one O-ring below the stem thrust collar. The thrust collar shall be factory lubricated. The thrust collar and its lubrication shall be isolated by the O-rings from the waterway and from outside contamination providing permanent lubrication for long term ease of operation. Valves without a stuffing box are unacceptable. Valves without at least three stem O-rings are also unacceptable.

L. The valve body, bonnet, stuffing box and operating nut shall be composed of ASTM A536 ductile iron. The body and bonnet shall adhere to the minimum wall thickness as set forth in AWWA C515. Wall thicknesses that do not meet AWWA minimums are not acceptable.

M. The valve disc and guide lugs shall be composed of ASTM A536 ductile iron and fully encapsulated in EPDM ASTM D2000 rubber. Guide caps of an acetal bearing material shall be placed over solid guide lugs to prevent abrasion and to reduce the operating torque. Guide lugs placed over bare metal are not acceptable.

N. See Section 40 – Coating, Lining, and Painting for coating requirements

O. A permanently attached label shall be provided listing the number of turns required to fully open and to fully close valve.

P. Valves shall be equipped with indicators to show the position of the gate in relation to the waterway.

Q. Valves shall have flat-faced flanged end connections. Refer to the Drawings for flange class and drilling pattern.

R. Valves shall be hydrostatically tested prior to shipment in accordance with AWWA standards.

S. Valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten (10) years from the date of manufacture. The manufacturing facility for the valves must have current ISO certification.

T. All valves shall be U.S. Pipe A-USP1 Resilient-Wedge Gate Valve FL. x FL. Gate Valves, Mueller Resilient Wedge A-2361 Gate Valves, or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Refer to Article 34.01 Valves and Actuators - General

3.02 QUALITY ASSURANCE

B. Refer to Article 34.01 Valves and Actuators - General

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to furnish and install the 18-inch wall mount sleeve valve with electric actuator and miscellaneous items of work including the actuator support and extension as shown on the Drawings and specified herein.

B. The work of this section shall include the furnishing, installation, and testing of all sleeve valves assemblies as specified herein, shown on the plans, and as required to make the pipeline operable and complete.

C. The Contractor shall furnish and install electric operators with handwheels or valve stem extensions, valve stem extension sleeves, valve stem extension support brackets, valve boxes and covers for all sleeve valves as shown on the Drawings and specified herein.

1.02 REFERENCES

A. Related Articles:

1. Section 32 – Piping
2. Article 34.01 – Valves and Actuator - General
3. Section 40 – Coating, Lining, and Painting

B. American Water Works Association (AWWA)

1. AWWA C 207 – Steel Pipe Flanges for Waterworks Service, Sizes 4-In Through 144-In

2. AWWA C 213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings

3. AWWA C 550 – Protective Interior Coatings for Valves and Hydrants

C. ASTM International (ASTM)

1. ASTM A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Application

D. American Society of Mechanical Engineers (ASME)

1. ASME Boiler and Pressure Vessel Code

2. ASME B16.1 – Pipe Flanges and Fittings Package

3. ASME B18.2.1 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)

1.03 SUBMITTALS

A. Refer to Article 34.01 Valves and Actuators - General

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

B. Refer to Article 21.01, Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

A. The wall mount sleeve valve shall consist essentially of a horizontally positioned body, a flanged cylindrical inlet section, which is mounted to a bulkhead flange, a valve body which has tapered control nozzles having a larger diameter on the inside of the sleeve. A valve gate shall be provided with a seal at its upper end and a hard-faced seating surface at its downstream end. The valve is to be a motor operated control unit located on an extension above the valve body as shown on the Drawings.

B. The assembly shall be designed such that the valve body with the outlet ports can be removed from the anchor plate and the extension section.

C. The wall mount sleeve valve shall be required to perform cavitation-free under the following conditions:

1. Controllable flow range of 10 to 50 cubic feet per second
2. Maximum inlet pressure head of 250 feet
3. Maximum outlet pressure head of 5 feet
4. Atmospheric or submerged discharge

D. The sleeve valve shall be designed to close at any flow through velocity up to 30 feet per second.

E. The wall mount sleeve valve shall be able to operate in a fully throttled position without excessive vibration and without the injection of air. Valve opening characteristics shall be normally linear throughout the valve stroke. It shall be possible to manually open the valve for cleanout purposes. The complete assembly shall have a smooth water passage with no sharp edges or abrupt changes in contour to cause localized cavitation.

F. The valve body shall conform to the following ASTM Designations or equal:

1. Plate: A240 Type 304
2. Pipe: A358 Type 304
3. Forgings: A182 Type 304

G. The valve gate shall conform to the following ASTM Designations or equal:

1. Plate: A240 Type 304
2. Pipe: A358 Type 304
3. Bars: A276 Type 304

H. See Section 40 – Coating, Lining, and Painting for coating requirements.

I. Valve actuator: Refer to Article 34.15 – Valve Actuators.

J. The wall mount sleeve valve shall be manufactured be Model B14 as manufactured by Bailey Company, or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Refer to Article 34.01 Valves and Actuators – General

3.02 QUALITY ASSURANCE

B. Refer to Article 34.01 Valves and Actuators – General

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to furnish and install cone valves with electric actuators as shown on the Drawings and specified herein.

B. The work of this section shall include the furnishing, installation, and testing of all cone valve assemblies as specified herein, shown on the plans, and as required to make the pipeline operable and complete.

C. The Contractor shall furnish and install electric operators with handwheels or valve stem extensions, valve stem extension sleeves, valve stem extension support brackets, valve boxes and covers for all cone valves as shown on the Drawings and specified herein.

D. Project Flow Requirements:

Valve Size (inches)	14	30
Minimum Flow Rate (CFS)	4	15
Maximum Flow Rate (CFS)	40	186
Pressure Upstream of Valve @ Minimum Flow Rate (PSI)	100	100
Pressure Upstream of Valve @ Maximum Flow Rate (PSI)	87	22
Flange Pressure Class (AWWA)	E	E
Operating Time (sec)	See Article 34.15-Valve Actuators	See Article 34.15-Valve Actuators
Operating medium	Raw Water	Raw Water
Required actuator type	Electric	Electric

1.02 REFERENCES

A. Related Articles:

1. Section 32 – Piping
2. Article 34.01 – Valves and Actuator - General
3. Section 40 – Coating, Lining, and Painting

B. American Water Works Association (AWWA)

1. AWWA C 207 – Steel Pipe Flanges for Waterworks Service, Sizes 4-In Through 144-In

2. AWWA C 213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings

3. AWWA C 550 – Protective Interior Coatings for Valves and Hydrants

C. ASTM International (ASTM)

1. ASTM A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Application

D. American Society of Mechanical Engineers (ASME)

1. ASME Boiler and Pressure Vessel Code

2. ASME B16.1 – Pipe Flanges and Fittings Package

3. ASME B18.2.1 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)

1.03 SUBMITTALS

A. Refer to Article 34.01 Valves and Actuators – General

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

B. Refer to Article 21.01, Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cone valves shall be hollow cone type with protrusions for admitting air into the interior of the valve.

B. Cone valves shall be designed for continuous discharge of water up to rated capacity at maximum net head without excessive vibration or pitting. The nominal size, maximum static head, guaranteed minimum full gate capacity with

corresponding minimum net heads and method of operation are summarized in section 1.01.D of this Article.

C. Fixed cone valve assemblies shall include the following components: a valve body, a fixed cone with self-adjusting seat, a moving gate, hood, a manual actuator, and an electric cylinder actuator.

D. Body requirements:

1. The body shall have an inlet flange for mounting the valve into the pipe system.

2. The body shall have a mounting flange that can also be used as a support leg, if needed, for the valve and as a mounting bracket for valve actuator or cylinder.

3. The body shall have nitronic 60 wear strips to prevent galling between the body and gate.

4. The body shall house a rubber seal to prevent upstream leakage between the body and the gate.

5. The valve shall be designed such that the seal shall be replaceable without removal or disassembly of the valve.

6. All pressure retaining components shall be made from carbon steel ASTM A-516 GR 70 while structural components shall be made from carbon steel ASTM A-36.

E. Cone requirements:

1. The fixed cone shall be inline and concentric with valve body.

2. The cone shall be attached to the body by ribs welded to the inside of valve body and upstream side of cone.

3. The ribs shall be contoured to provide vibration free operation and prevent pressure fluctuations.

4. Cone and ribs shall be made from carbon steel ASTM A-516 GR 70.

5. Seat shall be replaceable without removing valve from the pipeline.

6. Seats welded to or bolted to the cone shall not be acceptable.

7. Seat shall be made from nitronic 60.

F. Gate Requirements

1. The gate shall be used to control flow rate and pressure.

2. In the fully closed position, the gate shall provide shutoff with its downstream edge making contact with the metal seat ring on the cone.

3. In the fully open position, the gate shall be completely retracted in the upstream direction while the cone diverts the water flow into a radially discharging conical expanding spray.

4. Stroke length shall be determined by the valve manufacturer.

5. The gate shall be made from ASTM A-351 GR CF8, if centrifugally cast, or ASTM A-240 Type 304, if rolled plate.

6. Depending on valve size, gate shall be actuated by means of twin lever arms or twin screws. For the lever arm design, operation can be achieved by means of electric motor. For twin screw design, only electric motor operation is acceptable.

G. Hood Requirements

1. The hood shall be bolted to the cone.

2. The hood shall be removable without removal of valve from line.

3. Hoods that move as a result of valve position, direct welded to the cone or attached to gate shall not be acceptable.

4. Where possible the hood shall be designed with a 2:1 ratio (hood diameter to line diameter).

5. Hood shall be made from ASTM A-516 GR 70.

H. The cone valve shall be installed with the valve shaft orientation as shown on the plans. Lifting lugs shall be provided by the valve manufacturer.

I. The country of origin of all castings and an identifying serial number shall be stamped on a corrosion-resistant plate attached to the valve body.

J. All studs, bolts, washers, and nuts in contact with water shall be stainless steel type 304 or 316.

K. All materials of moving components in contact with each other shall be of dissimilar hardness to prevent galling.

L. Valve flanges shall be flat-faced, see 2.01-A of this Article.

M. See Section 40 – Coating, Lining, and Painting for coating requirements.

N. Valve actuator: Refer to Article 34.15 – Valve Actuators.

O. Cone valves shall be Henry Pratt Model 117 (SVE), or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Refer to Article 34.01 Valves and Actuators – General

3.02 QUALITY ASSURANCE

B. Refer to Article 34.01 Valves and Actuators – General

END OF ARTICLE

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ARTICLE 34.12
PRESSURE SURGE RELIEF VALVES SECTION 34

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to furnish and install pressure surge relief valves as shown on the Drawings and specified herein, including the following:

1. One 12-inch 90° angle body pressure surge relief valve, and miscellaneous items of work, including pilot system and associated components, as shown on the Drawings and as specified in these Specifications.

2. One 4-inch straight body pressure surge relief valve and miscellaneous items of work, including the pilot system and associated components, as shown on the Drawings and as specified in these Specifications.

B. The work of this section shall include the furnishing, installation, and testing of all pressure surge relief valve assemblies as specified herein, shown on the plans, and as required to make the pipeline operable and complete.

1.02 REFERENCES

A. Related Articles:

1. Section 32 – Piping
2. Article 34.01 – Valves and Actuator - General
3. Section 40 – Coating, Lining, and Painting

B. American Water Works Association (AWWA)

1. AWWA C 207 – Steel Pipe Flanges for Waterworks Service, Sizes 4-In Through 144-In

2. AWWA C 530 – Pilot-operated Control Valves

C. ASTM International (ASTM)

1. ASTM A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Application

D. American Society of Mechanical Engineers (ASME)

1. ASME Boiler and Pressure Vessel Code

2. ASME B16.1 – Pipe Flanges and Fittings Package

3. ASME B18.2.1 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)

1.03 SUBMITTALS

A. Refer to Article 34.01 Valves and Actuators - General

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

B. Refer to Article 21.01, Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pressure surge relief valves shall be flanged, full port, piston-style, and pilot-operated.

B. The opening speed of pressure surge relief valves shall be adjustable to facilitate stable operation.

C. Pressure surge relief valves shall withstand a maximum instantaneous flow velocity of 45ft/sec through the valve seat.

D. The lay length of all pressure surge relief valves shall be field verified prior to procurement.

E. The country of origin of all castings and an identifying serial number shall be stamped on a corrosion-resistant plate attached to the valve body.

F. All studs, bolts, washers, and nuts in contact with water shall be stainless steel type 304 or 316.

G. See Section 40 – Coating, Lining, and Painting for coating requirements.

H. Flanges shall be fully flat-faced and the flange class shall be as shown in the Drawings and as specified in these specifications

I. Pressure surge relief shall be the following models with optional materials as specified, or equal:

1. CLA-VAL Company Model No. 50-01, Pressure Relief/Sustaining Control Valve, as manufactured by Cla-Val Company, Newport Beach, CA 92659

2. Zurn Wilkins Model ZW205 Pilot Operated Pressure Relief / Pressure Sustaining Valve, as manufactured by Zurn Industries, LLC | Wilkins, Paso Robles, CA 93446

PART 3 EXECUTION

3.01 INSTALLATION

A. Refer to Article 34.01 Valves and Actuators – General

3.02 QUALITY ASSURANCE

A. Refer to Article 34.01 Valves and Actuators – General

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to furnish and install all air valves and appurtenances shown on the plans and specified herein. The Contractor is referred to Article 14.07 – District Furnished Material and Equipment

B. The work of this section shall include the furnishing, installation, and testing of air valves as specified herein, shown on the plans, and as required to make the pipeline operable and complete.

C. Combination air release valve assemblies shall consist of the specified size, gaskets, bolts, nuts, fittings, braces, extensions, and piping as shown on the Drawings and as specified in these Specifications

1.02 REFERENCES

A. Related Articles

1. Section 32 – Piping
2. Article 34.01 – Valves and Actuators - General
3. Section 40 – Coating, Lining, and Painting

B. American Water Works Association (AWWA)

1. AWWA C 203 – Standard for Coal-Tar Protective Coatings and Linings for Steel Water Pipelines – Enamel and Tape – Hot Applied

2. AWWA C 213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings

3. C 512 – Air Release, Air/Vacuum, and Combination Air Valves for Water and Wastewater Service

4. AWWA C 550 – Protective Interior Coatings for Valves and Hydrants

C. ASTM International (ASTM)

1. ASTM A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

D. American Society of Mechanical Engineers (ASME)

1. ASME B18.2.1 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)

1.03 SUBMITTALS

A. Refer to Article 34.01 Valves and Actuators - General

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Air Release Valves and Air Vacuum Valves

1. All air release valves, air/vacuum valves, and combination air release valves shall conform to the applicable portions of AWWA Standard C512, unless otherwise specified.

2. Valve body, cover, and baffle material shall be constructed of ASTM A536, Grade 65-45-12 ductile iron.

3. All internal components, trim and hardware of the air release valves, air vacuum valves, and combination release air valves shall be constructed Type 316 stainless steel. Non-metallic floats, linkage, or bushings are not acceptable.

4. Valve seats, cushions, and orifice button for air release valves shall be Buna-N rubber.

5. Valve ends shall be flat-faced flanged. Refer to Article 34.01 Valves and Actuators – General

6. Dual-body Assemblies:

a. For dual-body assemblies, air/vacuum valve outlets shall be hooded and screened.

(1) Outlet screen shall be stainless steel.

b. For dual-body assemblies, air release valves shall have a 2” NPT threaded Inlet and 1” NPT threaded, hooded and screened outlet.

c. For dual-body assemblies, pipe and ball valve connecting the air release valve to the air vacuum valve shall be similar material to the body of the air vacuum and air release valve.

7. Plug attached to air valves shall be installed only hand tight

8. See Section 40 – Coating, Lining, and Painting for lining and coating requirements

9. Manufacturer shall have a quality management system that is certified to ISO 9001 by an accredited, certifying body.

10. Combination air release valves and air release valves shall be capable of withstanding the design pressure of the pipeline system.

11. Mesh intake screen shall be provided in the hood assembly. Combination air release valves shall be of the size shown on the Drawings.

12. The rate of air release shall be adjusted as required to avoid water hammer conditions in piping it serves.

13. All air and air/vacuum release valve outlets shall be connected to vent piping as shown on the Drawings and specified herein.

14. Air release valves shall be Val-Matic Series 45 Air Release Valve – SuperValve or equal.

15. Air/vacuum valves shall be Val-Matic Series 100S Air/Vacuum Valve – SuperValve or equal.

16. Single body combination air valves shall be Val-Matic Series 200C – Single Body SuperValve or equal.

B. Vacuum Breaker Valves:

1. Valves shall be of the size, body style, and class as shown in the Drawings and as specified in these Specifications.

2. The valve body shall be constructed of ASTM A536 Grade 65-45-12 ductile iron.

3. Trim material shall be constructed of stainless steel.

4. The vacuum breaker valve shall incorporate a center guided, spring-loaded disc with rapid linear opening to automatically admit large quantities of air to enter a system on negative pressure.

5. The compression spring shall be Type 316 stainless steel with ground ends. The spring shall be designed to withstand 100,000 cycles without

failure and provide cracking power of 0.25 psi (1.7 kPa) and to fully open at a pressure differential of 2 psi (14 kPa).

6. The orifice, float and linkage mechanism shall be constructed of Type 316 stainless steel. Non-metallic floats or linkage mechanisms are not acceptable.

7. The orifice button shall be Buna-N.

8. See Section 40 – Coating, Lining, and Painting for lining and coating requirements

9. Vacuum breakers shall be hooded and screened.

10. Outlet screen shall be stainless steel

11. Air release valve attached to vacuum breaker shall conform to specifications specified herein.

12. Manufacturer shall have a quality management system that is certified to ISO 9001 by an accredited, certifying body.

13. Vacuum breaker valve shall be Val-Matic Series 1800VB or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Refer to Article 34.01 Valves and Actuators – General

3.02 QUALITY ASSURANCE

A. Refer to Article 34.01 Valves and Actuators – General

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to furnish and install all valves actuators shown on the Drawings and specified herein. The Contractor is referred to Article 14.07 – District Furnished Material and Equipment.

B. The work of this section shall include the furnishing, installation, and testing of all valve actuators as specified herein, shown on the plans, and as required to make the pipeline operable and complete.

C. The Contractor shall furnish and install manual operators with handwheels or valve stem extensions, valve stem extension sleeves, valve stem extension support brackets, valve boxes and covers for all butterfly and gate valves as shown on the Drawings.

D. Input Power Requirements:

TABLE 34.15-1
Input Power Requirements for Motorized Valves on Central Pipeline

Proposed Valve	Station	Site	Input Power	Close Time (Seconds)
12" Butterfly Valve	154+85.00	Coyote Turnout, Blowoff	240V, 3Ø, 60hz	40
66" Butterfly Valve (Guadalupe Isolation Valve)	273+24.00	Guadalupe Line Valve	240V, 3Ø, 60hz	1754
24" Butterfly Valve (West Bypass Valve)	273+24.00	Guadalupe Line Valve	240V, 3Ø, 60hz	49
24" Butterfly Valve (East Bypass Valve)	273+24.00	Guadalupe Line Valve	240V, 3Ø, 60hz	49
24" Butterfly Valve (Blowoff Valve)	273+24.00	Guadalupe Line Valve	240V, 3Ø, 60hz	49
12" Butterfly Valve	523+70.00	Lower Los Gatos Turnout	240V, 3Ø, 60hz	40
18" Sleeve Valve	646+00.00	Page Turnout	240V, 3Ø, 60hz	700
14" Cone Valve	656+58.50	Kirk Ditch Turnout	240V, 3Ø, 60hz	1500
30" Cone Valve	666+47.00	Vasona Valveyard	208V, 3Ø, 60hz	2400

1.02 REFERENCES

A. Related Articles:

1. Section 32 – Piping
2. Article 34.01 – Valves and Actuators - General
3. Article 34.02 – Butterfly Valves
4. Article 34.05 – Gate Valves
5. Article 34.10 – Sleeve Valves
6. Article 34.11 – Cone Valves

B. American Water Works Association (AWWA)

1. AWWA C 504 – Rubber-Seated Butterfly Valves

2. AWWA C 509 – Resilient-Seated Gate Valves for Water Supply Services

3. AWWA C 515 – Standard for Reduced-Wall, Resilient Seated Gate Valves for Water Supply Service

4. AWWA C 540 – Power-Actuating Devices for Valves and Sluice Gates

5. AWWA C 542 – Electric Motor Actuators for Valves and Slide Gates

C. ASTM International (ASTM)

1. ASTM A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

2. ASTM A 276 – Standard Specification for Stainless Steel Bars and Shapes

3. ASTM A 564 – Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless-Steel Bars and Shapes

D. American Society of Mechanical Engineers (ASME)

1. ASME B18.2.1 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series)

1.03 SUBMITTALS

A. Refer to Article 34.01 Valves and Actuators - General

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental

and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Butterfly Valves

1. Manual Actuator for Butterfly Valves

a. Vendor shall provide a traveling nut type manual actuator for the applicable butterfly valves shown on the Drawings and specified herein. The actuator shall be from the same manufacturer as the valve.

b. The actuator shall meet AWWA C504 and be for buried service.

c. Vault service actuators shall have a position indicator on the actuator. A permanent label shall be provided on the actuator listing the maximum number of turns from full open to full close.

d. For the buried service actuator, a base to align the soil pipe over the AWWA 2” key shall be provided.

e. The actuator housing shall be grease-packed and sealed.

f. Manual actuators shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering and have stops in the open/close position.

g. Actuators shall be equipped with mechanical stop-limiting devices to prevent over-travel of the disc in the open and closed positions.

h. Valves shall open by turning the handwheel or square nut in a counterclockwise rotation.

i. Actuators shall be fully enclosed and designed to produce the required torque with a maximum input torque of 150 ft-lbs on the 2” key or 80-lbs on the hand wheel. Actuator components shall withstand an input torque of 450 ft-lbs at extreme actuator position without damage.

j. The actuator shall be mounted directly to the valve.

k. See Section 40 – Coating, Lining, and Painting for coating and painting requirements

l. Manual actuators shall be factory mounted, tested, and adjusted on the valve for which it is supplied.

m. Manual actuators for Henry Pratt Valves shall be Pratt MDT or equal and manual actuators for Mueller Valves shall be Mueller MTD or equal.

2. Electric Actuator for Butterfly Valves

a. Contractor shall provide an electric motor actuator and gearbox for the applicable butterfly valves as shown on the Drawings and specified herein. Electric Valve actuators shall be Limitorque MX series with Limitorque PTA series gearbox for 3-phase, 60hz electrical service.

b. The actuator and gearbox shall meet AWWA C540 and AWWA C542 except that closure time shall be as specified in Table 34.15-1.

c. The actuator shall be suitable for use on the nominal power supply as shown in the Drawings and specified herein.

(1) See Table 34.15-1 for input power requirements

d. The actuator and gearbox shall be rated for Modulating service.

e. The actuator and gearbox shall be sized for the maximum operating conditions allowed for the valve.

(1) Class 150B Valves: 0 to 150 psi at 16 feet per second.
(2) Class 250B Valves: 0 to 250 psi at 16 feet per second.

f. The actuator and gearbox shall operate the valve from full open to full close in the time shown in the Drawings and as specified herein, within a -5% to +25% range. See Table 34.15-1 for closure times.

g. The actuator shall be equipped with the Solid State Motor Reverser (SSMR) option.

h. Unless otherwise specified, actuator motors shall have a duty rating of 30 minutes.

i. A permanent label shall be provided in the area of the hand wheel listing the maximum number of turns from full open to full close.

j. The actuator shall be activated and ready for use with:

(1) Bluetooth Communication
(2) MX Quik (Lost Power Buffer)
(3) Analog Position Transmitter
(4) Modutronic

k. Electric actuator and gearbox shall be factory mounted, tested, and adjusted on the valve for which it is supplied. Mounting and testing of the complete valve and actuator assembly shall be performed by one of the following:

(1) The valve manufacturer.

(2) The actuator manufacturer.

(3) An authorized distributor and service facility for the valve having at least 5 years' experience in the servicing of the equipment furnished.

(4) An authorized distributor and service facility for the actuator having at least 5 years' experience in the servicing of the equipment furnished.

l. The actuator shall have stainless steel plate stamped with actuator data including type, serial number, brand, and equipment record number.

m. The Vendor shall provide two (2) days per electric actuator of start-up assistance from an approved field service representative from the valve actuator manufacturer. The District shall provide a 5-calendar day notice to the vendor that the representative is needed.

B. Gate Valve Actuators

1. Valves shall be equipped with an enclosed miter gear, mounted parallel to the waterway.

2. Valve type shall be NRS (non-rising stem).

3. The operating nut shall be 2" square and shall be constructed of ductile iron fitted to a square tapered stem to help ensure even valve operating input torque.

4. Valves shall be equipped with a square nut operator and hand wheel as indicated in the Drawings and the Specifications. Valves shall be provided with an AWWA 2" square operating nut. The bolt that attaches the operating nut to the stem shall be recessed into the operating nut so as not to interfere with valve wrench operation. The aforementioned bolt shall be stainless steel.

5. Valve stems shall be made of stainless steel Type 316. The stem material shall provide a minimum 73,000psi tensile strength, yield strength of 48,000psi and 8% minimum elongation.

6. Valves shall open by turning the handwheel or square nut in a counterclockwise rotation.

7. Vault service actuators shall have a position indicator on the actuator. A permanent label shall be provided on the actuator listing the maximum number of turns from full open to full close.

C. Sleeve Valve Electric Actuator

1. The Contractor shall store the electric valve actuator in a dry location prior to installation.

2. The electric valve actuator heater shall be permanently energized by the Contractor immediately following actuator installation.

3. The electric valve actuator manufacturer shall certify installation and operation of the electric valve actuator prior to District acceptance.

4. General Sleeve Valve Electric Actuator

a. The actuator and gearbox shall meet AWWA C540 and AWWA C542 except that closure time and handwheel rim pull shall be as specified. See Table 34.15-1.

b. Control circuit voltage shall be 120 VAC ±10 percent, ground referenced and shall be supplied from an integral control transformer.

c. See Table 34.15-1 for input power requirements

d. Motor construction shall incorporate use of stator and rotor as independent components from the valve actuator such that failure of either item shall not require actuator disassembly or power gearing replacement.

e. The following features shall be provided:

(1) High starting torque motor, reversible, with minimum Class F insulation

(2) Overload relays for AC motors, overload relay devices for DC motors

(3) Two thermal contacts imbedded in AC motor windings to offer maximum thermal protection

(4) Integral motor reverser

(5) Close-coupled nonfused disconnect

(6) Integral weatherproof open-stop-close control station

(7) Integral weatherproof indicator lights:

(a) When Red – Fully Open

(b) When Green – Fully Closed

(c) When Red and Green – Mid-travel, or, a third color may be used to indicate mid-travel

(8) Integral Local/Remote/Off switch

(a) When “Local” – All remote commands are disabled

(b) When “Remote” – Local Open and Close are disabled

(c) When “Off” – Local and Remote Open and Close are disabled

(9) Eight (8) independently adjustable single-pole, double-throw limit switches for remote indication. One switch to close on valve fully open, one switch to close on valve fully closed, and six switches for spares.

(10) Monitor relay with normally open contact to energize when valve is in “remote” and control power is available

(11) Screw or lug type carrier terminal block for all field connections. These terminals shall be clearly identified to correspond to the wiring diagram

(12) Space heater in all electrical enclosures and the motor compartment

(13) Mechanical dial position indicator

(14) A minimum of 24 points on the terminal block

(15) 1000 ohm, 1 percent linearity, position-indicating potentiometer

5. Sleeve Valve Electric Actuator Ratings

a. See Table 34.15-1 for actuator requirements

6. Modulating Service Sleeve Valve Electric Actuator

a. The motor shall be rated for continuous modulating service.

b. The actuator shall contain an integral positioner capable of employing a 4-20 mA input valve position command (setpoint) signal.

c. The actuator shall automatically adjust the position of the valve when the error in the comparison of setpoint to feedback is greater than the preset or field modified deadband of the positioner.

d. The actuator modulating control package shall include a solid-state comparator and an internal feedback potentiometer.

e. The following comparator board control adjustments shall be provided:

(1) Span and zero for position feedback potentiometer calibration

(2) Gain to set motor pulsing initiation point

(3) Deadband (±0.5 - ±10 percent) to determine sensitivity

f. The control package shall include the following feature:

(1) Lock-In-Last Position designed to maintain the last valve position in the event of control signal loss

(2) The motor reversing device shall be solid state and shall be incorporated on the comparator board

7. Electric Valve Actuator Mechanical and Electrical Devices

a. Gear Limit Switches

(1) Position limit switches and associated gearing shall be an integral part of the electric valve actuator

(2) Limit switch gearing shall be of the “counting” intermittent type, made of stainless steel, grease lubricated, and enclosed in its own gear case to prevent foreign matter from entering the gear train

(3) Switches shall be independently adjustable, allowing for trip points from fully open to fully closed positions of valve travel

(4) Switches shall not be subject to breakage or slippage due to over travel

(5) Travel nuts, cams, or microswitch tripping mechanisms shall not be used

(6) Limit switches shall be of the heavy duty, open contact type with rotary wiping action

b. Torque Switches

(1) The electric valve actuator shall be equipped with a torque switch which is responsive to loads encountered in both the opening and closing direction

(2) Each side of the switch shall have a graduated dial and shall be adjustable

(3) A calibration tag shall be mounted near each switch correlating the dial setting with the unit output torque

(4) Microswitch elements or devices relying on coil springs shall not be used in the torque switch

c. Gearing

(1) The electric valve actuator shall be a double reduction unit consisting of spur or helical gears and worm gearing. The spur or helical gearing shall be of hardened alloy steel and the worm gear shall be alloy bronze

(2) All power gearing shall be grease lubricated

(3) Ball or roller bearings shall be used throughout

(4) Nonmetallic, aluminum or cast gearing shall not be allowed

d. Manual Operation

(1) A handwheel for manual operation of the electrical valve actuator

(2) It shall not be possible for the unit to be simultaneously in manual and motor operation

(3) The handwheel shall not rotate during motor operation

(4) A fused motor shall not prevent manual operation

(5) When in manual operating position, the unit shall remain in this position until the motor in energized

(6) No external pin or locking device shall be required to hold the declutch mechanism in manual operation nor shall any such device require removal to enable motor operation

(7) The actuator shall automatically return to electric operation when the motor is energized

(8) Movement from motor operation to handwheel operation is accomplished by a positive declutching lever which disengages the motor and related gearing operation is accomplished by a positive declutching lever which disengages the motor and related gearing mechanically but not electrically

(9) Where necessary, additive gearing shall be used to limit the required force on the rim of the handwheel to 40 pounds maximum when manually closing or opening the valve against full differential pressure

e. Motor

(1) The electric valve actuator motor shall be specifically designed for valve actuator service and shall be of high starting torque

(2) The motor shall be enclosed in a nonventilated enclosure that is, at a minimum, rated NEMA IV

(3) The motor shall be of sufficient size to open or close the valve at the maximum required torque

(4) The motor shall be capable of operating at ±10 percent of specified voltage

(5) The motor duty rating shall be sufficient for one complete cycle (open-close-open, or reverse) without exceeding its temperature rating

(6) Motor bearings shall be of the anti-friction type and permanently lubricated

(7) The motor shall be an independent subassembly such that the power gearing shall not be an integral part of the motor assembly to allow for motor or gear changes dictated by system operation requirements

8. Electric actuator and gearbox shall be factory mounted, tested, and adjusted on the valve for which it is supplied. Mounting and testing of the complete valve and actuator assembly shall be performed by one of the following:

a. The valve manufacturer.

b. The actuator manufacturer.

c. An authorized distributor and service facility for the valve having at least 5 years' experience in the servicing of the equipment furnished.

d. An authorized distributor and service facility for the actuator having at least 5 years' experience in the servicing of the equipment furnished.

9. The actuator shall have stainless steel plate stamped with actuator data including type, serial number, brand, and equipment record number.

10. The Vendor shall provide two (2) days per electric actuator of start-up assistance from an approved field service representative from the valve actuator manufacturer. The District shall provide a 5-calendar day notice to the vendor that the representative is needed.

D. Cone Valve Actuators

1. Supplier shall provide electric motor actuators and gearboxes for the cone valve as specified. Electric Valve actuators shall be a Limitorque valve control, or equal, for 3-phase 60 Hz electrical service.

2. See Table 34.15-1 for input power requirements

3. Electric actuator shall be mounted on a fabricated steel stand with geared manual override and limit switch in one waterproof assembly.

4. The operator shall be single speed and designed to close from full open in not less than the times required in Table 34.15-1. Opening rates shall be the same as closing rates of speed.

5. The power operator mechanism controls shall be arranged for the following operations:

a. Automatic stopping of the valve motor by torque limit control when the valve is tightly seated in the closed position or in the event an obstruction lodges in the valve opening during closure or opening.

b. Automatic stopping, by limit switch, of the valve motor when the valve reaches the full open position.

c. The handwheel shall be mechanically or electrically interlocked with the power operator so that the manual control does not operate when the electric control is operating and so that the electric control neither can nor does operate when the valve is being manually operated.

d. Limit switch to make the “close” control ineffective after the valve gate is seated in the closed position.

e. Control shall permit stopping and reversing travel at any position between full-open and full-closed position.

f. No lost motion device is to be provided in the valve operator.

g. The effort required on the handwheel to operate the valve shall not exceed 40 pounds and shall be geared so as to prevent closure in less than times required in Table 34.15-1

6. The actuator and gearbox shall conform to AWWA C540. Motor operators shall include electric motor, reductive gearing, gear case, torque and limit switches, space heaters, shop wiring, push button control, indicator lights, starter package and all other appurtenances as required for a complete operator unit.

7. The actuator and gearbox shall be sized for the maximum operating conditions of the cone valve.

8. The actuator shall be capable of functioning in an ambient temperature ranging from -33°C (22°F) to 70°C (140°F).

9. The actuator shall have stainless steel plate stamped with actuator data including type, serial number, brand, and equipment record number.

10. The actuator shall be activated and ready for use with:

    a. Bluetooth Communication
    b. MX Quik (Lost Power Buffer)
    c. Analog Position Transmitter
    d. Modutronic

11. Electric actuator and gearbox shall be factory mounted, tested, and adjusted on the valve for which it is supplied. Mounting and testing of the complete valve and actuator assembly shall be performed by one of the following:

    a. The valve manufacturer.

    b. The actuator manufacturer.

    c. An authorized distributor and service facility for the valve having at least 5 years’ experience in the servicing of the equipment furnished.

d. An authorized distributor and service facility for the actuator having at least 5 years' experience in the servicing of the equipment furnished.

12. The actuator shall have stainless steel plate stamped with actuator data including type, serial number, brand, and equipment record number.

13. The Vendor shall provide two (2) days per electric actuator of start-up assistance from an approved field service representative from the valve actuator manufacturer. The District shall provide a 5-calendar day notice to the vendor that the representative is needed.

E. Local Controls

1. The actuator shall incorporate local controls for Open, Close and Stop and a Local/Stop/Remote mode selector switch lockable in any one of the following three positions: local control only, stop (no electrical operation), remote control plus local stop only.

2. The local controls shall be arranged so that the direction of valve travel can be reversed without the necessity of stopping the actuator.

F. The local controls and display shall be rotatable through increments of 90 degrees to suit valve and actuator orientation.

G. Remote Valve Position and Status Indication

1. Four contacts shall be provided which can be selected to indicate any position of the valve; Provision shall be made for the selection of a normally closed or open contact form.

2. Contacts shall maintain and update position indication during handwheel operation when all external power to the actuator is isolated.

3. The contacts shall be rated for 5mA to 5A, 120V AC, 30V DC.

4. Valve shall remain in current position during control or power disruption (fail in last position).

5. Open and close external interlocks shall be made available to inhibit local and remote valve opening / closing control. It shall be possible to configure the interlocks to be active in remote control only.

H. Remote Valve Position Control

1. Remote valve control signals shall be capable of using 120V AC or 24V DC inputs and suitable for any one or more of the following methods of control:

a. Open, Close, and Stop Control

b. Open and Close maintained or “push to run” (inching) control.

c. Overriding Emergency Shut-down to close (or open) valve from a normally closed or open contact.

d. Controls the valve when local-stop-remote is in REMOTE. OPEN and CLOSE inputs configurable between maintained (actuator runs until end of travel, high torque, or a STOP input) and momentary (actuator stops when command is removed).

2. Isolated inputs shall be capable of operating from external control voltage source or internal power supply: Furnish control power supplies within the actuator.

I. Local Position Indication

1. The actuator display shall include a dedicated numeric/symbol digital position indicator displaying valve position from fully open to fully close.

2. The actuator display shall be backlit to enhance contrast at all ambient light levels.

3. The actuator display shall include a fully configurable dot-matrix display element with a minimum pixel resolution of 168 x 132 to display operational, alarm, configuration and graphical datalogger information. Datalogger graphical displays should as a minimum be able to display log and trend graphs on the local LCD for the following:

   a. Torque versus Position
   b. Number of Starts versus Position
   c. Number of starts per hour
   d. Dwell Time
   e. Average temperature

4. The actuator main display shall be capable of indicating 4 different home-screens of the following configuration:

   a. Position and status
   b. Position and torque (analogue)
   c. Position and torque (digital)
   d. Position and demand (positioning)

PART 3 EXECUTION

3.01 INSTALLATION

A. Refer to Article 34.01 Valves and Actuators - General

3.02 QUALITY ASSURANCE

A. Refer to Article 34.01 Valves and Actuators - General

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The work specified in this Article includes designing, fabricating, furnishing, delivering, and installing metal fabrications and associated components as shown on the Drawings and as specified herein.

B. Metal fabrications shall include, but is not limited to;

1. Aluminum grating stair tread
2. Aluminum stair nosing
3. Concrete inserts
4. Handrails and guardrails
5. Ladders
6. Metal gratings
7. Metal tread plate
8. Preformed channel pipe supports
9. Stairs
10. Miscellaneous metals
11. Associated accessories to the above items

1.02 RELATED REQUIREMENTS

A. State of California, Department of Transportation (Caltrans) Standard Specifications, Most Recent Edition

B. American Association of State Highway and Transportation Officials (AASHTO):

1. Standard Specifications for Highway Bridges.

C. American Concrete Institute (ACI):

1. ACI 355.2 – Qualification of Post Installed Mechanical Anchors in Concrete.

2. ACI 355.4 – Qualification of Post Installed Adhesive Anchors in Concrete.

D. American Institute of Steel Construction:

1. Manual of Steel Construction - Allowable Stress Design

E. Aluminum Association (AA):

1. DAF-45: Designations from Start to Finish:

a. M12-C22-A41.

F. ASTM International (ASTM):

1. ASTM-A6 - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.

2. A 36 - Standard Specification for Carbon Structural Steel.

3. A 48 - Standard Specification for Gray Iron Castings.

4. A 53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded, and Seamless.

5. A 108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.

6. A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

7. A 153 - Standard Specification Zinc Coating (Hot-Dip) on Iron and SteelHardware.

8. A 167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

9. A 193 - Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and other Special Purpose Applications.

10. A 194 - Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.

11. A 276 - Standard Specification for Stainless Steel Bars and Shapes.

12. A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

13. A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

14. A 380 - Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.

15. A 384 Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.

16. A 489 - Standard Specification for Carbon Steel Lifting Eyes.

17. A 490 - Standard Specification for Structural Bolts, Alloy Steel, Heat-Treated, 150 ksi Minimum Tensile Strength.

18. A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

19. A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

20. A 563 - Standard Specification for Carbon and Alloy Steel Nuts.

21. A 575 - Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades.

22. A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

23. A 786 - Standard Specification for Hot-Rolled Carbon, Low Alloy, HighStrength Low Alloy and Alloy Steel Floor Plates.

24. A 992 - Standard Specification for Structural Steel Shapes.

25. A 1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength Low Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened, Bake Hardenable.

26. A 1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled Carbon, Structural, High Strength Low Alloy and Ultra-High Strength, and High Strength Low Alloy with Improved Formability

27. B 98 - Standard Specification for Copper-Silicon Alloy Rod, Bar, and Shapes.

28. B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

29. B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.

30. B 308 - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.

31. B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

32. B 695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.

33. C 633 – Standard Test Method for Adhesion or Cohesion Strength of Thermal Spray Coatings.

34. E 140 – Hardness Conversion Tables for Metals

35. E 384 – Micro Hardness of Materials

36. F 593 – Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs

37. F 594 – Standard Specification for Stainless Steel Nuts

38. F 1554 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

39. F 593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.

G. American Welding Society (AWS):

1. A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

2. ANSI/AWS D1.1- Structural Welding Code - Steel.

3. ANSI/AWS D1.2 - Structural Welding Code - Aluminum.

4. ANSI/AWS QC1 - Qualification and Certification of Welding Inspectors.

H. National Fire Protection Association (NAFP):

1. NFPA 101 - Life Safety Code.

I. National Association of Architectural Metal Manufacturers (NAAMM):

1. Metal Finishes Manual.
2. Metal Stairs Manual.

J. National Association of Corrosion Engineers (NACE)

1. Coating Inspector Program (CIP)

K. Occupational Safety and Health Administration (OSHA).

L. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. All submittals shall be in accordance with the Standard Provisions.

B. Product Data:

1. Aluminum grating stair tread.
2. Aluminum stair nosing.

3. Handrail and guardrail.
4. Metal grating.

C. Shop drawings:

1. Shop Drawings - Shop drawings of all miscellaneous metalwork shall be submitted to the Engineer for review.

2. Handrails and guardrails:

   a. Including details on connection attachments, gates, kick plates, ladders, and angles.

   b. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size, and type of fasteners, and accessories.

   c. Include erection drawings, elevations, and details where applicable.

   d. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

3. Ladders.

4. Metal grating.

   a. Layout drawings for grating shall be submitted showing the direction of span, type and depth, size and shape of panels, seat angle details, and details of hold down fasteners. Load and deflection tables shall be submitted for each style and depth of grating used.

5. Metal tread plate.

6. Stairs.

7. Miscellaneous metals.

D. Quality control submittals:

1. Design data.

2. Test reports:

   a. Guardrails: 3 copies of certified tests performed by an independent testing laboratory certifying that guardrails meet current State and OSHA strength requirements.

b. Gratings:

(1) Grating manufacturers' calculations showing that gratings will meet specified design load, stress, and deflection requirements for each size grating for each span.

(2) Reports of tests performed.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

1.05 QUALITY ASSURANCE

A. The work of this Section shall be completely coordinated with the work of other Sections. Verify, at the site, both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.

B. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.

C. All welding shall be performed by qualified welders and shall conform to the applicable AWS welding code. Welding of steel shall conform to AWS D1.1 and welding of aluminum shall conform to AWS D1.2.

D. All welding procedures and welder qualifications shall be available in the Contractor's field office for Engineer's review.

E. All welding shall be inspected by a District provided inspector qualified in accordance with AWS requirements and approved by the Engineer.

F. Unless otherwise directed by the Engineer, the Contractor shall provide the services of an independent NACE certified coating inspector. The cost of such work, except as specifically stated otherwise, shall be paid by the Contractor. All shop applied coatings shall be inspected by an inspector, qualified in accordance with NACE requirements and approved by the Engineer.

G. Testing and inspection of concrete anchor installation shall be performed in accordance with Chapter 17 of the CBC.

H. On-site testing shall be paid for by the Contractor unless otherwise specified.

I. The Special Inspector shall keep a record of inspections and furnish inspection reports to the Engineer. The reports shall indicate that work inspected was performed in conformance with the Contract Documents. Discrepancies shall be

brought to the immediate attention of the Contractor for correction. A final report of inspections documenting required special inspections and correction of any discrepancies noted in the inspection reports shall be submitted periodically at a frequency agreed upon at the start of the work.

J. Testing shall be required as outlined below in addition to that specified in Chapter 17 of the 2010 California Building Code, unless specific testing requirements are provided in other Sections.

1. Anchors for Piping, Ducts, and Conduit. A minimum of 10% of the anchors installed in concrete shall be tested in tension for 160% of the allowable tension. Anchors that fail the test shall be removed and replaced. In addition, the testing shall be expanded to all anchors installed on the same day as the failed anchor by the same crew.

2. Anchors of Other Components and Nonstructural items. A minimum of 20% of the anchors installed in concrete shall be tested in tension for 160% of the allowable tension. Anchors that fail the test shall be removed and replaced. In addition, the testing shall be expanded to all anchors installed on the same day as the failed anchor by the same crew. Major pieces of equipment shall have a minimum of two anchor bolt tension tests.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver items to be incorporated into the work of other trades in sufficient time to be checked prior to installation.

B. Items damaged during transit, inadequate storage, improper handling, or corroded shall be repaired, at the Contractor's expense, to the satisfaction of the Engineer prior to incorporating them into the work.

1.07 PROJECT/SITE REQUIREMENTS

A. Field measurements shall be taken at the site, prior to fabrication of items, to verify or supplement indicated dimensions and to ensure proper fitting of all items.

PART 2 PRODUCTS

2.01 MATERIALS

A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

B. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance and manufacturer’s service.

C. General: Unless otherwise specified or indicated on the Drawings, structural and miscellaneous metals in accordance with the standards of the ASTM, including the following:

Item	ASTM Standard No.	Class, Grade Type or Alloy No.
Steel		
Galvanized sheet iron or steel	A 653	Coating G90
Coil (plate)	A 635	--
Structural plate, bars, rolled shapes, and miscellaneous items (except W shapes).	A 36	--
Rolled W shapes	A 992	Grade 50
Standard bolts, nuts, and washers	A 307	--
High strength bolts, nuts, and hardened flat washers	A 325 A 490	--
Eyebolts	A 489	Type 1
Tubing, cold-formed	A 500	--
Tubing, hot-formed	A 501	--
Steel pipe	A 53	Grade B
Stainless Steel		
Plate, sheet, and strip	A 240	Type 304* or 316**
Bars and shapes	A 276	Type 304* or 316**
Bolts (Type 304)	F593	Group 1 Condition CW
Bolts (Type 316)	F593	Group 2 Condition CW
Aluminum		
Flashing sheet aluminum	B 209	Alloy 5005-H14, 0.032 inches minimum thickness
Structural sheet aluminum-	B 209	Alloy 6061-T6
Structural aluminum	B 209 B 308	Alloy 6061-T6
Extruded aluminum	B 221	Alloy 6063-T42
* Use Type 304L if material will be welded. ** Use Type 316L if material will be welded.		

1. Stainless steels are designated by type or series defined by ASTM.
2. Where stainless steel is welded, use low-carbon stainless steel.

2.02 MANUFACTURED UNITS

A. Aluminum grating stair tread:

1. Manufacturers: One of the following or equal:

a. IKG Borden Industries, Aluminum Grating Stair Tread with Mebac nosing.

b. McNichols Co., Type A-Standard with Corrugated Angle Nosing.

2. Material: Welded aluminum grating tread with non-slip nosing and integral end plates for bolt on attachment to stair stringers.

3. Size:

a. Tread width: To equal tread spacing plus 1 inch minimum.

b. Tread length: Length to suit stringer-to-stringer dimension indicated on the Drawings.

c. Depth: 1-3/4 inches.

4. Bolts: Type 316 stainless steel.

B. Aluminum stair nosing:

1. Manufacturers: One of the following or equal:

a. Wooster Products, Inc., Type 101 Nosing.
b. American Safety Tread Co., Inc., Style 801 Nosing.

2. Material: Cast aluminum abrasive nosings with aluminum oxide granules integrally cast into metal, forming permanent, nonslip, long-wearing surface.

3. Configuration: 4 inches wide, fabricated with integrally cast stainless steel anchors at approximately 12-inch centers. Length to extend within 3 inches of stair edge on each side.

C. Handrails and guardrails:

1. General:

a. Design and fabricate assemblies to conform to current local, State, and OSHA standards and requirements.

b. Coordinate layout of assemblies and post spacings to avoid conflicts with equipment and equipment operators:

(1) Indicate on the shop drawings locations of such equipment.

(2) Highlight locations where railings cannot be made continuous, and obtain Engineer's directions on how to proceed before fabricating or installing railings.

2. Aluminum handrails and guardrails (nonwelded pipe):

a. Rails, posts, and fitting-assembly spacers:

(1) In accordance with ASTM B 429, 6005, 6063 or 6105, minimum Schedule 40, extruded aluminum pipe of minimum 1.89-inch outside diameter and 0.14-inch wall thickness.

b. Kick plates: 6061 or 6105 aluminum alloy.

c. Fastenings and fasteners: As recommended or furnished by the manufacturer.

d. Other parts: 6063 extruded aluminum, or F214 or F514.0 aluminum castings:

(1) Fabrications: In accordance with ASTM B 209 or ASTM B 221 extruded bars:

(a) Bases: 6061 or 6063 extruded aluminum alloy.

(2) Plug screws or blind rivets: Type 305 stainless steel:

(a) Other parts: Type 300 series stainless steel.

e. Finish of aluminum components:

(1) Anodized finish, 0.7 mil thick, applied to exposed surfaces after cutting. Aluminum Association Specification M12-C22-A41, mechanical finish non specular as fabricated, chemical finish-medium matte, anodic coating-clear Class I Architectural.

(2) Pretreat aluminum for cleaning and removing markings before anodizing.

f. Fabrication and assembly:

(1) Fabricate posts in single, unspliced pipe length.

(2) Perform without welding.

(3) Do not epoxy bond the parts.

(4) Maximum clear opening between assembled railing components as indicated on the Drawings.

g. Manufacturers: One of the following or equal:

(1) Moultrie Manufacturing Company, Wesrail.
(2) Golden Railings, Golden, CO, Riveted System.
(3) Craneveyor Corporation Enerco Metals, C-V Rail.

3. Fastenings and fasteners: As recommended or furnished by guardrail manufacturer for use with this system.

D. Ladders:

1. General:

a. Type: Safety type conforming to local, State, and OSHA standards as minimum. Furnish guards for ladder wells.

b. Size: 18 inches wide between side rails of length, size, shape, detail, and location indicated on the Drawings.

2. Aluminum ladders:

a. Materials: 6063-T5 aluminum alloy.

b. Rungs:

(1) 1-inch minimum solid square bar with 1/8-inch grooves in top and deeply serrated on all sides.

(2) Capable of withstanding 300 load without failure.

c. Side rails: Minimum 4-inch by 1/2-inch flat bars.

d. Finish of aluminum components:

(1) Anodized finish, 0.7 mil thick, applied to exposed surfaces after cutting. Aluminum Association Specification M12-C22-A41, mechanical finish non specular as fabricated, chemical finish-medium matte, anodic coating-clear Class I Architectural.

(2) Pretreat aluminum for cleaning and removing markings before anodizing.

e. Fabrication:

(1) Welded construction, of size, shape, location, and details indicated on the Drawings.

(2) For ladders over 20 feet high, furnish standard ladder cages or fall prevention system designed in accordance with State and OSHA requirements.

E. Metal gratings:

1. General: Metal grating shall be of the design, sizes and types indicated. Grating shall be completely banded at all edges and cutouts using material and cross section equivalent to the bearing bars. Such banding shall be welded to each cut bearing bar. Support members shall support grating on all sides of an opening. Where grating is supported on concrete, embedded support angles matching grating material shall be used on all sides, unless shown otherwise. Such angles shall be mitered and welded at corners.

2. All pieces of grating shall be securely fastened in two locations to each support. Grating clips, fasteners, anchors, bolts, nuts, and washers for grating and supports shall be Type 304 or Type 316 stainless steel.

3. Where grating forms the landing at the top of a stairway, the edge of the grating, which forms the top riser, shall have an integral non-slip nosing, width equal to that of the stairway.

4. Where grating depth is not given, grating shall be provided which will be within allowable stress levels, and which shall not exceed a deflection of 1/4 inch or the span divided by 180, whichever is less. For standard duty and safety grating, the loading to be used for determining stresses and deflections shall be the uniform live load of the adjacent floor or 100-psf, whichever is greater or a concentrated load of 1000 pounds. For heavy duty grating, the loading used for determining stresses and deflections shall be AASHTO HS- 20.

5. At a minimum, grating bars shall be I-bar configuration and be spaced at 1-3/16-inches on center. Crossbars shall be spaced at 4-inches on center, unless otherwise noted.

6. Grating cross bars shall be attached to the bearing bars with interlocked swaged joints having no exposed welding.

7. Openings 2-inch or greater in diameter/dimension and grating edges shall be banded with a bar of the same depth and thickness as the bearing bars. Cut bearing or cross bars shall be welded to the banding bar.

8. Unless otherwise designated by the Engineer, the maximum weight of each grating section shall be 80-pounds.

9. General:

   a. Fabricate grating to cover areas indicated on the Drawings.

   b. Unless otherwise indicated on the Drawings, grating over an opening shall cover entire opening.

   c. Make cutouts in grating where required for equipment access or protrusion, including valve operators or stems, and gate frames.

   d. Band ends of grating and edges of cutouts in grating:

      (1) End banding: 1/4 inch less than height of grating, with top of grating and top edge of banding flush.

      (2) Cutout banding: Full-height of grating.

      (3) Use banding of same material as grating.

      (4) Panel layout: Enable installation and subsequent removal of grating around protrusions or piping.

      (5) Openings 6 inches and larger: Lay out grating panels with edges of 2 adjacent panels located on centerline of opening.

      (6) Openings smaller than 6 inches: Locate opening at edge of single panel.

      (7) Where an area requires more than 1 grating section to cover area, clamp adjacent grating sections together at 1/4-points with fasteners acceptable to Engineer.

      (8) Fabricate steel grating sections in units weighing not more than 50 pounds each.

      (9) Fabricate aluminum grating sections in units of weighing not more than 50 pounds each.

   e. When requested by Engineer, test 1 section of each size grating for each span length involved on the job under full load:

      (1) Furnish a suitable dial gauge for measuring deflections.

   f. Grating shall be aluminum, unless otherwise specified or indicated on the Drawings.

10. Aluminum grating:

    a. Material for gratings, shelf angles, and rebates: 6061-T6 or 6063-T6 aluminum alloy, except crossbars may be 6063-T5 aluminum alloy.

    b. Shelf angle concrete anchors: Type 304 or Type 316 stainless steel.

    c. Grating rebate rod anchors: 6061-T6 or 6063-T6 aluminum alloy.

    d. Bar size and spacing: As determined by manufacturer to enable grating to support design load.

    e. Design live load: A minimum of 100 pounds per square foot uniform live load on entire grating area, but not less than the live load indicated on the Drawings for the area where grating is located.

    f. Maximum fiber stress for design load: 12,000 pounds per square inch.

    g. Maximum deflection due to design load: 1/240 of grating clear span.

    h. Maximum spacing of main grating bars: 1-1/8 inches clear between bars.

    i. Minimum grating height: 1-1/2 inches.

    j. Manufacturers: One of the following or equal:

        (1) IKG Borden Industries, grooved aluminum I-bar.
        (2) Brodhead Steel Products, Inc., grooved aluminum I-bar.

11. Aluminum grating planks:

    a. Materials: Meet requirements previously specified for aluminum grating.

    b. Fabrication:

        (1) Meet requirements previously specified for aluminum grating.

    c. Have unpunched surface with cross hatched anti-skid surface.

    d. Minimum weight of 3-1/4 pounds per square foot.

e. Provide 1 inch diameter hole with smooth edges at each end for each plank.

f. Furnish planks in 2 foot widths.

g. Manufacturers: One of the following or equal:

(1) IKG, Heavy Duty Aluminum Plank Grating HD-P.

h. Planks shall not lock with adjacent planks allowing the removal of individual planks without disturbing the adjacent planks.

12. Steel gratings:

a. Hot-dip galvanized in accordance with ASTM A 123.

b. Bar size and spacing: As determined by the manufacturer to support design load.

c. Design live load: A minimum of 100 pounds per square foot uniform live load on the entire area of the grating area, but not less than the live load indicated on the Drawings for the area where the grating is located.

d. Maximum fiber stress for design load: 18,000 pounds per square inch.

e. Maximum deflection under design load: 1/240 of grating clear span.

f. Bar spacing: Maximum of 1-1/8 inches clear between bars.

g. Manufacturers: One of the following or equal:

(1) IKG Borden Industries, IKG Weldforged.
(2) Brodhead Steel Products, Inc., Type 19 W 4.

13. Heavy-duty steel grating:

a. Heavy-duty type, fabricated from structural steel and designed in accordance with AASHTO Standard Specifications for Highway Bridges, using H-20 loading.

b. Hot-dip galvanized after fabrication in accordance with ASTM A 123.

c. Manufacturers: One of the following or equal:

(1) Reliance Steel Products Company, Heavy-Duty Steel Grating.

(2) Seidelhuber Metal Products, Inc., equivalent product.

F. Metal tread plate:

1. Plate having a raised figured pattern on 1 surface to provide improved traction.

G. Miscellaneous aluminum:

1. Fabricate aluminum products, not covered separately in this Section, in accordance with the best practices of the trade and field assemble by riveting or bolting.

2. Do not weld or flame cut.

3. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitively shown or specified.

4. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Welding shall be on the unexposed side as much as possible in order to prevent pitting or discoloration of the aluminum-exposed surface. Provide holes for temporary field connections and for attachment of the work of other trades.

5. Miscellaneous aluminum items shall include: beams, angles, posts, closure angles, grates, floor plates, stop plates, stair nosing, and any other miscellaneous aluminum called for on the Drawings and not otherwise specified.

6. Angle frames for hatches, beams, grates, etc., shall be complete with welded strap anchors attached.

7. Stair treads for aluminum stairs shall have abrasive non-slip nosing as approved.

H. Miscellaneous stainless steel:

1. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitively shown or specified.

2. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Provide holes for temporary field connections and for attachment of the work of other trades.

3. Miscellaneous stainless steel items shall include: beams, angles, bar racks and any other miscellaneous stainless steel called for on the

   Drawings and not otherwise specified.

4. Provide miscellaneous stainless steel items not specified in this Section as indicated on the Drawings or specified elsewhere:

   a. Fabricate and install in accordance with the best practices of the trade.

5. Cleaning and passivation:

   a. Following shop fabrication of stainless steel members, clean and passivate fabrications.

   b. Finish requirements: Remove free iron, heat tint oxides, weld scale and other impurities, and obtain a passive finished surface.

   c. Provide quality control testing to verify effectiveness of cleaning agents and procedures and to confirm that finished surfaces are clean and passivated:

      (1) Conduct sample runs using test specimens with proposed cleaning agents and procedures as required to avoid adverse effects on surface finishes and base materials.

   d. Pre-clean, chemically descale (pickle), and final clean fabrications in accordance with the requirements of ASTM A 380 to remove deposited contaminants before shipping:

(1) Passivation by citric acid treatment is not allowed:

(a) If degreasing is required before cleaning to remove scale or iron oxide, cleaning (pickling) treatments with citric acid are permissible; however, these treatments shall be followed by inorganic cleaners such as nitric-hydrofluoric acid.

(2) Provide acid descaling (pickling) in accordance with Table A1.1 of Annex A1 of ASTM A 380.

(3) After pickling, final cleaning of stainless steel shall conform to Part II of Table A2.1 of Annex A2 of ASTM A 380.

e. After cleaning, inspect using methods specified for “gross inspection” in ASTM A 380.

f. Improperly or poorly cleaned and passivated materials shall not be shipped and will not be accepted at the job site.

I. Miscellaneous structural steel:

1. Provide miscellaneous steel items not specified in this Section as indicated on the Drawings or specified elsewhere:

a. Fabricate and install in accordance with the best practices of the trade.

2. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitively shown or specified.

3. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Provide holes for temporary field connections and for attachment of the work of other trades.

4. Miscellaneous steel items shall include: beams, angles, lintels, metal stairs, support brackets, base plates for other than structural steel or equipment, closure angles, monorail hoist beams, hold down straps and lugs, door frames, splice plates, sub framing at roof openings and any

other miscellaneous steel called for on the Drawings and not otherwise specified.

5. Steel pipe pieces for sleeves, lifting attachments and other functions shall be Schedule 40 pipe unless otherwise shown on the Drawings. Wall and floor sleeves, of steel pipe, shall have welded circumferential steel waterstops at mid-length.

6. All steel finish work shall be thoroughly cleaned, by effective means, of all loose mill scale, rust and foreign matter and shall be given one shop coat of primer compatible with the finish coat after fabrication but before shipment. Paint shall be omitted within 3-in of proposed field welds. Paint shall be applied to dry surfaces and shall be thoroughly and evenly spread and well worked into joints and other open spaces.

7. Galvanizing, where required, shall be the hot-dip zinc process after fabrication. Coating shall be not less than 2 oz/sq ft of surface.

J. Miscellaneous Framing and Supports

1. Provide miscellaneous metal framing, supports, and other metal items required, including framing for architectural infill panels, which are not a part of the structural steel framework but are required to complete the Work.

2. Fabricate miscellaneous units to the sizes, shapes, and profiles shown or, if not shown, of the required dimensions to receive adjacent grating, plates, tanks, doors, or other work to be retained by the framing. Except as otherwise shown, fabricate from structural shapes, plates, and bars, of all welded construction using mitered corners, welded brackets and splice plates and a minimum number of joints for field connection. Cut, drill, and tap units to receive hardware and similar items to be anchored to the Work.

3. Equip units with integrally welded anchors for casting into concrete. Furnished inserts for units must be installed after concrete is placed.

4. Except as otherwise shown, space anchors, 24-inches on center, and provide units equivalent of 1¼-inch by 1¼-inch by 8-inch strips.

5. Galvanize all miscellaneous framing and supports.

K. Bolts and Anchors

1. Standard Service (Non-Corrosive Application): Unless otherwise indicated, bolts, anchor bolts, washers, and nuts shall be steel, galvanized after fabrication as indicated herein. Threads on galvanized bolts and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing. Except as

otherwise indicated, steel for bolts, anchor bolts and cap screws shall be in accordance with the requirements of ASTM A307, Grade A.

2. All bolted connections for aluminum members shall be stainless steel.

3. Unless otherwise indicated, stainless steel bolts, anchor bolts, nuts, and washers shall be Type 316 stainless steel, class 2, conforming to ASTM A276. All threads on stainless steel bolts shall be protected with an anti-seize lubricant suitable for submerged stainless

4. Bolt Requirements:

    a. The bolt and nut material shall be free-cutting steel.

    b. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. All bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.

    c. All bolts and nuts shall be installed with washers fabricated of material matching the base material of bolts, except that hardened washers for high strength bolts shall conform to the requirements of the AISC Specification. Lock washers shall be installed with washers where indicated and shall be fabricated of material matching the bolts.

    d. The length of all bolts shall be such that after joints are made up, each bolt shall extend through the entire nut, but in no case more than 1/2-inch beyond the nut.

5. Cast-in-Place Anchor Bolts – Unless otherwise indicated, the embedded end of the anchor bolt shall be either headed or with nut and washer. Threaded dimensions for the cast-in headed studs and/or headed bolts, prior to zinc coating, shall conform to the requirements of ANSI/ASME B1.1 having Class 2A tolerances (ANSI/ASME Standard B1.13M Grade 6g). Use of hooked bolts (J-bolts and L-bolts) in lieu of headed studs/bolts is not permissible.

    a. Equipment subject to vibration, e.g., pumps, motors, generators, etc. shall be anchored by means of cast-in-place anchor bolts. Anchor bolt layout shall be by means of a template obtained from the equipment manufacturer or supplier.

6. Adhesive Anchors - Unless otherwise indicated, all adhesive anchors for installation in concrete shall have satisfied the requirements of the Simulated Seismic Tests of ACI 355.4. No substitutions will be considered unless accompanied with ICC-ES report verifying strength and material equivalency and compliance with ACI 355.4.

a. Adhesive anchors shall be Hilti HIT-RE 500-SD adhesive anchors, Simpson SET-XP epoxy adhesive anchors, or equal.

b. Adhesive anchors shall not be used for overhead installations (i.e., installations at the underside of concrete slabs).

7. Expansion (Wedge) Anchors – Unless otherwise indicated all expansion anchors for installation in concrete shall have satisfied the requirements of the Simulate Seismic Tests of ACI 355.2. Expansion Anchors shall be zinc plated carbon steel wedge type anchors complete with nuts and washers. Type 316 stainless steel, wedge type anchors shall be used where they will be submerged or exposed to the weather or where stainless steel wedge type anchors are required. When the length or embedment of the bolt is not noted on the Drawings, provide length sufficient to place the wedge and expansion sleeve portion of the bolt at least 1-inch behind the concrete reinforcing steel.

a. Expansion anchors shall be Hilti Kwik Bolt TZ anchors, Simpson Strong-Bolt Wedge anchors, or equal.

b. Lead caulking anchors will not be permitted.

c. Expansion type anchors shall not be used with equipment subject to vibration e.g., pumps, motors, etc.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Examine work in place to verify that it is satisfactory to receive the work of this Section.

2. If unsatisfactory conditions exist, do not begin this work until such conditions have been corrected.

3.02 INSTALLATION

A. Fabrication and Erection: Except as otherwise indicated, the fabrication and erection of structural steel shall conform to the requirements of the American Institute of Steel Construction "Manual of Steel Construction."

B. All steel surfaces that come into contact with exposed concrete shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in accordance with the manufacturer's instructions prior to installation.

C. Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-chromate primer followed by two coats of aluminum metal and masonry paint to the dissimilar metal.

D. Where aluminum contacts concrete/masonry, apply one coat of TT-P-645B zincmolybdate primer or a heavy coat of approved alkali resistant bituminous paint to the aluminum or concrete/masonry.

E. Between aluminum grating, aluminum tread plate, aluminum stair treads, or aluminum handrail brackets and steel supports, insert 1/4-in thick neoprene isolator pads, 85 plus or minus 5 Shore-A-Durometer, sized for full width and length of bracket or support.

F. General: Install products as indicated on the Drawings, and in accordance with shop drawings and manufacturer's printed instructions, as applicable except where specified otherwise.

G. Aluminum Stair Nosing:

1. Install stair nosings on treads of concrete stairs, including top tread on upper concrete slab.

2. Omit stair nosings where concrete is submerged.

3. Coat aluminum surfaces in contact with concrete.

4. Cast stair nosings in fresh concrete, flush with tread and riser faces. Install nosing in center of step approximately 3 inches from each stair edge.

H. Handrails and Guardrails:

1. General:

a. Fasten pipe rails to fittings with Series 300 stainless steel pop rivets or flush set screws.

b. Make pipe cuts clean and straight, free of burrs and nicks, and square and accurate for minimum joint-gap.

c. Drill and countersink holes to proper size, as required for a tight flush fit of screws and other component parts.

d. Space attachment brackets as indicated in the manufacturer’s instructions.

2. Aluminum pipe handrails and guardrails:

a. During construction, keep exterior surfaces of handrails and guardrails covered with 0.4 millimeters, minimum, heat shrink polyethylene film.

b. Do not remove protective film before handrails and guardrails have been accepted by Engineer nor before other work in proximity of handrails and guardrails has been completed.

c. Discontinue handrails and guardrails at lighting fixtures.

d. Provide 1/8-inch diameter weep hole at base of each post.

e. Where protection is applied for prevention of dissimilar materials electrolysis, make application such that none of the protective material is visible in the completed assembly.

f. Space posts as indicated on the Drawings.

g. Anchor posts into concrete by grouting posts into formed holes in concrete, into stainless steel sleeves cast in concrete; or bracket mount to face of concrete surfaces as specified and indicated on the Drawings.

h. Space rails as indicated on the Drawings.

i. Make adequate provision for expansion and contraction of kick plates and rails:

(1) Make provisions for removable sections where indicated on the Drawings.

j. Make lower rails a single, unspliced length between posts, or continuous.

k. Make top rails continuous whenever possible, and attach single, unspliced lengths to 3 posts minimum.

l. Draw up fasteners tight with hand wrench or screw driver.

m. Space attachment brackets as indicated on shop drawings or in manufacturer's installation instructions.

n. Completed installation shall have handrails and railings rigid and free of play at joints and attachments.

o. Protect handrail and guardrail finish from scratches, gouges, dents, stains, and other damage.

p. Replace damaged or disfigured handrails and guardrails with new.

q. Shortly before final acceptance of the work, and after removal of protective polyethylene film, clean handrails and guardrails with mild detergent or with soap and water:

(1) After cleaning, thoroughly rinse handrails and guardrails and wipe with soft cloth.

r. Erect guardrail straight, level, plumb, and true to the positions as indicated on the Drawings. Correct deviations from true line of grade, which are visible to the eye.

I. Ladders:

1. Secure to supporting surface with bent plate clips providing minimum 8 inches between supporting surface and center of rungs.

2. Where exit from ladder is forward over top rung, extend side rails 3 feet 3 inches minimum above landing, and return the rails with a radius bend to the landing.

3. Where exit from ladder is to side, extend ladder 5 feet 6 inches minimum above landing and rigidly secure at top.

4. Erect rail straight, level, plumb, and true to position indicated on the Drawings:

a. Correct deviations from true line or grade which are visible to the eye.

J. Metal Gratings:

1. General:

a. Allow 1/8-inch maximum clearance between ends of grating and inside face of vertical leg of shelf angles.

b. Horizontal bearing leg of shelf angles shall be 2 inches minimum.

c. Install aluminum plate or angles where necessary to fill openings at changes in elevation and at openings between equipment and grating.

d. Install angle stops at ends of grating.

e. Installed grating shall not slide out of rebate or off support.

f. Weld stops in place, unless otherwise specified or indicated on the Drawings.

g. Top surfaces of grating sections adjacent to each other shall lie in same plane.

2. Aluminum grating:

   a. Coat surfaces of aluminum shelf angles, rebates, and rod anchors in contact with concrete as specified in Section 09960.

   b. Aluminum grating: Support on aluminum shelf angles or rebates.

3. Aluminum grating planks:

   a. Support and install planks as specified for aluminum grating.

K. Stainless Steel:

1. Welding:

   a. Passivate field-welded surfaces:

      (1) Provide cleaning, pickling and passivating as specified in this Section.

      (2) Clean using Derustit Stainless Steel Cleaner, or equal.

L. Drilled Anchors

1. Drilled anchors and reinforcing bars shall be installed in strict accordance with the manufacturer's instructions.

2. Holes shall be roughened with a brush on a power drill, cleaned and dry.

3. Adhesive anchors shall not be loaded until the adhesive has reached its indicated strength in accordance with the manufacturer's instructions.

4. Expansion anchors shall be checked for tightness a minimum of 24 hours after initial installation. Install anchors using the manufacturer's recommended drive units and adapters and in compliance with the manufacturer's recommendations.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. This section includes design of the catwalk systems shall include the interior catwalk systems, platforms, ladders, and stairs.

B. The design of the catwalk systems, platforms, ladders, and stairs in the concrete vaults shall conform to the requirements as set forth in the latest revision of the Group I Provisions of the General Industry safety Orders of the Division of Industrial Safety, State of California, and in accordance with the latest edition of the Aluminum Construction Manual of the Aluminum Association, Inc.

C. The catwalk system shall include stairs, handrails, platforms, guardrails, fixed ladders, safety posts, miscellaneous structural members, and miscellaneous items of work as shown on the Drawings and as specified.

1.02 RELATED ARTICLES

A. Article 30.01 – Concrete – General
B. Article 36.02 – Metal
C. Section 24 - Earthwork

1.03 REFERENCES

A. American Institute of Steel Construction (AISC), Steel Construction Manual, Thirteenth Edition

B. American Concrete Institute (ACI)

C. Structural Welding Code (AWS D1.1)

D. State Specifications (Latest Edition)

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

1.05 SUBMITTALS

A. The Contractor shall submit to the Engineer the following for approval:

1. Drawings and calculations showing the design of the catwalk system, stairs, and ladders signed by a Civil or Structural Engineer registered in the State of California and employed by the Contractor. Drawings shall include proposed locations of anchoring supports and foundations.

2. Refer to Article 36.02.

1.06 QUALITY ASSURANCE

A. Welder's Qualifications

1. Welders shall be qualified in accordance with AWS D1.1. and all labor as shown on the Drawings.

2. Shop drawings and engineering calculations on new metal fabrications that are modified to match dimensions as shown on the Drawings.

B. Unless otherwise shown on the Drawings or specified in these Specifications, materials and installation of the catwalk system shall conform to Sections 75 and 83 of the State Specifications.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Transport, handle, store, and protect the metal stairways and walkways in a manner to prevent cosmetic or structural damage.

B. Contractor shall take special care to establish safe and stable support points, and keep personnel and District out of harm's way through the lifting operation.

C. Contractor may store materials off-site or on-site in Contractor's staging area.

1.08 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 PRODUCTS

2.01 MATERIALS

A. Catwalk System

1. The catwalk system shall be constructed of aluminum.

2. Connections may either be welded or bolted.

3. The catwalk system shall be supported by bolts in the walls or by support columns.

4. Stainless steel anchor bolts shall be used to connect aluminum system to concrete wall and floor.

5. Galvanized steel anchor bolt will not be allowed.

6. Three-inch toeboards shall be constructed with platforms as shown in the Drawings or altered by the Contractor as long as design requirements are met and the supports do not interfere with any pumps, valves, piping, fittings, electrical or telemetry items, or any other miscellaneous items including the sump, with the approval of the Engineer.

B. Catwalk System Walking Surfaces

1. Walking surfaces, including stair and ladder treads shall be constructed with bearing bars placed edgewise and joined by straight cross bars.

2. Bearing bars shall have an I-bar or rectangular configuration.

3. Bear bars shall be spaced on 1-3/16-inch centers.

4. Cross bars shall be spaced on 4-inch centers.

5. Bearing bars shall be punched to receive the cross bars.

6. Cross bars shall be secured to the main bearing bars by a swaging process to prevent turning, twisting, or coming loose.

7. Ends of cross bars shall be trimmed flush with the outside face of each bearing bar.

8. All walking surfaces shall be skid resistant.

9. All walking surfaces shall be swaged grating, bolted together for added rigidity.

10. Refer to Article 36.02 for additional requirements.

C. Catwalk System Ladders

1. Refer to Article 36.02.

D. Catwalk System Handrails and Guardrails

1. Refer to Article 36.02.

E. Catwalk System Stairs

1. Refer to Article 36.02.

PART 3 EXECUTION

3.01 INSTALLATION

A. Contractor shall be responsible for re-establishing the grade of the walkway and providing any replacement parts and hardware of the structures should they be in poor condition.

B. Contractor shall mobilize and necessary hoisting equipment to install the parts of the catwalk walkways and stairways.

C. Contractor shall maintain temporary bracing as required in place until final support is provided.

D. Contractor shall provide anchor system and lateral bracing as required for erecting the walkways and stairways.

E. Contractor shall protect metal walkway and stairway from damage and provide non-combustible shield during welding operation.

F. Erect walkways and stairways level and plumb within allowable tolerances in accordance with recommendations of the shop drawings in the Drawings.

G. Contractor shall place grout as shown on Drawings below walkway base plate to ensure complete leveling is achieved.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. This section includes materials, design, and installation of the factory-fabricated roof hatch for vault access.

B. Vault hatches for existing vaults called for replacement as shown on the Drawings shall be installed using a drop-in method that fits inside the existing frame. This installation method shall prevent damage to the existing vault structure.

1.02 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Product Data:

1. Submit manufacturer's product data.

C. Shop Drawings:

1. Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications

1. A minimum of 5 years' experience manufacturing similar products.

B. Installer Qualifications

1. A minimum of 2 years' experience installing similar products.

C. Manufactures Quality System

1. Registered to ISO 9001: 2008 Quality Standards including in-house engineering for product design activities.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.06 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fabricated Access Double Door Hatches shall be Model CAA Access Cover Assembly by Jensen Precast, or equal.

B. Flush drop-in style double leaf hatch shall be Model CAS Pedestrian Cover Assembly by Jensen Precast, 825 Steneri Way, Sparks, NV, or equal.

2.02 MANUFACTURED UNITS

A. Fabricated Access Double Door Hatches

1. Designed and manufactured per ASTM C1802. Access doors and frames shall be manufactured using aluminum with slip-resistant material and torsion-assisted assemblies.

2. Loading: ASTM C1802 Load Level 5

a. Manufacturer shall provide structural calculations showing that the door design meets the loading requirement.

3. Covers: Shall be of minimum thickness and reinforced to support required loads and bolted to the frame.

4. Frame: Angle frame with leveling. A steel skirt shall be welded to the frame to provide a combined height equal to the depth of the concrete slab.

5. Hinges: Shall be through bolted to the cover with tamperproof bolts and locknuts and shall be through bolted to the frame with steel bolts and locknuts.

6. Latch: Shall be of Hex Head Bolt Down style.

7. A flush lifting handle shall be provided.

8. Lifting Mechanisms: Manufacturer shall provide the proper amount of lift assist to ensure that the cover can be opened by one person with no more than 40 lbs of required force. A flush lifting handle shall be provided.

9. Hardware shall be Type 316 stainless steel throughout.

    a. Hinges shall be provided and shall pivot so the cover does not protrude into the channel frame.

    b. Cover shall be equipped with a hold open arm, with secondary latch which locks the cover in its full upright and open position.

10. Padlocks will be provided by the District to lock hatches.

B. Flush Drop-In Style Hatch

1. Top plate shall be Diamond Plated.
2. Lift assistance shall be provided.
3. Latch shall be bolted with hex head bolt down
4. Finishes: Galvanized
5. Padlocks will be provided by the District to lock hatches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Flush drop-in style hatch shall be installed carefully to prevent damage to the existing frame and concrete structure.

1. Contractor shall remove hardware, doors, and hinges from existing hatch cover without damaging the existing frame or concrete structure. The new cover should sit inside the existing frame.

B. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.

1. Test units for proper function and adjust until proper operation is achieved.

2. Repair finishes damaged during installation.

3. Restore finishes so no evidence remains of corrective work.

3.03 ADJUSTING AND CLEANING

A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. Article includes general requirements for electrical scope and related items including materials and methods. The work shall include furnishing, installing, testing, and documentation of the equipment, materials, and installation detailed in the following articles:

Article No.	Title
37.04	Electrical Demolition and Modifications
37.10	District Specific Electrical Design and Installation Requirements
37.11	Common Electrical Equipment
37.16	Grounding Systems
37.19	Conduits, Boxes, and Fittings
37.22	Underground Raceway Systems
37.25	Wires and Cables, 600 Volts and below
37.34	Wiring Devices
37.49	Panelboards

B. The work shall include but not be limited to the following:

1. Electrical and telecommunication service installation and/or modification which include coordination, making arrangements, and scheduling with the utility companies the application, inspection, and testing of incoming services.

2. Site work which includes excavation, trenching, raceway installations, backfill, and resurfacing for incoming services.

3. Installation of major electrical equipment such as generators, switchgears, switchboards, transformers, motor control centers, distribution panels, and lighting panels.

4. Conduit, wire installation and termination to electrical equipment, wiring devices, light fixtures, motors, field devices, starters, controllers, drives, and control panels.

5. Installation of light fixtures, wiring devices, enclosures, terminal boxes, and junction boxes.

6. Installation and programming of various controllers, i.e., lighting, building automations, security, fire alarm, and similar systems.

7. Installation underground infrastructure which includes duct bank, manholes, handholes, and pullboxes to pull feeder cables between structures.

8. Conduit, wire, and terminations to instruments furnished under other sections including process instrumentation primary elements, transmitters, local indicators, remote and local control panels.

9. Installation of complete raceway system for:

   a. Telemetry
   b. District Network
   c. SCADA Network

10. Installation of concrete housekeeping, light pole bases, and other site appurtenances.

11. Installation of a ground grid system or the development of a UFER ground.

C. Modification and Demolition work shall include but not be limited to the following:

1. Demolition work associated with the removal of equipment from the existing facilities, including disconnecting and removing all electrical, controls, and communication wiring and conduits to equipment being removed under other related sections.

2. Start of demolition means that Contractor assumes responsibility of existing systems and the requirements for maintaining specific equipment in service and the requirements for restoration work.

3. Electrical relocation work associated with the relocation of equipment for the existing and new facilities, including disconnecting all existing wiring and conduits and providing new wiring and conduit to the relocated equipment.

4. Modifications to existing systems as required to provide the new functions as shown on the Drawings.

5. Obtain approval from Engineer prior to start of demolition work.

D. Excavation, bedding material, forms, concrete and backfill for the installation of underground raceways and site restoration shall comply with Section 24 – Earthwork.

E. Floor mounted electrical equipment shall be mounted on concrete housekeeping pads. Refer to forms and concrete for electrical equipment furnished under Section 30 – Concrete.

F. Secure electrical equipment and systems to meet Seismic 4 requirements and Special Provisions.

1.02 REFERENCES

A. Electric equipment, materials and installation shall comply with the latest edition of the National Electrical Code (NEC), and with the latest edition of the following codes and standards:

1. National Electrical Safety Code (NESC)
2. Occupational Safety and Health Administration (OSHA)
3. National Fire Protection Association (NFPA)
4. National Electrical Manufacturers Association (NEMA)
5. American National Standards Institute (ANSI)
6. Insulated Cable Engineers Association (ICEA)
7. Instrument Society of America (ISA)
8. Underwriters Laboratories (UL)
9. Factory Mutual (FM)
10. InterNational Electrical Testing Association (NETA)
11. California Building Code
12. American Society for Testing and Materials (ASTM)
13. Institute of Electrical and Electronics Engineers (IEEE)
14. Joint Industrial Council (JIC)

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Submit, in accordance with the Special Provisions, shop drawings for all equipment, materials and other items furnished under Section 37.

B. Section 37 submittals shall be packaged by individual specification articles. Each submittal package shall be complete and include all equipment specified within the article. Partial article submittals will not be allowed. As an example, all Article 37.49 Panelboards shall be submitted together, etc.

C. Submit engineering anchorage and seismic calculations for mounting electrical equipment in conformance with the Special Provisions (Seismic Design Criteria and Wind Design Criteria).

D. Mark submittals to clearly identify proposed specific equipment including accessories, options, and features. Other equipment listed in the submittals that are not applicable to the project shall be clearly marked as being excluded or not part of the submittal.

E. The following list of submittal requirements in this Article applies to electrical equipment such as medium voltage equipment, switchgears, power transformers, switchboards, motor control centers, distribution panels, lighting panels, relay,

pump, local control panels, adjustable speed drives, networking equipment related to power monitoring and SCADA, and other major electrical equipment.

1. Submit the following for review/approval prior to manufacturing:

   a. The following information shall be submitted to the ENGINEER:

      (1) Master drawing index

      (2) Elevation Drawings (Top, Front, Rear, Sides, External, and Internal)

      (3) Floor Plan, Cross Sections, and Mimic Diagram

      (4) Bussing diagram

      (5) Three-line diagrams

      (6) Elementary diagrams

      (7) Nameplate schedule

      (8) AC and DC Wiring Diagram

      (9) Point to Point Wiring Diagram

      (10) Anchoring details

      (11) Component list

      (12) Conduit entry/exit locations

      (13) Assembly ratings including short-circuit rating, rated voltage, rated current, and BIL

      (14) Major component ratings including voltage, continuous current, interrupting ratings

      (15) Cable terminal sizes

      (16) Product data sheets

      (17) DC battery or backup system details

      (18) Feeder power monitoring equipment

      (19) Protective devices and transient voltage surge suppressor details

(20) Networking equipment

(21) Power monitoring equipment

2. Where applicable, the following additional information shall be submitted to the Engineer:

   a. Busway connection
   b. Connection details between close-coupled assemblies
   c. Composite floor plan of close-coupled assemblies
   d. Key interlock scheme drawing and sequence of operations
   e. Descriptive bulletins

3. Submit the following for review prior to shipping to site for installation:

   a. Factory Acceptance Test or Certified production test reports
   b. Shop Drawings and Installation Instructions
   c. Transport dimensions and weights
   d. Packaging and shipping splits

4. Submittals – after construction and installation

   The following information shall be submitted for record purposes:

   a. Final as-built drawings and information for items listed under submittal for review/approval incorporating all changes made during the manufacturing process and during site installation (actual installed condition). As built shall include point to point wiring between equipment.

   b. Site Acceptance Report including raw data obtain during electrical testing.

   c. Installation information including equipment anchorage provisions

F. Operation and Maintenance Manuals

1. Submit operations and maintenance manual for equipment furnished under this section. The manuals shall be prepared specifically for this installation and shall include catalog data sheets, drawings, equipment lists, descriptions, parts lists, etc., to instruct operating and maintenance personnel unfamiliar with such equipment.

2. Manuals shall include the following as a minimum:

   a. A comprehensive index.

   b. A complete “As-Built” set of approved shop drawings.

c. A complete list of the equipment supplied, including serial numbers, ranges and pertinent data.

d. A table listing of the “as left” settings for all adjustable protective, alarm and trip setpoints.

e. System schematic drawings “As-Built,” illustrating all components, piping and electric connections of the systems supplied under this section.

f. Detailed service, maintenance and operation instructions for each item supplied.

g. Special maintenance requirements particular to this system shall be clearly defined, along with special calibration, test procedures, and frequency.

h. The operating instructions shall also incorporate a functional description of the entire system, with references to the systems schematic drawings and instructions.

i. Printout of programmed settings

j. Software and associated files required for programming and setting parameters

k. Complete spare parts list with stock numbers.

1.04 UTILITY SERVICES

A. For electrical service entrance installation or modification, the contractor shall coordinate with, and comply with, all PG&E requirements and the latest edition of the PG&E Greenbook.

B. For tele/communication service entrance installation or modification, the contractor shall coordinate with, and comply with, all AT&T, Verizon, Comcast, or designated tel/com provider’s requirements.

C. Temporary and construction power shall be the responsibility of the contractor.

1.05 CODES, INSPECTION AND FEES

A. Equipment, materials and installation shall comply with the requirements of the local authority having jurisdiction.

B. Obtain all necessary permits and pay all fees required for permits and inspections.

1.06 INTERPRETATION OF DRAWINGS

A. Electrical drawings are diagrammatic. Unless specifically dimensioned, the electrical drawings are not intended to show the exact locations of equipment and wiring devices.

B. Conduit layout shown is the general routing of raceways. Coordinate the installation with other trades and the actual supplied equipment.

C. Verify the exact locations and mounting heights of lighting fixtures, switches and receptacles prior to installation.

D. Except where dimensions are shown, the locations of equipment, fixtures, outlets and similar devices shown on the Drawings are approximate only. Exact locations shall be determined by the contractor and approved by the Engineer during construction. Obtain information relevant to the placing of electrical work and in case of any interference with other work.

E. Circuit layouts are not intended to show the number of fittings, or other installation details. Furnish all labor and materials necessary to install and place in satisfactory operation all electrical, instrumentation, and control systems shown.

F. Redesign of electrical or mechanical work, which is required due to the contractor's use of an alternate item, arrangement of equipment and/or layout other than specified in these Specifications, shall be done by the contractor at his/her own expense. Redesign and detailed plans shall be submitted to the Engineer for approval. No additional compensation will be provided for changes in the work, either his/her own or others, caused by such redesign.

1.07 QUALIFICATIONS

A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

B. The manufacturer of equipment listed in Section 37 shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

1.08 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be new, except where specifically identified on the Drawings to be re-used.

B. Equipment and materials shall be the products of reputable, recognized suppliers having adequate experience in the manufacture of these particular items. Similar items shall be by one manufacturer. All equipment shall be designed for the service intended and shall be of rugged construction of ample strength for all

stresses which may occur during fabrication, transportation, erection, and during continuous or intermittent operation.

1. All equipment and materials shall be listed by UL, where applicable, unless otherwise specified or as approved by the Engineer.

2. All self-contained components of standard manufacture for which a listing service is provided shall be UL listed. Where special non-standard assemblies are fabricated by the contractor, subassemblies therein shall bear the UL label whenever possible.

3. All electrical equipment shall conform to or exceed the current standards of the ANSI, IEEE, and NEMA, where applicable.

C. Contractor shall take field measurements to ensure that product being provided will fit and have the necessary code required clearances when installed.

D. Provide quality control in accordance with the Special Provisions.

1.09 SUBSTITUTION

A. Electrical equipment, components, protective devices, wires, and conduits shown in the drawings have been designed using project basis design documents. The design of the electrical system shown are typically based on the vendor in the drawing or first-named manufacturer in the specifications. The equipment shown and rating meets the project minimum requirements. Physical dimensions, electrical ratings, system performance and mechanical properties shall be adjusted in case an equivalent product or equipment is proposed other than listed at the expense of the contractor. All additional costs associated with acceptance of equivalent, or substituted project shall be at contractor's expense.

B. Engineering review time in excess of one (1) hour per equipment substitution per submittal shall be chargeable to the contractor.

C. There shall be no change in contract time allowed as a result of the substitution or substitution review process.

D. Refer to the Special Provisions regarding material and product substitution.

1.10 EQUIPMENT TRANSPORT AND STORAGE

A. Investigate each space in the structure through which equipment must pass to reach its final location. Coordinate shipping splits with the manufacturer to permit safe handling and passage through restricted areas in the structure.

B. The equipment shall be kept upright at all times during storage and handling. When equipment must be tilted for passage through restricted areas, brace the equipment to ensure that the tilting does not impair the functional integrity of the equipment.

C. Unless otherwise noted, storage of equipment or construction materials is not allowed on site. Designated construction areas may be pre-arranged or specified as part of the construction documents.

D. Damages to surfaces due to transportation of equipment shall be repaired at the contractor's expense.

1.11 HAZARDOUS AREAS

A. Equipment, materials and installation in areas designated as hazardous on the Drawings shall comply with NEC Articles 500, 501, 502 and 503.

B. Equipment and materials installed in hazardous areas shall be UL listed for the appropriate hazardous area classification.

1.12 IDENTIFICATION

If not provided under each article, the following identification shall apply.

A. Equipment Identification

1. Identify all equipment furnished under this section with the name of the equipment it serves as detailed on the oneline drawings. Nameplate list shall be submitted for review and approval.

2. Nameplates shall be engraved, laminated plastic, not less than 1/16 inches thick by 3/4 inches high by 2 1/2 inches wide with 3/16 inches high white letters on a black background.

3. Nameplates shall be screw mounted to NEMA enclosures using stainless steel screws. Epoxy shall be applied to the backside of the nameplate to seal against moisture. Nameplates shall be bonded to all other enclosure types using an epoxy, or similar, permanent waterproof adhesive. Two-sided foam adhesive tape is not acceptable. Where the equipment size does not have space for mounting a nameplate, the nameplate shall be permanently fastened to the adjacent mounting surface.

B. Raceway Identification

1. Junction boxes shall have unique identification. In addition, power and control circuits passing through the junction box shall also be identified on the inside cover of the junction box.

2. Conduits shall be labeled. Label shall indicate voltage, source equipment, service equipment, and system type.

1.13 SEISMIC RESTRAINTS

A. Refer to the Special Provisions for seismic restraint criteria.

B. Electrical equipment shall be securely fastened in placed. When electrical equipment over twenty pounds (20 lbs.) are suspended above ten (10) feet, additional seismic restraints shall be installed.

1.14 TESTING AND PROGRAMMING

A. Test electrical equipment, component, and materials furnished under this section. Test each equipment functionally as well as part a system wide functional test. Test under manual and automatic control.

B. Electrical equipment and controls furnished in other sections shall also be tested under Section 37.

C. Programmable equipment and systems shall be programmed and be functionally tested. Submit final settings and parameters as part of record documents.

D. Equipment, sensors, devices, or systems that are annunciated remotely through remote terminal, human machine interfaces, or web-client (pages) shall be brought into these various interfaces by updating software program, webscreens, or both.

1.15 RECORD DRAWINGS

A. As the work progresses, legibly record all field changes on a set of Project Contract Drawings as specified in these Specifications, to produce the “Record Drawings.”

B. Record Drawings shall accurately show the installed condition of the following items:

1. Oneline (Single Line) diagrams.

2. Raceways and pullboxes – show exact routing and location; homerun notations in record drawings are not acceptable

3. Conductor sizes and conduit fills.

4. Panel Schedules.

5. Control schematic diagrams.

6. Lighting Fixture Schedules.

7. Lighting fixture, receptacle and switch outlet locations.

8. Underground raceway and duct bank routing.

9. Plan view, sizes and locations of switchgear, distribution transformers, substations, motor control centers and panelboards. Indicated code required working clearances.

10. Fire alarm system components, wiring and routing of raceways.

11. Security system components, wiring and routing of raceways.

12. Communication system components, wiring and routing of raceways.

13. Power monitoring system.

14. Grounding system.

C. Submit a schedule of control wiring raceways and wire numbers, including the following information:

1. Circuit origin, destination and wire numbers.
2. Field wiring terminal strip names and numbers.

D. Submit directory of panel schedules in spreadsheet format.

E. Record point-to-point connection diagrams showing schedule of control wiring raceways, wire numbers, conduit tags, and wire identification.

F. Review shop drawings of equipment furnished under other related sections and prepare coordinated control wiring interconnection diagrams.

1.16 QUALITY ASSURANCE

Equipment, materials, or installation that failed during testing shall be replaced. Repair of defective equipment that have failed during acceptance testing shall be at no additional cost or change in contract.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SITE VERIFICATION

A. Prior to start of work, Contractor shall review existing as-builts and shall perform site walk to have a general understanding of the existing conditions and systems.

B. Obtain the existing equipment shop drawings from the Engineer before attempting to make any modifications to the existing equipment wiring. Verify all existing wiring and connections for correctness. If record drawings are not available, trace all circuits in the field and develop the wiring diagrams necessary for completion of the work.

3.02 DEMOLITION AND MODIFICATION WORK

A. Identify and mark equipment, wiring devices, and raceways to be demolished. Identify source power, control, and monitoring connection. Isolate circuits prior to demolition.

B. Provide alternate sources or means to power, control, and monitor systems impacted by demolition or modification work.

C. Coordinate and schedule the sequence of demolition with the sequence of construction to maintain plant operations. Remove and demolish equipment and materials in such a sequence that the existing and proposed plant will function properly with no disruption of operations.

D. Demolish all power supply, control, and communication wires back to their sources or upstream protective device.

E. Remove abandoned conduits, boxes, and unused equipment.

F. Paint and refinish surfaces and footprints left as part of demolition work. Match adjacent finished.

3.03 SITE ELECTRICAL WORK

A. Perform underground survey prior to any excavation work.

B. Call “811” to perform underground survey. Contractor shall hire underground surveying and locator service prior to excavation work inside the treatment and pumping plants.

3.04 ELECTRICAL ROUGH-IN AND EQUIPMENT LAYOUT

A. Electrical drawings show the general locations of equipment, devices, and raceways. They are not exact. Prior to installation of conduits, raceways, and equipment, contractor shall mark and rough-in location of the electrical system. Contractor shall coordinate location with other trades. Contractor shall walk the site with the inspector and engineer to review rough-in and layouts. Required working clearance shall be also marked during this walk-through. Contractor shall obtain approval prior to installation of equipment from Engineer.

B. Unless otherwise approved by the Engineer, conduit shown on the Drawings shall be concealed. Raceways installed exposed shall be pre-approved during rough-in. Route exposed conduits near the ceiling or along walls of the areas

through which they pass and shall be routed to avoid conflicts with HVAC ducts, cranes hoists, monorails, equipment hatches, doors, windows, etc.

C. Approved concealed raceways locations include concrete floor slabs, walls or ceilings and above suspended ceilings, or in partitions as required.

D. Where circuits are shown as “home runs”, all necessary fittings and boxes shall be provided for a complete raceway installation. Where home-runs indicate conduit is to be installed concealed or exposed, the entire branch circuit shall be installed in the same manner.

3.05 SLEEVES AND FORMS FOR OPENINGS

A. Provide and place all sleeves for conduits penetrating floors, walls, partitions, etc. Locate all necessary slots for electrical work and form before concrete is poured.

B. Exact locations are required for stubbing up and terminating concealed conduit. Obtain shop drawings and templates from equipment vendors or other subcontractors and locate the concealed conduit before the floor slab is poured.

C. Where setting drawings are not available in time to avoid delay in scheduled floor slab pours, the Engineer may allow the installations of such conduit to be exposed. Requests for this deviation must be submitted in writing. No additional compensation for such change will be allowed.

D. Seal all openings, sleeves, penetration and slots as specified in Article 29. Seal openings and penetration through fire rated construction to maintain or exceed fire and thermal ratings of the structure.

3.06 CUTTING AND PATCHING

A. Cutting and patching shall be done in compliance with modifications and repair to concrete as specified in Section 30.

B. Prior to core drill, x-ray concrete walls and floors. Core drill holes in concrete floors and walls as approved.

C. Install work at such time as to minimize the amount of cutting and patching.

D. Do not cut joists, beams, girders, columns or any other structural members.

E. Cut opening only large enough to allow installation of the conduit.

F. Patching to be of the same kind and quality of material as was removed.

G. The completed patching work shall restore the surface to its original appearance or better.

H. Patching of waterproofed surfaces shall render the area of the patching completely waterproof.

I. Remove rubble and excess patching materials from the premises.

J. When existing conduits are cut at the floor line of wall line, they shall be filled with grout or patching material approved by the Engineer.

3.07 INSTALLATION

A. Install according to manufacturer’s installation instructions.

B. Work not installed according to the Drawings and Specifications shall be subject to change as directed by the Engineer at no additional cost to the District.

C. Electrical equipment shall be protected against mechanical and water damage. Store electrical equipment in dry permanent shelters. Do not install electrical equipment in place until structures are weather-tight.

D. Provide temporary power connection to equipment space heaters as required by the equipment manufacturer’s storage instructions.

E. Damaged equipment shall be replaced or repaired by the equipment manufacturer, at the Engineer's discretion and at no additional cost to the District.

F. Repaint any damage to factory-applied paint finish using touch up paint furnished by the equipment manufacturer. The entire damaged panel or section shall be repainted in accordance with the field painting requirements specified in Section 30 at no additional cost to the District.

3.08 MANUFACTURERS SERVICE

A. Provide manufacturer's services for testing and startup of the equipment in accordance with the requirements of each individual specification article.

B. Testing and startup shall not be combined with training. Testing and start up time shall not be used for manufacturer's warranty repairs.

3.09 TRAINING

A. Provide manufacturer's services for training of plant personnel in operation and maintenance of the equipment furnished under Section 37 in conformance with the requirements of the Special Provisions. The training and instruction shall be directly related to the system being supplied.

B. The training program shall represent a comprehensive program covering all aspects of the operation and maintenance of each system. Provide detailed O&M manuals to supplement the training courses. The manuals shall include specific details of equipment supplied and operations specific to the project.

C. All training schedules shall be coordinated with, and at the convenience of, the District. Shift training may be required to correspond to the District’s working schedule.

D. All dimensions shall be field verified at the job site and coordinated with the work of all other trades.

E. Document all changes made to the wiring diagrams and return a marked-up set of Record Drawings to the District after the work is complete.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. Article includes all labor, materials, and incidentals required to demolish, modify and/or remove the electrical and instrumentation systems and equipment as shown on the Drawings and/or specified in these Specifications. Unless specifically noted as being reused, all conduit, wire, boxes, etc. detailed on the Drawings shall be new equipment installed under this Work.

B. The electrical modifications and removals work shall consist of, but not necessarily be limited to, removal or modifications of existing equipment in the following generalized categories:

1. Modification of motor control centers, motor starters, panels, and other devices as indicated on the Drawings.

2. Any electrically powered or controlled equipment indicated as being removed in this Contract and associated electrical appurtenances.

3. Existing electrical equipment or electrical equipment associated with mechanical or process equipment which must be removed or relocated due to conflicts with new construction.

4. Electrical control devices, starters, wiring, and other miscellaneous devices associated with equipment that will be modified or reused under this Contract.

5. Instrumentation and control equipment and related conduit and wire associated with equipment being removed under this Contract.

C. Related Articles:

1. Article 23, Selective Site Demolition.
2. Article 16, Work Restrictions.

1.02 SUBMITTALS

A. All submittals shall be in accordance with Articles 20.01 and 37.01.

B. Submit detailed time schedule for equipment which will be either modified or removed under this Work. Include details of work to be done, anticipated duration of the work, impact of the work on plant operations, coordination with other trades, etc.

C. Submit shop drawings for all modified motor control centers (MCC), switchboards, and other panels.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MODIFICATIONS

A. All MCCs, switchboards, and other panels requiring modification under this Work shall comply with the following general requirements:

1. Equipment removed from service shall have suitable covers placed over any unused exterior panel holes. Covers shall be painted to match the existing panel and shall be securely retained on the panel with machine screws and nuts.

2. Newly installed equipment shall be mounted, connected, and identified consistent with the other equipment in or on the panel.

3. Devices installed in compartmentalized panels shall be provided with new doors and interior mounting pans as required to match the existing panel construction style.

4. Mounting holes required for new equipment shall be neatly cut and de-burred.

5. Nameplates shall be provided for all new equipment mounted on the exterior of existing panels. Nameplates shall match the existing panel nameplates.

6. Interior panel wiring for newly added devices shall match the existing panel wiring and mounting.

7. All modifications made to 480 volts power system panels shall be retrofit with components furnished by the original panel manufacturer to maintain all original UL and NEMA labeling and certifications.

B. All modifications made to existing MCCs, switchboards, and other panels shall be fully described in shop drawing submittals. The submittals shall include the following as a minimum:

1. Panel elevation drawings specifically identifying the exact equipment that will be removed.

2. Revised panel wiring diagrams specifically indicating the revised connections of the new devices.

3. Technical details on the new equipment that will be added including electrical characteristics, physical sizing, and installation requirements.

4. Enclosure or housing modifications required to accept the new equipment including nameplates and enclosure alterations.

5. Engraving schedule details for all new nameplates.

3.02 EQUIPMENT TO BE REMOVED

A. Only the major electrical and instrumentation equipment to be removed is shown or noted on the Drawings and failure to detail all equipment exactly shall not relieve the contractor from the responsibility for its removal as directed by the Engineer. Removal items such as wire, conduit, junction boxes, etc. are in general not detailed on the Drawings.

B. Where removal of electrical, instrumentation, or any other equipment with wired connections is called for in this Work, the work shall include the removal of the associated electrical hardware as specified in these Specifications unless noted otherwise.

C. In general, all wiring shall be removed from the conduits. Boxes and fittings and all exposed conduit shall be removed. Concealed conduits shall be cut flush with the floor, wall, or ceiling and plugged with grout or other permanent material.

D. Electrical power, control, or instrumentation equipment, exposed conduit, wiring, etc. rendered inoperative by modifications to existing equipment under these articles or other sections of this contract shall be removed unless specifically noted that it is to be abandoned in place.

E. Not all existing conduits are shown on the Drawings. In general, existing conduits are shown only where they may be reused, or where they potentially affect or may be affected by new work under this Contract, or for providing useful background information to the contractor regarding the existing electrical installation.

F. Where existing conduit or wire associated with removed equipment is to be reused, it will be specifically noted on the Drawings. Where existing conduit is clearly required to be removed or relocated including the buried or embedded portion due to new construction, it will be noted as such on the Drawings. In instances where existing electrical underground or concealed work is close to, but not clearly in the way of, new construction, it shall be the contractor's responsibility to include that portion of work in the Contract scope if required.

G. No existing conduits, wiring, or electrical appurtenances shall be removed, or in any way damaged, unless allowed by the provisions of this Article. Any existing conduits or wiring or other electrical appurtenances that are encountered as an obstruction to new construction which are not covered by the provisions of this Specification shall be brought to the attention of the District.

H. Where functions of existing cables and/or conduits are replaced by new cable and/or conduits because of additions of new panels, instruments, revision to

control strategy, etc., the existing cables and exposed conduits shall be removed unless noted otherwise. Concealed conduits shall be retained and marked as spares unless noted otherwise.

I. Equipment removed shall not be reused under this contract unless specifically noted on the Drawings or Specifications.

J. To minimize disruptions to the existing plant operations, the schedule for modifications and removal of existing equipment shall be coordinated with, and approved by, the Engineer and District.

K. Where any existing circuits are disconnected due to abandonment or removal of existing equipment, the remaining motor starters or circuit breakers for these circuits shall be retagged as spares. At motor control centers, the tags shall be laminated nameplates matching the existing ones. In circuit breaker panels, the circuit card or listing shall be changed.

3.03 DEMOLITION

A. The contractor shall survey the existing electrical systems and equipment identified for removal with representatives from the other trades and the Engineer prior to performing any demolition work. Prior to removal, identify all conduit and equipment to be removed with tags or paint.

B. Where a piece of equipment is to be removed, all associated ancillary components (e.g. solenoid valves, pressure switches, etc.) and associated wiring and conduit shall also be removed.

C. Building or structures scheduled for complete demolition shall be made safe from electrical shock hazard prior to demolition. Disconnect all electrical power, communications, alarms, and signal systems.

D. Remove electrical work associated with equipment scheduled for demolition except those portions indicated to remain or be reused.

E. Remove unused exposed conduit and wiring back to point-of-concealment, including abandoned conduit above accessible ceiling finishes. Remove unused wiring in concealed conduits back to source (or nearest point of usage).

F. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank covers for abandoned outlets which are not removed.

G. Disconnect and remove abandoned panelboards, disconnect switches, control stations, distribution equipment, etc.

H. Disconnect and remove abandoned lighting fixtures. Remove brackets, stems, hangers and other accessories.

I. Repair adjacent construction and finishes damaged during demolition and extension work.

J. Where electrical systems pass through the demolition areas to serve other portions of the premises, they shall remain or be suitably relocated and the system restored to normal operation.

K. Coordinate outages in electrical systems with the Engineer. Where duration of proposed outage cannot be allowed by the District, provide temporary connections as required to maintain service.

L. Trace out existing wiring that is to be relocated or removed and perform the relocation or removal work as required for a complete operating and safe system.

M. Continuous service is required on all circuits and outlets affected by these changes, except where the District will permit an outage for a specific time. Obtain Engineer's consent before removing any circuit from continuous service.

N. Remove exposed conduits, wireways, outlet boxes, pull boxes and hangers made obsolete by the alterations, unless specifically designated to remain. Patch surfaces and provide blank covers for abandoned outlets which are removed.

O. All equipment, materials, controls, motor starters, branch and feeder breakers, panelboards, transformers, wiring, raceways, etc., furnished and installed to temporarily keep circuits energized shall be removed when the permanent installation is fully operational.

3.04 DISPOSITION OF REMOVED MATERIALS AND EQUIPMENT

A. In general, it is intended that material and equipment indicated to be removed and disposed of by the contractor shall, upon removal, become the contractor's property and shall be disposed of off the site by the contractor, unless otherwise directed by the District. A receipt showing acceptable disposal of any legally regulated materials or equipment shall be given to the Owner.

B. Ballasts in each existing lighting fixture shall be assumed to contain PCB's unless specifically marked with a label indicating "No PCBs." Remove ballasts from each lighting fixture and pack them in accordance with EPA PCB regulations. Ship ballasts in approved containers to an EPA-approved recycling facility and pay all shipping, packaging and recycle costs.

C. PCBs and PCB contaminated equipment shall be removed, packaged, shipped and disposed of in accordance with all State and Federal regulations. Obtain the services of a firm licensed and regularly engaged in the removal of PCBs and PCB-contaminated equipment. The firm shall be licensed in the State or States in which the contaminated material is handled, shipped and disposed. Pay all fees associated with the removal of the contaminated material and equipment and provide documentation showing acceptable disposal.

D. Should the contractor discover PCB-contaminated equipment that was not identified, they shall cease work on or about the equipment and notify the Engineer immediately. The contractor shall then proceed with the work as directed by the Engineer.

END OF ARTICLE

ARTICLE 37.10
DISTRICT SPECIFIC ELECTRICAL DESIGN AND INSTALLATION REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Article Includes:

1. Specific methods and requirements pertinent to the installation of the electrical and instrumentation work under this Contract.

2. The requirements of this article shall be in addition to those specifically detailed in other Articles of these Specifications and shown on the Drawings.

3. The requirements of this article shall be complied with where the project Drawings and Specifications do not contain specific design or installation details. In general, all requirements of the National Electric Code (NEC) shall be followed except as enhanced or modified by the requirements of this Article.

B. Related Articles:

1. Article 37.01, General Electrical Requirements

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 RACEWAYS INSTALLATION

A. No conduit smaller than 3/4" shall be used.

B. No underground conduit smaller than 1" shall be used.

C. Use PVC wrapped rigid conduit in chemical feed rooms and transition from underground to above ground.

D. Use of EMT shall be pre-approved and shall be limited.

E. If not noted in the drawings, enclosures shall be NEMA 4X.

F. Underground pullboxes shall be no smaller than 17” x 30” x 24” (Deep).

3.02 CONDUCTOR INSTALLATION

A. Number 12 AWG shall be the minimum size for power wires.

B. All electrical wire and cables shall be installed in conduits.

C. No more than one (1) 480 VAC circuit shall be installed in any one conduit.

D. No more than three (3) 120 VAC branch circuits shall be run in any one conduit.

E. Number 14 AWG shall be the minimum control wire size except that connections to I/O boards inside a PLC shall be made using No. 16 AWG MTW.

F. Signal conductors carrying analog instrumentation signals (4-20 mA dc or 1-5 V dc) shall not be run in the same conduit or pull boxes with ac power conductors.

G. Fire alarm cabling shall be in conduit.

3.03 CONTROL AND PROTECTIVE DEVICES

A. No motor starter smaller than a NEMA Size 1 unit shall be allowed for 208 volts or 480 volts three-phase motors.

3.04 GROUNDING

Provide grounding bus bar tied back to the main service entrance ground or the last grounding point of an alternately derived system at the following location:

A. Main Point of Entrance for Communications (telephone, internet, microwave, etc.)
B. At each RTU, I/O, and PLC Cabinet
C. At each main distribution frame or intermediate distribution frame room
D. At each SCADA Room
E. At each Server Room
F. At each Communication Room

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

This Article provides the requirements for common electrical equipment not specified in separate articles that are typically employed in an industrial facility, however, not all components specified in this Article are necessarily utilized on this project.

1.02 RELATED ARTICLES:

A. Article 37.01, General Electrical Requirements.

1.03 REFERENCES

A. NEMA – National Electrical Manufacturers Association (NEMA)
B. UL – Underwriter's Laboratory

1.04 EQUIPMENT LIST

A. The following equipment is included under this Article:

1. Enclosures
2. Switches
3. Enclosed Circuit Breakers
4. Motor Starters
5. Transformers
6. Control Stations

1.05 SUBMITTALS

A. Submittals shall be in accordance with the Special Provisions and Article 37.01.

B. Submittals shall contain detailed catalog information describing electrical characteristics of the product being submitted.

C. Submit product dimensioned drawings to show physical and mechanical characteristics of all equipment including weights.

D. Submit transformer no-load and load losses.

PART 2 PRODUCTS

2.01 ENCLOSURES

A. Unless otherwise shown on the Drawings, electrical enclosures shall be furnished based on the NEMA classification of the area as detailed on the

Drawings. For areas where a NEMA designation is not defined on the Drawings, the following shall be used:

1. NEMA 1 - indoors, dry, non-process, above finished grade locations. Typical locations - administration areas, office areas, laboratories, control rooms, storage rooms,

2. NEMA 3X – outdoor, wet location, non-hose down, within the area but not directly adjacent or within five feet of corrosive agents. Typical locations outdoors adjacent to chemical tanks

3. NEMA 3R - outdoor, wet location, non-hose down, non-corrosive areas, capable with additional ventilation. Typical locations outdoors away from chemical tanks

4. NEMA 4 – indoor or outdoor, wet and direct hose down, non-corrosive areas, stainless steel. Typical locations no corrosive chemicals present, basements, vaults

5. NEMA 4X - indoor or outdoor, wet and direct hose down, corrosive areas, fiberglass reinforced polyester. Typical locations corrosive chemicals present, basement, vaults

6. NEMA 7 – hazardous locations.

7. NEMA 12 - indoors, dry, above finished grade locations, without knockouts, protection of personnel from hazardous parts. Typical locations process areas, non-corrosive

8. NEMA 12X - indoors, dry, above finished grade locations, with knockouts, protection of personnel from hazardous parts. Typical locations process areas, corrosive environment

B. Enclosure color shall be ANSI Gray 61, unless otherwise noted.

2.02 SWITCHES

A. Disconnect Switches

1. Disconnect switches shall be horse power rated, heavy-duty, quick-make, quick-break, visible blades, 600 volts, three-pole with full cover interlock, interlock defeat and flange-mounted operating handle. Rating per the drawings.

2. Switches shall be six-pole for two-speed devices.

3. For disconnect switches installed at motors fed from adjustable speed drives (ASD), the switch shall be provided with electrical interlock contacts which are actuated by the pivot arm before the main switch

blades break. Unless otherwise specified, two (2) sets of one normally open and one normally closed contacts shall be provided for each switch.

4. Switches shall be as manufactured by the Schneider, General Electric, Cutler-Hammer, Allen-Bradley, or equal.

B. Fused Disconnect Switches

1. Fused disconnect switches shall be heavy-duty, quick-make, quick-break, visible blades, 600 volts, three-pole with full cover interlock, interlock defeat and flange-mounted operating handle.

2. Fuses shall be rejection type, 600 volts, 200,000 A.I.C., dual-element, time-delay, Bussman Fusetron, Class RK-5 or equal.

3. Switches shall be as manufactured by the Schneider , General Electric, Cutler-Hammer, Allen-Bradley, or equal.

2.03 ENCLOSED CIRCUIT BREAKER

A. Molded case circuit breaker: 600 volts, three-pole with integral fully-adjustable solid-state trip device. Trip device shall be temperature insensitive and have the following characteristics and functions:

1. Independently-adjustable long-time pick-up and delay.

2. Independently-adjustable short-time pick-up and delay with i^2t in and out switch.

3. Adjustable instantaneous.

4. Independently-adjustable ground fault pick-up and delay.

5. Trip mode targets for overload, short-circuit and ground fault.

6. Long-time pick-up light.

B. Circuit breaker shall be housed in an enclosure and shall have a short circuit rating of 65,000 amps RMS symmetrical at 480 volts.

C. Circuit breaker shall be furnished with solid neutral and solid ground assemblies.

D. Pilot lights to indicate breaker status

E. Circuit breaker shall be as manufactured by Schneider, General Electric Co., Cutler-Hammer, or equal.

2.04 MOTOR STARTERS

A. Manual Motor Starters

1. Manual starters shall be suitable for the voltage and number of phases shall be non-reversing, reversing or two-speed type as shown on the Drawings. NEMA sizes shall be as required for the horsepower shown on the Drawings. Manual starters shall have motor overload protection in each phase.

2. Pilot lights to indicate motor starter status, START, STOP

3. Manual motor starters shall be as manufactured by the Schneider, General Electric, Cutler-Hammer, Allen-Bradley, or equal.

B. Combination Magnetic Motor Starters

1. Motor starters shall be a combination motor circuit protector, contactor, and overload relay.

2. Contactors shall be two- or three-pole, single- or three-phase as required, 60 Hz, 600 volts, magnetically-operated, full-voltage, non-reversing unless otherwise shown on the Drawings. NEMA sizes shall be as required for the horsepower shown on the Drawings. Minimum size shall be NEMA Size 1.

3. Each motor starter shall have a 120 volts operating coil and control power transformer. Transformer primaries and secondaries shall be equipped with time-delay fuses. Three-phase starters shall have three overload relays. Three reversible auxiliary contacts shall be provided as spares in addition to contacts shown on the Drawings.

4. Overload relays shall be adjustable and manually-reset.

5. Furnish built-in control stations and indicating lights where shown on the Drawings.

6. Motor circuit protectors shall be molded-case with adjustable magnetic-trip only. They shall be specifically designed for use with magnetic motor starters.

7. Combination motor starters shall be fully-rated for 65,000 amps RMS symmetrical.

8. Two-speed starters shall be used for single- or two-winding motors as shown on the Drawings.

9. Combination magnetic motor starters shall be as manufactured by the Schneider, General Electric, Cutler-Hammer, Allen-Bradley, or equal.

2.05 CONTROL STATIONS

A. Control stations shall be heavy-duty type, with full-size operators.

B. Pushbuttons noted as emergency stop on the Drawings shall be momentary-contact stop buttons and have a latching mechanism that can be padlocked to retain the pushbutton in the open position.

C. Control stations shall be Square D Class 9001, or similar by Cutler-Hammer, General Electric Co., Allen-Bradley, or equal.

2.06 TRANSFORMERS

A. General Purpose Dry-Type

1. Dry-Type transformers shall be two-winding with kVA and voltage ratings as shown on the Drawings. Transformer shall incorporate a 220 degree C insulation system and be designed not to exceed 115 degrees C temperature rise above a 40 degree C ambient full load.

2. Five full-capacity taps shall be furnished, two 2-1/2 percent above and two 2-1/2 percent below rated primary voltage.

3. Windings shall be copper.

4. Transformers shall be furnished with mounting hardware.

5. Transformers shall have common core construction with low hysteresis and eddy current losses. The core flux density shall be below the saturation point to prevent overheating caused by harmonic distortion.

6. Transformer impedance shall be a minimum of 3 percent and a maximum of 5 percent.

7. Transformers shall be compliant with CEC Title 20, Article 1605, Table T-3, and meets the EPA Energy Star Program.

8. Transformers serving communications equipment shall be K-rated transformers. Transformers shall be built in accordance with ANSI C89.2 and NEMA ST-20, shall be UL listed and suitable for non-sinusoidal current loads with a K-factor of 4 unless noted otherwise on the Drawings.

9. Transformers shall be manufactured by Sorgel, General Electric Co., Cutler-Hammer, or equal.

B. Control Transformers

If incoming power supply as shown on the drawings is other than 120 VAC, each control panel shall be provided with a control transformer. Control transformers shall comply with the following requirements:

1. Each control transformer shall be rated 480/120 V or 240V/120V single phase, 2 wire, 60 Hz, and shall conform to the applicable requirements of NEMA ST 1. The transformer shall have adequate volt-ampere capacity for all connected control function loads indicated, plus an additional 20 percent capacity. Transformer capacity shall be increased as required for any additional non- control function loads, such as condensation heaters, ventilation fans, or air conditioning.

2. Each control transformer shall be feed from the load side of the panel or motor controller disconnect. Control transformers rated 480/120 V shall be provided with two primary fuses rated to interrupt 50,000 A (minimum) at 600 V. One transformer secondary lead shall be provided with a time delay, slow-blow fuse rated to interrupt 10,000 A at 250 V, and the other secondary lead shall be grounded. All fuses shall be provided with blown fuse indicators.

3. Where control circuit power is other than 120V, refer to the drawings for specific required control voltage. Sizing and protection shall be similar.

PART 3 EXECUTION

3.01 FACTORY TESTING

A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of UL and NEMA standards.

1. Insulation check to ensure the integrity of insulation and continuity of the entire system

2. Visual inspection to ensure that the switch matches the specification requirements and to verify that the fit and finish meet quality standards

3. Mechanical tests to verify that the switch's power sections are free of mechanical hindrances

4. Electrical tests to verify the complete electrical operation of the switch and to set up time delays and voltage sensing settings of the logic.

B. The manufacturer shall provide three (3) certified copies of factory test reports.

3.02 ELECTRICAL ROUGH-IN

A. CLEARANCE REQUIREMENT

1. Mark footprint of proposed equipment in proposed location. Review with Engineer.

2. Observe alignment with existing equipment.

3. Tape required NEC clearance.

B. INSTALLATION HEIGHT

1. Display shall be at eye level between 60” – 65” above finished floor.

2. Operable mechanism shall be at least 42” but no more than 66” above finished floor.

3.03 INSTALLATION

The Contractors shall install all equipment per the manufacturer’s recommendations and the contract drawings.

3.04 FIELD QUALITY CONTROL

A. Provide the services of a qualified factory-trained manufacturer’s representative to assist the contractor in installation and start-up of the equipment specified under this section for a period of 5 working days. The manufacturer’s representative shall provide technical direction and assistance to the contractor in general assembly of the equipment, connections and adjustments, and testing of the assembly and components contained therein.

B. The contractor shall provide three (3) copies of the manufacturer’s field start-up.

3.05 MANUFACTURER’S CERTIFICATION

A. A qualified factory-trained manufacturer’s representative shall certify in writing that the equipment has been installed, adjusted and tested in accordance with the manufacturer’s recommendations.

B. The Contractor shall provide three (3) copies of the manufacturer’s representative’s certification.

3.06 TRAINING

A. The contractor shall provide a training session for up to fifteen (15) owner’s representatives for two (2) normal workdays at a jobsite location determined by the owner.

B. The training session shall be conducted by a manufacturer’s qualified representative. The training program shall consist of the instruction on the operation of the assembly and major components within the assembly.

3.07 FIELD SERVICE

The manufacturer of the MTS and ATS shall also have a national service organization that is available throughout the continuous United States and is available on call 24 hours a day, 365 days a year. Include 2 years of field service, parts, and labor in the warranty.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. Article Includes:

1. All labor, materials, equipment and incidentals required to install a complete grounding system in strict accordance with Article 250 of the National Electrical Code (NEC), as shown on the Drawings and as specified in these Specifications.

2. All raceways, conduits and ducts shall contain equipment grounding conductors sized in accordance with the NEC. Minimum sizes shall be No. 12 AWG.

B. Related Articles:

1. Article 37.01, General Electrical Requirements.
2. Article 37.70, Electrical System Testing and Coordination.

1.02 SUBMITTALS

A. Submittals shall be made in accordance with Articles 20.01 and 37.01. Submittals shall include shop drawings and product data, for the following:

1. Ground rods.
2. Exothermic welding methods and materials.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ground wire shall be as specified under Article 37.25.

B. Ground rods shall be 3/4-inches by 10-feet copper-clad steel and constructed in accordance with UL 467. The minimum copper thickness shall be 0.25 mm. Ground rods shall be Copperweld, or equal.

C. Grounding conduit hubs shall be malleable iron type, and of the correct size for the conduit, as manufactured by Thomas & Betts Co., Catalog No. 3940 Series; similar by Burndy or O.Z. Gedney Co.; or equal.

D. Waterpipe ground clamps shall be cast-bronze saddle type, and of the correct size for the pipe, as manufactured by Thomas & Betts Co., Cat. No. 2; similar by Burndy, O.Z. Gedney Co.; or equal.

E. All buried grounding connections and connections to structural steel shall be made by the Cadweld process, or equal exothermic welding system.

1. Molds, cartridge materials and accessories shall be as recommended by the manufacturer of the molds for the items to be welded. Molds and powder shall be furnished by the same manufacturer.

2. Molds used for welding shall be new. The number of welds made per mold shall not exceed manufacturer's recommendations

PART 3 EXECUTION

3.01 INSTALLATION

A. Run grounding electrode conductors in rigid steel conduits. Bond the protecting conduits to the grounding electrode conductors at both ends. Do not allow water pipe connections to be painted. If the connections are painted, dis-assemble them and re-make them with new fittings.

B. Install equipment grounding conductors with all feeders and branch circuits.

C. Bond steel building columns in new structures together with grounding cable and connect to the distribution equipment ground bus, as shown on the Drawings.

D. Grounding cable connections to structural steel columns shall be made with exothermic welds.

E. Liquid-tight flexible metal conduit in sizes 1-1/2 inches and larger shall have bonding jumpers. Bonding jumpers shall be external, run parallel (not spiraled) and fastened with plastic tie-wraps. Plastic tie-wraps shall be ultraviolet-resistant for outdoor applications.

F. Ground transformer neutrals to the nearest available grounding electrode with a conductor sized in accordance with NEC Article 250-66.

G. Install grounding electrodes at locations as shown on the Drawings.

H. All equipment enclosures, motor and transformer frames, conduit systems, cable armor, exposed structural steel and all other equipment and materials required by the NEC to be grounded, shall be grounded and bonded in accordance with NEC Article 250.

I. Seal exposed connections between different metals with No-Oxide Paint Grade A, or equal.

J. Lay all underground grounding conductors slack, and where exposed to mechanical injury protect with pipes or other substantial guards. If guards are magnetic material, electrically connect conductors to both ends of the guard.

K. The installation shall ensure good grounding continuity between the conduit system and equipment frames and enclosures. Where necessary, jumper wires shall be installed.

L. All grounding type receptacles shall be grounded to the outlet boxes with a No. 12 THW green conductor connected to the ground terminal of the receptacle and fastened to the outlet box by means of a grounding screw.

3.02 INSPECTION AND TESTING

A. Inspect the grounding and bonding system conductors and connections for tightness and proper installation.

B. Testing shall be performed before energizing the distribution system.

C. A separate test shall be conducted for each building or system.

D. Grounding system testing shall be performed to verify resistance to ground is less than 25 ohms for all power distribution equipment.

E. Resistance-to-ground testing shall be performed during dry season.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. Article Includes:

1. Complete raceway systems as shown on the Drawings and as specified in these Specifications.

2. Raceway identification.

B. Related Articles:

1. Article 37.01, General Electrical Requirements.
2. Article 37.16, Grounding Systems.

1.02 SYSTEM DESCRIPTION

A. Conduits indicated to be run “exposed” on the schedules shall be run near the ceilings or along the walls of the areas through which they pass and shall be routed to avoid conflicts with HVAC ducts, cranes and hoists, lighting fixtures, doors and hatches, etc.

B. Conduits indicated to be run concealed shall be run in the center of concrete floor slabs, in partitions, or above hung ceilings, as required.

1.03 SUBMITTALS

A. Submittals shall be in accordance with Articles 20.01 and 37.01 and shall include:

1. The manufacturers’ names, product designation, catalog numbers, and catalog cut sheets of all materials specified.

2. All conduit racks suspended from ceilings shall be submitted detailing the materials and installation required to comply with seismic requirements of Article 13.05.01.

PART 2 PRODUCTS

2.01 MATERIALS

A. Rigid Steel Conduit

1. Rigid steel conduit interior and exterior shall be hot-dipped galvanized and shall be as manufactured by the Allied Tube and Conduit Corp., Wheatland Tube Co., or equal.

B. PVC Coated Rigid Steel Conduit

1. PVC coated rigid steel conduit shall have a minimum 0.040 inches thick, polyvinyl chloride coating permanently bonded to hot-dipped galvanized steel conduit and an internal chemically-cured urethane or enamel coating. The ends of all couplings, fittings, etc., shall have a minimum of one pipe diameter in length of PVC overlap. PVC coated rigid steel conduit and fittings shall be manufactured by Occidental Coating Company, “Plasti-Bond Red” as manufactured by Robroy Industries, or equal.

C. Electrical Metallic Tubing

1. Electrical metallic tubing shall be hot-dipped galvanized steel as manufactured by the Allied Tube and Conduit Corp., Triangle PWC Inc., Wheatland Tube Co., Bridgeport, or equal.

D. Rigid Non-metallic Conduit

1. Non-metallic conduit shall be rigid polyvinyl chloride (PVC) schedule 40 as manufactured by Carlon; Kraloy Products Co., Inc.; Highland Plastics Inc.; or equal.

E. Liquidtight Flexible Metal Conduit, Couplings and Fittings

1. Liquidtight flexible metal conduit shall be Sealtite, Type UA, manufactured by the Anaconda Metal Hose Div.; Anaconda American Brass Co.; American Flexible Conduit Co., Inc.; Universal Metal Hose Co.; or equal.

2. Fittings used with liquidtight flexible metal conduit shall be of the screw-in type as manufactured by the Thomas & Betts Co., Crouse-Hinds Co., or equal.

F. Flexible Metallic Tubing

1. Flexible metallic tubing shall be for use under the provisions of NEC Article 348.

2. Flexible metallic tubing shall be hot-dipped galvanized steel strips shaped into interlocking convolutions firmly joined to one another assuring a complete lock similar to Tristeel as manufactured by Triangle, PWC, Inc., or equal.

3. Flexible metallic tubing shall be used only indoors for connection to lighting fixtures in NEMA 1 administration and office areas.

4. Furnish and install insulated bushings at terminations for conductor protection.

G. Flexible Couplings

1. Flexible couplings shall be type ECGJH as manufactured by the Crouse-Hinds Co., Appleton Electric Co., Killark Electric Manufacturing Co., or equal.

H. Boxes and Fittings

1. Pressed steel switch and outlet boxes shall be hot-dipped galvanized as manufactured by the Raco Manufacturing Co., Adalet Co., O.Z. Manufacturing Co., or equal.

2. NEMA 1 and NEMA 12 area boxes:

   a. Terminal boxes, junction boxes, pull boxes, etc., shall be sheet steel unless otherwise shown on the Drawings.

   b. Boxes shall be galvanized and have continuously welded seams. Welds shall be ground smooth and galvanized.

   c. Box bodies shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal.

   d. Covers shall be gasketed and fastened with stainless steel screws.

   e. Terminal boxes shall be furnished with hinged doors, terminal mounting straps and brackets. Terminal blocks shall be NEMA type, not less than 20 amps, and 600 volts.

   f. Boxes shall be as manufactured by Hoffman Engineering Co.; Lee Products Co.; Keystone/Rees, Inc.; or equal.

3. NEMA 4 area boxes:

   a. Terminal boxes, junction boxes, pull boxes, etc., shall be sheet stainless steel unless otherwise shown on the Drawings.

   b. Boxes shall have continuously welded seams and mounting feet. Welds shall be ground smooth.

   c. Boxes shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal.

   d. Covers shall be gasketed and fastened with stainless steel clamps.

e. Terminal boxes shall be furnished with hinged doors, terminal mounting straps and brackets. Terminal blocks shall be NEMA type, not less than 20 amps, and 600 volts.

f. Boxes shall be as manufactured by Hoffman Engineering Co.; Lee Products Co.; Keystone/Rees, Inc.; or equal.

4. NEMA 4X area boxes:

a. Terminal boxes, junction boxes and pull boxes shall be fiberglass reinforced plastic with stainless steel hardware and gasketed covers.

b. Terminal boxes shall be furnished with hinged doors, terminal mounting straps and brackets. Terminal blocks shall be NEMA type, not less than 20 amps, and 600 volts.

c. Boxes shall be as manufactured by Hoffman Engineering Co.; Lee Products Co.; Keystone / Rees, Inc.; or equal.

5. All metal boxes and fittings used with PVC coated conduit shall be furnished with a PVC coating bonded to the metal, the same thickness as used on the coated steel conduit. The ends of couplings and fittings shall have a minimum of one pipe diameter PVC overlap to cover threads and provide a seal.

6. Cast or malleable iron device boxes shall be Type FD. All cast or malleable iron boxes and fittings shall have cadmium-zinc finish with cast covers and stainless steel screws as manufactured by the Crouse-Hinds Co., or equal.

7. Steel elbows and couplings shall be hot-dipped galvanized. Elbows and couplings used with PVC-coated conduit shall be furnished with a PVC coating bonded to the steel, the same thickness as used on the coated steel conduit.

8. Electrical metallic tubing fittings shall be of the raintight, concrete-tight, compression type as manufactured by the Appleton Electric Co., Crouse-Hinds Co., or equal.

9. Conduit hubs shall be as manufactured by Myers Electric Products, Inc., or equal.

10. Conduit wall seals for new concrete walls below grade shall be O.Z./Gedney Co., Type WSK; Spring City Electrical Manufacturing Co., Type WDP; or equal.

11. Conduit wall seals for cored holes shall be Type CSML as manufactured by the O.Z./Gedney Co., or equal.

12. Conduit wall and floor seals for sleeved openings shall be Type CSMI as manufactured by the O.Z./Gedney Co., or equal.

13. Combination expansion-deflection fittings embedded in concrete shall be Type XD as manufactured by the Crouse-Hinds Co.; O.Z./Gedney Co.; Spring City Electrical Mfg. Co.; or equal.

14. Combination expansion-deflection fittings installed exposed shall be Type XJ as manufactured by Crouse-Hinds Co.; O.Z. Gedney Co.; Spring City Electrical Mfg. Co.; or equal.

15. Explosion-proof fittings shall be as manufactured by the Crouse-Hinds Co.; Appleton Electric Co.; O.Z./Gedney Co.; or equal.

16. Conduit sealing bushings shall be O.Z./Gedney, Type CSB; or equal.

I. Conduit Mounting Equipment

1. In dry indoor areas, hangers, rods, backplates, beam clamps, channel, etc., shall be galvanized iron or galvanized steel.

2. PVC-coated steel channel or Fiberglass channel with stainless steel hardware shall be used in areas designated NEMA 4 or 4X on the Drawings or which are wet or corrosive. Fiberglass channel shall be resistant to the chemicals present in the area in which it is used.

3. Conduit mounted on ceilings shall have supports designed in accordance with the requirements of Article xx, Pipe Supports and Anchorage.

J. Conduit Identification Tags

1. Exposed conduit shall be tagged with numbers, pressure stamped into a non-corrosive, two inches long, one-half inch wide, stainless steel tape; Dymo marking system, or equal.

2. A tag with number shall be fixed with No. 18 AWG or larger Type 304 stainless steel wire to each conduit segment, at the end of each conduit and within three (3) feet of each pull box, panelboard and switchboard.

K. Wall and Floor Slab Opening Seals

1. Wall and floor slab openings shall be sealed with a UL classified, FM approved fire barrier as manufactured by 3M Electrical Products Division; Specified Technologies, Inc.; the Thomas & Betts Corp.; or equal.

L. Cold Galvanizing Compound

1. Cold galvanizing compound shall be as manufactured by ZRC Products Company, a Division of Norfolk Corp.; or equal.

PART 3 EXECUTION

3.01 RACEWAY APPLICATIONS

A. Except where otherwise shown on the Drawings, or specified, all wiring shall be in rigid steel conduit.

B. PVC coated rigid steel conduit shall be used where shown on the Drawings and in areas designated NEMA 4X on the Drawings.

C. PVC conduit shall be used for all conduit embedded in concrete walls, floors, and ceilings.

D. PVC conduit shall be used for concrete encased underground duct banks as specified in Article 37.22.

3.02 BOX APPLICATIONS

A. Unless otherwise specified in these Specifications or shown on the Drawings, all boxes shall be metal.

B. Switch, receptacle and lighting outlet boxes and condulet fittings utilized in NEMA 3R, 4, 4X, and 12 areas shall be cast iron or malleable iron.

C. Switch, receptacle and lighting outlet boxes utilized in NEMA 1 areas and installed concealed shall be pressed steel.

D. Switch, receptacle, and lighting outlet boxes utilized in NEMA 1 areas and installed exposed shall be cast iron or malleable iron.

E. Terminal boxes, junction boxes, and pull boxes shall have NEMA ratings suitable for the location in which they are installed.

3.03 FITTINGS APPLICATIONS

A. Combination expansion-deflection fittings shall be used where conduits cross structure expansion joints. Refer to Drawings for expansion joint locations. Provide bonding jumpers around fittings.

B. Conduit wall seals shall be used where underground conduits penetrate walls or at other locations shown on the Drawings.

C. Conduit sealing bushings shall be used to seal conduit ends exposed to the weather and at other locations shown on the Drawings.

3.04 INSTALLATION

A. Conduit smaller than ¾ inches electrical trade size shall not be used, nor shall there be more than the equivalent of three 90 degree bends in any one run. Pull boxes shall be provided as required or directed.

B. No wire shall be pulled until the conduit system is complete in all details; in the case of concealed work, until all rough plastering or masonry has been completed; in the case of exposed work, until the conduit system has been completed in every detail.

C. The ends of all conduits shall be tightly plugged to exclude dust and moisture during construction.

D. Conduit supports, other than for underground raceways, shall be spaced at intervals of eight feet or less, as required to obtain rigid construction.

E. Single conduits shall be supported by means of one-hole pipe clamps in combination with one-screw back plates, to raise conduits from the surface. Multiple runs of conduits shall be supported on trapeze type hangers with steel horizontal members and threaded hanger rods. The rods shall be not less than 3/8 inches diameter. Surface mounted panel boxes, junction boxes, conduit, etc., shall be supported by spacers to provide a minimum of one-half inches clearance between wall and equipment.

F. Conduit hangers shall be attached to structural steel by means of beam or channel clamps. Where attached to concrete surfaces, concrete inserts of the spot type shall be provided.

G. All conduits on exposed work, within partitions and above suspended ceilings, shall be run at right angles to and parallel with the surrounding wall and shall conform to the form of the ceiling. No diagonal runs will be allowed. Bends in parallel conduit runs shall be concentric. All conduit shall be run perfectly straight and true.

H. Conduit terminating in pressed steel boxes shall have double-locknuts and insulated bushings.

I. Conduit terminating in NEMA 3R, 4, 4X and 12 enclosures shall be terminated with Myers-type conduit hubs.

J. Conduits containing equipment grounding conductors and terminating in sheet steel boxes shall have insulated throat grounding bushings.

K. Conduits shall be installed using threaded fittings.

L. Liquidtight flexible metal conduit shall be used for all motor terminations, the primary and secondary of transformers, generator terminations and other equipment where vibration is present. The maximum length of liquidtight flexible conduit shall be limited to three (3) feet at each termination.

M. Where conduits pass through openings in fire-rated walls or floor slabs, the openings shall be sealed with sealing systems of equal fire rating to the wall, ceiling, or floor. Refer to Architectural Drawings for fire ratings.

N. PVC conduit to non-metallic box connections shall be made with PVC socket-to-male thread terminal adapters with neoprene O-ring and PVC round edge bushings.

O. Open-ended conduits containing SO cable, or similar cable that continues outside the conduit to the utilization equipment, shall be sealed with suitably-sized conduit sealing bushings.

P. PVC conduit shall be supported with non-metallic clamps or PVC-coated steel or non-metallic racks and stainless steel hardware.

Q. PVC boxes, conduit fittings, etc., with integral hubs shall be solvent-welded directly to the PVC conduit system.

R. Non-metallic boxes with field-drilled or punched holes shall be connected to the PVC conduit system with threaded and gasketed PVC Terminal Adapters.

S. Expansion fittings shall be used on exposed runs of PVC conduit where required for thermal expansion. Installation and number of fittings shall be as recommended by the conduit manufacturer.

T. All conduit entering or leaving a motor control center, switchboard or other multiple compartment enclosure shall be stubbed up into the bottom horizontal wireway, or other manufacturer-designated area, directly below the vertical section in which the conductors are to be terminated.

U. Conduit sealing and drain fittings shall be installed in areas designated as NEMA 7.

V. A conduit identification plate shall be installed on all power, instrumentation, alarm and control conduits at each end of the run and at intermediate junction boxes, manholes, etc. Conduit plates shall be installed before conductors are pulled into conduits. Exact identification plate location shall be coordinated with the Engineer at the time of installation to provide uniformity of placement and ease of reading. Conduit numbers shall be exactly as shown on the Drawings.

W. Conduits noted as spare shall be capped or plugged at both ends with easily removable fittings.

X. Mandrels shall be pulled through all existing conduits which will be reused and through all new conduits which are two (2) inches diameter and larger prior to installing conductors.

Y. 3/16-in polypropylene pull lines shall be installed in all new conduits noted as spares or designated for future equipment.

Z. All conduit which may under any circumstance contain liquids such as water, condensation, liquid chemicals, etc., shall be arranged to drain away from the equipment served. If conduit drainage is not possible, conduit seals shall be used to plug the conduits.

AA. Flexible metallic conduit shall be used for recessed fluorescent fixtures in hung ceilings to connect fixtures to the conduit system.

BB. Where no type or size is indicated for junction boxes, pull boxes or terminal cabinets, they shall be sized in accordance with the requirements of NEC Article 314.

CC. Miscellaneous steel for the support of fixtures, boxes, transformers, starters, contactors, panels and conduit shall be furnished and installed.

DD. Steel channels, flat iron and channel iron shall be furnished and installed for the support of all electrical equipment and devices, where required, including all anchors, inserts, bolts, nuts, washers, etc., for a rigid installation.

EE. Conduits shall not cross pipe shafts, access hatches or vent duct openings. They shall be routed to avoid such present or future openings in floor or ceiling construction.

FF. The use of running threads is prohibited and a three-piece union shall be used in lieu of running threads.

GG. Conduits passing from heated to unheated spaces, exterior spaces, refrigerated spaces, cold air plenums, etc., shall be sealed with “Duxseal” as manufactured by Manville, or by using a seal fitting, to prevent the accumulation of condensation.

HH. Conduits shall be located a minimum of three (3) inches from steam or hot water piping. Where crossings are unavoidable, the conduit shall be kept at least one (1) inch from the covering of the pipe crossed.

II. Conduits terminating at a cable tray or busduct shall be supported independently from the busduct or cable tray. Provide a conduit support within one (1) foot of the cable tray or busduct. The weight of the conduit shall not bear on the cable tray or busduct.

JJ. Rigid galvanized steel conduits buried in earth shall not be utilized.

KK. Rigid galvanized steel conduits which have been field-cut and threaded shall be painted with cold galvanizing compounds.

LL. PVC-coated galvanized rigid steel conduit shall be used for elbows and risers at the utility pole for electrical and telephone service conduits.

MM. PVC-coated galvanized rigid steel elbows shall be used for pad-mounted transformer stub-ups.

3.05 RACEWAY IDENTIFICATION

A. Individual raceways shall be identified by the designation “X-ORIG/DEST” as follows:

For grounding	X = G
For power	X = P
For control (DO), status (DI), and alarm (DI)	X = C
For combined power and control	X = P/C
For signal (AI/AO)	X = S
For network data cables	X = N
For voice cables	X = V

ORIG = the enclosure at the raceway system origination.
DEST = the raceway destination item of equipment, control panel, etc.

Example raceway identification: P-MCC-5/ROHPCP

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. Article includes a complete underground raceway system manholes, pullboxes, handholes, conduits, and accessories as shown on the drawings and as specified in these Specifications.

B. Related Article:

1. Article 37.01, General Electrical Requirements.
2. Article 37.19, Conduits, Boxes, and Fittings.

1.02 SUBMITTALS

A. Submittals shall be in accordance with the Special Provisions and Article 37.01.

B. Submittals shall contain shop drawings and product data for the following:

1. Manholes, pullboxes, and handholes
2. Frames and covers
3. Underground accessories

PART 2 PRODUCTS

2.01 CONDUITS

A. General type of underground raceways shall be Schedule 40 Polyvinyl Chloride (PVC) conduit.

B. At transition from below ground to above ground, raceways shall be PVC wrapped Rigid Steel Conduit.

C. Conduit splices and fittings shall be the materials as the conduits and approved by the manufacturer for the specific use.

D. At terminations, provide conduits with integral bell ends and bushings. Provide conduit plugs.

E. Provide bell ends, conduit spacers, spacers with bases, and reducers. Manufactured by Carlon, Underground Devices, TVC Inc., or equal.

2.02 MANHOLES

A. Manholes size shall be 72’ (L) x 96’ (W) x 72’ (H) minimum, nominal interior dimensions.

B. Manholes shall be engineered. Manholes shall be traffic loading made up of 4500 psi reinforced, designed for traffic loading.

C. Conduits shall enter and exit the manholes in a straight line method. The remaining parallel walls are to remain free of conduit entrances. These walls are to remain free to allow cable support and splicing operations.

D. Pulling irons shall to be provided on opposite side of the ducts, rated at 10,000 pounds pulling tensions.

E. Bonding jumpers shall be provided between each section and attached to reinforcing steel of the manhole.

F. Cover

1. Provide heavy-duty, cast-iron, frame with nominal 36 inches opening equal to NEENAH #R-1640-D with drop handles and security bolting or approved equal.

2. Manhole frames and covers shall be cast-iron, heavy-duty type for Class H-20 wheel loading.

3. Lid to be lettered “SCVWD”, “ELECTRIC”, “HIGH VOLTAGE”, and numbered as shown in the drawings.

4. Provide collar in 1” increment as needed to install cover flush with grade.

G. Provide a 14-inch sump with gravel and grate cover.

H. Provide space for ground rod at each opposite end. Provide a grounding connection to concrete reinforcement for grounding.

2.03 PULLBOXES AND HANDHOLES

A. Sizes

1. Pullboxes size shall be 36” (L) x 60 (W) x 36 (D), minimum. Bottom shall be solid concrete construction.

2. Handhole

a. 17” (L) x 30” (W) x 24” (D), unless otherwise noted in the drawings. Bottom shall be open construction.

b. 17” (L) x 10” (W) x 12” (D), Bottom shall be open construction

3. Handhole extensions shall be in 12” increments.

B. Construction

1. Pullboxes and handholes shall be precast concrete, heavy-duty type. Precast units shall be as manufactured by Old Castle Precast, Jensen Precast, Christy, or equal.

2. At handholes, conduits shall enter and exit in a straight line method. The remaining parallel walls are to remain free of conduit entrances. These walls are to remain free to allow cable support and splicing operations.

3. At pullboxes, conduits shall enter and exit at the bottom.

C. Covers

1. Handholes

a. Landscaped Areas

(1) 10” X17” Handhole covers shall be concrete steel reinforced lid. Jensen Precast, HN1017-L02, or equal.

(2) 17” X 30” Handhole covers shall be concrete steel reinforced lid. Jensen Precast, CYN36-FL36D, or equal.

b. Incidental Traffic Areas

(1) 10” X17” Handhole covers shall be steel diamond plate bolt down lid. Jensen Precast, HN1017-C01, or equal.

(2) 17” X 30” Handhole covers shall be concrete steel reinforced lid. Jensen Precast, CYN36-61J, or equal.

c. Traffic Areas

(1) 17” X 30” Handhole covers shall be cast in frame steel lid. Oldcastle Precast, 01-7962, or equal.

2. Pullboxes (36” x 60” x 36”, minimum)

a. Pullbox covers shall be H-20 traffic rated, slip resistant, with security bolts and hinged at non-traffic locations.

b. Pullbox covers shall be H-20 traffic rated, slip resistant, and bolt down full coverage at traffic locations.

c. Pullbox covers shall be equipped with height adjustments.

2.04 ACCESSORIES

A. Cable racks, supports, pulling irons, ladders, and hardwares shall be galvanized steel.

B. Cable racks, supports, ladders, and hardwares shall be fiberglass in manholes and pullboxes containing medium voltage cables.

C. Detectable Warning Tape

1. Warning tapes used to mark wires with voltage above 120VAC shall be Red with label “Caution Buried Electric Line Below”.

2. Warning tapes used to mark communication wires shall be orange with label “Caution Buried Communication Line Below”.

3. Tape shall be 2” wide, 5-mil with aluminum backing to make it detectable underground using a non-ferrous locator

4. Underground warning tapes shall be by Seton, or approved equal.

D. Pullropes shall be polypropylene rope, rot/mildew resistance, and unaffected by chemicals or water exposure. Diameter shall be ¼”, and 1000 lbs tensile strength minimum. Mule tape not acceptable.

E. Lubricant shall be environmentally safe and harmless to human, clean, slow-drying, water-based, high-performance gel. Lubricant shall provide maximum tension reduction in all types of cable pulling. Lubricant shall be specification-grade lubricant that does not promote flame propagation when used with fire-retardant cables and systems. It shall be compatible with all common cable jacket materials. Lubricant shall be Polywater Lubricant J or equal.

F. Duct Seal shall be semi-permanent, and can be removed. Foam type that expands and cures quickly and evenly. Duct seal shall seal ducts neatly. Seal shall tolerate cable movement, but shall provide seal for water, rodents, and other contaminants in the conduit. Duct seal shall be Polywater, FST-250, or equal.

G. Cable Ties shall be made up of durable nylon, heavy duty, Thomas Betts Ty-Rap, or equal.

PART 3 EXECUTION

3.01 UNDERGROUND SURVEY PRIOR TO EXCAVATION

A. Prior to any excavation work, call “811” and/or hire an underground utility locator to identify existing buried utilities. Submit findings to Engineer of Record, prior to excavation work.

B. If contractor fails to perform underground survey, costs and loss of revenue associated with downtime of impacted system shall be the contractor's responsibility.

3.02 INSTALLATION

A. General Installation

1. Install underground conduits in trenches. Trench excavation width over 48 inches shall be provided with shoring protection and plans are subject to structural engineer's review.

2. Dry and wet utilities shall not occupy the same trench. Provide at least five (5) feet separation between dry and wet utility trenches.

3. In general, dry utilities shall be routed above wet utilities.

4. Underground clearances shall be 36 inches below grade for power conduits and 30 inches below grade for signal/communication conduits.

5. Provide at least 1 inch spacing between conduits control, telemetry, and signal of 120V or less. Provide at least 2 inches spacing between low voltage (control, telemetry, and signal) conduits and power conduits below 600 Volts.

6. Maintain a minimum distance of 12 inches between conduits with conductors below 600Volts and conduits with conductors for medium voltage conductors

7. Maintain at least 1 inches spacing between conduits with similar low voltage conductors.

8. Maintain at least 2 inches spacing between medium voltage conduits.

9. Conduit for service entrance (Power and Communication) installation shall comply with utility requirements.

B. Installation in Trenches

1. Concrete encased ductbank at the following locations

a. As shown in the drawings, or

b. Concrete encasement of ductbank is required if underground minimum clearances are not met, or

c. When crossing wet utilities, where the conduits are route below the wet utilities or,

d. When routed parallel to wet utilities, where trench distance to pipe is less than five feet.

2. Install raceways to slope away from buildings. Raceways between manholes, pullboxes or handholes shall drain toward the largest manholes, pullboxes, or handholes. Raceway slopes shall not be less than ¼ inch per foot.

3. Raceways shall be lay in sand bedding material with 3 inch cover all around. Compaction shall be every 10 -12 inches with backfill material, as shown in the drawings.

4. Lay underground raceways trenches parallel and perpendicular to roads, structures, and path of travel or as shown on the Drawings.

5. Use plastic spacers to hold raceways in place. Space at least every four feet with conduit base spacers every ten feet, or as suggested by the manufacturer.

6. Raceway entrances to buildings, structures, and equipment shall be PVC-coated rigid steel conduit not less than three feet long.

C. Underground Conduit Terminations and Entries

1. Raceway terminations at manholes shall be end bells for PVC conduit and insulated throat grounding bushings for steel conduit.

2. Conduit entries at manholes and pullboxes shall be at the side with minimum clearance of 6 inches above bottom of manhole and pullboxes.

3. Conduit in entries at handholes shall be at the bottom and shall use long radius elbows, sweeps and offsets. Communication conduit sweeps shall be at least 12 times the diameter of the communication wire it contains.

D. Clean and mandrel raceways before installing cable. Use cable lubricant in pull wires.

E. Train cables in manholes and pullboxes and support and restrain them on racks and hooks. Furnish inserts on all manhole and handhole walls for mounting future racks, as well as racks required for present installation.

F. Plug spare raceways and seal them watertight at all manholes, buildings and structures. Use conduit plugs.

G. Seal the ends of raceways and make watertight at all manholes, buildings and structures. Use duct seat.

H. Drainage

1. Handholes shall be set above 12 inches of drain rock.

2. At pullboxes and manholes, provide pipe at the bottom for drainage to nearest storm drain or French drain.

I. Label

1. Provide permanent etching of “SCVWD” at manhole, pullbox, and handhole covers.

2. Label manholes, pullboxes, and handhole covers with their identification as called out in the drawings. Typical label:

a. “EMH-X” or “SMH-X” = Electrical Manhole “X” or Signal Manhole “X”

b. ““EPB-X” or “SPB-X” = Electrical Pullbox “X” or Signal Pullbox “X”

c. ““EHH-X” or “SHH-X” = Electrical Handhole “X” or Signal Handhole “X”

J. Grounding

1. Install at least two ground rods at each manhole and pullbox. Install one ground rod at each handhole. Tie ground rod to grounding pigtail provided at each manhole and pullbox that is connected to the reinforcement.

2. Ground all non-current carrying metal and shielding to the ground rod. Connect all cable rack supports, manhole steps and manhole hardware to a grounding rod.

3.03 DOCUMENTATION

A. Provide an as-built of underground conduit system. Include the following:

1. General Route
2. Typical Depth
3. General conduit orientation

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. Article Includes:

1. Wire and Cables

a. Building Wire

b. Low Voltage Wiring

(1) Control, Status and Alarms
(2) Instrumentation

c. Network Cables

(1) Serial Cables
(2) Coaxial Cables
(3) Ethernet Cable
(4) Fiber Optic Cable (Refer to Specification Section_____)

2. Connectors

a. Terminations
b. Splices

3. Wire and cable identification.

B. Related Articles:

1. Article 37.01, General Electrical Requirements.

2. Article 38.01, General Instrumentation and Control Systems Requirements.

C. Exclusions: Wires and Cables exceeding 600 volts

1.02 SUBMITTALS

A. Submittals shall be in accordance with Articles 20.01 and 37.01.

B. Submittals shall include:

1. Product data cutsheets of each type of proposed wire . Submittals shall highlight the electrical ratings, type of insulation, voltage, diameter, bending radius, and stenciled markings.

2. Samples of each type of proposed wire larger #2 AWG, or as required by project engineer. Approved samples will be sent to the project location for comparison by the Engineer with the wire actually installed.

3. Motor terminations.

4. Splices and terminations

5. Wire and cable markers.

C. Submit test reports for network cabling

1. Factory test reports prior to shipment

2. Field test reports shall be submitted to the Owner's Representative prior to commissioning network/data system

D. Submit field test reports for power and low voltage cabling

1. Continuity Testing – Pass or Fail

2. Megger test shall be submitted to the Owner's Representative prior to commissioning as part of electrical testing

1.03 DELIVERY, STORAGE AND HANDLING

A. Material shall be stored and protected per manufacturer's instructions.
B. Carefully handle all conductors to avoid kinks and damage to insulation.
C. Store in protected areas.

PART 2 PRODUCTS

2.01 GENERAL

A. Wires and cables shall be of annealed, 98 percent conductivity, soft drawn copper.

B. All conductors shall be stranded, except that lighting and receptacle wiring shall be solid.

C. Except for control, signal and instrumentation circuits, wire smaller than No. 12 AWG shall not be used.

D. General Wiring is defined as wires used in 150V or less circuits for single phase loads such:

1. Receptacle Outlets,

2. Lighting,

3. Fractional Horsepower rated motors (i.e., fans, disposers, etc.)

4. Non-process control and signal wires (door sensors, card readers, lighting systems, etc.)

5. Branch Circuits serving loads 30 amps or less (AWG #10 or less)

E. Field Wiring is defined as 150V or less circuit used for control, status, and alarm wiring originating from a control panel (I/O cabinet, signal termination cabinet, RTU, etc.) to field instruments/device or field terminals excluding intermediary terminal control panels.

F. Control Panel wiring is defined as 150V or less circuit used for control, status, and alarm wiring contained within a control panel (I/O cabinet, signal termination cabinet excluding field wiring terminated inside the control panel.

2.02 BUILDING WIRE

A. Building Wire shall be rated for 600V and No. 12 AWG minimum.

B. General wiring conductors shall be NEC type THHN/THWN or XHHW.

C. Wires for circuits over 150 Volts to ground, multi-phase loads, feeder, motor circuits shall be NEC type XHHW-2. The use of NEC type THHN/THWN is not acceptable on this project for circuits exceeding 150 volts to ground.

D. Multi-conductor control and power cables shall have stranded conductors with type with XLPE insulation and an overall PVC jacket covering over the individual wires. Cable shall be TC-ER rated and conform to UL 1277 and IEEE 383 Standards. Cable shall be flame resistant, no propagating and suitable for installation in a Class I, Division II hazardous location. Power and control cables shall be furnished with a green ground conductor and white neutral conductor where required. Limited to 19 conductors per cable.

E. Additional requirements for building wires inside or within 3 feet of fire-rated constructions shall be Type CI compliant with UL 2196.

F. Acceptable Manufacturers: Okonite Co., General Cable., Southwire, Anixter; or equal.

2.03 CONTROL, STATUS AND ALARM WIRE

A. Minimum wire sizes for control, status, and alarm wires other than building wire:

1. Field Wiring - No. 14 AWG, refer to Part 3 for exceptions.

2. Control Panel Wiring - No. 16 AWG minimum, or as per manufacturer's recommendations.

B. Wires shall be 600V rated, MTW, with PVC insulation and jacket.

C. Multi-conductor control cable shall be rated 600V, Type TC, PVC jacket and insulation.

D. Acceptable Manufacturers: Okonite Co., General Cable., Southwire, Anixter; or equal.

2.04 INSTRUMENTATION WIRE

A. Wire for process instrumentation signals (i.e. 1-5 VDC, 4-20 mADC), R.T.D., potentiometer, and similar signals shall be:

1. Single-pair cable:

a. Conductors: Two No. 16 AWG stranded and twisted on two-inch lay

b. Insulation: PVC with 300 volts, 105 degree C rating

c. Shield: 100 percent Mylar tape with drain wire

d. Jacket: PVC with UL Subject 13, UL 1581 and manufacturers identification

e. Maximum overall diameter: 0.262 inches

f. Misc: UL Subject 13, Type PLTC

g. Manufacturers: Okonite, N type P-0S, Model No. 264-10-4401; or equal. Equivalent cable: Belden 1030A, Okonite 564-10-3401, and Okonite 264-10-5801

2. Three-conductor (triad) cable:

a. Conductors: Three No. 16 AWG, stranded and twisted on two-inch lay

b. Insulation: PVC with 300 volts, 105 degree C rating

c. Shield: 100 percent Mylar tape with drain wire

d. Jacket: PVC with UL Subject 13, UL 1581 and manufacturers identification

e. Max overall diameter: 0.276 inches

f. Misc: UL Subject 13, Type PLTC

g. Manufacturers: Okonite, N Type P-OS, Model No. 564-15-4401 or equal. Equivalent cable is Belden 1031A, OKonite 264-15-5801, and Okonite 564-15-3401

2.05 NETWORK CABLES

A. Cables specified under this section are intended to be used in networking equipment, field devices, and headend equipment. Refer to related sections and drawings for additional requirements.

B. Serial Cable shall support duplex communications and shall be a two-pair cable suitable for use on an RS-485, four-wire system.

a. Conductors: Two No. 22 AWG, tinned-copper, stranded and twisted.

b. Insulation: PVC with 300 volts, 105 degree C rating.

c. Shielding: Individual shielded pairs.

d. Jacket: PVC, UL1581.

e. Maximum overall diameter: 0.323 inches.

f. Manufacturers: Belden 9328; Okonite, N type SP-OS; or equal.

C. Ethernet Cables

1. Category 6 and ISO 11801 Class E standards at swept frequencies up to 350MHz, 100MHZ above standard

2. Certified channel performance in a 4-connector configuration up to 100 meters and meets ANSI/TIA-568-C.2

3. Conductors/insulators:

a. Plenum – 23 AWG solid copper covered by FEP/polyolefin insulation

b. Riser – 23 AWG solid copper covered by polyolefin insulation, UTP

4. Flame rating:

a. Plenum – NFPA 262
b. Riser – UL1666

5. PoE compliance: Meets IEEE 802.3af and IEEE 802.3at for PoE Applications (as applicable)

6. Installation tension: 25 lbf (110N) maximum

7. Cable jacket:

a. Plenum – low smoke, flame-retardant PVC
b. Riser – flame-retardant PVC

8. Cable diameter:

a. Plenum – 0.224 in. (5.7mm) nominal
b. Riser – 0.210 in. (5.3mm) nominal

9. Cable weight:

a. Plenum – 29 lbs./1000 ft. (13 kg/305m)
b. Riser – 22 lbs./1000 ft. (10 kg/305m)

D. Remote Input/Output (Rio) Network Cables

RIO network trunk cables shall be RG-11 and drop cables shall be RG-6.

1. RG-6 cables shall be:

a. Attenuation: 0.38 dB/100 ft @ 2 MHz, 0.36 db/100 ft @ 1.544 MHz, RIO Transmit Frequency

b. Impedance and Tolerance: 75 W (+/- 3 W)

c. Velocity of Propagation: 83%

d. Capacitance: 16.2 pF/ft

e. Type of Shield: Bonded Foil Quad-Shield

f. UL/NEC Rating: CMR or CL2R

g. Type of Jacket: PVC

h. Minimum Bend Radius: 3 in.

i. Maximum Pull Strength: ~~162~~ 126 lb

j. Manufacturers: Belden 9116

2. RG-11 cables shall be:

a. Attenuation: 0.38 dB/100 ft @ 5 MHz, 0.17 dB/100 ft @ 1.544 MHz, RIO Transmit Frequency

b. Impedance and Tolerance: 75 W +/- 3 W

c. Velocity of Propagation: 83%

d. Capacitance: 16.2 pF/ft

e. Type of Shield: Bonded Foil Quad-Shield

f. Type of Jacket: PVC

g. UL/NEC Rating: CMR and CLR2

h. Minimum Bend Radius: 4.5 in.

i. Maximum Pull Strength: 300 lb

j. Manufacturers: Belden 1617A

2.06 SPLICES AND CONNECTORS (POWER CONDUCTORS)

A. Splices and connectors shall be per wire manufacturer’s recommendation.

B. Compression type connectors shall be insulated with a heat-shrink boot or outer covering and epoxy filling. Splice kits shall be as manufactured by Raychem, Ideal Industries, 3M Co., or equal.

C. Solderless pressure connectors shall be self-contained, waterproof and corrosion-proof units incorporating prefilled silicone grease to block out moisture and air. Connectors shall be sized according to manufacturer's recommendations. The connectors shall be UL listed and CSA approved, as manufactured by King Innovation, Ideal Industries, Inc., or equal.

D. Motor cable terminations shall be ring-type mechanical compression terminations installed on the branch circuit wires and the motor leads and secured with bolt, nut and springwasher.

E. Motor cable splices and connections shall be insulated with a Raychem Type RVC, roll-on stub insulator; or equal.

2.07 TERMINATION AND SPLICES FOR CONTROL, STATUS, & ALARM CONDUCTORS

A. Terminations shall be of the solderless, nylon insulated, locking fork-end (upturned leg ends) or eyelet type. Splices (connectors) shall be of the solderless, nylon insulated parallel or pigtail type.

B. Terminations and connectors shall be as manufactured by Thomas & Betts, Ideal Industries; 3M Co.; Panduit Corp.; or equal.

C. Solderless pressure connectors shall be self-contained, waterproof and corrosion-proof units incorporating prefilled silicone grease to block out moisture and air. Connectors shall be sized according to manufacturer's recommendations. The connectors shall be UL listed and CSA approved, as manufactured by King Innovation, Ideal Industries, Inc., or equal.

D. Ferrules shall be as manufactured by Thomas & Betts; 3M Co.; Panduit Corp; or equal.

2.08 TERMINATIONS FOR INSTRUMENTATION CABLES

A. Termination connectors shall be of the insulated locking fork-end (upturned leg ends) or eyelet type.

B. Terminations shall utilize nylon insulation.

C. Terminations shall be as manufactured by Thomas & Betts, Ideal Industries; 3M

D. Ferrules shall be as manufactured by Thomas & Betts; 3M Co.; Panduit Corp; or equal.

2.09 WIRE AND CABLE MARKERS

A. Wire and cable markers shall be heat-shrinkable sleeves with black lettering on white background as manufactured by the W.H. Brady Co., Thomas & Betts Co., 3M Co., or equal.

B. Wire and cables with diameters exceeding the capacity of the heat-shrinkable sleeves shall be marked with pre-printed, self-adhesive vinyl tapes as manufactured by the W.H. Brady Co., Panduit Corp., or equal.

C. Markers shall be printed using manufacturer's recommended product, or equal.

D. Markers used in tunnels or other wet locations shall be on heat-shrinkable marking sleeves.

E. Use self-laminating vinyl on white background for markers within electrical equipment such as panels, termination cabinets, motor control centers.

PART 3 EXECUTION

3.01 INSTALLATION

A. Limitations on installation:

1. Splices is generally not allowed. Submit and identify use of splices and obtain approval prior to installation.

2. Use of multi-conductor shall be limited. Submit and identify use of multi-conductor cable and obtain approval prior to installation.

3. Instrumentation wires are typically rated for 300 volts. Do not route instrumentation wires with power and control wires which are rated 600V.

B. Use lubrications to facilitate wire pulling. Lubricants shall be UL approved for use with the insulation specified.

C. Raceways shall be free and clean of debris, moisture, and water prior to cable or wire pulling.

3.02 CIRCUIT IDENTIFICATION

A. Uniquely identify all wires, cables and each conductor of multi-conductor cables at each end with wire and cable markers.

B. Color Coding General

1. All wire shall be color-coded or coded using electrical tape in sizes where colored insulation is not available. Where tape is used as the identification system, it shall be applied in all junction boxes, manholes and other accessible intermediate locations as well as at each termination.

C. Color Coding Table

System	Wire	Color
240/120 Volts	Neutral	White
Single-phase, three-wire	Line 1	Black
	Line 2	Red
208Y/120 Volts	Neutral	White
Three-phase, four-wire	Phase A	Black
	Phase B	Red
	Phase C	Blue
480Y/277 Volts	Neutral	White
Three-phase, four-wire	Phase A	Brown
	Phase B	Orange
	Phase C	Yellow
Equipment Grounding Cables		Green
General Purpose AC Control Cables		Red
Discrete AC Cables at I/O Cards		Red
24V General Purpose DC Control Cables		Blue/White w/Blue Tracer
24V Discrete DC Cables at I/O Cards		Blue/White w/Blue Tracer
12V General Purpose DC Control Cables		Pink w/White Tracer/Black w/White Tracer
12V Discrete DC Cables at I/O Cards		Blue/White w/Blue Tracer Pink w/White Tracer/Black w/White Tracer
Instrumentation Cables including Shielded Pair		Black/White
Externally-Fed Control Cables (Interlocks)		Yellow

1. Use control cable or instrumentation cable for alarm annunciator field wiring as shown on the Drawings and specified. Use color coding and phasing consistent throughout the site. Bus bars at panelboards and motor control centers to be connected Phase A-B-C, top-to-bottom, or left- to-right facing connecting lugs.

2. Conductors No. 2 AWG and smaller shall be factory color-coded with a separate color for each phase and neutral. Larger cables shall be coded using colored tape.

3. In addition to color coding, for all single-phase and three-phase systems, identify each cable (single or multi-conductor) and conductor at each end, in each manhole, pull box, cable tray, or other component of the raceway system. This identification is applicable to all power, control, alarm, signal, and instrumentation cables, and conductors.

4. Identify each cable (single or multi-conductor) and groups or bundles of individual single conductors in each manhole, pull box, or other component of the raceway system with circuit identification markers. Implement a “from-to” cable/conductor bundle tagging system as part of this identification effort.

5. Identify each individual conductor at each termination. This includes such locations as switchgear, switchboards, motor control centers, adjustable speed drives, control panels, junction/terminal boxes, all field devices, and all other locations where conductors are terminated. Identify the termination of these conductors in accordance with the accepted shop drawings. Tag conductors with sleeve-type labels.

6. Where more than one nominal voltage system exists, identify each ungrounded system conductor by phase and system. Permanently attach means of identification at each branch-circuit panelboard, switchboard, switchgear, motor control center, or other type of power distribution equipment.

D. Power Conductors

1. Include the following information for power wire and cable identification:

   a. Circuit Number
   b. Origin
   c. Destination

2. Circuit number shall be as indicated on one-line diagrams for circuits fed from switchgear, switchboards, and motor control centers and as shown on panelboard schedules for circuits fed from lighting or distribution panelboards.

3. Origin is included in the circuit number.

4. Destination shall be the load tag name for an individual item of equipment, panelboard, or control panel as shown on the Drawings.

5. Example identification:

   a. Feeder Circuit - SWBD1/MCCA
   b. Branch Circuit – PanelA – Ckt 2 / Lights

E. Instrumentation and Control Conductors

1. Use the following information for instrumentation and control conductor identification:

   a. Process area codes:

      (1) CS Caustic Soda

   b. Function designation and loop numbers:

      (1) For circuits between field source and control panel, use the equipment tag name.

   c. Example identification: For the Caustic Soda Pump No. 2 RUN status DI circuit, the two wires between ROHPCP and I/O Drop 18 should be labeled:

      (1) “CS-MN902-1”
      (2) “CS-MN902-2”

F. Drawings

1. Contractor shall prepare and submit shop drawings for electrical equipment room layouts, drawn at a minimum scale of 3/8 inch = 1 foot. Wiring plans shall be drawn at a minimum scale of ¼ inch = 1 foot.

2. Wiring diagrams shall carry a uniform and coordinated set of wire numbers and terminal block numbers to permit cross-referencing between the contract document drawings, the drawings prepared by the Contractor, and equipment O&M Manual Drawings.

3. Drawing number cross-references and continuation references shall also be provided. Contractor-prepared drawings shall reference applicable Contractor drawings such as P&IDs, control and logic diagrams, interface wiring diagrams, panel drawings, etc. Contractor-prepared drawings shall also reference applicable drawings provided by equipment manufacturers. Continuation and cross references denoted as “By Others” or similar non-specific wording are unacceptable.

4. On any drawing prepared for this project, if a wire, circuit, enclosure, panel, or device is continued on another drawing, the continuation drawing shall be referenced (and vice-versa). Wherever wires are shown connected to terminals, the drawings which show the continuation of the circuits on those terminals must be referenced.

5. Equipment interconnection diagrams shall be produced with the latest version of AutoCAD software, printed on 11 inches by 17 inches size paper, and submitted on both electronic CD-ROM media and paper drawings. Submit complete interconnection diagrams no later than 60 days prior to any cable installation into raceways. Contractor shall note that the equipment interconnection diagram submittal will not be partially approved ("Approved as Noted"). Cables shall not be installed into raceways until the wiring interconnection diagrams are reviewed by the design engineer and returned marked as "No Exceptions Noted."

3.03 TERMINATIONS AND SPLICES

A. Power conductors:

1. Terminations shall be die-compression type.

2. Splices (where allowed) shall be die-type compression connector and waterproof with heat-shrink boot or epoxy filling for copper conductors No. 4 AWG and larger.

3. Splices shall be solderless pressure connectors with insulating covers for copper conductors No. 6 AWG and smaller.

B. Control Conductors:

1. Termination on saddle-type terminals shall be wired directly with a maximum of two conductors.

2. Termination on screw type terminals shall be made with a maximum of two locking fork or eyelet connectors.

3. Splices, where allowed, shall be made with insulated compression type connectors.

4. Control conductors shall have non-insulated ferrules applied at both ends and shall not prevent two conductors from being installed in a single terminal. No more than one wire shall be installed in a single ferrule. Ferrule installation shall be performed using manufacturer's recommended crimping tool.

5. All control panel field wiring shall terminate on a set of terminal blocks bearing an overall unique identification number, with one terminal block set for each signal type. Each terminal point shall bear a unique identification number. Each set of terminal blocks shall have no less than 20% spares. Refer to 3.02 for numbering convention.

6. The field wiring side of terminal blocks shall be spaced a minimum of 6 inches from control panel side panels and adjacent sets of terminal blocks. The opposite side shall have a minimum spacing of 2 inches.

C. Instrumentation Signal Conductors including for graphic panel, alarm, low- and high-level signals:

1. Terminations same as for control conductors.
2. Splices allowed at instrumentation terminal boxes only.

D. Except where permitted by the Engineer no splices will be allowed in manholes, handholes or other below grade located boxes.

E. Splices shall not be made in push-button control stations, control devices (i.e., pressure switches, flow switches, etc.), conduit bodies, panelboards, etc.

3.04 INSTRUMENTATION CABLES

A. Instrumentation cables shall be installed in raceways as specified or as shown on the Drawings. All circuits shall be installed as twisted pairs or triads. In no case shall a circuit be made up using conductors from different pairs or triads. Triads shall be used wherever three wire circuits are required.

B. Terminal blocks shall be provided at all instrument cable junctions, and all circuits shall be identified at such junctions.

C. Shielded instrumentation wire, coaxial, data highway, I/O and fiberoptic cables shall be run without splices between instruments, terminal boxes, or panels.

D. Shields shall be grounded as recommended by the instrument manufacturer and isolated at all other locations. Terminal blocks shall be provided for inter-connecting shield drain wires at all junction boxes. Where individual circuit shielding is required, each shield circuit shall be provided with its own block.

E. Prior to termination, heat shrink tubing shall be applied to shield wires and to twisted shielded cable in order to cover any exposed shielding.

3.05 FIELD TESTING

A. Test all copper cabling for continuity.

B. Power wires #2 AWG or larger, or as identified in the drawings shall be meggered at 1000 DC volts after installation but prior to energization of circuit. Submit a written test report of the results to the Engineer.

C. General: Copper cabling shall be tested and certified after installation as follows and as required for cable manufacturer's warranty. Twisted-pair copper cable channels shall be tested for continuity as specified below, presence of ac/dc voltage, and performance. All cabling shall be tested for conformance to horizontal cable specifications as outlined herein, and shall be tested per test set manufacturer's instructions utilizing latest firmware and software. Testing shall include all electrical parameters as specified under Product. All cables and termination hardware shall be 100 percent tested by installation contractor for

defects in installation and to verify cable performance under installed conditions. All conductors of each installed cable shall be verified useable by Contractor prior to system acceptance. All cables shall be tested per contract documents, manufacturer's warranty provisions, and best industry practices. If any of these are in conflict, Contractor shall comply with most stringent requirements. All defects in cabling system installation shall be repaired or replaced to ensure 100 percent useable conductors in all cables installed, at no additional cost to Owner.

D. Perform the following additional tests for network cables:

1. Continuity: Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. The test shall be recorded as pass/fail as indicated by test unit per manufacturers recommended procedures, and referenced to appropriate cable identification number and circuit or pair number. Any faults in wiring shall be corrected and cable re-tested prior to final acceptance.

2. Length: Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to maximum distances set forth in ANSI/TIA-568-C standards and all other applicable standards specified in Appendix 1: Codes, Standards, and Informative References. Cable lengths shall be recorded, referencing cable identification number and circuit or pair number. For multi-pair cables, shortest pair length shall be recorded as length for cable.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. Article Includes:

1. All labor, materials, and equipment to install wiring devices as shown on the Drawings and as specified in these Specifications.

2. Provide all interconnecting conduit and branch circuit wiring for receptacle circuits in accordance with the NEC.

B. Related Articles:

1. Article 37.01. General Electrical Requirements

1.02 REFERENCES

A. Wiring devices shall comply with the requirements of the National Electric Code (NEC) and shall be Underwriters Laboratories (UL) labeled.

1.03 SUBMITTALS

A. Submittals shall be in accordance with in Articles 20.01 and 37.01 and shall include the manufacturers' names, product designation, catalog numbers, and catalog cutsheets for a material specified.

PART 2 PRODUCTS

2.01 MATERIALS

A. Wall switches shall be heavy-duty, specification-grade, toggle-action, flush-mounting quiet type, and brown in color in process areas. Color shall be as approved by the architect in architecturally finished areas. All switches shall conform to the latest revision of Federal Specification WS-896.

Wall switches shall be as follows:

1. Single-pole, 20 amps, 120/277 volts. Arrow-Hart, Catalog No. 1991; similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc.; or equal.

2. Double-pole, 20 amps, 120/277 volts. Arrow-Hart, Catalog No. 1992; similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc.; or equal.

3. Three-way, 20 amps, 120/277 volts. Arrow-Hart, Catalog No. 1993; similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc.; or equal.

4. Four-way, 20 amps, 120/277 volts. Arrow-Hart, Catalog No. 1994; similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc.; or equal.

5. Single-pole, 20 amps, 120/277 volts, key-operated. Arrow-Hart, Catalog No. 1991-L; similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc.; or equal.

6. Single-pole, 20 amps, 120 volts, red pilot-lighted handle. Arrow-Hart, Catalog No. 1991PL; similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc.; or equal.

7. Single-pole, 20 amps, 120 volts, clear-lighted handle. Arrow-Hart, Catalog No. 1991ILC; similar by Harvey Hubbell, Inc.; or equal.

8. Momentary-contact, three-position, two-circuit, center-off. Arrow-Hart, Catalog No. 1895; similar by Harvey Hubbell Inc.; Pass & Seymour, Inc.; or equal.

B. Receptacles shall be heavy-duty, specification-grade, brown color in process areas. Color shall be as approved by the architect in architecturally-finished areas.

Receptacles shall conform to Fed Spec WC596-F and shall be as follows:

1. Duplex, 20 amps, 125 volts, 2-pole, 3-wire. Arrow-Hart, Catalog No. 5362; similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc.; or equal.

2. Weatherproof/corrosion-resistant single type, 20 amps, 125 volts, 2-pole, 3-wire, with cover. Crouse-Hinds Co., Catalog No. WLRS-5-20; similar by Appleton Electric; or equal.

3. Weatherproof/corrosion resistant duplex, 20 amps, 125 volts, 2-pole, 3-wire, with cover; Crouse-Hinds Co., Catalog No. WLRD-5-20; similar by Appleton Electric; or equal.

4. Ground-fault interrupter, duplex, 20 amps, 125 volts, 2-pole, 3-wire, GFCI feed-thru type with “test” and “reset” buttons. Arrow-Hart, Catalog No. GF5342; similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc.; or equal.

5. Duplex, 20 amps, 125 volts, 2-pole, 3-wire, transient voltage surge suppressor and audio alarm or indicating light to indicate bad ground or failed MOV. Arrow-Hart, Catalog No. 5362S; similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc.; or equal.

C. Device Plates

1. Plates for indoor flush mounted devices shall be of the required number of gangs for the application involved and shall be as follows:

   a. In administration-type buildings:

      (1) Smooth, high impact nylon of the same manufacturer and color as the device. Final color to be as selected by the Architect.

   b. Where permitted in other areas of the plant:

      (1) Flush-mounted devices in cement block construction shall be Type 302 high nickel (18-8) stainless steel of the same manufacturer as the devices.

2. Plates for indoor surface-mounted device boxes shall be cast metal of the same material as the box; Crouse-Hinds No. DS23G and DS32G, or equal.

3. Oversized plates shall be installed where standard plates do not fully cover the wall opening.

4. Device plates for switches mounted outdoors or indicated as weatherproof shall be gasketed, cast aluminum with provisions for padlocking switches “ON” and “OFF”; Crouse-Hinds No. DS185, or equal.

5. Multiple surface-mounted devices shall be ganged in a single, common box and provided with an adapter, if necessary, to allow mounting of single-gang device plates on multi-gang cast boxes.

6. Engraved device plates shall be provided where required.

7. Weatherproof, gasketed cover for GFI receptacle mounted in a FS/FD box shall be: Arrow-Hart, Catalog No. 4501-FS; similar by Harvey Hubbell, Inc.; Pass & Seymour, Inc.; or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Switch and receptacle outlets shall be installed flush with the finished wall surfaces in areas with stud frame and gypsum board construction, in dry areas with cement block construction or when raceways are shown as concealed on the Drawings.

B. Do not install flush-mounted devices in areas designated NEMA 3R, 4, or 4X on the Drawings. Provide surface mounted devices in these areas.

C. Provide weatherproof device covers in areas designated NEMA 3R, 4, or 4X on the Drawings.

D. Convenience outlets shall be installed 18 inches above the floor unless otherwise required.

E. Convenience outlets installed outdoors and in rooms where equipment may be hosed down shall be 48 inches above floor or grade (unless otherwise shown or noted on the Drawings).

F. Switches shall be installed 48 inches above the finished floor unless otherwise shown or noted on the Drawings.

G. The location of all devices is shown, in general, on the Drawings, and may be varied within reasonable limits so as to avoid any piping or other obstruction without extra cost, subject to the approval of the Engineer. Coordinate the installation of the devices for piping and equipment clearance.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. Article includes:

1. All labor, materials, equipment and incidentals required and install all panelboards as shown on the Drawings and as specified in these Specifications.

2. All equipment identified on the Drawings as Lighting Panelboards or Distribution Panelboards shall conform to this specification unless noted otherwise on the Drawings.

B. Related Articles:

1. Article 37.01, General Electrical Requirements.

1.02 REFERENCES

A. Panelboards shall be in accordance with the Underwriter Laboratories (UL) “Standard for Panelboards” and “Standard for Cabinets and Boxes” and shall be so labeled where procedures exist. Panelboards shall also comply with NEMA Standard for Panelboards and the National Electrical Code (NEC).

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. All submittals shall be in accordance with Articles 20.01 and 37.01. The submittals shall include the following:

1. Submit catalog cuts and descriptive literature for each type of panelboard and breaker provided.

2. Submit individual panelboard schedule for each panelboard provided under this Work.

3. Engineering calculations shall be furnished in accordance with Article 12.05.01, Seismic Design Criteria. As a minimum, these shall demonstrate that each of the panelboards will adequately transfer the design seismic forces to the anchor bolts and foundation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. 120/240 volts, single-phase, 3-wire and 208/120 volts, 3-phase, 4-wire panelboards: Pow-R-Line 1a by Cutler-Hammer, equal product by General Electric or Square D, or equal.

B. 480 volts, 3-phase, 3-wire and 480Y/277 volts, 3-phase, 4-wire panelboards: Pow-R-Line 3a or 4b by Cutler-Hammer, equal product by General Electric or Square D, or equal.

2.02 GENERAL

A. Rating

1. Panelboard ratings shall be as shown on the Drawings.

2. Circuit breaker panelboards shall be fully-rated for the specified circuit breaker fault current interrupting capacity. Series connected short circuit ratings will not be acceptable.

3. Where required by the Drawings, panelboards shall be UL labeled as “suitable for use as service entry equipment”.

2.03 MATERIALS, NEMA 1

A. Interiors

1. All interiors shall be completely factory assembled with circuit breakers, wire connectors, etc. All wire connectors, except screw terminals, shall be of the anti-turn solderless type and all shall be suitable for copper or aluminum wire of the sizes indicated.

2. Interiors shall be so designed that circuit breakers can be replaced without disturbing adjacent units and without removing the main bus connectors and shall be so designed that circuits may be changed without machining, drilling or tapping.

3. Branch circuits shall be arranged using double-row construction except when narrow column panels are indicated. Branch circuits shall be numbered by the manufacturer.

4. A nameplate shall be provided listing manufacturer's name, panel type and rating.

B. Buses

1. Bus bars for the mains shall be of copper. Full-size neutral bars shall be included. Phase bussing shall be full height without reduction. Cross connectors shall be copper.

2. Neutral bussing shall have a suitable lug for each outgoing feeder requiring a neutral connection.

3. Spaces for future circuit breakers shall be bussed for the maximum device that can be fitted into them.

4. Equipment ground bars shall be furnished.

C. Boxes

1. Recessed or flush-mounted boxes shall be made from galvanized code gauge steel having multiple knockouts, unless otherwise noted. Boxes shall be of sufficient size to provide a minimum gutter space of four inches on all sides.

2. Surface-mounted boxes and trims shall have an internal and external finish as specified in Paragraph 2.04, D4 below. Surface-mounted boxes shall be field punched for conduit entrances.

3. At least four studs shall be furnished for mounting the panelboard interior.

D. Trim

1. Hinged doors covering all circuit breaker handles shall be included in all panel trims.

2. Doors shall have semi-flush type cylinder lock and catch, except that doors over 48 inches in height shall have a vault handle and three-point catch, complete with lock, arranged to fasten door at top, bottom and center. Door hinges shall be concealed. Furnish two keys for each lock. All locks shall be keyed alike. Directory frame and card having a transparent cover shall be furnished on each door.

3. The trims shall be fabricated from code gauge sheet steel.

4. All exterior and interior steel surfaces of the panelboard shall be properly cleaned and finished with ANSI Z55.1, No. 61 light gray paint over a rust-inhibiting phosphatized coating. The finish paint shall be of a type to which field applied paint will adhere.

5. Trims for flush panels shall overlap the box by at least ¾ inches all around. Surface trims shall have the same width and height as the box. Trims shall be fastened with quarter-turn clamps.

2.04 MATERIALS, NEMA 3, 4, 4X & 12

A. Interiors and Buses

1. Interiors and buses shall be as specified for NEMA 1 construction.

B. Boxes and Covers

1. Boxes and covers shall be made from stainless steel with natural finish.

2. Boxes and covers shall be bolted together and gasketed.

3. Exterior doors shall be provided with three-point latches and handle with padlocking provisions.

C. Freestanding Panelboards

1. Where indicated on the Drawings as being freestanding, panelboards shall be provided in a 90 inches high by 24 inches deep (minimum) by 24 inches wide (minimum) weatherproof exterior enclosure suitable for floor mounting.

2.05 CIRCUIT BREAKERS

A. Panelboards shall be equipped with circuit breakers with frame size and trip settings as shown on the Drawings.

B. Circuit breakers shall be molded-case, bolt-on type.

C. Each circuit breaker used in 120/240 volts and 208Y/120 volts panelboards shall have an interrupting capacity of not less than 10,000 amps, RMS symmetrical.

D. Each circuit breaker used in 480Y/277 volts and 480 volts panelboards shall have an interrupting capacity of not less than 65,000 amps, RMS symmetrical.

E. GFCI (ground fault circuit interrupter) shall be provided for circuits where shown on the Drawings. GFCI units shall be 1 Pole, 120 volts, molded-case, bolt-on breakers, incorporating a solid state ground fault interrupter circuit insulated and isolated from the breaker mechanism. The unit shall be UL listed Class A Group I device (5 milliamp sensitivity, 25 millisecond trip time) and an interrupting capacity of 10,000 amps, RMS.

F. Circuit breakers shall be as manufactured by the panelboard manufacturer.

G. Two- and three-pole circuit breakers shall be constructed as a single-unit and shall not require handle-ties.

2.06 ELECTRIC CIRCUIT MONITORS (ECM)

A. ECMs shall be factory installed in panelboards as indicated on the Drawings.

PART 3 EXECUTION

3.01 INSTALLATION

A. Mount boxes for surface-mounted panelboards to allow at least ½ inches air space between the box and the wall.

B. Connect panelboard branch circuit loads so that the load is distributed as equally as possible between the phase busses.

C. Type circuit directories giving location and nature of load served. Install circuit directories in each panelboard.

D. Install markers on the front cover of all panelboards which identify the voltage rating. Markers shall be made of self-sticking B-500 vinyl cloth printed with black characters on an Alert Orange background, 2-1/4 inches high by 9 inches wide, Style A as manufactured by W.H. Brady Co. or equal.

E. Install a one-inches by three-inches laminated plastic nameplate with ¼ inches white letters on a black background on each panelboard. Nameplate lettering shall be as shown on the Drawings. Nameplates shall be epoxy adhesive and stainless- steel-screw mounted.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY SCOPE OF WORK

A. This Article includes:

1. General requirements applicable to all Process Control and Instrumentation Work.

2. General requirements for process control and instrumentation submittals.

B. Instrumentation and Controls shall consist of all work and all materials required furnishing, installing, calibrating, and testing the instrumentation and controls as shown on the Drawings and as specified in these Specifications.

C. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

D. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.

E. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:

1. Section 3 – Scope of Work
2. Section 4 – Legal Relations and Responsibility
3. Section 5 – Prosecution and Progress of Work
4. Section 7 – Submittal Management
5. Section 9 – Quality Management
6. Section 13 – General Requirements
7. Section 14 – Special Requirements
8. Section 15 – General Coordination
9. Section 16 – Work Constraints and Site Restrictions
10. Section 17 – Safety and Security
11. Section 18 – Permits and Regulations
12. Section 20 – Submittal and Quality Requirements
13. Section 22 – Contract Closeout
14. Section 32 – Piping
15. Section 34 – Valves and Actuators
16. Section 37 – Electrical
17. Article 38.13 – I/O List
18. Article 38.14 – Instrument List
19. Article 38.15 – Process Control Strategies / Descriptions
20. Article 38.17 – Testing, Calibration, and Commissioning

F. The Contractor shall provide all materials and services required to achieve a fully integrated and operational system. The Contractor shall design and coordinate the instrument and control system for proper operation with related equipment and materials furnished by other suppliers under other sections of these Specifications. The Contractor shall also coordinate the new instrument and control systems with related existing equipment and District project management, operations and engineering personnel.

G. Interfaces to equipment, instruments, and other components:

1. The Drawings, Specifications, and overall design are based on preliminary information furnished by various equipment manufacturers, which identify a minimum scope of supply from the manufacturers. This information pertains to, but is not limited to, instruments, control devices, electrical equipment, packaged mechanical systems, and control equipment provided with mechanical systems.

2. Provide all material and labor needed to install the actual equipment furnished, include all costs to add any additional instruments, wiring, control system inputs/outputs, controls, interlocks, electrical hardware etc., which may be necessary to make a complete, functional installation based on the actual equipment furnished:

   a. Make all changes necessary to meet the manufacturer's wiring requirements.

3. Submit all such changes and additions to the Engineer for acceptance as specified in Section 3.

4. Review the complete set of Drawings and Specifications to ensure that all items related to the instrumentation and control systems are completely accounted for. Include any items indicated on the Drawings or in Specifications from another discipline in the scope of Work:

   a. If a conflict between Drawings and Specifications is discovered, refer conflict to the Engineer as soon as possible for resolution.

5. Loop drawings:

   a. Provide complete loop drawings for all systems, including packaged equipment furnished as part of a vendor furnished package, and for all pre-purchased equipment.

   b. The form, minimum level of detail, and format for the loop drawings must match that of the sample loop drawings included in the Contract Documents.

   c. The Owner and Engineer are not responsible for providing detailed loop diagrams for Contractor furnished equipment.

H. The following systems shall be designed, furnished, and installed under this project:

1. The RTU Panels for the following functions:

a. To be used as the local control panels for the controls and monitoring of the valves, the flow & pressure measurements, and other devices (hereinafter referred to as Devices) in the Sites per the Drawings and Specifications through the OIT and devices mounted on panel.

b. To be interfaced with the network communication for the remote controls and monitoring of the Devices in the Sites at the Raw Water Control Center at Rinconada.

c. To provide all required controls, monitoring, and communication functions of Devices with the PLC and the associated components in the Sites.

2. The internal and interconnection wires, cables, conduits for the RTU panels and Devices in the Sites.

3. The power connections for the RTU panels and the Devices in the Sites.

4. The integration of the telemetry cables and interface modules with the District existing telemetry system and RTU's.

5. The contractor shall develop and complete the PLC programming, OIT database, displays, alarm summaries and reports per the Drawings and Specifications under the direction and the supervision of District staffs.

6. Provide the material and the installation of the Devices per the Electrical and Instrumentation Plan Drawings.

7. Installation of the Devices and the required cables furnished by District per the Electrical and Instrumentation Plan Drawings.

I. Control System Diagrams and Details

1. To assist the Contractor in determining the scope of work, Process and Instrumentation Diagrams (P&IDs) are provided in the Drawings. Unless specifically stated otherwise, the Contractor shall be responsible for providing all instrumentation, control equipment and auxiliary devices necessary to perform the functions specified in these Specifications and as shown and described on the Drawings.

2. The intent of the P&IDs is to describe in as much detail as possible within this medium, the hardware, software and functional requirements of a process measurement or control system. They are not intended to convey

requirements for conduit and wiring between panels or system components. The contractor shall refer to the appropriate Electrical Specifications and Drawings for the required details.

3. To assist the Contractor in determining the scope of work and intent of the contract documents, written Process Control Strategies and Descriptions have been included in Section 38.15. The control strategies and descriptions are general in nature and do not detail all auxiliary devices, interlocks, and control functions required.

J. All instrumentation, and control equipment and systems for the entire project to comply with the requirements specified in the Instrumentation and Control Specifications, whether referenced in the individual Equipment Specifications or not:

1. The requirements of the Instrumentation and Control Specifications apply to all Instrumentation and Control Work specified in other Specifications, including HVAC controls, packaged mechanical systems, LCPs, VCPs, etc.

2. The contractor shall inform all vendors supplying instrumentation, control systems, panels, and/or equipment of the requirements of the Instrumentation and Control Specifications.

3. The Owner is not responsible for any additional costs due to the failure of the Contractor to notify all subcontractors and suppliers of the requirements in the Instrumentation and Control Specifications.

K. Contract Documents:

1. General:

a. The Drawings and Specifications are complementary and are to be used together to fully describe the Work.

2. Specifications:

a. As specified in 1.01 E of this Article.

3. Contract Drawings:

a. The Instrumentation and Control Drawings show in a diagrammatic manner, the desired locations, and arrangements of the components of the Instrumentation Work. Follow the Drawings as closely as possible, use professional judgment and coordinate with the other trades to secure the best possible installation, use the entire Drawing set for construction purposes.

b. Locations of equipment, control devices, instruments, boxes, panels, etc. are approximate only, exercise professional judgment in executing the Work to ensure the best possible installation:

(1) The equipment locations and dimensions indicated on the Drawings and elevations are approximate. Use the shop drawings to determine the proper layout, foundation, and pad requirements, etc. for final installation. Coordinate with all subcontractors to ensure that all instrumentation and control equipment is compatible with other equipment and space requirements. Make changes required to accommodate differences in equipment dimensions.

(2) The Contractor has the freedom to select any of the named manufacturers as identified in the individual Specifications; however, the Engineer has designed the spatial equipment layout based upon a single manufacturer and has not confirmed that every named manufacturer's equipment fits in the allotted space. It is the Contractor's responsibility to ensure that the equipment being furnished fits within the defined space.

c. Installation details:

(1) The Contract Drawings include installation details showing means and methods for installing instrumentation and control equipment. For cases where typical details are not provided or compatible with an installed location, develop installation details that are necessary for completing the Work, and submit these details for review by the Engineer.

d. Schematic diagrams:

(1) All controls are shown de-energized.

(2) Schematic diagrams show control function only. Incorporate other necessary functions for proper operation and protection of the system.

(3) Add slave relays, where required, to provide all necessary contacts for the control system or where needed to function as interposing relays for control voltage coordination, equipment coordination, or control system voltage drop considerations.

(4) Mount all devices shown on motor controller schematic diagrams in the controller compartment enclosure, unless otherwise noted or indicated.

(5) Control schematics are to be used as a guide in conjunction with the descriptive operating sequences the Specifications. Combine all information and furnish a coordinated and fully functional control system.

L. Alternates/Alternatives:

1. Substitute item provisions as specified in Section 3.

M. Changes and Change Orders:

1. As specified in Section 3.

1.02 REFERENCES

A. Code Compliance:

1. American Society for Testing and Materials (ASTM).

2. ASTM A269—Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

3. The International Society of Automation (ISA).

4. ISA S5.3—Graphic Symbols for Distributed Control/Shared Display Instrumentation Logic and Computer Systems.

5. ISA S5.4—Instrument Loop Diagrams.

6. ISA S5.5—Graphic Symbols for Process Displays.

7. ISA S20—Specification Forms for Process Measurement and Control Instruments, Primary Elements, and Control Valves.

8. ISA RP60.3—Human Engineering for Control Centers.

9. ISA RP60.6—Nameplates, Labels, and Tags for Control Centers.

10. American National Standards Institute (ANSI).

11. National Electrical Manufacturers Association (NEMA).

12. National Fire Protection Association (NFPA)—70, National Electrical Code.

13. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 DEFINITIONS

A. Definitions of terms and other electrical and instrumentation considerations in accordance with:

1. Factory Mutual (FM).
2. International Electrotechnical Commission (IEC).
3. Institute of Electrical and Electronics Engineers (IEEE).
4. International Society of Automation (ISA).
5. International Organization for Standardization (ISO).
6. National Electrical Code (NEC).
7. National Electrical Manufacturers Association (NEMA).
8. InterNational Electrical Testing Association (NETA).
9. National Fire Protection Association (NFPA).
10. National Institute of Standards and Technology (NIST).
11. Underwriters Laboratories (UL).

B. Specific Definitions:

1. Control circuit: Any circuit operating at 120 volts alternating current (VAC) or direct current (VDC) or less, whose principal purpose is the conveyance of information (including performing logic) and not the conveyance of energy for the operation of an electrically powered device.

2. Panel: An instrument support system that may be a flat surface, a partial enclosure, or a complete enclosure for instruments and other devices used in process control systems.

3. Power circuit: Any circuit operating at 90 volts (AC or DC) or more, whose principal purpose is the conveyance of energy for the operation of an electrically powered device.

4. Signal circuit: Any circuit operating at less than 50 VAC or VDC, which conveys analog information or digital communications information.

5. 2-Wire transmitter (loop powered): A transmitter that derives its operating power supply from the signal transmission circuit and requires no separate power supply connections. As used in this Section, 2-wire transmitter refers to a transmitter that provides a signal such as 4 to 20 mA 24VDC regulation of a signal in a series circuit with an external 24 VDC driving potential:

6. Powered transmitters: A transmitter that requires a separate power source (120 VAC, 240 VAC, etc.) for the transmitter to develop its signal. As used in this Section, the produced signal may be a 4 to 20 mA 24VDC signal, a digital bus communications signal or both.

7. System supplier - As specified in ICSC Qualifications in the Quality Assurance article of this Section.

8. Modifications: Changing, extending, interfacing to, removing, or altering an existing circuit.

C. Acronym Definitions:

1. CCS: The PCS central computer system (CCS) consisting of computers and software. The personal computer-based hardware and software system that includes the operator interface, data storage, data retrieval, archiving, alarming, historian, reports, trending, and other higher level control system software and functions.

2. DPDT: Double-pole, double-throw.

3. ES: Enterprise system: Computer based communications or data sharing system utilized for non-process control functions such as E-mail, sharing files, creating documents, etc.

4. FAT: Factory acceptance test also known as Source Test.

5. HART: Highway addressable remote transducer.

6. HOA: Hand-Off-Auto control function that is totally PLC based. In the Hand mode, equipment is started or stopped, valves are opened or closed through operator direction under the control of the PLC software. In the Auto mode, equipment is started or stopped and valves are opened or closed through a control algorithm within the PLC software. In the Off mode, the equipment is prohibited from responding from the PLC control.

7. HMI: Human machine interface is a software application that presents information to an operator or user about the state of a process, and to accept and implement the operators control instructions. Typically information is displayed in a graphical format.

8. ICSC: Instrumentation and control system contractor: Subcontractor who specializes in the design, construction, fabrication, software development, installation, testing, and commissioning of industrial instrumentation and control systems.

9. I/O: Input/Output.

10. IP: Internet protocol or ingress protection.

11. LCP: Local control panel: Operator interface panel that may contain an HMI, pilot type control devices, operator interface devices, control relays, etc. and does not contain a PLC or RIO.

12. LAN: Local area network: A control or communications network that is limited to the physical boundaries of the facility.

13. LOR: Local-Off-Remote control function. In the Remote mode, equipment is started or stopped, and valves are opened or closed through the PLC based upon the selection of the HOA. In the Local mode, equipment is started or stopped, valves are opened or closed based upon hardwired control circuits completely independent of the PLC with minimum interlocks and permissive conditions. In the Off mode, the equipment is prohibited from responding to any control commands.

14. OIT: Operator Interface Terminal is an operator interface device consisting of an alphanumeric or graphic display with operator input functionality. The OIT is typically a flat panel type of display mounted on the front of an enclosure with either a touch screen or tactile button interface.

15. P&ID: Process and instrumentation diagram.

16. PC: Personal computer.

17. PCIS: Process control and instrumentation system: Includes the entire instrumentation system, the entire control system, and all of the Work specified in the Instrumentation and Control Specifications and depicted on the Instrumentation Drawings. This includes all the PCS and instruments and networking components as well as the various servers, workstations, thin clients etc.

18. PCM: Process control module: An enclosure containing any of the following devices: PLC, RTU, or RIO.

19. PCS: Process Control System: A general name for the computerized system that gathers and processes data from equipment and sensors and applies operational controls to the process equipment. It includes the PLCs and/or RIOs, OITs, HMIs, both LCPs, VCPs and all data management systems accessible to staff.

20. PJB: Power junction box: An enclosure with terminal blocks that distribute power to multiple instruments.

21. PLC: Programmable logic controller.

22. RIO: Remote I/O device for the PLC consisting of remote I/O racks, or remote I/O blocks.

23. RTU: Remote telemetry unit: A controller typically consisting of a PLC, and a means for remote communications. The remote communications devices typically are radios, modems, etc.

24. SCADA: Supervisory control and data acquisition system: A general name for the computerized system that gathers and processes data from

sensors and equipment located outside of the facility, such as wells, lift stations, metering stations etc.

25. SPDT: Single-pole, double-throw.

26. SPST: Single-pole, single-throw.

27. UPS: Uninterruptible power supply.

28. VCP: Vendor control panel: Control panels that are furnished with equipment by a vendor other than the ICSC. These panels may contain PLCs, RIO, OIT, HMI, etc.

29. WAN: Wide area network: A control or communications network that extends beyond the physical boundaries of the facility.

1.04 SUBMITTALS

A. Furnish submittals as specified in Section 7, Section 20, and this Section.

B. General:

1. Instruct all equipment suppliers of submittals and operation and maintenance manuals of the requirements in this Section.

2. Furnish the submittals required by each section in the Electrical Specifications.

3. Adhere to the wiring numbering scheme specified in Section 37.01 throughout the Project:

a. Uniquely number each wire.
b. Wire numbers must appear on all Equipment Drawings.

4. Use equipment and instrument tags, as indicated on the Drawings, for all submittals.

C. Submittal organization:

1. First page:

a. Specification section reference.

b. Name and telephone number of individual who reviewed submittal before delivery to Engineer.

c. Name and telephone number of individual who is primarily responsible for the development of the submittal.

d. Comments.

e. Contractor's review certification statement and signature.

2. Next pages:

a. Provide confirmation of specification compliance in a tabular form that individually lists each specification section, paragraph, and sub- paragraphs and unequivocally states compliance with said requirement or takes exception to the requirement and lists the reason for said exception and offers alternative means for compliance.

b. Include a response in writing to each of the Engineer's comments or questions for submittal packages which are re-submitted:

(1) In the order that the comments or questions were presented throughout the submittal.

(2) Referenced by index section and page number on which the comment appeared.

(3) Acceptable responses to Engineer's comments are either:

(a) Engineer's comment or change is accepted and appropriate changes are made.

(b) Explain why comment is not accepted or requested change is not made.

(c) Explain how requirement will be satisfied in lieu of comment or change requested by Engineer.

(4) Any re-submittal, which does not contain responses to the Engineer's previous comments shall be returned for Revision and Re-submittal.

(5) No further review by the Engineer will be performed until a response for previous comments has been received.

3. Remaining pages:

a. Actual submittal data:

(1) Organize submittals in exactly the same order as the items are referenced, listed, and/or organized in the specification section.

(2) For submittals that cover multiple devices used in different areas under the same specification section, the submittal

for the individual devices must list the area where the device is intended to be used.

D. Submittal requirements:

1. Furnish submittals that are fully indexed with a tabbed divider for every component.

2. Sequentially number pages within the tabbed sections. Submittals and operation and maintenance manuals that are not fully indexed and tabbed with sequentially numbered pages, or are otherwise unacceptable, will be returned without review.

3. Furnish submittals in the following general order, each in a separate bound set:

   a. Schedule of Values.

   b. Product Data.

   c. After Engineer acceptance of the Product Data, submit the Project Shop Drawing submittals.

   d. Loop Description Submittal.

   e. The Process Control Hardware and Software Submittal including, control system software, programming, and screens.

   f. Testing, Calibration and Process Start-up procedures.

   g. Operation and Maintenance Manuals.

   h. Training Submittals.

   i. Record Documents.

4. Edit all submittals and operation and maintenance manuals so that the submittal specifically applies to only the equipment furnished:

   a. Neatly cross out all extraneous text, options, models, etc. that do not apply to the equipment being furnished, so that the information remaining is only applicable to the equipment being furnished.

5. Submit copies of shop drawings, and product data:

   a. Show dimensions, construction details, wiring diagrams, controls, manufacturers, catalog numbers, and all other pertinent details.

6. Where submittals are required, provide a separate submittal for each specification section. In order to expedite construction, the Contractor

may make more than 1 submittal per specification section, but a single submittal may not cover more than 1 specification section:

a. The only exception to this requirement is when 1 specification section covers the requirements for a component of equipment specified in another section. (For example, circuit breakers are a component of switchgear. The switchgear submittal must also contain data for the associated circuit breakers, even though they are covered in a different specification section.)

7. Exceptions to Specifications and Drawings:

a. Include a list of proposed exceptions to the Specifications and Drawings along with a detailed explanation of each.

b. If there is insufficient explanation for the exception or deviation, the submittal will be returned requiring revision and re-submittal.

c. Acceptance of any exception is at the sole discretion of the Engineer:

(1) Provide all items (materials, features, functions, performance, etc.) required by the Contract Documents that are not accepted as exceptions.

d. Replace all items that do not meet the requirements of the Contract Documents, which were not previously accepted as exceptions, even if the submittals contained information indicating the failure to meet the requirements.

E. Submittal preparation:

1. During the period of preparation of submittals, the Contractor shall authorize direct, informal liaison between the ICSC and the Engineer for exchange of technical information. As a result of this liaison, certain minor refinements and revisions may be authorized informally by the Engineer, which do not alter the scope of Work or cause increase or decrease in the Contract price or times. During this informal exchange, no oral statement by the Engineer shall be construed to give formal approval of any component or method, nor shall any statement be construed to grant exception to, or variation from, these Contract Documents.

2. In these Contract Documents, some items of Work are represented schematically, and are designated for the most part by numbers, as derived from criteria in ISA-5.1:

a. Employ the nomenclature and numbers designated in this Section and indicated on the Drawings exclusively throughout shop drawings, data sheets, and similar submittals.

b. Replace any other symbols, designations, and nomenclature unique to a manufacturer's, suppliers, or subcontractor's standard methods with those identified in this Section and indicated on the Drawings.

F. Specific submittal requirements:

1. Shop drawings:

a. Required for materials and equipment listed in this and other sections.

b. Furnish sufficient information to evaluate the suitability of the proposed material or equipment for the intended use, and for compliance with these Specifications.

c. Shop drawings requirements:

(1) Front, side, and, rear elevations, and top and bottom views, showing all dimensions.

(2) Locations of conduit entrances and access plates.

(3) Component layout and identification.

(4) Schematic and wiring diagrams with wire numbers and terminal identification.

(5) Connection diagrams, terminal diagrams, internal wiring diagrams, conductor size, etc.

(6) Anchoring method and leveling criteria, including manufacturer's recommendations for the Project site seismic criteria.

(7) Weight.

(8) Finish.

(9) Nameplates: As indicated in the Drawings.

(10) Temperature limitations, as applicable.

d. Use equipment and instrument tags as depicted on the P&IDs for all submittals.

e. Adhere to wiring numbering scheme outlined in Section 37.01 throughout the Project:

(1) Uniquely number each wire per the Specifications.

f. Wire numbers must appear on all equipment drawings.

g. Organize the shop drawing submittals for inclusion in the Operation and Maintenance Manuals:

(1) Furnish the initial shop drawing submittal bound in one or more standard size, 3-ring, D-ring, loose leaf, vinyl plastic, hard cover binders suitable for bookshelf storage.

(2) Binder ring size: 2 inches.

h. Include the letterhead and/or title block of the firm responsible for the preparation of all shop drawings. Include the following information in the title block, as a minimum:

(1) The firm's registered business name.
(2) Firm's physical address, email address, and phone number.
(3) Owner’s name.
(4) Project name and location.
(5) Drawing name.
(6) Revision level.
(7) Personnel responsible for the content of the drawing.
(8) Date.

i. The work includes modifications to existing circuits:

(1) Clearly show all modifications to existing circuits.

(2) In addition, show all existing unmodified wiring to clearly depict the functionality and electrical characteristics of the complete modified circuits.

2. Product data:

a. Submitted for non-custom manufactured material listed in this and other sections and shown on shop drawings.

b. Include:

(1) Catalog cuts.

(2) Bulletins.

(3) Brochures.

(4) Quality photocopies of applicable pages from these documents.

(5) Identify on the data sheets the Project name, applicable specification section, and paragraph.

(6) Identify model number and options for the actual equipment being furnished.

(7) Neatly cross out options that do not apply or equipment not intended to be supplied.

c. Use equipment and instrument tags as depicted on the P&IDs for all submittals.

d. Adhere to wiring numbering scheme outlined in Section 37.01 throughout the Project:

(1) Uniquely number each wire per the Specifications.

e. Wire numbers must appear on all equipment drawings.

3. Detailed sequence of operation for all equipment or systems.

4. Operation and maintenance manuals:

a. As specified in Section No. 14.10.

b. Submit preliminary sets of these manuals to the Engineer for review of format and content:

(1) Engineer will return 1 set with comments.

(2) Revise and/or amend as required and submit the requisite number of copies to the Engineer 15 days before Functional Testing of the systems.

c. Incorporate changes that occur during process start-up and submit as part of the final manuals.

d. Provide comprehensive information on all systems and components to enable operation, service, maintenance, and repair.

e. Include Record Documents and the accepted shop drawing submittals, modified for conditions encountered in the field during the work.

f. Include signed results from Functional Testing and Process Operational Period.

g. Provide installation, connection, operating, calibration, setpoints (e.g., pressure, pump control, time delays, etc.), adjustment, test,

troubleshooting, maintenance, and overhaul instructions in complete detail.

h. Provide exploded or other detailed views of all instruments, assemblies, and accessory components together with complete parts lists and ordering instructions.

i. Spare parts list:

(1) Include a priced list of recommended spare parts for all the equipment furnished under this Contract:

(a) Include recommended quantities sufficient to maintain the furnished system for a period of 5 years.

(2) Annotate the list to indicate which items, if any and quantity are furnished as part of this Contract.

j. Provide the name, address, and phone number of manufacturer and manufacturer's local service representative of these parts.

k. Additional operation and maintenance manual requirements:

(1) Completely index manuals with a tab for each section:

(a) Each section containing applicable data for each piece of equipment, system, or topic covered.

(b) Assemble manuals using the accepted shop drawings, and include, the following types of data:

i) Complete set of 11-inch by 17-inch drawings of equipment.

ii) Complete set of 11-inch by 17-inch drawings of the control system.

iii) Complete set of control schematics.

iv) Complete parts list for all equipment being provided.

v) Catalog data for all products or equipment furnished.

l. Operational Manual:

(1) Prepare and provide a simplified version of the standard manufacturer's HMI software and system operations manual that includes basic instructions in the application of the system as required for operators in day-to-day operations.

m. Control System Software Record Documents:

(1) Include complete documentation of all the software programs provided for the entire control and PCS system, including:

(a) Listings of all application software on both hard copy and DVD- ROM.

(b) Database, both hard copy and DVD-ROM.

(c) Communication protocols.

(d) All documentation necessary to maintain, troubleshoot, modify, or update the software system.

(e) PLC/RTU I/O list.

n. Organize the operation and maintenance manuals for each process in the following manner:

(1) Section A - Process and Instrumentation Diagrams.
(2) Section B - Control Descriptions.
(3) Section C - Loop Drawings.
(4) Section D - Instrument Summary.
(5) Section E - Instrument Data Sheets and Brochures.
(6) Section F - Sizing Calculations.
(7) Section G - Instrumentation Installation Details.
(8) Section H - Test Results.
(9) Section I - Operational Manual.
(10) Section J - Spare Parts List.
(11) Section K - Control System Software.

5. Material and equipment schedules:

a. Furnish a complete schedule and/or matrix of all materials, equipment, apparatus, and luminaries that are proposed for use:

(1) Include sizes, names of manufacturers, catalog numbers, and such other information required to identify the items.

6. Itemized instrument summary:

   a. Submit a hard 11" x 17" size copy of the instrument summary in a spreadsheet called "Instrument Index."

   b. List all of the key attributes of each instrument in the Instrument Index including:

      (1) Tag number.
      (2) Manufacturer.
      (3) Model number.
      (4) Service.
      (5) Area location.
      (6) Calibrated range.
      (7) Loop drawing number.

   c. Associated LCP, VCP, PCM, or PLC.

7. Instrument data sheets and cut sheets:

   a. Furnish fully completed data sheets, both electronically in Microsoft Word or Excel and in hardcopy, for each instrument and component according to ISA-20 Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves. The data sheets provided with the instrument specifications are preliminary and are not complete. They are provided to assist with the completion of final instrument data sheets. Additional data sheets may be required. Include the following information on the data sheet:

      (1) Component functional description specified in this Section and indicated on the Drawings.

      (2) Manufacturers model number or other product designation.

      (3) Tag number specified in this Section and indicated on the Drawings.

      (4) System or loop of which the component is a part.

      (5) Location or assembly at which the component is to be installed.

      (6) Input and output characteristics.

      (7) Scale range with units and multiplier.

      (8) Requirements for electric supply.

      (9) Requirements for air supply.

(10) Power consumption.

(11) Response timing.

(12) Materials of construction and of component parts that are in contact with, or otherwise exposed to, process media, and or corrosive ambient air.

(13) Special requirements or features, such as specifications for ambient operating conditions.

(14) Features and options that are furnished.

b. Provide a technical brochure or bulletin ("cut sheet") for each instrument on the project. Submit with the corresponding data sheets:

(1) Where the same make and model of instrument is used in 2 or more applications on the project, and the process applications are nearly identical, and the materials, features and options are identical submit one brochure or bulletin for the set of identical instruments.

(2) Include a list of tag numbers for which it applies with each brochure or bulletin.

(3) Furnish technical product brochures that are complete enough to verify conformance with all Contract Document requirements, and to reflect only those features supplied with the device.

(4) Cross out models, features, options, or accessories that are not being provided.

(5) Clearly mark and identify special options and features.

c. Organization: Index the data sheets and brochures in the submittal by systems or loops.

8. Control panel hardware submittal:

a. Submit the following in 1 submittal package.

b. Complete and detailed bills of materials:

(1) Including quantity, description, manufacturer, and part number for each assembly or component for each control panel.

(2) Include all items within an enclosure.

c. Complete grounding requirements for each system component including any requirements for PLCs, process LANs, and Control System equipment.

d. Requirements for physical separation between control system components and 120 VAC, 480 VAC, and medium voltage power cables.

e. UPS and battery load calculations to show that the backup capacity and time meet the specified requirements.

f. Provide a data sheet for each control system component together with a technical product brochure or bulletin, which include:

(1) The manufacturer's model number or other identifying product designation.

(2) Tag and loop number.

(3) System to which it belongs.

(4) Site to which it applies.

(5) Input and output characteristics.

(6) Requirements for electric power.

(7) Device ambient operating requirements.

(8) Materials of construction.

9. Schedule of values:

a. In addition to completing all items referred to in the schedule of values, Section No. 21.02., submit per unit instrument and labor costs used in developing the final bid for the PCS system, for the express purpose of pricing and cost justification for any proposed change orders. It is the responsibility of the ICSC subcontractor to prove to the Engineer’s satisfaction that said per unit costs were used in the development of the final Bid amount.

10. Installation recommendations:

a. Submit the manufacturer’s printed recommendations for installation of instrumentation equipment.

11. Training submittals:

a. Develop and submit for review a general training plan for approval by Owner within 14 calendar days from Notice to Proceed. Include

complete descriptions of all planned training classes, a preliminary training schedule, a list of all proposed instructors along with resumes, examples of proposed training manuals, and a description of any special training tools to be used (simulators, self-paced modules, personal computer- based training, etc.).

b. The Engineer will review the general training plan. Special emphasis will be placed on review of the qualifications of the proposed instructors and the timing of the individual courses to maximize their effectiveness. If, in the opinion of the Engineer, the proposed instructors are not sufficiently qualified to conduct the specified training courses, or lack experience, where required, on the specific configuration of the system, provide more qualified instructors.

c. The general training plan and schedule shall be updated by the Contractor at the beginning of each Phase and approved by the Owner a minimum of 30 days prior to commencement of training.

d. Training course plan submittals:

(1) For each training course or other training activity, submit a detailed, complete outline and agenda for each lesson as specified in Section No. 22.03.

(2) Describe any student pre-requisites for the course or training activity.

(3) Provide an updated schedule for all sessions of the course, including dates, times, durations, and locations.

(4) Submit training materials.

e. Incorporate all submittal review comments into the course.

f. Do not conduct training courses before review and acceptance of the Course Plan submittal for the course.

12. Project Record documents:

a. Furnish as specified in Section No. 22.05.

b. Record Drawing requirements:

(1) Provide Project Record Drawing of all Instrumentation Drawings.

(2) Update Record Drawings weekly.

(3) Record Drawings must be fully updated as a condition of the monthly progress payments.

(4) Clearly and neatly show all changes including the following:

(a) All existing pipe, conduit, wire, instruments or other structures encountered or uncovered during construction.

c. Shop drawings:

(1) General:

(a) Coordinate all aspects of the Work so that a complete, instrumentation, computer, and control system for the facility is supported by accurate shop and record drawings:

i) Clearly show every wire, circuit, and terminal provided under this contract on one or more submitted wiring diagrams.

(b) Show all interfaces between any of the following: instruments, vendor control panels, motor control centers, motor starters, variable speed drives, control valves, flow meters, chemical feeders and other equipment related to the PCS.

(c) Generate all drawings developed for this project utilizing AutoCAD by Auto Desk Version 2012 or later:

i) Furnish on CD-ROM disks containing the following for each drawing:

a) Original CAD files in DWG format.

b) PDF version.

ii) Provide hard copies on 11 inch by 17 inch plain bond paper.

(d) Upon completion of the Work, update all shop drawings to indicate the final as-built configuration of the systems:

i) Should an error be found in a shop drawing during installation or process start-up of equipment, note the correction, including

any field changes found necessary, on the drawing and submit the corrections in the Record Documents.

ii) Update, check, and revise all wiring drawings and other submitted drawings and documents to show final installed conditions.

iii) Provide as-built shop drawings for all instrumentation equipment on 11 inch by 17-inch using plain bond paper.

iv) Provide electronic copies of these documents on CD-ROM disks in AutoCAD DWG 2010 format or later and Adobe PDF format. Size all drawings to be readable and legible on 11 inch by 17-inch media.

(e) Submittal Documents:

i) Provide an interim submittal of Record Documents after the PCS system Functional Testing.

ii) Submit final Record Documents before Substantial Completion or earlier if so specified in Section No. 13.10 or the General Requirements.

(f) Review and Corrections:

i) Correct any Record Documents or other documents found to be incomplete, not accurate, of poor quality, or containing errors.

ii) Promptly correct and re-submit Record Documents returned for correction.

(2) Furnish written information prepared specifically for this Project using Microsoft Word.doc and Adobe.pdf formats and printed on 8.5-inch by 11-inch plain bond paper:

(a) Provide electronic copies of these documents on CD-ROM disks.

d. Review and corrections:

(1) Correct any record documents or other documents found to be incomplete, not accurate, of poor quality, or containing errors.

(2) Promptly correct and re-submit record documents returned for correction.

13. Loop Drawings:

a. Submit loop drawings for every analog, discrete, and fieldbus signal and control circuit:

(1) Provide a loop drawing submittal that completely defines and documents the contents of each monitoring, alarming, interlock, and control loop on this Project.

(2) This requirement applies to all signal and control circuits associated with equipment on this Project including vendor supplied equipment packages and control panels.

(3) Provide loop drawings in the format indicated in the contract drawings. Provide all tagging in accordance with the Owner's standard.

b. Show every instrument and I/O point on at least one loop diagram.

c. Provide a complete index in the front of each bound volume:

(1) Index the loop drawings by systems or process areas.

d. Provide drawings showing definitive diagrams for every instrumentation loop system:

(1) Show and identify each component of each loop or system using requirements and symbols from ISA-5.4.

(2) Furnish a separate drawing sheet for each system or loop diagram.

e. In addition to the ISA-5.4 requirements, show the following details:

(1) Functional name of each loop.

(2) Reference name, drawing, and loop diagram numbers for any signal continuing off the loop diagram sheet.

(3) Show all terminal numbers, regardless of the entity providing the equipment.

(4) MCC panel, circuit, and breaker numbers for all power feeds to the loops and instrumentation.

(5) Designation of and, if appropriate, terminal assignments associated with, every manhole, pull-box, junction box, conduit, and panel through which the loop circuits pass.

(6) Show vendor control panel, instrument panel, conduit, junction box, equipment and PCS terminations, termination identification, wire numbers and colors, power circuits, and ground identifications.

(7) If a circuit is continued on another drawing, show the name and number of the continuation drawing on the loop drawing. Provide complete references to all continuation drawings whether vendor control panels, other loop drawings, existing drawings provided by the Owner, or other drawings.

14. Instrument Installation Drawings:

a. Submit, instrument installation, mounting, and anchoring details for all components and assemblies, including access requirements and conduit connection or entry details.

b. Furnish for each instrument a dedicated 8 1/2-inch by 11-inch installation detail that pertains to the specific instrument by tag number.

c. For each detail, provide certification and the hard copies, by the instrument manufacturer, that the proposed installation is in accordance with the instrument manufacturer's recommendations and is fully warrantable.

d. For each detail, provide, as a minimum, the following contents:

(1) Necessary sections and elevation views required to define instrument location by referencing tank, building or equipment names and numbers, and geographical qualities such as north, south, east, west, basement, first floor, etc.

(2) Ambient temperature and humidity where the instrument is to be installed.

(3) Corrosive qualities of the environment where the instrument is to be installed.

(4) Hazardous rating of the environment where the instrument is to be installed.

(5) Process line pipe or tank size, service and material.

(6) Process tap elevation and location.

(7) Upstream and downstream straight pipe lengths between instrument installation and pipe fittings and valves.

(8) Routing of tubing and identification of supports.

(9) Mounting brackets, stands, anchoring devices, and sun shades.

(10) Conduit entry size, number, location, and delineation between power and signal.

(11) NEMA ratings of enclosures and all components.

(12) Clearances required for instrument servicing.

(13) List itemizing all manufacturer makes, model numbers, quantities, lengths required, and materials of each item required to support the implementation of the detail.

15. Control Panel Drawings:

a. Layout Drawings:

(1) Submit panel, enclosure, console, furniture, and cabinet layout drawings for all items provided.

(2) As a minimum, include the following information:

(a) To scale front, side, and plan views.

(b) Dimensions.

(c) Interior and exterior arrangements.

(d) Mounting information, including conduit entrance location.

(e) Finish data.

(f) Tag number and functional name of items mounted in and on each panel, console, and cabinet.

(g) Nameplate legend including text, letter size, materials and colors.

b. Wiring and Piping Diagrams:

(1) Submit panel wiring and piping diagrams for every panel that contains wiring and/or piping.

(2) Include the following information:

(a) Name of panel.

(b) Wiring and piping sizes and types.

(c) Terminal strip numbers.

(d) Wire tags and labels.

(e) Functional name and manufacturer's designation for items to which wiring and piping are connected.

(f) Electrical control schematics in accordance with ANSI standards.

c. Installation drawings:

(1) Provide site-specific installation drawings for all control equipment panels, including dimensions.

(2) Provide scaled drawings and show the position of the equipment at its intended installation location.

(3) Show the placement of all equipment being provided under this Contract and its spatial relationship to all other equipment located in the abutting and adjoining areas.

(4) Show all required access and clearances associated with the equipment with a statement of compliance to manufacturer's recommendations, NEC, and other applicable codes.

16. Schematic Diagrams:

a. Submit schematic diagrams for all electrical equipment in ladder diagram format.

b. Include device and field connection terminal numbers on all schematic diagrams.

c. Incorporate equipment manufacturer's shop drawing information into the schematic diagrams to document the entire control system.

17. Control System Diagram:

a. Submit a complete set of control system diagrams including the following information:

(1) All PLCs, workstations, printers, communication devices, and communication links:

(a) Show all PLCs with their current I/O allocation, and future I/O allocation, current plus spares provided, and maximum potential I/O based on available slots.

(2) All cables required for communication requirements.

(3) Show each component fully annotated with conduit size and number associated with the power source.

18. Process Control Software Submittal:

a. In accordance with Product Data and Shop Drawing general requirements.

b. Submit a complete description of the standard application software programs, operating system, and utility programs, including modifications and explanation of how the specific functional requirements are met:

(1) Provide a cross-reference between the Specification requirements and the software submittal, in order to provide the Engineer the ability to identify how each specified requirement or function is met.

c. A complete listing of the PCS system point I/O database:

(1) Include for each data point, relevant parameters such as range, contact orientation, limits, incremental limits, I/O card byte, I/O hardware address, and PLC assignment.

(2) Organize on a site-by-site basis, separate by point type.

(3) In addition to the active I/O points, list the implemented spare I/O points and the available I/O points remaining on each card, as well as other defined future points specified or shown.

d. Detailed descriptions of procedures used to implement and modify control strategies and database construction.

e. Preliminary overview, screens, station graphic displays, and preliminary reports.

19. Instrumentation and Control System Contractor Statement of Qualifications:

a. Submit statement of qualifications of the proposed ICSC in accordance with subsequent requirements of this Section.

20. Control Descriptions:

a. For each control loop, provide a detailed functional description of the operation of the equipment, signals, and controls as shown on the P&IDs:

(1) Include all functions depicted or described in the Contract Documents.

(2) Include within the Control Description content:

(a) All specific requirements.

(b) All common requirements that pertain in general to all loops.

(c) Listing all ranges, setpoints, timers, values, counter values, etc.

21. Commissioning and Process Start-up Submittals:

a. Inform the Owner and or Engineer of the day, date, and time for a scheduled test at least 15 calendar days before the test takes place to allow the Owner and or Engineer sufficient time to plan travel to the test site.

b. General testing submittal requirements are specified in this Section:

(1) Additional requirements are specified in Section 22, Section 38, and other technical sections.

c. Test Procedure Submittals:

(1) Submit the proposed procedures to be followed during tests of the PCS and its components in 2 parts:

(a) Preliminary Submittal: Outline of the specific proposed tests and examples of proposed forms and checklists.

(b) Detailed Submittal: After successful review of the Preliminary Submittal, submit the proposed detailed test procedures, forms, and checklists. Include a statement of test objectives with the test procedures.

d. Provide certified and witnessed test and calibration checklists for each of the following tests:

(1) Source Testing:

(a) Also called Factory Acceptance Tests (FAT).

(b) Submit completed Manufacturer's Certificate of Source Testing as specified in Section No. 21.04.

(2) Functional Testing:

(a) Loop Validation Tests:

i) Loop Validation Certifications:

a) Complete field device loop tests have been successfully completed for all individual instruments, all separate analog control networks, all valves, all VCPs, all motors, all local operator interface panels, all motor control centers, etc.

(b) Calibration, adjustment, and test details for all components and systems.

(c) Programming.

(d) Submit completed Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section No. 21.04.

(3) Process Operational Period.

22. Test reports:

    a. As specified in Section No. 20.01.

    b. Include the following:

        (1) A description of the test.
        (2) List of equipment used.
        (3) Name of the person conducting the test.
        (4) Date and time the test was conducted.
        (5) All raw data collected.
        (6) Calculated results.
        (7) Each report signed by the person responsible for the test.

    c. Additional requirements for commissioning and process start-up reports are specified in Section 38.17.

23. Calculations:

    a. Where required by specific Instrumentation Specifications:

        (1) Because these calculations are being provided by a registered professional engineer, they will be reviewed for form, format, and content but will not be reviewed for accuracy and calculation means.

1.05 QUALITY ASSURANCE

A. Manufacture instruments at facilities certified to the quality standards of ISO 9001.

B. ICSC qualifications:

1. General information on the proposing company:

    a. Document that the ICSC company has been actively involved in the instrumentation, PLC based control systems, business for a minimum of five years and has adequate facilities, organization structure, manpower and technical and managerial expertise to properly perform the Work as specified in these Specifications.

    b. Submit a financial prospectus indicative of the corporation's financial state. This prospectus shall also include:

        (1) A letter from a financial institution indicating a current line of credit and bonding limit which can be applied to this Project.

        (2) Latest annual report or reviewed financial statement.

2. Document that the ICSC has a qualified permanent service facility:

   a. Said facility shall be staffed with permanent employees and equipped with the tools and test equipment necessary to calibrate, test, and process start-up all of the instrumentation, control, telemetry, SCADA and control systems hardware and software furnished under this Contract, including remote diagnostic capability.

   b. Document in-house resource of permanent personnel experienced in the design and programming of equipment and systems as specified in these Specifications.

   c. Document the existence of a training program staffed by qualified instructors, to provide proper training in the operation and maintenance of equipment as specified in these Specifications.

   d. Document that the firm is a recognized or certified “system integrator partner” or similar designation for the control software and PLC system being supplied for this Project.

3. Similar project experience of the company:

   a. Provide a list of at least 3 successfully completed projects for a water and/or wastewater system of similar scope and complexity in which the proposing firm used components the same as those intended for use on this Project. The proposing firm must have performed, for each listed project, system engineering, system fabrication and installation, documentation (including schematic, wiring and panel assembly drawings), software configuration and documentation, field testing, calibration and process start-up, operator instruction and maintenance training. In addition, provide the following information for each project:

      (1) Name of plant or system owner, contact name, and current telephone number. Design engineer’s name, address, and telephone number. Failure to provide current contact information may result in the listed project being disqualified for use in meeting the minimum requirements for prequalification.

      (2) Manufacturer and model number(s) of the PLC based control system and the computer-based SCADA system used for both hardware and software.

      (3) Brief description of the system.

      (4) Approximate number of input and output signals: analog, digital, and fieldbus.

(5) Brief application software description.

(6) Contracted cost of the system, separate by base amount and any change orders for the completed projects.

(7) Duration of the project and date of completion.

4. Information on the proposed Project team members:

a. Provide the name and resume of the individual persons who will be responsible for each of the following:

(1) Office engineering and management of this Project.

(2) Lead for software configuration/programming.

(3) Individual who will be responsible for the hardware and hardware interface design.

(4) Individual who will be responsible for field testing, calibration, process start-up.

(5) Individual who will be responsible for operator training.

b. All of these individuals must be permanent employees of the proposing firm.

5. Determination of the proposed ICSC qualifications is at the sole discretion of the Engineer.

C. Furnish all equipment listed by and bearing the label of UL or of an independent testing laboratory acceptable to the Engineer and the Authority Having Jurisdiction.

D. The ICSC must have their own operating UL listed panel fabrication facility. All panels must be fabricated at this facility and meet all UL 508/508A requirements.

E. ICSC:

1. The Contractor, through the use of a qualified ICSC, is responsible for the implementation of the PCIS and the integration of the system with other required instrumentation, control devices and software.

2. The ICSC assumes full responsibility, through the Contractor, to perform all work to select, furnish, install, program, test, calibrate, and place into operation all instrumentation, controls, telemetry equipment, control panels, and control system including application software, for a complete, integrated and functional PCIS system.

3. Due to the complexities associated with the interfacing of numerous control system devices, it is the intent of these Specifications that the ICSC be responsible for the integration of the PCIS with existing devices and devices provided under the Contract Documents with the objective of providing a completely integrated control system.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 9.

B. Store all equipment and materials delivered to the job site in a location that will not interfere with the construction or the Owner's operations.

C. Shipping precautions:

1. After completion of shop assembly, successful Source Test, pack all equipment, cabinets, panels, and consoles in protective crates and enclose in heavy-duty polyethylene envelopes or secured sheeting to provide complete protection from damage, dust, and moisture.

2. Place dehumidifiers when required, inside the polyethylene coverings.

3. Skid-mount the equipment for final transport.

4. Provide lifting rings for moving without removing protective covering.

5. Display boxed weight on shipping tags together with instructions for unloading, transporting, storing, and handling at the job site.

D. Special instructions:

1. Securely attach special instructions for proper field handling, storage, and installation to each piece of equipment before packaging and shipment.

E. Tagging:

1. Tag each component and/or instrument to identify its location, instrument tag number, and function in the system.

2. Firmly attach a permanent tag indelibly machine marked with the instrument tag number, as given in the tabulation, on each piece of equipment constituting the PCS.

3. Tag instruments immediately upon receipt in the field.

4. Prominently display identification on the outside of the package.

5. Utilize the Tag and Loop Number identifications shown on the P&IDs.

F. Delivery and inspection:

1. Deliver products in undamaged condition, in manufacturer's original container or packaging with identifying labels intact and legible. Include date of manufacture on label.

1.07 PROJECT OR SITE CONDITIONS

A. Site conditions:

1. Provide a PCS, including all equipment, raceways and any other components required for a complete installation that meets the environmental conditions for the Site as specified in the General Requirements and below.

2. Seismic classification:

a. Provide all equipment and construction techniques suitable for the seismic requirements for the site, as specified in Section 13.

3. Wind:

a. Provide all equipment and construction techniques suitable for the site wind loading criteria, as specified in Section 13.

4. Altitude, temperature, and humidity:

a. As specified in Section 13.

b. Provide all equipment and instrumentation fully rated for continuous operation at this altitude, temperature and humidity conditions with no additional derating factors applied.

c. Provide additional temperature conditioning equipment to maintain all equipment and instrumentation in non-conditioned spaces or outdoors subject to these ambient temperatures 10 degrees Fahrenheit above the minimum operating temperature and 10 degrees Fahrenheit below maximum operating temperature as determined by the equipment manufacturer's guidelines:

(1) Provide all power wiring for these devices (e.g., heaters, fans, etc.), whether or not indicated on the Drawings.

5. Area classifications:

a. Provide enclosures for electrical, instrumentation and control equipment, regardless of supplier or subcontractor furnishing the equipment, that meet the requirements outlined in NEMA Standard 250 for the following types of enclosures:

(1) NEMA Type 1: Intended for indoor use, primarily to provide a degree of protection from accidental contact with energized parts or equipment.

(2) NEMA Type 4: Intended for indoor or outdoor use, primarily to protect equipment from exposure to windblown dust and rain, splashing or hose directed water, ice formation and freezing.

(3) NEMA Type 4X: Made from corrosion resistant materials (fiberglass reinforced plastic, 316 stainless steel or equal) and are intended for indoor or outdoor use, primarily to protect equipment from exposure to windblown dust and rain, splashing or hose directed water, ice formation and freezing, and corrosion.

(4) NEMA Type 12: Intended for indoor use, primarily to provide a degree of protection from dust, falling dirt and dripping non-corrosive liquids.

(5) NEMA Type 6: Rated for submergence.

(6) NEMA Type 6P: Rated for prolonged submergence.

b. Provide all Electrical Work in accordance with the following requirements, unless otherwise specifically indicated on the Drawings:

(1) Valve Vaults: NEMA Type 4 enclosure, GRC exposed conduit, damp environment, SS 316 support material.

(2) Outdoor Areas: NEMA Type 4 enclosure, GRC exposed conduit, wet environment, SS 316 support material.

(3) Inside Control Room/Buildings: NEMA Type 12 enclosure, GRC exposed conduit, wet environment, SS 316 support material.

6. Site security:

a. Abide by all security and safety rules concerning the Work on the Site, as specified in Section 9.

1.08 SEQUENCING

A. General:

1. As specified in Section No. 15.01 and No. 22.04.

2. Testing requirements are specified in Sections Section No. 22.04, Section 38.17 and other sections.

3. General scheduling requirements are specified in Section 5.

4. Work restrictions and other scheduling requirements are specified in Section 16.

5. Commissioning and Process Start-up requirements as specified in Section 22.

B. Submit proposed ICSC statement of qualifications:

1. The ICSC must be accepted by the Engineer before any other Work commences.

C. Pre-submittal conferences:

1. Before producing any submittals, schedule a pre-submittal conference for the purposes of reviewing the entire project, equipment, control philosophy, schedules, and submittal requirements.

2. The Contractor, instrumentation and control subcontractor, and electrical subcontractor must attend.

3. The Programmer shall be invited to attend the pre-submittal conference.

D. System configuration meetings:

1. Review the system configuration, the system database, control schemes, displays, report formats, etc. with the Engineer and Owner on at least 3 occasions during development.

2. Preliminary meeting: Before configuration work is begun. The ICSC must bring to this meeting example of displays, display symbols, reports, etc. to show the capabilities of the system software.

3. Intermediate review meeting: Held after the initial database is entered and typical screens and reports have been entered.

4. Final review meeting: Held after initial completion of all configuration work. This final meeting may not be held in conjunction with the Source Test. Make final format revisions after this review.

5. Additional requirements as specified in Section 38.01.01.

E. Source Testing:

1. Before the delivery and installation of control panels, PLCs, control system equipment, and other PCS components at the job site, but after the procurement and assembly of components, perform Source Test.

2. Schedule the Source Test after receiving approval of the Source Test procedures submittal.

3. Submit a copy of the test procedures including all forms at least 21 days before any scheduled test date.

F. General Field Start-up and testing procedures:

1. As specified in Section No. 22.04.

G. Installation testing:

1. As specified in Section No. 22.04.

2. Commence after acceptance of all training, wire test, calibration tests, and loop validation tests, and all inspections have demonstrated that the PCIS complies with all Contract requirements.

3. Acceptance of the PCIS Installation testing must be provided in writing by the Owner before the performance testing may begin.

H. Training:

1. As specified in Section No. 22.03. - Training.

I. Functional testing:

1. Representatives from each of the following groups shall be in attendance during the functional Testing: Programmer, System Supplier Commence after acceptance of all training, wire test, calibration tests, and loop validation tests, and all inspections have demonstrated that the PCIS complies with all Contract requirements.

2. Loop validation test.

3. As specified in Section 38.17:

a. Notify the Owner of scheduled tests a minimum of 21 days before the estimated completion date of installation and wiring of the PCIS.

b. Complete loop validation testing a minimum of 5 days before the pre- commissioning phase of the project.

c. Loop validation certifications:

(1) After the field device loop tests have been successfully completed as specified in Section 38.17 for all individual instruments, all separate analog control networks, all valves, all VCPs, all motors, all local operator interface panels, all motor control centers, etc., submit a certified copy of all test forms signed by the Contractor, Vendor, and the Owner's representative with test data entered, together with a clear and unequivocal statement that all instrumentation, including all control and signal wiring, has been successfully calibrated, inspected, and tested:

(a) Acceptance of the PCIS Installation Testing must be provided in writing by the Engineer before the Process Operational Period may begin.

d. The Programmer shall not be required to be on site, nor shall the Programmer be required to supply application software, until the loop validation tests are complete for a PLC and all prerequisites for the Process Operational Period are completed.

J. Provide all special tools and spare parts, as specified in the Maintenance paragraph of this Section, before Process Operational Period commences, suitably wrapped and identified.

K. Process Operational Period:

1. Upon completion of the Process Operational Period, conduct an Instrumentation and Controls Process Performance Test as a condition for Project completion.

1.09 WARRANTY

A. Provide additional warranty as specified in the individual Instrumentation and Control Specifications that extends beyond the Correction Period, as specified in the Section 11.

1.10 SYSTEM PROCESS START-UP

A. Replace or modify equipment, software, and materials that do not achieve design requirements after installation in order to attain compliance with the design requirements:

1. Following replacement or modification, retest the system and perform additional testing to place the complete system in satisfactory operation and obtain compliance acceptance from the Engineer.

1.11 MAINTENANCE

A. Before Substantial Completion, perform all maintenance activities required by the Contract Documents including any calibrations, final adjustments, component replacements or other routine service required before placing equipment or systems in service.

B. Furnish all spare parts as required by the Contract Documents.

C. Spare parts:

1. Furnish the spare parts selected by the Engineer from the priced list of spare parts in the hardware submittal.

2. Furnish a price list of all special tools required to calibrate and maintain all of the instrumentation provided under the Contract Documents. Furnish the special tools selected by the Engineer from the priced list.

D. Provide additional spare parts specified in other sections of the Instrumentation and Control Specifications.

E. Submit all special tools and spare parts, suitably wrapped and identified, before Process Operational Period commences.

PART 2 PRODUCT

2.01 MANUFACTURERS AND SUPPLIERS

A. The Contractor shall be responsible for providing all Equipment, Instrumentation, Enclosures, Custom Control Panels, and Control Devices as shown on the Drawings and specified in these Specifications.

B. All manufacturers of materials and equipment specified in these Specifications shall have been regularly engaged in the design, fabrication, and/or service of instruments provided for a minimum of five (5) years. Each manufacturer shall have an authorized service facility within 150 miles of the project site and offer on-site support within 48 hours.

C. The Contractor, or its supplier, shall employ the use of a State Licensed Electrical Engineer and Control Systems Engineer with a minimum of five (5) years' experience preparing design documents for industrial applications in water and/or waste water systems in the State of California.

2.02 MATERIALS AND EQUIPMENT

A. The Contractor shall provide new and undamaged materials and shall use construction equipment which is in good repair, well-maintained, and of adequate capacity to ensure that breakdowns will not endanger the quality or progress of the work.

B. To facilitate the District's future operations and maintenance, instrumentation products shall be of the same manufacturer, with panel-mounted devices of the same type and model to the greatest extent possible.

C. Auxiliary and accessory devices necessary for system operation or performance, such as transducers or relays to interface with existing equipment or equipment provided by other suppliers under other Sections of these Specifications, shall be included whether they are shown on the instrument Drawings or not.

D. Materials, plant, machinery, tools, and equipment acquired, possessed, or provided for incorporation in the work shall become the property of the District, whether or not such materials, plant, machinery, tools, or equipment are brought to or upon the site. The removing or disposing of the same, or any part thereof, without the consent of the Engineer, shall be prohibited.

E. Should the Engineer establish that the existing equipment owned by the District was caused to be defective as a result of the Contractor's actions, the Contractor shall bear the costs involved in removing the defective equipment from the site, purchasing replacement equipment, and replacing same with equipment satisfactory to the Engineer.

F. The Contractor shall be responsible for ascertaining the information, dimensions, connections, and appurtenances required to provide for satisfactory installation of equipment.

G. The Contractor shall restore equipment to newly manufactured condition prior to acceptance, including, but not limited to: repair of damaged meters, indicators, and switches; replacement of pitted contacts; touch up of rusted or chipped enclosures; and repainting pipe, valves, and fittings.

H. Instruments shall operate on 115 VAC ±10%, 60 Hz power and shall return automatically to accurate measurement upon restoration of power after a power failure, except where specifically noted otherwise, or shall be loop-powered as shown on the Drawings. Instruments shall have short circuit protection.

I. Instrument transmitters shall produce isolated 4 to 20 mA dc (milliampere direct current), however, signals between instruments within the same panel or cabinet may be 1-5V dc (volts direct current), or the like, on prior approval of the Engineer. Instruments which produce a pulse signal shall have a dc pulse frequency whose repetition rate is directly proportional to the process variable over a 10:1 range. Outputs of equipment that are not of the standard signals as outlined, shall have the output immediately raised and/or converted to compatible standard signals for remote transmission.

J. Instruments shall have conformal coated printed circuit boards to prevent damage by dust, moisture, fungus, and airborne contaminants. Solid state components shall be conservatively rated for their purpose, to assure optimum long term performance and dependability over ambient atmosphere fluctuations and 0 to 100 percent relative humidity.

K. All equipment provided shall be of modular construction and shall be capable of field expansion.

L. Instruments shall be complete with mounting hardware, floor stands, wall brackets, or instrument racks.

M. All indicators and recorder readouts shall be linear in process units, unless otherwise noted.

N. All electronic/digital equipment shall be provided with radio frequency interference protection and shall be FCC-approved.

O. Instrument enclosures shall be heavy-duty type rated for the site conditions. Waterproof enclosures shall be provided for equipment, panels, and instruments mounted outdoors. In hazardous areas, enclosures shall be of the Class, Group, and Division as shown on the Drawings, or as specified in these Specifications to comply with the National Electrical Code.

P. Instrumentation shall be of rugged construction designed for the site conditions. The field-mounted equipment and system components shall be designed for installation in dusty, humid, and corrosive service conditions.

Q. Only new, standard, first grade materials shall be provided throughout, conforming to standards established by UL, and so marked or labeled, together with manufacturer's brand or trademark.

R. Material and equipment shall meet applicable codes and standards, except as modified by the Specifications.

S. Equipment removed in the course of this work shall remain the property of the District

T. Spare parts requirements are specified in the individual specification sections. The Contractor shall obtain spare parts from the equipment manufacturer. Spare instruments shall be complete with all accessories and gauges, with same specification, make and model as installed in the field. Third-party equivalent replacements will not be acceptable.

U. The Contractor shall package spare parts for protection against dirt and moisture. Each package shall be labeled as to its contents with a description and part number. Packages shall be sized for convenient storage and handling, and shall weigh no more than 30 pounds each and be no larger than 30 inches long by 18 inches deep by 18 inches wide. Spare parts for different equipment items shall not be placed in the same package.

V. The Contractor shall obtain extended warranties (if necessary) from the original equipment manufacturers to cover the period of operation of the equipment from its initial installation until one (1) year after installation and acceptance by the District.

W. Discrete control circuits shall be configured to fail-safe:

1. Alarm – Alarms shall be wired failsafe so that broken or loose wire will cause the alarm.

2. Status – Typically ON/OFF, shall be wired with positive logic. Signal ON at the PLC input means that the device is ON or RUNNING.

3. Valve position – shall be wired with negative logic. Both signals shall be ON at the PLC when the valve is in mid position. The ZB signal shall remain ON when the valve is fully CLOSED. The ZD signal shall remain ON when the valve is fully OPENED. Both signals OFF shall be an alarm condition.

4. Other – Signals which do not fall within these three types shall be handled on a case by case basis for the applications and shall be discussed , reviewed and approved by Engineer .

X. Surge protection shall be provided to protect the electronic instrumentation system from induced surges propagating along the signal and power supply lines. The protection systems shall be such that the protective level shall not interfere with normal operation, but shall be lower than the instrument surge withstand level and be maintenance-free and self-restoring. Instruments shall be housed in a suitable metallic case, properly grounded. Ground wires for all surge protectors shall be connected to a good earth ground and each ground wire run individually and insulated from each other. These protectors shall be mounted within the instrument enclosure or a separate NEMA 4 junction box coupled to the enclosure. The units shall be as indicated on the Drawings, or as manufactured by Telecommunications Industries Inc., Joslyn, Leviton, Phoenix, or equal.

Y. Power Supply—Protection of all 120 VAC instrument power supply lines shall be provided. Cabinets, panels, and groups of field instruments, regardless of location (indoor or outdoor), shall be protected by isolation transformers and surge suppressors. Individual field instruments shall be protected by individual gas tube surge suppressors or metal oxide varistors (MOVs).

Z. Signal Lines—All signal lines shall be protected through the use of gas tube surge arrestors and Zener diode protectors when they enter or leave a building—provided at both ends of the signal lines and as close to the instruments as possible.

AA. All instrument air header takeoffs and branch connections smaller than two (2) inches in size shall be 316 stainless steel.

BB. All instrument shut-off valves and associated fittings shall be supplied in accordance with the piping specifications and instrument installation details. Fittings shall be Swagelok 316 stainless steel, or equal. Valves shall be Whitey 316 stainless steel, or equal.

CC. All instrument tubing shall be fully annealed ASTM A269 Seamless 316 grade, free of scratches, and having the following dimensional characteristics as required to fit the specific installation:

1. 1/4-inches to 1/2-inches O.D. by 0.035 wall thickness.
2. 5/8-inches to 1-inches O.D. by 0.049 wall thickness.
3. 1-inches O.D. by 0.065 wall thickness.
4. 1-1/4-inches O.D. by 0.065 wall thickness.
5. 1-1/2-inches O.D. by 0.083 wall thickness.
6. 2-inches O.D. by 0.095 wall thickness.

DD. All process connections to instruments shall be annealed stainless steel tubing, Type 316.

EE. All tube track supports shall be stainless steel material and shall be installed in accordance with the manufacturer's instructions.

2.03 COMPONENTS

A. Furnish all meters, instruments, and other components that are the most recent field proven models marketed by their manufacturers at the time of submittal of the shop drawings unless otherwise specified to match existing equipment.

B. Unless otherwise specified, furnish individual instruments that have a minimum accuracy of within 0.5 percent of full scale and a minimum repeatability of within 0.25 percent of full scale.

C. Signal transmission:

1. Analog signals:

a. Furnish analog measurements and control signals that vary in direct linear proportion to the measured variable, unless otherwise indicated.

b. Furnish electrical analog signals outside control panels that are 4 to 20 milliamperes 24 VDC, except as indicated.

c. Analog signals within enclosures may be 1 to 5 VDC.

d. Electrically or optically isolate all analog signals from other signals.

e. Furnish regulated analog signals that are not affected by changes in supply voltage or load resistance within the unit's rating.

f. Maintain the total 4 to 20 milliamperes loop impedance to 10 percent below the published value at the loop operating voltage.

g. Where necessary, reduce loop impedance by providing current-to-current (I/I) isolation amplifiers for signal re-transmission.

2. Pneumatic Signals:

a. All pneumatic signals: 3 to 15 pounds per square inch gauge.

3. Discrete input Signals:

a. As indicated in the controller hardware specification.

4. Discrete output signals:

a. Dry contacts or TRIAC outputs (with express written approval by the Engineer) as needed to coordinate with the field device.

b. Provide external terminal block mounted fuse with blown fuse indication for all discrete outputs.

c. Provide interposing relays for all discrete outputs for voltage and/or current compatibilities.

d. Provide interposing relays as required for functionality of the control circuit.

5. Signal Performance and Design Criteria:

a. Stability:

(1) After Control have taken corrective action, oscillation of the final control element shall not exceed 2 cycles per minute or a magnitude of motion of 0.5 percent of full travel.

b. Response:

(1) Any change in setpoint or controlled variable shall produce a corrective change in position of the final control element and stabilized within 30 seconds.

c. Agreement:

(1) Setpoint indication of controlled variable and measured indication of controlled variable shall agree within 3 percent of full scale over a 6:1 operating range.

d. Repeatability:

(1) For any repeated magnitude of control signal, from either an increasing or decreasing direction, the final control

element shall take a repeated position within 0.5 percent of full travel regardless of force required to position the final element.

e. Sensitivity:

(1) Controls shall respond to a setpoint deviations and measured variable deviations within 1.0 percent of full scale.

f. Performance:

(1) All instruments and control devices shall perform in accordance with the manufacturers' specifications.

D. Discrete circuit configuration:

1. Configure discrete control circuits to fail safe, on loss of continuity or loss of power.

2. Alarm contacts: Fail to the alarm condition.

3. Control contacts fail to the inoperative condition unless otherwise indicated on the Drawings.

E. Grounding:

1. Provide control panels with a signal ground bus, isolated from the power ground bus:

a. Provide multiple panels in one location with a common point for signal ground bus connection to ground.

2. Ground single point ground shields and measurement loops at the source panel external terminals, unless otherwise noted, by bonding to the control panel signal ground bus.

3. Provide isolating amplifiers within control panels for field equipment possessing a grounded input or output, except when the panel circuit is galvanically isolated.

2.04 ACCESSORIES

A. Provide flow conditioning devices or other required accessories if necessary to meet the accuracy requirements in the Contract Documents.

B. Nameplates:

1. Provide a nameplate for each controller, instrument transducer, instrument power supply, solenoid, or any other control device located either in the field or within panels.

2. All nameplates shall be of identical style, color, and material throughout the facility.

3. All Device and instrument nameplates shall include:

   a. Designations as indicated on the Drawings and identified on the Process and Instrumentation Drawings:

      (1) Device tag and loop number ID (e.g., FIT-300).
      (2) PLC ID (e.g., PLC-11).
      (3) Power information (e.g., PCM-11, 120VAC).

   b. White lettering on a black background, laminated plastic.

PART 3 EXECUTION

3.01 EXAMINATION

A. The ICSC is required to visit the site and examine the premises completely before bidding. It is the ICSC's responsibility to be fully familiar with the existing conditions and local requirements and regulations.

B. Review the existing Site conditions and examine all shop drawings for the various items of equipment in order to determine exact routing and final terminations for all wiring and cables.

C. Provide a complete instrumentation and control system:

   1. Install all extra conduits, cables, and interfaces as may be necessary to provide a complete and operating electrical, and process control and instrumentation system.

3.02 INSTALLATION

A. Instrumentation and accessory equipment shall be installed in accordance with the manufacturer’s instructions. The instrument and control systems shall include necessary connections to sources of electrical power, air, water and vents, with required valves, switches, and accessories as specified, or as recommended for the best operation by the manufacturer of the equipment furnished.

B. The locations of equipment, transmitters, alarms and similar devices shown on the Drawings are approximate only. Exact locations shall be as approved by the Engineer during construction. Obtain in the field all information relevant to the placing of process control work, and in case of any interference with other work,

proceed as directed by the Engineer and furnish all labor and materials necessary to complete the work in an approved manner.

C. The Contractor shall inspect instrumentation for damage in shipment. Damaged instrumentation shall be returned to the manufacturer. The Contractor shall package instrumentation to protect against shipping damage, dust, moisture, and atmospheric contaminants, and shall include a shipping label which contains the tag name, description, and instructions for unloading, transporting, storing, and handling at the site.

D. The P&IDs indicate the intent and not the precise nature of the interconnection between the individual instruments. Any exceptions taken to the implied interconnection shall be noted for review by the Engineer.

E. The instrumentation installation details on the Drawings indicate the designed installation for the instruments specified. Where specific installation details are not specified or shown on the Drawings, the American Petroleum Institute (API) Recommended Practice 550 shall be followed as applicable.

F. The Contractor shall install instrumentation and auxiliary devices to be accessible for maintenance. Space shall be provided between instruments and other equipment and piping for ease of removal and servicing. Generally, instrumentation shall be safely accessible from floor level or grade.

G. The Contractor shall furnish and install a stainless steel tag with black engraved letters to each primary element, transmitter, and readout, and all field mounted instruments with the instrument full tag name, description, manufacturer, model, and serial number. Tags shall be affixed with stainless steel wire fasteners.

H. The Contractor shall coordinate with various subcontractors, equipment suppliers, and manufacturers. The Contractor shall coordinate instrumentation to assure proper interface and system integration. The Contractor shall coordinate the work so as to minimize interference with or interruptions of the daily operations of the SCADA system.

I. All work shall be executed in full accordance with codes and local rulings. Should any work be performed contrary to said rulings, ordinances, and regulations, the Contractor shall bear full responsibility for such violations and assume all costs arising therefrom.

J. All equipment used in areas designated as hazardous shall be designed for the Class, Group and Division as required on the Electrical Drawings for the locations.

K. Unless specifically shown in the Drawings, direct reading or electrical transmitting instrumentation shall not be mounted on process piping. Instrumentation shall be mounted on instrument racks or stands as detailed on the installation detail drawings. All instrumentation connections shall be provided with shutoff and drain valves. For differential pressure transmitters, valve manifolds for

calibration, testing and blow-down service shall also be provided. For slurries, chemical or corrosive fluids, diaphragm seals with flushing connections shall be provided.

L. All piping and tubing to and from field instrumentation shall be provided with necessary unions, calibrations and test tees, couplings, adaptors, and shut-off valves. Process tubing shall be installed to slope from the instrument toward process for gas measurement service and from the process toward the instrument for liquid measurement service. Provide drain/vent valves or fittings at any process tubing points where the required slopes cannot be maintained.

M. Field instruments requiring power supplies shall be provided with a power disconnect switch. Disconnect switch shall be as specified in Section 36.

N. Provide a sun-shield as follows:

1. Each instrument transmitter with a readout and each control panel located outdoors shall be provided with a sun-shield.

2. Sun-shield shall be designed and installed to minimize heat gain in instruments and panels.

3. Where practical, outdoor instruments shall be installed so readouts face north to minimize direct sun exposure.

4. Design and install sun shield to prevent direct sunlight from striking instrument readouts.

O. All necessary mounting panels, stands, hangers and brackets shall be designed, furnished, and installed by the Contractor. The Contractor shall review other sections and ensure full compliance with the total Contractor Documents.

P. The Contractor shall investigate each space in the building through which equipment must pass to reach its final location. If necessary, the Contractor shall be required to ship material in sections sized to allow passage through restricted areas in the building. The Contractor shall also investigate, and make any field modifications to the allocated space for each cabinet, enclosure and panel, to assure proper space and access (front, rear, side).

Q. The shield on each process instrumentation cable shall be continuous from source to destination and be grounded as directed by the manufacturer of the instrumentation equipment. However, in no case shall more than one ground point be employed for each shield. Unless otherwise necessary, all analog cables shall be grounded in the PLC I/O drop cabinets.

R. Instrument panels shall be provided with a signal ground bus which shall be single-point-connected to the power ground bus. Multiple panels in one location shall have a common point for signal ground bus connection to ground.

S. Isolating amplifiers shall be provided within the panel for field equipment possessing a grounded input or output, except when the panel circuit is galvanically isolated.

T. Lifting rings from cabinets/assemblies shall be removed. Hole plugs shall be provided for the holes, of the same color as the cabinet.

U. The Contractor shall coordinate the installation, placing and location of system components, their connections to the process equipment panels, cabinets and devices, subject to the Engineer's approval. The Contractor shall be responsible to insure that all field wiring for power and signal circuits are correctly wired in accordance with best industry practice, and provide for all necessary system grounding to insure a satisfactory functioning installation. The Contractor shall schedule and coordinate work under this section with that of the electrical work specified under applicable Sections of Division 36.

V. Two complete sets of approved shop drawings shall be kept at the job site during all on-site construction. Both sets shall be identically marked up to reflect any modifications made during field installation or start-up. All markings shall be verified and initialed by the Engineer. Following completion of the installation and the operational readiness test, one set of marked up drawings shall be provided to the Engineer, and the other retained by the supplier for incorporation of the mark-ups into final record documentation.

W. Any existing conditions, equipment location, or other restrictions that prevent adherence to the Drawings and Specifications shall be submitted to the Engineer for review. Approval from the Engineer is required prior to commencement of work resulting from installation or mounting restrictions.

X. The services of the manufacturer's technical representative shall be provided for pre-startup installation checks, startup assistance, training of District's personnel, troubleshooting, acceptance testing, and other services as required within these Drawings and Specifications. The manufacturer's representative shall:

1. Approve installation in writing to the Engineer before operation.

2. Verify conformance to all specified requirements.

3. Fully instruct all designated personnel for the plant on proper care, maintenance, and operation of all equipment and appurtenances.

4. Perform specified acceptance tests and operate the system to verify satisfactory operation of all equipment in the presence of District personnel and the Engineer.

5. Check all equipment for excessive noise or vibration, proper alignment, general operation, etc.

6. Operate the equipment through the design performance range consistent with available process variables.

7. Adjust, balance, calibrate, and verify that the equipment, safety devices, controls, and process system operate within the design conditions. Each safety device shall be tested for proper setting and signal.

8. Re-visit job sites as often as necessary beyond minimum services specified to correct deficiencies to the satisfaction of the Engineer.

Y. Loop Tuning:

All electronic control stations incorporating PID controllers shall be tuned following device installation, but prior to commencement of the field tests.

1. Optimal loop tuning shall be achieved either by auto-tuning software, or manually by trial-and-error, Ziegler-Nichols step-response method, etc. Assigning common PID factors for identical loops following field tuning of a single typical loop is acceptable. However, tuning documentation shall be submitted for each loop individually as specified in Part 1 of these Specifications.

2. Determine and configure optimal tuning parameters to assure stable, steady state operation of final control elements running under the control of field-mounted, dedicated PID controllers, or software-based PID controllers residing as part of the programmable logic controller system. Each control loop that includes anti-reset windup features shall be adjusted to provide optimum response following startup from an integral action saturation condition.

3. Tune all PID control loops to eliminate excessive oscillating final control elements. Loop parameters shall be adjusted to achieve one-quarter amplitude damping or better. In addition, loop steady state shall be achieved at least as fast as the loop response time associated with critical damping.

4. Loop performance and stability shall be verified in the field following tuning by step changes to setpoint. Submit loop tuning methodology and verification as part of the final system documentation as specified in Part 1.

5. For cascade loops, tune both sets of controllers so that the cascade loop achieves the loop tuning characteristics specified in these Specifications.

Z. Perform all related Electrical Work in accordance with the applicable sections of the Electrical Specifications.

AA. Field instruments installation:

1. Install field instruments as specified in the Contract Documents, API RP 550 and RP 551, and the manufacturer's instructions.

2. Mount field instruments so that they can be easily read, readily approached, and easily serviced, and so they do not restrict access to mechanical equipment:

   a. Mount field instruments on a pipe stand or local panel, if they are not directly mounted, unless otherwise indicated on the Drawings.

   b. Provide sun shields for all field electronic instruments exposed to direct sunlight.

3. Make connections from rigid conduit systems to field instruments with PVC coated flexible conduit:

   a. Type of flexible conduit required shall be per the area classification.

   b. Maximum length of 18 inches.

4. Connect field instruments with cable as specified in the Electrical Specifications, except when the manufacturer requires the use of special cable, or otherwise specified in this Section:

   a. Special cable applications shall be in accordance with the NEC.

5. Verify the correctness of each installation:

   a. Polarity of electric power and signal connections.
   b. Ensure all process connections are free of leaks.

BB. Process sensing lines and air tubing:

1. Install individual tubes parallel and/or perpendicular to and near the surfaces from which they are supported.

2. Provide supports for rigid tubing at intervals of not more than 3 feet.

3. Slope horizontal runs of instrument tubing at a minimum of 1/16th inch per foot to allow for draining of any condensate.

4. Bends:

   a. Use proper tool.
   b. Make bends for parallel lines symmetrical.
   c. Make bends without deforming or thinning the walls of the tubing.

5. Square-cut and clean all ends of tubing before being inserted in the fittings.

6. Provide bulkhead fittings at all panels requiring pipe and/or tubing entries.

7. Use stainless steel tubing for all piping hard piped from the air header, unless otherwise indicated on the Drawings or not compatible with the fluids or atmosphere in the area:

   a. Use flexible connections only on moving equipment and under the constraint that the length shall be less than 1.5 times maximum travel of the equipment.

CC. Conduit, cables, and field wiring:

1. Provide all PCS equipment cables, and process LAN communication networks under the Instrumentation and Control Specifications.

2. Provide terminations and wire identification as specified in the Electrical Specifications.

3. Protect all wiring from sharp edges and corners.

4. Provide all conduits, fittings, boxes, etc. in accordance with all the requirements of the Electrical Specifications.

5. Install wire label appropriately on each separate wire at both ends of the wire per specific loop diagram or schematic drawing, whether from a field device to a terminal block in a junction box or from a terminal to another terminal in the control panel.

DD. Equipment tie-downs:

1. Anchor all instruments, control panels, and equipment by methods that comply with seismic and wind bracing requirements, which apply to the Site.

2. All control panels, VCPs, LCPs, RTUs, PCMs, etc., shall be permanently mounted and tied down to structures.

EE. Instrument tagging:

1. Provide all field-mounted instruments with nameplates:

   a. Nameplates engraved with the instrument's full tag number as indicated on the Drawings:

      (1) Affix tags with stainless steel wire fasteners.

2. Provide all front and back of panel instruments with nameplates:

   a. Engraved with the instrument's full tag number as indicated on the Drawings. Engraving to include the following:

      (1) Instrument's full tag number.
      (2) Service description.

   b. Nameplates:

      (1) Secure nameplates to the panel with stainless steel screws.

      (2) Use an accepted adhesive if screws would violate the NEMA or other ratings of the enclosure.

FF. Cable and conductor termination:

1. Terminate all cables and conductors on terminal blocks.

2. Terminal block enclosures:

   a. Suitable for the area classification.

GG. Surge protection:

1. Provide outdoor field instrument loops with voltage surge protection units installed on the instruments.

2. Individually fuse each 4 to 20 milliamperes direct current loop with a 1/16 ampere fuse between power supplies and receiver surge protectors.

3. Provide voltage surge protection for 4 wire transmitters and analyzers:

   a. Protect both power source and signal loop.

3.03 TESTING

A. General

1. Confirmation of an operational control system is dependent upon results derived from test procedures as specified in this Section. As part of this contract the Contractor shall provide factory testing prior to shipment of the equipment and also testing of the equipment once installed in the field. Once the plant is in operation an additional Thirty-Day Acceptance Test is required.

2. Each test shall be the cause and effect type. The test-person shall initiate an input (cause). If the system or subsystem produces the correct result (effect), then the specific test requirement will have been satisfied.

3. All tests shall be conducted with the Engineer's approval. Each test to be performed shall be described and a space provided for sign-off by the appropriate party upon satisfactory completion.

4. Copies of the sign-off test procedures, forms and checklists will constitute the required test documentation.

5. Provide all special testing materials and equipment. Wherever possible, perform tests using actual process variables, equipment, and data. Where it is not practical to test with real process variables, equipment and data, provide suitable means of simulation. Define these simulation techniques in the test procedures.

6. The Contractor shall coordinate all required testing with the General Contractor, all affected Subcontractors, and the Engineer.

7. The Engineer reserves the right to test or retest all specified functions whether or not explicitly stated in the prior approved Test Procedures until the functional requirements of the overall system are achieved. No additional compensation shall be provided for any required extended testing.

8. The Engineer's decision shall be final regarding the acceptability and completeness of all testing.

9. No equipment shall be shipped until the Engineer has received all test results and approved the system as ready for shipment.

10. The Contractor shall provide the services of field service engineers, all special calibration and test equipment, and labor to perform the field tests.

11. Any additional hardware or software that may be required to successfully verify system operation shall be supplied at no cost to the District.

B. Factory Testing

1. Prior to shipment of the equipment, the following factory tests are required:

a. Unwitnessed Factory Test (UFT).

(1) The entire system, except for primary elements, final control elements, and field mounted transmitters, shall be interconnected and tested to ensure that the system will operate as specified. All analog and discrete input/output points not interconnected at this time shall be simulated to ensure proper operation of all alarms, monitoring devices/functions and control devices/functions.

(2) All panels, consoles, and assemblies shall be inspected and tested to verify that they are in conformance with related submittals, Specifications, and Drawings. During the tests, all digital system hardware and software shall be operated for at least five days continuously without a failure to verify the system is capable of continuous operation.

Tests to be performed shall include, but not be limited to, the following, and each test shall be specifically addressed in the Test Procedure submittal:

(a) Building and loading the System Data Base.

(b) Conduct online modifications to the data base.

(c) Demonstrate operability of the interfaces (hardware and software).

(d) Demonstrate operability of the data communication network.

(e) Demonstrate all system software functions specified.

(f) Verify the displays and interactive capabilities of the operator's console.

(g) Simulate selected operating conditions to verify the performance of the monitoring, alarm and control functions.

(h) Generate reports using test data.

(i) Verify communication links between all remote sites. Testing of all parameters within the protocol shall be included.

i) All analog control panels shall be included in these tests.

ii) Submit UFT results for review by the Engineer per Paragraph 1.03H.

b. Witnessed Factory Test (WFT).

(1) Implicit in the scheduling of the witnessed factory acceptance test is the assumption that the Contractor has completed the test procedures as defined in the UFT, has

submitted the UFT results and those results have been approved.

(2) All system tests specified for the unwitnessed factory test shall be repeated.

(3) The Contractor shall notify the Engineer in writing that the system is ready for the Witnessed Factory Test and allow the Engineer and/or District to schedule a test date within 30 days of receipt of the “Ready To Test” letter. At the time of notification, the Contractor shall submit any revisions to the detailed test procedure previously approved by the Engineer in the project system plan.

(4) The purpose of the test shall be to verify the functionality, performance, and stability of the hardware and software. The system must operate continually for one-hundred (100) hours without failure before the test shall be judged successful. Successful completion of the test, as determined by the Engineer, shall be the basis for approval of the system to be shipped to the site.

(5) The various tests performed during the Engineer- and/or District-witnessed factory demonstration test shall be designed to demonstrate that hardware and software fulfill all the requirements of the Specifications. The test conditions shall resemble, as closely as possible, the actual installed conditions.

(6) During the test, for a period of time equal to at least twenty percent (20%) of the test duration, the Engineer shall have unrestricted access to the system.

(7) All deficiencies identified during these tests shall be corrected and retested prior to completion of the Factory Test, as determined by the Engineer.

(8) Punchlist items and Resolutions noted during the test shall be documented on the Punchlist/Resolution form.

(9) The following documentation shall be made available by the Contractor, to the Engineer at the test site, both before and during the Factory Tests:

(a) All Drawings and Specifications, addenda, letters of clarification, and Extra Work authorizations.

(b) Master copy of the test procedure.

(c) List of the equipment to be tested including make, model, and serial number.

(d) Design-related hardware submittal applicable to the equipment being tested.

(e) Preliminary software documentation submittal.

(f) Submit WFT results for review by the Engineer per Paragraph 1.03H—Testing Submittals.

C. Field Testing

1. Prior to Plant Startup, the following tests shall be performed:

a. Operational Readiness Test (ORT)

(1) Prior to Startup and the Functional Acceptance Test, the entire system shall be certified (inspected, wired, calibrated, tested, etc., and documented) as installed and ready for the ORT as defined below.

(2) Loop/Component Inspections and Tests: The entire system shall be checked for proper installation, calibrated and adjusted on a loop-by-loop and component-by-component basis to ensure conformance with related submittals and these Specifications. Loop tuning shall be completed per Paragraph 3.01.0 of this Article.

(a) The Loop/Component Inspections and Tests shall be implemented using Engineer-approved forms and checklists.

(b) Each loop shall have a Loop Status Report to organize and track its inspection, adjustment and calibration. These reports shall include the following information and check off items with spaces for sign off by the system supplier:

i) Project Name, Loop Number, and Tag Number for each component

ii) Check-offs/sign-offs for each component functionality, wiring and calibration

(c) Submit ORT results for review by the Engineer per Paragraph 1.03F.

D. Functional Acceptance Test (FAT).

1. Prior to Startup and the Functional Acceptance Test (FAT), the entire installed instrument and control system shall be certified as Ready for Operation. All preliminary testing, inspection, and calibration shall be complete as defined in the Operational Readiness Tests.

   a. Once the facility has been started up and is operating, a witnessed FAT shall be performed on the complete system to demonstrate that it is operating and in compliance with these Specifications. Each specified function shall be demonstrated on a paragraph-by-paragraph, loop-by-loop, and site-by-site basis.

   b. Loop-specific and non-loop-specific tests shall be the same as specified under Factory Tests except that the entire installed system shall be tested and all functions demonstrated.

   c. Updated versions of the documentation specified to be provided during the Factory Tests shall be made available to the Engineer at the job site both before and during the tests. In addition, one copy of all O & M Manuals shall be made available to the Engineer at the job site both before and during testing.

   d. The specified daily schedule for the Factory Tests shall also be followed during the Functional Acceptance Testing.

   e. The system shall operate at least for a continuous one-hundred (100) hours without failure during the FAT.

   f. Punch-list items, issues, and resolutions noted during the test shall be documented on the Punchlist/Resolution form.

   g. Submit FAT results for review by the Engineer as per Paragraph 1.03H.

E. Thirty-Day Acceptance Test

1. After completion of the Operational Readiness and Functional Acceptance Tests, the Contractor shall be responsible for operation of each separate process system as it is incorporated into service for a period of thirty (30) consecutive days, under conditions of full plant process operation, without a single non-field repairable malfunction. The 30-Day Acceptance Test may occur concurrently with the FAT.

2. During this test, plant operating and Contractor personnel shall be present as required. The Contractor personnel shall have an intimate knowledge of the system hardware and software.

3. While this test is proceeding, the District shall have full use of the system. Only plant operating personnel shall be allowed to operate equipment associated with live plant processes.

4. Any malfunction during the tests shall be analyzed, and corrections made by the Contractor. The Engineer will determine whether any such malfunctions are sufficiently serious to warrant repeating the test.

5. Any malfunction, during the 30-consecutive-day test period, which cannot be corrected within 24 hours of occurrence by the Contractor's personnel, or more than two similar failures of any duration, will be considered as a non-field-repairable malfunction.

6. Upon completion of repairs by the Contractor, the test shall be repeated as specified in these Specifications.

7. In the event of rejection of any part or function, the Contractor shall perform repairs or replacement within ninety (90) days.

8. All data-base errors must be corrected prior to the start of each test period. The 30-day test will not be considered successful until all data base points are correct.

9. The Total Availability of the system shall be greater than 99.5 percent during the test period and is defined as follows:

$$\text{Total Availability} = [1 - (\text{down time} / \text{total time})] \times 100\%$$

10. Down times caused by power outages originating external to the tested system will not be counted for calculating total availability but will extend the test duration.

3.04 TRAINING

A. General:

1. The cost of training programs to be conducted for District personnel shall be included in the Contract Price. The training and instruction, insofar as practicable, shall be directly related to the system being supplied.

2. The Trainer shall provide detailed manuals to supplement the training courses. The manuals shall include specific details of equipment supplied and operations specific to the project.

3. The Trainer shall make use of teaching aids, manuals, slide/video presentations, etc. After the training is completed, such materials shall be delivered to the District.

4. The training program shall represent a comprehensive program covering all aspects of the operation and maintenance of the system.

5. All training schedules shall be coordinated with, and at the convenience of, the District. Repeated training may be made necessary by the District's particular working schedules.

6. Factory training shall be conducted before the system is commissioned, and subsequent to final manual submittals. Factory training shall comprise a number of separate courses, whose content and structure is detailed in the individual specification sections. Factory training shall include schooling and hands-on experience.

7. On-site (field) training shall be conducted at the District's plant site and shall provide detailed hands-on instruction for District personnel covering system debugging, program modification, troubleshooting, maintenance procedures, calibration procedures, and system operation.

8. Training shall not commence until the training schedule and outline has been approved by the District. The Contractor shall submit a training schedule thirty (30) days prior to the proposed scheduled training date. Trainings shall occur between Tuesdays and Thursdays.

B. Owner Training:

1. Provide system maintenance and operator training courses for all the instrumentation and control equipment and systems furnished, as described below:

   a. All training described below shall be provided by the Contractor.

   b. The Programmer is not responsible for the training described in this Section.

   c. The Programmer will provide training on software provided by the Programmer.

2. Conduct all training at the Project Site unless another location which is accepted by the Engineer and Owner:

   a. Include instruction on the use of all maintenance equipment and special tools provided under the Contract.

3. Tailor training classes to the specific needs of the class participants:

   a. Develop separate courses for operators, maintenance staff, and supervisors:

      (1) The specific categories and number of personnel in each category are identified below.

Course Title	Minimum Course Length (hours per session)	Personnel (estimated number of students)	Minimum Number of Sessions
System Overview	4	8	1
Operator Training - Basic	4	8	1
Programming Training	4	8	1
Instrument Training	4	4	1

b. Furnish training courses that are a combination of classroom and hands-on training:

(1) To the greatest extent possible, utilize components from the Owner's PCS system.

(2) Limit classes that include extensive hands-on activities to a maximum of 5 students per class.

c. Present the minimum number of sessions, specified in Table below, for each course in order to satisfy class size restrictions and limitations scheduling Owner staff.

d. Furnish additional sessions if required to accommodate the total number of personnel identified for each course.

4. Schedule individual training classes:

a. Coordinate with the Owner at least 3 weeks before the start of the class.

b. Schedule training classes Monday - Friday between 7:30 AM and 3:30 PM.

c. Each individual daily training session, travel time excluded:

(1) Minimum duration of 4 hours.

(2) Maximum duration of 7 hours.

(3) Breaks scheduled at least every 90 minutes and 1 hour for lunch.

d. Complete training for maintenance personnel 90 days before Process Operational Period.

e. Complete operator training classes before process start-up of the control system software, or any part of it:

(1) As specified in the Sequencing article of this Section.

f. Schedule follow-up training classes after the PCS start-up on a schedule determined by the Owner.

5. Instructor qualifications:

a. Highly qualified training instructors for technical training with demonstrated expertise in not only control system functionality but also professional training techniques:

(1) Instructor qualifications are subject to the approval of the Engineer.

C. Training manuals and materials:

1. Furnish training manuals and other materials for training courses.

2. Manuals are to be professionally written to present the course material in a format that is easy to comprehend.

3. The manuals are to serve as teaching aids during presentation of the training classes.

4. Manuals are to serve as reference material after the training has been completed.

D. Training course requirements:

1. System overview training:

a. Furnish a training course that gives the Owner's supervisory level personnel an overview of the new Contractor-provided elements of the PCIS system. Focus on the overall functional aspects of each new elements of the control system, particularly the mechanical system vendor-provided control packages

2. Operator training:

a. Furnish training courses that instruct system operators in the efficient operation of Contractor-provided aspects of the PCIS that include not only the general operation of each control system but also the operation of specific system features:

(1) Control system overview: Architecture, equipment functions, software components, etc.

(2) Display navigation, overview, and types of displays.

(3) Process and equipment monitoring and control: Basic principles and operation.

(4) Logging ON and OFF the system and description of the security and access system.

(5) Alarm subsystem.

(6) Trending: Provide a thorough session on how to use all trending functions.

(7) Reports: How to access, print, and review content.

(8) Control strategies: Present an average 15-minute review of each control strategy, including a hands-on demonstration of screens and operator functions for each.

3. Instrumentation training:

a. Furnish training covering all instruments and control panels.

b. Furnish the specified quantity of training, allocated to cover new instruments and hardwired controls as specified in this Section and specifically determined in the accepted training plan.

c. Train maintenance staff in the use, cleaning, calibration, maintenance, and troubleshooting of all the instruments furnished within this Project.

d. Furnish training on the operation of new hardwired controls.

4. Programming training:

a. Furnish training covering all RTU, PLC and HMI in this project including communications to other sites.

b. Furnish the specified quantity of training, allocated to cover new controls and communications as specified in this Section and specifically determined in the accepted training plan.

c. Train maintenance staff in the use, cleaning, calibration, maintenance, and troubleshooting of the RTU, PLC and HMI including communications to other sites.

d. Furnish training on the operation of the RTU, PLC and HMI controls.

3.05 FIELD QUALITY CONTROL

A. Inspection:

1. Allow for inspection of PCIS installation as specified in Section 20.

2. Provide any assistance necessary to support inspection activities.

3. Engineer inspections may include, but are not limited to, the following:

a. Inspect equipment and materials for physical damage.

b. Inspect installation for compliance with Drawings and Specifications.

c. Inspect installation for obstructions and adequate clearances around equipment.

d. Inspect equipment installation for proper leveling, alignment, anchorage, and assembly.

e. Inspect equipment nameplate data to verify compliance with design requirements.

f. Inspect cable terminations.

g. Inspect/witness instrument calibrations/verifications.

4. Inspection activities conducted during construction do not satisfy inspection requirements specified in Section 38.17.

B. Instrument Installation Inspection:

1. Provide any assistance necessary to support inspection activities.

2. Inspections may include, but are not limited to, the following:

a. Inspect equipment and materials for physical damage.

b. Inspect the installed arrangement, lay lengths, orientation, piping obstructions etc., that could affect the instruments accuracy or repeatability.

c. Inspect installation for compliance with Drawings and Specifications.

d. Inspect installation for obstructions and adequate clearances around equipment.

e. Inspect equipment installation for proper leveling, alignment, anchorage, and assembly.

f. Inspect equipment nameplate data to verify compliance with design requirements.

g. Inspect cable terminations.

h. Inspect/witness instrument calibrations/verifications.

3. Inspection activities conducted during construction do not satisfy inspection requirements specified in Section 38.17

4. Field acceptance testing: (Functional Testing) is specified in Section 38.17. Additional general requirements are specified in Section No. 22.03. - Training.

C. Installation supervision:

1. Ensure that the entire PCIS is installed in a proper and satisfactory manner. At a minimum, the ICSC shall provide the following services:

a. Installation resources:

(1) Coordinate with the Contractor regarding installation requirements of the Contract Documents.

b. Provide technical assistance to installation personnel by telephone:

(1) Furnish installation personnel with at least one copy of the accepted submittals, including all installation details.

c. Periodic inspections during the construction period.

d. A complete check of the completed installation to ensure that it is in conformance with the requirements of the equipment manufacturer and the Contract Documents.

e. Field verify accuracy and calibration of all instruments.

3.06 ADJUSTING

A. Control valves:

1. Stroke all control valves, cylinders, drives and connecting linkages from the control system as well as local control devices and adjust to verify proper control action, hand switch action, limit switch settings, torque settings, remote control actions, and remote feedback of valve status and position.

2. Check control valve actions and actuator settings with the valves in place to ensure that no changes have occurred since the bench calibration.

3.07 CLEANING

A. As specified in Section 22.

B. Vacuum clean all control panels and enclosures before process start-up and again after final completion of the project.

C. Clean all panel surfaces.

D. Return to new condition any scratches and/or defects.

E. Wipe all instrument faces and enclosures clean.

F. As specified in other sections of the Contract Documents.

3.08 PROTECTION

A. Protect all Work from damage or degradation until date of Substantial Completion.

END OF ARTICLE

ARTICLE 38.02
CONTROL PANELS, ENCLOSURES, AND PANEL COMPONENTS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall fabricate, install, and test, Control Panels, Enclosures, and Panel Components as shown on the Drawings and as specified in these Specifications:

B. District will furnish and program the back panels and OIT screens of the RTU's.

1.02 REFERENCES AND RELATED REQUIREMENTS

A. References

1. National Electrical Code (NEC): Article 250 Grounding.

2. National Electrical Manufacturer's Association (NEMA), including NEMA 250—Enclosures for Electrical Equipment (1,000 Volts Maximum).

3. Electrical Standard for Industrial Machinery NEPA 79.

4. Institute of Electrical and Electronics Engineers (IEEE).

5. ANSI/IEEE C62.41—IEEE Recommended Practice on Surge Voltages in Low Voltage AC Power Circuits.

6. Underwriter Laboratories, Inc.

B. Related Requirements

1. Section 37—Electrical
2. Article 38.01—General Instrumentations and Controls Requirements

1.03 SUBMITTALS

A. Refer to Article 38.01, Part 1.04 for submittal requirements. All hardware, instruments, equipment, and enclosures shall be included in the submittal(s).

1.04 STRUCTURAL DESIGN

A. Design connections and related details for seismic design criteria as specified in these Specifications.

B. For Equipment Systems with Weight of 400 Pounds or More, Provide Calculations for:

1. Determination of weight including panel internal components

2. Determination of centroid of equipment.

3. Determination of seismic forces and overturning moments.

4. Determination of shear and tension forces in connections.

5. Design of connection details based on calculated shear and tension forces.

C. Equipment Units Weighing 50 Pounds or More: Provide with lifting lugs or eyes to allow removal with hoist or other lifting devices.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. All manufacturers shall have been regularly engaged in the design, fabrication, and service of industrial control panels, enclosures, and cabinets for a minimum of five (5) years.

B. The manufacturer shall provide evidence of at least five (5) different installations of comparable equipment in similar environments, with a contact name and number for each. The contact information must be current, and the manufacturer shall have communicated the potential for contact by District personnel regarding the previous work completed.

2.02 CONTROL PANELS, ENCLOSURES, AND PANEL CONPOMENTS

A. The following Paragraphs describe general fabrication requirements of control panels, enclosures, and cabinets.

1. Equipment Mounting/Arrangement

a. All components shall be securely mounted and arranged in a manner that permits easy servicing, adjustment, testing, and removal without disconnecting, moving, or disturbing any other component. Components mounted on the inside of panels shall be mounted on suitable racks or sub-panels, and not directly to the enclosure. Mounting shall be rigid and stable unless shock mounting is required by the manufacturer to protect equipment from vibration. Layout and arrangement of panels and panel-mounted components shall conform to ISA Recommended Practice RP60.3.

b. All components appearing in the Districts instrument list for the system shall be identified with suitable plastic or metal engraved tags. The letters shall be white against a black background. The

labels shall include the name of the piece of equipment, and its equipment or instrument number.

c. Front panel devices such as pushbuttons, switches, lights, and exhaust fans shall be mounted in front-door cutouts.

d. No fastening devices shall project through the outer surfaces of the cabinet.

e. Thermal loading calculations are to be performed and submitted for all control panels based on the expected maximum and minimum ambient temperatures at the installation location and leaving at least a 10 deg F margin of safety for operation of critical components within the panel.

f. The component layout in a panel shall reserve sufficient space for the visibility and access to the components and allow sufficient air ventilation for heat dissipation.

2. Wiring

a. All field wiring shall comply with the requirements of the latest National Electrical Code requirement and Article 36.25, as applicable.

b. Panel wiring shall satisfy the following requirements:

(1) Power wire shall be type THHN and sized per applicable NEC requirements and No. 14 AWG stranded minimum for circuits 600 Volts and below unless specified otherwise.

(2) Control, status, and alarm wire inside the panel shall be No. 18 AWG Type THWN stranded unless specified otherwise. Control, status and alarm wire outside the panel shall be No. 14 AWG Type THWN stranded unless specified otherwise.

(3) Analog signal wire inside the panel shall be No. 18 AWG Type THWN stranded, twisted and shielded suitable for termination unless specified otherwise. Analog signal wire outside the panel shall be No. 14 AWG Type THWN stranded, twisted and shielded suitable for termination unless specified otherwise.

(4) All field wiring shall terminate in master numbered terminal strips, either one for each signal type or organized by PLC I/O module. The master terminal strips shall have a minimum of twenty percent (20%) spares included all wired spare I/O points (see section 2.02.A.2.b.12, below). Only one side of a terminal block strip shall be used for internal

wiring. The field wiring side of the terminal shall not be within six (6) inches of the side panel or adjacent terminal board. Each terminal point shall be provided with an identification strip bearing a unique identification number. Field terminal strips shall be elevated and angled for ease of field connections, and shall have additional space of two inches on the panel side to accommodate modifications or additions needed after installation.

(5) All wiring to hand switches, relays, indicators, etc. which are a part of live circuits independent of the panel's normal circuit breaker protection, shall be clearly identified as such.

(6) Control wires shall have non-insulated ferrules applied at both ends. The ferrules are to be applied using the proper ferrule manufacturer's crimping tool. Twin-wire ferrules shall not be used. Only one wire per ferrule is allowed.

(7) All wiring shall be clearly tagged and color-coded. All tag numbers and color-coding shall correspond to the panel wiring diagrams and loop drawings prepared by the Contractor and as specified in Article 38.01.

(8) All power wiring, control wiring, grounding, and DC wiring shall utilize different color insulation for each wiring system used as follow:

(a)	Line Power	Black
(b)	Neutral/Common	White
(c)	AC Control	Red
(d)	DC Control (+)	Blue
(e)	DC Control (-)	White/Blue
(f)	Equipment/Chassis Ground	Green
(g)	Externally Powered Circuits	Yellow

(9) All field wires shall be labeled the same at both ends. Labels should consist of the system area code, underscore character separator, function designation followed by loop number, followed by "1" or "2", or a capital letter depending on the signal (Example: FLT1_XSH0700A) unless otherwise specified. Analog signal wiring labeling shall be applied to the overall cable rather than individual wires of the cable. Internal panel wiring may use other wire numbering so long as all PLC I/O includes the appropriate labeling, described above, and that the resultant internal wire numbering provides for unique, unambiguous numbering.

(10) Wire and tube markers shall be the heat-shrink sleeve type with heat-impressed letters and numbers. Wire labels shall be black letters on white plastic tube. Labels shall be sized and shrunk to ensure they stay securely fixed to the wiring should the wire be disconnected for any reason.

(11) Shield wires shall be covered with shrink tubing prior to termination. Shrink tubing shall also be applied to the twisted shielded cable to cover any exposed shielding (wire braid or foil). The shrink tubing shall be sized and shrunk to ensure the tubing does not come off when the wiring is disconnected.

(12) All unused PLC I/O points are to be wired to terminals.

(13) All wiring within the panel shall be grouped together routed in slotted PVC wireways secured to the structure. Power and low voltage DC signal wiring shall be routed in separate wireways. Crossing of the two system wires shall be at right angles. Wiring troughs shall not be filled to more than sixty percent (60%) visible fill. Wiring trough covers shall be match-marked to identify placement. If component identification is shown on covers for visibility, the ID shall also appear on the mounting subpanel.

(14) Wiring trough for supporting internal wiring shall be plastic type with snap-on covers. The side walls shall be louvered type to permit wiring changing without disconnecting.

(15) For terminations on components which do not have a secure compression type of lug, wire connectors shall be the hook-fork type with insulated barrel for crimp type compression connection to the wire.

(16) Instruments and circuits shall be provided with individual fuses or miniature circuit breakers to minimize system disruption.

(17) Each analog signal loop shall incorporate the following terminal block types:

(a) Fuse type (0.25 A)
(b) Standard type (2 each)
(c) Ground type (1 each)

(18) Each discrete input card will include a fuse for each common group of inputs or for each eight inputs, whichever is smallest, and shall incorporate the following terminal block types:

(a) Fusible type (size as required, as noted on the Drawings)

(b) Standard type (quantity as required)

(19) Each discrete output card will include a fuse for each common group of outputs or for each eight outputs, whichever is smallest, and shall incorporate the following terminal block types:

(a) Fusible type (size as required, as noted on the Drawings)

(b) Knife-disconnect type (quantity as required)

(20) Power and miscellaneous circuits shall use terminal blocks as appropriate for the load consistent with these guidelines. Signal amplifiers or isolators shall be provided for analog signals where loop resistance is greater than the transmitter output can overcome.

(21) When wiring is bundled to the door mounted devices, the bundle of the wires shall not restrict opening and closing the door, or does not damage the wiring bundle.

3. Freestanding vertical panels located indoors shall be NEMA 12 construction as a minimum and be labeled by Underwriters Laboratories. The panels shall be constructed of 11 gauge thick sheet steel, suitably braced internally for structural rigidity and strength. All exposed welds, seams, or edges shall be ground smooth. Front panels, or panels containing instruments, shall be not less than 7 gauge thick stretcher-leveled sheet steel, reinforced to prevent warping or distortion. All outdoor panels and indoor panels specified as having a NEMA 4X rating shall be constructed of stainless steel.

4. Painting

a. All sections shall be de-scaled, degreased, filled, ground and finished. The enclosure, when fabricated of steel, shall be finished with two rust resistant phosphate prime coats and two coats of enamel, polyurethane, or lacquer finish which shall be applied by either the hot air spray, or conventional cold spray, method.

b. Stainless steel panels will not require a paint finish.

5. Panels shall be provided with full length rear doors or front access doors as shown on the panel details. Full length rear access door shall be not greater than 24-in width. Front access doors with mounted instruments or control devices shall be of sufficient width to permit door opening without

interference from flush mounted instruments. All doors shall be mounted with strong, continuous, piano type hinges and be provided with lockable door handles and three point latches.

6. Approximate size and equipment layout is shown on the panel details.

7. Overhead fluorescent lighting shall be provided and automatically switched on when the panel door is opened. There shall be at least one GFI convenience receptacle in each panel suitable for 12 amp loads. Devices shall be wired separately from control and instrument circuits.

8. The panel shall be suitable for top or bottom conduit entry as required by the Electrical Drawings. For top-mounted conduit entry the panel top shall be provided with nominal one-foot square removable access plates which may be drilled to accommodate conduit and cable penetrations. All conduit and cable penetrations shall be provided with ground bushings, hubs, gasketed locknuts, or other accessories as required to maintain the NEMA rating of the panel and electrical rating of the conduit system.

9. Wall- or Framing Channel- Mounted Panels

   a. Unless noted otherwise on the Drawings, all indoor panels shall be NEMA 12 as a minimum and fabricated of not less than USS 14 gauge steel.

   b. All outdoor panels and indoor panels specified as having a NEMA 4X rating shall be constructed of stainless steel.

10. Panels shall have complete isolation between 480 volts power and 120 volts (and lower) power by full height and width steel internal panel barriers.

11. Panels shall be UL labeled.

12. Surge protectors shall be provided on all incoming power supply lines at each panel as specified in Section 38.01 or as indicated on the Drawings.

13. An inside pocket shall be provided to hold the panel drawings. One copy of accepted submittal drawings shall be shipped with panels in a sealed plastic bag stored in the panel drawing pocket.

14. An Extended Sun Shade shall be provided for outdoor panels for the protection of displays and indicator lights, etc.

15. Heating, cooling, dehumidifying, and filtering devices shall be provided in control panels, enclosures, and cabinets as required to maintain internal ambient conditions within the equipment's environmental operating range.

   a. Panels containing electronic components such as panel instruments, programmable logic controllers, remote I/O and

adjustable speed drives, as required to maintain an internal air temperature of 90°F, maximum, or as indicated on the Drawings shall be modified to include a thermostatically controlled exhaust blower.

b. Intake and Exhaust Openings: Openings shall be provided with filters and louvers, and shall be adequately sized per manufacturer's guidelines. Inlet openings shall be high on the side of the enclosure, and exhaust openings low on the opposite side of the enclosure. Coordinate the location of inlet and exhaust openings with adjacent-mounted equipment to ensure that the openings will not be blocked. Openings may be located on the front of the enclosure if sides are blocked by other equipment.

16. A panel identification nameplate shall be attached near the top center of the enclosure door. Nameplates shall be provided for all door-mounted equipment. Nameplates shall be a 3/32-inch thick, black and white, laminated Bakelite or Lamicoid with engraved inscriptions. The letters shall be white against a black background. Edges of the nameplates shall be beveled and smooth. Nameplates with chipped or rough edges will not be acceptable. Nameplates shall be attached to panels by stainless-steel screws; gluing-only is not acceptable.

2.03 POWER SUPPLIES/FUSING

A. Design and arrange regulated 24 volt DC power supplies for instrument loops so that loss of one loop does not affect more than one instrument loop or system. Provide power supplies suitable for an input voltage variation of plus or minus ten percent. Provide fuse or circuit-breaker protection for the supply output.

B. Selectively fuse the power distribution from multi-loop supplies so that a fault in one instrument loop will be isolated from the other loops being fed from the same supply. Label and locate fuses for easy access.

C. Output Voltage Regulation: As required by the instrument or control equipment being supplied.

D. Backup power supply units shall be provided to automatically supply the load upon failure of the primary supply. Design backup supply systems so that either the primary or backup supply can be removed, repaired, and returned to service without disrupting the instrument system operation. Failure on one or both power supplies shall be indicated in SCADA.

E. Oversize the multi-loop supply systems for an additional 25 percent future load. Indicate failure of a multi-loop supply on the respective instrument panel or enclosure.

F. Furnish and install signal repeaters for instrument loops that exceed the load impedance of the power supplies. Indicating fuses shall be neon bulb type for 120 VAC circuits and glass indicating fuse type for 24 VDC circuits.

G. Enclosures shall be Hoffman, Rittal, Gaylord Manufacturing, or equal.

2.04 TYPICAL RTU COMPONENTS

The parts listed below shall be selected for the fabrication of the RTU panels.

Part Number	Description	Manufacturer
A72H3724FS3PT	Enclosure, 72x37x24, NEMA 4, Painted Steel Gray, 3 Point Latch	HOFFMAN
A72P36F1	Back panel, 72x36, Full, Painted Steel White	HOFFMAN
PK15GTA	Ground Bus Bar, 15 Point	SQUARE D
025411-00	Lights, 24-48 VDC, 5W, 13.8 x 1.3 in., Motion Sensor, Magnet Mount, LED	STEGO
244361	Lights, Cable for Under Cabinet, DC	STEGO
011419-00	Cool, 32-140 Deg F, NO, Thermostat, Close on Rise	STEGO
3241.110	Cool, 10 x 10 in, 120 VAC, Fan 147 CFM	RITTAL
3240.200	Cool, 10 in x 10 in., Fan Exhaust Vent, includes filter mat	RITTAL
3240.085	Cool, 10 in x 10 in, NEMA 4, Fan Hose Proof Hood, Painted Steel, Hood size is 15x11	RITTAL
DAH1001A	Enclosure, 100 Watt, 115V, Electric Heater, Aluminum	HOFFMAN
DIN-UPS 24-10	Power Supply UPS, 10 Amp, 24 VDC, DIN Mount	NEWMAR
SU201M-K20	Breakers, 20 Amp, 1 Pole, Circuit	ABB
SU201M-K10	Breakers, 10 Amp, 1 Pole, Circuit	ABB
SU201M-K5	Breakers, 5 Amp, 1 Pole, Circuit	ABB
E9130CCS	Fuse Holder, Class CC, 1 Pole	ABB
FNQR 15 AMP	Fuses, 15 Amp, Rejection	BUSSMANN
FNQR 10 AMP	Fuses, 10 Amp, Rejection	BUSSMANN
BMXXBP1200	PLC, 12 Slot, Modicon M340 Rack	MODICON
BMXXBP0800	PLC, 8 Slot, Modicon M340 Rack	MODICON
BMXCPS2010	PLC, Modicon M340, DC Input, Power Supply, Standard Capacity	MODICON
BMXP342020	PLC, 4MB, Modicon M340 Processor, Modbus, Ethernet	MODICON
BMXNOM0200	PLC, 2 Ports, Modicon M340, Modbus Serial Adapter	MODICON
BMXAMI0410	PLC, 4 Channel, Modicon M340, Analog Input Module, Isolated	MODICON
BMXDDI1602	PLC, 24 VDC, 16 Point, Modicon M340, Discrete Input Module	MODICON
BMXDDO1602	PLC, 24 VDC, 16 Point, Modicon M340, Discrete Output Module	MODICON
BMXFTB2000	PLC, 20 Point, Modicon M340, Removable Terminal Block	MODICON
RJ2S-CL-D24	GP RLY 8A DPDT 24VDC 8BLD LED	IDEC
RJ2S-CL-A120	GP RLY 8A DPDT 120VAC 8BLD LED	IDEC
SJ2S-05BW	Socket, Relay; DPDT, Standard Screw Terminal	IDEC

Part Number	Description	Manufacturer
RR3B-UL-AC120V	Plug-In Relay 10A Contact 3PDT 110VAC Coil Indicator Light	IDEC
RR3B-UL-DC24V	Plug-In Relay 10A Contact 3PDT 24VDC Coil Indicator Light	IDEC
SR3B-05	Socket, 3 Pole	IDEC
3038930	Terminal Block Bridge, 50 Position, FBS 50-5	PHOENIX CONTACT
3032224	Terminal Block Bridge, 50 Position, FBS 50-6	PHOENIX CONTACT
3044102	Terminal Block, UT-4 (6.2mmm), Feed Through, 30 Amp	PHOENIX CONTACT
0824589	Terminal Block Marker, UT-4 (6.2mmm), 1-50	PHOENIX CONTACT
3047028	Terminal Block End Plate, UT-4 (6.2mmm), 30 Amp	PHOENIX CONTACT
0800886	Terminal Block Anchor, E/NS 35 N	PHOENIX CONTACT
3046090	Terminal Block Fused, DC, 5X20	PHOENIX CONTACT
3064085	Terminal Block, UT-2.5 (5.2mmm), Feed Through, 20 Amp	PHOENIX CONTACT
0824962	Terminal Block Marker, UT-2.5 (5.2mmm), 1-50	PHOENIX CONTACT
3047141	Terminal Block End Plate, UT-2.5 (5.2mmm), 20 Amp	PHOENIX CONTACT
3046362	Terminal Block Disconnect, UT-2.5 (5.2mm), 20 Amp	PHOENIX CONTACT
3044539	Terminal Block Ground, UT-2.5 (5.2mmm)	PHOENIX CONTACT
GMA-250MA	Fuses, 1/4 Amp	BUSSMANN
GMA-1A	Fuses, 1 Amp	BUSSMANN
GMA-2A	Fuses, 2 Amp	BUSSMANN
GMA-4A	Fuses, 4 Amp	BUSSMANN
GMA-6A	Fuses, 6 Amp	BUSSMANN
TT238-0600	Transmitter, High Voltage Input, 4-20mA Output, Loop Powered	ACROMAG
TT235-0600	Transmitter, RTD/Resistance Input, 4-20mA Output, Loop Powered	ACROMAG
EWS-RTD	Wall Mount RTD Sensor (100 Ohm)	OMEGA ENG.
HMI5102L	PLC, 1024 x 600, 10 in., Maple Systems OIT, Color	MAPLE SYSTEMS
S14HR-24VDC	GarrettCom Unmanaged Ethernet Switch, 4 Port, 24 VDC	GARRETTCOM
TRD815GRY-7	Network, 7', RJ45/RJ45, CAT5E Patch Cable, Gray	L-COM
TRD815Y-7	CAT5E Patch Cable, RJ45/RJ45, Yellow, 7’	L-COM
TRD815GR-7	CAT5E Patch Cable, RJ45/RJ45, Green, 7’	L-COM
TRD815BL-3	CAT5E Patch Cable, RJ45/RJ45, Blue, 3’	L-COM
RA258M	Modular Adapter, DB25 Male/RJ45	L-COM
RA098F	Modular Adapter, DB9 Female/RJ45	L-COM
RA098M	Modular Adapter, DB9 Male/RJ45	L-COM
MP45J	RJ45 Protective Cover for Jacks	L-COM
NAMEPLATE	Nameplates/Legend	MCC
TEL 12-60	Tel 12-70 Battery, 6 Cells, 12 Volt	C&D TECHNOLOGIES

PART 3 EXECUTION

3.01 GENERAL

A. Enclosures, cabinets, and control panels shall be pre-assembled, or assembled prior to arrival at the site.

B. The Contractor is responsible for providing all tools, equipment, and accessories required for proper installation of all enclosures, cabinets, and control panels.

3.02 EXAMINATION

A. Examine the installation location for the instrument and verify that the instrument will work properly when installed.

B. Notify the Engineer promptly if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

3.03 INSTALLATION

A. Enclosures, cabinets, and control panels shall be mounted upright and in an accessible location. Appropriate clearance for door movement, latching, and locking shall be provided.

B. Enclosures, cabinets, and control panels shall not be used as pull boxes or junction boxes, unless specified otherwise.

C. Seal all conduits entering control panels with duct sealing compound per

D. Install conduit gasket, sealing material, and NEC Article 500 Seal-Off

E. Install signal grounding conductor and grounding electrode as required by the panel manufacturer.

F. Connect panel equipment grounding (safety) terminal to the building or facility ground grid with No. 6 AWG green insulated conductor.

G. Enclosure sizes shown on the Drawings are a guide. The Contractor shall be responsible for final sizing of the control panels, taking into account mounting location, space requirements, and existing, including environmental, conditions. Any differences in panel dimensions from the Drawings shall be approved by the Engineer. If a larger or custom enclosure is required, the Contractor shall furnish such enclosure at no additional cost to the District.

H. One pint of touch-up paint shall be furnished for each panel of the paint type and color used for the panel finish coat.

I. Install enclosures so that their surfaces are plumb and level within 1/8 inch over the entire surface of the panel; anchor securely to wall and structural supports at each corner, minimum. Direct attachment to drywall is not permitted.

J. Install the enclosure per guidelines and submitted installation instructions to meet the seismic requirements at the project site.

K. Provide floor stand kits for wall-mounted enclosures larger than 48 inches high.

L. Provide 3-1/2-inch high concrete housekeeping pads for freestanding enclosures.

M. Install gasket and sealing material under panels with floor slab cutouts for the conduit connected to the undercoat floor-mounted panels.

N. Provide a full-size equipment-grounding conductor in accordance with NEC included with the power feeder. Terminate to the incoming power circuit-grounding terminal.

O. All holes for field conduits, etc. shall be cut in the field. There shall be no additional holes, factory cut holes, or hole closers allowed. Incorrect holes, additional holes, or mis-cut holes shall require that the entire enclosure be replaced.

P. Control panels that are adjacent to motor control centers shall be fully wired to the motor control centers using wireways integral to the motor control center or additional conduits as needed. These interconnections are not shown or reflected on the Conduit Schedule, but shall be shown on the Loop Drawings prepared by the Contractor.

Q. Provide individually fused analog input module points with blown-fuse indicator lights, mounted external of the module on the output terminal strip.

R. Side panels shall be kept free off all control equipment and devices. Any deviation must be sent to the engineer in writing asking for a deviation.

END OF ARTICLE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall complete all work and furnish all materials required to procure, install, calibrate, and test all Flow Instruments as shown on the Drawings and as specified in these Specifications.

1.02 RELATED REQUIREMENTS

A. Section 37 - Electrical
B. Article 38.01 - General Instrumentations Requirements.
C. Article 38.17 - Testing, Calibration, and Commissioning

1.03 SUBMITTALS

A. Refer to Article 38.01, Part 1.04 for submittal requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. All manufacturers of materials and equipment specified in these Specifications shall have been regularly engaged in the design, fabrication, and/or service of instruments provided for a minimum of five (5) years.

B. Each manufacturer shall have an authorized service facility within 150 miles of the project site and offer on-site support within 48 hours.

2.02 MATERIALS AND EQUIPMENT

A. All flow instruments shall be of material suitable for the measured material.

B. All instruments and transmitters that are mounted outdoors shall be housed in a NEMA 4X enclosure.

C. MAGNETIC FLOWMETER ELEMENTS

1. Manufacturer shall be the following, and no equal shall be allowed:

a. Endress Hauser Proline Promag L 400

2. Electrode and Liner Materials: Fully compatible with process fluid, complying with requirements of application.

3. Power Supply Safety Ground from Signal Converter: Grounding conductor connected to grounding lug internal to flow meter element control box.

4. Power Supply and Safety Ground, Meters and Externally-Mounted Signal Converter/Transmitters. Grounding conductor connected to grounding lug internal to flow meter element control box.

5. Meter Housing: Capable of standing empty for extended time intervals without damage to components with splash-proof and drip-proof meter housing.

6. Ground Rings: Manufacturer's standard.

D. MAGNETIC FLOW INDICATING SIGNAL CONVERTER/TRANSMITTER

1. Manufacturer shall be the following, and no equal shall be allowed:

   a. Endress Hauser Proline Promag L 400

2. Type:

   a. Power: 24 VDC

   b. Direct current, pulsed-bipolar, with signal stability at zero flows.

   c. Micro-processor type with local flow rate indication and local flow totalization indicator, scaled in engineering units.

   d. With zero-return units where specified or indicated on the Drawings.

   e. Requiring only dry contact closure from external device to actuate.

   f. Produces 4 mA direct current signal during no-flow conditions or programmable for low-flow cutoff.

3. System Accuracy, Including Magnetic Flow meter Transmitter and Signal Converter: Within ± 0.4 percent of actual flow rate for 10-100 percent full scale where velocity is between 1.0 and 30 feet per second.

4. Cable Between Remote Converter (FIT) and Magnetic Flow meter Elements: Per Manufacturer's standard. The length shall be per the electrical layout plan drawing.

5. Housing: NEMA 4X, corrosion-resistant, weatherproof, operable in ambient minus 0 to plus 120 degrees F temperature and 10 to 100 percent relative humidity.

6. Signal Converter/Transmitter Output:

   a. Analog Output: Isolated 4-20 mA direct current.

   b. Pulse Output: Able to operate remote totalizer scaled for minimum 60 days at 100 percent flow without repeating.

   c. Scale Factors: Field adjustable, selected to provide totalizer multiplier of 0-10,000.

7. Zero Flow Stability: ± 0.1% of Full Scale.

PART 3 EXECUTION

3.01 GENERAL

A. Any existing conditions, equipment location, or other restrictions that prevent adherence to the Drawings and Specifications shall be submitted to the Engineer for review. Approval from the Engineer is required prior to commencement of work resulting from installation or mounting restrictions.

B. Nameplates

1. Each instrument shall be provided with a stainless steel nameplate engraved or stamped and permanently fastened to the equipment in an accessible location with No.4 or larger oval stainless steel screw or drive pin.

2. Nameplates shall contain tag name, manufacturer's name, model, and serial no.

3.02 INSTALLATION

A. All flow instruments shall be installed per manufacturer's recommendations. Flow instruments shall be installed in locations as shown on the drawings.

B. Pipe flow measurement instruments shall be sized for the pipe. Use of reduction or expansion fittings to match instrument size is unacceptable.

C. All flow meters shall be installed in-line with at least 5 to 7 pipe diameters upstream and 0 to 3 pipe diameters downstream of any fittings, diffusers, injectors, meters, or valves to minimize flow pattern disturbances per manufacturer's standard for the required accuracy as specified in Section 2.02. D.3. Pipe flow instruments shall be installed in horizontal piping.

D. Magnetic Flowmeter Elements: Connect ground rings from non-metallic flow elements, or flow elements with internal non-conducting or corrosion-resistant coatings to ground rod, ground grid, or building steel.

E. Magnetic Flow Indicating Transmitter: Field verify signal cable length. Do not field splice factory cable.

F. Nameplates:

1. Each instrument shall be provided with a stainless steel nameplate, engraved or stamped, and permanently fastened to the equipment in an accessible location with No.4 or larger oval stainless steel screws or drive pins.

2. Nameplates shall include tag name, manufacturer's name, model and serial no.

3.03 TESTING

A. All flow instrumentation shall be provided with factory testing, calibration, and certification documentation. Calibration data sheets shall be submitted to the Engineer for approval.

B. Refer to Article 38.17 for testing details and requirements.

END OF ARTICLE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall complete all work and furnish all materials required to procure, install, calibrate, and test all Pressure Instruments as shown on the Drawings and as specified in these Specifications.

1.02 RELATED REQUIREMENTS

A. Section 37—Electrical
B. Article 38.01—General Instrumentations and Controls Requirements
C. Article 38.17— Testing, Calibration, and Commissioning

1.03 SUBMITTALS

A. Refer to Article 38.01 for submittal requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. All manufacturers of materials and equipment specified in these specifications shall have been regularly engaged in the design, fabrication, and/or service of instruments provided for a minimum of five (5) years.

B. Each manufacturer shall have an authorized service facility within 150 miles of the project site and offer on-site support within 48 hours.

C. All products shall be Underwriters Laboratory (UL) certified.

2.02 MATERIALS AND EQUIPMENT

A. All pressure instruments and connections shall be of material suitable for the measured material.

B. All instruments and transmitters that are mounted outdoors shall be housed in a NEMA 4X enclosure.

C. Pressure Indicating Transmitter (absolute, gauge, differential) for Pressure or Level Sensing

1. Manufacturer shall be the following, and no equal shall be allowed:

a. Rosemount 3051 pressure transmitter

2. Components:

   a. Loop powered 2-wire, 24 volt direct current microprocessor electronic circuitry.

   b. Silicone oil fluid filled, Type 316 stainless steel, cobalt-nickel-chrome, or Hastelloy C diaphragms, able to isolate process fluid form sensing elements.

   c. Electronic span and zero adjustments, and adjustable damping feature.

   d. NEMA 4X weatherproof housings with operating range of 0 to 120 degrees F, at 0 to 100 percent relative humidity.

   e. Positive overrange protection.

   f. Mounting brackets as required.

3. Accuracy: Within 0.10 percent of span including combined effects of linearity, hysteresis, and repeatability.

4. Rangeability: 10 to 1

5. Output: 4-20 milliampere direct current into a 650 ohm load without need for external load adjustments.

6. Reverse Polarity: Protection required

7. Flow Metering System Transmitters: With integral loop-powered square root extractors with stable 4 mA direct current output signal at no-flow conditions.

8. Accuracy of Transmitter and Square Root Extractor Signal Conditioner Combination: 0.10 percent of span.

9. Optional Transmitters for Gauge Pressure Applications: Differential when input range, signal suppression, and elevation requirements are met.

10. Local Indicators Scales: In Engineering Units.

D. Pressure Gauge and Differential Pressure Gauge.

1. Pressure gauges shall be 4½ inches in diameter, minimum, and bottom connected with white laminated dials and black graduations.

2. Gauges shall have a blowout disc and safety glass, encased in phenolic, steel, or cast iron.

3. Process connection: Process gauges shall have ½-inch NPT connections. Sockets shall have wrench flats.

4. Movement shall be rotary geared, all stainless steel material.

5. Gauges shall be supplied with diaphragm seals or annular seals where shown on the Drawings. Seal wetted parts shall be of material appropriate for the process fluid.

6. Accuracy shall be plus or minus ½ percent of range.

7. The Contractor shall supply spare Gauges per these Specifications.

8. The Pressure Gauges shall be Ashcroft Series 1279, or equal.

E. Diaphragm Seals

1. The seal bottom housing shall be Type 316L stainless steel except for chemical applications where the seal material shall be as recommended by the manufacturer for the application.

2. All seals shall be protected from damage due to instrument failure, accidental removal, or leakage of the process fluid.

3. A fill/bleed connection shall be provided on all seals.

4. Diaphragm seals shall be rated for a minimum pressure of 200 psi at 74 degrees F.

5. Diaphragm seals shall be Ashcroft Series 100, or equal.

PART 3 EXECUTION

3.01 GENERAL

A. Pressure Instruments shall be procured, delivered, installed, and tested by the Contractor. The instruments shall be installed in the locations specified on the Drawings.

3.02 INSTALLATION

A. The Contractor shall install all Pressure Instruments in accordance with manufacturer's installation requirements. Adequate clearance for maintenance, repair, and/or replacement, must be provided.

B. Nameplates:

1. Each instrument shall be provided with a stainless steel nameplate, engraved or stamped and permanently fastened to the equipment in an

accessible location with No. 4 or larger oval stainless steel screws or drive pins.

2. Nameplates shall include tag name, manufacturer's name, model, and serial no.

3.03 TESTING

A. All instrumentation shall be provided with factory testing, calibration, and certification documentation. Refer to Article 38.17 for instrument testing details and requirements.

END OF ARTICLE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall complete all work and furnish all materials required to procure, install, calibrate, and test all Level Instruments as shown on the Drawings and as specified herein.

1.02 REFERENCES AND RELATED REQUIREMENTS

A. References

1. Underwriters Laboratory (UL)

B. Related Sections

1. Section 37—Electrical
2. Article 38.01— General Instrumentation Requirements

1.03 SUBMITTALS

A. Refer to Article 38.01, Part 1.04 for submittal requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. All manufacturers of materials and equipment specified herein shall have been regularly engaged in the design, fabrication, and/or service of instruments provided for a minimum of 5 years.

B. Each manufacturer shall have an authorized service facility within 150 miles of the project site and offer on-site support within 48 hours.

2.02 MATERIALS AND EQUIPMENT

A. All Level Instruments shall be of material suitable for the measured material.

B. All instruments and transmitters that are mounted outdoors shall be housed in a NEMA 4X enclosure.

C. Float Level Switch

1. Level switches for the sumps shall be suitable for aggressive or ultra-pure liquids and shall be of CPVC.

2. The switches shall consist of a movable magnetic float and a stationary stem, with a SPST reed switch rated for 20 VA. The switch shall be

furnished with a sufficient length of cables to reach the junction box above the stem support assembly. The reed switch shall be selectable between N.O. and N.C. by inverting the float.

3. The Contractor shall provide one (1) spare Float Level Switch.

4. Float level switches shall be Gems Sensors LS-1950 P/N 26717 or equal.

2.03 TESTING

A. All level instrumentation shall be provided with factory testing, calibration, and certification documentation. Refer to Article 37.01, Part 2.03 for instrument testing details and requirements.

PART 3 EXECUTION

3.01 GENERAL

A. Level instruments shall be procured, delivered, installed, and tested by the Contractor. The instruments shall be installed in the locations specified on the Drawings.

3.02 INSTALLATION

A. The Contractor shall install all level instruments in accordance with manufacturer's installation requirements. Adequate clearance for maintenance, repair, and/or replacement must be given.

3.03 FIELD TESTING

A. All instrumentation shall be provided with factory testing, calibration, and certification documentation. Refer to Article 38.17 for instrument testing details and requirements.

END OF ARTICLE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The PLC Input/Output (I/O) List is a take-off list. Refer to Drawings and Specifications for additional information. The I/O List shall be used as an index for adding new I/O points, or updating existing I/O points.

B. Abbreviations used in the PLC I/O List are defined on the Drawings.

C. Refer to notes at end of the list for instrument devices that are generally not included on the list.

D. The Contractor shall prepare a new PLC I/O List, or add I/O points to an existing PLC I/O List, as required on the Drawings and Specifications.

1.02 REFERENCES AND RELATED REQUIREMENTS

A. Section 37—Electrical
B. Article 38.01—General Instrumentations Requirements

1.03 SUBMITTALS

A. Refer to Article 38.01 for submittal requirements.

B. PLC I/O List: PLC I/O List shall be furnished for all instruments supplied under this Specification Article in accordance with Article 38.01

PART 2 PRODUCTS (NOT USED

PART 3 EXECUTION

3.01 GUADALUPE LINE VALVE VAULT- GRV RTU I/O LIST

Discrete Inputs			
Tag Name	**Description**	**Addr.**	**Dev.**
GRV_ZB400	EAST BYPASS VLV NOT OPENED	%I0.5.0	R0S5C0
GRV_ZD400	EAST BYPASS VLV NOT CLOSED	%I0.5.1	R0S5C1
GRV_YN400	EAST BYP VLV IN LOCAL MODE	%I0.5.2	R0S5C2
GRV_EA800	LOW BATTERY VOLTAGE	%I0.5.3	R0S5C3
GRV_YN402	WEST BYP VLV IN REMOTE MODE	%I0.5.4	R0S5C4
GRV_JA800	AC POWER FAIL	%I0.5.5	R0S5C5

Discrete Inputs			
Tag Name	**Description**	**Addr.**	**Dev.**
GRV_LA200	VAULT FLOOD	%I0.5.6	R0S5C6
GRV_YA600	VAULT ENTRY	%I0.5.7	R0S5C7
GRV_YN403	BLOWOFF VLV IN REMOTE MODE	%I0.5.8	R0S5C8
GRV_ZB401	LINE VALVE NOT OPENED	%I0.5.9	R0S5C9
GRV_ZD401	LINE VALVE NOT CLOSED	%I0.5.10	R0S5C10
GRV_YN401	LINE VALVE IN LOCAL MODE	%I0.5.11	R0S5C11
GRV_ZB402	WEST BYPASS VLV NOT OPENED	%I0.5.12	R0S5C12
GRV_ZD402	WEST BYPASS VLV NOT CLSD	%I0.5.13	R0S5C13
GRV_ZB403	BLOWOFF VALVE NOT OPENED	%I0.5.14	R0S5C14
GRV_ZD403	BLOWOFF VALVE NOT CLOSED	%I0.5.15	R0S5C15
GRV_YN900	GENERATOR IN REMOTE	%I0.6.0	R0S6C0
GRV_JN800	GENERATOR POWER ON	%I0.6.1	R0S6C1
GRV_MN900	GENERATOR RUNNING	%I0.6.2	R0S6C2
GRV_UA900A	GENERATOR MALFUNCTION	%I0.6.3	R0S6C3
GRV_LAL201	GENERATOR LOW FUEL	%I0.6.4	R0S6C4
GRV_UA900B	ATS MALFUNCTION	%I0.6.5	R0S6C5
GRV_YA600A	GENERATOR ENTRY	%I0.6.6	R0S6C6
	Spare	%I0.6.7	R0S6C7
	Spare	%I0.6.8	R0S6C8
	Spare	%I0.6.9	R0S6C9
	Spare	%I0.6.10	R0S6C10
	Spare	%I0.6.11	R0S6C11
	Spare	%I0.6.12	R0S6C12
	Spare	%I0.6.13	R0S6C13
	Spare	%I0.6.14	R0S6C14
	Spare	%I0.6.15	R0S6C15

3.01 GUADALUPE LINE VALVE VAULT- GRV RTU I/O LIST (CONT'D)

Analog Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
GRV_V5002	RTU BATTERY VOLTAGE	%IW0.2.0	R0S2C0
GRV_T5001	RTU CABINET TEMPERATURE	%IW0.2.1	R0S2C1
GRV_ZI400	EAST BYPASS VALVE POS	%IW0.2.2	R0S2C2
GRV_PI100	UPSTRM HGL	%IW0.2.3	R0S2C3
GRV_PI101	DNSTRM HGL	%IW0.3.0	R0S3C0
GRV_PI102	BYPASS LINE HGL	%IW0.3.1	R0S3C1
GRV_ZI402	WEST BYPASS VALVE POS	%IW0.3.2	R0S3C2
GRV_ZI401	LINE VALVE POSITION	%IW0.3.3	R0S3C3
	Spare	%IW0.4.0	R0S4C0
GRV_T5002	RTU BATTERY TEMPERATURE	%IW0.4.1	R0S4C1
GRV_ZI403	BLOWOFF VALVE POS	%IW0.4.2	R0S4C2
	Spare	%IW0.4.3	R0S4C3
Analog Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
	NA		

Discrete Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
GRV_VB400	EAST BYPASS VLV CLOSE CMD	%Q0.7.0	R0S7C0
GRV_VD400	EAST BYPASS VLV OPEN CMD	%Q0.7.1	R0S7C1
GRV_VB401	LINE VALVE CLOSE COMMAND	%Q0.7.2	R0S7C2
GRV_VD401	LINE VALVE OPEN COMMAND	%Q0.7.3	R0S7C3
GRV_VB402	WEST BYPASS VLV CLOSE CMD	%Q0.7.4	R0S7C4
GRV_VD402	WEST BYPASS VLV OPEN CMD	%Q0.7.5	R0S7C5
GRV_VB403	BLOWOFF VALVE CLOSE COMMAND	%Q0.7.6	R0S7C6
GRV_VD403	BLOWOFF VALVE OPEN COMMAND	%Q0.7.7	R0S7C7

Discrete Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
GRV_MB900	GENERATOR START	%Q0.7.8	R0S7C8
	Spare	%Q0.7.9	R0S7C9
	Spare	%Q0.7.10	R0S7C10
	Spare	%Q0.7.11	R0S7C11
	Spare	%Q0.7.12	R0S7C12
	Spare	%Q0.7.13	R0S7C13
	Spare	%Q0.7.14	R0S7C14
	Spare	%Q0.7.15	R0S7C15

3.02 LOWER LOS GATOS TURNOUT VAULT - LLG RTU I/O LIST

Discrete Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
LLG_ZB400	VALUE NOT OPENED	%I0.4.0	R0S4C0
LLG_ZD400	VALVE NOT CLOSED	%I0.4.1	R0S4C1
LLG_YN400	VALVE IN LOCAL MODE	%I0.4.2	R0S4C2
LLG_EA800	LOW BATTERY VOLTAGE	%I0.4.3	R0S4C3
LLG_JA800	AC POWER FAIL	%I0.4.4	R0S4C4
LLG_LA200	VAULT FLOOD	%I0.4.5	R0S4C5
LLG_YA600	VAULT ENTRY	%I0.4.6	R0S4C6
LLG_FQ300	FLOW PULSE	%I0.4.7	R0S4C7
	Spare	%I0.4.8	R0S4C8
	Spare	%I0.4.9	R0S4C9
	Spare	%I0.4.10	R0S4C10
	Spare	%I0.4.11	R0S4C11
	Spare	%I0.4.12	R0S4C12
	Spare	%I0.4.13	R0S4C13
	Spare	%I0.4.14	R0S4C14
	Spare	%I0.4.15	R0S4C15

Analog Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
LLG_V5002	RTU BATTERY VOLTAGE	%IW0.2.0	R0S2C0
LLG_T5001	RTU CABINET TEMPERATURE	%IW0.2.1	R0S2C1
LLG_FI300	FLOW	%IW0.2.2	R0S2C2
LLG_PI100	HGL	%IW0.2.3	R0S2C3
LLG_ZI400	VALVE POSITION	%IW0.3.0	R0S3C0
LLG_T5002	RTU BATTERY TEMPERATURE	%IW0.3.1	R0S3C1
	Spare	%IW0.3.2	R0S3C2
	Spare	%IW0.3.3	R0S3C3

Analog Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
	NA		

3.02 LOWER LOS GATOS TURNOUT VAULT - LLG RTU I/O LIST (CONT'D)

Discrete Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
LLG_VB400	VALVE CLOSE COMMAND	%Q0.5.0	R0S5C0
LLG_VD400	VALVE OPEN COMMAND	%Q0.5.1	R0S5C1
	Spare	%Q0.5.2	R0S5C2
	Spare	%Q0.5.3	R0S5C3
	Spare	%Q0.5.4	R0S5C4
	Spare	%Q0.5.5	R0S5C5
	Spare	%Q0.5.6	R0S5C6
	Spare	%Q0.5.7	R0S5C7
	Spare	%Q0.5.8	R0S5C8
	Spare	%Q0.5.9	R0S5C9
	Spare	%Q0.5.10	R0S5C10
	Spare	%Q0.5.11	R0S5C11
	Spare	%Q0.5.12	R0S5C12
	Spare	%Q0.5.13	R0S5C13
	Spare	%Q0.5.14	R0S5C14
	Spare	%Q0.5.15	R0S5C15

3.03 PAGE DITCH TURNOUT- PDT RTU I/O LIST

Discrete Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
PDT_ZB400	TURNOUT VALVE NOT OPENED	%I0.5.0	R0S5C0
PDT_ZD400	TURNOUT VALVE NOT CLOSED	%I0.5.1	R0S5C1
PDT_YN400	T/O VALVE IN LOCAL MODE	%I0.5.2	R0S5C2
PDT_EA800	LOW BATTERY VOLTAGE	%I0.5.3	R0S5C3
PDT_JA800	AC POWER FAIL	%I0.5.4	R0S5C4
PDT_YA600	TURNOUT VAULT ENTRY	%I0.5.5	R0S5C5
PDT_YA601	PAGE STILLWELL ENTRY	%I0.5.6	R0S5C6
PDT_FQ304	DITCH TO POND FLOW TOT. PULSE	%I0.5.7	R0S5C7
PDT_FQ303	TURNOUT FLOW PULSE	%I0.5.8	R0S5C8
	Spare	%I0.5.9	R0S5C9
	Spare	%I0.5.10	R0S5C10
	Spare	%I0.5.11	R0S5C11
	Spare	%I0.5.12	R0S5C12
	Spare	%I0.5.13	R0S5C13
	Spare	%I0.5.14	R0S5C14
	Spare	%I0.5.15	R0S5C15

Analog Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
PDT_V5002	RTU BATTERY VOLTAGE	%IW0.2.0	R0S2C0
PDT_T5001	RTU CABINET TEMPERATURE	%IW0.2.1	R0S2C1
PDT_FI303	TURNOUT FLOW	%IW0.2.2	R0S2C2
PDT_PI100	TURNOUT UPSTRM HGL	%IW0.2.3	R0S2C3
PDT_FI304	PAGE DITCH LEVEL GAUGE HEIGHT	%IW0.3.0	R0S3C0
PDT_ZI400	TURNOUT VALVE POSITION	%IW0.3.1	R0S3C1
PDT_T5002	RTU BATTERY TEMPERATURE	%IW0.3.2	R0S3C2
	Spare	%IW0.3.3	R0S3C3

Analog Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
PDT_FY304	DITCH FLOW TO PAGE BLCKHSE	%QW0.4.0	R0S4C0
		%QW0.4.1	R0S4C1

3.03 PAGE DITCH TURNOUT- PDT RTU I/O LIST (CONT'D)

Discrete Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
PDT_VB400	VALVE CLOSE COMMAND	%Q0.6.0	R0S6C0
PDT_VD400	VALVE OPEN COMMAND	%Q0.6.1	R0S6C1
	Spare	%Q0.6.2	R0S6C2
	Spare	%Q0.6.3	R0S6C3
PDT_FQ303	T/O FLOW TOTALIZING PULSE	%Q0.6.4	R0S6C4
	Spare	%Q0.6.5	R0S6C5
	Spare	%Q0.6.6	R0S6C6
	Spare	%Q0.6.7	R0S6C7
	Spare	%Q0.6.8	R0S6C8
	Spare	%Q0.6.9	R0S6C9
	Spare	%Q0.6.10	R0S6C10
	Spare	%Q0.6.11	R0S6C11
	Spare	%Q0.6.12	R0S6C12
	Spare	%Q0.6.13	R0S6C13
	Spare	%Q0.6.14	R0S6C14
	Spare	%Q0.6.15	R0S6C15

3.04 KIRK DITCH TURNOUT - KDT RTU I/O LIST

Discrete Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
KDT_EA800	LOW BATTERY VOLTAGE	%I0.7.0	R0S7C0
KDT_JA800	AC POWER FAIL	%I0.7.1	R0S7C1
KDT_ZD400	TURNOUT VALVE NOT CLOSED	%I0.7.2	R0S7C2
KDT_LA200	TURNOUT VAULT FLOOD	%I0.7.3	R0S7C3
KDT_ZB402	PAGE DITCH GATE NOT OPENED	%I0.7.4	R0S7C4
KDT_ZD402	PAGE DITCH GATE NOT CLOSED	%I0.7.5	R0S7C5
KDT_ZD401	KIRK DITCH GATE NOT CLOSED	%I0.7.6	R0S7C6
KDT_YA600	T/O VALVE VAULT ENTRY	%I0.7.7	R0S7C7
KDT_YA601	KIRK STILLING WELL ENTRY	%I0.7.8	R0S7C8
KDT_YN400	T/O VALVE IN LOCAL MODE	%I0.7.9	R0S7C9
KDT_YN401	KIRK GATE IN LOCAL MODE	%I0.7.10	R0S7C10
KDT_YN402	PAGE GATE IN LOCAL MODE	%I0.7.11	R0S7C11
KDT_ZB400	TURNOUT VALVE NOT OPENED	%I0.7.12	R0S7C12
KDT_ZB401	KIRK DITCH GATE NOT OPENED	%I0.7.13	R0S7C13
KDT_FQ300	TURNOUT TOTAL FLOW	%I0.7.14	R0S7C14
KDT_FQ301	KIRK DAM TO DITCH TOTAL FLOW	%I0.7.15	R0S7C15
KDT_FQ302	KIRK DAM/KIRK TOTAL FLOW	%I0.8.0	R0S8C0
KDT_FQ305	KIRK DAM/PAGE TOTAL FLOW	%I0.8.1	R0S8C1
	Spare	%I0.8.2	R0S8C2
	Spare	%I0.8.3	R0S8C3
	Spare	%I0.8.4	R0S8C4
	Spare	%I0.8.5	R0S8C5
	Spare	%I0.8.6	R0S8C6
	Spare	%I0.8.7	R0S8C7
	Spare	%I0.8.8	R0S8C8
	Spare	%I0.8.9	R0S8C9
	Spare	%I0.8.10	R0S8C10
	Spare	%I0.8.11	R0S8C11
	Spare	%I0.8.12	R0S8C12
	Spare	%I0.8.13	R0S8C13
	Spare	%I0.8.14	R0S8C14
	Spare	%I0.8.15	R0S8C15

3.04 KIRK DITCH TURNOUT - KDT RTU I/O LIST (CONT'D)

Analog Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
KDT_V5002	RTU BATTERY VOLTAGE	%IW0.2.0	R0S2C0
KDT_T5001	RTU CABINET TEMPERATURE	%IW0.2.1	R0S2C1
KDT_FI300	TURNOUT FLOW	%IW0.2.2	R0S2C2
KDT_FI301	KIRK DITCH LEVEL GAUGE HEIGHT	%IW0.2.3	R0S2C3
KDT_PI100	TURNOUT UPSTRM HGL	%IW0.3.0	R0S3C0
KDT_ZI400	TURNOUT VALVE POSITION	%IW0.3.1	R0S3C1
KDT_ZI401	KIRK DITCH GATE POSITION	%IW0.3.2	R0S3C2
KDT_ZI402	PAGE DITCH GATE POSITION	%IW0.3.3	R0S3C3
KDT_T5002	RTU BATTERY TEMPERATURE	%IW0.4.0	R0S4C0
	Spare	%IW0.4.1	R0S4C1
	Spare	%IW0.4.2	R0S4C2
	Spare	%IW0.4.3	R0S4C3
Analog Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
KDT_FI302	KIRK DAM/DITCH FLOW	%QW0.5.0	R0S5C0
KDT_FI303	PAGE DITCH T/O FLOW TO BLKHSE	%QW0.5.1	R0S5C1
KDT_FI305	KIRK DAM/PAGE DITCH FLOW	%QW0.6.0	R0S6C0
	Spare	%QW0.6.1	R0S6C1

Discrete Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
KDT_VB400	TURNOUT VALVE CLOSE COMMAND	%Q0.9.0	R0S9C0
KDT_VD400	TURNOUT VALVE OPEN COMMAND	%Q0.9.1	R0S9C1
KDT_VB401	KIRK DITCH GATE CLOSE COMMAND	%Q0.9.2	R0S9C2
KDT_VD401	KIRK DITCH GATE OPEN COMMAND	%Q0.9.3	R0S9C3
KDT_VB402	PAGE DITCH GATE CLOSE COMMAND	%Q0.9.4	R0S9C4
KDT_VD402	PAGE DITCH GATE OPEN COMMAND	%Q0.9.5	R0S9C5
	Spare	%Q0.9.6	R0S9C6
	Spare	%Q0.9.7	R0S9C7
	Spare	%Q0.9.8	R0S9C8
	Spare	%Q0.9.9	R0S9C9

Discrete Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
	Spare	%Q0.9.10	R0S9C10
	Spare	%Q0.9.11	R0S9C11
	Spare	%Q0.9.12	R0S9C12
	Spare	%Q0.9.13	R0S9C13
	Spare	%Q0.9.14	R0S9C14
	Spare	%Q0.9.15	R0S9C15

3.05 COYOTE CREEK BLOWOFF - CYV RTU I/O LIST

Discrete Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
CYV_ZB400	VALVE NOT OPENED	%I0.4.0	R0S4C0
CYV_ZD400	VALVE NOT CLOSED	%I0.4.1	R0S4C1
CYV_YN400	VALVE IN LOCAL MODE	%I0.4.2	R0S4C2
CYV_EA800	LOW BATTERY VOLTAGE	%I0.4.3	R0S4C3
CYV_JA800	AC POWER FAIL	%I0.4.4	R0S4C4
CYV_LA200	VAULT FLOOD	%I0.4.5	R0S4C5
CYV_YA600	VAULT ENTRY	%I0.4.6	R0S4C6
CYV_FQ300	FLOW TOTALIZER PULSE INPUT	%I0.4.7	R0S4C7
	Spare	%I0.4.8	R0S4C8
	Spare	%I0.4.9	R0S4C9
	Spare	%I0.4.10	R0S4C10
	Spare	%I0.4.11	R0S4C11
	Spare	%I0.4.12	R0S4C12
	Spare	%I0.4.13	R0S4C13
	Spare	%I0.4.14	R0S4C14
	Spare	%I0.4.15	R0S4C15
Analog Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
CYV_V5002	RTU BATTERY VOLTAGE	%IW0.2.0	R0S2C0
CYV_T5001	RTU CABINET TEMPERATURE	%IW0.2.1	R0S2C1
CYV_FI300	FLOW	%IW0.2.2	R0S2C2
CYV_PI100	UPSTRM HGL	%IW0.2.3	R0S2C3
CYV_T5002	RTU BATTERY TEMPERATURE	%IW0.3.0	R0S3C0
CYV_ZI400	BLOWOFF VALVE POSITION	%IW0.3.1	R0S3C1
	Spare	%IW0.3.2	R0S3C2
	Spare	%IW0.3.3	R0S3C3
Analog Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
	NA		

3.05 COYOTE CREEK BLOWOFF - CYV RTU I/O LIST (CONT'D)

Discrete Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
CYV_VB400	CLOSE VALVE COMMAND	%Q0.5.0	R0S5C0
CYV_VD400	OPEN VALVE COMMAND	%Q0.5.1	R0S5C1
	Spare	%Q0.5.2	R0S5C2
	Spare	%Q0.5.3	R0S5C3
	Spare	%Q0.5.4	R0S5C4
	Spare	%Q0.5.5	R0S5C5
	Spare	%Q0.5.6	R0S5C6
	Spare	%Q0.5.7	R0S5C7
	Spare	%Q0.5.8	R0S5C8
	Spare	%Q0.5.9	R0S5C9
	Spare	%Q0.5.10	R0S5C10
	Spare	%Q0.5.11	R0S5C11
	Spare	%Q0.5.12	R0S5C12
	Spare	%Q0.5.13	R0S5C13
	Spare	%Q0.5.14	R0S5C14
	Spare	%Q0.5.15	R0S5C15

3.06 VASONA VALVE YARD I/O LIST - VPA/VPB MOMENTUM PLC

Discrete Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
VPS_ZB903	VALVE V-903 NOT OPENED		
VPS_ZD903	VALVE V-903 NOT CLOSED		
VPS_YN903	VALVE V-903 IN LOCAL MODE		
VPS_ZB906	VALVE V-906 NOT OPENED		
VPS_ZD906	VALVE V-906 NOT CLOSED		
VPS_YN906	VALVE V-906 IN LOCAL MODE		
Discrete Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
VPS_VB903	CLOSE VALVE V-903 COMMAND		
VPS_VD903	OPEN VALVE V-903 COMMAND		
VPS_VB906	CLOSE VALVE V-906 COMMAND		
VPS_VD906	OPEN VALVE V-906 COMMAND		
Analog Inputs			
Tag Name	**Description**	**Addr**	**Dev.**
VPS_ZI903	VALVE V-903 POSITION		
VPS_ZI906	VALVE V-906 POSITION		
Analog Outputs			
Tag Name	**Description**	**Addr**	**Dev.**
	NA		

END OF ARTICLE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Abbreviations used in the Instrument Index are defined on the Drawings.

B. Refer to notes at end of list for instrument devices that are generally not included on the list.

C. Information regarding instrumentation and control devices to be furnished by others is included for information. Unless provided as a completely pre-assembled and pretested package, instruments furnished by the others are to be installed and tested by the Contractor under this Contract. Refer to the specific application contract documents for further details.

D. Confirmation of Set-points:

Instrument set-points shall be confirmed with the requirements of other associated equipment by the Contractor. This confirmation shall be completed prior to the initial adjustment and startup of equipment. All setpoints shall be provided to the Engineer for review.

1.02 REFERENCES AND RELATED REQUIREMENTS

A. Plan Drawings I-Sheets
B. Section 37—Electrical
C. Article 38.01—General Instrumentations and Controls Requirements
D. Article 38.13—I/O List

1.03 SUBMITTALS

A. Refer to Article 38.01 for submittal requirements.

B. An Instrumentation Index shall be furnished for all instruments supplied under this Specification Article in accordance with Article 38.01.

PART 2 PRODUCTS

A. As per Articles 38.02 and 38.06.

PART 3 EXECUTION

3.01 GUADALUPE LINE VALVE VAULT (REF DRAWINGS 1I-01)

Tag No.	Description	Range	Specification	Remarks
PIT-100	Upstream HGL Transmitter	0-300 psig	38.06	
PI-100	Upstream HGL Gauge			
PIT-101	Downstream HGL Transmitter	0-300 psig	38.06	
PI-101	Downstream HGL Gauge			
PIT-102	Bypass Line HGL Transmitter	0-300 psig	38.06	
PI-102	Bypass Line HGL Gauge			
HMS-400	East Bypass Valve Control Switch (Open-Stop-Close)		34.15	Shall be included in the valve actuator package.
HS-400	East Bypass Valve Control Mode Switch (Local-Off-Remote)			
ZSB-400	East Bypass Valve Not Opened Position Limit Switch			
ZSD-400	East Bypass Valve Not Closed Position Limit Switch			
ZT-400	East Bypass Valve Position Transducer			
HMS-401	Line Valve Control Switch (Open-Stop-Close)		34.15	Shall be included in the valve package.
HS-401	Line Valve Control Mode Switch (Local-Off-Remote)			
ZSB-401	Line Valve Position Not Opened Limit Switch			
ZSD-401	Line Valve Position Not Closed Limit Switch			
ZT-401	Line Valve Position Transducer			
HMS-402	West Bypass Valve Control Switch (Open-Stop-Close)		34.15	Shall be included in the valve package.
HS-402	West Bypass Valve Control Mode Switch (Local-Off-Remote)			
ZSB-402	West Bypass Valve Not Opened Position Limit Switch			
ZSD-402	West Bypass Valve Not Closed Position Limit Switch			
ZT-402	West Bypass Valve Position Transducer			
HMS-403	Blowoff Valve Control Switch (Open-Stop-Close)		34.15	Shall be included in the valve package.
HS-403	Blowoff Bypass Valve Control Mode Switch (Local-Off-Remote)			
ZSB-403	Blowoff Bypass Valve Not Opened Position Limit Switch			
ZSD-403	Blowoff Bypass Valve Not Closed Position Limit Switch			
ZT-403	Blowoff Bypass Valve Position Transducer			

3.02 LOWER LOS GATOS TURNOUT VAULT (REF DRAWINGS 2I-01)

Tag No.	Description	Range	Specification	Remarks
PIT-100	HGL Transmitter	0-300 psig	38.06	
PI-100	HGL Gauge			
FE-300	Flow Element		38.05	Shall be included in the flow meter package.
FQ-300	Flow Totalizer			
FT-300	Flow Transmitter			
HMS-400	Valve Control Switch (Open-Stop-Close)		34.15	Shall be included in the valve actuator package.
HS-400	Valve Control Mode Switch (Local-Off-Remote)			
ZSB-400	Valve Not Opened Position Limit Switch			
ZSD-400	Valve Not Closed Position Limit Switch			
ZT-400	Valve Position Transducer			

3.03 PAGE DITCH TURNOUT (REF DRAWINGS 3I-01)

Tag No.	Description	Range	Specification	Remarks
PIT-100	HGL Transmitter	0-300 psig	38.06	
PI-100	HGL Gauge			
FE-303	Flow Element		38.05	Shall be included in the flow meter package.
FQ-303	Flow Totalizer			
FT-303	Flow Transmitter			
HMS-400	Valve Control Switch (Open-Stop-Close)		34.15	Shall be included in the valve actuator package.
HS-400	Valve Control Mode Switch (Local-Off-Remote)			
ZSB-400	Valve Not Opened Position Limit Switch			
ZSD-400	Valve Not Closed Position Limit Switch			
ZT-400	Valve Position Transducer			

3.04 KIRK DITCH TURNOUT (REF DRAWINGS 4I-01)

Tag No.	Description	Range	Specification	Remarks
PIT-100	HGL Transmitter	0-300 psig	38.06	
PI-100	HGL Gauge			
FE-300	Flow Element		38.05	Shall be included in the flow meter package.
FQ-300	Flow Totalizer			
FT-300	Flow Transmitter			
HMS-400	Valve Control Switch (Open-Stop-Close)		34.15	Shall be included in the valve actuator package.
HS-400	Valve Control Mode Switch (Local-Off-Remote)			
ZSB-400	Valve Not Opened Position Limit Switch			
ZSD-400	Valve Not Closed Position Limit Switch			
ZT-400	Valve Position Transducer			

3.05 COYOTE CREEK BLOWOFF (REF DRAWINGS 5I-01)

Tag No.	Description	Range	Specification	Remarks
PIT-100	HGL Transmitter	0-300 psig	38.06	
PI-100	HGL Gauge			
HMS-400	Valve Control Switch (Open-Stop-Close)		34.15	Shall be included in the valve actuator package.
HS-400	Valve Control Mode Switch (Local-Off-Remote)			
ZSB-400	Valve Not Opened Position Limit Switch			
ZSD-400	Valve Not Closed Position Limit Switch			
ZT-400	Valve Position Transducer			

3.06 VASONA VALVE YARD (REF DRAWINGS 6I-01)

Tag No.	Description	Range	Specification	Remarks
HMS-903	Valve V-903 Control Switch (Open-Stop-Close)		34.15	Shall be included in the valve actuator package.
HS-903	Valve V-903 Control Mode Switch (Local-Off-Remote)			
ZSB-903	Valve V-903 Not Opened Position Limit Switch			
ZSD-903	Valve V-903 Not Closed Position Limit Switch			
ZT-903	Valve V-903 Position Transducer			
HMS-906	Valve V-906 Control Switch (Open-Stop-Close)		34.15	Shall be included in the valve actuator package.
HS-906	Valve V-906 Control Mode Switch (Local-Off-Remote)			
ZSB-906	Valve V-906 Not Opened Position Limit Switch			
ZSD-906	Valve V-906 Not Closed Position Limit Switch			
ZT-906	Valve V-906 Position Transducer			

END OF ARTICLE

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PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section includes Control Strategies for the control systems that shall be developed and implemented by the Contractor.

B. Related Sections:

1. Article 38.01—General Instrumentation Requirements.

1.02 SYSTEM DESCRIPTION

A. To assist the Contractor in determining the scope of work and intent of the contract documents, written Process Control Descriptions and control strategies have been included. The process control descriptions and control strategies are general in nature and do not detail all required auxiliary devices and interlocks. They are intended to supplement and complement the instrumentation control P&ID drawings, and other details included in the Drawings and Specifications.

B. The Contractor is responsible for providing all control equipment and computer programming as required for complete functional control systems that perform all functions described in these Specifications and as indicated on the Drawings.

C. In the event of discrepancy between this description and the P&ID drawings, the Engineer shall be contacted for a written explanation using the formal Request for Information (RFI) procedure.

1.03 SUBMITTALS

A. Submit software and program in accordance with Article 38.01.

1.04 GENERAL DESIGN CRITERIA

A. General

1. The Process Control Descriptions included in this Article describe the control strategy required for the various mechanical, electrical and instrumentation components for both field and SCADA control requirements.

2. The Process and Instrumentation Drawings (P&IDs) form an integral part of these Process Control Descriptions and shall be used in conjunction with this Article to develop the overall control system.

3. The Control Schematics form an integral part of these Process Control Descriptions and shall be used in conjunction with this Article to develop the overall control system.

4. The Process Control Descriptions, P&IDs and Electrical Control Schematics provide the minimum functional requirements for each system. These documents do not include all software functions needed that are required for a complete and operational system. The Contractor shall provide all functions that are required for a complete and operational system.

5. The term SCADA is used in this section to refer to the entire plant PC/PLC based control and monitoring system.

6. The term HMI is used in this Article to refer to the Human Machine Interface of the SCADA system.

7. All development and configuration of the SCADA system shall be in full conformance with the District's SCADA Configuration Standards.

B. General Control Requirements

1. In general, the control system shall allow control from only one location at a time (e.g., simultaneous control from two separate locations shall not be possible). To implement this approach, a hierarchical design is utilized. Each controlled piece of process equipment has a Local-Off-Remote (LOR) switch located adjacent to the equipment in the field. The LOR shall have the following functions:

   a. LOCAL—Control shall only be from the adjacent pushbutton station (automatic or remote control from any other location is not available, except in special circumstances where specifically noted).

   b. OFF—Control shall be unavailable from any location.

   c. REMOTE—Control shall only be from SCADA (or in some cases another field location).

2. In general, any SCADA Emergency Stop command for a <u>safety</u> shutdown <u>shall</u> be able to shut down the equipment irrespective of the position of the LOR (i.e., R or L).

3. In general, all equipment shutdown conditions (e.g., motor overload, high discharge pressure, low suction pressure, etc.) shall prevent equipment from restarting until reset by the operator. The physical location of the reset (e.g., at the MCC, at SCADA, etc.) shall be as defined in the Process Control Descriptions, or as indicated on the Drawings.

4. All field- and panel mounted LOR switches shall have an input to SCADA to monitor the status of the REMOTE position of the switch.

5. All process control shall be implemented in the SCADA. All strategies utilizing time or process variables to control the operation of the system shall allow the Operators to adjust the setpoints from the SCADA system.

6. In general, discrete control circuits shall be configured to fail-safe, i.e., on loss of continuity or loss of power. Alarm contacts shall fail to the alarm condition: open contacts. Control contacts shall fail to the inoperative condition unless otherwise indicated on the Drawings.

C. General Alarm and Monitoring Criteria

1. As a minimum, all field analog process variables that are connected to SCADA shall include the following:

   a. Values shall be indicated in real time.
   b. Values shall be added to the historical archive data base.
   c. Historical values shall be available for trending.

2. As a minimum, all analog variables connected to the SCADA system shall have high-high, high, low and low-low alarms. Alarm set points shall be developed in the HMI system software. All set points shall be easily changed by the Operator via the SCADA system (HMI).

D. The P&IDs do not indicate the required control, monitoring, and alarming that shall be developed and configured within SCADA. The minimum requirements for the SCADA based control, monitoring, and alarming functions are specified in the Process Control Descriptions, and shall be provided as required to implement the control strategies.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. This Article includes the testing requirements that apply to process control and instrumentation systems for the entire Project.

B. The Contractor shall perform all testing specified in this Article.

1.02 RELATED REQUIREMENTS

A. Section 37—Electrical
B. Article 38.01—General Instrumentations Requirements

1.03 SUBMITTALS

A. Test procedures:

1. Develop and submit detailed test procedures to show that the integrated SCADA system hardware and software is fully operational and in compliance with the requirements specified in the Contract Documents.

2. Provide a statement of test objectives for each test.

3. Prepare specific procedures for each process system.

4. Describe sequentially the steps to be followed in verifying the correct operation of each process system, including all features described in the loop descriptions, control strategies, and shown in the P&IDs. Implied or generic test procedures are not acceptable.

5. Specify who will perform the tests, specifically what testing equipment will be used (including serial numbers and NIST-traceable calibration), and how the testing equipment will be used.

6. Describe the expected role of the Engineer, as well as any requirements for assistance from Owner's staff.

7. Provide the forms and checklists to be used.

B. Test forms:

1. Provide test and calibration forms and checklists for each of the following:

a. Calibration.

b. Factory acceptance tests (FAT).

c. Loop validation tests.

d. Installation tests.

e. Functional tests.

f. Instrumentation and Controls Performance test.

g. Communication Testing including all digital bus and all forms of Ethernet.

2. Test forms shall include the detailed test procedures or shall include clear references to separate pages containing the complete test procedure applicable to each form. If references to procedures are used, the complete procedure shall be included with each test binder.

3. Every page of each test form shall include project name, date, time, name of person conducting the test, signature of person conducting the test, and for witnessed tests, place for signature of person (Engineer and Owner) witnessing the test.

4. Some sample test forms are included at the end of this Article. These test forms show the minimum required test form content. They are not complete and have not been customized for this Project. The Contractor is to develop and submit test forms customized for the Project and meeting all the specified test and submittal requirements.

C. Testing binders:

1. Sub-system to be tested, provide, and submit a test binder containing all test procedures and individual test forms for the test. References to other documents for test procedures and requirements are not acceptable.

2. Fill out in advance headings and all other information known before the test.

3. Include applicable test plan information, as well as a list of all test prerequisites, test personnel, and equipment.

4. Include or list reference material and provide separately at the time of the test.

5. Record test results and verify that all test requirements and conditions have been met.

D. FAT procedure additional minimal requirements:

1. Prepare and submit a FAT procedure which includes:

a. Control system testing block diagram.

b. Estimated test duration.
c. Details on the simulator construction, components, and operation.

E. Test reports:

1. After each test, submit a complete test report, including all test results and certifications.

2. Include all completed test binders, forms, and checklists.

3. Submission, review, and acceptance of each test report is required before the start of the sub-system.

1.04 QUALITY ASSURANCE

A. Test personnel: Furnish qualified technical personnel to perform all calibration, testing, and verification. The test personnel are required to be familiar with this Project and the equipment, software, and systems before being assigned to the test program.

PART 2 EXECUTION

2.01 COMMISSIONING AND PROCESS START-UP

A. Factory Acceptance Testing (FAT):

1. General:

a. Performed during the Commissioning Phase, factory acceptance testing activity.

b. Before shipment to the Project Site, the complete PCIS system including all operator stations, servers, network equipment, printers, PCMs, PLCs, RTUs, LCPs, CCS, peripherals, communications equipment, and other SCADA equipment, shall be assembled, connected, and all software loaded for a fully functional FAT of the integrated system.

c. Perform tests to show that the integrated system hardware and software is fully operational and in compliance with the requirements specified in the Contract Documents.

d. Additional factory tests are specified in other sections of the Instrumentation and Control Specifications.

e. The FAT will be witnessed.

f. Right of observation: The Owner retains the right to observe all factory test activities including all subsystem preparation, pretests,

troubleshooting, retests, warm-up, and software modification and/or update.

g. The Owner reserves the right to test any specified function, whether explicitly stated in the test submittal.

h. Correction of deficiencies: Any deficiencies observed during the test shall be corrected and retested before completion of the test.

i. Any changes and/or corrections shall be noted on the test forms. Engineer shall witness the revisions and/or corrections prior to leaving the test site.

j. If the corrections and/or revisions are too extensive to be made while the Engineer is scheduled to be at the FAT test site, the FAT shall be, at the Engineer's sole discretion, considered failed, and the test shall be restarted later. All costs for the re-test shall be borne by the Contractor.

2. Testing simulation:

a. The FAT shall make use of hardware simulators that contain switches, pilot lights, variable analog signal generators, and analog signal level displays, which shall be connected to the I/O points within the SCADA system. All inputs and outputs shall be simulated, and proper control and system operation shall be validated.

b. The use of jumper wires, terminal block mounted pilot lights, and loose meters to act as or supply the functionality of a simulator shall not be allowed.

c. The hardware simulator may consist of a PLC, operating under a SCADA software package, or other approved software that has its I/O points wired to PLC's I/O points. Software operating on a PC may then act as the switches, pilot lights, variable analog signal generators, and analog signal level displays.

3. Preliminary FAT:

a. A complete preliminary FAT (pre-FAT) shall be conducted utilizing test procedures approved by the Engineer. The pre-FAT test procedure shall be a subset of the full FAT.

b. The purpose of the pre-FAT is to provide assurance to the Engineer that the SCADA system is ready for the full, witnessed FAT, in terms of both stability and functionality. Debugging of software and troubleshooting of hardware shall occur during and before the pre-FAT, not during the FAT. The Contractor shall fully

test the SCADA system and fix all deficiencies found before the full FAT.

c. The Owner shall have the right to witness any or all the pre-FAT testing and shall be notified in writing 20 days before the start of the pre-FAT.

d. The pre-FAT test results submittal shall include a letter, signed by the Contractor's project manager or company officer, certifying that the system is complete, has been tested successfully, and is fully ready for the full, witnessed FAT. The submittal shall include completed pre-FAT test forms, signed by the Contractor's staff, and shall be submitted for review before the start of the FAT.

4. Panel inspections:

a. The Engineer will inspect each control panel for completeness, workmanship, fit and finish, and compliance with the Contract Documents and the accepted shop drawings.

b. Provide panel inspection forms as part of the FAT procedure submittal.

c. Inspection to include, as a minimum: Layout, mounting, wire and data cable routing, wire tags, power supply, components and wiring, I/O components layout (including terminals, wiring and relays), device layout on doors and front panels, and proper ventilation operation.

d. A sample FAT control panel form has been provided at the end of this Section.

5. I/O test:

a. Verify that I/O is properly wired to field terminals and is properly mapped into the PLC and the rest of the SCADA system, including all operator interface devices.

b. Test methodology:

(1) Use the submitted and approved system simulator for this test.

(2) Discrete inputs: Apply appropriate input from simulator at panel terminal, observe input card indicator, observe data value at each indicated data address, observe data received on all operator interface displays (SCADA workstations and local operator interface (LOI) displays).

(3) Discrete outputs: Issue commands from operator interface screen, verify output card indicator light and measure response on simulator.

(4) Analog inputs: Apply appropriate analog input signal at panel terminals on simulator, observe data value at each indicated data address, and observe data properly received at each operator screen. Check each point at 0 percent, 50 percent, and 100 percent of scale.

(5) Analog outputs: Enter scaled values in the output buffer file, observe the output data file value, and measure appropriate response on simulator.

c. Test forms to include, but not be limited to:

(1) PLC and panel number.
(2) I/O type.
(3) I/O tag name.
(4) Panel terminal block numbers.
(5) Rack/slot/number of I/O point.
(6) Check-off for correct response for each I/O point.
(7) Space for comments.
(8) Initials of individual performing test.
(9) Date test was performed.
(10) Witness' signature lines.

6. System configuration test:

a. Demonstrate and test the setup and configuration of all operator stations, servers, development stations, and peripherals.

b. Demonstrate all utility software and functions, such as virus protection, backup, optical drive burning, network monitoring, etc.

c. Demonstrate the proper operation of all peripheral hardware.

d. Demonstrate all general SCADA functions.

e. Demonstrate proper operation of log-on and other access security functions.

f. Demonstrate the proper operation of all historical data storage, trend, display, backup, and report functions.

g. Test automatic fail over of redundant equipment.

h. Demonstrate the proper operation of the alarm display and acknowledgement functions.

i. Test forms:

(1) For each test, list the specification page and paragraph of the function demonstrated, and provide a description of the function.

(2) List the specific tests and steps to be conducted.

(3) For each function, list all the different sub-functions or ways the function can be used, and provide a test check-off for each:

(a) Include signature and date lines.

7. Control logic test:

a. The purpose of this test is to verify that all software functions and logic work as specified, along with any hardwired logic or functions in the tested control panels.

b. Testing requirements:

(1) Demonstrate each function described in Section 17100. Demonstrate in detail how each function operates under a variety of operating scenarios. Test to verify the application of each general control strategy function to each specific control strategy or loop description.

(2) Demonstrate the proper operation of the programming and configuration for each control strategy or loop description. Test each strategy or loop description on a sentence by sentence and function by function basis. Loops with similar or identical logic must each be tested individually.

(3) Demonstrate the proper operation of all digital communication links and networks. Verify each digital communication I/O point.

(4) Failure testing: In addition to demonstrating correct operation of all specified features, special effort shall be made to demonstrate how the system responds to and recovers from abnormal conditions including, but not limited to: equipment failure, operator error, communications subsystem error, communications failures, simulated/forced software lockups, power failure (both utility power and power to SCADA hardware), process equipment failure, and high system loading conditions.

c. Test forms:

(1) Include the fully revised and approved control strategy for the loop being tested.

(2) Identify the cause and effect as each I/O point is toggled through the simulator. Check boxes shall be provided to track proper and/or improper operation of the loop.

(3) Any deficiencies or operational changes shall be noted on the forms for correction and documentation:

(a) Include signature and date lines.

B. Installation Testing:

1. General:

a. The Owner reserves the right to test any specified function, whether explicitly stated in the test submittals.

b. Failure testing:

(1) In addition to demonstrating correct operation of all specified features, demonstrate how the system reacts and recovers from abnormal conditions including, but not limited to:

(a) Equipment failure.
(b) Operator error.
(c) Communications sub-system error.
(d) Power failure.
(e) Process equipment failure.
(f) High system loading conditions.

c. Conduct testing Monday through Friday during normal working hours for no more than 8 hours per day:

(1) Testing at other times requires approval of the Engineer.

2. Calibration:

a. After installation but before starting other tests, calibrate and adjust all instruments, devices, valves, and systems, in conformance with the component manufacturer's instructions and as specified in these Contract Documents.

b. Components having adjustable features are to be set carefully for the specific conditions and applications of this installation. Test

and verify that components and/or systems are within the specified limits of accuracy.

c. Replace either individually or within a system, defective elements that cannot achieve proper calibration or accuracy.

d. Calibration points:

(1) Calibrate each analog instrument at 0 percent, 25 percent, 50 percent, 75 percent, and 100 percent of span, using test instruments with accuracies traceable to NIST.

e. Field verify calibration of instruments that have been factory-calibrated to determine whether any of the calibrations are in need of adjustment.

f. Analyzer calibration:

(1) Calibrate and test each analyzer system as a workable system after installation. Follow the testing procedures directed by the manufacturers' technical representatives.

g. Complete instrument calibration sheets for every field instrument and analyzer.

h. Calibration tags:

(1) Attach a calibration and testing tag to each instrument, piece of equipment, or system.

(2) Sign the tag when calibration is complete.

3. LAN cable post-testing:

a. After installing the cable and connectors, test all cables using the LAN certification to confirm the installation meets the requirements of the specification.

b. Provide test documentation that includes the cable number, total length of cable, a permanent hard copy, as well as a-USB or CD copy of all traces:

(1) After installing connectors.

(2) Perform cable end-to-end testing on all installed cables from both ends of the cable. Test shall include cable system performance tests and confirm the absence of wiring errors.

(3) Submit a signed test report presenting the results of the cable testing.

(4) Repair or replace any portions of the system not meeting ANSI/TIA/EIA standards for a Category 6 installation. Repaired sections shall be retested.

c. Submit 3 copies of all final documentation (including traces), using the approved test form, to the Engineer upon successful completion of the testing.

4. Industrial network testing:

a. Installation qualification and test procedures:

(1) Visual and mechanical inspection:

(a) Compare network devices nameplate data with drawings and specifications.

(b) Confirm network components are PTO (Public Telecommunications Operators) compliant.

(c) Verify labeling of all trunk cables.

(d) Confirm minimum cable distance between nodes.

(e) Verify the presence/absence of stub lines.

(f) Verify network terminators are in place.

(g) Verify power supply source and connections for active terminations.

(h) Verify total network node count.

(i) Verify power supply specifications including quantity, ratings, locations, and configuration. Verify power supply source of supply location, conductor size, and rating.

(j) Inspect accessible network cabling for adherence to specified installation practices:

i) Cable installed in conduit or protective raceway.

ii) Cable proximity to high voltage wiring.

iii) Exposure to extreme temperatures, shock, vibration, chemicals, or moisture.

iv) Bend radius.

(k) Inspect cable and conductor terminations for adherence to specified installation practices.

(l) Check all accessible components for evidence of physical damage.

(m) Check grounding techniques including ground conductor sizes and termination points.

(n) Non-permissible cable length.

(o) Wrong cable type.

(p) Signal reflections.

(2) Electrical tests:

(a) Measure network resistance.

(b) Measure network cable length.

(c) Line analysis for the following conditions:

i) Short circuit between signal lines A and B.

ii) Short circuit between signal lines A and B and the cable shield.

(d) Shield continuity.

(e) Cross-wired signals lines.

(f) Terminator installed in wrong position.

(g) Poor transmission or reception levels.

(h) Non-permissible stub line.

i) Examine the data traffic between the master and each slave device.

ii) Verify baud rate.

iii) Confirm signal level.

iv) Verify network cycle time.

v) Generate “live” slave list.

vi) Verify and record scanner diagnostic data including node status and error codes.

vii) Monitor and capture network waveform.

(3) Generate slave list.

(4) Measure power supply voltage at active terminations.

(5) Evaluation:

(a) Confirm the network cable topology (length and configuration) does not exceed data rate limitations.

(b) Confirm total stub length (if required by design) does not exceed data rate limitations.

(c) Calculate spare trunk length for the specified data rate.

b. Operations qualifications and test procedures:

(1) Electrical tests:

(a) Examine the data traffic between the master and each slave device.

(b) Verify baud rate.

(c) Confirm signal level.

(d) Verify network cycle time.

(e) Generate “live” slave list.

(f) Verify and record scanner diagnostic data including node status and error codes.

(g) Monitor and capture network waveform.

(2) Evaluation:

(a) Confirm all specified slave devices appear on the live list.

(b) Evaluate data traffic between master and each

slave to confirm proper slave configuration and performance.

(c) Inspect waveform capture for evidence of excessive noise.

(d) Evaluate and report any failed or questionable network tests.

(e) Evaluate and report network error codes and related symptoms.

5. Loop check/validation:

a. Check all control loops under simulated operating conditions by causing a range of input signals at the primary control elements and observing appropriate responses of the respective control and monitoring elements, final control elements, and the graphic displays associated with the SCADA system. Issue commands from the SCADA system and verify proper responses of field devices. Use actual process inputs wherever available.

b. Provide “end-to-end” tests:

(1) Test SCADA system inputs from field device to SCADA system operator workstations.

(2) Test SCADA system outputs from SCADA operator workstations to field devices and equipment.

(3) Observe and record responses at all intermediate devices.

(4) Test and record operator commands and signal readouts to each operator device where there is more than one operator interface point.

(5) For each signal, perform separate tests for SCADA computer screens, local operator interface (LOI) screens, and local control panels.

c. Retest any loop following any necessary corrections.

d. Apply simulated sensor inputs corresponding to 0 percent, 25 percent, 50 percent, 75 percent, and 100 percent of span for networks that incorporate analog elements, and monitor the resulting outputs to verify compliance to accuracy tolerance requirements.

e. Apply continuously variable up and down analog inputs to verify the proper operation and setting of discrete devices (signal trips, etc.).

f. Apply provisional settings on controllers and alarm setpoints.

g. Record all analog loop test data on test forms.

h. Exercise each field device requiring an analog command signal, through the SCADA system. Vary, during the validation process, the output from the PLC SCADA system and measure the end device position, speed, etc. to confirm the proper operation of the device for the supplied analog signal. Manually set the output from the SCADA screen at 0 percent,25 percent, 50 percent, 75 percent, and 100 percent and measure the response at the final device and at any intermediate devices.

i. Exercise each field device providing a discrete input to the SCADA system in the field and observe the proper operation shall be observed at the operator workstation:

(1) Test limit switches, set limits mechanically, and observe proper operation at the operator workstation.

(2) Exercise starters, relay contacts, switch contacts, and observe proper operation.

(3) Calibrate and test instruments supplying discrete inputs, and observe proper operation.

j. Test each device accepting a discrete output signal from the SCADA. Perform the appropriate operator action at the SCADA operator stations (including LOIs, if present) and confirm the proper operation of the field device:

(1) Stroke valves through outputs from the SCADA system, and confirm proper directional operation. Confirm travel limits and any feedback signals to the SCADA system.

(2) Exercise motors starters from the SCADA system and verify proper operation through direct field observation.

(3) Exercise solenoids and other field devices from the SCADA system and verify proper operation through direct field observation.

k. Include in the test forms:

(1) Analog input devices:

(a) Calibration range.

(b) Calibration data: Input, output, and error at each test value.

(c) Analog input associated PLC register address.

(d) Value in PLC register at each test point.

(e) Value displayed at each operator interface station (local operator interface displays and SCADA workstations).

(2) Analog output devices:

(a) Calibration range.

(b) Test value at each test point.

(c) Analog output associated PLC register address.

(d) Control variable value at field device at each test point.

(e) Physical device response at each test point:

i) Response to be actual valve position, or motor speed, etc.

(3) Discrete instrument input devices:

(a) Switch setting, contact action, and dead band.

(b) Valve position switches:

i) Response in the PLC as the valve is stroked from the PLC.

ii) Field observed actual valve position, and valve indicator position as the valve is stroked from the PLC.

(c) Operator interface switches (control stations and other pilot devices) and associated response.

(d) Starter and drive auxiliary device contact response.

(e) Response of all other discrete inputs to the PLC.

(4) Discrete output devices:

(a) Observed response of field device to the discrete output from the PLC.

(b) Observe the proper operation of Open, Close, Start, Stop, On, Off, etc.

(5) Test equipment used and associated serial numbers.

C. Functional Testing:

1. General:

a. Commence Functional tests after completion of all loop check/validation tests:

(1) As specified in Section 17050, Sequencing and Scheduling article.

b. Functional to demonstrate proper operation of all systems with process equipment operating over full operating ranges under conditions as closely resembling actual operating conditions as possible.

c. Additional tests are specified in other Instrumentation and Control Sections.

d. Follow approved detailed test procedures and check lists for Functional Test activities.

2. Control logic operational validation:

a. The purpose of control logic validation is to field test the operation of the complete control system, including all parts of the SCADA system, all control panels (including vendor control panels), all control circuits, all control stations, all monitored/controlled equipment, and final control elements.

b. Demonstrate all control functionality shown on the P&IDs, control schematics, and other drawings, and specified in the loop descriptions, control strategies, Electrical Specifications, and Mechanical Equipment Specifications.

c. Test in detail on a function-by-function and sentence-by-sentence basis.

d. Thoroughly test all hardware and software functions:

(1) Including all hardwired and software control circuit interlocks and alarms.

e. Test final control elements, controlled equipment, control panels, and ancillary equipment under startup, shut down, and steady-state operating conditions to verify all logic and control is achieved.

f. Control logic validation tests to include, but not limited to a repeat of all control logic tests from the FAT, modified and expanded to include all field instruments, control panels, circuits, and equipment.

3. Loop tuning:

a. Optimally tune all electronic control stations and software control logic incorporating proportional, integral, or derivative control. Apply control signal disturbances at various process variable levels and adjusting the gain, reset, or rate settings as required to achieve proper response.

b. Verify the transient stability of final control elements operating over the full range of operating conditions, by applying control signal disturbances, monitoring the amplitude and decay rate of control parameter oscillations and making necessary controller adjustments as required to eliminate excessive oscillatory amplitudes and decay rates. As a minimum, achieve 1/4 wave amplitude decay ratio damping (subsidence ratio of 4) under the full range of operating conditions.

c. If excessive oscillations or system instability occur, as determined by the Engineer, continue tuning and parameter adjustments, or develop and implement any additional control algorithms needed to achieve satisfactory control loop operation.

4. Functional validation sheets:

a. Document each Functional test on an approved test form.

b. Document loop tuning with a report for each loop, including two-pen chart recordings showing the responses to step disturbance at a minimum of 3 setpoints or process rates approved by the Engineer. Show tuning parameters on the charts, along with time, date, and sign-off by Contractor and Engineer.

c. Include on the form, functions which can be demonstrated on a loop-by- loop basis:

(1) Loop number and P&ID number.

(2) Control strategy, or reference to specification tested.

(3) Test procedures: Where applicable, use the FAT function-by- function, sentence-by-sentence loop test checklist forms modified to meet the requirements of the Functional test. Otherwise, create new forms.

d. For functions that cannot be demonstrated on a loop-by-loop basis (such as overall plant power failure), include on the test form a listing of the specific steps and tests to be conducted. Include with each test description the following information:

(1) Specification page and paragraph of function demonstrated.

(2) Description of function and/or text from specification.

(3) Test procedures: use the FAT loop test checklist forms modified to meet the specific testing conditions of the Functional test.

5. Functional certification:

a. Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 21.40:

(1) Including all test forms with test data entered, submitted to the Engineer with a clear and unequivocal statement that all Functional test requirements have been satisfied.

D. Instrumentation and Controls Performance Testing:

1. After the Process Operational Period, test PCIS system for additional 60 days as specified in this Section to identify issues and make corrections, as needed.

2. General:

a. The performance test is part of the Work that must be completed as a condition of substantial completion and final completion for the entire Project.

b. The complete PLC control and SCADA system must run continuously for the duration of the performance test.

c. Test and use the entire process control system under standard operating conditions.

d. Exercise all system functions.

e. Log failure, any system interruption and accompanying component, subsystem, or program failure including time of occurrence, duration of each failure, failure classification, and cause:

(1) Provide a competently trained technician or programmer on call for the Project Site during all normal working days and hours from the start of the performance test until final acceptance of the system:

(a) Response time to the Project Site: 24 hours or less, for a major failure.

3. SCADA system testing:

a. Exercise each system function, e.g., status report, alarms, logs, and displays several times at a minimum, and in a manner that approximates "normal" system operation.

b. Failure of the SCADA system during testing shall be considered as indicating that the programs and operating system do not meet the requirements of the specifications:

(1) Corrective action is required before restarting the performance test.

4. Failures:

a. Classify failures as either major or minor:

(1) Minor failure:

(a) A small and non-critical component failure or software problem that can be corrected by the Owner's operators.

(b) Log this occurrence but this is not a reason for stopping the test and is not grounds for non-acceptance.

(c) Should the same or similar component failure occur repeatedly, this may be considered as grounds for non-acceptance.

(d) Failure of one printer or operator station is considered a minor failure providing all functions can be provided by backup equipment, i.e., alternate printers and operator station, and repairs can be made and equipment returned to service within 3 working days.

(2) Major failure:

(a) Considered to have occurred when a component, subsystem, software control, or program fault causes a halt in or improper operation of the system and/or when a technician's work is required to make a repair or to re-initiate operation of the system.

(b) Cause termination of the performance test.

(c) Start a new acceptance test when the causes of a major failure have been corrected.

(d) A failure is also considered major when failure of any control system that results in an overflow, underflow, overdose, or underdose condition occurs.

5. Technician report:

a. Each time a technician is required to respond to a system malfunction, they must complete a report, which includes details concerning the nature of the complaint or malfunction and the resulting repair action required and taken.

b. If a malfunction occurs which clears itself or which the operator on duty is able to correct, no report is required or logged as specified above.

c. If a technician has performed work but no report is written, then a major failure is considered to have occurred.

d. Each report shall be submitted within 24 hours to the Engineer and the Owner, or its representative.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The work specified in this Article includes furnishing and installing corrosion control test stations, insulating joints, and other materials required for the protection of the pressure pipe and appurtenances, as shown on the Drawings and as specified herein.

B. Work incidental to installation of these facilities includes installation of buried test wires, test boxes, performance testing, and field-apply epoxy at flanged insulating joints.

C. Locations for corrosion control facilities are approximate and exact placement shall be determined in accordance with structural and mechanical considerations verified in the field. The corrosion control items may be moved with approval of the Engineer.

1.02 RELATED REQUIREMENTS

A. Section 32 - Piping
B. Article 40.02 – Painting and Coating

1.03 SUBMITTALS

A. Prior to fabrication and installation, the Contractor shall submit copies of catalog cuts of the following items in accordance with Article 7.05:

1. Alumino-thermic weld kits
2. Splice kits
3. Conduit, wire and cable, test leads
4. Coating for alumino-thermic welds
5. Concrete test boxes
6. Test station
7. Insulating blankets

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials and equipment furnished under this Article shall be the standard product of manufacturers regularly engaged in the manufacture of such products and shall be the manufacturer's latest standard design that complies with the requirements of these Specifications.

B. All materials and equipment shall be new and shall bear Underwriters Laboratories (UL) approval where UL standards apply. Unless otherwise specified, materials and equipment shall conform to the requirements of the National Electric Code (NEC) and shall be installed to conform to all city, county, state, federal, and special codes and regulations.

C. Insulating Joints

1. Flange insulation kits shall contain full face non-asbestos gaskets having a minimum dielectric strength of 500 volts/mil, full length insulating sleeves, insulating washers, and high strength steel bolts with steel washers as shown on the Drawings.

2. The complete assembly shall have a pressure rating equal to that of the flanges between which it is installed.

a. Gaskets shall be neoprene faced phenolic, ⅛ inch thick.

b. Insulating sleeves shall be NEMA G-10 epoxy glass insulating kits, min. 1/32 inch thick.

c. Steel washers shall be cadmium plated and fit well within the bolt facing on the flange.

d. Insulating washers shall be set of ⅛ inch thick fiberglass epoxy. Insulating washers shall fit within the bolt facing the flange over the outside diameter of the sleeve.

D. Insulating Blankets

1. Insulating blankets shall be a minimum ¼ inch thick sheet of butyl rubber, PVC, high density polyethylene, micarta, neoprene, or other similar insulating material as approved by the Engineer.

2. Insulating blankets shall be sized as required or as shown on the Drawings.

E. Cable Warning Tape:

1. The underground warning tape shall be along the entire buried length of the cable.

2. The underground warning tape shall be installed a minimum of six (6) inches above the top of the cables for the entire length of the cables

3. The underground warning tape shall be a minimum of four (4) inches wide and 3½ mils thick, constructed of polyethylene.

4. The underground warning tape color shall be yellow and shall bear the continuously printed non-fading legend in 3-inch-high lettering in black printing: "CAUTION CATHODIC PROTECTION CABLES BURIED BELOW".

F. Field Coating at Flanged Insulating Joints

1. The Contractor shall install a field-applied, two-part, 100 percent solids epoxy coating at insulating joints as shown on the Drawings and as specified herein.

2. The 100 percent solids epoxy coating shall be NSF 61 listed, 0 percent volatile organic compound, white color, two coats.

3. The 100 percent solids epoxy coating shall be Aquatapoxy Coating System A-6, as manufactured by American Chemical Corporation, 5231 Northrup Avenue, St. Louis, Missouri 63110, or equal.

PART 3 EXECUTION

3.01 GENERAL

A. Record Drawings for the cathodic protection system shall be maintained by the Contractor during installation and construction of the cathodic protection system. Record Drawings shall be revised by the Contractor to show exact locations of all anodes, rectifiers, cables, conduit, and wire to pipe connector locations and shall properly identify all items of equipment and material.

B. Electrical Bonding

1. Electrical bonding using pipe joint cables shall be required across all pipe joints except welded and insulating joints.

2. Where flanged coupling adapters are installed, No. 2 AWG bond cables shall be installed to provide electrical continuity between components of couplings and pipe, except across insulating joints where bond cables shall not be installed.

C. Electrical Isolation

1. All underground metallic project piping shall be installed such that it is electrically isolated and not in contact with other grounded piping or structures. Where such contacts cannot be avoided or when there is less than two (2) feet clearance or at specific locations shown on the

Drawings, an insulating blanket shall be placed between the project pipe and other piping or structures as shown on the Drawings.

D. Insulating Joints—Insulating joints shall be installed as specified herein. Locations for insulating joints shall include the following unless indicated otherwise on the Drawings:

1. Upstream side of all valves at blow offs.

2. Both sides of all discharge and bypass valves.

3. All connections between cement mortar coated and noncement mortar coated pipe.

4. All connections between different types of pipe (i.e., welded steel pipe or ductile iron pipe). This requirement shall be waived at tapers and specials if the pipe coating on both types of pipe is the same.

5. At all air release valve assemblies.

6. Other locations as shown on the Drawings or specified herein.

E. Field Epoxy Coating at Flanged Insulating Joints

1. Surface preparation shall consist of wire brushing to remove all rust and scale and to provide a suitable surface for adhesion of the 100 percent solids epoxy coating. See Article 40.01 – 'Coating and Paints' of the Technical Provisions.

3.02 TESTING

A. The Engineer reserves the right to test and inspect all phases of the Contractor's work. The Contractor shall notify the Engineer at least two (2) days in advance for inspection of materials and critical operations as defined below:

1. All test lead connections.
2. Installation of buried insulating fittings.

END OF ARTICLE

ARTICLE 39.04
CORROSION CONTROL TEST STATIONS SECTION 39

PART 1 GENERAL

1.01 SUMMARY

A. The work of this section shall include the furnishing and installation of corrosion control test stations as specified herein, shown on the plans, and as required for complete, functional cathodic protection.

1.02 RELATED REQUIREMENTS

A. Section 32 – Piping
B. Article 39.01 – Corrosion Control - General
C. Article 39.08 – Wire, Cable and Conduit
D. Article 39.11 – Identification Tags

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Refer to Article 39.01 Corrosion Control – General.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Test Boxes

1. Concrete test boxes shall be precast concrete with a cast iron lid as shown on the Drawings and shall have sufficient strength to support H-20 vehicular traffic.

2. Covers shall be cast with the legend “CP Test,” using letters not less than 1½ inches high.

3. A five-lead terminal board shall be included. Terminal studs and nuts shall be nickel-plated brass.

4. Insulating blankets shall be sized as required or as shown on the Drawings.

B. Wire

1. Test leads shall be of the stranded copper conductors indicated on the Drawings and shall be of the American Wire Gauge (AWG).

2. No. 8 AWG and larger conductors shall be stranded copper conductors with 7/64-inch-thick high molecular weight polyethylene (HMW/PE) insulation unless otherwise indicated on the Drawings.

3. Test station wires from existing test stations may be lengthened by using a crimped connection in a waterproof splice.

PART 3 EXECUTION

3.01 GENERAL

A. Test Leads

1. All test leads shall be of sufficient length to reach the termination point at the test or terminal box without splicing; test leads from new test stations shall not be spliced.

   a. All test lead wires terminating in at-grade concrete test boxes shall have sufficient slack to extend a minimum of 18 inches above finish grade.

   b. Test leads shall be attached to casing, pipe, or valves as shown on the Drawings.

   c. All coatings removed for attachment of test leads shall be repaired as indicated. Connections and all exposed copper wire shall be coated with a bitumastic material prior to repairing the coating as indicated.

   d. Wire routing for test leads shall be as shown on the Drawings. Alternate routing from locations shown is acceptable when approved by the Engineer.

   e. Test stations shall be installed as shown on the Drawings. The location of the test box may be adjusted only with the approval of the Engineer. Unless otherwise indicated on the Drawings, top of concrete test stations shall be set flush with the finished grade.

B. Conduit for corrosion control test leads shall be plugged with Waterplug (Alumino Hydraulic Cement) around the cables. Where conduit ends immediately outside of precast vault, plug shall be at conduit end outside precast vault. Where conduit extends across roadway, plug shall be in conduit immediately inside precast vault.

C. Test Stations

1. Test stations shall be placed at the locations indicated on the Drawings or as specified herein.

2. The Contractor shall field verify final location of the test stations.

3. Wire identification tags shall be placed on all wire prior to backfill and installation of test stations.

4. The terminal end of each cable shall be identified with the structure identification using the permanent cable identification tags.

5. New test stations shall be installed in sidewalks or non-traffic areas for easy access for future testing.

3.02 TESTING

A. The Engineer reserves the right to test and/or inspect all phases of the Contractor's work. The Contractor shall notify the Engineer at least two (2) days in advance for inspection of all test lead connections.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The work of this section shall include the furnishing and installation of alumino-thermic welds as specified herein, shown on the plans, and as required for complete, functional cathodic protection

1.02 RELATED REQUIREMENTS

A. Section 32 - Piping
B. Article 39.01 – Corrosion Control - General
C. Article 39.04 – Corrosion Control Test Stations
D. Article 39.08 – Wire, Cable and Conduit

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Refer to Article 39.01 Corrosion Control – General.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Alumino-thermic welds shall be provided for connecting cables and structures in strict accordance with the manufacturer's requirements. Connections shall be made at locations shown on the Drawings and specified herein.

B. Alumino-thermic welds shall be Cadweld, as manufactured by Erico Products, Inc., or Thermoweld, as manufactured by Continental Industries, Inc., or equal. Duxseal packing, as manufactured by Johns Manville, or equal, shall be used where necessary to prevent leakage of molten weld metal.

C. Molds shall be the type recommended by the manufacturer for the wire size, metal shape, and orientation. Weld alloy shall be formulated for use on steel or iron pipe as appropriate and shall be of the weight recommended by the manufacturer for the size cable and mold being used. Welds to be buried or

submerged shall be primed with an elastomer resin based primer, then be covered with a 100 percent solids mastic filled plastic cap.

D. Use the plastic cap on dielectric coated pipe following the manufacturer's instructions. Primer and cap shall be Roybond Primer 747 and Handy Cap as manufactured by Royston Laboratories, or equal.

E. The shape and charge of the alumino-thermic weld shall be chosen based on the following parameters:

1. Pipe material
2. Pipe size
3. Wire material/size and requirement for sleeves
4. Number of strands to be welded
5. Orientation of weld (vertical or horizontal)

PART 3 EXECUTION

3.01 GENERAL

A. Alumino-Thermic Weld Connections

1. Alumino-thermic weld connections shall be installed in the manner and at the locations indicated.

2. Coating materials shall be removed from the surface over an area of sufficient size to make the connection. The steel or ductile iron surface shall be cleaned to white metal by grinding or filing prior to welding the conductor. The use of resin impregnated grinding wheels will not be allowed.

3. The conductor shall be welded to the pipe by the alumino-thermic welding process with a copper sleeve fitted over the conductor.

4. Only enough insulation shall be removed such that the copper conductor can be placed in the welding mold.

B. Coating of Welds

1. The Contractor shall furnish all materials, clean surfaces and repair any damage to protective coatings and linings damaged as a result of the welding.

2. The coating shall be applied to all alumino-thermic weld locations.

3. The coating shall be a bitumastic coating.

4. Coating repairs shall be performed in accordance with manufacturer's requirements.

C. Weld Caps

1. Weld caps shall be Royston Handy Cap, as manufactured by Royston Laboratories, Inc.; Thermit Weld Cap, as manufactured by Phillips Petroleum Company, or equal.

3.02 TESTING

A. Testing of Alumino-Thermic Welds

1. As soon as the weld has cooled, the weldment shall be tested for strength by striking a sharp blow with a 16 oz. or larger, hammer while pulling firmly on the wire.

2. All weld slag shall be removed from the weldment with a wire brush and the metallurgical bond shall be tested for adherence to the pipe or casing.

3. All unsound or defective welds are to be rewelded and retested at the sole expense of the Contractor.

4. All exposed surfaces of the copper and steel shall be covered with insulating materials as indicated.

5. No connections to the piping shall be buried prior to inspection and approval of the Engineer.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. The work of this section shall include the furnishing and installation of bitumastic coating as specified herein, shown on the plans, and as required for complete, functional cathodic protection

B. Coating for all buried bolts, nuts and metallic washers shall have Bitumastic coal tar mastic coating.

1.02 RELATED REQUIREMENTS

A. Section 32 – Piping
B. Article 39.01 – Corrosion Control – General
C. Article 39.04 – Corrosion Control Test Stations
D. Article 39.05 – Alumino-thermic Welds
E. Article 39.08 – Wire, Cable and Conduit

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Refer to Article 39.01 Corrosion Control – General.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made

PART 2 PRODUCTS

2.01 MATERIALS

A. Bitumastic Coating

1. Bitumastic coating shall be TC Mastic, as manufactured by Tapecoat Company, Bitumastic 505, as manufactured by Kopcoat, Inc., or equal.

PART 3 EXECUTION

A. All buried nuts and bolts not in direct contact with mortar coating, mortar encasement, or CLSM shall be coated with bitumastic prior to encasement. After flange hardware is installed use wire brush, power brush, or an abrasive cleaning

pad to remove all loose material, dirt and grime from substrate to a minimum cleanliness of SSPC SP2. Apply bitumastic coating liberally with a medium bristle brush to the extent that all surfaces are completely covered with no bare spots visually evident. Coat exposed surfaces of bolts, washers and nuts, giving special attention to the bottom-side surfaces. Follow the manufacturer's recommendations for drying times required before encasement and backfill.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The work of this section shall include the furnishing and installation of wire, cable and conduit as specified herein, shown on the plans, and as required for complete, functional cathodic protection

1.02 RELATED REQUIREMENTS

A. Section 32 – Piping
B. Article 39.01 – Corrosion Control – General
C. Article 39.04 – Corrosion Control Test Stations
D. Article 39.05 – Alumino-thermic Welds
E. Article 39.11 – Identification Tags

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Refer to Article 39.01 Corrosion Control – General

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Conduit

1. Unless otherwise specified on the Drawings, all conduits for corrosion control wiring shall be Schedule 40 Polyvinyl chloride (PVC).

PART 3 EXECUTION

3.01 GENERAL

A. Wire and Cable

1. Wire and cable routing shall be as shown on the Drawings. Alternate routing from locations shown on the Drawings may be acceptable where

there is a compelling reason. All changes to the wire and cable routing shown on the Drawings are subject to approval by the Engineer.

2. All buried wire and cable shall be installed at a minimum depth of three (3) feet below finished grade or as shown on the Drawings. The trench shall be backfilled as shown on the Drawings and as specified herein. Care shall be taken when installing wire and cable to backfill the trench so that insulation is not broken, cut, or bruised. If insulation is damaged, then the entire wire shall be replaced.

3. All wiring attached to structures and anodes shall be of sufficient length to reach the termination point at the test box without splicing. Prior to connecting the cables or wires to the structure, anode, or pipe, the Contractor shall inspect each cable to verify appropriate cable lengths that satisfy the no-splice requirement.

4. All wire and cables shall be attached to the pipe as follows:

   a. Wire cutters shall be used to cut wire to prevent the deformation of the wire ends. Hacksaws may be used if the wire insulation is removed.

      Wire shall be cleaned of oil and grease with rapid drying solvent. Solvent shall be comprised of natural spirits which leave no residue. Bare wire shall only be exposed to the extent necessary to allow the weld connection to be made.

   b. The attachment of copper wire to the pipe shall be made using an alumino-thermic weld as shown on the Drawings as specified herein. Only one wire at a time shall be attached with each weld.

      Weld charges and mold size shall be as specified by the manufacturer for various pipe and cable sizes and surface configurations involved. Weld charges for use on cast iron are different from those for ductile iron and steel.

      Care should be taken during installation to be sure correct charges are used. Welding charges and molds shall be the product of a manufacturer regularly engaged in the manufacture of such products.

   c. The wire is to be held at a 30° to 45° angle to the surface when welding.

   d. Coating for alumino-thermic welds and repairing damaged coatings for joint bond assemblies and test lead assemblies shall be a cold-applied, fast drying mastic consisting of bituminous resins and solvents. Approved products include Koppers Bitumastic 50, or equal.

END OF ARTICLE

PART 1 GENERAL

1.01 SUMMARY

A. The work of this section shall include the furnishing and installation of identification tags as specified herein, shown on the plans, and as required for complete, functional cathodic protection.

1.02 RELATED REQUIREMENTS

A. Article 39.01 – Corrosion Control – General
B. Article 39.04 – Corrosion Control Test Stations
C. Article 39.08 – Wire, Cable and Conduit

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. Refer to Article 39.01 Corrosion Control – General.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made

PART 2 PRODUCTS

2.01 MATERIALS

A. Wire Identification

1. All wires used for corrosion protection shall be identified with brass tags securely attached to the wire with a nylon fastener.

2. The brass tags shall be approximately 1 inch in diameter and 1/16 inch thick with die stamped identifying numbers and a letter designation of N, S, E, W to represent North, South, East, and West, respectively, and indicates which side of the pipe from which the wires are connected to.

B. Cable Identification Tags

1. All cables in the terminal boxes shall be identified. The identification tags shall be white plastic "zip-tie" type straps with a plastic tab of sufficient size to allow the pipeline station to be written on the tab with a permanent felt tip marker.

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. This article covers protective coating and lining systems for steel pipe and pipeline appurtenances.

B. Unless otherwise specified herein or shown on the Drawings, all steel pipe (including nozzles) and fittings shall be shop cement mortar lined and coated conforming to AWWA Standard C205.

C. Unless otherwise indicated, the exterior of all valves, thread-o-lets, couplings, flanges, insulating joints, bolt heads, support devices, etc., and all steel pipe in vaults and boxes shall be liquid epoxy-coated, or polyethylene-coated, in accordance with these Specifications and painted to provide uniform color after assembly.

D. Coatings shall not be required for brass, bronze, and copper pipe or fitting material.

E. All valves, couplings, and fittings shall be shop coated in accordance with AWWA C205, C213, and C550, unless noted otherwise.

F. All couplings, both flanged and not flanged, shall be fusion bonded epoxy coated and lined conforming to AWWA Standard C213 on all surfaces.

G. The entire procedure(s) of applying the protective coating materials as herein specified may be inspected by the Engineer from surface preparation to completion of coating. Such inspection shall not relieve the Contractor of their responsibility to furnish material and perform work in accordance with these Specifications.

H. The Engineer shall have free access to those parts of all plants that are concerned with the furnishing of materials or the performance of work under this Contract.

I. The Contractor shall furnish the Engineer reasonable facilities and space, without charge, for the inspection, testing, and obtaining of such information as he/she desires regarding the character of material used and the progress and manner of the work and the results obtained.

J. For painting requirements, see Article 40.02 – Painting and Coating - General

1.02 REFERENCES

A. Related Articles:

1. Section 32 – Piping
2. Article 40.02 – Painting and Coating

B. American Water Works Association (AWWA):

1. AWWA C 105 – Polyethylene Encasement for Ductile-Iron Pipe Systems

2. AWWA C 205 – Cement-Mortar Protective Lining and Coating for Steel Water Pipe

3. AWWA C 210 –Liquid Epoxy Coatings and Linings for Steel Water Pipe and Fittings

4. AWWA C 213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings

5. AWWA C 504 – Rubber-Seated Butterfly Valves

6. AWWA C 509 – Resilient-Seated Gate Valves for Water Supply Service

7. AWWA C 550 – Protective Interior Coatings for Valves and Hydrants

C. American Society of Testing and Materials (ASTM)

1. C 309 – Standard Specifications for Liquid Membrane-Forming Compounds for Curing Concrete

2. D 1000 – Standard Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications

3. D 1505 – Standard Test Method for Density of Plastics by the Density-Gradient Technique

4. G8 – Standard Test Methods for Cathodic Disbonding of Pipeline Coatings

5. G14 – Standard Test Method for Impact Resistance of Resistance of Pipeline Coatings (Falling Weight Test)

D. National Association of Corrosion Engineers

1. SP-01-88 (2006) – Standard Practice, Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates.

1.03 SUBMITTALS

A. Refer to Article 7.05 – Submittals to be Furnished by the Contractor for submittal requirements.

B. The Contractor shall submit to the Engineer in accordance with Article 7.05 an affidavit of compliance stating that all coating systems furnished comply with the applicable requirements of the AWWA and ASTM Standards.

1.04 MEASUREMENT AND PAYMENT

A. Unless noted otherwise, full compensation for Work involved in complying with all requirements per this Article as shown on the Drawings, as specified in these Specifications, and as directed by the Engineer shall be considered incidental and included in the Contract Price(s) paid for the various items of Work involved; no additional time shall be allowed or payment made.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials shall conform to the requirements of the AWWA Standards and the requirements of these Specifications.

B. Valves

1. Butterfly Valves

a. Unless otherwise specified, butterfly valves shall be provided with protective coatings conforming to AWWA C550.

b. The interior and exterior surfaces of butterfly valves shall be coated in accordance with AWWA C550 and C504.

c. The seating shall not be coated.

d. Lining and coating thickness shall be a minimum dry film thickness of 12 mil.

e. Actuators shall be coated

2. Gate Valves

a. Gate valves shall have all internal and external ferrous surfaces coated with an NSF/ANSI 61 certified fusion bonded epoxy coating of 10 mils nominal thickness in accordance with AWWA C550.

3. Air Valves

   a. Interior and exterior surfaces of combination air release valves, vacuum breakers and air release valve assemblies shall be protected with an NSF/ANSI 61 certified fusion bonded epoxy conforming to AWWA C550.

4. Sleeve, Cone, and Pressure Surge Relief Valves

   a. Sleeve valves shall be coated in accordance with the manufacturer's recommendations

   b. Unless otherwise specified, coating and lining for sleeve valves shall be fusion-bonded epoxy in accordance with AWWA C550

   c. All ductile iron and carbon steel components shall be coated with a minimum of 10 mils of fusion-bonded epoxy

5. Coating shall be Ameron Amerlock 370, or equal.

PART 3 EXECUTION

3.01 PLACEMENT

A. Procedures for surface preparation and application, surface finishing, and curing as described in the AWWA standards shall be adhered to.

B. Field joints shall be coated and lined as shown on the Drawings in accordance with the following requirements:

1. On all cement mortar-coated welded pipe, the exterior of the joints shall be coated with cement mortar grout conforming to AWWA standards.

2. Immediately prior to placing the field-applied cement mortar grout, the edges of the shop-applied cement mortar coating shall be cleaned and moistened.

3. The grout shall be poured into the diaper from one side only and shall be rodded to eliminate air pockets. The joint coating shall be kept moist until the backfill is placed.

4. A mastic compound shall be applied where required and at all field joints or fittings requiring field tape coatings which have irregular or uneven surfaces. See Article 39.01 – Corrosion Control - General.

5. The mastic shall be applied to provide a smooth, regular surface to allow tape coating to be placed without gaps, folds, or air pockets. See Article 39.01 – Corrosion Control - General.

6. The mastic compound shall be flexible and shall be:

   a. "Ram-Nek," as distributed by Hanson Concrete Products, Inc., 1 Hanson Court, Milpitas, California 95035,

   b. "Redi Seal R Concrete Joint Sealant," as distributed by Burke Company, 2655 Campus Drive, San Mateo, California 94403, or equal

7. The exterior of joints of fusion-bonded epoxy coated pipe shall be liquid epoxy coated conforming to AWWA C210.

8. In all types of pipe with cement-mortar lining, the inside joints shall be mortared by hand and trowel without crumbling.

9. Before placing the joint cement-mortar materials against the surfaces of the lining, these surfaces shall be carefully cleaned and wetted to ensure a good bond between the lining and joint cement-mortar.

10. Upon completion of the joint, cement-mortar surfaces shall be cured by applying a curing compound conforming to ASTM Standard C309.

3.02 QUALITY ASSURANCE

A. Testing shall conform to the requirements of AWWA Standards C104, C105, C205, C210, C213, C550 and these Specifications.

B. Inspection failure over large areas, as determined by the Engineer, in any length of pipe shall be cause for rejection of the length of pipe as unfit and the pipe shall be removed immediately from the work site. The Contractor shall be responsible for replacement of rejected pipe at his/her sole cost. No extension of time for completion of the work will be provided due to rejection of pipe. The Contractor shall be responsible for arranging for and providing power as necessary for field testing.

C. A certificate of compliance shall be furnished with each valve stating that the materials supplied meet the material specification set out herein and the Manufacturer's quality assurance program

END OF ARTICLE

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PART 1 GENERAL

1.01 SUMMARY

A. This article covers field applied protective coatings and painting, including surface preparation, protection of surfaces, inspection, and other appurtenant work for equipment, piping, appurtenances, vault interiors, vault exteriors and other such surfaces designated to be coated and painted.

B. Furnishing and operating any and all lead and heavy metal removal/containment/capture system

C. Furnishing and operating all climate controlled environments as required by any and all coating manufacturer's application requirements.

D. Removing, handling and disposing of the existing exterior paint, coatings and any other hazardous materials in accordance with local, state, and federal regulations and as specified.

E. Regardless of the number of coats previously applied, at least two field coats in addition to any shop coats or field prime coats shall be applied to the exterior of all fully assembled above grade and vaulted piping and appurtenance assembly surfaces to provide uniform and consistent coverage and color.

F. Cleaning, surface preparation, coating application, and thickness shall be as specified herein and shall meet or exceed the coating manufacturer's recommendations. When the manufacturer's minimum recommendations exceed the specified requirements, Contractor shall comply with the manufacturer's minimum recommendations. When equivalent products are acceptable to the Engineer, Contractor shall comply with this specification and the coating manufacturer's recommendations.

G. All cleaning, surface preparation, coating application, thickness, testing, and coating materials (where available) shall be in accordance with the referenced standards of the following AWWA, ANSI, NACE, SSPC, NSF, and ASTM.

1.02 REFERENCES

A. American Water Works Association (AWWA):

1. AWWA C 213 – Liquid Epoxy Coatings and Linings for Steel Water Pipe and Fittings

B. American Society of Testing and Materials (ASTM)

1. D4541 – Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

2. D4787 – Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates

3. D5162 – Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates

C. State of California Department of Transportation (Caltrans)

1. Section 54 – Waterproofing
2. Section 59 – Structural Steel Coatings

D. The National Association of Corrosion Engineers (NACE)

1. SSPC-SP 1 – Solvent Cleaning
2. SSPC-SP 2 – Hand Tool Cleaning
3. SSPC-SP 3 – Power Tool Cleaning
4. SSPC-SP 5 – White Metal Blast Cleaning
5. SSPC-SP 6 – Commercial Blast Clearing
6. SSPC-SP 7 – Brush-off Blast Cleaning
7. SSPC-SP 10 – Near-White Metal Blast Cleaning
8. SSPC-SP 11 – Power Tool Cleaning to Bare Metal
9. SSPC-SP 13 – Surface Preparation of Concrete

1.03 SUBMITTALS

A. Contractor shall submit color cards for all coatings proposed for use, together with complete descriptive specifications, manufacturer's product data sheet and the completed Coating System Data Sheets, to Engineer for review and color selection. Each product data sheet shall include application temperature limits including recoat time requirements for the ambient conditions at the site, including temperatures up to 130°F. Requests for review submitted directly to Engineer by coating suppliers will not be considered.

B. Contractor shall submit a Coating System Data Sheet for each separately identified surface in the Coating Schedule that will be used in the project, using the appropriate Coating System Data Sheet forms (Figures 1 and 2) at the end of this section. Each field coating system shall be acceptable to the coating material manufacturer.

C. Each proposed coating system shall be assigned a unique number with a prefix letter based on the following:

Prefix	Surfaces	Figure
A	Iron and steel	2
C	Concrete and concrete block	1
E	Equipment: Submerged Nonsubmerged	1 2
F	Nonferrous metal	1
G	Galvanized	1

D. Each coating system that will be applied entirely in the field shall be assigned only a prefix letter and no suffix letter. When appropriate under the indicated conditions, the following suffix shall be added to the coating system numbers:

a. Each shop-applied coating system that includes a finish coat applied in the field.

E. A separate Coating System Data Sheet shall be developed and submitted for each variation or change in a coating system or surface to be coated.

1.04 MEASUREMENT AND PAYMENT

A. Full compensation for furnishing all work and materials for Painting and Coating shall be included in the lump sum price bid for Bid Item entitled “Painting and Coating”.

B. Refer to Article 21.01 Bid Items.

PART 2 PRODUCTS

2.01 MATERIALS

A. In addition to the coatings listed herein, equivalent products of the following manufacturers will also be acceptable:

Sigma	PPG	Porter
Rust-Oleum	MAB	Carboline Company
ICI Devoe	Tnemec	International Protective Coatings
Sherwin Williams		

B. Whenever a coating is specified by the name of a proprietary product or of a particular manufacturer or vendor, the specified coating shall be understood as establishing the desired type and quality of coating desired. Other manufacturers’ coatings will be accepted, provided that sufficient information is submitted to enable Engineer to determine that the proposed coatings are equivalent to those named. Proposed coatings must have an equivalent range of color selections to those manufacturers specified. Information on proposed coatings and color availability shall be submitted for review in accordance with the Submittals section. Requests for review of equivalency will be accepted only from Contractor, and will be considered only after the contract has been awarded.

C. All coatings shall be delivered to the job in original, unopened containers, with labels intact. Coatings shall be stored indoors and shall be protected against freezing. No adulterant, unauthorized thinner, or other material not included in the coating formulation shall be added to the coating for any purpose.

D. All coatings shall conform to the air quality regulations applicable at the location of use. Coating materials that cannot be guaranteed by the manufacturer to conform, whether or not specified by product designation, shall not be used.

E. The coatings specified have been selected on the basis of the manufacturer's statement that the VOC content of the product is 2.8 lbs per gallon or less; in the thinned condition, unless otherwise indicated herein; however, it shall be the Contractor's responsibility to use only coating materials that are in compliance with the requirements of all regulatory agencies including the Bay Area Air Quality Management District Regulation 8 Rule 3. Local regulations may require some coatings to have a lower VOC content than specified herein.

F. The coatings specified may meet the VOC limits in the unthinned (as shipped) condition, but may exceed the limits if thinned according to the manufacturer's recommendations. Under these conditions, the coatings shall not be thinned beyond the 2.8 lbs per gallon limit, and if the product cannot be thinned to suit the application method or temperature requirements, another manufacturer's coating shall be used, subject to acceptance by Engineer.

G. Some of the architectural coatings specified may contain VOC's in excess of 2.8 pounds per gallon; however, the coatings may be acceptable if supplied in containers of 1 quart or less and provided it conforms to all applicable regulations, codes, and standards.

H. Contractor shall be responsible for ensuring the compatibility of field coatings with each other or with the coatings on shop coated or previously coated surfaces. Coatings used in successive field coats shall be produced by the same manufacturer. Coatings used in the first field coat over shop coated or previously coated surfaces shall cause no wrinkling, lifting, or other damage to underlying coats.

I. Exterior – An epoxy coating shall be applied to the exterior surfaces of steel, gray iron, cast iron, and ductile iron surfaces that will be exposed to corrosive groundwater. The coating shall have a minimum solids content of 67% or greater by volume. Approved products include Bar Rust 231 as manufactured by International Protective Coatings, Amerlock 2 as manufactured by PPG Amercoat, or Carboguard 890 as manufactured by Carboline Company, or equal.

J. Primers

Universal Primer	PPG Amercoat "Amercoat 385 Epoxy", Carboline "Rustbond", ICI Devoe "Devran 224HS", Tnemec "Series 27 F.C. Typoxy", or Sherwin-Williams "Macropoxy 646".
Zinc Primer	PPG Amercoat "Dimetate 9 Series", Carboline "Carbo Zinc II Series", ICI Devoe "Catha-Coat 304V", or Sherwin-Williams "Zinc Clad II Series".

K. Intermediate and Finish Coatings

Epoxy Enamel (NSF certified systems)	
Ferrous Metal Surfaces Contact with Treated or Raw Water	PPG Amercoat “Amerlock 400 High- Solids Epoxy Coating”, Carboline “Carboguard 891”, ICI Devoe “Bar-Rust 233H”, Tnemec “Series N140 Pota-Pox Plus”, or Sherwin-Williams “Macropoxy 646NSF”; immersion service
Epoxy Enamel	
Ferrous Metal Surfaces	PPG Amercoat “Amercoat 385 Epoxy”, Carboline “Carboguard 890”, ICI Devoe Devran “224HS”, Tnemec “Series N69 Hi-Build Epoxoline II”, or Sherwin-Williams “Macropoxy 646”.
Aliphatic Polyurethane	PPG Amercoat “Amercoat 450H”, Carboline “Carbothane 134HG”, ICI Devoe “Devthane 379H” Tnemec “Series 1074 Endura-Shield II”, or Sherwin- Williams “Acrolon 218HS”.

L. Acrylic emulsion paint for masonry and concrete surfaces must comply with the MPI detailed performance standards for saint, latex, exterior and must be listed on one of the following MPI approved products lists:

MPI List No.	Category Name
10	Latex, exterior flat (MPI gloss level 1)
11	Latex, exterior semi-gloss (MPI gloss level 5)
119	Latex, exterior, gloss (MPI gloss level 6)

PART 3 EXECUTION

3.01 DELIVERY AND STORAGE

A. All coating products shall be received and stored in accordance with the coating manufacturer’s recommendations.

3.02 SURFACE PREPARATION

A. All surfaces to be coated shall be clean and dry and shall meet the recommendations of the coating manufacturer for surface preparation. Freshly coated surfaces shall be protected from dust and other contaminants. Oil and grease shall be completely removed by use of solvents or detergents before mechanical cleaning is started. The gloss on previously coated surfaces shall be dulled if necessary for proper adhesion of topcoats.

B. Surfaces shall be free of cracks, pits, projections, or other imperfections that would interfere with the formation of a smooth, unbroken coating film, except for concrete block construction where a rough surface is an inherent characteristic.

C. When applying touchup coating or repairing previously coated surfaces, the surfaces to be coated shall be cleaned as recommended by the coating manufacturer, and the edges of the repaired area shall be feathered by sanding or wire brushing to produce a smooth transition that will not be noticeable after the coating is applied. All coatings made brittle or otherwise damaged by heat of welding shall be completely removed.

D. Galvanized surfaces shall be prepared for coating according to the instructions of the manufacturer of the epoxy enamel. Any chemical treatment of galvanized surfaces shall be followed by thorough rinsing with clean water.

E. Nongalvanized ferrous metal surfaces shall be prepared for coating by using one or more of the following cleaning procedures as specified: solvents (SSPC- SP1); blasting (SSPC-SP5, -SP6, -SP7, or -SP10); power tools (SSPC-SP3 or - SP11); or hand tools (SSPC-SP2). Oil and grease shall be completely removed in accordance with SSPC-SP1 before beginning any other cleaning method. Surfaces of welds shall be scraped and ground as necessary to remove all slag and weld spatter. Tools which produce excessive roughness shall not be used.

1. All components of equipment that can be properly prepared and coated after installation shall be installed prior to surface preparation. Components that will be inaccessible after installation shall have the surfaces prepared and coated before installation. Motors, drive trains, and bearings shall be protected during surface preparation in accordance with the equipment manufacturer's recommendations.

2. All cut or sheared edges shall be ground smooth to a 1/8 inch minimum radius for all material 1/4 inch thickness and larger. For material thickness less than 1/4 inch all cut or sheared edges shall be ground smooth to a radius equal to 1/2 the material thickness. Grinding of rolled edges on standard shapes with a minimum radius of the 1/16 inch will not be required.

3. All ferrous metal surfaces which are specified to be coated with epoxy enamel shall have all welds ground smooth and free of all defects in accordance with NACE Standard SPO178, Appendix C, Designation C and sharp edges ground smooth, if not previously prepared in the shop. Instead of blending of the weld with the base metal as required by the NACE standard, it will be acceptable to furnish a welded joint that has a smooth transition of the weld to the base metal. All welds shall be ground smooth to ensure satisfactory adhesion of paint.

4. The cleaning methods and surface profiles specified herein are minimums, and if the requirements printed in the coating manufacturer's data sheets exceed the limits specified, the value printed on the data sheets shall become the minimum requirement.

F. Ferrous metal surfaces, including fabricated equipment, in non-immersion service shall be cleaned to the degree recommended by the coating

manufacturer for surfaces to be coated with epoxy enamel, except galvanized surfaces. Blast cleaning to at least SSPC-SP6 shall be used where recommended by the coating manufacturer, and may be used elsewhere at the option of Contractor, provided that no dust is permitted to settle on adjacent wet coating. Surface profile shall be at least 15 percent of the dry film thickness specified for the coating system.

G. Surface preparation of ferrous metal surfaces in immersion service shall consist of blast cleaning to at least SSPC-SP10 and the first application of coating shall be performed on the same day. If more surface area is prepared than can be coated in one day, the uncoated area shall be blast cleaned again to the satisfaction of Engineer. Surface profile shall be as recommended by coating manufacturer, but not less than 3.5 mils.

H. All flux residue shall be removed from joints in copper tubing. Immediately before coating is started, tubing shall be wiped with a clean rag soaked in xylol.

I. All wax and oil shall be removed from plastic surfaces that are to be coated, including PVC and FRP, by wiping with a solvent compatible with the specified coating.

J. Hardware items such as bolts, screws, washers, springs, and grease fittings need not be cleaned prior to coating if there is no evidence of dirt, corrosion, or foreign material.

K. When a coating system is required, remove all oil or deleterious substance with neutral detergent or emulsion cleaner or blast lightly with fine abrasive.

L. When a coating system is required, surface preparation shall conform to the coating manufacturer's recommendations.

M. Concrete surfaces must be at least 28 days old before painting. Prepare surfaces under SSPC-SP 13/NACE no. 6. Pressure rinse prepared surfaces before applying coating. Surfaces must be thoroughly dry at the time of painting.

3.03 MIXING AND THINNING

A. Coating shall be thoroughly mixed each time any is withdrawn from the container. Coating containers shall be kept tightly closed except while coating is being withdrawn.

B. Coating shall be factory mixed to proper consistency and viscosity for hot weather application without thinning. Thinning will be permitted only as necessary to obtain recommended coverage at lower application temperatures.

In no case shall the wet film thickness of applied coating be reduced, by addition of coating thinner or otherwise, below the thickness recommended by the coating manufacturer. Thinning shall be done in compliance with all applicable air quality regulations.

3.04 APPLICATION

A. Coating shall be applied in a neat manner that will produce an even film of uniform and proper thickness, with finished surfaces free of runs, sags, ridges, laps, and brush marks. Each coat shall be thoroughly dry and hard before the next coat is applied. Each coat shall be a different color, if available. In no case shall coating be applied at a rate of coverage greater than the maximum rate recommended by the coating manufacturer.

B. Coating failures will not be accepted and shall be entirely removed down to the substrate and the surface recoated. Failures include but are not limited to sags, checking, cracking, teardrops, fat edges, fisheyes, or delamination.

C. Priming

1. Edges, corners, crevices, welds, and bolts shall be given a brush coat (stripe coat) of primer before application of the primer coat. The stripe coat shall be applied by a brush and worked in both directions. Special attention shall be given to filling all crevices with coating.

2. Abraded and otherwise damaged portions of shop-applied coating shall be cleaned and recoated as recommended by the manufacturer of the finish coating. Welded seams and other uncoated surfaces, heads and nuts of field-installed bolts, and surfaces where coating has been damaged by heat shall be given a brush coat of the specified primer. Before the specified spot or touchup coating of metal surfaces, edges, corners, crevices, welds, and bolts in the area of the spot or touchup coating shall be given a brush coat of primer. This patch, spot, or touchup coating shall be completed, and the paint film shall be dry and hard, before additional coating is applied.

D. Epoxy Enamel

1. When used, epoxy enamel shall be applied in accordance with the coating manufacturer's recommendations, including temperature limitations and protection from sunlight until top-coated.

2. When applying high build epoxy coatings with a roller or brush and where a dry film thickness of at least 4-6 mils per coat is required, two or more coats shall be applied to achieve the recommended dry film thickness equal to a spray applied coating.

3. The total coating film thickness including intermediate coats and finish coat, shall be not less than the following:

Type of Coating	Minimum Dry Film Thickness
Epoxy Enamel	
Surfaces with first coat of epoxy enamel and final coat of aliphatic polyurethane.	7 mils.
Surfaces with first and second coat of epoxy enamel and final coat of aliphatic polyurethane	12 mils (10 mils DFT for epoxy plus 2 mils DFT for aliphatic polyurethane).
Other surfaces (two coats)	10 mils.
Immersion service (three coats)	15 mils.
Zinc, Epoxy, Polyurethane	
Surfaces with first coat of zinc, intermediate coat of epoxy, and final coat of aliphatic polyurethane	10 mils, 3 mils zinc, 5 mils epoxy, plus 2 mils for aliphatic polyurethane.
Other (one coat)	5 mils.
Other (two coats)	10 mils.

E. Weather Conditions

1. Coatings shall not be applied, except under shelter, during wet, damp, or foggy weather, or when windblown dust, dirt, debris, or insects will collect on freshly applied coating.

2. Coatings shall not be applied at temperatures lower than the minimum temperature recommended by the coating manufacturer, or to metal surfaces such as tanks or pipe containing cold water, regardless of the air temperature, when metal conditions are likely to cause condensation. When necessary for proper application, a temporary enclosure shall be erected and kept heated until the coating has fully cured.

3. Coatings shall not be applied at temperatures higher than the maximum temperature recommended by the coating manufacturer. Where coatings are applied during periods of elevated ambient temperatures, Contractor and the coatings manufacturer shall be jointly responsible to ensure that proper application is performed including adherence to all re-coat window requirements. Precautions shall be taken to reduce the temperature of the surface application, especially for metal, at elevated temperatures above 100°F including shading application area from direct sunlight, applying coating in the evening or at night, and ventilating the area to reduce the humidity and temperature.

3.05 REPAIRING FACTORY FINISHED SURFACES

A. Factory finished surfaces damaged prior to acceptance by Owner shall be spot primed and recoated with materials equivalent to the original coatings. If, in the opinion of Engineer, spot repair of the damaged area is not satisfactory, the entire surface or item shall be recoated.

3.06 PROTECTION OF SURFACES

A. Throughout the work, the Contractor shall use drop cloths, masking tape, and other suitable measures to protect adjacent surfaces. Contractor shall be responsible for correcting and repairing any damage resulting from its or its subcontractors' operations. Coatings spilled or spattered on adjacent surfaces which are not being coated at the time shall be immediately removed. Exposed concrete or masonry not specified to be coated which is damaged by coatings shall be either removed and rebuilt or, where authorized by Owner, coated with two coats of masonry coating.

3.07 FIELD QUALITY CONTROL

A. The following inspection and testing shall be performed: surface profile, visual inspection, spark testing, adhesion testing, and wet and dry film thickness testing. All inspection and testing shall be witnessed by Engineer.

B. The surface profile for ferrous metal surfaces shall be measured for compliance with the specified minimum profile. The surface profile for concrete shall comply with SSPC 13/NACE 6 Table 1 for severe service.

C. The surface of the protective coatings shall be visually inspected.

D. Coating film thickness shall be verified by measuring the film thickness of each coat as it is applied and the dry film thickness of the entire system. Wet film thickness shall be measured with a gauge that will measure the wet film thickness within an accuracy of ±0.5 mil. Dry film thickness shall be measured in accordance with SSPC-PA 2.

E. Coatings shall be spark tested by the coating manufacturer using an acceptable electrical spark tester set at the recommended voltage. Engineer shall observe the spark testing and shall verify the testing equipment is working properly before the spark testing of the coating is started. The electrode movement shall be continuous and shall proceed in a systematic manner that will cover 110 percent of the coated surface.

F. Spark testing for coatings on metal shall be done in accordance with ASTM D5162. Spark testing for coating on concrete shall be done in accordance with ASTM D4787. All detected holidays and pinholes shall be marked and repaired as recommended by the coating material manufacturer.

G. An adhesion test, when required, shall be conducted on a properly prepared and coated steel surface that is acceptable to the coating material manufacturer and Engineer. The test area shall be at least 2 square feet or larger to allow a minimum of three tests to be conducted. The test area shall be coated with the specified system and cured as recommended by the coating material manufacturer. Pull-off strength adhesion tests of the coating shall be conducted by the coating material manufacturer in accordance with ASTM D4541 using an Elcometer tensile adhesion tester. At least three adhesion tests shall be conducted and the results averaged. Adhesion strength shall equal or exceed the minimum adhesion strength recommended by the coating material manufacturer and shall exceed the tensile strength of the concrete.

If the coating fails the adhesion test, the cause of the failure shall be determined and corrected before reconducting the test.

3.08 FIELD PRIMING SCHEDULE

A. In general, steel and cast-iron surfaces of equipment are specified to be shop primed. Any such surfaces which have not been shop primed shall be field primed. Damaged or failed shop coatings which have been determined unsuitable by Engineer shall be removed and the surfaces shall be field coated, including prime coat (if any). Galvanized, aluminum, stainless steel, and insulated surfaces shall be field primed. Primers used for field priming, unless otherwise required for repair of shop primers, shall be:

Surface To Be Primed	Material
Equipment, surfaces to be coated with:	
Aliphatic polyurethane	Universal primer.
Epoxy enamel	Same as finish coats.
Steel and cast iron, surfaces to be coated with:	
Epoxy enamel	Same as finish coats or inorganic zinc.
Aluminum	Epoxy enamel.
Galvanized	Epoxy enamel.
Copper	Epoxy enamel.
Stainless steel	Epoxy enamel.
Plastic surfaces, including PVC and FRP	Same as finish coats.

Unless otherwise recommended by the coating manufacturer or specified herein, priming will not be required on metal surfaces specified to be coated with epoxy enamel.

3.09 FINISH COATING SYSTEMS

A. The following schedule lists coatings systems and coating system designations.

No.	Finish Coating Systems	Coating System Designation						
		A	C	E	F	G	H	P
1.	Epoxy enamel – One coat	x			x	x		
2.	Epoxy enamel – Two coats	x	x	x	x	x		x
3.	Epoxy enamel / NSF – Two coats		x	x				
4.	Epoxy enamel – Three coats	x	x	x				
5.	Epoxy enamel / NSF – Three coats	x	x	x				
6.	Epoxy enamel – First coat Aliphatic polyurethane – Finish coat	x	x	x	x	x		x
7.	Epoxy enamel – First and second coat Aliphatic polyurethane – Finish coat	x		x	x	x		
8.	Universal primer – First coat Aliphatic polyurethane – Finish coat	x		x				

B. Unless otherwise specified, the following surfaces shall be left uncoated:

1. Exposed aluminum;

2. Polished or finished stainless steel. Unfinished stainless steel, except flashings and counter flashings, shall be coated;

3. Galvanized surfaces, except piping, conduit, ductwork, and other items specifically noted;

4. Rubber and plastics, except as specified;

5. Exterior concrete; and

6. Surfaces specified to be factory finished.

C. Items to be shop finished include the following. Shop finishing shall be in accordance with the coating manufacturer's recommendations.

1. Other surfaces where blast cleaning cannot be or is not recommended to be performed in the field.

2. Other items as otherwise specified.

D. Items to be field coated include the following. Field coating shall be in accordance with the field priming schedule, the coating schedule, and the manufacturer's recommendations.

1. Surfaces not indicated to be shop finished and surfaces where blast cleaning can be performed in the field.

2. All interior ferrous metal surfaces except stainless steel.

3. Other items as otherwise specified.

3.10 METAL SURFACES COATING SCHEDULE

Surface To Be Coated	Finish Coating System
Non-galvanized and galvanized structural and miscellaneous steel exposed to view or to the elements in exterior locations.	A6
Unless otherwise specified, pumps, motors, speed reducers, and other machines and equipment exposed to view.	E8
Electrical equipment cabinets, and similar Items and equipment (unless factory finished) exposed to view.	E8
Steel yard lighting poles exposed to view or to the elements.	A8
Cast iron and steel piping inside vaults, including valves, fittings, flanges, bolts, supports, and accessories, and galvanized surfaces after proper priming.	A2
Ductile and cast Iron and steel piping above grade exposed to the elements and to view outdoors, including valves, fittings, flanges, bolts, supports, and accessories, and galvanized surfaces after proper priming.	A6
All metal surfaces, unless otherwise specified, which will be submerged or buried, all or in part, including valves, but excluding piping laid in the ground.	E4
Miscellaneous castings, including manhole rings and covers, and manhole steps. (One coat, if not shop coated.)	E2
Ductile and cast iron and steel piping in vaults, manholes, basins, and similar locations, including valves fittings, flanges, bolts, supports, and accessories.	A4

3.11 QUALITY ASSURANCE

A. The coating applicator and coating manufacturer shall review and approve in writing the coating manufacturer's written recommendations for the coating system and the intended service. Any variations from the specifications or the coating manufacturers published recommendations shall be submitted in writing and approved by the coating manufacturer. The coating manufacturer shall observe the surface preparation, mixing, and application of the coating systems and submit a written report of his observations and any additional recommendations.

SURFACE DESCRIPTION	**SYSTEM NO. -**

SURFACE PREPARATION DESCRIPTION	
☐ Solvent SSPC-SP1	
☐ Ferrous Metal Nonimmersion SSPC-SP6	☐ Ferrous Metal Immersion
☐ SSPC-SP10	☐ SSPC-SP-5
☐ Other	

COATING	**DFT mils [µm]**	**MANUFACTURER AND PRODUCT**
First Coat (Primer)		
Second Coat		
Third Coat		
Total System		Not less than minimum thickness specified.

Notes: (Attached if needed.)

Project:		
Coatings Manufacturer:		IInitials _____
Painting Applicator:		IInitials _____
SCVWD	COATING SYSTEM DATA SHEET	Fig 1

SHOP PRIMED SURFACE DESCRIPTION	SYSTEM NO. - -F

SURFACE PREPARATION DESCRIPTION
☐ Solvent SSPC-SP1 ☐ Other:

COATING	DFT mils [µm]	MANUFACTURER AND PRODUCT
Shop (Primer)		(Identify Product/Type)
Touchup		
Intermediate Coat		
Finish Coat		
Total System		Not less than minimum thickness specified.

Notes: (Attached if needed.)

Project:		
Coatings Manufacturer:		Initials _____
Painting Applicator:		Initials _____
SCVWD	COATING SYSTEM DATA SHEET	Fig 2

END OF ARTICLE

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APPENDIX A

Agreement
Payment Bond
Performance Bond
Instructions for Completing SBE Utilization Report
Sample Small/Micro Business Enterprises (SBE) Utilization Report
Escrow Agreement for Security Deposits in Lieu of Retention

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The following is an agreement entered into as of _____ by and between the SANTA CLARA VALLEY WATER DISTRICT, State of California, hereinafter referred to as "District" and _____, hereinafter referred to as "Contractor."

For the considerations hereinafter specified, Contractor and District agree as follows:

ARTICLE I: Work to Be Done and Documents Forming the Contract

Contractor agrees to do all the work and furnish all materials necessary to construct and complete, in accordance with the Specifications the following work:

[

Said work shall be performed to the satisfaction of the Engineer all in accordance with the Drawings, Specifications, Notice to Bidders, and the Proposal of the Contractor, all of which documents are hereby specially referred to and by such reference made a part of this Contract.

ARTICLE II: Contract Price

District hereby agrees and promises to pay to Contractor the sum of _____ Dollars ($_____).

For the performance of said work; provided, however, that the above mentioned sum is one determined by the Proposal of Contractor as based upon the estimated amount of work to be done, and should there be any variance between the estimated amount of work to be done and the actual amount of work performed, then the final payment price shall be computed on the basis of the unit prices contained in the Proposal of Contractor.

ARTICLE III: Completion of Contract

It is hereby agreed that the work called for under this Contract, in all its parts and requirements, shall be completed before the expiration of _____ calendar days from the First Chargeable Day of the Contract as stated on the Notice to Begin Work unless the time for completion is extended, as allowed by the Specifications.

ARTICLE IV: Bonds Required

This Contract shall have no force or effect whatsoever unless and until Contractor delivers to District a Payment Bond in the sum of _____ Dollars ($_____).

Nor shall such Contract be effective until Contractor also gives a good and sufficient bond in the sum of _____ Dollars ($_____) for the faithful performance of the work to be done under the terms of this Contract.

ARTICLE V: Certification by Contractor

Contractor hereby certifies as follows:

"I certify that I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for workers' compensation or to undertake self insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this Contract."

ARTICLE VI: Gift Policy Observance

Contractor hereby acknowledges that District policy prohibits the acceptance by District personnel of gifts of any kind from vendors or contractors. Contractor shall honor this policy by not sending or bringing gifts to the District.

IN WITNESS WHEREOF, Contractor and District have caused this Agreement to be subscribed as of the day and year first hereinabove written.

Date Contractor signature affixed:

_____

By _____

_____ Title _____

Federal I.D. "Contractor"

SANTA CLARA VALLEY WATER DISTRICT

Date District signature affixed: By _____

Chair/Board of Directors

_____

Payment Bond

BE IT KNOWN BY THESE PRESENTS:

WHEREAS, the Santa Clara Valley Water District (hereinafter called "the Public Entity"), and _____ (hereinafter designated as "Principal") have entered into an agreement for the _____ Project which said agreement is dated as of _____, 20_____; and

WHEREAS, said Principal is required by California Civil Code Sections 9550 and 9554 to furnish a bond in connection with said agreement;

NOW, THEREFORE, we, the Principal and _____, a corporation duly organized under the laws of the State of _____, having its principal place of business at _____ in the State of _____, and authorized to do business in the State of California, hereinafter "Surety," are held and firmly bound unto the Public Entity in the penal sum of _____ Dollars ($_____) lawful money of the United States of America for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, Administrators, and successors and assigns, jointly and severally, firmly by these presents.

1. THE CONDITION OF THIS OBLIGATION IS SUCH that if the Principal or the Principal's subcontractor fails to pay any of the persons named in Section 9100, or amounts due under the California Unemployment Insurance Code with respect to work or labor performed under the agreement, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal and the Principal's subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, that the Surety or Sureties will pay for the same, in an amount not exceeding the sum hereinabove specified, and also, in case suit is brought upon the bond, a reasonable attorney's fee, to be fixed by the court. The Principal may require of the Principal's subcontractors a bond to indemnify the Principal for any loss sustained by the Principal because of any default by the Principal's subcontractors under Section 9554 of the California Civil Code.
2. This bond shall inure to the benefit of any of the persons named in Section 9100 of the California Civil Code, so as to give a right of action to such persons or their assigns in any suit brought upon this bond.
3. Surety, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or to the Contract Documents accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the other portions of the Contract Documents.
4. Should the condition of this bond be fully performed, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.

IN WITNESS WHEREOF two identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety or Sureties above named on the _____ day of _____, 20_____.

PRINCIPAL:	**SURETY**:
_____	_____
Signature	Signature
_____	_____
Name	Name (Seal)
_____	_____
Title	Title
_____	_____
Address	Address

NOTE: Signatures of those executing for the Surety or Sureties must be properly acknowledged.

Performance Bond

BE IT KNOWN BY THESE PRESENTS: That

WHEREAS, the Santa Clara Valley Water District, State of California, has awarded to _____ _____ (hereinafter designated as "Principal") a Contract for , and

WHEREAS, said Principal is required under the terms of said Contract to furnish a bond for the faithful performance of said Contract,

NOW, THEREFORE, we, the Principal and _____ as Surety, are held and firmly bound unto the Santa Clara Valley Water District (hereinafter called "District") in the sum of _____ Dollars ($_____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the above bounden Principal, or heirs, executors, administrators, successors, or assigns shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said Contract and any alteration thereof made as therein provided, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless District, its officers, agents, and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

And the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any wise affect its obligation on this bond, and does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract or to the work or to the Specifications.

In the event suit is brought upon this bond by District and judgment is recovered, Surety shall pay all costs incurred by District in such suit, including a reasonable attorney's fee to be fixed by the Court.

IN WITNESS WHEREOF two identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by Principal and Surety above named, on the _____ day of _____, 20_____.

PRINCIPAL:	**SURETY**:
_____	_____
Signature	Signature
_____	_____
Name	Name (Seal)
_____	_____
Title	Title
_____	_____
Address	Address

NOTE: Signature of those executing for Surety must be properly acknowledged.

Instructions for Completing SBE Utilization Report

Download Excel form from District's website:
www.valleywater.org/Programs/Construction.aspx

This form is **due as noted below** with the **Progress Pay Application**.

1. **If the Prime Contractor is a Small Business Enterprise (SBE) Company—**
   Submit SBE Utilization Report with the First and Last Progress Pay Estimate
2. **If the Prime Contractor is not a SBE but SBE subcontractors will be working on the project—**
   Submit SBE Utilization Report monthly with each Progress Pay Application
3. **If the Prime Contractor is not a SBE and will have no SBE subcontractors working on the project—**
   No need to submit the SBE information at all

If Applicable (in Category 1 or 2 above)—The final SBE Utilization Report is due prior to final payment.

Instructions for completing the SBE Utilization Report

Page 1 Instructions:

a. This is the total amount of money paid to date by SCVWD for work completed on this Contract including retention.

b. This is the CURRENT Total Contract amount, including all executed change orders.

c. a ÷ b = c (Formula is built-in for line c of page 1)

d. Total of Column I from page 2 of SBE Utilization Report (Total is linked for line d of page 1)

e. Total of Column V from page 2 of SBE Utilization Report (Total is linked for line e of page 1)

f. e ÷ a = f (Formula is built-in for line f of page 1)

g. e ÷ d = g (Formula is built-in for line g of page 1)

Page 2 Instructions:

Column I. List $ amount of SBE participation to each Subcontractor or Supplier listed on Bid Form #4 of Bid Proposal. The total of this column is linked to line d of page 1.

Column II. List ***Adjusted*** $ amount of SBE participation to each Subcontrator or Supplier listed on Bid form #4 of Bid Proposal.

Column III. List Materials/Supplies/Trucking amount paid to each SBE.

Column IV. List Subcontractor amount paid to each SBE.

Column V. Column III plus Column IV. The total of this column is linked to line e of page 1.

SAMPLE Small/Micro Business Enterprises (SBE) Utilization Report

Santa Clara Valley Water District

CONTRACT DOCUMENTS

SMALL/MICRO BUSINESS ENTERPRISES (SBE) UTILIZATION REPORT

Page 1 of 2

☐ MONTHLY ☐ FINAL

CONTRACT NO.:	ORIGINAL BID AMOUNT:	FIRM (PRIME):
CONTRACT TITLE:		ADDRESS:
REPORT PERIOD:		CITY, STATE & ZIP CODE
		PHONE NO.:

a. Amount of Contract Completed (Including Retention Amount)........ $ ______

b. TOTAL Amount of Contract (Including all change orders)........ $ ______

c. % of Contract Completed........ ______ %

d. SBE Participation Amount (Column I of page 2)........ $ ______

e. SBE Work Paid to Date (Column V of page 2)........ $ ______

f. SBE % of Contract Completed........ ______ %

g. % of SBE Participation Completed........ ______ %

Advertised Contract Goal: $ ______

When Contract progress is 50% or more complete, and if SBE participation % complete (h) is less than the total % of Contract completion, Contractor must submit a report to SCVWD on how it will achieve SBE participation % by completion of Contract.*

NAME & TITLE OF PERSON COMPLETING THIS FORM (PLEASE PRINT OR TYPE):

SIGNATURE: FORM COMPLETION DATE:

THIS FORM IS NOT TO BE ALTERED IN ANY WAY.
ALTERED FORMS WILL BE REJECTED AS NONCOMPLIANT.

***SBE must be certified or accepted as certified by Department of General Services.**

(Rev. 01/16/15)
WP File Name

PROJECT NAME

Santa Clara Valley Water District

CONTRACT DOCUMENTS

SMALL/MICRO BUSINESS ENTERPRISES (SBE) UTILIZATION REPORT

Page 2 of 2

List ALL SBE* PARTICIPATION SUBCONTRACTORS/ SUPPLIERS/TRUCKERS (From Bid Form #4--Bid Proposal)	AMOUNT OF SUBCONTRACT OR PURCHASE (From Bid Form #4--Bid Proposal) (I)	ADJUSTED AMOUNT OF SUBCONTRACT OR PURCHASE (After Initial Bid Proposal) (II)	MATERIALS/SUPPLIES/TRUCKING			SUBCONTRACTORS			TOTAL PAID TO DATE (V)	ITEM NUMBER(S) OR GENERAL DESCRIPTION OF WORK PERFORMED THIS PERIOD (Electrical, landscape, engineering, survey, etc.)
			PAID PREVIOUSLY	PAID THIS PERIOD	PAID TO DATE (III)	PAID PREVIOUSLY	PAID THIS PERIOD	PAID TO DATE (IV)		
ABC Co.										
TOTAL	$								$	

THIS FORM IS NOT TO BE ALTERED IN ANY WAY.
ALTERED FORMS WILL BE REJECTED AS NONCOMPLIANT.
***SBE must be certified or accepted as certified by Department of General Services.**

(Rev. 01/16/15)
WP File Name

PROJECT NAME

Download Excel form from District's website: www.valleywater.org/Programs/Construction.aspx

Escrow Account No.: _____

This Escrow Agreement is made and entered into by and between:

SANTA CLARA VALLEY WATER DISTRICT whose address is 5750 Almaden Expressway, San Jose, CA 95118 hereinafter called "**Owner**," and

_____ whose address is _____ hereinafter called "**Contractor**," and

_____ whose address is _____ hereinafter called "**Escrow Agent**," and

For the consideration hereinafter set forth, the Owner, Contractor, and Escrow Agent agree as follows:

1. Pursuant to §22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for] in the amount of $_____ dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the retention earnings directly to the Escrow Agent. When the Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within 10 days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of **Santa Clara Valley Water District**, and shall designate the Contractor as the beneficial owner.

2. The Owner shall make progress payments to the Contractor for those funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

3. When the Owner makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until the time that the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.

6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from the Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

7. The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven days' written notice to the Escrow Agent from the owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

8. Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.

9. Escrow Agent shall rely on the written notifications from the Owner and the Contractor pursuant to Sections (5) to (8), inclusive, of this Agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

11. Throughout the term of this Escrow Agreement, the Escrow Agent herein agrees to provide monthly statements indicating the account balances and status of the account, directly to the Owner, the Santa Clara Valley Water District, at the address provided below, to the attention of the District's representative identified below. The Escrow Agent may submit a request to provide such statements in electronic format.

12. The Escrow Agent must provide written notice to the Owner in advance of any action that will negatively impact the account.

On behalf of Owner:

Signature Date

Name
Capital Program Deputy Operating Officer
Designated Engineer

Title

5750 Almaden Expressway
San Jose, CA 95118

Address

On behalf of Contractor:

Signature Date

Name

Title

Address

On behalf of Escrow Agent:

Signature Date

Name

Title

Address

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

OWNER:

Signature Date

Name
Capital Program Deputy Operating Officer
Designated Engineer

Title

5750 Almaden Expressway
San Jose, CA 95118

Address

CONTRACTOR:

Signature Date

Name

Title

Address

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APPENDIX B

Contractor Safety Qualifications Packet
Rescue Training Certification Form
Imported Materials Certification Form

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Downloaded or printed copies are for reference only. Verify this is the current version prior to use. See the District website for released version.

COMPANY DATA

1. **Company Name**: _____

   Subsidiary/Division of: _____

   Local Address: _____

   Headquarters Address: _____
   (If different from local)

2. **Contact Name/Title**: _____

   Telephone No.: _____

   Email Address: _____

   FAX No.: _____

   Local Address: _____

3. **Form of Company Ownership**: ☐ Sole Proprietorship

   ☐ Partnership

   ☐ Corporation State: _____

   Date Company Established: _____

   Name or Names Company Has Previously Operated Under:

4. **Total No. of Employees:** _____

COMPANY HISTORY

1. **Job History with Santa Clara Valley Water District (Give date and brief description for past three years):**

2. Please provide references for your last three jobs of similar type and scope as the work proposed by Santa Clara Valley Water District:

	COMPANY	CONTACT	PHONE NO.
1)			
2)			
3)			

Briefly describe the type and scope of work performed:

1) _____

2) _____

3) _____

WORK TO BE PERFORMED

1. Briefly describe the type and scope of work to be performed:

1) _____

2) _____

3) _____

2. Identify any hazardous work activities to be performed by your employees and subcontractors:

Will workers conduct any hazardous work activities, including activities listed below? ☐Yes ☐No		Will workers be potentially disturbing any asbestos, lead/cadmium containing materials? ☐Yes ☐No			
Aerial/man lift device s?	☐Yes	Chainsaw or weed abatement?	☐Yes	Chemical (bulk haz.chem) delivery?	☐Yes
Confined space entry?	☐Yes	Crane or rigging?	☐Yes	Demolition activities?	☐Yes
Diving operations?	☐Yes	Drilling (soil)?	☐Yes	Electrical or LOTO?	☐Yes
Excavation, Trenching, Shoring?	☐Yes	Fall protection hazards?	☐Yes	Heavy equip/ powered industrial veh?	☐Yes
Hot work?	☐Yes	Scaffolding?	☐Yes	Traffic control?	☐Yes
Record all other hazardous work activities:					

3. Identify work location(s): _____

4. Identify SCVWD Project Manager: _____

5. Identify expected start and end dates: _____

SECTION A. WORKERS' COMPENSATION INSURANCE—EXPERIENCE MODIFICATION RATE (EMR)

1. Please obtain from your insurance agent/broker/carrier your intrastate EMRs for the last three rating periods. If you do not have an intrastate rating, obtain your interstate EMRs. Then complete the following data and check the appropriate box for intrastate or interstate EMR.

	POLICY YEAR	MODIFICATION RATE
Current EMR		
1 Year Ago		
2 Years Ago		
Rating Type: ☐ Intrastate ☐ Interstate		
By initialing here, I certify that this company does not have an EMR: _____ (You must submit a copy of your company's Loss Runs for the last three years if your company does not have an EMR.)		
Is your company self-insured for Workers' Compensation Claims? ☐ Yes. If yes, please attach a copy of the latest Annual Report to the State of California Department of Industrial Relations and/or State of California Certificate of Self-Insurance. ☐ No		

2. Anniversary Rating Date: _____ **Rating Bureau File No.**: _____

3. Name of Your Company's Workers' Compensation Carrier: _____

SECTION B. OSHA/LOST WORKDAY INCIDENCE RATES

To answer the following questions, utilize data obtained from your company's OSHA 300 "Log and Summary of Occupational Injuries and Illnesses," or Workers' Compensation Loss Run (if your company has 10 or fewer employees).

ALL COMPANIES HAVE DATA TO REPORT, AND MUST COMPLETE THIS SECTION.

1. **Record your Industry Comparison Information number (NAICS Code)**: _____
(The North American Industry Classification System [NAICS] has replaced the U.S. Standard Industrial Classification [SIC] system.) **Provide data only for the years identified below.** **http://www.naics.com/search.htm**

2. **What was your company-wide OSHA Total Case Incident Rate* (recordable cases)?**

YEAR	NO. OF CASES	CO. HOURS ***	RATE
2016			
2017			
2018			

3. **What was your company-wide Lost Workday Case Incidence Rate** (recordable cases with lost workdays or restricted duty)?**

YEAR	NO. OF CASES	CO. HOURS ***	RATE
2016			
2017			
2018			

INFORMATION TO AID IN COMPLETING SECTION B. 2 AND 3:

* OSHA Total Case Incidence Rate = $\frac{\text{Total No. of Recordable Cases x 200,000}}{\text{Company Man-Hours}}$

** Lost Workday Case Incidence Rate: = $\frac{\text{No. of Lost Workday Cases x 200,000}}{\text{Company Man-Hours}}$

*** Co. Hours = Hours worked by all employees on the Company payroll in the applicable calendar year.

- Do not use the number of lost workdays in these three calculations.
- Rates are not a "%," nor should the number be similar to "0.00024."
- To verify your calculations for a given year, check your math as follows:
Lost Workday Case Rate + No Lost Workday Case Rate = Total Case Incidence Rate

SECTION C. OSHA CITATION (VIOLATION) HISTORY

Has your company received any "serious," "willful," "repeat," or "failure to abate" OSHA violations (citations) within the past sixty (60) months, beginning immediately prior to submittal of this questionnaire? This question ***includes*** such citations if they have been appealed or contested, but have not yet been resolved. If yes, check "Yes" below and submit copies of all citations and descriptions of abatement actions, your company Injury and Illness Prevention Program and Code of Safe Practices, ***and*** your OSHA 300 Log and Summaries for each of the last three years. Provide a completed OSHA form 160 or 161 for each citation identified. Please indicate if these citations are currently being appealed or contested.

☐ Yes. If yes, list total number of citations (violations) by type per year in the table below.
☐ No.

YEAR	SERIOUS	WILLFUL	REPEAT	FAILURE TO ABATE	TOTAL

SECTION D. SAFETY POLICIES AND PROCEDURES (18 QUESTIONS)

NO.	QUESTIONS	YES	NO	NA	POINTS
1.	Injury and Illness Prevention Program. Does your company have an effective, written Injury and Illness Prevention Program (IIPP) in accordance with 8CCR §1509 and §3203? [LC §6401.7]	☐	☐	☐	20
2.	Does your company have a safety policy statement endorsed by top management? [LC §6401]	☐	☐	☐	2
3.	Does your on-site safety representative have sufficient authority to implement changes and implement corrective action? [LC §6401.7(a)(7)]	☐	☐	☐	2
4.	Does your company have a disciplinary action program that includes provisions for acting on safety and health issues of your employees (and subcontractors, if applicable), and is the program enforced? [LC §6401.7(a)(6)]	☐	☐	☐	2
5.	Does your company have a safety incentive program effective in reducing occupational injuries and illnesses? [8 CCR §3203(a)(2)]	☐	☐	☐	2
6.	Do your company safety and health policies, procedures, and subcontract agreements address minimum safety requirements in accordance with OSHA and Owner requirements for suppliers, and vendors and subcontractors? [LC §6401.7(h)]	☐	☐	☐	4
7.	Does your company have a comprehensive Hazard Communication Program that (a) details locations for Safety Data Sheets (SDS) and (b) contains provisions for multi-employer job sites? [8 CCR §5194]	☐	☐	☐	10
8.	Do you conduct ongoing job site safety and health inspections, and are the inspection records kept on file and available for review? [LC §6401.7(A)(2)]	☐	☐	☐	12
9.	Are the inspection records and written evidence that safety and health concerns have been reviewed and corrective action taken maintained and available for review? [LC§6401.7(b) and (D)]	☐	☐	☐	4
10.	Safety Reviews/Hazard Analysis. Are all critical (hazardous) job activities identified and Job Safety Analysis' (JSA, a.k.a. Job Hazard Analysis, or JHA) conducted by your company (and subcontractors, if applicable)? [LC§6401.7(A)(5)]	☐	☐	☐	6
11.	Are the procedures for critical (hazardous) job activities written and reviewed with all employees (including subcontractor employees)? [LC 6401.7(a)(5)]	☐	☐	☐	2

NO.	QUESTIONS	YES	NO	NA	POINTS
12.	Accident/Incident Investigation and Analysis. Does your company have a written accident/incident investigation procedure in which: (a) all accidents/incidents (including those of subcontractors, if applicable) are investigated to determine their root cause, and (b) corrective action is taken by site supervision and management, and (c) written investigation and corrective action records are available for review? [8CCR §3203(a)(5) and (b)]	☐	☐	☐	4
13.	Are reports completed for "near miss" incidents that might have caused serious injury, property, or equipment damage? [LC §6403(b)]	☐	☐	☐	2
14.	Emergency Response. Does your company have a comprehensive written emergency response plan (i.e., fire, toxic spills, bomb threats, natural disasters, crowd and traffic control, and media relations) for job sites; and do all employees (including subcontractor employees, if applicable) receive project-specific emergency response training? [8 CCR §3220(a) and (e)]	☐	☐	☐	4
15.	Substance Abuse Control Program. Does your company have a written Substance Abuse Program? [LC §6403]	☐	☐	☐	2
16.	Do you require your subcontractors of all tiers to have a Substance Abuse Program? [LC §6403]	☐	☐	☐	2
17.	Employee Training. Does your company ensure that all employees (including subcontractor employees) are trained in accordance with your company's written training plan, and (a) are competent to perform the work required, and (b) that job tasks requiring specific training and/or certification are performed by employees having the appropriate training documentation and certificates, and the documentation is maintained and available for review? [LC §6401.7(c) and (d)]	☐	☐	☐	10
18.	Is documentation on file and available for review to verify that training and safety meetings for your company (and subcontractors, if applicable) have been completed? [LC §6401.7(c) and 8CCR §1509(e)]	☐	☐	☐	10
Q#	Explain why answers were checked No or NA.			**Total Points**	

CONTRACTOR CERTIFICATION STATEMENT

NOTE: The Santa Clara Valley Water District reserves the right to request any and all documentation necessary to verify responses submitted in Sections A, B, C, and D of this Contractor Safety Qualification Packet.

I certify that the information contained herein is true and correct to the best of my knowledge and that no attempt has been made to give false, omissive, or misleading information. I further certify that I shall comply with the safety qualification requirements for any and all subcontractors my company shall employ for any Santa Clara Valley Water District project and I certify under penalty of perjury under the laws of the State of California that these subcontractors meet the safety standards and all other Santa Clara Valley Water District requirements prior to contracting with them for use on any Santa Clara Valley Water District project.

If sending the document via e-mail, fill in the “Printed/Typed” line with the name of the authorized agent for the company. The document is considered signed and valid if transmitted via the signatories e-mail address.

Signed: _____

Printed/Typed: _____

Title: _____

Date: _____

Santa Clara Valley Water District

Enter Company Name Here

RESCUE TRAINING CERTIFICATION

FC 1767 (01-31-14)

Contractor shall ensure that all its employees working in or supporting work in a confined space have received all training mandated by Cal-OSHA and meet other Cal-OSHA requirements related to such work.

All employees of the Contractor or subcontractor performing rescue services must have received previous training in **(1)** Atmospheric monitoring and ventilation; **(2)** Communication; **(3)** Emergency, self-rescue, and non-entry rescue operations; **(4)** Permit system; **(5)** Signs; **(6)** First aid and CPR; **(7)** Lockout/tagout; **(8)** Fall protection; **(9)** Electrical safety; and **(10)** Respirator protection.

Rescue services training must have been performed consistent with established industry standards (ANSI Z117.1, Safety Requirements for Confined Spaces, American National Standards Institute and Cal/OSHA regulations). All trained employees must have practiced making permit required confined space rescues at least once every twelve months by means of simulated rescue operations in which they remove dummies, mannequins, or actual persons from actual permit spaces or from representative permit spaces. "Representative permit spaces" must, with respect to opening size, configuration and accessibility, simulate the types of permit spaces from which a rescue could be performed. Such training shall have taken place no more than twelve months before the work to be performed on this Project begins.

With regard to employees of Contractor or any subcontractor performing rescue services, prior to the start of work, Contractor shall submit for review and acceptance by the District all of the following information in the spaces designated below: a certification with the respective employee's name, the name(s) of the trainers, the dates of training, the dates of all rescue practice sessions, and brief descriptions of the rescue practice sessions. Copies of all written materials provided during the training courses or rescue practice sessions shall be attached to this form. **Prior to entry, the Contractor shall post copies of such certifications (without their attachments) at the worksite where rescue services are to be provided.**

PREPARED BY _____ PHONE NO. _____ E-MAIL ADDRESS _____

	EMPLOYEE'S NAME	DATE OF LAST INCLUSIVE TRAINING **(1, 2, 3, 4, 5, 6, 7, 8, 9, 10)**	DATE OF LAST PRACTICE RESCUE SESSION (ANNUAL)	TRAINER NAME/COMPANY		DESCRIPTION OF THE RESCUE PRACTICE SESSION (BRIEF)	COPIES OF ALL WRITTEN MATERIAL PROVIDED DURING THE TRAINING COURSES OR RESCUE PRACTICE SESSIONS
1							☐ Yes ☐ No
2							☐ Yes ☐ No
3							☐ Yes ☐ No
4							☐ Yes ☐ No
5							☐ Yes ☐ No
6							☐ Yes ☐ No
7							☐ Yes ☐ No
8							☐ Yes ☐ No
9							☐ Yes ☐ No
10							☐ Yes ☐ No

I Certify that the information provided is true and correct:

SIGNATURE _____ PRINT NAME _____ TITLE _____

DATE PREPARED _____ COMPANY ADDRESS _____

Import Material Certification

Project Name and Location _____

Contract or Permit Number _____

Contractor's Name and Address
Subcontractor's Address (if applicable)

_____
(Contact) (Phone Number)

_____
(Street Address)

_____
(City) (State) (Zip Code)

Original Source of the Subject Material*
(e.g., excavation of building foundation, excavation of Hwy., etc.)

_____

_____

Original Owner of the Subject Material

_____
(Contact) (Phone Number)

_____
(Street Address)

_____
(City) (State) (Zip Code)

How Material is to be Used on Project*
(e.g., backfill, temporary ramp, levee, etc.)

_____

_____

Material Placement or Location of use on Project*

Project Station: _____Elev._____
To
Project Station: _____Elev._____

I hereby certify that the material identified above is not contaminated with regulated materials. I further certify that if the material is determined to be contaminated with regulated materials that I will immediately and diligently: remove all contaminated material and dispose of it in accordance with all applicable laws, ordinances and regulations; conduct necessary sampling and monitoring to verify that all contaminated material has been removed; and verify to the satisfaction of Valley Water and/or appropriate regulatory agencies that any surrounding areas, materials, soils or waters have not been impacted by the contaminated materials. I will conduct these removal and sampling activities at my sole expense without any costs to the Valley Water. I further declare that I am authorized to execute this certification.

I declare under penalty of perjury that the foregoing is true and correct. Executed this _____day of _____at _____(City), _____(State).

_____ _____
(Authorized Signature) (Date)

_____ _____
(Printed Name) (Title)

*Use additional sheets if necessary. Reference the applicable item being extended on the additional page.

APPENDIX C

Pipeline Discharge Forms
Solid Materials Management Report Form
Notice of Temporary Discharge

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State Drinking Water System Discharges General Permit
Planned Discharge to Storm Drain/Receiving Water Monitoring Form for Raw Water

- **IF TURBIDITY READING IS ABOVE 100 NTU, IMPLEMENT BMPs & CORRECTIVE ACTIONS**

- **IF WATER IS DISCHARGED INTO STORM DRAIN/RECEIVING WATER ABOVE 100 NTU, NOTIFY:**
  - **ON-SITE OR DEWATERING LEAD @ XXX-XXX-XXXX**
  - **PROJECT ENGINEER @ XXX-XXX-XXXX**

Project/Pipeline Name: _____

Monitoring Location/Stationing Number: _____

Reason for Sampling: _____

Equipment Name + Serial #: _____

Monitor for pH, temperature, turbidity and dissolved oxygen of the raw water discharge per the sampling intervals as follows:

Discharge Event	Total # Samples	Timing	Discharge Event	Total # Samples	Timing	Discharge Event	Total # Samples	Timing
< 20 minutes	1	1 sample during first 10 min	20 – 60 minutes	2	1st sample during first 10 min; 2nd sample during last 10 min.	> 60 minutes	Depending on length of discharge	1st sample during first 10 min; 2nd sample during next 50 min; continue sampling every 60 min; last sample during last 10 min.

Date	Time	Initials	pH		Temperature (°F)		Turbidity (NTU)		Dissolved Oxygen (%)		Comments
			U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S	

U/S = Upstream; D/S = Downstream; °F = degrees Fahrenheit; NTU = Nephelometric Turbidity Unit; % = percent saturation.

State Drinking Water System Discharges General Permit
Planned Discharge to Storm Drain/Receiving Water Monitoring Form for Raw Water

- **IF TURBIDITY READING IS ABOVE 100 NTU, IMPLEMENT BMPs & CORRECTIVE ACTIONS**

- **IF WATER IS DISCHARGED INTO STORM DRAIN/RECEIVING WATER ABOVE 100 NTU, NOTIFY:**
  - **ON-SITE OR DEWATERING LEAD @ XXX-XXX-XXXX**
  - **PROJECT ENGINEER @ XXX-XXX-XXXX**

Date	Time	Initials	pH		Temperature (°F)		Turbidity (NTU)		Dissolved Oxygen (%)		Comments
			U/S	D/S	U/S	D/S	U/S	D/S	U/S	D/S	

U/S = Upstream; D/S = Downstream; °F = degrees Fahrenheit; NTU = Nephelometric Turbidity Unit; % = percent saturation.

State Drinking Water System Discharges General Permit
Planned Discharge Type and BMPs Form

Project/Pipeline Name: _____

Fill out this form to keep track of discharge types and BMPs

Date	Initial	Monitoring Location/ Stationing Number	Discharge Type (Check all that apply)					Distance to Receiving Waterbody	Duration	Flow Rate	Volume	Implemented BMPs & Corrective Actions*
			Superchlorinated?	Vol ≥ 325,850 gal?	Well Develop./ Rehab?	Annual Rep. Monitoring Location?	Directly into/ within 300 ft of receiving water?	(FEET)	(MINUTES)	(GPM)	(GALLONS)	

*Corrective Actions should be taken if monitoring indicates:

- Turbidity ≥ 100 NTU
- Chlorine Residual ≥ 0.1 mg/L

Santa Clara Valley Water District

SOLID MATERIALS MANAGEMENT REPORT

FC 1810 (07-21-16)

Project Name:		Project Number:	
Contract Number:	Reporting period (month and year): From: To:		
Contractor Name:		Phone Number:	FAX Number:
Street Address:	City, State, and Zip:		
Preparer's Name (please print):	Signature:		Date:

A. Construction and Demolition Waste Management Report

Note 1: Earth and rock material, ground water, and construction and demolition waste material that contains contaminated or hazardous materials shall not be reported as either waste material diverted from or disposed to landfill. See specifications for project-specific list of construction and demolition waste materials.

Note 2: Contractor to attach facility receipts for loads taken for disposal in landfill and loads taken for recovery/recycling.

Note 3: If no minimum diversion rate is specified, contractor has the option of reporting material quantity by weight (ton) or volume (cubic yard).

Name and Address of Recycling or Disposal Facility	Type of Material Enter letter as follows: A = asphalt C = concrete M = metal D = mixed debris W = wood/cleared vegetation O = other (described) **See Note 1.**	Type of Activity Enter number as follows: 1 = source-separated materials recycling 2 = on-site reuse 3 = mixed debris recycling 4 = reuse of salvageable items 5 = disposal at landfill or transfer station 6 = other (described)	Quantity of Material Taken to Landfill (ton) **See Notes 2 and 3.**	Quantity of Material Diverted From Landfill (ton) **See Notes 2 and 3.**	Total Material Generated (ton) **See Note 3.**	Material Diversion Rate (%)

Total Quantity Taken to Landfill (ton)				
Total Quantity Diverted from Landfill (ton)				
Total Material Generated (ton)				
Total Material Diversion Rate (%)				

B. Post-Consumer Recycled Content Report

Note 1: Contractor to attach documentation certifying % of post-consumer recycled material content

Material/Product Description	Manufacturer (Name, Address, and Phone Number)	Post-Consumer Recycled Content Required per Contract (%)	Certified Post-Consumer Recycled Content (%) **See Note 1.**
Specification writer to list material/equipment specified to be furnished/installed which must contain a minimum specified percentage of post-consumer recycled material	*(Contractor to complete)*	*Specification writer to list, for each material/product, the minimum % content of post-consumer recycled material*	*(Contractor to complete)*

Contractor Certification: I certify under penalty of perjury that the information provided in this form is complete and accurate.

SIGNATURE:	DATE OF REPORT:
PRINT NAME AND TITLE:	

I have reviewed the information submitted in this report for completeness.

ENGINEER SIGNATURE:	DATE:
PRINT NAME:	

NOTICE OF TEMPORARY DISCHARGE

Santa Clara Valley Water District

for Water Utility Operation & Maintenance activities

Facility Name (origination of discharge): _____

Location of discharge: _____

Facility discharging to: _____

Name of person responsible for reporting/monitoring:_____

Type of water being discharged:

☐ Raw Water ☐ Treated water (dechlorinated) ☐ Ground water

Volume of water being / to be discharged:_____ gallons

Date of discharge: _____

Time discharge began / will begin:_____am/pm

Time discharge ended / will end: _____am/pm

Flow rate: _____cfs

BMPs to be implemented during discharge (check & list all that apply):

☐ Erosion control (list BMPs): _____

☐ Sediment control (list BMPs): _____

☐ Turbidity monitoring (attach monitoring sheet) ☐ Dechlorination (attach monitoring sheet)

Explanation of discharge, discharge location, BMPs to be implemented, monitoring, etc:

_____

_____

_____

_____

_____

_____

_____

_____

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APPENDIX D

Best Management Practices and Mitigation Measures
California Department Fish and Wildlife 1602 Lake Streambed Alternation Agreement
SWRCB Notice of Applicability
Central Pipeline VHP Conditions, MMRPs, and BMPs
Central Pipeline Figure 7 Impact Areas

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BEST MANAGEMENT PRACTICES HANDBOOK

SANTA CLARA VALLEY WATER DISTRICT COMPREHENSIVE LIST

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Table 1 - Santa Clara Valley Water District Comprehensive BMP List 6

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Purpose

The Best Management Practices Handbook (Handbook) provides a list of Santa Clara Valley Water District (District) Best Management Practices (BMPs), intended to be incorporated into projects or activities. It aids in accomplishment of the stewardship component of the District Ends Policies by incorporating the basic principle of avoiding or minimizing the potential to impact the environment negatively in projects and activities.

Process

The Handbook is a controlled ISO document. It is a technical guidance document (W751M01) under ISO 14001 Environmental Management System Environmental Planning Q520D01 designed to ensure that the District meets its responsibilities under the California Environmental Quality Act (CEQA).[1] Work Instruction *W520M03 Section 3 – Mitigation, Monitoring and Reporting Programs* describes the standard policies for environmental review process used to apply these BMPs to projects and activities, consistent with CEQA Guidelines §15097(e).

The handbook is an electronic repository of information that allows staff to access and incorporate standardized BMPs, as/if appropriate, into CEQA documents efficiently, BMPs are incorporated into project design or activity implementation during an analytical process to identify and avoid or minimize project impacts for a particular project. They can be included as a component of the project description for projects at all levels of review, including categorical and/or statutory exemptions. The BMPs are selected by an Environmental Planner, with assistance from other project team members, (including Biologists, as well as design-, construction-, and maintenance engineers), to identify the appropriate BMPs for the proposed work activities. Thus, they only become official for the project after the CEQA document for that project has been certified or approved.

For projects or activities where implementation of BMPs would not suffice to avoid or minimize the impacts to a level below that of significance, a higher level of environmental evaluation would be required, leading to a higher level of documentation (e.g., MND or EIR). In instances where a project requires additional avoidance or minimization measures not included in this handbook, such practices and/or measures would be evaluated appropriately during the environmental review process and incorporated as project-specific mitigation measures and, potentially, be incorporated in a future revision of the Handbook.

Organization

For ease in application, the BMPs have been organized into the standard environmental factors found in the Initial Study Checklist, which is consistent with the CEQA Guidelines.[2] This supports the 'activities and impacts matrix' (AIM) approach contained in *W520M03 Section 3 – Mitigation, Monitoring and Reporting Program.* Generally, these practices are either structural treatments (e.g., devices) or non-structural behaviors, methods, actions, procedures, or other management practices that have been shown to avoid or minimize potential adverse environmental effects.

The Handbook also includes sets of BMPs grouped together to address more commonly conducted activities such as bank protection; storm water management; discharge activities; grading and excavation; pesticide use; sediment removal and storage; vegetation management; and, well and exploratory boring construction-, modification-, and destruction operations. These '*BMP Suites*' make it easier for environmental planners to include the applicable BMPs consistently in a project's environmental document. When using a set of activity-based BMPs, individual practices should be reviewed to ensure its applicability.

[1] Public Resources Code Section 21000 *et seq.*
[2] Title 14 Code of Regulations Section 15000 *et seq.* Appendix G

Limitations

Under no circumstances should the entire contents of the Handbook be included as supporting information in an Initial Determination Memorandum (IDM), or in a project's design (i.e., plans and specifications) to circumvent an analysis of impacts from project activities. The consideration of the suitability of *individual* BMPs, to avoid or minimize the significance of impacts, is central to the environmental review process.

Furthermore, since BMPs are District standard operating procedures, and are not project-specific, they are not mitigations and are not to be used as a substitute for proper environmental evaluation and mitigation.

The BMPs reflect how the District currently conducts business. They are updated as new methods or industry standards are identified that provide an opportunity to further improve upon our practice of environmental stewardship, while maintaining a high level of service to the public. Thus, these BMPs are a guideline and not a substitute for analytical decision-making on how to avoid and minimize impacts.

QEMS Elements

Reference Documents:

See page 32 for a listing of both external and internal references

Requirements:

ISO 9001

7.5.1 Control of Production and Service Provision

ISO 14001

4.4.6 Operational Control

Quality Records:

None

Change History:

DATE	REVISION	COMMENTS
11/2006	A	Converted Watershed QEMS WW75109 into W751M01
1/2009	B	BMP updated
03/22/10	C	The Process Owner was changed from Debra Caldon to Jennifer Castillo
08/31/10	D	Stakeholder working group (WG) made some final changes including: Bill Smith, David Dunlap, Jamie McLeod and Janell Hillman and Jennifer Castillo. Prior to the WG, the document was sent for review by biologists, environmental planners and vegetation specialists.
01/24/11	E	Added QEMS Elements (Reference documents, Requirements, Quality Records. Added references to CEQA, Q520D01, & Q751D02 on last page. Changed BI-7 Avoid Secondary Poisoning from Rodenticide Use to inspect on a weekly basis instead of the fifth day.
01/08/14	F	Updated BMPs based on updated Stream Maintenance Program and other standard practices incorporated into District projects and activities.
9/15/14	G	Removed BMPs BI-3, -8, -10, -11; CU-2; WQ-4, -7, -8, -11, -14, -17, -18; NO-1, -2; and TR-2 from version F of Handbook. Modified BMPs BI-6 and CU-1 from version F of Handbook. Revised document number to the new QEMS numbering convention (previously identified as W751M01)

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Table 1 - Comprehensive BMP List

BMP #	BMP Name	
Air Quality		
AQ-1	Use Dust Control Measures	
AQ-2	Avoid Stockpiling Odorous Materials	
Biological Resources		
BI-1	Avoid Relocating Mitten Crabs	
BI-2	Minimize Impacts to Steelhead	
BI-3	Remove Temporary Fills	
BI-4	Minimize Adverse Effects of Pesticides on Non-target Species	
BI-5	Avoid Impacts to Nesting Migratory Birds	
BI-6	Avoid Impacts to Nesting Migratory Birds from Pending Construction	
BI-7	Minimize Impacts to Vegetation from Survey Work	
BI-8	Choose Local Ecotypes Of Native Plants and Appropriate Erosion-Control Seed Mixes	
BI-9	Restore Riffle/Pool Configuration of Channel Bottom	
BI-10	Avoid Animal Entry and Entrapment	
BI-11	Minimize Predator-Attraction	
Cultural Resources		
CU-1	Accidental Discovery of Archaeological Artifacts or Burial Finds	
Hazards & Hazardous Materials		
HM-1	Comply with All Pesticide Application Restrictions and Policies	
HM-2	Minimize Use of Pesticides	
HM-3	Post Areas Where Pesticides Will Be Used	
HM-4	Comply with All Pesticide Usage Requirements	
HM-5	Comply with Restrictions on Herbicide Use in Upland Areas	
HM-6	Comply with Restrictions on Herbicide Use in Aquatic Areas	
HM-7	Restrict Vehicle and Equipment Cleaning to Appropriate Locations	
HM-8	Ensure Proper Vehicle and Equipment Fueling and Maintenance	
HM-9	Ensure Proper Hazardous Materials Management	
HM-10	Utilize Spill Prevention Measures	
HM-11	Ensure Worker Safety in Areas with High Mercury Levels	
HM-12	Incorporate Fire Prevention Measures	
HM-13	Avoid Impacts from Naturally Occurring Asbestos	
Hydrology/Water Quality		
WQ-1	Conduct Work from Top of Bank	
WQ-2	Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms	
WQ-3	Limit Impact of Pump and Generator Operation and Maintenance	
WQ-4	Limit Impacts From Staging and Stockpiling Materials	
WQ-5	Stabilize Construction Entrances and Exits	
WQ-6	Limit Impact of Concrete Near Waterways	
WQ-7	Isolate Work in Tidal Areas With Use of Coffer Dam	
WQ-8	Minimize Hardscape in Bank Protection Design	
WQ-9	Use Seeding for Erosion Control, Weed Suppression, and Site Improvement	
WQ-10	Prevent Scour Downstream of Sediment Removal	
WQ-11	Maintain Clean Conditions at Work Sites	
WQ-12	Manage Well or Exploratory Boring Materials	
WQ-13	Protect Groundwater from Contaminates Via Wells or Exploratory Borings	
WQ-14	Backfill Completed Exploratory Borings	
WQ-15	Prevent Water Pollution	
WQ-16	Prevent Stormwater Pollution	
WQ-17	Manage Sanitary and Septic Waste	

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Table 1 - Comprehensive BMP List

BMP #	BMP Name	
Transportation/Traffic		
TR-1	Use Suitable Public Safety Measures	

Table 2
Santa Clara Valley Water District
BMP Suite List

BMP Suite
Bank Protection BMP Suite
Stormwater Management BMP Suite
Discharge Activities BMP Suite
Grading and Excavation BMP Suite
Sediment Removal and Storage BMP Suite
Vegetation Management and Removal BMP Suite
Well and Exploratory Boring Construction, Modification, or Destruction BMP Suite

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Air Quality

AQ-1 **Use Dust Control Measures**	The following Bay Area Air Quality Management District (BAAQMD) Dust Control Measures will be implemented: 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day; 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered; 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited; 4. Water used to wash the various exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, etc.) will not be allowed to enter waterways; 5. All vehicle speeds on unpaved roads shall be limited to 15 mph; 6. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used; 7. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations), and this requirement shall be clearly communicated to construction workers (such as verbiage in contracts and clear signage at all access points); 8. All construction equipment shall be maintained and properly tuned in accordance with manufacturer‘s specifications, and all equipment shall be checked by a certified visible emissions evaluator; 9. Correct tire inflation shall be maintained in accordance with manufacturer‘s specifications on wheeled equipment and vehicles to prevent excessive rolling resistance; and, 10. Post a publicly visible sign with a telephone number and contact person at the lead agency to address dust complaints; any complaints shall be responded to and take corrective action within 48 hours. In addition, a BAAQMD telephone number with any applicable regulations will be included.
AQ-2 **Avoid Stockpiling Odorous Materials**	Materials with decaying organic material, or other potentially odorous materials, will be handled in a manner that avoids impacting residential areas and other sensitive receptors, including: 1. Avoid stockpiling potentially odorous materials within 1,000 feet of residential areas or other odor sensitive land uses; and 2. Odorous stockpiles will be disposed of at an appropriate landfill.

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Biological Resources

BMPs for biological resources are designed to minimize impacts to sensitive resources, including special status and listed species, and sensitive natural communities and habitats. Sensitive species and habitats may be directly or indirectly affected by project activities such as excavation, fill, vegetation management including pruning or removal, alteration of hydrological regime, etc. Impacts to species and natural communities are regulated by agencies such as the California Department of Fish and Wildlife (CDFW), the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and the Bay Conservation and Development Commission, as well as corresponding laws such as the State and Federal Endangered Species Acts, the Migratory Bird Treaty Act, the Clean Water Act, the Fish and Game Code, the Native Plant Protection Act, and the California Environmental Quality Act. In addition, the California Native Plant Society publishes a rarity listing status for plants that is used by CDFW and is required for review under CEQA.

BI-1 **Avoid Relocating Mitten Crabs**	Sediment potentially containing Chinese Mitten Crabs will not be transported between San Francisco Bay Watersheds and Monterey Bay Watersheds, specifically: 1. Sediment removed from the San Francisco Bay watersheds will not be transported south of Coyote Creek Golf Drive in south San Jose, and the intersection of McKean and Casa Loma Roads; and, 2. Earth moving equipment used in the San Francisco Bay watershed will be cleaned before being moved to, and used in, the Pajaro Watershed.
BI-2 **Minimize Impacts to Steelhead**	Minimize potential impacts to salmonids by avoiding routine use of vehicles and equipment in salmonid streams between January 1 and June 15.
BI-3 **Remove Temporary Fill**	Temporary fill materials, such as for diversion structures or cofferdams, will be removed upon finishing the work or as appropriate. The creek channels and banks will be re-contoured to match pre-construction conditions to the extent possible. Low-flow channels within non-tidal streams will be contoured to facilitate fish passage and will emulate the preconstruction conditions as closely as possible, within the finished channel topography.
BI-4 **Minimize Adverse Effects of Pesticides on Non-target Species**	"Pesticides" refers to any herbicide, insecticide, rodenticide, algaecide, fungicide, or any combination of substances intended to prevent, destroy, or repel any pest. Pesticides will be handled, stored, transported, and used in compliance with any established directions and in a manner that minimizes negative environmental effects on non-target species and sensitive habitats. The proposed project plan for handling, storing, transporting and using pesticides must be reviewed and approved by <u>both</u> of the following subject matter experts: 1. District's Pest Control Advisor (a State-certified Qualified Applicator) – the plan will be reviewed, and modified as deemed appropriate, for compliance with: District policy, label restrictions and any advisories published by the California Department of Pesticide Regulation, the Santa Clara County Division of Agriculture, and the U.S. EPA bulletin *Protecting Endangered Species, Interim Measures for Use of Pesticides in Santa Clara County* (USEPA 2000). 2. Qualified District Biologist (as defined in EMAP-30264) – the plan will be reviewed,

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Biological Resources

	and modified as deemed appropriate, for compliance with: District policy, approved environmental review documents, project permits, and avoidance of all known listed (Threatened or Endangered) and sensitive species. Information sources for determination of all known locations of species that may be harmed by pesticides include the District's GIS system and California Natural Diversity Database (CNDDB). Either the District's Pest Control Advisor or the Qualified District Biologist may modify the proposed pesticide plan, such as establishing buffer areas or prohibiting the use of pesticides outright, based on site-specific data, current regulatory requirements, and District policy. The purchase of all pesticides must be approved by the District's Pest Control Advisor to ensure compliance with the District's *Control and Oversight of Pesticide Use* policy and appropriate regulatory agency reporting requirements.
BI-5 **Avoid Impacts to Nesting Migratory Birds**	Nesting birds are protected by state and federal laws. The District will protect nesting birds and their nests from abandonment, loss, damage, or destruction. Nesting bird surveys will be performed by a qualified biologist prior to any activity that could result in the abandonment, loss, damage, or destruction of birds, bird nests, or nesting migratory birds. Inactive bird nests may be removed with the exception of raptor nests. Birds, nests with eggs, or nests with hatchlings will be left undisturbed.
BI-6 **Avoid Impacts to Nesting Migratory Birds from Pending Construction**	Nesting exclusion devices may be installed to prevent potential establishment or occurrence of nests in areas where construction activities would occur. All nesting exclusion devices will be maintained throughout the nesting season or until completion of work in an area makes the devices unnecessary. All exclusion devices will be removed and disposed of when work in the area is complete.
BI-7 **Minimize Impacts to Vegetation from Survey Work**	Survey cross-sections will be moved, within acceptable tolerances, to avoid cutting dense riparian vegetation and minimize cutting of woody vegetation, taking advantage of natural breaks in foliage. If the cross-section cannot be moved within the established acceptable tolerances to avoid impacts to dense riparian or woody vegetation, the survey section will be abandoned.
BI-8 **Choose Local Ecotypes Of Native Plants and Appropriate Erosion-Control Seed Mixes**	Whenever native species are prescribed for installation the following steps will be taken by a qualified biologist or vegetation specialist: 1. Evaluate whether the plant species currently grows wild in Santa Clara County; and, 2. If so, the qualified biologist or vegetation specialist will determine if any need to be local natives, i.e. grown from propagules collected in the same or adjacent watershed, and as close to the project site as feasible. Also, consult a qualified biologist or vegetation specialist to determine which seeding option is ecologically appropriate and effective, specifically: 1. For areas that are disturbed, an erosion control seed mix may be used consistent with the SCVWD *Guidelines and Standards for Land Use Near Streams, Design Guide 5, 'Temporary Erosion Control Options.'*

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Biological Resources

	2. In areas with remnant native plants, the qualified biologist or vegetation specialist may choose an abiotic application instead, such as an erosion control blanket or seedless hydro-mulch and tackifier to facilitate passive revegetation of local native species. 3. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable. 4. If a gravel or wood mulch has been used to prevent soil compaction, this material may be left in place [if ecologically appropriate] instead of seeding. Seed selection shall be ecologically appropriate as determined by a qualified biologist, per *Guidelines and Standards for Land Use Near Streams, Design Guide 2: Use of Local Native Species*.
BI-9 **Restore Riffle/Pool Configuration of Channel Bottom**	The channel bottom shall be re-graded at the end of the work project to as close to original conditions as possible. In salmonid streams, restore pool and riffle configurations to emulate pre-project instream conditions, taking into account channel morphological features (i.e. slope), which affects riffle/pool sequence.
BI-10 **Avoid Animal Entry and Entrapment**	All pipes, hoses, or similar structures less than 12 inches diameter will be closed or covered to prevent animal entry. All construction pipes, culverts, or similar structures, greater than 2-inches diameter, stored at a construction site overnight, will be inspected thoroughly for wildlife by a qualified biologist or properly trained construction personnel before the pipe is buried, capped, used, or moved. If inspection indicates presence of sensitive or state- or federally-listed species inside stored materials or equipment, work on those materials will cease until a qualified biologist determines the appropriate course of action. To prevent entrapment of animals, all excavations, steep-walled holes or trenches more than 6-inches deep will be secured against animal entry at the close of each day. Any of the following measures may be employed, depending on the size of the hole and method feasibility: 1. Hole to be securely covered (no gaps) with plywood, or similar materials, at the close of each working day, or any time the opening will be left unattended for more than one hour; or 2. In the absence of covers, the excavation will be provided with escape ramps constructed of earth or untreated wood, sloped no steeper than 2:1, and located no farther than 15 feet apart; or 3. In situations where escape ramps are infeasible, the hole or trench will be surrounded by filter fabric fencing or a similar barrier with the bottom edge buried to prevent entry.

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Biological Resources

BI-11 **Minimize Predator-Attraction**	Remove trash daily from the worksite to avoid attracting potential predators to the site.

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Cultural Resources

CU-1 **Accidental Discovery of Archaeological Artifacts or Burial Remains**	If historical or unique archaeological artifacts are accidentally discovered during construction, work in affected areas will be restricted or stopped until proper protocols are met. Work at the location of the find will halt immediately within 30 feet of the find. A “no work” zone shall be established utilizing appropriate flagging to delineate the boundary of this zone. A Consulting Archaeologist will visit the discovery site as soon as practicable for identification and evaluation pursuant to Section 21083.2 of the Public Resources Code and Section 15126.4 of the California Code of Regulations. If the archaeologist determines that the artifact is not significant, construction may resume. If the archaeologist determines that the artifact is significant, the archaeologist will determine if the artifact can be avoided and, if so, will detail avoidance procedures. If the artifact cannot be avoided, the archaeologist will develop within 48 hours an Action Plan which will include provisions to minimize impacts and, if required, a Data Recovery Plan for recovery of artifacts in accordance with Public Resources Code Section 21083.2 and Section 15126.4 of the CEQA Guidelines. If burial finds are accidentally discovered during construction, work in affected areas will be restricted or stopped until proper protocols are met. Upon discovering any burial site as evidenced by human skeletal remains, the County Coroner will be immediately notified and the field crew supervisor shall take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent. No further excavation or disturbance within 30 feet of the site or any nearby area reasonably suspected to overlie adjacent remains may be made except as authorized by the County Coroner, California Native American Heritage Commission, and/or the County Coordinator of Indian Affairs.

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Hazards & Hazardous Materials

The District's projects and operations often require exposure to, and the use of, potentially hazardous materials. The BMPs listed in this section reflect the District's standard procedures for their handling and use. Pesticides are one tool for pest control on district properties and facilities. The most common pesticide use is herbicide application to manage vegetation. Insecticides and rodenticides are used infrequently and in small quantities. All BMPs associated with pesticide use comply with, Q751D02, *Control and Oversight of Pesticide Use***.** ISO document **Q751D02** defines District policies and procedures for pesticide use and reporting. The policies and procedures specified therein apply to all District-owned or operated facilities, as well as to pesticide use by staff, contractors, permittees, and suppliers. It is the District policy to minimize the environmental risk, and exposure, resulting from its pesticide use, by employing alternatives to the maximum extent practicable. To assure avoidance and minimization of impacts from the use of pesticides, all proposed pesticide applications must be reviewed by the District's Pest Control Adviser, who is responsible for coordinating, reviewing, tracking, documenting and reporting pest control practices at the District.

HM-1 **Comply with All Pesticide Application Restrictions and Policies**	Pesticide products are to be used only after an assessment has been made regarding environmental, economic, and public health aspects of each of the alternatives by the District's Pest Control Advisor (PCA). All pesticide use will be consistent with approved product specifications. Applications will be made by, or under the direct supervision of, State Certified applicators under the direction of, or in a manner approved by the PCA. Refer to Q751D02, *Control and Oversight of Pesticide Use*.
HM-2 **Minimize Use of Pesticides**	In all cases, where some form of pest control is deemed necessary by the PCA; evaluate alternative pest control methods and pesticides. Refer to Q751D02: *Control and Oversight of Pesticide Use*.
HM-3 **Post Areas Where Pesticides Will Be Used**	Posting of areas where pesticides are to be used shall be performed in compliance with Q751D02: *Control and Oversight of Pesticide Use.* Posting shall be performed in compliance with the label requirements of the product being applied. In addition, the District shall provide posting for **any** products applied in areas used by the public for recreational purposes, and areas readily accessible to the public, regardless of whether the label requires such notification (the posting method may be modified to avoid destruction of bait stations or scattering of rodenticide), including: 1. Sign postings shall notify staff and the general public of the date and time of application; the product's active ingredients, and common name; and, the time of allowable re-entry into the treated area. 2. A District staff contact phone number shall be posted on the sign. 3. Signs shall not be removed until after the end of the specified re-entry interval. 4. Right-to-know literature on the product shall be made available upon request to anyone in the area. 5. Notification will take into account neighbors with specific needs prior to treatment of an adjacent area to ensure such needs are met. Such requests are maintained by the District under Q751D02.

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Hazards & Hazardous Materials

HM-4 **Comply with All Pesticide Usage Requirements**	All projects that propose ongoing use of pesticides will comply with all provisions of Q751D02: *Control and Oversight of Pesticide Use*, including, but not necessarily limited to the following: 1. All pest control methods will be performed only after a written Pest Control Recommendation for use has been prepared by the District's PCA in accordance with requirements of the California Food and Agricultural Code. 2. F751D01 – *Pest Control Recommendation & Spray Operators Report* will be completed for each pesticide application.
HM-5 **Comply with Restrictions on Herbicide Use in Upland Areas**	Consistent with provisions of Q751D02: *Control and Oversight of Pesticide Use,* application of pre emergence (residual) herbicides to upland areas will not be made within 72 hours of predicted significant rainfall. Predicted significant rainfall for the purposes of this BMP will be described as local rainfall greater than 0.5 inch in a 24-hour period with greater than a 50% probability of precipitation according to the National Weather Service.
HM-6 **Comply with Restrictions on Herbicide Use in Aquatic Areas**	Consistent with provisions of Q751D02: *Control and Oversight of Pesticide Use,* only herbicides and surfactants registered for aquatic use will be applied within the banks of channels within 20 feet of any water present. Furthermore, aquatic herbicide use will be limited to June 15th through October 31st with an extension through December 31 or until the first occurrence of any of the following conditions; whichever happens first: 1. local rainfall greater than 0.5 inches is forecasted within a 24-hour period from planned application events according to the National Weather Service; or 2. when steelhead begin upmigrating and spawning in the 14 steelhead creeks, as determined by a qualified biologist (typically in November/December). If rain is forecast then application of aquatic herbicide will be rescheduled.
HM-7 **Restrict Vehicle and Equipment Cleaning to Appropriate Locations**	Vehicles and equipment may be washed only at approved areas. No washing of vehicles or equipment will occur at job sites.

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Hazards & Hazardous Materials

HM-8 **Ensure Proper Vehicle and Equipment Fueling and Maintenance**	No fueling or servicing will be done in a waterway or immediate flood plain, unless equipment stationed in these locations is not readily relocated (i.e., pumps, generators). 1. For stationary equipment that must be fueled or serviced on-site, containment will be provided in such a manner that any accidental spill will not be able to come in direct contact with soil, surface water, or the storm drainage system. 2. All fueling or servicing done at the job site will provide containment to the degree that any spill will be unable to enter any waterway or damage riparian vegetation. 3. All vehicles and equipment will be kept clean. Excessive build-up of oil and grease will be prevented. 4. All equipment used in the creek channel will be inspected for leaks each day prior to initiation of work. Maintenance, repairs, or other necessary actions will be taken to prevent or repair leaks, prior to use. 5. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location will be done in a channel or flood plain.
HM-9 **Ensure Proper Hazardous Materials Management**	Measures will be implemented to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means. 1. Prior to entering the work site, all field personnel will know how to respond when toxic materials are discovered. 2. Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage. 3. Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials will not contact soil and not be allowed to enter surface waters or the storm drainage system. 4. All toxic materials, including waste disposal containers, will be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. 5. Quantities of toxic materials, such as equipment fuels and lubricants, will be stored with secondary containment that is capable of containing 110% of the primary container(s). 6. The discharge of any hazardous or non-hazardous waste as defined in Division 2, Subdivision 1, Chapter 2 of the California Code of Regulations will be conducted in accordance with applicable State and federal regulations. 7. In the event of any hazardous material emergencies or spills, personnel will call the Chemical Emergencies/Spills Hotline at 1-800-510-5151.

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Hazards & Hazardous Materials

HM-10 **Utilize Spill Prevention Measures**	Prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water following these measures: 1. Field personnel will be appropriately trained in spill prevention, hazardous material control, and clean up of accidental spills; 2. Equipment and materials for cleanup of spills will be available on site, and spills and leaks will be cleaned up immediately and disposed of according to applicable regulatory requirements; 3. Field personnel will ensure that hazardous materials are properly handled and natural resources are protected by all reasonable means; 4. Spill prevention kits will always be in close proximity when using hazardous materials (e.g., at crew trucks and other logical locations), and all field personnel will be advised of these locations; and, 5. The work site will be routinely inspected to verify that spill prevention and response measures are properly implemented and maintained.
HM-11 **Ensure Worker Safety in Areas with High Mercury Levels**	To ensure worker safety is protected in areas with elevated mercury concentrations in exposed surfaces, personal protective equipment will be required during project construction to maintain exposure below levels established by the California Division of Occupational Safety and Health (Cal/OSHA).
HM-12 **Incorporate Fire Prevention Measures**	1. All earthmoving and portable equipment with internal combustion engines will be equipped with spark arrestors. 2. During the high fire danger period (April 1–December 1), work crews will have appropriate fire suppression equipment available at the work site. 3. An extinguisher shall be available at the project site at all times when welding or other repair activities that can generate sparks (such as metal grinding) is occurring. 4. Smoking shall be prohibited except in designated staging areas and at least 20 feet from any combustible chemicals or vegetation.
HM-13 **Avoid Impacts from Naturally Occurring Asbestos**	The District will comply with and implement BAAQMD dust control measures and notification requirements when working in serpentine soils.

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Hydrology/Water Quality

The District's projects and operations often pose situations that warrant standard measures to avoid or minimize impacts to water quality. As of this Handbook revision (G), the following best management practices represent measures currently used by the District; however, since many of these measures are based on industry standards for stormwater management maintained by the California Stormwater Quality Association (**CASQA**), the selection of appropriate BMPs from this list **must be verified** by comparison with the most current standards found on the CASQA website.

WQ-1 **Conduct Work from Top of Bank**	For work activities that will occur in the channel, work will be conducted from the top of the bank if access is available and there are flows in the channel.
WQ-2 **Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms**	Field personnel will use the appropriate equipment for the job that minimizes disturbance to the stream bottom. Appropriately tired vehicles, either tracked or wheeled, will be used depending on the situation. Tracked vehicles (bulldozers, loaders) may cause scarification. Wheeled vehicles may cause compaction. Heavy equipment will not operate in the live stream.
WQ-3 **Limit Impact of Pump and Generator Operation and Maintenance**	Pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species. 1. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dry-back or washout conditions. 2. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding. 3. Pump intakes will be screened to prevent uptake of fish and other vertebrates. Pumps in steelhead creeks will be screened according to NMFS criteria. 4. Sufficient back-up pumps and generators will be onsite to replace defective or damaged pumps and generators.
WQ-4 **Limit Impacts From Staging and Stockpiling Materials**	1. To protect on-site vegetation and water quality, staging areas should occur on access roads, surface streets, or other disturbed areas that are already compacted and only support ruderal vegetation. Similarly, all equipment and materials (e.g., road rock and project spoil) will be contained within the existing service roads, paved roads, or other pre-determined staging areas. 2. Building materials and other project-related materials, including chemicals and sediment, will not be stockpiled or stored where they could spill into water bodies or storm drains. 3. No runoff from the staging areas may be allowed to enter water ways, including the creek channel or storm drains, without being subjected to adequate filtration (e.g., vegetated buffer, swale, hay wattles or bales, silt screens). 4. The discharge of decant water to water ways from any on-site temporary sediment stockpile or storage areas is prohibited. 5. During the wet season, no stockpiled soils will remain exposed, unless surrounded by properly installed and maintained silt fencing or other means of erosion control.

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Hydrology/Water Quality

	During the dry season; exposed, dry stockpiles will be watered, enclosed, covered, or sprayed with non-toxic soil stabilizers.
WQ-5 **Stabilize Construction Entrances and Exits**	Measures will be implemented to minimize soil from being tracked onto streets near work sites: 1. Methods used to prevent mud from being tracked out of work sites onto roadways include installing a layer of geotextile mat, followed by a 4-inch thick layer of 1 to 3-inch diameter gravel on unsurfaced access roads. 2. Access will be provided as close to the work area as possible, using existing ramps where available and planning work site access so as to minimize disturbance to the water body bed and banks, and the surrounding land uses.
WQ-6 **Limit Impact of Concrete Near Waterways**	Concrete that has not been cured is alkaline and can increase the pH of the water; fresh concrete will be isolated until it no longer poses a threat to water quality using the following appropriate measures: 1. Wet sacked concrete will be excluded from the wetted channel for a period of four weeks after installation. During that time, the wet sacked concrete will be kept moist (such as covering with wet carpet) and runoff from the wet sacked concrete will not be allowed to enter a live stream. 2. Poured concrete will be excluded from the wetted channel for a period of four weeks after it is poured. During that time, the poured concrete will be kept moist, and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry. 3. Dry sacked concrete will not be used in any channel. 4. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles.

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Hydrology/Water Quality

WQ-7 **Isolate Work in Tidal Areas With Use of Coffer Dam**	For work in tidal areas, It is preferable to isolate one side of the channel with a cofferdam and allow flows to continue on the other side of the creek. If downstream flows cannot be diverted around the project site, the creek waters will be transmitted around the site through cofferdam bypass pipes. By isolating the work area from tidal flows, water quality impacts are minimized. 1. Installation of coffer dams will begin at low tide. 2. Waters discharged through tidal coffer dam bypass pipes will not exceed 10 percent in areas where natural turbidity is greater than 50 NTU over the background levels of the tidal waters into which they are discharged. 3. Coffer dams in tidal areas may be made from earthen or gravel material. If earth is used, the downstream and upstream faces will be covered by a protected covering (e.g., plastic or fabric) and anchored to minimize erosion. 4. Cofferdams and bypass pipes will be removed as soon as possible but no more than 72 hours after work is completed. Flows will be restored at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat.
WQ-8 **Minimize Hardscape in Bank Protection Design**	Bank repair techniques appropriate to a given site based on hydraulic and other site conditions will be selected. 1. Biotechnical repair methods include construction with living materials; willow wattling; erosion control blankets; brush matting; and, installation of root wads and boulders in banks. 2. The repair will be designed and installed so that it will be self-sustaining and use vegetation that adds structural integrity to the stream bank.
WQ-9 **Use Seeding for Erosion Control, Weed Suppression, and Site Improvement**	Disturbed areas shall be seeded with native seed as soon as is appropriate after activities are complete. An erosion control seed mix will be applied to exposed soils down to the ordinary high water mark in streams. 1. The seed mix should consist of California native grasses, (for example *Hordeum brachyantherum*; *Elymus glaucus*; and annual *Vulpia microstachyes*) or annual, sterile hybrid seed mix (e.g., *Regreen*™, a wheat x wheatgrass hybrid). 2. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable, or have other appropriate erosion control measures in place.
WQ-10 **Prevent Scour Downstream of Sediment Removal**	After sediment removal, the channel will be graded so that the transition between the existing channel both upstream and downstream of the work area is smooth, and continuous between the maintained and non-maintained areas, and does not present a sudden vertical transition (wall of sediment) or other blockage that could erode once flows are restored to the channel.

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Hydrology/Water Quality

WQ-11 **Maintain Clean Conditions at Work Sites**	The work site, areas adjacent to the work site, and access roads will be maintained in an orderly condition, free and clear from debris and discarded materials on a daily basis. Personnel will not sweep, grade, or flush surplus materials, rubbish, debris, or dust into storm drains or waterways. For activities that last more than one day, materials or equipment left on the site overnight will be stored as inconspicuously as possible, and will be neatly arranged. Any materials and equipment left on the site overnight will be stored to avoid erosion, leaks, or other potential impacts to water quality Upon completion of work, all building materials, debris, unused materials, concrete forms, and other construction-related materials will be removed from the work site.

WQ-12

Manage Well or Exploratory Boring Materials	All materials or waters generated during drilling, well or exploratory boring construction, well development, pump testing, or other activities associated with wells or exploratory borings, will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case will these materials and/or waters be allowed to enter, or potentially enter, on- or off-site storm sewers, dry wells, or waterways. Such materials/waters must not be allowed to move off the property where the work is being completed.
WQ-13 **Protect Groundwater from Contaminates Via Wells or Exploratory Borings**	Any substances or materials that may degrade groundwater quality will not be allowed to enter any well or boring. Lubricants used on drill bits, drill pipe, or tremie pipe will not be comprised of oily or greasy substances or other materials that may degrade groundwater quality. Well openings or entrances will be sealed or secured in such a way as to prevent the introduction of contaminants.
WQ-14 **Backfill Completed Exploratory Borings**	All borings should be backfilled within 24 hours of termination of testing. Borings will not be left in such a condition as to allow for the introduction of surface waters or foreign materials into them. Borings will be secured such that they do not endanger public health. All borings must be properly destroyed by backfilling with acceptable sealing materials. Acceptable sealing materials are: 1. 27 sack neat cement (four 94-pound bags/55-gallon drum), 2. 10 sack cement sand grout, or 3. hydrated high solids 20 percent bentonite slurry. No soil cuttings may be used for backfilling boreholes. No bentonite chips or pellets may be used to backfill borings. Free fall of sealing material will not be allowed if greater than 30 feet or if more than 3 feet of standing water exists in borehole. A tremie pipe must be used to place the cement sealing material if exploratory boring is over 30 feet deep or if more than 3 feet of standing water exists in borehole. Exploratory borings located in Geologic Setting Zone 4 (bedrock) may be backfilled with borehole cuttings from total depth of the boring up to a depth of 50 feet from the surface grade. The top 50 feet of the borehole must

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	be backfilled with above described sealing materials.
WQ-15 **Prevent Water Pollution**	Oily, greasy, or sediment laden substances or other material that originate from the project operations and may degrade the quality of surface water or adversely affect aquatic life, fish, or wildlife will not be allowed to enter, or be placed where they may later enter, any waterway. The project will not increase the turbidity of any watercourse flowing past the construction site by taking all necessary precautions to limit the increase in turbidity as follows: 1. where natural turbidity is between 0 and 50 Nephelometric Turbidity Units (NTU), increases will not exceed 5 percent; 2. where natural turbidity is greater than 50 NTU, increases will not exceed 10 percent; 3. where the receiving water body is a dry creek bed or storm drain, waters in excess of 50 NTU will not be discharged from the project. Water turbidity changes will be monitored. The discharge water measurements will be made at the point where the discharge water exits the water control system for tidal sites and 100 feet downstream of the discharge point for non-tidal sites. Natural watercourse turbidity measurements will be made in the receiving water 100 feet upstream of the discharge site. Natural watercourse turbidity measurements will be made prior to initiation of project discharges, preferably at least 2 days prior to commencement of operations.
WQ-16 **Prevent Stormwater Pollution**	To prevent stormwater pollution, the applicable measures from the following list will be implemented: 1. Soils exposed due to project activities will be seeded and stabilized using hydroseeding, straw placement, mulching, and/or erosion control fabric. These measures will be implemented such that the site is stabilized and water quality protected prior to significant rainfall. In creeks, the channel bed and areas below the Ordinary High Water Mark are exempt from this BMP. 2. The preference for erosion control fabrics will be to consist of natural fibers; however, steeper slopes and areas that are highly erodible may require more structured erosion control methods. No non-porous fabric will be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff, but only if there are no indications that special-status species would be impacted by the application. 3. Erosion control measures will be installed according to manufacturer's specifications. 4. To prevent stormwater pollution, the appropriate measures from, but not limited to, the following list will be implemented: • Silt Fences • Straw Bale Barriers • Brush or Rock Filters • Storm Drain Inlet Protection • Sediment Traps or Sediment Basins • Erosion Control Blankets and/or Mats

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	• Soil Stabilization (i.e. tackified straw with seed, jute or geotextile blankets, etc.) • Straw mulch. 5. All temporary construction-related erosion control methods shall be removed at the completion of the project (e.g. silt fences). 6. Surface barrier applications installed as a method of animal conflict management, such as chain link fencing, woven geotextiles, and other similar materials, will be installed no longer than 300 feet, with at least an equal amount of open area prior to another linear installation.
WQ-17 **Manage Sanitary and Septic Waste**	Temporary sanitary facilities will be located on jobs that last multiple days, in compliance with California Division of Occupational Safety and Health (Cal/OSHA) regulation 8 California Code of Regulations 1526. All temporary sanitary facilities will be located where overflow or spillage will not enter a watercourse directly (overbank) or indirectly (through a storm drain).

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Transportation/Traffic

TR-1 **Incorporate Public Safety Measures**	Fences, barriers, lights, flagging, guards, and signs will be installed as determined appropriate by the public agency having jurisdiction, to give adequate warning to the public of the construction and of any dangerous condition to be encountered as a result thereof.

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Bank Protection BMP Suite

AQ-1 Use Dust Control Measures
BI-1 Avoid Relocating Mitten Crabs
BI-2 Minimize Impacts to Steelhead
BI-3 Remove Temporary Fills
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
CU-1 Accidental Discovery of Archaeological Artifacts or Burial Finds
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-11 Ensure Worker Safety in Areas with High Mercury Levels
HM-12 Incorporate Fire Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-3 Limit Impact of Pump and Generator Operation and Maintenance
WQ-4 Limit Impacts from Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-6 Limit Impact of Concrete Near Waterways
WQ-7 Isolate Work in Tidal Areas with Use of Coffer Dam
WQ-8 Minimize Hardscape in Bank Protection Design
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement
WQ-10 Prevent Scour Downstream of Sediment Removal
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

Stormwater Management BMP Suite

AQ-1 Use Dust Control Measures
BI-3 Remove Temporary Fills
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-3 Limit Impact of Pump and Generator Operation and Maintenance
WQ-4 Limit Impacts From Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-6 Limit Impact of Concrete Near Waterways
WQ-7 Isolate Work in Tidal Areas with Use of Coffer Dam
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement
WQ-10 Prevent Scour Downstream of Sediment Removal
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste

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Discharge Activities BMP Suite

BI-2 Minimize Impacts to Steelhead
BI-5 Avoid Impacts to Nesting Migratory Birds
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
WQ-3 Limit Impact of Pump and Generator Operation and Maintenance
WQ-5 Stabilize Construction Entrances and Exits
WQ-7 Isolate Work in Tidal Areas With Use of Coffer Dam
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

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Grading and Excavation BMP Suite

AQ-1 Use Dust Control Measures
AQ-2 Avoid Stockpiling Odorous Materials
BI-2 Minimize Impacts to Steelhead
BI-3 Remove Temporary Fills
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
CU-1 Accidental Discovery of Archaeological Artifacts or Burial Finds
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-11 Ensure Worker Safety in Areas with High Mercury Levels
HM-12 Incorporate Fire Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-4 Limit Impacts From Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-7 Isolate Work in Tidal Areas With Use of Coffer Dam
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

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Sediment Removal and Storage BMP Suite

AQ-1 Use Dust Control Measures
AQ-2 Avoid Stockpiling Potentially Odorous Materials
BI-1 Avoid Relocating Mitten Crabs
BI-2 Minimize Impacts to Steelhead
BI-3 Remove Temporary Fills
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-11 Ensure Worker Safety in Areas with High Mercury Levels
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-3 Limit Impact of Pump and Generator Operation and Maintenance
WQ-4 Limit Impacts from Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-7 Isolate Work in Tidal Areas with Use of Coffer Dam
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement
WQ-10 Prevent Scour Downstream of Sediment Removal
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

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Vegetation Management and Removal BMP Suite

BI-2 Minimize Impacts to Steelhead
BI-4 Minimize Adverse Effects of Pesticides on Non-target Species
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
BI-7 Minimize Impacts to Vegetation from Survey Work
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-5 Stabilize Construction Entrances and Exits
WQ-8 Minimize Hardscape in Bank Protection Design
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement e
WQ-11 Maintain Clean Conditions at Work Sites
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

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Well and Exploratory Boring Construction, Modification, or Destruction BMP Suite

AQ-1 Use Dust Control Measures
BI-5 Avoid Impacts to Nesting Migratory Birds
HM-9 Clean Vehicles and Equipment
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-12 Incorporate Fire Prevention Measures
WQ-4 Limit Impacts from Staging and Stockpiling Materials
WQ-11 Maintain Clean Conditions at Work Sites
WQ-12 Manage Well or Exploratory Boring Materials
WQ-13 Protect Groundwater from Contaminates Via Wells or Exploratory Borings
WQ-14 Backfill Completed Exploratory Borings
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
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TR-1 Use Suitable Public Safety Measures

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References

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California Environmental Quality Act (CEQA) (http://ceres.ca.gov/ceqa/)

Q520D01 – Environmental Management System Environmental Planning (Sections 1 – 5)

Q751D02 – Pesticide Use (On District QEMS)

December 4, 2015

Mr. James Fiedler
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

NOTICE OF APPLICABILITY; SANTA CLARA VALLEY WATER DISTRICT WATER SYSTEM; STATEWIDE GENERAL PERMIT FOR DRINKING WATER SYSTEM DISCHARGES TO WATERS OF THE UNITED STATES

Dear Mr. Fiedler:

Thank you for submitting the June 4, 2015 application package for coverage under the Statewide Drinking Water Systems Discharge Permit,[1] adopted by the State Water Resources Control Board (State Water Board) in November 2014. The Statewide Drinking Water Systems Discharge Permit provides Clean Water Act regulatory coverage for: (1) discharges resulting from essential operations and maintenance activities of drinking water systems undertaken to comply with the federal Safe Drinking Water Act, California Health and Safety Code, and State Water Board's Division of Drinking Water permitting requirements; and (2) emergency discharges.

Notice of Applicability
The information submitted in the June 4, 2015 application package, including the Notice of Intent form and map for the system described below, satisfies the permit application requirements; therefore the application package is deemed complete. This Notice of Applicability implements regulatory coverage under the Statewide Drinking Water Systems Discharge Permit for the water system described below, effective as of the date of this letter. A waste discharge identification number of 4DW0642 has been assigned to this coverage.

Discharge Description
The Santa Clara Valley Water District (District) is a wholesaler that treats and delivers water to eight community drinking water systems and one non-transient non-community drinking water system around San Jose in Santa Clara County. The source of water for the system consists of groundwater and treated surface water. The system consists of a well field, 92 miles of raw water pipelines, 40 miles of treated water pipelines, and three surface water treatment plants. The system discharges to tributaries to Calabazas Creek, Coyote Creek, Guadalupe River, Permanente Creek, San Tomas Aquino Creek, Pajaro River, Llagas Creek, Uvas Creek, and Pacheco Creek. There are no applicable total maximum daily loads for these receiving waters.

[1] Statewide General National Pollutant Discharge Elimination System (NPDES) Permit for Drinking Water System Discharges to Waters of the United States; State Water Board Order 2014-0194-DWQ (see http://www.waterboards.ca.gov/water_issues/programs/npdes/docs/drinkingwater/final_statewide_wqo2014_0194_dwq.pdf)

General Requirements
To comply with the Statewide Drinking Water Systems Discharge Permit, the District shall:

a. Establish and implement appropriate best management practices.

b. Ensure that all planned discharges comply with the terms and requirements of the permit including applicable effluent limitations for chlorine residual and turbidity.

c. Take all necessary steps to review and update the effectiveness and adequacy of the control measures and best management practices.

d. Keep best management practices updated and available onsite for all system operators.

e. Conduct monitoring and reporting in compliance with the provisions and requirements in the Monitoring and Reporting Program, Attachment E of the Statewide Drinking Water Systems Discharge Permit.

f. Maintain self-monitoring reports including compliant and non-compliant discharge monitoring information at the system's main office and make them available upon request of staff of the State Water Board, San Francisco Bay Regional Water Quality Control Board (San Francisco Bay Water Board), and the Central Coast Regional Water Quality Control Board (Central Coast Water Board).

g. Submit an annual report and all reporting information required by the Monitoring and Reporting Program to the following address:

   State Water Resources Control Board
   Division of Water Quality
   NPDES Wastewater Unit
   1001 I Street, 15th Floor
   Sacramento, CA 95814

   Include the following certification in the annual monitoring report:

   "I certify under penalty of law that this document and all enclosures were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

   If you prefer to submit an electronic copy of the report you can do so by sending it to the following e-mail: DMR@waterboards.ca.gov and title the e-mail "DWS No. 4310027 Annual Report."

h. Notify the San Francisco Bay Water Board or the Central Coast Water Board accordingly depending on the location of the discharge, per notification requirements in the permit's Monitoring and Reporting Program. The staff contact at the San Francisco Bay Water Board

is Mr. Habtemariam Kifle who may be contacted at (510) 622-2371 or Habte.Kifle@waterboards.ca.gov. The staff contact at the Central Coast Water Board is Ms. Sheila Soderberg who may be contacted at (805) 549-3592 or sheila.soderberg@waterboards.ca.gov.

Previous Permitting Coverage
Based on your application package and staff review of the California Integrated Water Quality System database, the District's system has existing coverage under the San Francisco Bay Water Board NPDES Permit CAG382001, Order No. R2-2009-033 for the following facilities:

- WDID 2 438659001 for the Rinconada Water Treatment Plant
- WDID 2 438661001 for the Penitencia Water Treatment Plant, and
- WDID 2 438660001 for the Santa Teresa Water Treatment Plant.

The District's system additionally has existing coverage under the Central Coast Water Board NPDES Permit CAG993001, Order No. R3-2011-0223 with WDID-3 350214527 for its Pacheco and Santa Clara Conduit. It is the intention of the State Water Board that this Notice of Applicability for coverage under the Statewide Drinking Water Systems Discharge Permit supersedes all other Regional Water Board-issued non-MS4 NPDES permit coverage for drinking water systems discharges. The San Francisco Bay and Central Coast Water Boards will terminate your existing permit coverage of these discharges in a separate action, and will notify you in separate letters or notices.

If you have any questions regarding this Notice of Applicability or the Statewide Drinking Water Systems Discharge Permit, please contact Mr. Renan Jauregui in the NPDES Wastewater Unit of the Division of Water Quality at (916) 341-5505 or renan.jauregui@waterboards.ca.gov.

Sincerely,

Victoria A. Whitney

Victoria A. Whitney, Deputy Director
Division of Water Quality

cc: Pascal Mues
NPDES Permits Office
U.S. EPA Region 9, WTR-5
75 Hawthorne Street
San Francisco, CA 94105

Bruce Wolfe, Executive Officer
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400-First Floor
Oakland, CA 94612

Ken Harris, Executive Officer
Central Coast Regional Water Quality Control Board
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

cc: See next page

cc: Continuation page

Mary Boyd, Senior Water Resource Control Engineer
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400-First Floor
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Sheila M. Soderberg, P.G.
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895 Aerovista Place, Suite 101
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Habtemariam Kifle, Water Resource Control Engineer
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400-First Floor
Oakland, CA 94612

MEASURES TO PREVENT SEDIMENT FROM ENTERING WATERCOURSES DURING AND AFTER CONSTRUCTION

Table 1. Conditions, Best Management Practices and Avoidance and Minimization Measures (AMMs) Applied to the Project to Control Erosion

BMP, Condition, AMM, and/or Minimization Measure Reference	Conditions, BMPs and AMMs applied to Protect to Control Erosion: Description
Santa Clara Valley Habitat Plan	
VHP Condition 3: Maintain Hydrologic Conditions and Protect Water Quality (Table 6-2 of the VHP).	The project would comply with Condition 3, which necessitates implementing the measures listed in Chapter 6 (Table 6-2) of the VHP. These measures are BMPs to protect water quality and avoid other adverse effects, such as source and treatment control measures to prevent pollutants from leaving the construction site and minimizing site erosion and local sedimentation during construction. Many of these measures overlap or are similar to Valley Water's PMP BMPs .
VHP Condition 5: Avoidance and Minimization Measures for In Stream Operations and Maintenance	The project would comply with Condition 5 of the VHP requires the identification of avoidance and minimization measures for conducting in-stream operations and maintenance activities. The project would be required to implement the avoidance and minimization measures from Valley Water's Pipeline Maintenance Program Final Program EIR as listed on page 6-20 of the VHP.
Pipeline Maintenance Program PEIR	
PMP PEIR BMP Biology-3	Building materials and construction materials will not be stockpiled or stored where they could be washed into the water or where they will cover aquatic or riparian vegetation.
PMP PEIR BMP Hazards-4	Measures shall be implemented to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means. 1) Prior to entering the work site, all field personnel shall know how to respond when toxic materials are discovered. 2) The discharge of any hazardous or non-hazardous waste as defined in Division 2, Subdivision 1, Chapter 2 of the California Code of Regulations shall be conducted in accordance with applicable State and federal regulations
PMP PEIR BMP Hazards-5	Spill prevention kits shall always be in close proximity when using hazardous materials (e.g., crew trucks and other logical locations). 1) Prior to entering the work site, all field personnel shall know the location of spill kits on crew trucks and at other locations within Valley Water facilities.

	2) All field personnel shall be advised of these locations and trained in their appropriate use.
PMP PEIR BMP Hazards-6	All equipment will be properly maintained and inspected for leaks daily before start of work. No fueling shall be done in a stream channel or immediate flood plain, unless equipment stationed in these locations is not readily relocated (i.e., pumps, generators). 1) For stationary equipment that must be fueled on-site, containment shall be provided in such a manner that any accidental spill of fuel shall not be able to enter the water or contaminate sediments that may come in contact with water. 2) All fueling done at the job site shall provide containment to the degree that any spill shall be unable to enter any channel or damage stream vegetation.
PMP PEIR BMP Hazards-7	Valley Water shall prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels. Valley Water vehicles shall be washed only at the approved area in the corporation yard. 1) Field personnel shall be appropriately trained in spill prevention, hazardous material control, and clean-up of accidental spills. 2) No fueling, repair, cleaning, maintenance, or vehicle washing shall be performed in a creek channel or in areas at the top of a channel bank that may flow into a creek channel
PMP PEIR BMP Hazards-8	No washing of vehicles shall occur at job sites. [1]
PMP PEIR BMP Hazards-9	Debris, soil, silt, bark, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to aquatic life, shall be prevented from contaminating the soil and/or entering the waters of the state. Any of these materials, placed within or where they may enter a stream or lake shall be removed immediately.
PMP PEIR BMP Hazards-10	All equipment shall be stored in a secure area away from the channel. Quantities greater than 55 gallons will be provided with a secondary containment capable of containing 110 percent of the primary container. During the period between October 15 and April 15 (and depending on rain patterns, could include before and after these dates as well), all equipment fluid storage areas will be provided with an impermeable cover to prevent contact with storm water.
PMP PEIR BMP Hazards-14	The Contractor/Field crew shall provide one portable toilet and one wash station per 20 workers or fraction thereof for any project sites that do not have mobile access to a nearby facility. Wash stations shall also be required on-site for any job where hazardous materials are handled (such as in repair work) or where pipeline draining involves using dechlorination chemical.

PMP PEIR BMP Hazards-16	All chemicals stored in staging areas will be stored in secondary containment with no less than 110% capacity. Proper storage and security will be implemented to ensure that chemicals are not spilled or vandalized during non-working hours.
PMP PEIR BMP Hydrology-1	Access shall be provided as close to the work area as possible, using existing ramps where available and planning work site access so as to minimize disturbance to the creek bed, creek banks, and the surrounding land uses.
PMP PEIR BMP Hydrology-2	Methods used to prevent mud from being tracked out of work sites onto roadways include installing on unsurfaced access roads a layer of geotextile mat followed by a 4-inch thick layer of 1-3 inch diameter gravel.
PMP PEIR BMP Hydrology-3	Erosion control matting or fabric shall be installed if necessary.
PMP PEIR BMP Hydrology-5	Discharge volume reduction options (such as performing maintenance activities with partially full pipelines, employing sectioning valves, and/or opportunities for reuse of water) will be considered prior to draining the pipelines.
PMP PEIR BMP Hydrology-6	Discharge rates will be ramped up slowly such that the increase in flow rate in the receiving water is gradual and scouring of the channel bed and banks does not occur.
PMP PEIR BMP Hydrology-8	To protect exposed soil and vegetated surfaces from erosion, erosion control blankets, mats, or geotextiles will be placed over the erodible surface. A number of materials are available ranging from straw blankets to synthetic fiber with netting. The blanket can be removed following completion of the discharge or left in place to provide a more permanent means of erosion control. If netted material is used, it would be removed immediately after use to prevent entanglement of and impacts to wildlife species. Instructions for installation can be found in the Construction Volume of the California Stormwater BMP Handbook (CASQA, 2003).
PMP PEIR BMP Hydrology-12	Existing access ramps and roads to streams shall be used where possible. If temporary access points are necessary, they shall be constructed in a manner that minimizes impacts to streams.
PMP PEIR BMP Hydrology-13	Where practicable, maintain a vegetated buffer strip between staging/excavation areas and receiving waters.
PMP PEIR BMP Hazards-14	The Contractor/Field crew shall provide one portable toilet and one wash station per 20 workers or fraction thereof for any project sites that do not have mobile access to a nearby facility. Wash stations shall also be required on-site for any job where hazardous materials are handled (such as in repair work) or where pipeline draining involves using dechlorination chemical.

PMP PEIR BMP Hydrology-15	RWQCB objectives for temperature change in receiving waters (measured 100 feet downstream of discharge point) shall not be exceeded. Receiving water and discharge water shall be monitored for temperature changes after a comparison of ambient temperature to pipeline water temperature suggests the potential for change. **All NPDES Permit conditions will be adhered to in this project.**
BMP PEIR BMP Hydrology-18	Receiving water may be monitored for dissolved oxygen and pH to ensure that relevant water body or as required in NPDES permits issued by the RWQCB. Data shall be reported to RWQCB as required.
BMP PEIR BMP-19	The District will obtain storm drain capacity information from the responsible municipality prior to discharge to a storm drain. Discharge reates to the storm drain wil be maintained below its conveyance capacity.
PMP PEIR BMP Hydrology-20	A trained individual will observe flows in the receiving water. If it appears that discharges are approaching channel capacity in the channel or any structure within the channel, discharge rates will be reduced.
PMP PEIR Mitigation Measure Hydrology-3	The discharge location and receiving water will be observed for signs of erosion by a trained individual. If erosion is evident, flow rates will be reduced. If erosion continues to occur, discharges will be terminated until appropriate erosion control BMPs are installed. Monitoring will be conducted just prior to the start of the discharge and regularly (i.e., every hour, every four hours, every eight hours) during the discharge. Monitoring frequency will depend on the nature of the discharge and the erosion in the area.
PMP PEIR Mitigation Measure Hydrology-4	An environmental monitor will walk along each discharge drainage to the termination of the drainage or 500 feet downstream to inspect for erosion after a draining is complete. If erosion is detected, reclamation measures should be taken to correct the erosion. Correction measures shall include recontouring the land to its previous state and revegetating with the dominant appropriate native grass species in the area, if necessary.
Mitigation Measure Hydrology-6	RWQCB objectives for temperature change in receiving waters (measured 100 feet downstream of discharge point) shall not be exceeded. Receiving water and discharge water shall be monitored by a trained individual for turbidity prior to the discharge and periodically throughout the drainage operation. Silty or turbid water from project activities shal not be discharged into tstrams, lakes or storm drains. Such water shall be treated prior to release by one of the following methods: [Source: WUUDPPP BMP CM-D and CM-E] 1) Sprayed over a large area outside of the stram channel to allow for natural filtration of sediments. 2) Discharged to the sanitary sewer system (requires approval from local sanitary district) 3) Treated with an on-line filter system or storm drain inlet protection. 4) Pumped into a holding facility or into a settling pond located in a flat stable area.

[1] Wash stations specifically required for plant pathogen prevention will be excluded by this BMP.

AVOIDANCE AND/OR MINIMIZATION MEASURES TO PROTECT, FISH, WILDLIFE, and PLANT RESOURCES

Table 2. Plant and Animal Conditions, Best Management Practices (BMPs) and Avoidance and Minimization Measures (AMMs) Applied to the Project to Protect Fish, Wildlife and Plant Resources

BMP, Condition, AMM, and/or Minimization Measure Reference	BMPs and AMMs applied to protect Fish and Wildlife and Plant Resources: Description
Santa Clara Valley Habitat Plan	
VHP Condition 1: Avoid Direct Impacts on Legally Protected Plant and Wildlife	The project would comply with Condition 1 of the VHP in order to avoid the take of fully protected species that are known to occur within the study area including Golden eagle, bald eagle, American peregrine falcon, Southern bald eagle, White-tailed kite, California condor, and Ring-tailed cat either by implementing repairs during the non-breeding season (September 1 to January 31) or by conducting pre-construction surveys and maintaining appropriate buffers around nests that contain eggs or young as noted on pages 6-7 and 6-8 of the VHP.
VHP Condition 3: Maintain Hydrologic Conditions and Protect Water Quality (Table 6-2 of the VHP).	The project would comply with Condition 3, which necessitates implementing the measures listed in Chapter 6 (Table 6-2) of the VHP. These measures are BMPs to protect water quality and avoid other adverse effects, such as source and treatment control measures to prevent pollutants from leaving the construction site and minimizing site erosion and local sedimentation during construction. Many of these measures overlap or are similar to the PMP PEIR BMPs.
VHP Condition 5: Avoidance and Minimization Measures for In Stream Operations and Maintenance	The project would comply with Condition 5 of the VHP, which requires implementation of the measures in Table 6-2 in the VHP. The project would be required to implement the avoidance and minimization measures listed on page 6-20 of the VHP.

VHP Condition 12: Wetland and Pond Avoidance and Minimization	The project would comply with Condition 12 of the VHP which helps to minimize impacts on high quality wetlands and ponds by prescribing vegetated stormwater filtration features, proper disposal of cleaning materials, and other requirements. The project would be required to implement the avoidance and minimization measures listed on pages 6-56 to 6-58 of the VHP.
VHP Condition 15: Western Burrowing Owl	Western Burrowing owl habitat surveys will be conducted by a qualified biologist prior to construction. Avoidance measures identified in Chapter 6 of the VHP will be utilized.
Pipeline Maintenance Program PEIR	
PMP PEIR BMP Biology-2	All trash will be removed from the site daily to avoid attracting potential predators to the site.
PMP PEIR BMP Biology-3	Building materials and construction materials will not be stockpiled or stored where they can be washed into the water or where they will cover aquatic or riparian vegitation.
PMP PEIR BMP Hazards-4	Measures shall be implemented to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means. 1) Prior to entering the work site, all field personnel shall know how to respond when toxic materials are discovered. 2) The discharge of any hazardous or non-hazardous waste as defined in Division 2, Subdivision 1, Chapter 2 of the California Code of Regulations shall be conducted in accordance with applicable State and federal regulations
PMP PEIR BMP Hazards-5	Spill prevention kits shall always be in close proximity when using hazardous materials (e.g., crew trucks and other logical locations). 1) Prior to entering the work site, all field personnel shall know the location of spill kits on crew trucks and at other locations within District facilities. 2) All field personnel shall be advised of these locations and trained in their appropriate use.
PMP PEIR BMP Hazards-6	All equipment will be properly maintained and inspected for leaks daily before start of work. No fueling shall be done in a stream channel or immediate flood plain, unless equipment stationed in these locations is not readily relocated (i.e., pumps, generators). 1) For stationary equipment that must be fueled on-site, containment shall be provided in such a manner that any accidental spill of fuel shall not be able to enter the water or contaminate sediments that may come in contact with water. 2) All fueling done at the job site shall provide containment to the degree that any spill shall be unable to enter any channel or damage stream vegetation.
PMP PEIR BMP Hazards-7	The District shall prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels. District vehicles shall be washed only at the approved area in the corporation yard. 1) Field personnel shall be appropriately trained in spill prevention, hazardous material control, and clean-up of accidental spills.

	2) No fueling, repair, cleaning, maintenance, or vehicle washing shall be performed in a creek channel or in areas at the top of a channel bank that may flow into a creek channel
PMP PEIR BMP Hazards-8	No washing of vehicles shall occur at job sites.[1]
PMP PEIR BMP Hazards-9	Debris, soil, silt, bark, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to aquatic life, shall be prevented from contaminating the soil and/or entering the waters of the state. Any of these materials, placed within or where they may enter a stream or lake shall be removed immediately.
PMP PEIR BMP Hazards-10	All equipment shall be stored in a secure area away from the channel. Quantities greater than 55 gallons will be provided with a secondary containment capable of containing 110 percent of the primary container. During the period between October 15 and April 15 (and depending on rain patterns, could include before and after these dates as well), all equipment fluid storage areas will be provided with an impermeable cover to prevent contact with storm water.
PMP PEIR BMP Hazards-14	The Contractor/Field crew shall provide one portable toilet and one wash station per 20 workers or fraction thereof for any project sites that do not have mobile access to a nearby facility. Wash stations shall also be required on-site for any job where hazardous materials are handled (such as in repair work) or where pipeline draining involves using dechlorination chemical.
PMP PEIR BMP Hazards-16	All chemicals stored in staging areas will be stored in secondary containment with no less than 110% capacity. Proper storage and security will be implemented to ensure that chemicals are not spilled or vandalized during non-working hours.
PMP PEIR BMP Hydrology-1	Access shall be provided as close to the work area as possible, using existing ramps where available and planning work site access so as to minimize disturbance to the creek bed, creek banks, and the surrounding land uses.
PMP PEIR BMP Hydrology-2	Methods used to prevent mud from being tracked out of work sites onto roadways include installing on unsurfaced access roads a layer of geotextile mat followed by a 4-inch thick layer of 1-3 inch diameter gravel.
PMP PEIR BMP Hydrology-3	Erosion control matting or fabric shall be installed if necessary.
PMP PEIR BMP Hydrology-5	Discharge volume reduction options (such as performing maintenance activities with partially full pipelines, employing sectioning valves, and/or opportunities for reuse of water) will be considered prior to draining the pipelines.
PMP PEIR BMP Hydrology-6	Discharge rates will be ramped up slowly such that the increase in flow rate in the receiving water is gradual and scouring of the channel bed and banks does not occur.

PMP PEIR BMP Hydrology-8	To protect exposed soil and vegetated surfaces from erosion, erosion control blankets, mats, or geotextiles will be placed over the erodible surface. A number of materials are available ranging from straw blankets to synthetic fiber with netting. The blanket can be removed following completion of the discharge or left in place to provide a more permanent means of erosion control. If netted material is used, it would be removed immediately after use to prevent entanglement of and impacts to wildlife species. Instructions for installation can be found in the Construction Volume of the California Stormwater BMP Handbook (CASQA, 2003).
PMP PEIR BMP-12	Existing access ramps and roads to streams shall be used where possible. If temporary access points are necessary, they shall be constructed in a manner that minimizes impacts to streams.
PMP PEIR BMP Hydrology-13	Where practicable, maintain a vegetated buffer strip between staging/excavation areas and receiving waters.
PMP PEIR BMP Hydrology-14	Erosion control measures shall be utilized throughout all phases of the operation where sediment runoff from exposed slopes threatens to enter waters of the State. At no time shall silt laden runoff be allowed to enter water of the State.
PMP PEIR BMP Hydrology-15	RWQCB objectives for temperature change in receiving waters (measured 100 feet downstream of discharge point) shall not be exceeded. Receiving water and discharge water shall be monitored for temperature changes after a comparison of ambient temperature to pipeline water temperature suggests the potential for change.
PMP PEIR BMP Hydrology-20	A trained individual will observe flows in the receiving water. If it appears that discharges are approaching channel capacity in the channel or any structure within the channel, discharge rates will be reduced.
PMP PEIR BMP Utilities -1	Field personnel shall clean the work site before leaving by removing all litter and construction related materials. Maintenance crews shall be responsible for all debris incurred as a result of construction and for cleaning up dumped material.
PMP PEIR BMP Utilities-2	all construction and maintenance wastes will be taken off-site to disposal collection areas within te District for proper permanent disposal according to regulations.
Special-status Plants Avoidance and Minimization Measure	An avoidance and minimization measures (AMM) for special-status plants was created specifically for this Project. Qualified botanists shall conduct surveys for special-status plants in areas of suitable habitat within the Project work area, in advance of Project activities. Floristic surveys shall be conducted by a qualified botanist during the appropriate blooming periods, or for perennial plants within 30 days of the start of Project activities. If surveys identify any special-status plants, results shall be submitted to CDFW at least one week prior to the start of Project activities. If special-status plant species are identified, a qualified botanist shall identify them with flagging to create a 25-foot no-disturbance buffer during project activities. If avoidance is not feasible for special-status plants, CDFW shall be consulted, in writing, to determine whether alternative avoidance measures that are equally protective are possible.

[1] Wash stations specifically required for plant pathogen prevention will be excluded by this BMP.

MITIGATION MEASURES TO PROTECT, FISH, WILDLIFE, and PLANT RESOURCES

Table 3: Plant and Animal Mitigation Measures Applied to the Project to Protect Fish, Wildlife and Plant Resources

Mitigation Measures	
Biology	
PMP PEIR Mitigation Measure Biology-16	Pipeline discharge for maintenance work would preferentially be performed during winter months, when storm events are more common and when water is naturally highest. Discharge flows are then a minimal portion of overall stream or river flow. If draining must occur during summer or fall, a slow release is mandatory to ensure receiving waters do not experience a temperature change greater than 2 degrees (Jennings, personal communication 2006). Fahrenheit in either direction, and overall receiving water does not exceed 68 degrees Fahrenheit in steelhead and Chinook salmon inhabited streams.
PMP PEIR Mitigation Measure Biology-20	Openings of gravity-drain gates and on the suction and discharge piping of any submersible pumps used for pipeline discharge to minimize discharge of species for any discharge of Delta water. The screens must be examined throughout the draining process to remove introduced fish and prevent debris clogging.
Hydrology and Water Quality	
PMP PEIR Mitigation Measure Hydrology-1	For all exposed earthen areas, once the maintenance activity is complete or during the appropriate time of year, an erosion control seed mix shall be used, compatible with the surrounding environment. The mix will consist of California native grasses (e.g. *Hordeum californicum*, *Elymus glaucus* 'Berkeley,' *Bromus carnatus*) on slopes greater than 3:1. A sterile form of 'Zorro' Annual Fescue, or another quick growing species may be added to the mix where slopes are steeper (e.g. 2:1) [Source: SMP Provision No. 2.7]
PMP PEIR Mitigation Measure Hydrology-3	The discharge location and receiving water will be observed for signs of erosion by a trained individual. If erosion is evident, flow rates will be reduced. If erosion continues to occur, discharges will be terminated until appropriate erosion control BMPs are installed. Monitoring will be conducted just prior to the start of the discharge and regularly (i.e., every hour, every four hours, every eight hours) during the discharge. Monitoring frequency will depend on the nature of the discharge and the erosion in the area.

PMP PEIR Mitigation Measure Hydrology-4	An environmental monitor will walk along each discharge drainage to the termination of the drainage or 500 feet downstream to inspect for erosion after a draining is complete. If erosion is detected, reclamation measures should be taken to correct the erosion. Correction measures shall include recontouring the land to its previous state and revegetating with the dominant appropriate native grass species in the area, if necessary.
PMP PEIR Mitigation Measure Hydrology - 5	Prior to any ground disturbing work the District shall prepare an Erosion Control Plan to be included in the Excavation Plan. At a minimum, the plan shall include: • A proposed schedule of grading plan. • Identification if any critical areas of high erodibility potential and/or unstable slopes. • Contour and spot elevations indicating runoff patterns before and after grading. • Identification of erosion control measures on slopes, lots, and streets. Measures will be based on recommendations contained in the "Erosion and Sediment Control Field Manual" published by the San Francisco Regional Water Quality Control Board. Erosion control measures such as placement of silt fencing or straw waddles shall be utilized to prevent sedimentation from runoff from graded surfaces into any waterways or wetlands. • Soil stabilization techniques such as short-term biodegradable erosion control blankets and hydroseeding.
PMP PEIR Mitigation Measure Hydrology-6	RWQCB objectives for turbidity in receiving waters (measured 100 feet downstream of project site in streams and 50 feet downstreams in lakes) shall not be exceeded. Receiving water and discharge water will be monitored by a trained individual for turbidity prior to the discharge and periodically throughout the drainage operation. Silty or turbid water from project activities shall not be discharged into streams lakes or storm drains. Such water shall be treated prior to release by one of the following methods: • Sprayed over a large area outside of the stream channel to allow for natural filtration and sediments. • Discharged to the sanitary sewer system (requires approval from local sanitary district). • Treated with an on-line filter system or storm drain inlet protection.

	• Pumped into a holding facility or into a settling pond located in a flat stable area.

Figure 7: Impact Locations

Central Pipeline Inspection & Rehabilitation Project

Guadalupe River
Coyote Creek
Upper Penitencia Creek
Los Gatos Creek
Fig. 7a
Fig. 7b
Fig. 7c
Text
N

Discharge Site: Hard Infrastructure

Discharge Site: Temporary BMPs

Central Pipeline

Index Panel

Valley Water

Figure 7a: Impact Locations

Upper Penitencia Creek & Coyote Creek

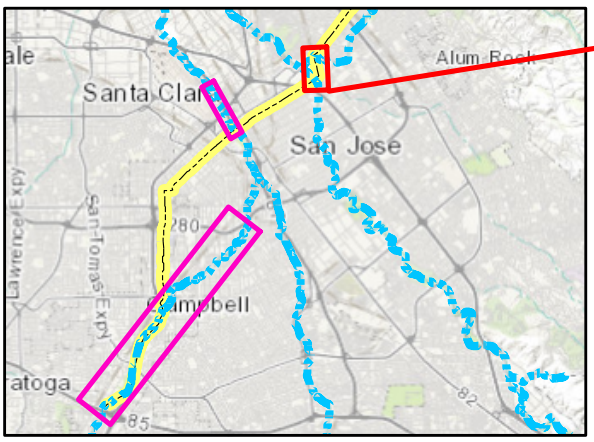
Upper Penitencia Creek

Fig 7a.i

Coyote Creek

Fig 7a.ii

N

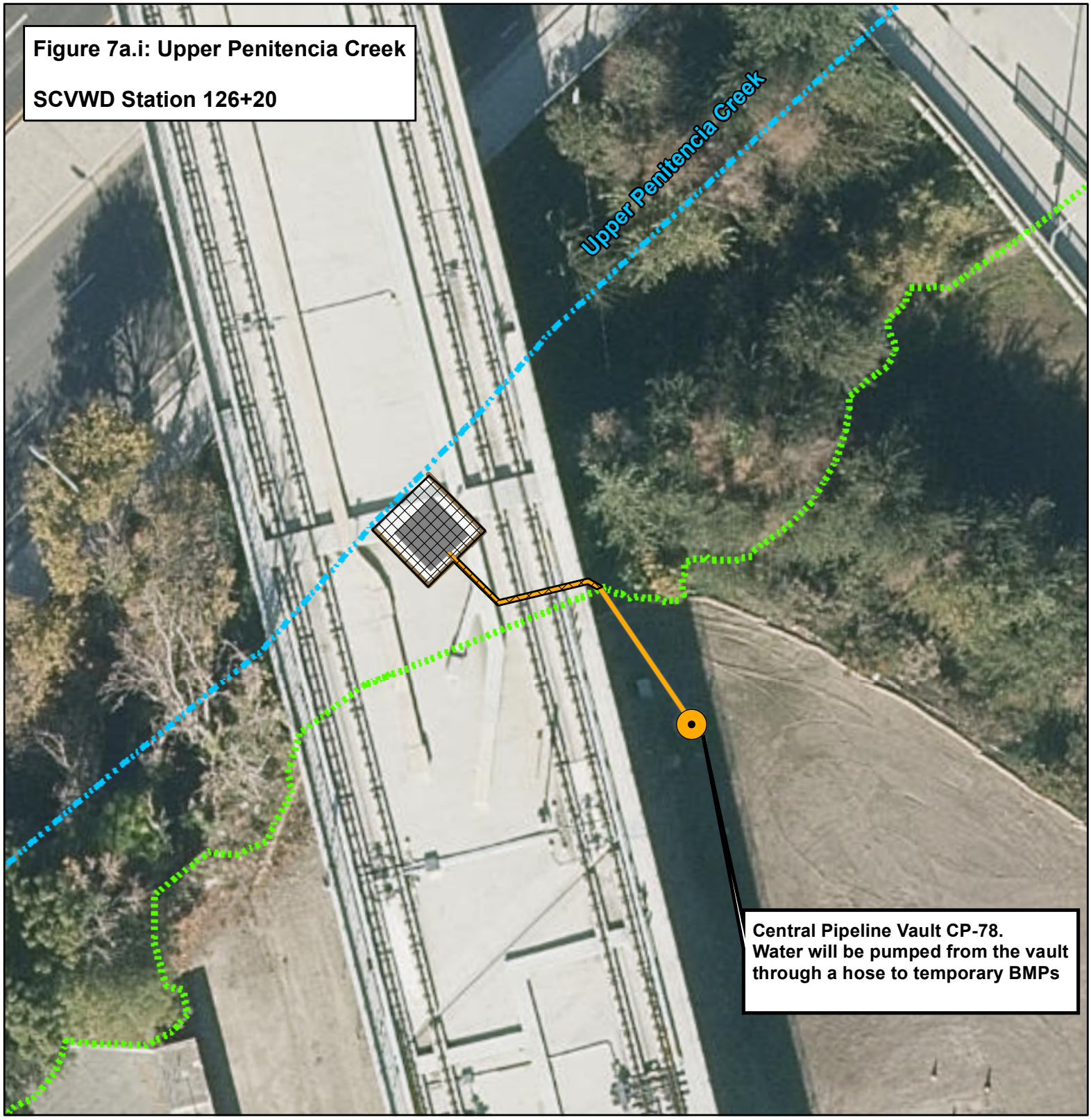


Discharge Site: Temporary BMPs

Central Pipeline

Index Panel

Valley Water



N

0 12.5 25 50 Feet

One Inch = 25 Feet

LSAA Jurisdiction

Temporary Impacts (254 ft²)

Pipeline Vault

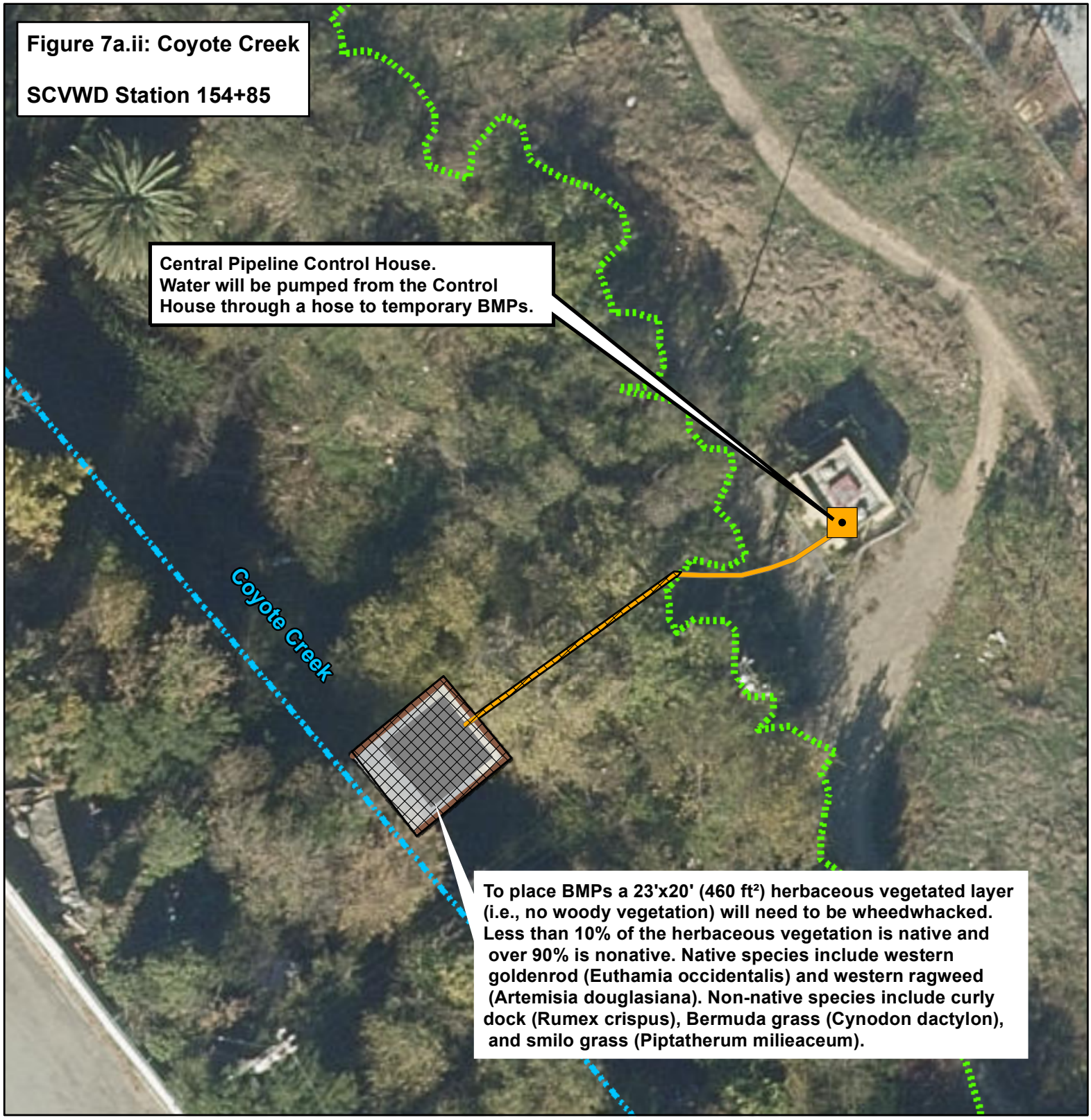
Hose

Dissipater Bag

Wattle

Visqueen

Valley Water



N

0 12.5 25 50 Feet

One Inch = 25 Feet

LSAA Jurisdiction

Temporary Impacts (499 ft²)

Pipeline Control House

Hose

Dissipater Bag

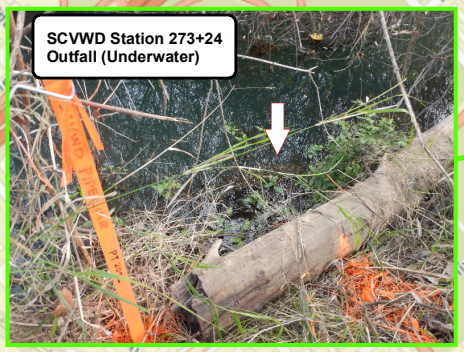
Wattle

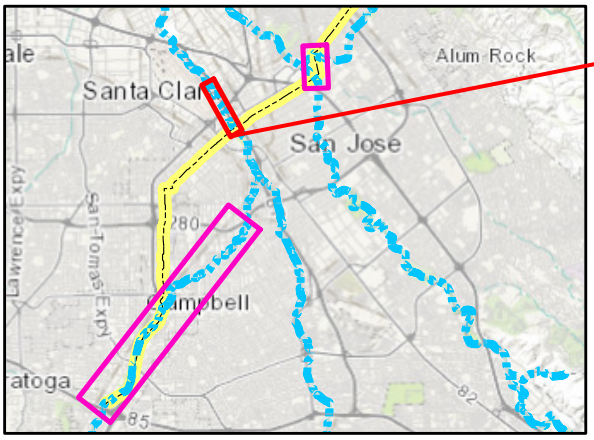
Visqueen

Valley Water

Figure 7b: Impact Locations

Guadalupe River





Discharge Site: Hard Infrastructure

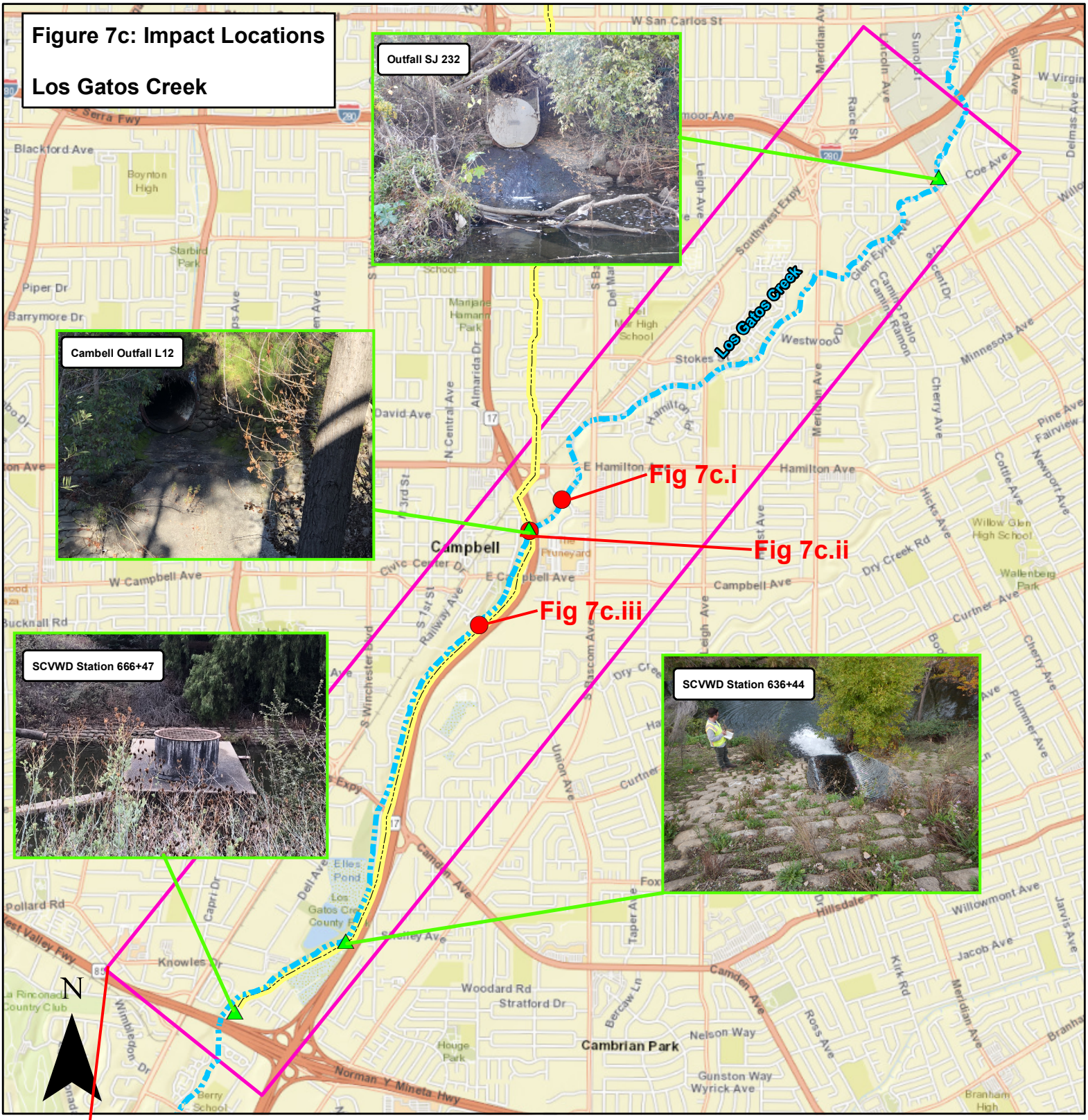
Central Pipeline

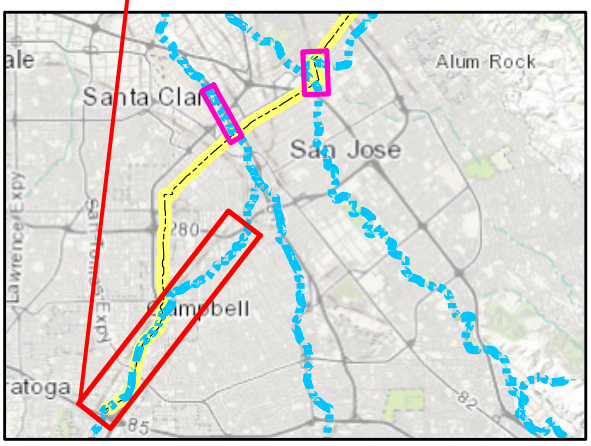
Index Panel

Valley Water

Figure 7c: Impact Locations

Los Gatos Creek





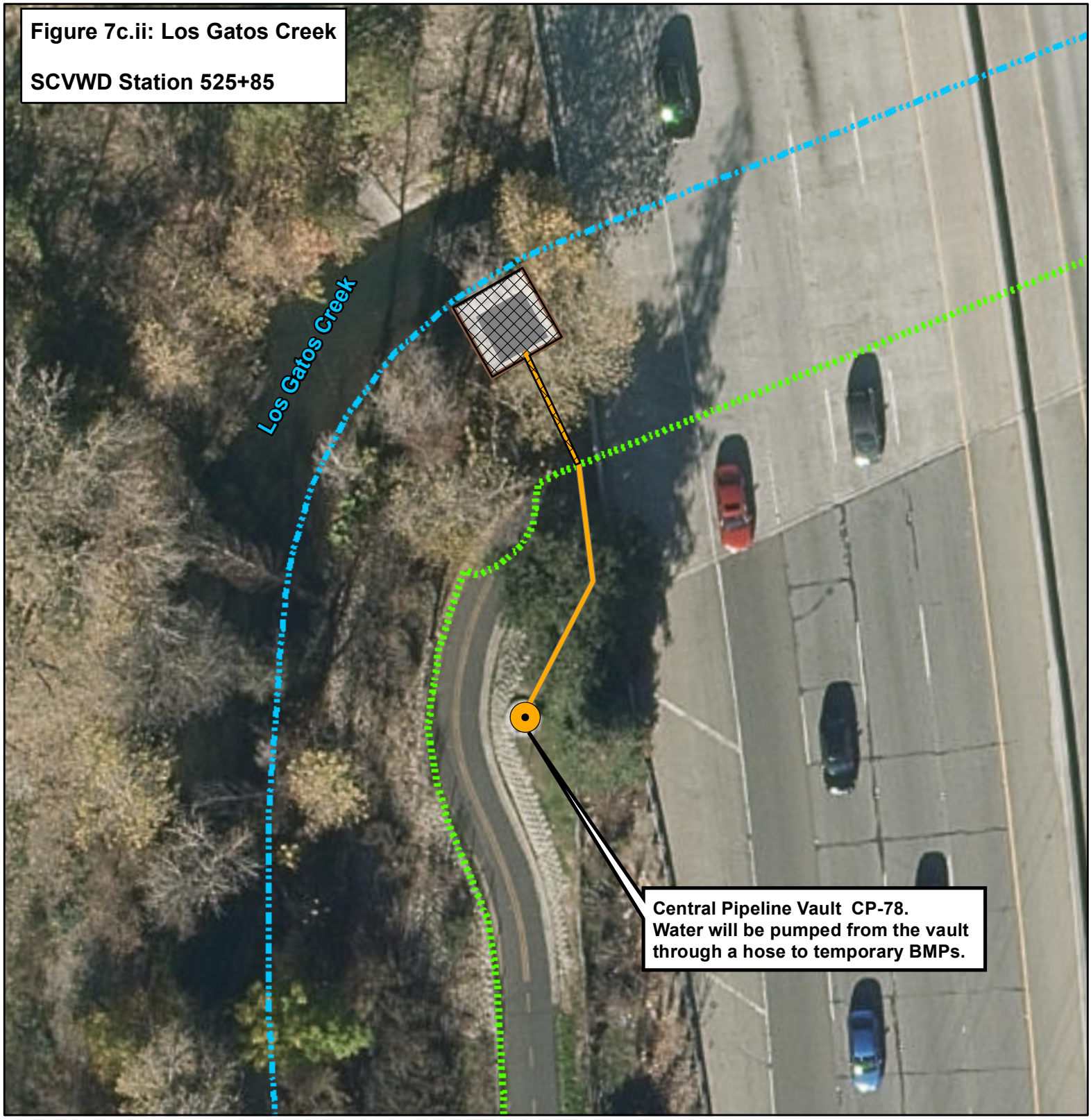
Discharge Site: Hard Infrastructure

Discharge Site: Temporary BMPs

Central Pipeline

Index Panel

Valley Water



N

0 12.5 25 50 Feet

One Inch = 25 Feet

LSAA Jurisdiction

Temporary Impacts (247 ft²)

Pipeline Vault

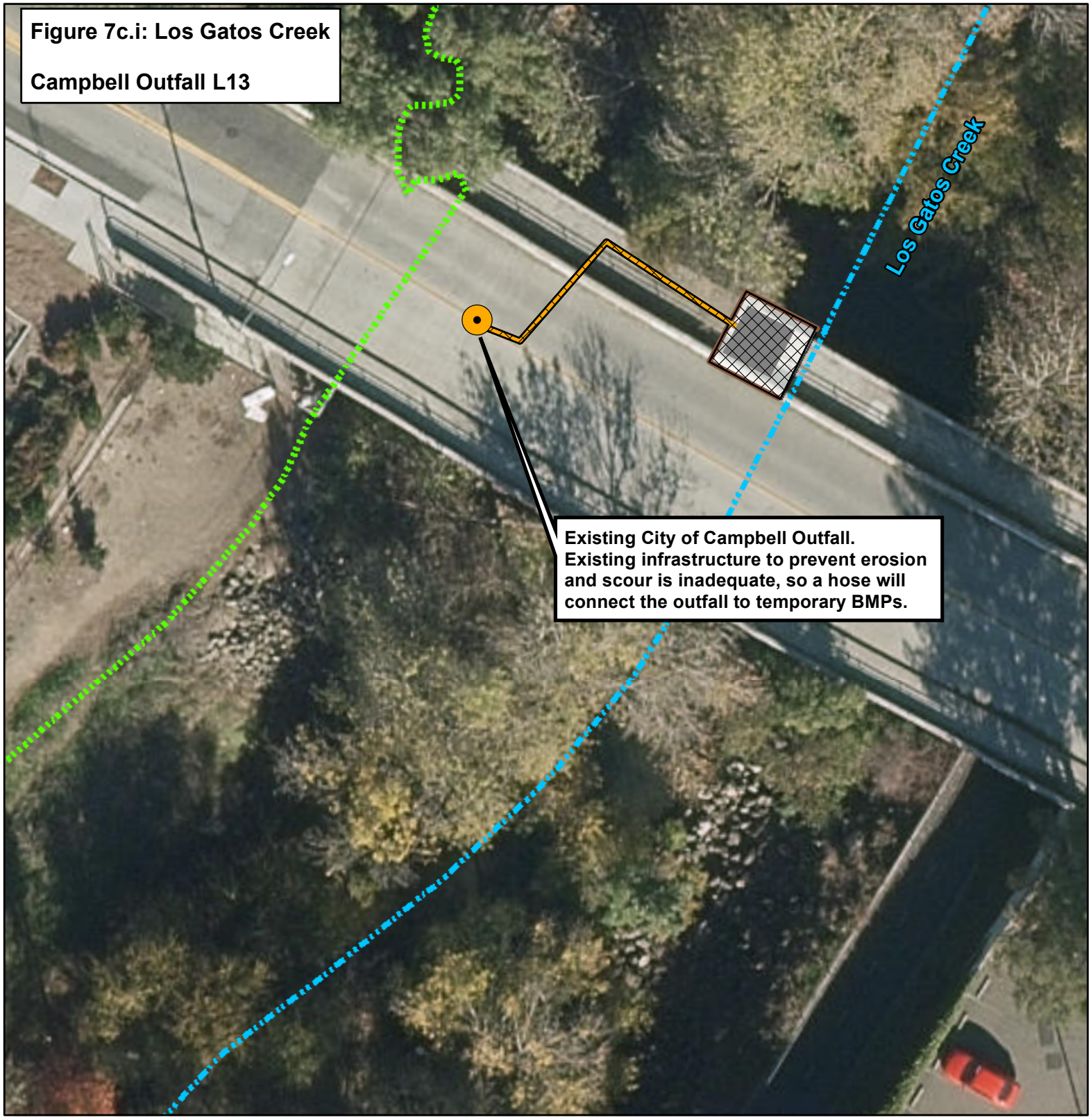
Hose

Dissipater Bag

Wattle

Visqueen

Valley Water



N

0 12.5 25 50 Feet

One Inch = 25 Feet

LSAA Jurisdiction

Temporary Impacts (283 ft²)

Existing Outfall

Hose

Dissipater Bag

Wattle

Visqueen

Valley Water

N

0 12.5 25 50 Feet

One Inch = 25 Feet

LSAA Jurisdiction

Temporary Impacts (264 ft²)

Existing Outfall

Hose

Dissipater Bag

Wattle

Visqueen

Valley Water

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APPENDIX E

City of San Jose Encroachment Permit
City of Campbell Encroachment Permit
Town of Los Gatos Encroachment Permit
County of Santa Clara Encroachment Permit
Caltrans Encroachment Permit
Central Pipeline Dewatering City and Storm Drain List

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CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

DEPARTMENT OF PUBLIC WORKS

UTILITIES SECTION
200 E. Santa Clara Street, Tower 3RD floor
San José, California 95113

DEVELOPMENT SERVICES DIVISION
TELEPHONE (408) 975-7455
FAX (408) 971-4882

INTER AGENCY REVOCABLE ENCROACHMENT PERMIT

APPLICATION

PERMITTEE

Agency: _____

Address: _____

_____

Contact: _____

Phone: _____

Name of Responsible Party: _____

Start Date: _____ Thomas Guide: _____

No. of Working Days: _____

CONTRACTOR

Contractor: _____

Address: _____

_____

24 hr. Contact: _____

24 hr. phone: _____

Contractor's Lic. No. _____

City Business Lic. No. _____

Project Schedule: _____

Location of Work:_____

Description of work: _____

_____

_____

Attach to the Application:

(1) Detailed Traffic Control Plan **(3 Copies)**
(2) Construction Schedule **(3 Copies)**
(2) Site / Project Plans and Specifications **(3 Copies)**
(3) **Contractor Insurance Certification** (CSJ as additional insured)

This **INTER AGENCY REVOCABLE ENCROACHMENT PERMIT** is issued in accordance with the fee schedule adopted by the City Council on June 14, 2005, Resolution No. 72737, which designates a "Cost plus" fee for recovery of the City's expense for plan review and inspection. The City may waive these fees at its sole discretion when in the interest of the City. The Permittee will be invoiced monthly for time and material cost accrued by City Staff to perform all activities necessitated by the project.

If applicable, permit fee estimate will be provided to the permittee after complete submittal is received.

(CITY USE ONLY)

CSJ RECEIVED BY: _____ **DATE:** _____ **TIME:** _____ AM / PM

- ❑ Reason for encroachment Date: _____
- ❑ Description of Work Date: _____
- ❑ Insurance Certificate Date: _____
- ❑ Traffic Control Plan Date: _____
- ❑ Site Plan Date: _____

SPECIAL CONDITIONS AND COMMENTS: _____

- ❑ Permit Complete Date: _____
- ❑ Permit Signed Date: _____
- ❑ Notification of Completion Date: _____

_____
INSPECTOR ASSIGNED

_____
PERMIT NUMBER

Revised:2/17/2010

CITY OF CAMPBELL
DEPT. OF PUBLIC WORKS
70 North First Street
Campbell, CA 95008
Ph. (408) 866-2150
Fx. (408) 376-0958

ENCROACHMENT PERMIT
(for working within the public right-of-way)

Issued _____

Permit Expiration Date _____

Permit No.: _____
X-Ref. File _____
Application Date _____

Application Expiration Date _____
APN _____

APPLICATION - Application is hereby made for a Public Works Permit in accordance with Campbell Municipal Code, Section 11.04. (Application expires in six (6) months if the permit is not issued. Application Fee is non-refundable.)

A. Work Address : _____

B. Nature of Work/Utility Trench Location: _____

☐ No Fee Permit for work related to City Project Project Name: _____

C. Attach four (4) copies of an engineered plan showing the location and extent of the work, and four (4) copies of the preliminary Engineer's Estimate of work. The plans shall show the relation of the proposed work to existing surface and underground improvements. When approved by the City Engineer, said plan becomes a part of this permit.

D. All work shall conform to the City of Campbell Standard Specifications and Details for Public Works Construction; the General Permit Conditions listed on the reverse side; and the Special Provisions for this permit, listed below. Failure to abide by these conditions and provisions may result in job shutdown and/or forfeiture of Faithful Performance Sureties and cash deposits.

E. The Contractor must have this permit and approved plans at the site and must notify the Public Works Department at least two days before starting work. Notice must be given to Public Works at least 24 hours before restarting any work.

Name of Applicant: _____ Telephone: _____

Address: _____

E-Mail Address: _____ 24-HOUR EMERGENCY PHONE NUMBER: _____

Is this work being done by the property owners at their own residence? ☐ Yes ☐ No

The Applicant/Permittee hereby agrees by affixing their signature to this permit to hold the City of Campbell, its officers, agents, and employees free, safe and harmless from any claim or demand for damages resulting from the work covered by this permit.

The Applicant/Permittee hereby acknowledges that they have read and understand both the front and back of this permit, and they will inform their contractor(s) of the information. Applicant is advised that upon issuance of this permit, property owner, or property owner's successors, shall be responsible for any and all damages arising out of improvements completed in the public right-of-way.

Accepted: _____
(Applicant Permittee) (sign) Date

_____
(Contractor) (Print Name) Date

SPECIAL PROVISIONS:

___ 1. Street shall not be open cut for underground installations. Minimum cuts may be allowed for connections or exploration holes. Such cuts may be specifically approved by the Inspector prior to cutting.
___ 2. Pavement may be cut for underground installations and must be restored in accordance with the Standard Details Trench Restoration Method "A", unless otherwise approved by the Engineer.
___ 3. Work to be staked by a licensed Land Surveyor or Civil Engineer and two (2) copies of the cut sheets sent to the Public Works Department before starting work.
___ 4. Per section 4216 of the Government Code this permit is not valid for excavations until Underground Service Alert (USA) has been notified and the inquiry identification number has been entered hereon. USA Phone: 1-800-227-2600. USA TICKET NO._____
___ 5. Prior to any work, the property owner shall execute an Agreement for Private Improvements in the Public Right-of-way, which shall be recorded.
___ 6 . Public Notification Requirements: _____
___ 7. _____

SEE PUBLIC WORKS FEE SCHEDULE FOR CURRENT FEES	AMOUNT	RECEIPT NO.
PERMIT APPLICATION FEE	$_____	_____
PLAN CHECK DEPOSIT	$_____	_____
SECURITY FOR FAITHFUL PERFORMANCE/LABOR & MATERIALS	$_____	_____
CONSTRUCTION CASH DEPOSIT	$_____	_____
PLAN CHECK & INSPECTION FEE	$_____	_____
2% TECHNOLOGY FEE	$_____	_____
TRAFFIC CONTROL REVIEW	$_____	_____

APPROVED FOR ISSUANCE _____
For City Engineer
Permit Expires 12 Months After Date of Issuance

GENERAL PERMIT CONDITIONS

1. The Permittee must provide evidence of insurance and Additional Insured Endorsements as required by the City. Insurance shall be maintained for the duration of the permit work.
2. A Construction Cash Deposit is required. Changes will be made against this deposit if there is an emergency call-out, overtime inspection or when City ordered barricading is required. Any such costs in excess of the deposit will be billed to the Permittee.
3. Faithful Performance Surety and Labor and Materials Surety are required.
4. Refund of the construction cash deposit balance and refund or cancellation of the sureties will be initiated by the written acceptance of the work by the City.
5. A one-year maintenance period and surety are required. Such period will begin on date of written acceptance by the City. Surety posted shall be equal to 25% of the original Faithful Performance Security.
6. Submit project schedule 10 (ten) days prior to proposed start of work. Additional lead time may be required for work within City facilities and downtown Campbell.
7. The Permittee must request in writing a final inspection and acceptance of the work upon completion. Acceptance by the City will be made in writing to the Permittee.
8. Maintain safe pedestrian and vehicular crossings and free access to private driveways, bus stops, fire hydrants, and water valves.
9. A Construction Traffic Control Plan and a Construction Schedule are required for all lane closures, detours, and street closures. This plan must be reviewed and approved prior to any lane closures.
10. A Construction Traffic Control Plan shall conform to the most recent version of the California Manual on Uniform Traffic Control Devices (MUTCD).
11. Replace, as directed by the City Engineer, any damaged or removed improvements in accordance with City Standards and Specifications at the sole expense of the Permittee as expeditiously as possible.
12. Sawcut for all PCC or AC removals. All PCC removals shall be to the nearest scoremark and new PCC shall be doweled to existing improvements.
13. Prior approval of inspector is required for any work proposed after normal working hours, on weekends or holidays and may require reimbursement of inspection costs at the current overtime rate.
14. Work on arterials and collectors may require the use of changeable message boards. Adequate signing and barricading is required on the job site. Failure to provide such signing and barricading may result in the City's providing signing and barricades and charging the cost (including all labor and materials) against the construction cash deposit.
15. Compaction testing of subgrade, base rock, and asphalt concrete by Permittee is required unless otherwise stated by the City Engineer.
16. The Contractor or Permittee will have a supervisory representative available for contact on the project at all times during construction. Contractor or Permittee shall provide a phone number at which they can be contacted outside the hours of 8:00 a.m. to 4:00 p.m. and on weekends.
17. No storage of materials or equipment will be allowed near the edge of the pavement, the traveled way, or within the shoulderline which would create a hazardous condition to the public.
18. This permit shall not be construed as authorization for excavation and grading on private property adjacent to the work or any other work for which a separate permit may be required, nor does it relieve the Permittee of any obligation to obtain any other permit required by law.
19. This permit does not release the Permittee from any liabilities contained in other agreements or contracts with the City and any other public agency.
20. This permit is not transferable. Work must be performed by the Permittee or his designated agent or contractor as specified thereon.
21. Call back (call out) due to emergencies regarding this permit shall be at the current overtime rate with a three (3) hour minimum charge per occurrence.
22. Pursuant to Chapter 14.02 of the Campbell Municipal Code, applicant shall not cause to be discharged any material into the municipal storm drain system other than storm water. Applicant shall adhere to the BEST MANAGEMENT PRACTICES established by the Santa Clara Valley Urban Runoff Pollution Prevention Program.
23. If the public interest requires a modification of, or a departure from the permit, plans, special provisions and/or specifications, the City shall have the authority to require or approve any modification or departure and to specify the manner in which the same is to be made.
24. Permittee must provide advance notification to all parties that may be affected by the permit activities. Notification shall be reviewed by the City prior to distribution and include dates of work and a contact name and a phone number.
25. Applicant shall remove water from utility vaults in accordance with the requirements of State Water Resources Control Board Water Quality Order WQ 2014-0174-DWQ. Said vault water shall not be discharged into the City of Campbell's storm drain system.
    See http://www.waterboards.ca.gov/water_issues/programs/npdes/utilityvaults.shtml for more information.

Applicant is hereby responsible for ensuring that all those providing services under the applicant are aware of and abide by all of the above conditions.

Applicant _____ Date: _____

Contractor (Print Name) _____ Date: _____

J:\FORMS\Templates\Encroachment Permits\Encroachment Permit 5 9 19

ENCROACHMENT PERMIT

[redacted]
Permit Number

City of Campbell, Public Works Department, 70 N 1st St, Campbell CA 95008
Telephone: 408-866-2150, Website: www.campbellca.gov

Permit Type Encroachment Permit - Utility Work (OLD)		Issue Date
Project Address / Location [redacted]		Expiration Date
Project Description [redacted]		
Applicant / Permittee [redacted]	Mobile #	Work # [redacted]
Contractor's Name [redacted]	Mobile #	Work #
	License #	

Permit Fees	
Traffic Control Plan Review Fee (720.4728)	$230.00
Technology Enhancement Fee (554.4214)	$27.56
Encroachment Permit - Utility Work Application Fee (740.4722)	$574.00
Encroachment Permit - Utility Work Inspection Fee (740.4722)	$574.00

Special Provisions, Working Hours, Notes, etc.

SAMPLE

1. All work shall conform to the City of Campbell Standard Specifications and Details for Public Works Construction; the General Permit Conditions listed on the reverse side; and the Special Provisions for this permit, listed above. Failure to abide by these conditions and provisions may result in job shutdown and/or forfeiture of Faithful Performance Sureties and cash deposits.
2. The Contractor must have this permit and approved plans at the site and must notify the Public Works Department at least two days before starting work. Notice must be given to Public Works at least 24 hours before restarting any work.
3. Per section 4216 of the Government Code this permit is not valid for excavations until Underground Service Alert (USA) has been notified and the inquiry identification number has been entered heron. USA Phone: 1-800-227-2600.
4. The Applicant/Permittee hereby agrees by affixing their signature to this permit to hold the City of Campbell, its officers, agents, and employees free, safe and harmless from any claim or demand for damages resulting from the work covered in this permit.
5. The Applicant/Permittee hereby acknowledges that they have read and understand all pages of this permit and they will inform their contractor(s) of the information. Applicant is advised that upon issuance of this permit, property owner, or property owner's successors, shall be responsible for any and all damages arising out of improvements completed in the public right-of-way.

SEE PAGE 2 FOR REQUIRED INSPECTION SEQUENCE

Call 408-866-2150
to request an inspection.

Permit #[redacted]

Inspection Sequence

[redacted]	[redacted]

Conditions and Restrictions

1. The Permittee must provide evidence of insurance and Additional Insured Endorsements as required by the City. Insurance shall be maintained for the duration of the permit work.
2. A Construction Cash Deposit is required. Charges will be made against this deposit if there is an emergency call-out, overtime inspection or when City ordered barricading is required. Any such costs in excess of the deposit will be billed to the Permittee.
3. Faithful Performance Surety and Labor and Materials Surety are required.
4. Refund of the construction cash deposit balance and refund or cancellation of the sureties will be initiated by the written acceptance of the work by the City.
5. A one-year maintenance period and surety are required. Such period will begin on date of written acceptance by the City. Surety posted shall be equal to 25% of the original Faithful Performance Security.
6. Submit project schedule ten (10) days prior to proposed start of work. Additional lead time may be required for work within City facilities and downtown Campbell.
7. The Permittee must request in writing a final inspection and acceptance of the work upon completion. Acceptance by the City will be made in writing to the Permittee.
8. Maintain safe pedestrian and vehicular crossings and free access to private driveways, bus stops, fire hydrants, and water valves.
9. A Construction Traffic Control Plan and a Construction Schedule are required for all lane closures, detours, and street closures. This plan must be reviewed and approved prior to any lane closures.
10. A Construction Traffic Control Plan shall conform to the most recent version of the California Manual on Uniform Traffic Control Devices (MUTCD).
11. Replace, as directed by the City Engineer, any damaged or removed improvements in accordance with City Standards and Specifications at the sole expense of the Permittee as expeditiously as possible.
12. Sawcut for all PCC or AC removals. All PCC removals shall be to the nearest scoremark and new PCC shall be doweled to existing improvements.
13. Prior approval of inspector is required for any work proposed after normal working hours, on weekends or holidays and may require reimbursement of inspection costs at the current overtime rate.
14. Work on arterials and collectors may require the use of changeable message boards. Adequate signing and barricading is required on the job site. Failure to provide such signing and barricading may result in the City's providing signing and barricades and charging the cost (including all labor and materials) against the construction cash deposit.
15. Compaction testing of subgrade, base rock, and asphalt concrete by Permittee is required unless otherwise stated by the City Engineer.
16. The Contractor or Permittee will have a supervisory representative available for contact on the project at all times during construction. Contractor or Permittee shall provide a phone number at which they can be contacted outside the hours of 8:00 a.m. to 4:00 p.m. and on weekends.
17. No storage of materials or equipment will be allowed near the edge of the pavement, the traveled way, or within the shoulder line which would create a hazardous condition to the public.
18. This permit shall not be construed as authorization for excavation and grading on private property adjacent to the work or any other work for which a separate permit may be required, nor does it relieve the Permittee of any obligation to obtain any other permit required by law.
19. This permit does not release the Permittee from any liabilities contained in other agreements or contracts with the City and any other public agency.
20. This permit is not transferable. Work must be performed by the Permittee or his designated agent or contractor as specified thereon.
21. Call back (call out) due to emergencies regarding this permit shall be at the current overtime rate with a three (3) hour minimum charge per occurrence.
22. Pursuant to Chapter 14.02 of the Campbell Municipal Code, applicant shall not cause to be discharged any material into the municipal storm drain system other than storm water. Applicant shall adhere to the BEST MANAGEMENT PRACTICES established by the Santa Clara Valley Urban Runoff Pollution Prevention Program.
23. If the public interest requires a modification of, or a departure from the permit, plans, special provisions and/or specifications, the City shall have the authority to require or approve any modification or departure and to specify the manner in which the same is to be made.
24. Permittee must provide advance notification to all parties that may be affected by the permit activities. Notification shall be reviewed by the City prior to distribution and include dates of work and a contact name and a phone number.
25. Applicant shall remove water from utility vaults in accordance with the requirements of State Water Resources Control Board Water Quality Order WQ 2014-0174-DWQ. Said vault water shall not be discharged into the City of Campbell's storm drain system.
See http://www.waterboards.ca.gov/water_issues/programs/npdes/utilityvaults.shtml for more information.
26. Standard working hours are 9am to 3pm on Arterials, and 8am to 4pm on all other streets unless specifically stated on page 1 of this permit.

SAMPLE

TOWN OF LOS GATOS PARKS & PUBLIC WORKS DEPT.
41 MILES AVE. LOS GATOS, CA 95030
(408) 399-5771 FAX: (408) 399-5763
WWW.LOSGATOSCA.GOV

ENCROACHMENT PERMIT APPLICATION

Application Date: _____ Permit No. EN_____

Project Address:_____ A.P.N.:_____

Work Description:_____

Location of Work (if not at address frontage):_____

Cost of Work in the Public Right-of-Way (Required):_____ Depth of Trench:_____

Estimated Date of Completion of Work:_____ Your Job #_____

ADDITIONAL INFORMATION:

1. Property Owner/Applicant (circle one):

Name:_____ E-mail:_____

Address:_____ Phone:_____ Fax:_____

City:_____ State:_____ Zip:_____

NOTE: The information on the contractor must be supplied to the Engineering Inspector prior to the start of construction.

2. General Contractor in charge of work at the site:

Name:_____ E-mail:_____

Firm:_____ Town Business License No:_____

License No.:_____ Class:_____ Exp. Date:_____

Address:_____ Phone:_____ Fax:_____

City:_____ State:_____ Zip:_____

Any questions regarding Encroachment Permits, please call Eric Christianson, Engineering Inspector at (408) 354-6824. All work in the Public Right-of-Way requires an Encroachment Permit. Failure to obtain a Permit may result in penalties per Town Code - Chapter 23, Article III, Encroachments. (It may take up to 10 working days to process this application)

SIGNATURE OF OWNER (REQUIRED):

_____ Date:_____

Print Name:_____ Title:_____

SIGNATURE OF APPLICANT (IF OTHER THAN OWNER):

_____ Date:_____

Print Name:_____ Title:_____

FOR OFFICIAL USE ONLY:

Indemnity Agreement Required: Yes No Date Returned:_____
(circle one)

Approved by:_____ Date:_____

Notes:

COUNTY OF SANTA CLARA – ROADS AND AIRPORTS DEPARTMENT

ENCROACHMENT PERMIT APPLICATION

ALL WORK IN THE COUNTY ROAD RIGHT OF WAY REQUIRES AN ENCROACHMENT PERMIT FROM THE ROADS AND AIRPORTS DEPARTMENT. EACH INDIVIDUAL ACTIVITY REQUIRES A SEPARATE PERMIT- I.E. CABLE, ELECTRIC, GAS, SEWER, WATER, RETAINING WALLS, DRIVEWAY APPROACHES, FENCES, LANDSCAPING, ETC.

TO BE COMPLETED BY PERMIT APPLICANT:

Section A – Applicant Information

Applicant:_____ Owner:_____

Mailing Address:_____ **Email**:_____

City:_____ State:_____ Zip:_____ Phone:_____

Site Address:_____ Alt. Phone:_____

_____ Date: _____

Briefly describe the proposed work or activity to take place in the County Right-of-Way (Example: describe what is existing to be removed and/or what is proposed to be installed, within the Right-of-Way):

_____

_____

_____

_____

_____

_____.

Building Plan Check No.(if any):_____

Planning File No.(if any):_____

Please be aware that all work occurring within the County of Santa Clara road right-of way requires implementation of construction Best Management Practices (BMP'S) for storm water pollution prevention. (California Stormwater Quality Association (CASQA) Construction BMP Handbook, www.casqa.org).

By signing below I am acknowledging my having been informed of this responsibility.

_____ _____

Signature Date

_____

Staff Initials

STANDARD ENCROACHMENT PERMIT APPLICATION

TR-0100 (REV 12/2018)

FOR CALTRANS USE
TRACKING NO.
DIST/CO/RTE/PM
SIMPLEX STAMP
DATE OF SIMPLEX STAMP

Complete ALL fields, write "N/A" if not applicable. Type or print clearly.

This application is not complete until all requirements have been approved.

Permission is requested to encroach on the State Highway right-of-way as follows:

1. COUNTY	2. ROUTE	3. POST MILE
4. ADDRESS OR STREET NAME	5. CITY	
6. CROSS STREET (Distance and direction from project site)		

7. WORK TO BE PERFORMED BY
☐ APPLICANT ☐ CONTRACTOR

8. IS THIS APPLICATION FOR THE CONTRACTOR'S (DOUBLE) PERMIT?
☐ NO ☐ YES. If "YES", provide the Parent Permit Number

9. ESTIMATE START DATE

10. ESTIMATED COMPLETION DATE

11. ESTIMATED NUMBER OF WORKING DAYS WITHIN STATE HIGHWAY RIGHT-OF-WAY

12. ESTIMATED CONSTRUCTION COSTS WITHIN STATE HIGHWAY RIGHT-OF-WAY

13. HAS THE PROJECT BEEN REVIEWED BY ANOTHER CALTRANS BRANCH?
☐ NO ☐ YES. If "YES", which branch?

14. FUNDING SOURCE(S)
☐ FEDERAL ☐ STATE ☐ LOCAL ☐ PRIVATE ☐ SB 1 (ROAD REPAIR AND ACCOUNTABILITY ACT OF 2017)

15. CALTRANS PROJECT CODE (ID)

16. APPLICANT'S REFERENCE / UTILITY WORK ORDER NUMBER

17. DESCRIBE WORK TO BE DONE WITHIN STATE HIGHWAY RIGHT-OF-WAY (in 20 lines or less)
Attach 6 complete sets of plans (folded to 8.5" x 11") and any applicable specifications, calculations, maps, traffic control plans, etc.

18 (a). PORTION OF STATE HIGHWAY RIGHT-OF-WAY WHERE WORK IS BEING PROPOSED (check all that apply)
☐ Traffic lane ☐ Shoulder ☐ Sidewalk ☐ Median ☐ At or near an intersection ☐ Mobile work
☐ Outside of the shoulder, feet from edge of pavement ☐ Other _____

18 (b). PROPOSED TRAFFIC CONTROL PLANS AND METHOD
☐ No traffic control needed ☐ State Standard Plans (T-Sheets) # _____
☐ Project specific Traffic Control Plans included ☐ To be submitted by contractor

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STANDARD ENCROACHMENT PERMIT APPLICATION

TR-0100 (REV 12/2018)

TRACKING NO.

19. EXCAVATION	MAX. DEPTH (in)	MIN. DEPTH (in)	AVG. WIDTH (in)	LENGTH (ft)	SURFACE TYPE (e.g. Asphalt, concrete, soil, etc.)

20. PIPES	PRODUCT BEING TRANSPORTED	CARRIER PIPE DIAMETER_____(in.) MATERIAL_____	CASING PIPE DIAMETER_____(in.) MATERIAL_____

PROPOSED INSTALLATION METHOD (e.g. HDD, Bore & Jack, Open Cut, etc.)	VOLTAGE / PSIG

DOES THE PROPOSED PROJECT INVOLVE THE REPLACEMENT AND/OR ABANDONMENT OF AN EXISTING FACILITY?

☐ NO ☐ YES. If "YES", provide a description

21. IS A CITY, COUNTY OR OTHER PUBLIC AGENCY INVOLVED IN THE APPROVAL OF THIS PROJECT?

☐ YES (if "YES", check the type of project AND attach the environmental documentation and conditions of approval)

☐ COMMERCIAL DEVELOPMENT ☐ BUILDING ☐ GRADING ☐ OTHER _____

☐ CATEGORICALLY EXEMPT ☐ NEGATIVE DECLARATION ☐ ENVIRONMENTAL IMPACT REPORT ☐ OTHER _____

☐ NO (if "NO", check the category below which best describes the project AND answer questions A-K)

☐ DRIVEWAY OR ROAD APPROACH, RECONSTRUCTION, MAINTENANCE OR RESURFACING ☐ FENCE ☐ EROSION CONTROL

☐ PUBLIC UTILITY MODIFICATION, EXTENSIONS, HOOKUPS ☐ MAILBOX ☐ LANDSCAPING

☐ FLAGS, SIGNS, BANNERS, DECORATIONS, PARADES AND CELEBRATIONS ☐ OTHER _____

The following questions must be answered when a City, County or other public agency IS NOT involved in the approval of this project.

Your answers to these questions will assist Caltrans staff in identifying any physical, biological, social or economic resources that may be affected by your proposed project within State Highway right-of-way and to determine which type of environmental studies may be required to approve your application for an encroachment permit. It is the applicant's responsibility for the production of all required environmental documentation and supporting studies and in some cases this may be costly and time consuming. If possible, attach photographs of the location of the proposed project. Answer these questions to the best of your ability. Provide a description of any "YES" answers (type, name, number, etc.).

A. Will any existing vegetation and/or landscaping within State Highway right-of-way be disturbed?

B. Are there waterways (e.g. river, creek, pond, natural pool or dry streambed) adjacent to or within the limits of the proposed project?

C. Is the proposed project located within five miles of the coast line?

D. Will the proposed project generate construction noise levels greater than 86 decibels (dBA) (e.g. Jack-hammering, pile driving)?

E. Will the proposed project incorporate land from a public park, recreation area or wildlife refuge open to the public?

F. Are there any recreational trails or paths within the limits of the proposed project?

G. Will the proposed project impact any structures, buildings, rail lines or bridges within State Highway right-of-way?

H. Will the proposed project impact access to any businesses or residences?

I. Will the proposed project impact any existing public utilities or public services?

J. Will the proposed project impact any existing pedestrian facilities, such as sidewalks, crosswalks or overcrossings?

K. Will new lighting be constructed within or adjacent to State Highway right-of-way?

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22. Will the proposed project cause a substantial change in the significance of a historical resource (45 years or older), or cultural resource? ☐ YES ☒ NO (if "YES", provide a description)

23. Will the proposed project be on an existing State Highway or street where the activity involves removal of a scenic resource? (e.g. A significant tree or stand of trees, a rock outcropping or a historic building) ☐ YES ☒ NO (if "YES", provide a description)

24. Is work being done on the applicant's property in addition to State Highway right-of-way? ☐ YES ☒ NO
(If "YES", attach 6 complete sets of site and grading plans)

25. Will the proposed project require the disturbance of soil? ☐ YES ☒ NO
If "YES", estimate the area of disturbed soil within State Highway right-of-way in acres: _____
and estimate the area of disturbed soil outside State Highway right-of-way in acres: _____

26. Will the proposed project require dewatering? ☒ YES ☐ NO
If "YES", estimate Total gallons AND gallons/month. _____ (Total gallons) AND _____ (gallons/month)
SOURCE*: ☐ STORMWATER ☐ NON-STORMWATER
(*See Caltrans SWMP for definition of non-storm water discharge: http://www.dot.ca.gov/env/stormwater/)

27. How will any storm water or ground water be disposed?
☐ Storm Drain System ☐ Combined Sewer / Stormwater System ☐ Stormwater Retention Basin ☐ N/A
☐ Other (explain) _____

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STANDARD ENCROACHMENT PERMIT APPLICATION

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TRACKING NO.

READ THE FOLLOWING CLAUSES PRIOR TO SIGNING THIS ENCROACHMENT PERMIT APPLICATION.

The applicant's submission of this application to the California Department of Transportation constitutes the applicant's agreement and representation that the work or other activity contemplated by the encroachment permit application shall comply with all applicable standards, specifications, policies, requirements, conditions, and regulations of the California Department of Transportation, and the applicant understands the application may be denied if there is non-compliance with any of the above. An exception process exists and may result in approval of a non-compliant encroachment, in the discretion of the California Department of Transportation, but the exception process may require additional time to complete. The applicant understands and agrees all work or other activity contemplated by the encroachment permit application is subject to inspection and oversight by the California Department of Transportation. The applicant understands and agrees encroachment permit fees must still be paid if an application is withdrawn or denied. The applicant understands a denial may be appealed, in accordance with California Streets and Highways Code, Section 671.5, and the related regulations found in California Code of Regulations, Title 21, Division 2, Chapter 8, Article 2.

The applicant understands and agrees that immediately upon issuance of the encroachment permit the applicant is bound by, subject to, and must comply with the "Encroachment Permit General Provisions" (TR-0045), "Stormwater Special Provisions" (TR-0400) and any other applicable Special Provisions and Conditions of the encroachment permit. The "Encroachment Permit General Provisions" (TR-0045), and the Stormwater Special Provisions (TR-0400) are available at: http://www.dot.ca.gov/trafficops/ep/docs/Appendix_K_(WEB).pdf. If a paper copy is needed of the "Encroachment Permit General Provisions" (TR-0045) and/or "Stormwater Special Provisions" (TR-0400), please contact the District Office of Encroachment Permits. Their contact information is available at: http://www.dot.ca.gov/trafficops/ep/docs/Appendix_G_(WEB).pdf. The "Encroachment Permit General Provisions" (TR-0045) and any other applicable Special Provisions and Conditions will be provided as part of the encroachment permit. Information about Stormwater requirements is available at the Internet address: http://www.dot.ca.gov/hq/construc/stormwater/.

The applicant understands an encroachment permit may be denied, revoked, and/or a bond may be required, for non-payment of prior or present encroachment permit fees. An encroachment permit is not a property right and does not transfer with the property to a new owner. Each of the persons purporting to execute this application on behalf of the applicant and/or on behalf of the applicant's authorized agent or engineer represents and warrants such person has full and complete legal authority to do so and to thereby bind applicant to the terms and conditions herein and to the terms and/or conditions of the encroachment permit. Applicant understands and agrees this application may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Executed copies of this application and/or its counterparts may be reproduced and/or exchanged by copy machine, mailing, facsimile, or electronic means (such as e-mail), and such copies shall be deemed to be effective as originals.

28. NAME OF APPLICANT (Project or Property Owner or Organization)		
ADDRESS OF APPLICANT (Include City, State and Zip Code)		
E-MAIL ADDRESS	PHONE NUMBER	FAX NUMBER
29. NAME OF AUTHORIZED AGENT / ENGINEER (A "Letter of Authorization" is required if different from #28)		IS A LETTER OF AUTHORIZATION ATTACHED? ☐ YES ☐ NO
ADDRESS OF AUTHORIZED AGENT / ENGINEER (Include City, State and Zip Code)		
E-MAIL ADDRESS	PHONE NUMBER	FAX NUMBER
30. NAME OF BILLING CONTACT (Same as #28 ☐ Same as #29 ☐)		
BILLING ADDRESS WHERE INVOICE(S) IS / ARE TO BE MAILED (Include City, State and Zip Code)		
E-MAIL ADDRESS	PHONE NUMBER	FAX NUMBER

* I hereby certify under penalty of perjury under the laws of the State of California that the information in this application and any document submitted with or in support of this application are true and correct to the best of my knowledge and belief, and that copies of any documents submitted with or in support of this application are true and correct copies of unaltered original documents. I further understand that if I have provided information that is false, intentionally incomplete, or misleading I may be charged with a crime and subjected to fine or imprisonment, or both fine and imprisonment. (Penal Code Section 72)

31. SIGNATURE OF APPLICANT OR AUTHORIZED AGENT*	32. PRINT OR TYPE NAME	
33. TITLE		34. DATE

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STANDARD ENCROACHMENT PERMIT APPLICATION

TR-0100 (REV 12/2018)

INSTRUCTIONS

Complete ALL fields, write "N/A" if not applicable. Type or print clearly. All dimensions must be in U.S. Customary (English) units.

Print your application single sided and submit all of the required attachments (See Section VII A&B of the "Encroachment Permit Application Guide Booklet" found at: http://www.dot.ca.gov/trafficops/ep/docs/EP_Application_Guide_Booklet.pdf).

1. County (e.g. Fresno, San Francisco, Los Angeles, etc.)
2. State Highway Route Number (e.g. I-5, SR-99, etc.)
3. Highway Postmile: (location of work, see https://postmile.dot.ca.gov/) If unable to determine, contact the appropriate District Encroachment Permits Office for assistance at: http://www.dot.ca.gov/trafficops/ep/docs/Appendix_G_(WEB).pdf
4. Address of project site (if the property has a physical address with a Number and Street/Road Name)
5. City (e.g. Sacramento, Redding, Irvine, etc.)
6. Distance and the direction from the nearest cross street to the project site (e.g. 500 ft. north of "C" Street).
7. Indicate whether the work will be performed by the applicant (your own forces) or by a contractor.
8. Indicate if you are applying for a "Contractor's (Double) Permit" and provide the “Parent Permit Number”.
9. Estimated start date for the proposed work. (Allow a minimum of 60 calendar days from the submittal date of your application for processing)
10. Estimated completion date for the proposed work.
11. Estimated number of working days within State Highway right-of-way.
12. Estimated construction costs for all work to be done within State Highway right-of-way.
13. Has another Caltrans' branch seen or reviewed your project? Which branch? (e.g. Design, Project Management, Right-of-Way, Environmental, etc.)
14. Identify funding source(s) for the proposed work.
15. Caltrans’ Project Code (ID) if this is a State project, capital project, or joint venture project.
16. Your company’s reference number or utility work order number for this project.
17. Describe the proposed work to be done entirely. If applicable, attach six (6) complete sets of FOLDED plans (folded 8-½” X 11”) and any applicable specifications, calculations, maps, etc.
18. (a) Identify portion(s) of State right-of-way where work will occur and (b) proposed traffic control plans to be used if any.
19. Maximum and minimum depth, average width, and length of the excavation area. Existing surface type (e.g. Asphalt, concrete, soil, etc.)
20. Product being transported (e.g. water, natural gas, etc.) Carrier pipe, diameter (inches) and material (e.g. Steel, HDPE, etc.) Casing pipe (if any), diameter and material Proposed installation method, Voltage of electrical current or pressure of liquid or gas. Replacement and/or abandonment of an existing facility (e.g. Abandoning pipe and filling it with two-sack slurry cement)
21. Check “YES”, if you are getting a permit or approval from another agency (City, County, etc.), and an environmental determination has been made. Then check the Categorically Exempt, Negative Declaration, Environmental Impact Report box or Other if one has been prepared. Attach a copy of the approved document and a copy of the Notice of Determination. Skip questions A-K.

    If you checked “NO”, check the box of the appropriate type of work to be done,or check “other” and fill in the type of work to be done. Also answer questions A-K.
22. A Historical Resource includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript that has historical or archaeological significance, or significance in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.
23. In this context a Scenic Resource includes, but is not limited to, trees that display outstanding features of form or age; unique, massive rock formations; historic buildings that are rare examples of their period, style, design, or which have special architectural features and details of importance.
24. Is there any work being done on the applicant’s property?
25. Indicate if the proposed project will require the disturbance of soil. If “YES,” estimate the area within AND outside of State Highway right-of-way in acres.
26. Indicate if the proposed project will require dewatering. If “YES,” estimate volume in total gallons AND gallons per month. Also indicate the source: Stormwater or Non-Stormwater (see Caltrans Stormwater Management Plan for definitions of non-stormwater discharge at: http://www.dot.ca.gov/hq/env/stormwater).
27. Indicate how any stormwater or ground water will be disposed of from or near the limits of the proposed project.
28. Name of the applicant or organization applying for the permit. List the mailing address, e-mail address, phone and fax numbers.
29. Name of the authorized agent or engineer acting on behalf of the applicant or organization. Attach a letter of authorization signed by the applicant or organization. List the mailing address, e-mail address, phone and fax numbers.
30. Name of the billing contact. List the mailing address where invoices are to be mailed, email address, phone and fax numbers.
31. Signature of the applicant or applicant's authorized agent.
32. Name of the applicant or applicant's authorized agent.
33. Title (owner, president, etc.) of the applicant or applicant's authorized agent.
34. Date of the signature.

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Notes:
1. Raw water will be pumped to storm inlets from nozzles along CPL via pumps and dewatering hoses sized to meet discharge rates.
2. For City of San Jose Storm Drain Inlet and Outfall locations, visit: https://www.sanjoseca.gov/your-government/departments/public-works/resources.
3. For City of Campbell Storm Drain Inlet and Outfall locations, visit:
http://www2.lynxgis.com/Html5Viewer/Index.html?configBase=http://www2.lynxgis.com/Geocortex/Essentials/REST/sites/CampbellPublic/viewers/Campbell/virtualdirectory/Resources/Config/Default.
4. Internal pumpout of water at CP-62 and CP-68 shall be pumped internally to CP-59.

Pipeline	Discharge Site	Vault Number	Vault Station	Storm Inlet	Storm Outfall	Discharge Body	Max Discharge Rate
CPL	1	CP-18	126+20.00	-	-	Upper Penitencia Creek	3 CFS
CPL	2	CP-22	154+85.00	-	-	Coyote Creek	5 CFS
CPL	2	CP-22	154+85.00	-	-	Coyote Creek	5 CFS
CPL	3	CP-29	186+25.00	City of San Jose ID 17679	City of San Jose ID 607 City of San Jose ID 608	Guadalupe River	3 CFS
CPL	4	CP-34	215+17.75	City of San Jose ID 18172	City of San Jose ID 607 City of San Jose ID 608	Guadalupe River	3 CFS
CPL	5	CP-36	228+96.80	City of San Jose ID 18396	City of San Jose ID 607 City of San Jose ID 608	Guadalupe River	3 CFS
CPL	6	CP-45	273+24.00	-	-	Guadalupe Secondary Channel	5 CFS
CPL	6	CP-45	273+24.00	-	-	Guadalupe Secondary Channel	5 CFS
CPL	7	CP-56A	371+24.52	City of San Jose ID 2587	City of San Jose ID 527 City of San Jose ID 528 City of San Jose ID 623 City of San Jose ID 624	City of San Jose ID 527 - Guadalupe Secondary Channel City of San Jose ID 528 - Guadalupe Secondary Channel City of San Jose ID 623 - Guadalupe River City of San Jose ID 624 - Guadalupe River	1.5 CFS
CPL	8	CP-59	386+62.00	City of San Jose ID 2600	City of San Jose ID 527 City of San Jose ID 528 City of San Jose ID 623 City of San Jose ID 624	City of San Jose ID 527 - Guadalupe Secondary Channel City of San Jose ID 528 - Guadalupe Secondary Channel City of San Jose ID 623 - Guadalupe River City of San Jose ID 624 - Guadalupe River	3 CFS
CPL	10	CP-64	424+22.00	Santa Clara County 2686	City of San Jose ID 232	Los Gatos Creek	2.5 CFS
CPL	12	CP-70	465+68.64	City of San Jose ID 879	City of San Jose ID 232	Los Gatos Creek	3 CFS
CPL	13	CP-74	508+94.00	City of Campbell ID L13-01-MH	City of Campbell ID L13-01-OF	Los Gatos Creek	3 CFS
CPL	14	CP-75	517+10.00	City of Campbell ID L12-57-CB	City of Campbell ID L12-01-OF	Los Gatos Creek	3 CFS

Pipeline	Discharge Site	Vault Number	Vault Station	Storm Inlet	Storm Outfall	Discharge Body	Max Discharge Rate
CPL	15	CP-78	525+85.00	-	-	Los Gatos Creek	3 CFS
CPL	16	CP-81	552+13.89	-	-	Los Gatos Creek	5 CFS
CPL	17	CP-92	636+44.00	-	-	Los Gatos Creek	3 CFS
CPL	18	CP-101	666+47.00	-	-	Los Gatos Creek	3 CFS

APPENDIX F

Qualified Biologist

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Qualified Biologist

Qualified Biologists are professional biologists in any of the categories below who meet the minimum qualifications. The Qualified Biologist must possess educational and or professional training in ornithology, ichthyology, herpetology, mammalogy, water quality monitoring, habitat assessment and principals of wildlife management or conservation biology. The Qualified Biologist must be familiar with the species of birds, bird resources, and amphibians they are likely to encounter on District projects. The Qualified Biologists must have sufficient background experience to implement protocols, collect and organize ornithological and herpetological data and be capable of making appropriate decisions in the field.

***Knowledge of*:**

Basic principles and practices of ecology, biology, botany, wetlands science, wildlife management and related natural resources management. Pertinent federal, state and local codes, laws and regulations. Principles of business letter writing and basic report preparation.

***Ability to*:**

Perform scientific research, analysis and reporting. Learn to analyze and evaluate complex biological data and technical reports in order to make recommendations based on results and findings. Read and interpret maps, plans, specifications and contract documents. Learn specific quantitative techniques to evaluate resource functions and values. Learn computer programs and their biological resource applications. Learn monitoring techniques and data evaluation in order to develop and implement mitigation and monitoring programs. Learn to interpret and explain applicable environmental laws and regulations. Prepare clear and concise reports. Understand and carry out oral and written instruction. Maintain accurate notes and records. Communicate clearly and concisely, both orally and in writing. Establish and maintain effective working relationships with those contacted in the course of work.

***Experience and Training Guidelines (Qualified Biologist)*:**

- A minimum of five (5) years of academic training and professional experience in biological sciences and related resource management activities with a minimum of two (2) years conducting surveys for each species that may be present within the project area.

Experience and Training Guidelines (Qualified Biological Monitor):

- Several years of academic and professional experience in biological sciences and related resource management activities at it pertains to the Project.
- Experience with Construction-level biological monitoring
- Be able to recognize species that may be present within the project area
- Be familiar with the habits and behaviors of those species.

with a minimum of two (2) years conducting surveys for each species that may be present within the project area.

APPROVAL OF QUALIFIED BIOLOGIST AND BIOLOIGAL MONITOR SUBJECT TO APPROVAL BY CDFW AT LEAST TWO WEEKS PRIOR TO START OF CONSTRUCTION.

APPENDIX G

Migratory Bird Permit Memorandum

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, Washington, D C 20240

MBPM-2
Date: APR 15, 2003

MIGRATORY BIRD PERMIT MEMORANDUM

SUBJECT: Nest Destruction

PURPOSE: The purpose of the memorandum is to clarify the application of the Migratory Bird Treaty Act (MBTA) to migratory bird nest destruction, and to provide guidance for advising the public regarding this issue.

POLICY: The MBTA does not contain any prohibition that applies to the destruction of a migratory bird nest alone (without birds or eggs), provided that no possession occurs during the destruction. To minimize MBTA violations, Service employees should make every effort to inform the public of how to minimize the risk of taking migratory bird species whose nesting behaviors make it difficult to determine occupancy status or continuing nest dependency.

The MBTA specifically protects migratory bird nests from ***possession, sale, purchase, barter, transport, import,*** and ***export,*** and ***take.*** The other prohibitions of the MBTA – ***capture, pursue, hunt,*** and ***kill*** – are inapplicable to nests. The regulatory definition of ***take,*** as defined by 50 CFR 10.12, ***means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue hunt, shoot, wound, kill, trap, capture, or collect.*** Only ***collect*** applies to nests.

While it is illegal to collect, possess, and by any means transfer possession of any migratory bird nest, the MBTA does not contain any prohibition that applies to the destruction of a bird nest alone (without birds or eggs), provided that no possession occurs during the destruction. The MBTA does not authorize the Service to issue permits in situations in which the prohibitions of the Act do not apply, such as the destruction of unoccupied nests. (Some unoccupied nests are legally protected by statutes other than the MBTA, including nests of threatened and endangered migratory bird species and bald and golden eagles, within certain parameters.)

However, the public should be made aware that, while destruction of a nest by itself is not prohibited under the MBTA, nest destruction that results in the unpermitted take of migratory birds or their eggs, is illegal and fully prosecutable under the MBTA.

Due to the biological and behavioral characteristics of some migratory bird species, destruction of their nests entails an elevated degree of risk of violating the MBTA. For example, colonial nesting birds are highly vulnerable to disturbance; the destruction of unoccupied nests during or near the nesting season could result in a significant level of take. Another example involves

ground nesting species such as burrowing owls and bank swallows, which nest in cavities in the ground, making it difficult to detect whether or not their nests are occupied by eggs or nestlings or are otherwise still essential to the survival of the juvenile birds. The Service should make every effort to raise public awareness regarding the possible presence of birds and the risk of violating the MBTA, the Endangered Species Act (ESA), and the Bald and Golden Eagle Protection Act (BGEPA), and should inform the public of factors that will help minimize the likelihood that take would occur should nests be destroyed (i.e., when active nesting season normally occurs).

The Service should also take care to discern that persons who request MBTA permits for nest destruction are not targeting nests of endangered or threatened species or bald or golden eagles, so that the public can be made aware of the prohibitions of the ESA and the BGEPA against nest destruction.

In situations where it is necessary (i.e., for public safety) to remove (destroy) a nest that is occupied by eggs or nestlings or is otherwise still essential to the survival of a juvenile bird, and a permit is available pursuant to **50** CFR parts 13 and 21, the Service may issue a permit to take individual birds.

Steve Williams

Director

APPENDIX H

Central Pipeline Biological Report

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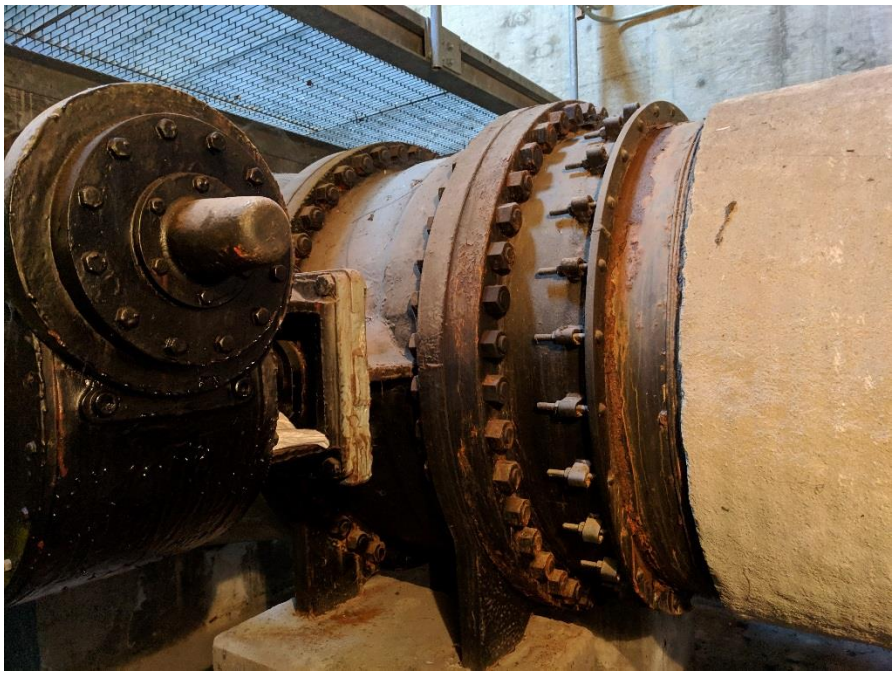
Central Pipeline Inspection and Rehabilitation Project

Biological Report to Support the Project's

Lake and Streambed Alteration Agreement Application



Prepared by:

Valley Water

5750 Almaden Expressway

San Jose, CA 95118

February 11, 2020

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Attachment B. USFWS IPAC System Report B-1

Section 1. Introduction

This Biological Report (Report) evaluates potential project impacts on sensitive biological resources within California Department of Fish and Wildlife's (CDFW) jurisdiction, under California Fish and Game Code (CFGC) 1600-1606, for Valley Water's proposed Central Pipeline Inspection and Rehabilitation Project (Project). Under CFGC 1600-1606, CDFW is responsible for the protection and conservation of many of the State's fish, wildlife, and sensitive habitats including bed and banks of river, lakes, and streams, and the surrounding riparian habitats to top of bank or the outer extent of the riparian canopy, whichever is greater. CDFW's primary nexus to this responsibility is through their Lake and Streambed Alteration Agreement (LSAA) program. This purpose of this Report is to support the Project's LSAA application, specifically Box 11 of the application, by providing a description of potential Project impacts on sensitive biological resources, that are present or may be present in the Project areas that intersect streams and/or the riparian habitats surrounding them (i.e., LSAA jurisdiction), as well as the conservation measures that will be implemented by the Project to avoid and minimize these impacts. Project areas outside of LSAA jurisdiction are primarily within the existing pipeline in urban and suburban areas (i.e., roadways in San Jose and Campbell) and potential Project impacts to sensitive biological resources are not anticipated (See Figure 1). However, as a covered activity under the Santa Clara Valley Habitat Plan (VHP; See Section 1.2.1), the entire Project will be evaluated in the biological report for the VHP application.

For this Report, sensitive biological resources are defined as:

- Wetlands, streams, and the riparian vegetation surrounding them.
- Critical Habitats designated by United States Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS)
- Nesting birds and raptor nests in or near the Project area, pursuant to Federal or State law.
- Special-status species

For this Report, special-status species are defined as:

- Plants that are listed as threatened, endangered, or have a California Rare Plant Ranking (CRPR) of 1A, 1B, 2A, 2B, 3, or 4.
- Animals that are listed as candidate, threatened, endangered, or fully protected, pursuant to Federal or State law.
- Animals that are listed as California Species of Special Concern (CSSC) by CDFW.

This Report was written by Valley Water Wildlife Biologist Shawn Lockwood and Valley Water Plant Ecologist Josh Weinik (hereinafter "we").

1.1 Project Summary

The Central Pipeline consists of approximately 12.6-miles of 66-inch concrete pipe that includes 79 pipeline appurtenance vaults throughout the pipeline. The pipeline connects to the South Bay Aqueduct in northeastern San Jose to convey Delta-water to the Almaden Valley Pipeline via the Vasona Pump Station in Los Gatos. Between these two locations, the pipeline is used to provide water to several groundwater recharge ponds. The Project consists of inspection and rehabilitation of the pipeline as part of Valley Water's Pipeline Maintenance Program (PMP; See Section 1.1.1 below). This includes a full internal inspection, installation of structural lining within the pipeline, appurtenance replacement, and maintenance activities. Three upland staging areas would be used to create centralized locations for

temporary staging of Project equipment and materials. Two staging areas would occur in existing rocked areas (i.e., pipeline yards) and the other would include temporary rocking of a California annual grassland in Guadalupe River Park Gardens. Minor excavation (8' x8') may be required to replace an existing flowmeter vault located in the rocked upland Los Gatos Turnout yard.

All the work described above is outside of the riparian corridor and the LSAA jurisdictional boundaries. However, to perform this work the pipeline will need to be dewatered and discharged into LSAA boundaries. The Project would discharge approximate 12,000,000 gallons of raw water into Upper Penitencia Creek, Coyote Creek, Guadalupe River, and Los Gatos Creek collectively. Dewatering would consist of a sequential, controlled, and programmatic discharge at 16 locations in January of 2021 (See Figure 1). Discharges to streams would occur by pumping the water from the pipeline's vaults to adjacent storm drains leading to outfalls with hard infrastructure in place such as dissipators (i.e., flap gates) and spillways made up of concrete, sacrete, and/or rip rap. At two outfall locations, the existing hard infrastructure is not adequate to prevent erosion so temporary discharge measures (i.e., hoses, wattles/sandbags, visqueen sheeting, and geotextile dissipator bags) would be installed to facilitate the discharge. At locations where storm drain systems are absent, water would be pumped directly from the pipeline's vaults to temporary discharge measures. Figure 1 depicts the Project's alignment and where discharge locations intersect streams.

Valley Water

Figure 1: Project Location

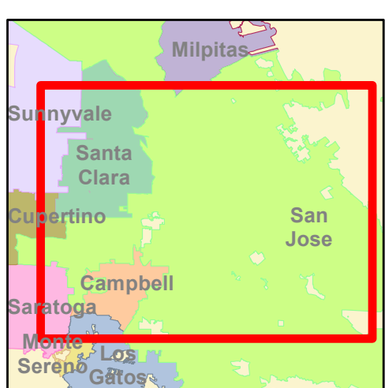
Central Pipeline Inspection & Rehabilitation Project

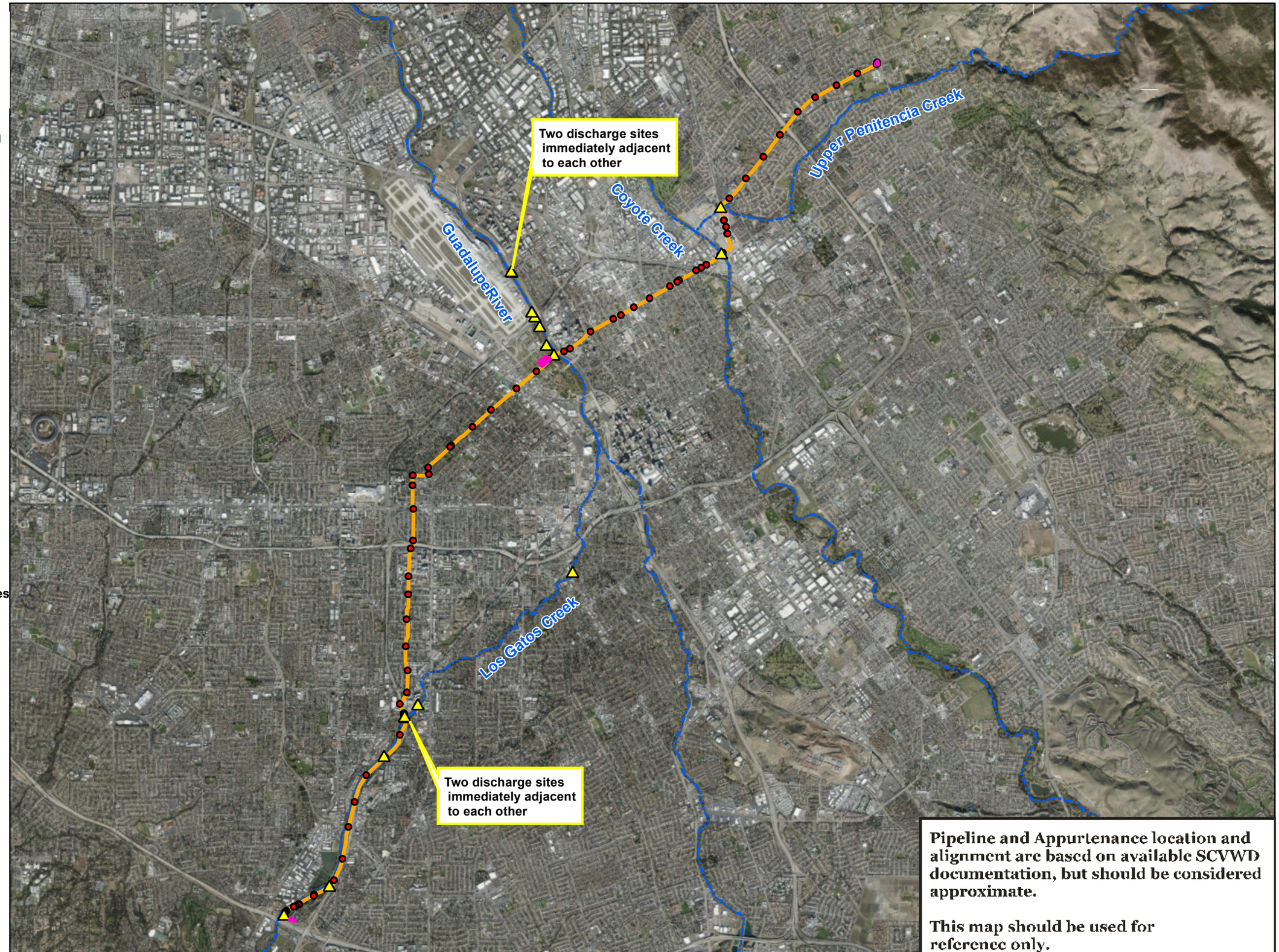
- Staging Areas
- Discharge Sites
- Pipeline Vaults
- Central Pipeline

N

0 0.5 1 2 Miles

1-inch approximately equals 1-mile





Pipeline and Appurtenance location and alignment are based on available SCVWD documentation, but should be considered approximate.

This map should be used for reference only.

1.1.1 Pipeline Maintenance Program

The PMP is a comprehensive plan that defines how maintenance and repair activities on Valley Water's pipelines can be carried out in the most environmentally responsible and cost-effective manner. The PMP covers 23 pipelines, which are primarily located in Santa Clara county with a few miles of pipeline located in San Benito and Merced Counties. The PMP work area includes the areas around these 23 pipeline facilities, including pipelines, pump stations, turnouts, blow-offs, and vaults. Most of the pipeline components are located on Valley Water fee or easement properties, except in the case of the Pacheco and Santa Clara Conduits/Tunnels, which are on property easements or owned by the U.S. Department of Interior's Bureau of Reclamation (Bureau). Activities under the PMP are undertaken to address the manufacturers' recommendations for maintenance of equipment and the need for maintenance that may arise from age, wear, corrosion, leaks, integrity loss due to seismic movement, or other causes. Most activities in the PMP also require draining water from the pipelines, which is one of the primary aspects of work that without appropriate avoidance and minimization measures could have potentially significant environmental effects. Some of the main activities associated with the PMP include: air release and valve maintenance; leak repair; cathodic protection/corrosion control and monitoring; internal inspection; replacement/repair of buried service valves; replacement/repair of pipeline segments; replacement/repair of appurtenances, fittings, manholes, and meters; vault maintenance; telemetry cable/SCADA system inspection and repairs; access road repairs; and, bank stabilization.

1.2 Permits

The Project is a covered activity under the VHP, and its discharge is covered under the Statewide National Pollutant Discharge Elimination System (NPDES) Permit. The Project is seeking coverage under a LSAA.

1.2.1 Santa Clara Valley Habitat Plan

The VHP was adopted in 2013 and is a joint habitat conservation plan and natural communities conservation plan developed to serve as the basis for the issuance of incidental take permits and authorizations pursuant to Section 10 of the federal Endangered Species Act and the California Natural Community Conservation Planning Act. The SCVHA leads the implementation of the VHP, which is a regional partnership between CDFW, USFWS, and six local partners of which Valley Water is one.

The VHP defines measures to avoid, minimize, and mitigate impacts on covered species and their habitats while allowing for implementation of certain covered activities. The proposed Project is classified as a rural operations and maintenance project, which is a covered activity under the VHP. Rural operations and maintenance projects include utility line or facility operations and maintenance. Valley Water's PMP is discussed in detail in the VHP on pages 2-98 through 2-102, page 4-41, and page 6-20.

1.2.2 National Pollutant Discharge Elimination System Permit

The Project is considered a covered discharge under the NPDES Permit for Drinking Water System Discharges to Waters of the United States (Order WQ-2014-0194-DWQ). A Statewide Discharge Permit, No. 4DW062, was issued to Valley Water by the State Water Resources Control Board for coverage under this permit in December 2015. This permit includes Best Management Practices (BMPs) and water quality parameter limitations so that the receiving waters' beneficial uses are not adversely affected.

1.3 California Environmental Quality Act

A Programmatic Environmental Impact Report (PEIR) was prepared for Valley Water's PMP in 2007 to evaluate and disclose the environmental effects of PMP projects under the California Environmental Quality Act (Valley Water 2007). This PEIR was extended to cover pipeline maintenance projects until

2022, and therefore applies to this Project. To reduce potential impacts associated with PMP projects to less than significant levels, the PEIR identified both BMPs and mitigation measures to be included in PMP projects. Because the Project is also covered under the VHP which was established after the PMP PEIR, as was done for the Cross Valley and Calero Pipelines Inspection and Rehabilitation Project, mitigation measures provided in the PMP PEIR for impacts on VHP-covered biological resources (e.g., riparian land covers and western pond turtle) will be superseded by VHP Conditions and payment of VHP fees. However, for potential Project impacts on biological resources that are not covered under the VHP (e.g., special-status fish species), applicable BMPs and/or mitigation measures from the PMP PEIR would be implemented by the Project to reduce impacts on these resources to less than significant levels.

1.4 National Marine Fisheries Service– Bureau of Reclamation Consultation

The Pacheco and Santa Clara Conduits/Tunnels are owned by the Bureau but are operated and maintained by Valley Water. Due to the potential to affect Federally threated steelhead (*Oncorhynchus mykiss)* and their critical habitat through operation and maintenance of the Pacheco and Santa Clara Conduit/Tunnels, on February 29, 2008, the Bureau requested initiation of consultation pursuant to Section 7 of the Endangered Species Act. The Bureau did not request consultation for Valley Water owned facilities (i.e., other pipelines under Valley Water's PMP not owned by the Bureau); however, after the consultation was triggered, NMFS was required to assess the effects of interrelated and interdependent actions. Because Valley Water's PMP was an integral part of the Pacheco and Santa Clara Conduits/Tunnels operations and maintenance, NMFS determined Valley Water's PMP to be an interdependent action and analyzed the effects of the entire maintenance project (i.e., the Pacheco and Santa Clara Conduits/Tunnels operations and maintenance and Valley Water's entire PMP). NMFS concluded that with implementation of PMP's BMPs and mitigation measures and compliance with other required permit (i.e., LSAA and NDPES) conditions, operation of the Pacheco and Santa Clara Conduits/Tunnels and operation of Valley Water's entire PMP (including the Central Pipeline Inspection and Rehabilitation Project) were not likely to adversely affect threatened South Central Coast or Central Coast steelhead or their designated critical habitats (NMFS 2008).

Section 2. Methods

Our evaluation to determine if sensitive biological resources are present within the Project areas that are within or adjacent to streams and/or riparian habitats consisted of the following. Prior to our field efforts, we conducted a desktop reconnaissance review of the existing information that was available. This was followed by multiple biological surveys at each of the discharge locations. Additionally, to minimize impacts in riparian areas we collaborated with the Project engineers to modify the site-specific discharge plans by moving impact areas outside of vegetated areas, minimizing project footprints, and by addition of BMPs (e.g., temporary hoses, wattles, visqueen, and filter bags) to prevent erosion and scour. Lastly, we used our findings on presence of sensitive biological resources and the Project's conservation measures to evaluate the Project's potential impacts on those resources.

2.1 Desktop Reconnaissance

As part of our background review we reviewed the following resources:

- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants database for the 13 quads within which the project falls and/or is adjacent to, a county-wide search, and individual species ecology reviews (CNPS 2019; Attachment A)
- Calflora Database to review locations of species observations (Calflora 2019)
- Processed and unprocessed data layers of California Natural Diversity Database (CNDDB) using a search radius of 2-miles around all work areas in or immediately adjacent to streams (CDFW 2019a; Figure 2)
- CDFW Rarefind Program (CDFW 2019b)
- CDFW Biogeographic Information and Observation System (CDFW 2019c)
- California Wildlife Habitat Relationships (CWHR) System (CDFW 2014)
- SCVHA Geobrowser (SCVHA 2019)
- VHP (ICF 2012)
- Santa Clara County Breeding Bird Atlas (Bousman 2007)
- U.C. Davis Tricolored Blackbird Portal (UCDTBP 2020)
- USFWS Information, Planning, and Consultation (IPAC) System (USFWS 2019a; Attachment B)
- Valley Water fisheries surveys, monitoring, and observation data
- Various scientific literature and reports

After we gathered all the available information, we used our professional expertise to interpret, refine, and add to the results of our background review. See Sections 3.2 and 3.3.

2.2 Field Surveys

We visited each discharge site (i.e., Project area within LSAA jurisdiction) at least twice. Our field visits were conducted on the following dates: 11/26/19, 12/12/2019, 12/16/2019, 12/19/2019, 1/23/2020, and 1/29/2020.

At each site we completed the following tasks:

1. We determined land cover types according to the VHP land cover definitions.
2. We identified all plants that were detectable during the times of the surveys, within and immediately adjacent to the work areas, down to the species level.

3. We conducted reconnaissance-level surveys for perennial plant species with similar form or structure to special-status perennial plant species.
4. Completed protocol-level surveys for one special-status plant species (western leatherwood; See Section 3.2.1) during its bloom period which overlapped with our surveys.
5. We conducted habitat assessments and focused surveys for special-status fish and wildlife species.
6. In collaboration with Project engineers, we assessed the draft pipeline dewatering plans for each discharge site to determine if they were appropriate or if they could be modified to minimize temporary impacts (e.g., vegetation removal). See Section 2.3 below.
7. We mapped impacts associated with the installation of the discharge temporary BMPs (i.e., hoses, wattles, visqueen) using surveyors-tape on aerial imagery hard copy maps.
8. We delineated the LSAA jurisdiction boundaries, the landward riparian dripline or top of bank (whichever was greater), on aerial imagery hard copy maps.

The results of Tasks #7 and #8, mapped temporary impacts and LSAA jurisdictional boundaries, can be found in Box 11 of the LSAA application.

2.3 Modifications to Site-specific Pipeline Dewatering Plans

The draft pipeline dewatering plans consisted of two types of discharges:

1. Use of existing hard infrastructure (i.e., existing outfalls)
2. Use of temporary BMPs where no hard infrastructure existed

We collaborated with the Project engineers to assess the draft pipeline dewatering plans for each discharge location. Most of the locations had well designed existing hard infrastructure in place that consisted of outfalls with flap gates that flowed out into concrete, riprap, or sacrete spillways. At these locations the discharge would be dissipated by the flap gates before flowing across the existing spillways into the receiving waters. Therefore, the Project team determined there was no concern of erosion and scour. However, at two locations where existing hard infrastructure was present, the outfalls lacked flap gates and adequate spillways. To prevent discharge across exposed soils at these two locations, in consultation with Project engineers, secondary BMPs were added to the final plans to prevent erosion and scour. This included connecting temporary hoses to the outfalls to capture the discharge. The temporary hose would terminate in a geotextile filter bag to dissipate the water before exiting the bag onto a visqueen spillway bordered by wattles. For the discharge sites that lacked existing hard infrastructure all together, in the draft plans the temporary discharge BMPs were proposed to go in locations that would require removal of native vegetation. At these locations, we worked with the Project engineers to relocate the BMPs to barren soil areas. There was one location where avoidance of vegetation removal was not possible, so we worked with Project engineers to place the BMPs in a vegetated area that was ~90% nonnative herbaceous plant species (i.e., not woody). Lastly, Project engineers determined that the temporary BMP footprints could be minimized (e.g., 15’ x 15’ instead of 50’ x 30’ specifications pulled from a larger project). All of these changes were brought into the final pipeline dewatering plan, minimizing the Project’s temporary impacts to riparian habitats. When work is implemented, all erosion and sedimentation controls will be re-evaluated and conducted by the Project engineer, qualified maintenance worker, or contractor.

Section 3. Results

3.1 Environmental Setting

Project work areas (i.e., discharge sites) are located within the riparian corridors of Upper Penitencia Creek, Coyote Creek, Guadalupe River, and Los Gatos Creek. Natural communities in the work areas can generally be described as corridors of moderately to highly disturbed riparian vegetation confined and intersected by urban and commercial development. These communities are described below in further detail using the established land cover types of the VHP.

3.1.1 Mixed Riparian Forest and Woodland

The mixed riparian woodland and forest (MRWF) is characterized by the VHP as a varying composition of native riparian tree species relative to site specific conditions with no single species dominating the tree canopy (ICF 2012). The tree layer of MRFW encountered within the Project area was primarily comprised of mature native red willow (*Salix laevigata*), Fremont cottonwood (*Populus fremontii*), and western sycamore (*Platanus racemosa*) found in varying levels of co-dominance. Other native species comprising a more occasional component of the tree layer included white alder (*Alnus rhombifolia*), big leaf maple (*Acer macrophyllum*), and coast live oak (*Quercus agrifolia*). Nonnative trees were also present as weeping willow (*Salix babylonica*), blue gum eucalyptus (*Eucalyptus globulus*), and palm (*Washingtonia robusta* and *Phoenix canariensis*) species. The shrub layer of the MRWF was most developed where sandbar willow (*Salix exigua*) was present. Other shrubs species included newly establishing native willow species *(Salix lasiolepis* and *Salix laevigata*) and the nonnative Himalayan blackberry (*Rubus armeniacus*). Herbaceous understory was sparse and dominated by nonnative species such as Bermuda grass (*Cynodon dactylon*) and smilo grass (*Piptatherum milieaceum*). Patchy occurrences of herbaceous native species did occur with species such as spreading rush (*Juncus patens*) and nut sedge (*Cyperus eragrostis*) establishing sporadically or in small colonies along river and creek benches.

3.1.2 Willow Riparian Forests, Woodlands and Scrub

The willow riparian forest and scrub (WRFWS) is characterized by the VHP as riparian habitats with canopies dominated by native willow species (ICF 2012). The tree layer of WRFWS habitats encountered within the Project area was dominated by arroyo willow and to a lesser extent red willow. Other native riparian trees such as Fremont cottonwood, western sycamore, and white alder were also commonly found albeit in lower abundance than in MRWF. The native coast live oak was also found and most abundant within increasingly scrub-oriented habitat areas. The shrub layer of this community was limited and mainly comprised of recruiting willow species and mulefat (*Baccharis salicifolia*). The herbaceous layer was heavily invaded by the nonnative species Bermuda grass and smilo grass although native herbaceous species such as mugwort (*Artemisia douglasiana*), dotted smartweed (*Persicaria punctata*), and Western golden rod (*Euthamia occidentalis*) were occasionally present.

3.1.3 Urban-Suburban

The urban-suburban land cover type is characterized generally as areas where native vegetation has been replaced by the development of residential, commercial, industrial, transportation, and recreational structures (ICF 2012). Vegetation present within these areas is predominately nonnative and cultivated. The urban-suburban land cover within the Project area primarily consists of roads, bike paths, outfalls, slipways, and riprap.

3.2 Special-status Plant Species

The CNPS search resulted in a list of 56 rare plant species with potential to occur in the thirteen USGS-quadrangles that contained or surrounded the Project area or in Santa Clara county[1]. The CNDDB search for rare plants resulted in a list of seven species, all of which also returned by the CNPS search, which had occurrence records within a 2-mile search radius surrounding the Project areas in or adjacent to streams. The USFWS IPAC System report generated a list of 4 federally listed plants species, all of which also returned by the CNPS search. After an analysis of the documented habitat requirements and occurrence records for each species, we eliminated 51 species because of a lack of suitable habitat, lack of suitable edaphic conditions, species are not known from the Santa Clara Valley area, proximity of the Project area to known occurrences (Calflora 2019), and/or all potential habitat for the species with the Project area was deemed too disturbed to support that species (Attachment A). This process resulted with five special-status plant species that warranted further habitat assessments and protocol-level surveys to determine the likelihood of presence within the Project area (Table 1). Descriptions of survey effort (conducted or scheduled) and results to date, specific to each of the five special-status plant species are described below in Sections 3.2.1 and 3.2.2.

Table 1: Bloom Periods for Special-status Plant Species with Potential for Occurrence in the Project Area

Common Name	Species Name	Status[a]	Bloom Period
western leatherwood	*Dirca occidentalis*	CRPR 1B.2	January - March (April)
Loma Prieta hoita	*Hoita strobilina*	CRPR 1B.1; VHP	May - July (August to October)
arcuate bush-mallow	*Malacothamnus arcuatus*	CRPR 1B.2	April - September
Hall's bush-mallow	*Malacothamnus hallii*	CRPR 1B.2	(April) May – September (October)
maple-leafed checkerbloom	*Sidalcea malachroides*	CRPR 4.2	(March) April - August

[a]Key to Status Abbreviations: CRPR = California Rare Plant Rank; VHP = VHP Covered Species

3.2.1 Western Leatherwood

There were no CNDDB occurrences of western leatherwood (*Dirca occidentalis;* CRPR 1B.2) within a 2-mile buffer of the Project areas. However, the CNPS rare plant inventory search returned several occurrences within Santa Clara county. Protocol-level surveys were conducted within the known bloom period (i.e., January – March) of the species at and surrounding each discharge site (i.e., Project area) where potential suitable habitat was deemed present and the species was not detected.

Western leatherwood is considered absent within the Project area.

3.2.2 Arcuate Bush-mallow, Loma Preita Hoita, Hall's Bush-mallow, and Maple-leafed Checkerbloom

There were no CNDDB occurrences of Loma Prieta hoita (*Hoita strobilina*; CRPR 1B.1) or maple-leafed checkerbloom (*Sidalcea malachroides*; CRPR 4.2) and a single occurrence for both arcuate bush-mallow (*Malacothamnus arcuatus*; CRPR 1B.2; Occurrence #38) and Hall's bush-mallow (*Malacothamnus hallii*;

[1] Quadrangle-level results are not maintained for CRPR 3 and 4 species, so we also conducted a search of the CNPS inventory records for these species occurring in the county.

CRPR 1B.2; Occurrence #9) within a 2-mile buffer of the Project areas. These species were not observed during preliminary surveys and potential presence of these species is considered to be unlikely. However, protocol-level surveys are scheduled to coincide with the known bloom periods of these species to confirm absence that was presumed in the reconnaissance surveys or locate previously undetected species presence for Project avoidance (See Section 4.2.4).

Because of these factors, these four special-status species are considered unlikely to occur within the Project area.

3.3 Special-status Fish and Wildlife Species

The CNDDB search resulted in a list of 19 fish and wildlife "special animal[2]" species within two miles of the Project areas (Figure 2). The USFWS IPAC System report generated a list of nine fish and wildlife species that are federally listed (Attachment B), including one that overlapped with the CNDDB query. The VHP wildlife survey zones intersected with the Project area for two VHP-covered wildlife species, including one that overlapped with the CNDDB query. In addition, we added ten fish and wildlife species that did not return from the sources above because we knew they do occur or had a potential to occur in or adjacent to the Project area. This resulted in a total list of 37 fish and wildlife species. Of this list, we eliminated yellow rail (*Coturnicops noveboracensis*; CSSC; CNDDB Occurrence #37) because in California the species is only known to breed in the northeast interior of the State (Shuford et al. 2008). Since the species is only considered a species of special concern when nesting, as rare nonbreeding visitors to the county they do not meet our definition of a special-status species**.** Similarly, we eliminated obscure bumble bee (*Bombus caliginosus;* CNDDB Occurrence #132, 133, & 134*)* and hoary bat (*Lasiurus cinereus;* CNDDB Occurrence #96, 98, & 99) because they have no official status and do not meet our definition of a special-status species. Therefore, we evaluated 34 special-status species for their potential for occurrence within the Project area. In Sections 3.3.1 – 3.3.17 below, we discuss the 17 species that were determined to either be present or have a likelihood of presence. Our findings on occurrence for all 34 of the special-status species are summarized in Table 2 in Section 3.4, including our rationale for determining absence for the other 17 species.

3.3.1 Pacific Lamprey

Through Valley Water fisheries surveys, monitoring efforts, and observations Pacific lamprey (CSSC) are known to occur in Coyote Creek, Guadalupe River, and Upper Penitencia Creek. We are not aware of any detections of Pacific lamprey in Los Gatos Creek, but due to the hydrological connectivity with Guadalupe River they are likely present.

Pacific lamprey is considered to be present within the Project area.

3.3.2 Central Valley Fall-run Chinook

Central Valley fall-run Chinook salmon (hereinafter "Chinook salmon"; CSSC) are designated as a Species of Special Concern by CDFW and by NMFS. The NMFS designation only applies to "…*all naturally spawned populations of fall-run Chinook salmon in the Sacramento and San Joaquin River Basin and their tributaries, east of Carquinez Strait, California*" (NMFS 2009). CDFW consider Chinook salmon a Species of Special Concern and indicate that the species is found within Central Valley rivers and streams, and range maps do not include Santa Clara county (CDFW 2018). The Project area is not included in the areas designated by NMFS and CDFW, and further, Chinook salmon in the county are

[2] "Special Animals" is a broad term used to refer to all the animal taxa tracked by CDFW's CNDDB, regardless of their legal or protection status (CDFW 2019d).

known to be of hatchery origin based on historical occurrence data, genetic testing, and the presence of adipose fin-clipped fish in the system (Garcia-Rossi and Hedgecock 2003; Garza and Pearse 2008; Leal and Watson 2018). Hatchery-stray Chinook salmon have been observed in the county since the mid-1980s and are likely to occur in the Project Area.

Through Valley Water fisheries surveys and monitoring efforts, Chinook salmon are known to occur in Coyote Creek, Guadalupe River, and Los Gatos Creek. The species has not been documented in Upper Penitnecia Creek and is likely temporally precluded due to lack of hydrological connectivity between Upper Penitencia Creek and Coyote Creek during their upstream migrations.

Chinook salmon is considered to be present within the Project area.

3.3.3 Central California Coast Steelhead

Through Valley Water fisheries surveys and monitoring efforts, Central California coast steelhead ((hereinafter "steelhead"; Federally Threatened) are known to occur in Upper Penitnecia Creek, Coyote Creek, Guadalupe River, and Los Gatos Creek. In addition, the Project area intersects critical habitat for steelhead at Upper Penitencia Creek, Coyote Creek, and Guadalupe River (See Figure 2).

Steelhead is considered to be present within the Project area.

3.3.4 Sacramento Hitch

Through Valley Water fisheries surveys and monitoring efforts, Sacramento hitch (CSSC) are known to occur in Coyote Creek. However, this species has not been detected in Upper Penitencia Creek, Guadalupe River, or Los Gatos Creek.

Sacramento hitch is considered to be present within the Project area.

3.3.5 Central California Roach

Through Valley Water fisheries surveys and monitoring efforts, Central California roach (CSSC) are known to occur in Upper Penitencia Creek, Coyote Creek, Guadalupe River, and Los Gatos Creek.

Central California roach is considered to be present within the Project area.

3.3.6 Riffle Sculpin

Riffle sculpin prefer habitats with cool, fast-moving water, rocky substrates, and riffles (Moyle 2002; Moyle et al. 2015). The discharge locations are located on the valley floor downstream of the upper watershed tributaries where riffle sculpin is known to occur.

Because of these factors, riffle sculpin is considered unlikely to occur within the Project area.

3.3.7 Western Pond Turtle

We did not observe any WPT in or adjacent to the dewatering sites that were surveyed; however, we did observe suitable aquatic habitat and WPT are known to occur in Upper Penitencia Creek, Coyote Creek, Guadalupe River, and Los Gatos Creek. Upland areas surrounding the Project area above the high-water mark could potentially provide nesting or overwintering habitat; however, the local soil conditions (i.e., compacted soils due to levees, outfalls, and other infrastructure), as well as the degree and frequency of anthropogenic disturbances (e.g., loose dogs associated with homeless encampments and vegetation maintenance) likely limit the suitability of the upland areas. The upland areas surrounding the streams immediately adjacent to the Project area is considered to be low quality habitat for turtle nesting and overwintering.

WPT is considered present within the Project area.

3.3.8 Western Burrowing Owl

We did not observe any western burrowing owls or sign of their presence (e.g., pellets, feathers, or whitewash at burrows or other suitable underground refugia) during our surveys. Western burrowing owl are not expected to occur within riparian habits; however, Guadalupe River Park Gardens is immediately adjacent to some of the Guadalupe River discharge locations and a temporary staging area would be established in this park a little over 250-feet from the outer riparian dripline. Guadalupe River Park does have California annual grassland and California ground squirrels *(Otospermophilus beecheyi*) present making it potentially suitable for owls; however, this area has a large homeless presence (i.e., vehicles, tents, and loose dogs) throughout the open fields which greatly reduces the likelihood of owl presence. The staging area is approximately half a mile south of the San Jose Airport, which historically had the largest population of breeding owls in the county. As of 2019, only two pairs of owls bred at the airport. Owls have never been detected in the Guadalupe River Park Gardens (P. Higgins, pers. comm. 2020), despite intensive monitoring efforts in the area and throughout the county. Due to the large homeless encampments, including several loose dogs, throughout and surrounding the staging area, we determined that the high anthropogenic stressors onsite would likely preclude burrowing owls from the area. However, because grasslands and squirrel burrows are present and the proximity to the airport, we could not rule presence of this species out completely.

Because of these factors**,** burrowing owl is considered unlikely within the Project area.

3.3.9 American Peregrine Falcon

Peregrine falcon (*Falco peregrinus*; FP) was not observed during the surveys performed for this Report. Historically, this species was rare or uncommon in Santa Clara county, though birds from farther north would overwinter in the county. Today, this species is increasingly common winter-resident in the county, but nesting is still rare. Historically there are a few records of peregrines nesting within the county on cliffs in the Diablo Range and Santa Cruz Mountain Range (Bousman 2007). Recently, only four to five pairs are known to have nested in the county. Nesting has occurred annually since 2007 on the top of City Hall in downtown San Jose. Since 2007, in most years one to two pairs have nested in the Mountain View-Alviso areas (i.e., electrical towers adjacent to salt ponds, Ames Wind Tunnel, and Hoover Tower at Stanford), in the northern part of the county. Lastly, a pair has nested on Summit Rock in Sanborn-Skyline Park in the Santa Cruz Mountains. Peregrine falcons are ledge nesters, nesting on cliffside aeries or on tall bridges, towers, and office buildings. None of which (i.e., suitable nesting locations) are in or immediately adjacent to dewatering sites.

Because of these factors, American peregrine falcon is considered absent as a breeder within the Project area.

3.3.10 White-tailed Kite

White-tailed kite was not observed during the surveys performed for this Report. White-tailed kite is fairly common in Santa Clara county (Bousman 2016). Preferred nesting habitat includes grassland, agricultural, wetland, oak-woodland, and savannahs. Riparian areas adjacent to opens areas are also used for nesting (Dunk 1995). Our literature review showed that nest site selection is in or adjacent to open areas which provide the microhabitat needed for foraging. The discharge sites along Guadalupe River and Los Gatos Creek are adjacent to foraging habitat that we determined to be of low quality due to the anthropogenic disturbances. However, it is possible a kite could nest in these areas.

Because of these factors, white-tailed kite is considered unlikely as a breeder within the Project area.

3.3.11 Common Raptor Species

Several species of raptors that do nest in riparian habitats but are not special-status species are fairly common to common breeders on the valley floor. Because raptor nests are protected year-round under CFGC 3503.5, they are included here. Potential species that could nest in or near the Project area include Cooper's hawk (*Accipiter cooperii*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), western screech owl (*Megascops kennicottii*), and great horned owl (*Bubo virginianus*). For this Report these species were grouped into a single ecological guild (common raptors).

Common raptor species are considered present as breeders within or adjacent to the Project area.

3.3.12 Yellow Warbler

Yellow warbler was not observed during the surveys performed for this Report. However, the surveys were conducted during winter (i.e., when Project activities would occur in riparian habitats) and typically this neotropical migrant is only present in the county during the summer and fall/spring migrations. Early observers in Santa Clara county considered yellow warbler to be a common-to-abundant summer resident (Barlow 1900, Grinnell & Wythe 1927). A decline in breeding yellow warbler has been observed in Santa Clara county since the 1970s (Bousman 2007). This trend appears to be widespread on the California central coast, with declines also noted in Monterey and Alameda counties (Roberson and Tenney 1993, Richmond et. al. 2011). Currently, yellow warbler is considered to be an uncommon summer resident in the county (Bousman 2016). Our literature review showed that the preferred nesting habitat for yellow warbler is multi-story riparian habitats with dense understory. On the valley floor in Santa Clara county, yellow warbler has been documented nesting along riparian corridors, often with a mature overstory of cottonwoods and sycamores, a midstory of willow and box elder, and a substantial shrub understory of vines, blackberries, and forbs (Bousman 2007). We assessed the riparian habitat onsite and determined that due to the lack of riparian habitat complexity and the high degree of anthropogenic stressors, suitable nesting habitat is absent within the Project area.

Because of these factors, yellow warbler is considered absent as a breeder within the Project area.

3.3.13 Yellow-breasted Chat

Yellow-breasted chat was not observed during the surveys performed for this Report. However, the surveys were conducted during winter and typically this neotropical migrant is only present in the county during the summer and fall/spring migrations. Historically fairly common in Santa Clara county, the yellow-breasted chat is now considered to be very rare in the county (Bousman 2016) and is only found breeding in scattered riparian locations in the Diablo Range in southern portions of the county (Bousman 2007). This decline appears to be statewide (Shuford & Gardali. 2008). Our literature review showed that yellow-breasted chat utilizes a variety of nesting habitats (multi-overstory, no overstory, etc.), all of which had a dense understory. We assessed the riparian habitat onsite and determined that due to the lack of a dense understory and the high degree of anthropogenic stressors, suitable nesting habitat is absent within the Project area.

Because of these factors, yellow-breasted chat is considered absent as a breeder within the Project area.

3.3.14 Western Red Bat

No bats or sign of their presence were observed during the surveys performed for this Report. Our surveys were conducted during the right time of the year for western red bat but detecting this species during visual diurnal surveys is difficult. We reviewed the ecology of the western red bat, a migratory and typically solitary foliage roosting species. Western red bat is not known to raise young in Santa Clara

county (D. Johnston, pers. comm. 2019; Johnston, D. S., and S. Whitford. 2009); therefore, the species is considered absent as a maternity rooster. This migratory species is known to overwinter in the San Francisco Bay area, generally present from November to February (Johnston, D. S., and S. Whitford. 2009; Cryan, P. M., 2003), when the dewatering of the pipeline (i.e., work within riparian areas) would occur. Western red bat day roosts are located commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact riparian habitat and tend to be associated with mature trees such as cottonwoods (WBWG 2019a), which are present in the Project areas.

Because of these factors, though in low numbers because of its solitary roosting, western red bat is considered likely as a winter day rooster within the Project area.

3.3.15 Townsend's Big-eared Bat

No bats or sign of their presence were observed during the surveys performed for this Report. Townsend's big-eared bat is a cave-dwelling species, but is also known to use old, mostly abandoned buildings with darkened and enclosed cave-like attics in addition to other anthropogenic structures (Barbour and Davis 1969). Summer maternity colonies form between March and July (WBWG 2019b). Since the Project work that intersects streams will occur in the winter months, this species is considered absent as a maternity rooster. Overpasses, which this species has been documented using as roost sites (CDFW 2019b; WBWG 2019b), are present at a few of the work areas along streams. At these overpasses, expansions slots and other openings that could be used for roosting were present. We also observed a few trees with cavities adjacent to the work areas. These potential roosting structures, the walls or bark beneath, and the ground beneath were carefully inspected and no characteristic signs, such as guano, urine statins, or prey remains (e.g., culled arthropod parts), were observed that would indicate bat use. This species is highly sensitive to human disturbance (WBWG 2019b) and all the potential roosting structures (i.e., overpasses or tree hollows) are in high disturbance areas from both recreation and homeless encampments.

Because of these factors, Townsend's big-eared bat is considered unlikely as a winter-day rooster within the Project area.

3.3.16 Pallid Bat

No bats or sign of their presence were observed during the surveys performed for this Report. Pallid bat is primarily a crevice roosting species and has been recorded roosting in a variety of structures including rock cracks and crevices, caves, buildings, bridges, and tree cavities (Baker et al. 2008, Hermanson & O'Shea 1983, O'Shea and Vaughan 1977). However, most often this species uses crevices and cracks in rocks or secondarily human structures throughout its range (Barbour and Davis 1969). This species, although it will coexist with humans in rural settings, appears to be intolerant of suburban and urban development (i.e., the Project area). In northern California, this species is associated with oak habitat in lower elevations, particularly oak savannahs, and coniferous forests in mid- to higher elevations (Bolster et al. 1998). Summer maternity colonies form between April and August (WBWG 2019b). Since the Project work adjacent to streams will occur in the winter months, this species is considered absent as a maternity rooster. Pallid bats have been documented using bridges and tree cavities as roost sites (CDFW 2019b; WBWG 2019b), which are present at a few of the work areas. These potential roosting structures, the walls or bark beneath, and the ground beneath were carefully inspected and no characteristic signs, such as guano, urine statins, or prey remains, were observed that would indicate bat use.

Because of these factors, pallid bat is considered unlikely as a winter-day rooster within the Project area.

3.3.17 San Francisco Dusky-footed Woodrat

No San Francisco dusky-footed woodrats (*Neotoma fuscipes annectens*), woodrat lodges, or other signs of their presence were observed during the surveys we conducted for this Report. Detection of presence of this species is relatively easy due to their behavior of constructing large lodges (Ingles 1965), which are typically the focal point of their home range (Linsdale and Tevis 1951). Woodrats are a non-migratory species (CDFW 2014) and since there are no lodges present within the Project area, the concern of woodrats occurring would come from the establishment of new territories by dispersing woodrats. There are high costs associated with female dispersal and their reproduction favors female philopatry since they require nests for successful rearing of young. Female woodrats, unlike males, usually spend their entire life in their natal area (Kelly 1989). Therefore, our concern would likely come from a pioneering male. The maximum dispersal distance known for woodrats is 434 meters (Penrod et al. 2004). Due to safety concerns associated with the homeless encampments surrounding the work areas, we were unable to survey up to the maximum dispersal distance to assess for the potential of woodrats dispersing into the work area. However, the work areas are located in areas that are inundated by high storm flows which would likely preclude establishment of lodges at or close to grade (i.e., still possible for them to establish an arboreal lodge up in the trees, but none were observed during our surveys).

Because of these factors, San Francisco dusky-footed woodrat is considered unlikely within the Project area.

3.4 Special-status Species Summary

Results pertaining to 39 special-status plant, fish, and wildlife species, their status, habitat descriptions, and our findings on potential for occurrence within the Project area are summarized in Table 2.

The results of our CNDDB query with locations of occurrences are depicted, relative to the Project area, in Figure 2.

Table 2: Special-status Species, Their Status, Habitat Description, and Potential for Occurrence Within or near the Project Area

Names[a]	Status[b]	Habitat	Potential for Occurrence in the Project Area
western leatherwood[1] (*Dirca occidentalis)*	CRPR 1B.2	Broad-leafed upland forest, Closed-cone coniferous forest, Chaparral, Cismontane woodland, North Coast coniferous forest, Riparian forest, Riparian woodland; mesic areas	**Absent**; Not detected by protocol-level surveys performed during the known bloom period (Jan. to March).
Loma Prieta hoita[1] (*Hoita strobilina)*	CRPR 1B.1; VHP	Chaparral, Cismontane woodland, Riparian woodland; usually serpentinite or mesic areas	**Unlikely**; Not detected during reconnaissance surveys performed prior to the bloom period. Additional surveys are planned for May 2020 to coincide with known bloom period for the species. Suitable habitat available in Project area.
arcuate bush-mallow[1,2] (*Malacothamnus arcuatus)*	CRPR 1B.2	Chaparral, Cismontane woodland	**Unlikely**; Not detected by focused plant surveys performed prior to the bloom period. Few areas of suitable habitat were available. Additional surveys are planned for May 2020 to coincide with bloom period.
Hall's bush-mallow[1,2] (*Malacothamnus halli)*	CRPR 1B.2	Chaparral, Coastal scrub	**Unlikely**; Not detected by focused plant surveys performed prior to the bloom period. Few areas of suitable habitat were available. Additional surveys are planned for May 2020 to coincide with bloom period.
maple-leafed checkerbloom[1] (*Sidalcea malachroides*)	CRPR 4.2	Broadleafed upland forest, Coastal prairie, Coastal scrub, North Coast coniferous forest, Riparian woodland, often in disturbed areas	**Unlikely;** Not detected by focused plant surveys performed prior to the bloom period. Few areas of suitable habitat were available. Additional surveys are planned for May 2020 to coincide with bloom period.
bay checkerspot butterfly[3] *(Euphydryas editha bayensis)*	FT; VHP	Serpentine grasslands	**Absent;** Species inhabits serpentine grasslands that are not present in or immediately adjacent to the Project area. The Project does not intersect any of the populations or "habitat units" that are well known and monitored within the county (ICF 2012).

Names[a]	Status[b]	Habitat	Potential for Occurrence in the Project Area
San Bruno elfin butterfly[3] (Callophrys mossii bayensis)	FE	Coastal grasslands and low scrub of north-facing slopes within the fog belt where the larval host plant grows	**Absent;** Species is restricted to San Mateo county (USFWS 2019b).
Crotch bumble bee[2] *(Bombus crotchii)*	SC	Open grasslands and scrub habitats	**Absent;** Range has contracted considerably since the collection in 1902 (CNDDB Occurrence #23) in the greater City of Campbell – City of San Jose area (Xerces Society 2018; CDFW 2019b), and the species inhabits open grassland and scrub habitats that are not present in the Project area.
western bumble bee[2] *(Bombus occidentalis occidentalis)*	SC	Meadows and grasslands with abundant floral resources	**Absent;** Range has contracted considerably since the collection in 1976 (CNDDB Occurrence #254) in the greater City of Campbell – City of San Jose area (Xerces Society 2018, CDFW 2019b), and the species inhabits meadows and grasslands with abundant floral resources that are not present in the Project area.
pacific lamprey[4] (*Entosphenus tridentatus)*	CSSC	Perennial streams, rivers, estuaries and marine systems with cool, well-oxygenated water	**Present;** Through Valley Water fisheries surveys, monitoring efforts, and observations the species is known to occur in Coyote Creek, Guadalupe River, and Upper Penitenica Creek, and is likely present in Los Gatos Creek.
central valley fall-run Chinook salmon[4] *(Oncorhynchus tshawytscha)*	FT	Perennial streams, rivers, estuaries, and marine systems with cool, well-oxygenated water	**Present;** Through Valley Water fisheries surveys, monitoring efforts, and observations hatchery stray Chinook salmon are known to occur in Coyote Creek, Guadalupe River, and Los Gatos Creek, but is likely precluded from Upper Penitencia Creek.
central California coast steelhead[2,4] (*Oncorhynchus mykiss irideus)*	CSSC	Perennial streams, rivers, estuaries, and marine systems with cool, well-oxygenated water	**Present;** Through Valley Water fisheries surveys, monitoring efforts, and observations the species is known to occur in Upper Penitencia Creek, Coyote Creek, Guadalupe River, and Los Gatos Creek. Upper Penitencia Creek, Coyote Creek, and a segment of Guadalupe River are designated as Critical Habitat for this species.

Names[a]	Status[b]	Habitat	Potential for Occurrence in the Project Area
delta smelt[3] *(Hypomesus transpacificus)*	FT; SE	Estuaries in the Sacramento-San Joaquin Delta; Seasonally in Suisun bay, Carquinez Straight and San Pablo Bay	**Absent;** Project area is outside of the species known range (CDFW 2019c; USFWS 2017).
Sacramento hitch[4] *(Lavinia exilicauda exilicauda)*	CSSC	Warm, lowland, waters including clear streams, turbid sloughs, lakes, and reservoirs	**Present;** Through Valley Water fisheries surveys, monitoring efforts, and observations the species is known to occur in Coyote Creek, but has not been detected in Upper Penitencia Creek, Guadalupe River, or Los Gatos Creek.
central California roach[4] *(Lavinia symmetricus symmetricus)*	CSSC	Inhabit a variety of aquatic environments from fast-moving cold-water streams that support trout to slow-moving warm-water streams with low dissolved oxygen levels	**Present;** Through Valley Water fisheries surveys, monitoring efforts, and observations the species is known to occur in Upper Penitencia Creek, Coyote Creek, Guadalupe River, and Los Gatos Creek.
riffle sculpin[4] *(Cottus gulosus)*	CSSC	Headwater streams with fast-moving, cold water (less than 30°C) dominated by riffles and rocky substrate with cover in the form of undercut banks, rocks, or logs	**Unlikely;** Through Valley Water fisheries surveys, monitoring efforts, and observations the species is known to occur in some upper watershed tributaries (i.e., outside of the Project area) but is considered unlikely on the valley floor downstream of the discharge sites.
Santa Cruz black salamander[2] *(Aneides niger)*	CSSC	Mixed deciduous, coniferous woodlands, and coastal grasslands	**Absent;** Project area is outside of the species known range and predicted habitat model (CDFW 2014, CDFW 2019a). All known occurrences of the species in the county are in the mountains and foothills of the Santa Cruz Mountains and not on the valley floor (i.e., Project area; CDFW 2019b). Species is found within mixed deciduous and coniferous woodlands and coastal grasslands that are not present in the Project area.

Names[a]	Status[b]	Habitat	Potential for Occurrence in the Project Area
California giant salamander[2] *(Dicamptodon ensatus)*	CSSC	Cold clear streams and surrounding uplands in wet coastal forests	**Absent;** All known occurrences of the species are in the mountains and foothills of the Santa Cruz Mountains and not on the valley floor (i.e., Project area; CDFW 2019b). Species is found in wet coastal forests that are not present in the Project area.
California tiger salamander[2,3] (*Ambystoma californiense*)	FT; ST; VHP	Temporary or perennial pools and surrounding uplands in annual grasslands or open woodlands	**Absent**; Our analysis of known locality records in CNDDB reveals that the species has disappeared from the valley floor in northern Santa Clara county and is likely extirpated in these areas due to the massive conversion of open habitats and rural/agricultural land uses to urban hardscape (CDFW 2019b, H.T. Harvey 1997a). In addition, riparian habitats do not provide suitable habitat for this species. Lastly, CNDDB Occurrence #41, which intersected our 2-mile query, was determined to be extirpated by CDFW.
California red-legged frog[3] *(Rana draytonii)*	FT; CSSC; VHP	Streams, freshwater pools, and ponds with emergent or overhanging vegetation and surrounding uplands	**Absent**; Our review of known locality records in CNDDB revealed that are there no known occurrences on the valley floor in the northern portion of the county (i.e., Project area), only records in the surrounding foothills and mountains (CDFW 2019b). An independent assessment also found that CRLF had essentially disappeared from the urban lowland areas of the county as well as brackish marshlands bordering the San Francisco Bay (H. T. Harvey 1997c; ICF 2012). The closest CRLF record to a work area within LSAA boundaries was 4.4 miles, which is more than double their upper dispersal distances of 2.0 miles (Bulger et al. 2003). The Project areas that intersect the streams are in moderately to highly disturbed riparian habitats, this includes presence of nonnative and/or invasive species and significant anthropogenic disturbance. The presence of bullfrogs and nonnative predatory fish likely preclude CRLF breeding. Human presence, both homeless and recreational, greatly decrease the suitability of upland habitat surrounding the streams. We determined that the stream and riparian habitats in the Project areas to be poor habitat for CRLF.

Names[a]	Status[b]	Habitat	Potential for Occurrence in the Project Area
foothill yellow-legged frog[2] *(Rana boylii)*	SE; VHP	Partly shaded, shallow streams and riffles with a rocky substrate and surrounding uplands	**Absent**; Prior to the land conversions of the lowland areas, this species was not present historically in the lower portions of Coyote Creek or Guadalupe River where the Project intersects these riverine systems (Zweifel 1955, ICF 2012). A review of the distribution in Santa Clara county revealed that the species has essentially disappeared from the farmed and urbanized lowland areas of the county (CDFW 2019b; H. T. Harvey 1997b, ICF 2012), which includes where the Project intersects Upper Penitencia Creek and Los Gatos Creek. Lastly, CNDDB Occurrences #2079, #2089, & #2094, which intersected our 2-mile query, were determined to be extirpated by CDFW.
northern California legless lizard[2] *(Anniella pulchra)*	CSSC	Sparsely vegetated habitats with sandy or loose loamy soils conducive to burrowing	**Absent**; Species is a microhabitat specialist requiring sandy or loose loamy substrates conducive to burrowing. Soils that are not used include gravel sized substrates and those with greater than approximately 10% clay content (Thomson et al. 2016). Clay content was high at each Project location within LSAA jurisdictional boundaries, gravel sized substrates were present at some locations, loose substrates conducive to burrowing were absent at all locations, and all locations become inundated during high winter flows. In addition, there is only two historic records for this species in the county from 1941 and 1949 (CNDDB Occurrence #130). Since their collections the areas of collection have been developed and are presently residential and commercial buildings with extensive roads throughout the area. These records are considered possibly extirpated by CDFW (CDFW 2019b).
western pond turtle[2] *(Actinemys marmorata pallida)*	CSSC; VHP	Ponds, lakes, perennial and intermittent streams, and wetlands with vegetation, basking habitat, and upland areas for reproduction	**Present;** Suitable aquatic habitat is present in the Project area. Species is known to occur in Upper Penitencia Creek, Coyote Creek, Guadalupe River, and Los Gatos Creek. Surrounding upland areas are considered to be low quality habitat for nesting and overwintering.

Names[a]	Status[b]	Habitat	Potential for Occurrence in the Project Area
Alameda whipsnake[3] *(Masticophis lateralis euryxanthus)*	FT; ST	Chaparral and scrub habitats but will also use adjacent grassland, oak savanna, and woodland habitats	**Absent;** Project area is outside of the species known range (CDFW 2019c; USFWS 2002; USFWS 2011).
western burrowing owl[2] *(Athene cunicularia)*	CSSC; VHP	Open sparsely vegetated areas with mammal burrows	**Unlikely;** Species is not found in riparian habitats**.** A grassland with ground squirrels (i.e., potentially suitable habitat) is present at Guadalupe River Park Gardens where a temporary staging area will be established, but the area is highly disturbed by homeless encampments, including loose dogs, and the species has never been detected at this location despite past and ongoing monitoring efforts (P. Higgins, pers. comm. 2020).
California Ridgway's rail[3] (*Rallus obsoletus obsoletus*)	FE; SE	Saltwater and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay	**Absent;** Project area is outside of the species known range (CDFW 2014; USFWS 2013).
California least tern[3] *(Sterna antillarum browni*)	FE; SE	Nests along the coasts from San Francisco to northern Baja in sparsely vegetated, flat substrates such as sand beaches, alkali flats, and levee roads	**Absent;** Project area is outside of the species known range (CDFW 2014; USFWS 2013).
American peregrine falcon[2] *(Falco peregrinus)*	FP; CFGC	Nests on ledges such as cliffside aeries or tall bridges, towers, and office buildings	**Absent as Breeder;** Suitable nesting habitat is absent within the work areas. Species may forage in or adjacent to the Project area.
white-tailed kite[4] *(Elanus leucurus)*	FP; CFGC	Nest high in dense tree stands near foraging habitat. Forage in open grasslands, meadows, agricultural, and marsh habitats	**Unlikely as Breeder**; Potential nesting substrates are present, but the adjacent foraging habitat required for nesting is considered to be of low quality due to anthropogenic disturbance levels.

Names[a]	Status[b]	Habitat	Potential for Occurrence in the Project Area
Swainson's hawk[2] *(Buteo swainsonii)*	ST	Breeds in riparian areas, grasslands, savannahs, or agriculture/ranch lands with adjacent open habitats for foraging	**Absent;** CNDDB query intersected a historic nesting record of Swainson's hawk (Occurrence #2570). Only four nests have been documented in the county. Two are historical records from 1894 and 1889 (Bousman 2007; CDFW 2019b) and the other two records are recent. One pair has been nesting in northern Coyote Valley since 2013 (Philipps et al. 2014), and another pair in southeast Gilroy since 2018 (R. Phillips, pers. comm. 2019). Extensive development throughout the Project limits and surrounding areas have eliminated nesting and foraging habitat in the northern section of the valley floor.
common raptor species[2,4]	CFGC	Nest in a wide array of habitats including riparian areas, woodlands, and residential areas	**Present as Breeder;** Suitable breeding habitat is present in the Project area for common raptors species including but not limited to western-screech owl, Cooper's hawk, red-shouldered hawk, and red-tailed hawk.
yellow warbler[4] *(Setophaga petechia)*	CSSC	Nest in multi-story riparian habitats with dense understories	**Absent as Breeder**; Project area lacks multi-story riparian habitats with dense understory which is used for nesting by the species. Species may forage within the Project area as summer resident or itinerant migrant.
yellow-breasted chat[4] *(Icteria virens)*	CSSC	Nest in riparian or open habitats with dense understories	**Absent as Breeder**; Project area lacks dense understory which is used for nesting by the species. Species may forage within the Project area as summer resident or itinerant migrant.

Names[a]	Status[b]	Habitat	Potential for Occurrence in the Project Area
tricolored blackbird[5] (*Agelaius tricolor*)	ST	Nests in areas with open water with protected suitable nesting substrates that are flooded, spiny, or thorny, which are within foraging distance of suitable foraging habitats (e.g., agricultural crops, annual grasslands, and cattle lots/dairies)	**Absent;** Discharge sites are mostly within woody riparian habitat and there are no records of the species nesting in the county in woody riparian habitat (i.e., willow riparian forest and scrub or mixed riparian forest and woodland; SCVHA 2017). A few discharge sites have patches of freshwater marsh adjacent, however the meager widths of the wetland vegetation along the banks of the stream (i.e., unprotected nesting substrates) make these locations unsuitable for nesting. All adjacent locations with potential nesting substrates (e.g., small patches of freshwater marsh) are completely surrounded by urban-suburban or golf course/urban park and does not provide suitable nesting habitat for the species (SCVHA 2017). The entire Project area is surrounded by urban-suburban and/or golf course/urban park, does not provide suitable foraging habitat (breeding or overwintering), and is not within 2-miles of any recent or historic nesting site (UCDTBP 2020; CDFW 2019a; Bousman 2007)
western red bat[4] *(Lasiurus blossevillii)*	CSSC	Roosts primarily in trees, less often shrubs. Roost sites often in edge habitats	**Likely as Winter Day Rooster;** Migratory species. Does not raise young in Santa Clara county. Overwinters in the county generally from November to February. Typically, solitary foliage roosting species.
Townsend's big-eared bat[2] *(Corynorhinus townsendii)*	CSSC	Roosts in caves, mines, tunnels, buildings, or other human-made structures	**Unlikely as Winter Day Rooster;** No bat sign (i.e., guano, urine stains, or prey remains) was observed at potential roosting structures adjacent to the Project area. Project area has high degree of anthropogenic disturbance.
pallid bat[2] *(Antrozous pallidus)*	CSSC	Roosts in rock cracks and crevices, caves, buildings, bridges, and tree cavities	**Unlikely as Winter Day Rooster;** No bat sign (i.e., guano, urine stains, or prey remains) was observed at potential roosting structures adjacent to the Project area. Project area has high degree of anthropogenic disturbance.

Names[a]	Status[b]	Habitat	Potential for Occurrence in the Project Area
San Francisco dusky-footed woodrat[4] *(Neotoma fuscipes annectens)*	CSSC	Riparian and woodland habitats	**Unlikely;** Woodrat lodges were absent throughout the Project area and surrounding areas. Project area (i.e., discharge sites) is in locations that become inundated during high storm flows, likely precluding establishment of lodges at or close to grade.
San Joaquin kit fox[3] *(Vulpes macrotis mutica*)	FE; ST; VHP	Annual grasslands or grassy open stages with scattered shrubby vegetation	**Absent;** Project area is outside of the species range (CDFW 2014; ICF 2012; USFWS 1998) and suitable habitat is absent.

[a] Key to Sources: 1 = CNPS Inventory of Rare and Endangered Plants database; 2 = CNDDB 2-mile Query; 3 = USFWS IPAC System; 4 = Valley Water; 5 = VHP Wildlife Survey Areas

[b] Key to Status Abbreviations: CFGC = California Fish and Game Code 3503.5; CRPR = California Rare Plant Rank; CSSC = California Species of Special Concern; FP = Fully Protected; SE= State Endangered; ST = State Threatened; SC = State Candidate; FE = Federally Endangered; FT = Federally Threatened; VHP = Covered Species under the Valley Habitat Plan

Valley Water

Figure 2A: CNDDB 2-mile Query

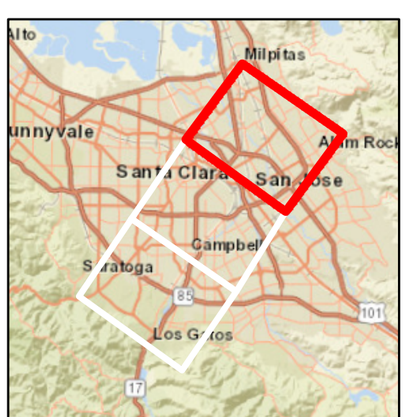
Central Pipeline Inspection & Rehabilitation Project

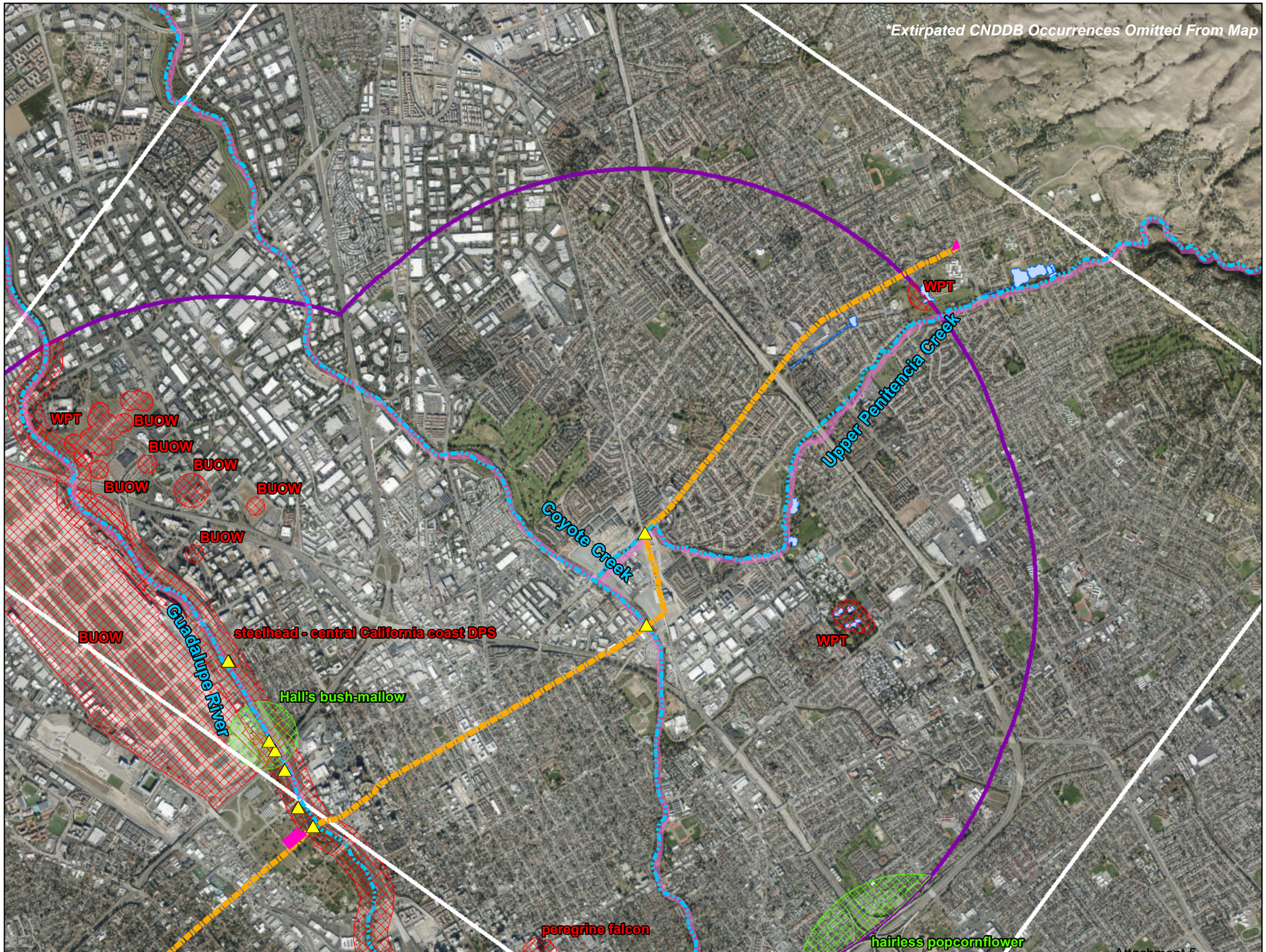
- Two-mile CNDDB Query
- Animal Occ: Mod-High Accuracy
- Plant Occ: Mod-High Accuracy
- Steelhead Critical Habitat
- Discharge Sites
- Staging Areas
- Central Pipeline

N W E S

0 0.25 0.5 1 Miles

One inch = 0.5 mile





Valley Water

Figure 2B: CNDDB 2-mile Query

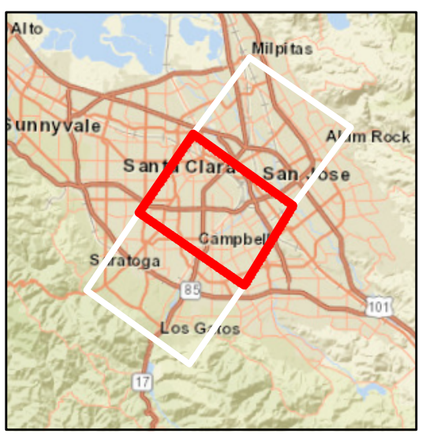
Central Pipeline Inspection & Rehabilitation Project

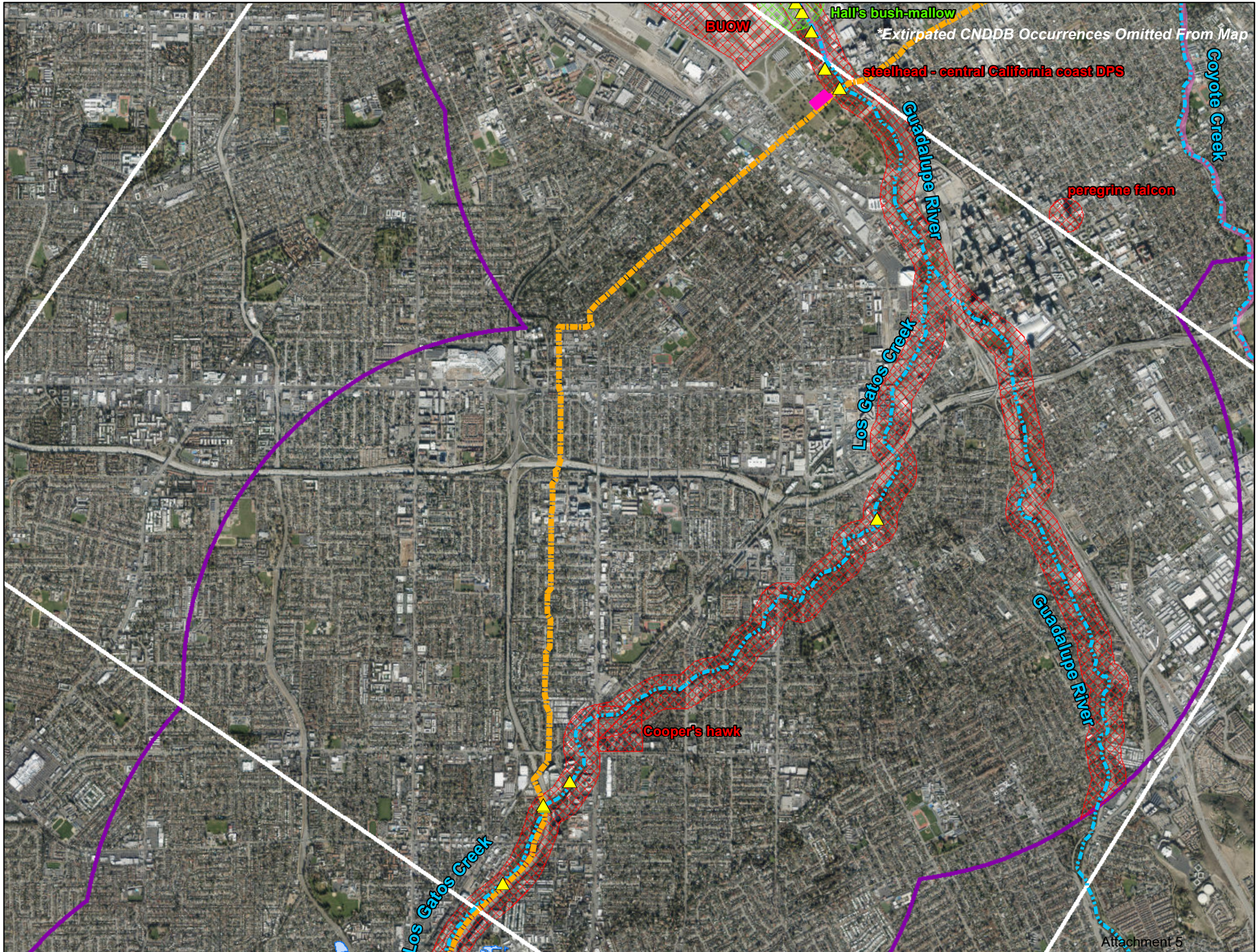
- Two-mile CNDDB Query
- Animal Occ: Mod-High Accuracy
- Plant Occ: Mod-High Accuracy
- Steelhead Critical Habitat
- Discharge Sites
- Staging Areas
- Central Pipeline

N W E S

0 0.25 0.5 1 Miles

One inch = 0.5 Mile





Valley Water

Figure 2C: CNDDB 2-mile Query

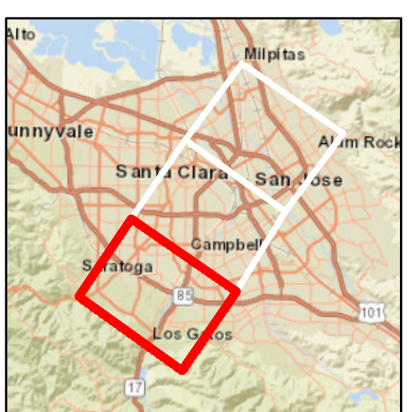
Central Pipeline Inspection & Rehabilitation Project

- Two-mile CNDDB Query
- Animal Occ: Mod-High Accuracy
- Plant Occ: Mod-High Accuracy
- Discharge Sites
- Staging Areas
- Central Pipeline

N W E S

0 0.25 0.5 1 Miles

One inch = 0.5 mile



Valley Water

Figure 2D: CNDDB 2-mile Query

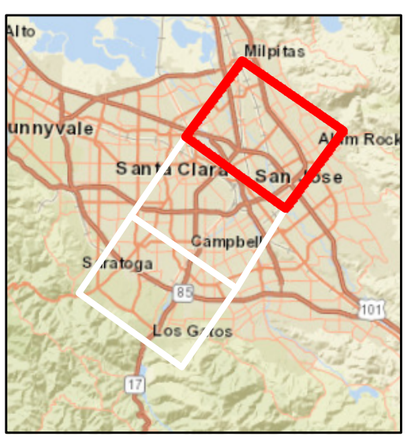
Central Pipeline Inspection & Rehabilitation Project

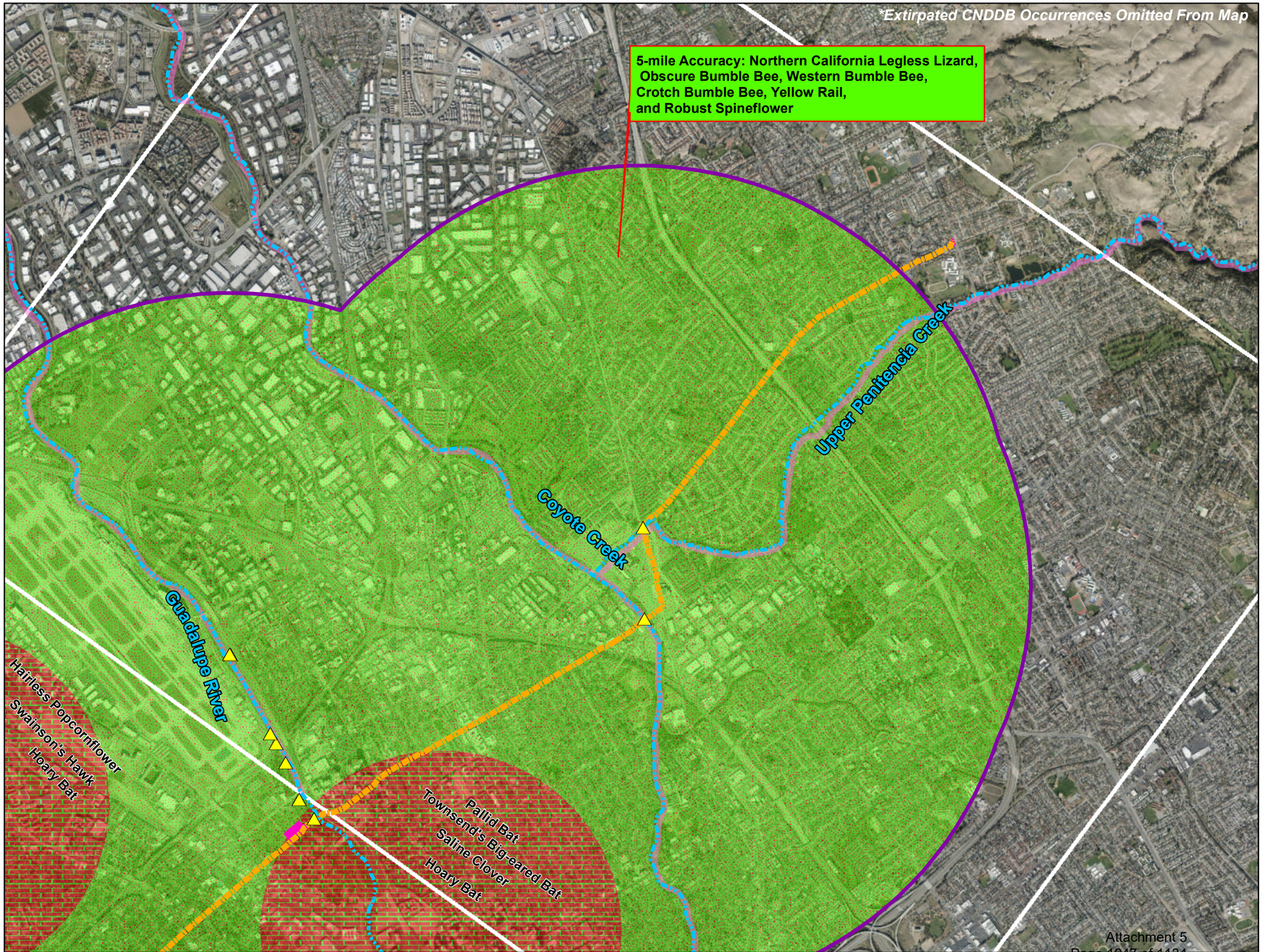
- Two-mile CNDDB Query
- Animal/Plant Occ: 1-mile Acc.
- Animal/Plant Occ: 5-mile Acc.
- Steelhead Critical Habitat
- Discharge Sites
- Staging Areas
- Central Pipeline

N W E S

0 0.25 0.5 1 Miles

One inch = 0.5 mile





Valley Water

Figure 2E: CNDDB 2-mile Query

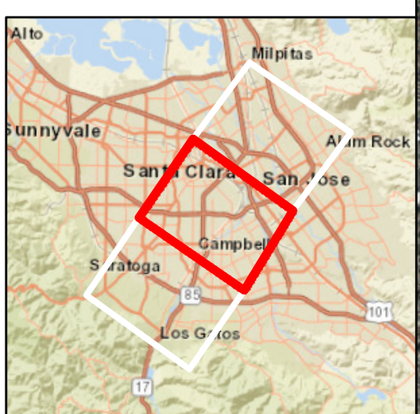
Central Pipeline Inspection & Rehabilitation Project

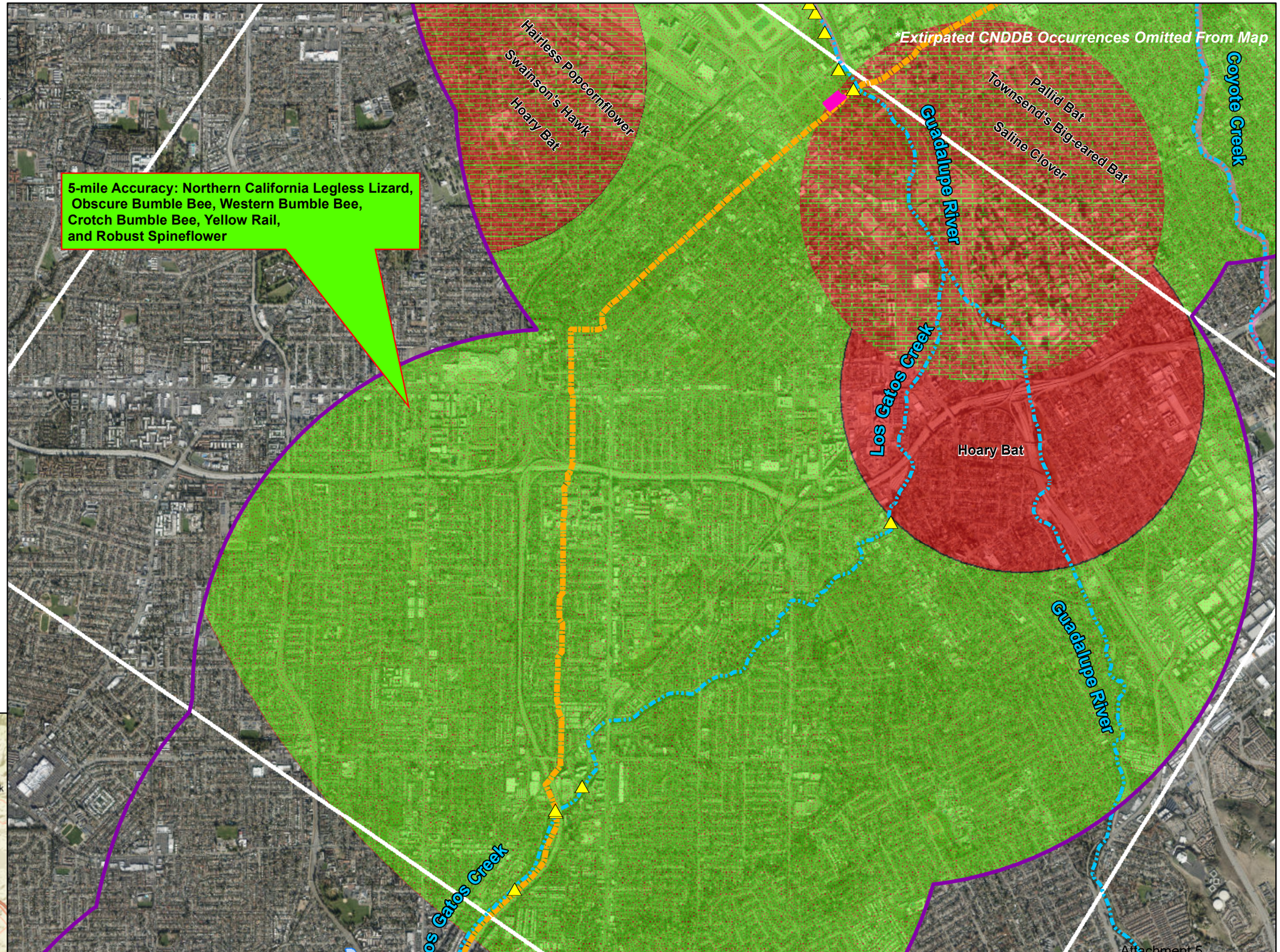
- Two-mile CNDDB Query
- Animal Occ: 1-mile Acc.
- Animal/Plant Occ: 1-mile Acc.
- Animal/Plant Occ: 5-mile Acc.
- Steelhead Critical Habitat
- Discharge Sites
- Staging Areas
- Central Pipeline

N W E S

0 0.25 0.5 1 Miles

One inch = 0.5 mile





Valley Water

Figure 2F: CNDDB 2-mile Query

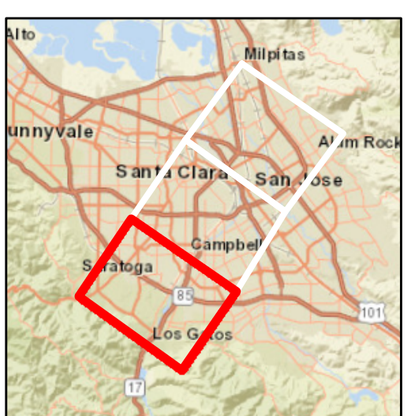
Central Pipeline Inspection & Rehabilitation Project

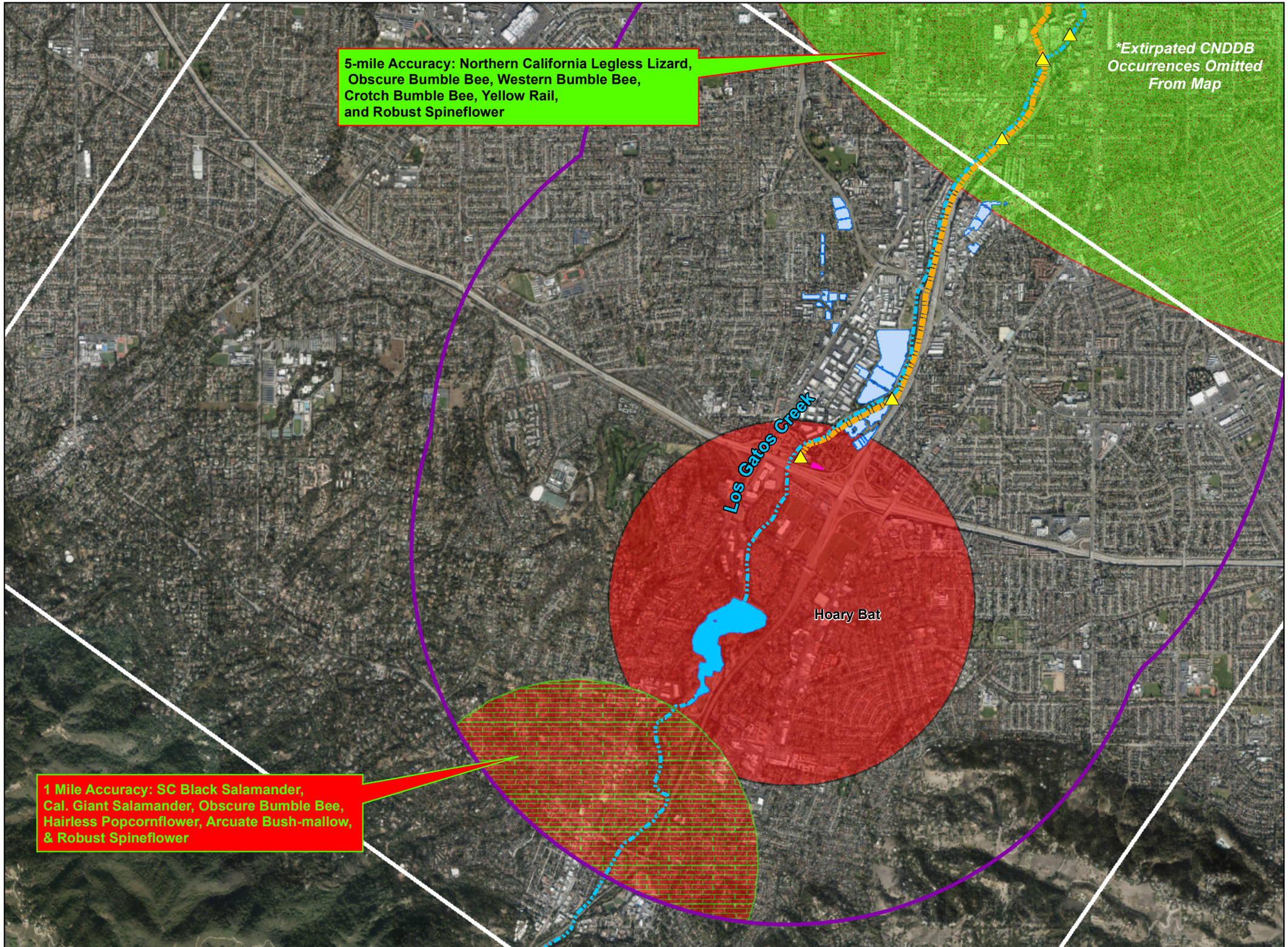
- Two-mile CNDDB Query
- Discharge Sites
- Central Pipeline
- Staging Areas
- Animal Occ: 1-mile Acc.
- Animal/Plant Occ: 1-mile Acc.
- Animal/Plant Occ: 5-mile Acc.

N W E S

0 0.25 0.5 1 Miles

One inch = 0.5 mile





Section 4. Analysis

Below we describe the Project impacts within the LSAA jurisdictional boundaries, describe the Project's conservation measures, and assess potential impacts to sensitive biological resources.

4.1 Impacts

The Project would include work within Upper Penitencia Creek, Coyote Creek, Guadalupe River, and Los Gatos Creek; all of which is related to dewatering of the pipeline.

Dewatering of the pipeline consists of two activities:

1. Installation and removal of temporary BMPs to create "visqueen spillways" at some discharge locations. BMPs would include hoses, wattles and/or sandbags, visqueen sheeting, and geotextile fabric bags. Temporary BMPs are expected to be in place for no longer than a week at each site. At one discharge location to allow for installation of BMPs, ~460 ft^2 of herbaceous plant species (~90% of which is nonnative species) would need to be weed-whacked.
2. Controlled and monitored dewatering of the pipeline through existing outfalls with hard infrastructure BMPs (e.g., outfall flap gates, concrete spillways, and riprap) or through temporary secondary BMPs. Approximately 12,000,000 gallons of raw water would be discharged systematically through 16 outfall locations. Discharge rate would be no more than 3 cubic-feet-per-second (cfs) at 14 locations and no more than 5-cfs at the remaining two locations.

Detailed information regarding the Project's impacts within LSAA boundaries (i.e., descriptions, quantities, and figures depicting impact areas at each dewatering site) are provided in Box 11 of the LSAA application. The Project does not have permanent impacts to LSAA jurisdictional habitat.

4.2 Project Conservation Measures

To completely avoid or reduce impacts to sensitive biological resources, the Project will implement applicable BMPs from the PMP PEIR, applicable VHP Conditions, and conditions prescribed in the NDEPS permit. Additionally, VHP fees will be paid to the SCVHA for Project impacts. The SCVHA will use these fees to implement their conservation strategy. The conservation strategy mitigates VHP impacts through protection, restoration, and enhancement of natural communities, which promotes recovery for listed species and prevention of listing for non-listed species (ICF 2012).

The majority of the biological resources within the Project area are covered by the VHP, either explicitly (e.g., covered sensitive habitats and VHP-covered special-status species) or indirectly (e.g., special-status species that would receive a net benefit from the VHP's conservation program); therefore, no conservation measures beyond the PMP PEIR BMPs and compliance with the Project permits are proposed for these resources. However, a few of the biological resources (i.e., special-status fish species) require additional measures beyond the PMP PEIR BMPs and permit conditions/measures. For these resources, in addition to the PMP BMPs and permit conditions, the Mitigation Measures from the PMP PEIR would help avoid or reduce the Project's impacts to sensitive biological resources.

Lastly, the Project would adhere to all conditions prescribed in the LSAA.

4.2.1 Applicable PMP BMPs to Reduce Impacts on Biological Resources

The Project would implement the following BMPs from the PMP PEIR to avoid or reduce potential impacts on biological resources:

- BMP Biology-2: Minimize Predator Attraction
- BMP Biology-3: Limit Impacts From staging and Stockpiling Materials
- BMP Hazards-4: Properly Handle Hazardous Materials
- BMP Hazards-5: Have Spill Prevention Kits Available
- BMP Hazards-6: Inspect and Maintain Equipment
- BMP Hazards-7: Prevent Accidental Release of Chemicals
- BMP Hazards-8: Do Not Wash Vehicles at Project Sites
- BMP Hazards-9: Prevent Contamination of Soil and Water
- BMP Hazards-10: Store Equipment Away from Channel and with Proper Containment
- BMP Hazards-14: Provide Portable Toilet and Wash Stations
- BMP Hazards-16: Provide Secondary Containment for Chemicals
- BMP Hydrology-1 and 12: Minimize Access to Creeks
- BMP Hydrology-2: Prevent Tracking of Mud from Work Sites
- BMP Hydrology-3, 8, and 14: use Erosion Control Measures
- BMP Hydrology-5: Consider Discharge Volume Reduction Options
- BMP Hydrology-6: Slowly Ramp up Discharge Rates
- BMP Hydrology-9: Use Velocity Dissipation Devices
- BMP Hydrology-13: Maintain Vegetated Buffer between Staging/Excavation Areas and Receiving Waters
- BMP Hydrology-15: Minimize Temperature Change in Receiving Waters
- BMP Hydrology-20: Monitor Flows in Receiving Waters
- BMP Utilities-1: Clean Work Site following Project Completion
- BMP Utilities-2: Remove Construction Waste from Work Site

Detailed descriptions of these BMPs are provided in Box 12A and 12B of the LSAA application.

4.2.2 Applicable VHP Conditions

The Project would adhere to the following VHP Conditions (permit conditions) to avoid or reduce potential impacts on biological resources:

- VHP Condition 1: Avoid Direct Impacts on Legally Protected Plants and Wildlife
- VHP Condition 3: Maintain Hydrologic Conditions and Protect Water Quality[3]

[3] Condition 3 necessitates implementing the measures listed in Table 6-2 of the VHP

- VHP Condition 5: Avoidance and Minimization Measures for In Stream Operations and Maintenance
- VHP Condition 12: Wetland and Pond Avoidance and Minimization
- VHP Condition 15: Western Burrowing Owl Avoidance and Minimization

Detailed descriptions of these Conditions are provided in Box 12A and 12B of the LSAA application.

4.2.3 NPDES Permit

The Statewide General NPDES permit for discharges from drinking water systems requires the discharger (i.e., Valley Water) to implement proven BMPs (e.g., water dissipators and erosion control measures) and perform water quality monitoring (e.g., chlorine, pH, and turbidity) during discharge events so that receiving water limitations prescribed in the permit are not exceeded and the receiving waters' beneficial uses are not adversely affected. The BMPs, receiving water limitations, and water quality monitoring measures (permit conditions) are described in detail in the permit itself, which is included in Box 13 of the LSAA application. To reduce redundancy in the application we did not repeat this level of detail here in the report. The Project would adhere to all the NPEDS permit conditions.

4.2.4 Special-status Plants Avoidance and Minimization Measure

An avoidance and minimization measures (AMM) for special-status plants was created specifically for this Project. Qualified botanists shall conduct surveys for special-status plants in areas of suitable habitat within the Project work area, in advance of Project activities. Floristic surveys shall be conducted by a qualified botanist during the appropriate blooming periods, or for perennial plants within 30 days of the start of Project activities. If surveys identify any special-status plants, results shall be submitted to CDFW at least one week prior to the start of Project activities. If special-status plant species are identified, a qualified botanist shall identify them with flagging to create a 25-foot no-disturbance buffer during project activities. If avoidance is not feasible for special-status plants, CDFW shall be consulted, in writing, to determine whether alternative avoidance measures that are equally protective are possible.

4.2.5 PMP PEIR Mitigation Measures

The Project would implement the following mitigation measures from the PMP PEIR to reduce potential impacts to biological resources to less than significant levels:

- Mitigation Measure Biology-16: Pipeline discharge for maintenance work would preferentially be performed during winter months, when storm events are more common and when water is naturally highest. Discharge flows are then a minimal portion of overall stream or river flow. If draining must occur during summer or fall, a slow release is mandatory to ensure receiving waters do not experience a temperature change greater than 2-degrees Fahrenheit in either direction, and overall receiving water does not exceed 68 degrees Fahrenheit in steelhead and Chinook salmon inhabited streams.

- Mitigation Measure Biology-20: Openings of gravity-drain gates and on the suction and discharge piping of any submersible pumps used for pipeline discharge to minimize discharge of species for any discharge of Delta water. The screens must be examined throughout the draining process to remove introduced fish and prevent debris clogging.

- Mitigation Measure Hydrology-3: The discharge location and receiving water will be observed for signs of erosion by a trained individual. If erosion is evident, flow rates will be reduced. If

erosion continues to occur, discharges will be terminated until appropriate erosion control BMPs are installed. Monitoring will be conducted just prior to the start of the discharge and regularly (i.e., every hour, every four hours, every eight hours) during the discharge. Monitoring frequency will depend on the nature of the discharge and the erosion in the area.

- Mitigation Measure Hydrology-4: An environmental monitor will walk along each discharge drainage to the termination of the drainage or 500 feet downstream to inspect for erosion after a draining is complete. If erosion is detected, reclamation measures should be taken to correct the erosion. Correction measures shall include recontouring the land to its previous state and revegetating with the dominant appropriate native grass species in the area, if necessary.

- Mitigation Measure Hydrology-6: RWQCB objectives for turbidity in receiving waters (measured 100 feet downstream of project site in streams and 50 feet downstream in lakes) shall not be exceeded. Receiving water and discharge water will be monitored by a trained individual for turbidity prior to the discharge and periodically throughout the drainage operation. Silty or turbid water from project activities shall not be discharged into streams lakes or storm drains. Such water shall be treated prior to release by one of the following methods:
    - Discharged to the sanitary sewer system (requires approval from local sanitary district).
    - Treated with an on-line filter system or storm drain inlet protection.
    - Pumped into a holding facility or into a settling pond located in a flat stable area.

4.3 Impact Analysis of Sensitive Biological Resources

Below we discuss our analysis of the Project's potential impacts on sensitive biological resources.

4.3.1 No Impact

Western leatherwood and 17 wildlife species were determined to be absent (See Table 2) within the Project area. In addition, yellow warbler and yellow-breasted chat were determined to be absent as breeders and are only considered to be special-status species (i.e., CSSC) when nesting. Peregrine falcon was determined to be absent as a breeder. White-tailed kite and common raptor species could potentially nest within the Project area; however, dewatering would occur in the winter months (i.e., January) outside of the nesting season and no trees or shrubs that could have inactive raptor nests[4] will be impacted.

California tiger salamander and foothill yellow-legged frog, which were determined to be absent, would benefit directly from the SCVHA's targeted recovery of these VHP covered species. The other species with ranges within the VHP Plan Area would benefit indirectly from the SCVHA's conservation strategy that includes preservation, restoration, and enhancement of natural communities.

Because of these factors, the Project would result with no impacts to these species.

4.3.2 Impacts Avoided/Minimized through BMPs, Permit Conditions, and AMM

Temporary impacts would occur in riparian habitat as a result of installation of temporary discharge BMPs (e.g., wattles, visqueen, and geotextile filter bags). Except for one location, all the BMPs were intentionally placed on barren soil areas to prevent the need for vegetation removal. At one location,

[4] Under California Fish and Game Code 3503.5 raptor nests are protected year round

avoidance of vegetation was not possible. At this location we identified a 460 ft^2 area of herbaceous plant species, of which ~90% were nonnative, to place the BMPs successfully avoiding other areas with native and woody vegetation. Because the BMPs are intended to prevent erosion and scour and the impacts are small, temporally and in size (1,547ft^2 total between 16 discharge sites), these impacts are considered to be diminutive.

The Project would involve controlled and programmatic discharging of water into four streams; therefore, the streams and the riparian and wetland habitats downstream of the discharge sites would temporarily receive more water as a result of the dewatering of the pipeline. However, this impact is not expected to represent a substantial adverse effect, and may be beneficial, because the managed release of water from the pipeline in January emulates the natural movement of water through the watersheds. Discharge would occur during the wet season, and therefore the ecology of the streams, riparian habitats, and wetland habitats are not expected to be adversely affected. Additionally, the discharges would be at a low cfs relative to the flows of the receiving water bodies, the discharges would be both dissipated and slowly ramped up, and water quality monitoring would occur to assure the beneficial uses of the receiving waters were not adversely affected.

Hall's bush-mallow, arcuate bush-mallow, Loma Prieta hoita, and maple-leafed checkerbloom were determined to be unlikely to occur in the Project area. Reconnaissance level surveys (performed outside of the species' bloom period) did not detect these species and habitat assessments found few locations of potential suitable habitat within Project area. Protocol-level surveys are scheduled for early spring 2020 to coincide with the species' respective bloom periods to confirm absence of these species within Project work areas. If detected, avoidance protocols as described in section 4.2.4 will be implemented.

WPT, a VHP covered species, was determined to be present. Because the work is temporary and no permanent impacts to habitat would occur, we evaluated potential impacts to individual turtles or their nests. In mid-late fall, this species may enter a period of brumation (periods of low activity during cool temperatures). It is one of relatively few *Emydid* turtles that regularly overwinter on land, likely as a mechanism to avoid mortality from increased winter water flows in the Mediterranean climate. Where it overwinters or enters brief periods of brumation terrestrially, the species chooses sites above the high-water mark. Similarly, nest sites are chosen above the high-water mark. Hatchlings emerge in fall, but for some nests, hatchlings remain in the nest through the first winter, emerging the following spring (Thomson et al. 2016). Because the Project's pipeline dewatering is scheduled to occur in January, all work will occur in areas that are subject to inundation during high storm flows (i.e., turtles likely would not nest or over-winter there), compacted soils surrounding the Project area, plus the frequency and degree anthropogenic disturbance (e.g., loose dogs associated with nearby homeless encampments) in the upland areas, the likelihood of turtle presence and potential impacts to turtles in these areas at this time of year is extremely low.

Western burrowing owl, a VHP covered species, was determined to be unlikely to occur in the Guadalupe River Park Gardens adjacent to the Guadalupe River. To comply with Condition 15 of the VHP, two preconstruction surveys will be conducted for burrowing owls prior to construction. If detected the avoidance and minimizations measures prescribed in the VHP will be adhered to (see pages 6-62 through 6-667 in the VHP).

Western red bat was determined to be likely as a winter day rooster. If this species is present in any of the work areas, it is considered to be present in low numbers due to its typical solitary roosting behavior. Because the work is temporary and no permanent impacts to habitat would occur, we

evaluated potential impacts regarding disturbance to this species as a winter day rooster. Due to the existing anthropogenic activity levels at these locations and the work only involving a few laborers and hand tools, any disturbance that may result from this work is considered to be diminutive.

Pallid bat and Townsend's big-eared bat were determined to be unlikely as winter day roosters in the Project area. Because the work is temporary and no permanent impacts to habitat would occur, we evaluated potential impacts regarding disturbance to these species as winter day roosters. We carefully inspected all the potential roosting structures that were identified and made two key observations. First, there was no sign of bat roosting. Second, all these locations had high levels of anthropogenic disturbance, either recreational (e.g., jogging and bicycling), homeless encampment activities, or both. Due to the existing anthropogenic stressors at these locations and the work only involving a few laborers and hand tools, any disturbance that may result from this work is considered to be diminutive.

San Francisco dusky-footed woodrat was determined to be unlikely in the Project areas. No woodrat lodges were seen in or immediately adjacent to the Project areas; however, due to proximity of homeless encampments it was not safe to complete focused surveys throughout the species' entire dispersal range. For this reason, we were unable to conclude they were absent and made a finding of unlikely. We evaluated the potential for direct impacts to woodrat lodges as a proxy to direct impacts to the species. Because all the work will occur in areas that are subject to inundation during high storm flows, likelihood of woodrats establishing a lodge in these areas is extremely low. Additionally, if woodrats did disperse into the work areas, because their lodges are conspicuous, they would be easily be detected during the preconstruction biological surveys and subsequently avoided.

The proposed Project would implement all applicable PMP PEIR BMPs, permit conditions, and the special-status plants AMM to help avoid or minimize impacts to these species and their habitats. Through payment of VHP fees these species will benefit. Loma Preita hoita, western pond turtle, and western burrowing owl would benefit directly from the SCVHA's targeted recovery of these VHP covered species. The other species would benefit indirectly from the SCVHA's conservation strategy that includes preservation, restoration, and enhancement of natural communities.

4.3.3 Impacts Avoided/Minimized through BMPs, Permit Conditions, and Mitigation Measures

Pacific lamprey, Chinook salmon, steelhead, Sacramento hitch, and Central California roach were determined to be present in some or all the systems evaluated. Riffle sculpin was determined to be unlikely. The species present are most vulnerable to discharge impacts during and immediately after spawning, when eggs (redds) and small fish fry are present. To evaluate potential impact to these species we reviewed their spawning phenology to determine the likelihood of their eggs or small fish fry occurring downstream of discharge locations during the dewatering events. We also considered the potential for all life stages of these species to be exposed to degraded water qualities.

Pacific lamprey, an anadromous species, usually move into spawning streams between early March and later June. However, upstream movements in January and February have also been observed in California. Upstream movements are usually associated with periods of high flows. Spawning typically occurs immediately after the upstream migrations. Embryos hatch in approximately 19 days and shortly after the ammocoetes (larvae) are washed downstream to a suitable area of soft sand and mud. Ammocoetes spend the next several years as filter feeders (length of ammocoete stage is uncertain but probably 5-7 years) before beginning their dramatic metamorphosis from detritus feeding larvae to active parasitic adults. Downstream migrations occur during high flows, perhaps coincident with the upstream migration of adults (Moyle 2002). We determined it is likely that ammocoetes could be

present downstream of the discharge sites during the dewatering of the pipeline. Additionally, if upstream migrations were to occur into January it is possible adults and redds could be present as well.

Chinook salmon, an anadromous species, usually migrate into freshwater streams between late summer and early fall (Moyle 2002); however, in Santa Clara county migrations have been observed into February (Valley Water 2020). Spawning usually occurs within a few days or weeks of arriving on the spawning grounds. Juveniles emerge from the gravel in spring and move downstream within a few months, to rear in mainstem rivers or estuaries before heading out to sea (Moyle 2002). Chinook salmon have been observed in low numbers breeding downstream of discharge locations along Coyote Creek, Guadalupe River, and Los Gatos Creek. We determined it is likely that fish fry could be present living within gravel downstream of the discharge sites during the dewatering of the pipeline. Additionally, if upstream migrations were to occur into January it is possible adults and redds could be present as well.

Steelhead, an anadromous species, migrate into freshwater streams during winter when higher flows are present. Steelhead select spawning sites in the upper watersheds with gravel substrates that receive sufficient flow to maintain circulation through the gravel. Eggs hatch in 25-35 days, and fry emerge from the gravel after 2-3 weeks. Fry move to stream edges and then move to deeper water as they grow larger. Juvenile rearing occurs during all seasons of the year with outmigration to the sea typically occurring between February to June (Moyle 2002; Shapovalov and Taft 1954). Steelhead prefer spawning in the upper watershed tributaries and have not been documented spawning below the discharge locations along Upper Penitencia Creek, Coyote Creek, and Guadalupe River. Steelhead have been documented spawning downstream of the discharge locations along Los Gatos Creek historically. We determined that adults and juveniles could be present during the dewatering of the pipeline. In addition, if breeding was to occur in Los Gatos Creek it possible that redds and/or fish fry could be present as well.

Sacramento hitch and Central Valley roach are resident species that could spawn downstream of the discharge locations. However, as with most native California fish species, these species spawn in between March and August (throughout spring into early summer; Moyle 2002). Therefore, we determined that eggs or young fry of these species would be absent during the dewatering of the pipeline, but juvenile and adult fish may be present.

Riffle sculpin are resident species that spawn February through April (Moyle 2002). Therefore, we determined eggs or young fry would be absent during dewatering of the pipeline, but adults or juveniles could present. In general, this species is deemed unlikely to present in streams downstream of the dewatering locations.

The PMP PIER analyzed the potential effects of pipeline discharge into receiving water bodies where steelhead and Chinook salmon could possibly be present. Mitigation measures were designed to reduce any potential impacts to these species and their aquatic habitats to less than significant levels. We determined that these mitigation measures would also minimize potential Project impacts to Pacific lamprey, Sacramento hitch, Central Valley roach, riffle sculpin, and their aquatic habitats.

It is possible that Pacific lamprey redds and/or ammocoetes, Chinook salmon redds and/or fry, and steelhead redds and/or fry (i.e., in Los Gatos Creek) could be present downstream of the discharge sites during the dewatering of the pipeline. Significant adverse effects such as scouring of redds or washing of fish fry or ammocoetes downstream are not anticipated due to the following reasons: 1) the pipeline

would be dewatered during the winter when the stream flows are at the highest; 2) the species have evolved to be in these life stages during the winter months; and 3) the discharge would be controlled, at a slow rate, and monitored. In addition, it is possible that juveniles and/or adults of these special-status fish species could be present downstream of the discharge sites during the pipeline dewatering. Because water quality monitoring will occur to assure the receiving waters' limitations are not exceeded and their beneficial uses are not adversely affected, significantly adverse impacts to special-status fish species or their aquatic habitats are not anticipated.

In summary, we determined that implementation of the PMP BMPs, compliance with permit conditions, and implementation of the mitigation measures prescribed by the PMP PEIR would avoid and minimize potential project impacts to special-status fish species and their aquatic habitats. Additionally, as described in Section 1.4, NMFS, who has purview over steelhead and its critical habitats, determined that implementation all the measures and conditions described above, the PMP was not likely to adversely affect steelhead or its critical habitat (NMFS 2008**)**. Lastly, payment of VHP impacts fees would support conservation of these species' habitats.

Section 5. Conclusion

Through compliance with the conservation measures described in Section 4.2 of this report and payment of VHP fees, potential impacts to sensitive biological resources would be completely avoided, reduced, and/or mitigated for. Therefore, substantial adverse impacts to biological resources are not expected as a result of this Project.

Section 6. Photos

Photo 1: Los Gatos Creek SCVWD Outfall Station 666+47. Existing hard infrastructure is adequate.

Photo 2: Los Gatos Creek SCVWD Outfall Station 636+44. Existing hard infrastructure is adequate.

Photo 3: Los Gatos Creek SCVWD Outfall Station 552+13.89. Existing hard infrastructure is not adequate. A temporary hose will be clamped to the existing outfall and connected to a geotextile dissipator bag on top on a visqueen spillway bordered by wattles. See Photo 4.

Photo 4: Los Gatos Creek SCVWD Outfall Station 552+13.89. Photo shows placement of temporary dewatering BMPs and provides a mockup of the design.

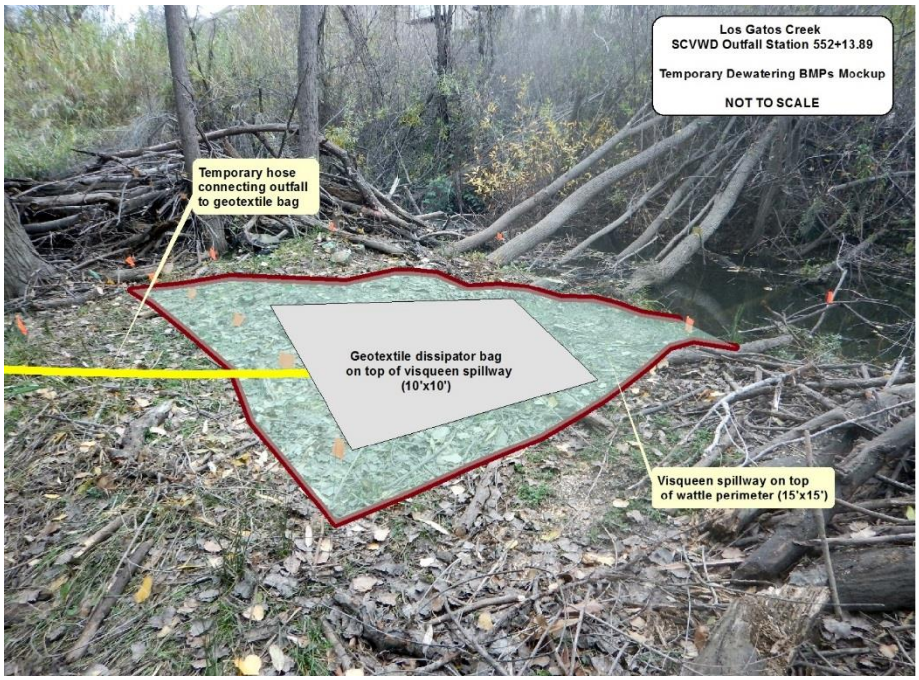


Photo 5: Los Gatos Creek SCVWD Outfall Station 525+85. Existing hard infrastructure is absent. Water will be pumped from the vault in the photo through a temporary hose across the bike path to temporary dewatering BMPs. Location show in Photo 6.

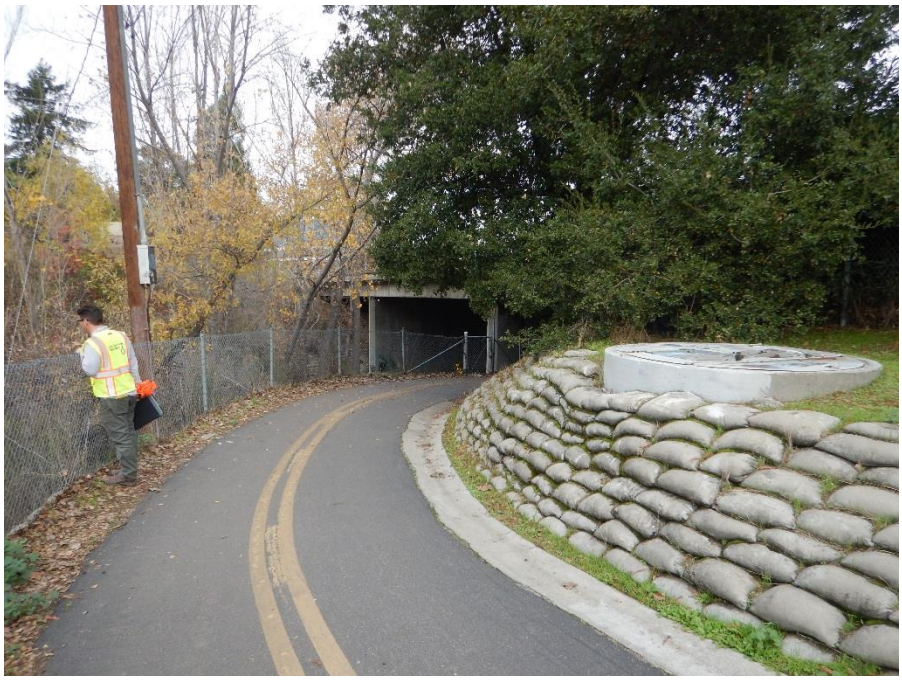


Photo 6: Los Gatos Creek SCVWD Outfall Station 525+85. Photo shows placement of temporary dewatering BMPs and provides a mockup of the design.

Photo 7: Los Gatos Creek City of Campbell Outfall L-12-01. Existing hard infrastructure is adequate.

Photo 8: Los Gatos Creek City of Campbell Outfall L13-01. Existing hard infrastructure not adequate. The outfall will be dammed with sandbags to connect a temporary hose to capture discharge and transfer water to temporary dewatering BMPs. See Photo 9.

Photo 9: Los Gatos Creek City of Campbell Outfall L13-01. Existing hard infrastructure not adequate. Mockup of temporary dewatering BMPs and discharge locations provided in photo.

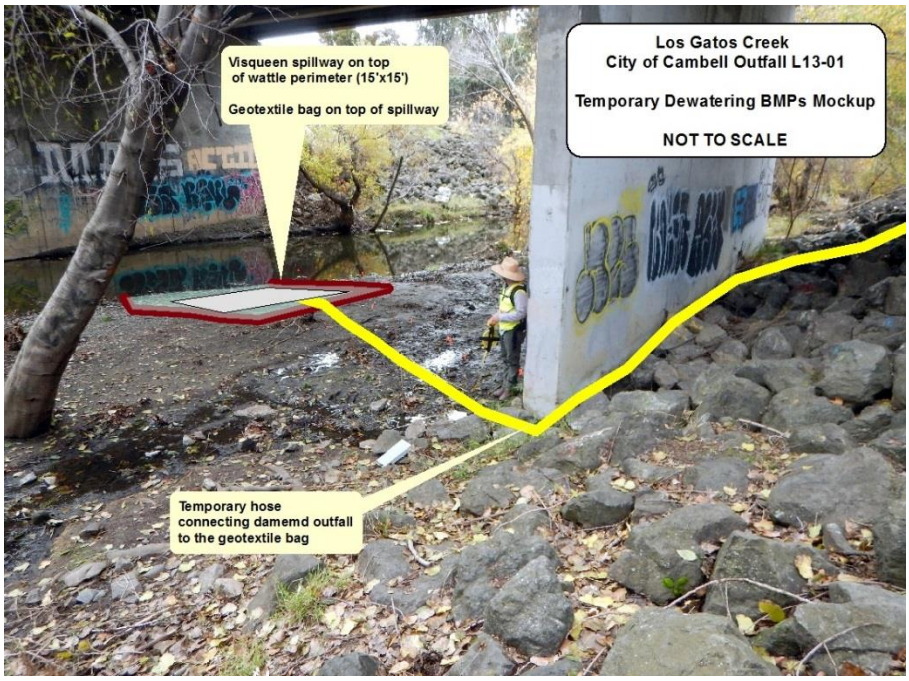


Photo 10: Los Gatos Creek City of San Jose Outfall SJ 232. Existing hard infrastructure adequate.

Photo 11: Guadalupe river city of San Jose Outfall SJ 608. Existing hard infrastructure is adequate.

Photo 12: Guadalupe river city of San Jose Outfall SJ 607. Existing hard infrastructure is adequate.

Photo 13: Guadalupe river city of San Jose Outfall SJ 624. Existing hard infrastructure is adequate.

Photo 14: Guadalupe river city of San Jose Outfall SJ 623. Existing hard infrastructure is adequate.

Photo 15: Guadalupe river city of San Jose Outfall SJ 527. Existing hard infrastructure is adequate.

Photo 16: Guadalupe river city of San Jose Outfall SJ 528. Existing hard infrastructure is adequate.

Photo 17: Guadalupe River SCVWD Station 273+24 Outfall. Existing hard infrastructure adequate. Arrow pointing to outfall structure under water.

Photo 18: Coyote Creek SCVWD Station 154+85 Outfall. Temporary hose will be connected inside the pump house and ran down into the riparian corridor and connected to temporary dewatering BMPs See Photo 19.

Photo 19: Coyote Creek SCVWD Station 154+85 Outfall. Mockup of temporary dewatering BMPs and discharge locations provided in photo.

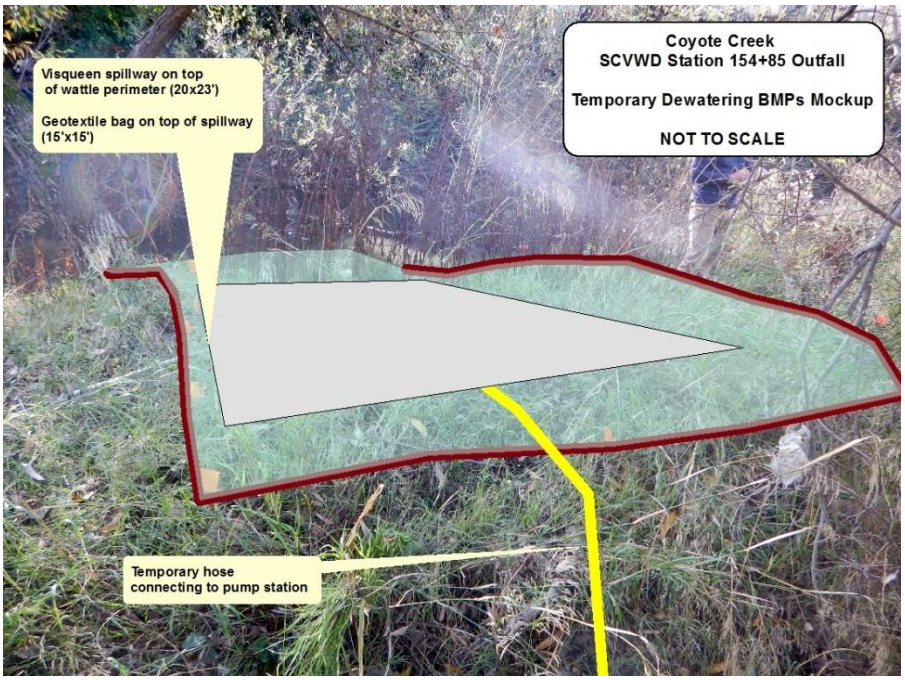
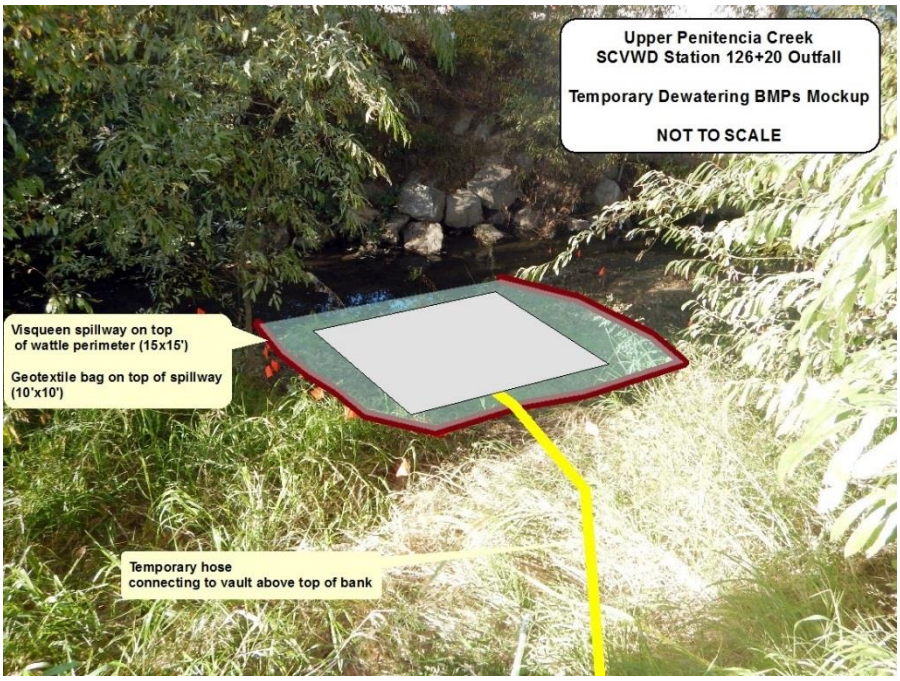


Photo 20: Upper Penitencia Creek SCVWD Station 126+20 Outfall. Hard infrastructure is absent. Temporary BMPs would be installed for dewatering. A temporary hose would run from the vault in foreground and ran down into the riparian corridor and connected to temporary dewatering BMPs See Photo 21.

Photo 21: Upper Penitencia Creek SCVWD Station 126+20 discharge location. Existing hard infrastructure absent. Mockup of temporary dewatering BMPs and discharge locations provided in photo.



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Attachment A

Special-status Plant Species Occurrence Assessment

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Scientific Name[a] Common Name	Listing Status[b] (Fed/State/CRPR)	Habitat Requirements[c]	Potential for Occurrence[d]
Acanthomintha lanceolate[1] Santa Clara thorn-mint	- / - / 4.2	Chaparral (often serpentinite), Cismontane woodland, Coastal scrub Elevation: 260 - 3935ft Bloom: March - June	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of coastal sage scrub, although are absent from impacted work areas. The species is a strong indicator of serpentine soils, where 65 – 74% of occurrences are within serpentine. Serpentine soil was not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Amsinckia lunaris[1] bent-flowered fiddleneck	- / - / 1B.2	Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland Elevation: 5 - 1640ft Bloom: March - June	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Androsace elongata ssp. *acuta*[1] California androsace	- / - / 4.2	Chaparral, Cismontane woodland, Coastal scrub, Meadows and seeps, Pinyon and juniper woodland, Valley and foothill grassland Elevation: 490 - 4280ft Bloom: March - June	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland and coastal scrub, although are absent from impacted work areas. The Project area lacks appropriate elevation. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Astragalus tener var. *tener*[1] alkali milk-vetch	- / - / 1B.2	Playas, Valley and foothill grassland (adobe clay), Vernal pools Elevation: 0 - 195ft Bloom: March - June	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Balsamorhiza macrolepis[1] big-scale balsamroot	- / - / 1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland Elevation: 145 - 5100ft Bloom: March - June	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Calandrinia breweri[1] Brewer's calandrinia	- / - / 4.2	Chaparral, Coastal scrub Elevation: 30 - 4005ft	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of coastal scrub, although

		Bloom: (Jan) March - June	are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Calochortus umbellatus[1] Oakland star-tulip	- / - / 4.2	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland Elevation: 325 - 2295ft Bloom: April - June	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Calystegia collina ssp. venusta[1] South Coast Range morning-glory	- / - / 4.3	Chaparral, Cismontane woodland, Valley and foothill grassland Elevation: 1390 - 4890ft Bloom: April - June	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. The Project area lacks appropriate elevation. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Campanula exigua[1] chaparral harebell	- / - / 1B.2	Chaparral (rocky, usually serpentinite) Elevation: 900 - 4100ft Bloom: May - June	**Absent.** The Project area is within the known range of the plant species. Potential suitable habitat in the form of serpentine soils and appropriate elevation was not present. The species is a broad endemic to strong indicator of serpentine soils, where 75 – 84% of occurrences are within serpentine. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Centromadia parryi ssp. congdonii[1] Congdon's tarplant	- / - / 1B.1	Valley and foothill grassland (alkaline) Elevation: 0 - 755ft Bloom: May - Oct. (Nov.)	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, yet are absent from impacted work areas. There is one CNDDB occurrence (occ. #40) for the species within 2 miles of the Project area. The occurrence is considered extirpated was recorded with 5-mile accuracy in 1908.
Chloropyron maritimum ssp. *palustre*[1] Point Reyes bird's-beak	- / - / 1B.2	Marshes and swamps (coastal salt) Elevation: 0 - 35ft Bloom: Jun - Oct	**Absent.** The Project area is within the known range of the plant species. Potential suitable habitat in the form of marshes and swamps or appropriate elevation was not present. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Chorizanthe robusta var. *robusta*[1, 2] robust spineflower	FE / - / 1B.1	Chaparral (maritime), Cismontane woodland (openings), Coastal dunes, Coastal scrub Elevation: 5 - 985ft Bloom: April - Sept.	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of coastal scrub, although are absent from impacted work areas. There are two CNDDB occurrences for the species (occ. #4 and #19) within 2 miles of the Project area. Both occurrences are considered possibly extirpated and recorded with accuracies of 1 mile for occ. #4 and 5 miles for occ. #19.

Cirsium fontinale var. *campylon*[1] Mt. Hamilton fountain thistle	- / - / 1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland, serpentinite seeps Elevation: 325 - 2920ft Bloom: (Feb) Apr - Oct	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of coastal scrub and valley and foothill grassland, although are absent from impacted work areas. The species is a strict endemic of serpentine soils, where 95% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Clarkia breweri[1] Brewer's clarkia	- / - / 4.2	Chaparral, Cismontane woodland, Valley and foothill grassland, often serpentinite Elevation: 705 - 3660ft Bloom: Apr - June	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. The Project area lacks appropriate elevation. The species is a broad endemic to strict indicator of serpentine soils, where 75 - 84% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Clarkia concinna ssp. *automixa*[1] Santa Clara red ribbons	- / - / 4.3	Chaparral, Cismontane woodland Elevation: 295 - 4920ft Bloom: (Apr) May - Jun (Jul)	**Low.** The Project area is within the known range of the plant species. Potential suitable habitat in the form of chaparral, cismontane woodland, and serpentine soils was not present. The species is a broad endemic to strong indicator of serpentine soils, where 75 – 84% of occurrences are within serpentine. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Collinsia multicolor[1] San Francisco collinsia	- / - / 1B.2	Closed-cone coniferous forest, Coastal scrub, sometimes serpentinite. Elevation: 295 - 4920ft Bloom: (Feb) Mar - May	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of coastal scrub, although are absent from impacted work areas. The species is a weak indicator of serpentine soils, where 50 - 54% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Cypripedium fasciculatum[1] clustered lady's-slipper	- / - / 4.2	Lower montane coniferous forest, North Coast coniferous forest, usually serpentinite seeps and streambanks Elevation: 325 - 7990ft Bloom: Mar - Aug	**Absent.** The Project area is within the known range of the plant species. Potential suitable habitat was not present. The species is a strong indicator of serpentine soils, where 75 - 84% of occurrences are within serpentine. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Delphinium californicum ssp. *interius*[1] Hospital Canyon larkspur	- / - / 1B.2	Chaparral (openings), Cismontane woodland (mesic), Coastal scrub	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of coastal scrub, although

		Elevation: 635 - 3595ft Bloom: Apr - Jun	are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Dircа occidentalis[1] Western leatherwood	- / - / 1B.2	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Cismontane woodland, North Coast coniferous forest, Riparian forest, Riparian woodland, mesic. Elevation: 80 - 1395 ft Bloom: Jan - Mar (Apr)	**Absent.** The Project area is within the known range of the plant species. Potential suitable habitat is present in the form of riparian woodland, riparian forest, and mesic conditions. There are no CNDDB occurrences of this plant species within 2 miles of the Project area. Protocol level surveys conducted during the bloom period did not detect the presence of this plant within the Project area.
Dudleya abramsii ssp. *setchellii*[1,3] Santa Clara Valley dudleya	FE / - / 1.B1	Cismontane woodland, Valley and foothill grassland, serpentinite, rocky. Elevation: 195 - 1495ft Bloom: Apr - Oct	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. The species is a strict indicator of serpentine soils, where 75% to 84% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Eriophyllum jepsonii[1] Jepson's woolly sunflower	- / - / 4.3	Chaparral, Cismontane woodland, Coastal scrub, sometimes serpentinite. Elevation: 655 - 3365ft Bloom: Apr - Jun	**Low.** The Project area is within the known range of the plant species, yet lacks appropriate elevation. Few areas of potential suitable habitat are present in the form of coastal scrub, although are absent from impacted work areas. The species is a broad endemic to strict indicator of serpentine soils, where 95% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Eryngium aristulatum var. hooveri[1] *Hoover's button-celery*	- / - / 1B.1	Vernal pools Elevation: 5 - 150ft Bloom: (Jun) Jul (Aug)	**Absent.** The Project area is within the known range of the plant species. Potential suitable habitat in the form of vernal pools was not present. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Fritillaria agrestis[1] stinkbells	- / - / 4.2	Chaparral, Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland, clay soils and sometimes serpentinite. Elevation: 30 – 5100ft	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. The species is a strong indicator of serpentine soils, where 65 - 74% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.

		Bloom: Mar - Jun	
Fritillaria liliacea[1] fragrant fritillary	- / - / 1B.2	Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland, often serpentinite. Elevation: 5 – 1345ft Bloom: Feb - Apr	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland and coastal scrub, although are absent from impacted work areas. The species is a weak indicator of serpentine soils, where 55 - 64% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Galium andrewsii ssp. *gatense*[1] phlox-leaf serpentine bedstraw	- / - / 4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest, serpentinite, rocky. Elevation: 490 - 4755ft Bloom:	**Low.** The Project area is within the known range of the plant species, yet lacks appropriate elevation. Potential suitable habitat was not present. The species is a broad endemic indicator of serpentine soils, where 85 - 94% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Hoita strobilina[1] Loma Prieta hoita	- / - / 1B.1	Chaparral, Cismontane woodland, Riparian woodland, usually serpentinite, mesic. Elevation: 95 - 2820ft Bloom: May - Jul (Aug - Oct)	**Moderate.** The Project area is within the known range of the plant species. Potential suitable habitat was present in the form of riparian woodland and mesic conditions. The species is a strong indicator of serpentine soils, where 65 – 74% of occurrences are within serpentine soils. Serpentine soils were not found within the study area. Preliminary surveys (performed outside of the species' bloom period) did not detect this perennial species. Protocol level surveys are scheduled for spring 2020 to coincide with known bloom period of the species. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Iris longipetala[1] coast iris	- / - / 1B.1	Coastal prairie, Lower montane coniferous forest, Meadows and seeps, mesic Elevation: 0 - 1970ft Bloom: Mar-May	**Low.** The Project area is within the known range of the plant species. Potential suitable habitat was present in the form of mesic conditions, although appropriate habitat types were not. The species is a weak indicator of serpentine soils, where 55 - 64% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Lasthenia conjugens[1, 2, 3] Contra Costa goldfields	FE / - / 1B.1	Cismontane woodland, Playas (alkaline), Valley and foothill grassland, Vernal pools, mesic Elevation: 0 - 1540ft	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. The species is commonly associated with vernal pools, which were not present in the Project area. There is one CNDDB occurrence (occ. #44) of this plant species within 2

		Bloom: Mar - Jun	miles of the Project area. This occurrence is considered extirpated and was recorded with 3/5-mile accuracy in 1955.
Legenere limosa[1] legenere	- / - / 1B.1	Vernal pools Elevation: 0 - 2885ft Bloom: Apr - Jun	**Absent.** The Project area is within the known range of the plant species. The species is strongly associated with vernal pools, which were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Leptosiphon acicularis[1] bristly leptosiphon	- / - / 4.2	Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland Elevation: 180 - 4920ft Bloom: Apr - Jul	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Leptosiphon ambiguus[1] serpentine leptosiphon	- / - / 4.2	Cismontane woodland, Coastal scrub, Valley and foothill grassland, usually serpentinite Elevation: 390 - 3705ft Bloom: Apr - Jul	**Low.** The Project area is within the known range of the plant species, yet lacks appropriate elevation. Few areas of potential suitable habitat are present in the form of valley and foothill grassland and coastal scrub, although are absent from impacted work areas. The species is a strict endemic of serpentine soils, where 95% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Leptosiphon grandiflorus[1] large-flowered leptosiphon	- / - / 4.2	Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal dunes, Coastal prairie, Coastal scrub, Valley and foothill grassland, usually sandy. Elevation: 15 - 4005ft Bloom: Apr - Aug	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland and coastal scrub, although are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Leptosyne hamiltonii[1] Mt. Hamilton coreopsis	- / - / 1B.2	Cismontane woodland (rocky) Elevation: 1880 - 4265ft Bloom: Mar - May	**Absent.** The Project area is within the known range of the plant species. Potential suitable habitat in the form of cismontane woodland and appropriate elevation was not present. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Lessingia hololeuca[1] woolly-headed lessingia	- / - / 3	Broadleafed upland forest, Coastal scrub, Lower montane coniferous forest,	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland and coastal scrub, although are absent from impacted work areas. The species is a strong indicator of serpentine soils, where 65 – 74% of

		Valley and foothill grassland, clay and serpentine soils. Elevation: 45 - 1000ft Bloom: June - Oct.	occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Lessingia micradenia var. *glabrata*[1] smooth lessingia	- / - / 1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland, serpentinite, often roadsides. Elevation: 390 - 1380ft Bloom: Jun - Oct	**Low.** The Project area is within the known range of the plant species, yet lacks appropriate elevation. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. The species is a weak indicator of serpentine soils, where 55 – 64% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Lomatium observatorium[1] Mt. Hamilton lomatium	- / - / 1B.2	Cismontane woodland Elevation: 3995 - 4365ft Bloom: Mar - May	**Absent.** The Project area is within the known range of the plant species. Potential suitable habitat in the form of cismontane woodland and appropriate elevation was not present. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Malacothamnus arcuatus[1,2] arcuate bush-mallow	- / - / 1B.2	Chaparral, Cismontane woodland Elevation: 45 - 1165ft Bloom: Apr - Sep	**Moderate.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of coastal scrub, although are absent from impacted work areas. There is one CNDDB occurrence (occ. #9) of this plant species within 2 miles of the Project area. This occurrence is considered presumed extant and was recorded with 1/5-mile accuracy in 1899. Preliminary surveys (performed outside of the species' bloom period) did not detect this perennial species. Protocol level surveys are scheduled for spring 2020 to coincide with known bloom period of the species.
Malacothamnus hallii[1, 2] Hall's bush-mallow	- / - / 1B.2	Chaparral, Coastal scrub Elevation: 30 - 2495ft Bloom: (Apr) May - Sep (Oct)	**Moderate.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of coastal scrub, although are absent from impacted work areas. There is one CNDDB occurrence (occ. #38) of this plant species within 2 miles of the Project area. This occurrence is possibly extirpated and was recorded with 1-mile accuracy in 1976. Preliminary surveys (performed outside of the species' bloom period) did not detect this perennial species. Protocol level surveys are scheduled for spring 2020 to coincide with known bloom period of the species.
Micropus amphibolus[1] Mt. Diablo cottonweed	- / - / 3.2	Broadleafed upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland, rocky.	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. The species is a weak indicator of serpentine soils, where 55 – 64% of occurrences are within

		Elevation: 145 - 2705ft Bloom: Mar - May	serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Mielichhoferia elongata[1] elongate copper moss	- / - / 4.3	Broadleafed upland forest, Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Meadows and seeps, Subalpine coniferous forest, Metamorphic rock, usually acidic, usually vernally mesic, often roadsides, sometimes carbonate. Elevation: 0 - 6430ft	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of coastal scrub, although are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Monolopia gracilens[1] woodland woolythreads	- / - / 1B.2	Broadleafed upland forest (openings), Chaparral (openings), Cismontane woodland, North Coast coniferous forest (openings), Valley and foothill grassland, serpentine. Elevation: 325 - 3935ft Bloom: (Feb) Mar - Jul	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. The species is a weak indicator of serpentine soils, where 55 – 64% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Phacelia phacelioides[1] Mt. Diablo phacelia	- / - / 1B.2	Chaparral, Cismontane woodland, rocky. Elevation: 1640 - 4495ft Bloom: Apr - May	**Absent.** The Project area is within the known range of the plant species. Potential suitable habitat and appropriate elevation was not present in the Project area. The species is a broad endemic of serpentine soils, where 85 – 94% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Piperia candida[1] white-flowered rein orchid	- / - / 1B.2	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous	**Absent.** The Project area is near the known range of the plant species, with the nearest occurrence approximately 7.8 miles to the west of the Project area. The species is a weak indicator of serpentine soils, where 55 – 64% of occurrences are within serpentine. Potential suitable habitat, including serpentine soils, was

		forest, sometimes serpentine. Elevation: 95 - 4300ft Bloom: (Mar) May - Sep	not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Plagiobothrys chorisianus var. *hickmanii*[1] Hickman's popcornflower	- / - / 4.2	Closed-cone coniferous forest, Chaparral, Coastal scrub, Marshes and swamps, Vernal pools Elevation: 45 - 605ft Bloom: Apr - Jun	**Low.** The Project area is near the known range of the plant species, with the nearest occurrence approximately 3.7 miles to the west of the Project area. Few areas of potential suitable habitat are present in the form of coastal scrub, although are absent from impacted work areas. The species is a broad endemic of serpentine soils, where 85 – 94% of occurrences are within serpentine. Serpentine soils were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Plagiobothrys glaber[1, 2] hairless popcornflower	- / - / 1A	Meadows and seeps (alkaline), Marshes and swamps (coastal salt) Elevation: 45 - 590ft Bloom: Mar - May	**Absent.** The Project area is within the known range of the plant species. Potential suitable habitat was not present. There are three CNDDB occurrences for the species (occ. #2, #3, and #4) within 2 miles of the Project area. CNDDB occurrences are considered possibly extirpated and recorded with accuracies of 1 mile for occ. #2 and occ. #4, and 1/5-mile for occ. #3.
Puccinellia simplex[1] California alkali grass	- / - / 1B.2	Chenopod scrub, Meadows and seeps, Valley and foothill grassland, Vernal pools, Alkaline, vernally mesic; sinks, flats, and lake margins Elevation: 5 - 3050ft Bloom: Mar - May	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Sanicula saxatilis[1] rock sanicle	- / - / 1B.2	Broadleafed upland forest, Chaparral, Valley and foothill grassland, rocky, scree, talus. Elevation: 2030 - 3555ft Bloom: Apr - May	**Absent.** The Project area is within the known range of the species, yet lacks appropriate elevation. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Senecio aphanactis[1] chaparral ragwort	- / - / 2B.2	Chaparral, Cismontane woodland, Coastal scrub, sometimes alkaline	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of coastal scrub, although are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.

		Elevation: 45 - 2625ft Bloom: Jan - Apr (May)	
Sidalcea malachroides[1] maple-leaved checkerbloom	- / - / 4.2	Broadleafed upland forest, Coastal prairie, Coastal scrub, North Coast coniferous forest, Riparian woodland, often in disturbed areas. Elevation: 0 - 2395ft Bloom: (Mar) Apr - Aug	**Moderate.** The Project area is within the known range of the plant species. Potential suitable habitat was present in the form of riparian woodland, coastal scrub, and disturbed areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area. Preliminary surveys (performed outside of the species' bloom period) did not detect this perennial species. Protocol level surveys are scheduled for spring 2020 to coincide with known bloom period of the species.
Streptanthus albidus ssp. *albidus*[1, 3] Metcalf Canyon jewelflower	FE / - / 1B.1	Valley and foothill grassland (serpentinite) Elevation: 145 - 2625ft Bloom: Apr - Jul	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. The species is associated with serpentine soils, which were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Streptanthus albidus ssp. *peramoenus*[1, 3] most beautiful jewelflower	- / - / 1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland, serpentinite. Elevation: 310 - 3280ft Bloom: (Mar) Apr - Sep (Oct)	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. The species is associated with serpentine soils, which were not present in the Project area. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Stuckenia filiformis ssp. *alpina*[1] slender-leaved pondweed	- / - / 2B.2	Marshes and swamps (assorted shallow freshwater) Elevation: 980 - 7055ft Bloom: May - Jul	**Absent.** The Project area is within the known range of the plant species. Potential suitable habitat in the form of appropriate habitat types(s) and elevation was not present. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Suaeda californica[1] California seablite	FE / - / 1B.1	Marshes and swamps (coastal salt) Elevation: 0 - 50ft Bloom: Jul - Oct	**Absent.** The Project area is within the known range of the plant species, although potential suitable habitat in the form of cismontane woodland and appropriate elevation was not present. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.
Trifolium buckwestiorum[1] Santa Cruz clover	- / - / 1B.1	Broadleafed upland forest, Cismontane woodland, Coastal	**Low.** The Project area is within the known range of the plant species. Potential suitable habitat in the form of appropriate habitat type(s) was not present. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.

		prairie, gravelly, margins. Elevation: 340 - 2000ft Bloom: Apr - Oct	
Trifolium hydrophilum[1, 2] saline clover	- / - / 1B.2	Marshes and swamps, Valley and foothill grassland (mesic, alkaline), Vernal pools Elevation: 0 - 985ft Bloom: Apr - Jun	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. There is one CNDDB occurrences for the species (occ. #40) within 2 miles of the Project area. The occurrence is considered extant and was recorded with a 1 mile accuracy in 1903.
Tropidocarpum capparideum[1] caper-fruited tropidocarpum	- / - / 1B.1	Valley and foothill grassland (alkaline hills) Elevation: 0 – 1495ft Bloom: Mar - Apr	**Low.** The Project area is within the known range of the plant species. Few areas of potential suitable habitat are present in the form of valley and foothill grassland, although are absent from impacted work areas. There are no CNDDB occurrences of this plant species within 2 miles of the Project area.

[a] Key to Sources: 1 = CNPS Inventory of Rare and Endangered Plants database; 2 = CNDDB 2-mile Query; 3 = USFWS IPAC System

[b] Status Designations

Federal and State Codes:

FE = Federally Endangered

California Rare Plant Rank (CRPR) (CNPS, 2019):

1A. Plants presumed extirpated in California and either rare or extinct elsewhere.

1B. Plants rare, threatened, or endangered in California and elsewhere.

2B. Plants rare, threatened, or endangered in California but more common elsewhere.

3. Review List: Plants about which more information is needed

4. Watch List: Plants of limited distribution.

Threat Ranks:

.1 - Seriously threatened in California (over 80% of occurrences threatened /high degree of immediacy of threat);

.2 - Fairly threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat);

.3 - Not very threatened in California ((less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known

[c] Habitat information received from CNPS rare plant inventory download (CNPS, 2019)

[d] Potential for Occurrence:

Moderate: The Project area is located within the range and elevation known to support the species; species occurrences have been documented within 2 miles of the Project area; potential suitable habitat such as correct habitat type(s) are present.

Low: The Project area is within the species range and within 100 feet of appropriate elevation; few areas of potentially suitable habitat are available; no recent occurrences have been documented within the Project area.

Absent: Protocol level surveys conducted during the bloom period of the species have been completed and produced no observations of the species; the Project area is not within the known range of the species; no potential habitat such as habitat type(s) or elevation are present to support the species.

Attachment B

USFWS IPAC System Report

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IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Santa Clara County, California

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Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
San Joaquin Kit Fox *Vulpes macrotis mutica* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2873	Endangered

Birds

NAME	STATUS
California Clapper Rail *Rallus longirostris obsoletus* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4240	Endangered
California Least Tern *Sterna antillarum browni* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8104	Endangered

Reptiles

NAME	STATUS
Alameda Whipsnake (=striped Racer) *Masticophis lateralis euryxanthus* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5524	Threatened

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Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander Ambystoma californiense There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Bay Checkerspot Butterfly Euphydryas editha bayensis There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2320	Threatened
San Bruno Elfin Butterfly Callophrys mossii bayensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3394	Endangered

Flowering Plants

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NAME	STATUS
Contra Costa Goldfields Lasthenia conjugens There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7058	Endangered
Metcalf Canyon Jewelflower Streptanthus albidus ssp. albidus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4186	Endangered
Robust Spineflower Chorizanthe robusta var. robusta There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/9287	Endangered
Santa Clara Valley Dudleya Dudleya setchellii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3207	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS

NOT FOR CONSULTATION

ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Burrowing Owl Athene cunicularia This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9737	Breeds Mar 15 to Aug 31
Clark's Grebe Aechmophorus clarkii This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jan 1 to Dec 31
Common Yellowthroat Geothlypis trichas sinuosa This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Costa's Hummingbird Calypte costae This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9470	Breeds Jan 15 to Jun 10

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Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Lawrence's Goldfinch Carduelis lawrencei — Breeds Mar 20 to Sep 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Nuttall's Woodpecker Picoides nuttallii — Breeds Apr 1 to Jul 20

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Rufous Hummingbird selasphorus rufus — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

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Song Sparrow Melospiza melodia — Breeds Feb 20 to Sep 5
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Spotted Towhee Pipilo maculatus clementae — Breeds Apr 15 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/4243

Tricolored Blackbird Agelaius tricolor — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3910

Willet Tringa semipalmata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wrentit Chamaea fasciata — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Yellow-billed Magpie Pica nuttalli — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9726

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

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Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

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Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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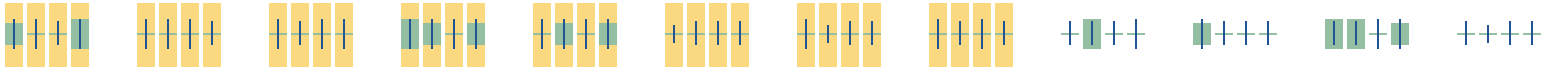
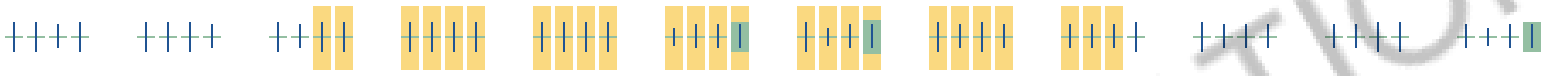
Costa's Hummingbird
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Golden Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



Lawrence's Goldfinch
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Nuttall's Woodpecker
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Oak Titmouse
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Rufous Hummingbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

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Short-billed Dowitcher
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Song Sparrow BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)												
Spotted Towhee BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)												
Tricolored Blackbird BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)												
Willet BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)												
Wrentit BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)												
Yellow-billed Magpie BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)												

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Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

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What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In

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contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

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Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

PFOA

FRESHWATER POND

PUBHh
PUBKx

RIVERINE

R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

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Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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APPENDIX I

Guidelines for Contractor's As-Built Mark-Ups or Engineer's Record Drawings

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Guidelines for Contractor's As-Built Mark-Ups or Engineer's Record Drawings

Santa Clara Valley Water District
CADD Services Unit

Santa Clara Valley Water District

Version: 1.1 Effective Date: December 2009	Document Number **CADD G101**

EXTERNAL USERS:
The version provided by the "District" represents the applicable version.

INTERNAL "DISTRICT" STAFF:
Printed or downloaded versions are for reference only. See the CADD Services Unit website for released version.

Guidelines for Contractor's As-Built Mark-Ups or Engineer's Record Drawings

CADD Services Unit

These guidelines were developed and written by Emmanuel Aryee (CADD Services unit) and the example figures were provided by Roberto Parmituan (Construction Inspection unit). They were then reviewed by the Plans and Specifications Standardization team.

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1.0 REDLINE MARKING IN THE FIELD OR THE OFFICE

Redline mark ups should be neat, legible, clear, and orderly and should accurately record and reflect the actual as-built condition.
It should be done with the correct symbols, lines, lettering and text, details, dimensioning, etc. using red pencil or ink.
All construction changes are based on authorized change documents or Engineer's instructions. These documents are kept in the Project or Construction files.

Change documents include addendum, request for information (RFI), contract change order (CCO), engineers work order or extra work order (EWO), field memo, etc. See Figure 4 & 6. It is not acceptable to attach change documents to the drawings to avoid having to mark up changes on the drawings. Changes should be interpreted and then transferred by redline markings on to the drawing sheets; they should be referred to in the listing of the changes or revisions in the title block of the drawing sheet. See Figure 4 to 8.
Already drafted changes, sketches, diagrams of the changes (not the complete change document) may be attached on blank spaces on the drawing sheet or a separate blank sheet, (not to cover the original drawing information) to show or illustrate the extent of the changes, if that will be helpful.
Features, items, details that were changed should be clearly detailed, dimensioned, located (survey information, tying to control lines, other features or monuments, station offsets or reference lengths, distances, etc.) and described in detail with lines, lettering & text, etc. with redline mark up.
Redline mark ups should be done in a manner that enables any competent technician or drafter to draft the as-built mark-up or the record drawings with minimum difficulty.
Redline marking includes making changes, additions and/or deletions representing the actual construction changes for the as-built drawings or changes authorized by the engineer on the record drawings.

1.1 CHANGE

A change is made when an item(s) on the drawing sheet is modified or replaced with completely new item(s). It may involve the change of a simple line, dimension, note or re-sketch of a part or a component. Only those areas of a drawing that are affected should be marked up. Item(s) changed should be clouded.

> **Clouding**—The use of a cloud to surround the area or item, text or symbol changed so as to make the changes stand out and be easily identified. The original content that is not affected by the change is left unclouded. See Figure 8.

1.2 ADDITIONS

Additions occur when new item(s) are introduced on to the drawing sheet to supplement or clarify information without modifying or replacing the original items. When additions are made to the drawings that affect only the drawing content, the additions should also be clouded since they are revisions to the original drawings.

1.3 DELETIONS

Deletions occur when features, details or items on the drawings are not constructed, are removed, are changed and/or replaced.

When preparing As-built drawings, all original drawing details, items are preserved. Deleted items should not be erased or removed from the marked up drawing. Deletions are shown by **crossing** out the deleted elements, details, lines, text, symbols, or any other items involved, with one of these methods;

– a slanted/horizontal line (strike-out line) across the element,
– a heavy "X" over the element,
– a bold, big X across a major element or across the entire drawing sheet.

The area or item affected should be clouded to indicate the limits of removal. See Figure 8.

2.0 ADDITIONAL SHEETS

When changes involve the incorporation of new additional sheet or sheets, it may or may not be necessary to do clouding on the original sheet. If there is a reference to a new sheet in the set, then the reference area should be clearly clouded and the call out to the additional sheet made. Otherwise the new drawing should be marked as normal but tracking notation should show that this is an additional sheet with the original sheet left intact.
In cases where the marking up of several changes on the same sheet leaves the drawing content unclear, crowded, or when features and items become unidentifiable or make the drawing unreadable, use of additional sheets should be considered.

3.0 TRACKING OF "AS-BUILT" CHANGES OR REVISIONS

All changes marked up must be tracked. They must be clearly identified with the triangle symbol with the revision number (used in the change document) or the letters "AB" embedded (if no revision numbers are used). The triangle symbol should be placed by the side of all changes, outside the cloud, on the affected drawing sheet.

Figure 1—As-Built (AB) Triangle Symbol

A subscript representing the number (#) assigned to track and identify the particular change or revision is placed by the triangle symbol as shown above in Figure 1.

4.0 LISTING OR RECORDING OF CHANGES OR REVISIONS

All changes that have been done since the final (construction) drawings were issued must be listed or recorded on the Contractor's "As-Built" drawing sheets and/or the Engineer's record drawings.

Changes made during construction must be listed or recorded and identified under the revision section of the title block of the drawing sheet. Each listing should be identified with the corresponding number (subscript) of the triangle symbol. The listing consist of a short description of the change and an abbreviated name of the change document such as CCO #2 for contract change order number 2, placed in brackets, under the "DESCRIPTION" heading.

It could also be "as per the Engineer instructions" for some of the changes done under the direct instructions of the Engineer. It must include a date and the initials of the person who authorized the change. See Figure 2.

REV	DESCRIPTION	DATE	APPR.
AB	1. REMOVE AND REPLACE EXISTING PIPE SYSTEM (LOC #1)	08/01	S.C.
	2. REVISE ANODE LEAD WIRE (CCO #2)	05/02	D.M.

Figure 2—Listing or Recording of Changes

5.0 SIGNING OF THE AS-BUILT OR THE RECORD DRAWINGS

Each sheet must be signed and dated by the contractor's representative for the contractor's as-built mark-ups. The representative must also include his/her printed name and his/her company's name. Similarly the Engineer must do the same for the record drawings. See sample below.

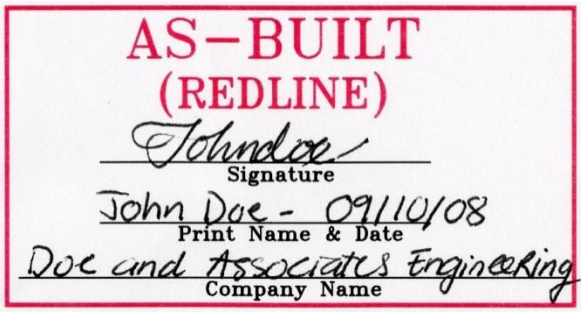


Figure 3—Sample of As-Built Signature Stamp

Santa Clara Valley Water District

REQUEST FOR INFORMATION
FC 825 (04-10-86)

To: John Doe (Resident Inspector)

Date: Feb. 6, 2008

From: R. B. Construction Co., Inc. (Contractor, Utility, etc.)

Contractor File No.: 001

Contract: PWTP Landscaping

RFI Consec. No.: 4

Contract No.: C0526

Reply Needed By: Feb. 12, 2008

Item No.	INFORMATION ACTION NEEDED	Ref.Spec/Plan No.
1.	An existing buried concrete block was discovered	
	during the trench excavation for the irrigation mainline.	
	Location is shown in the attached drawing.	PLAN SHT
		I-4
	This buried concrete block will not allow for the	
	installation of the proposed irrigation mainline in the	
	location shown. Please provide direction on how	
	to proceed.	

Figure 4—Request for Information

ENGINEER'S RESPONSE

Santa Clara Valley Water District

REQUEST FOR INFORMATION
FC 825 (04-10-86)

To: John Doe (Resident Inspector)
Date: Feb. 6, 2008
From: R. B. Construction Co., Inc. (Contractor, Utility, etc.)
Contractor File No.: 001
Contract: PWTP Landscaping
RFI Consec. No.: 4
Contract No.: C0526
Reply Needed By: Feb. 12, 2008

Item No.	INFORMATION ACTION NEEDED	Ref.Spec/Plan No.
1.	An existing buried concrete block was discovered during the trench excavation for the irrigation mainline. Location is shown in the attached drawing.	PLAN SHT I-4
	This buried concrete block will not allow for the installation of the proposed irrigation mainline in the location shown. Please provide direction on how to proceed.	

DISTRIBUTION: Pink = retained by Initiator 3 copies to Resident Inspector

Item No.	REPLY	Extra WO Forthcoming (Yes/No)
1.	Please re-route/re-align the irrigation line installation as shown in the attached drawing.	TBD

Design Consultant: Date:	Project Engineer Mr. Smart Date: 2/11/08	Resident Inspector John Doe Date: 2/11/08

NOTICE TO CONTRACTOR: This form has been designed to expedite responses to your inquiries. You may include more than one request on one form, but separate forms should be used for the different construction disciplines, e.g., architectural; civil; structural; mechanical; electrical.

Distribution: White = Retained by Resident Inspector; Pink = Initiator; Yellow = Project Engineer; Goldenrod = Returned to Initiator with reply

Figure 5—Engineer's Response to RFI

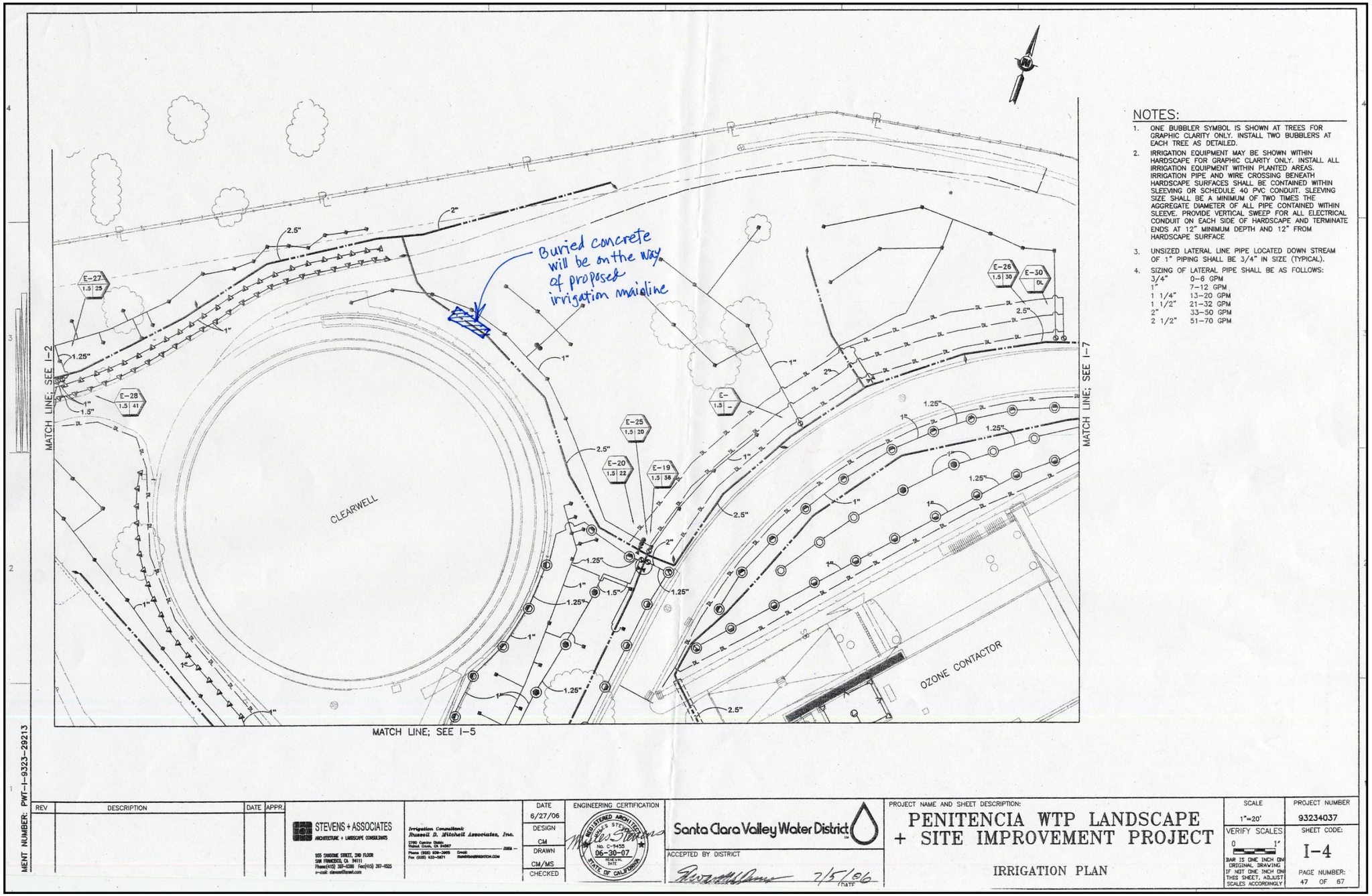


Figure 6—

Mark-Up on Drawing Showing RFI

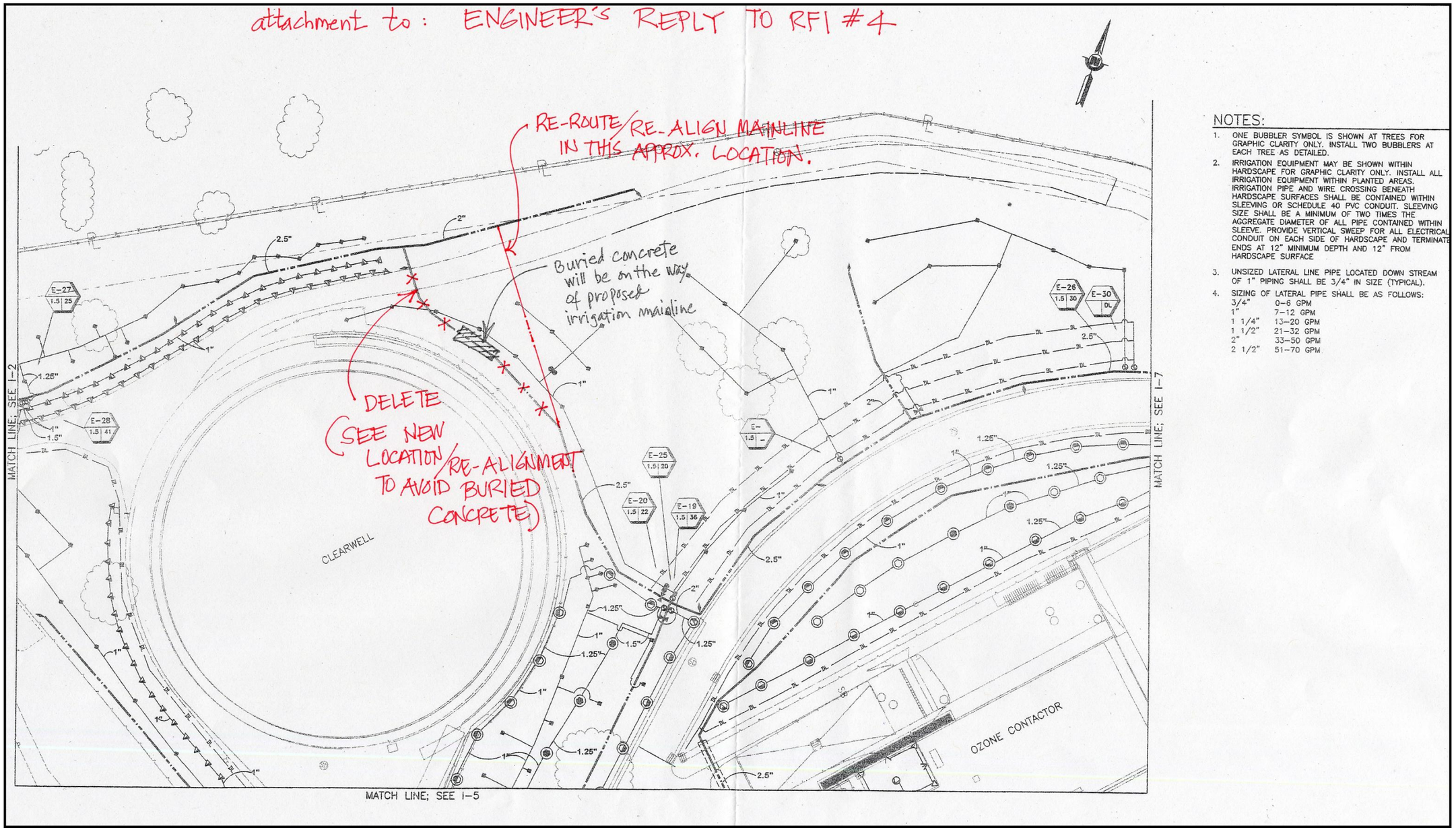
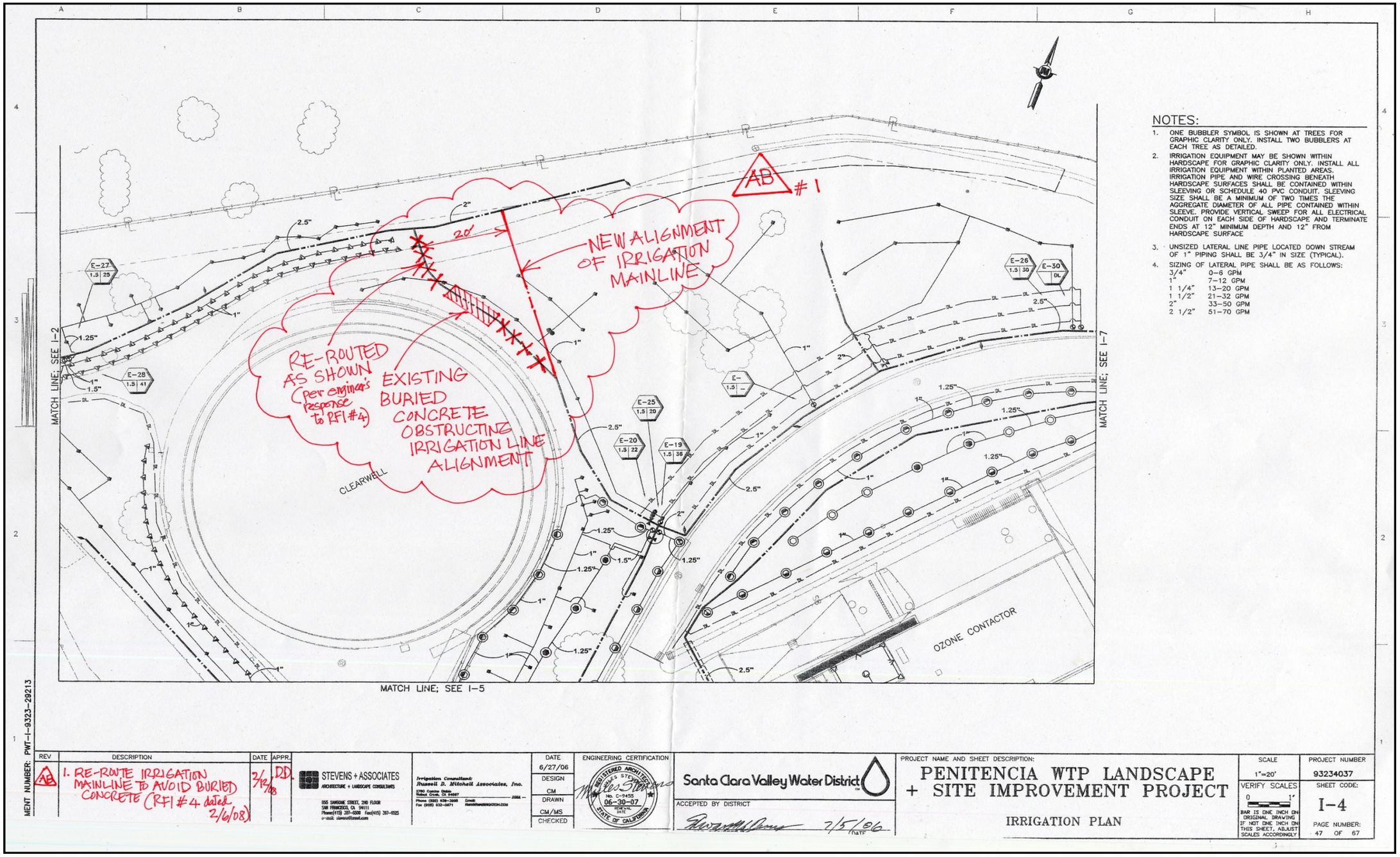


Figure 7—Mark-Up on Drawing Showing Engineer's Response to RFI



NOTES:

1. ONE BUBBLER SYMBOL IS SHOWN AT TREES FOR GRAPHIC CLARITY ONLY. INSTALL TWO BUBBLERS AT EACH TREE AS DETAILED.
2. IRRIGATION EQUIPMENT MAY BE SHOWN WITHIN HARDSCAPE FOR GRAPHIC CLARITY ONLY. INSTALL ALL IRRIGATION EQUIPMENT WITHIN PLANTED AREAS. IRRIGATION PIPE AND WIRE CROSSING BENEATH HARDSCAPE SURFACES SHALL BE CONTAINED WITHIN SLEEVING OR SCHEDULE 40 PVC CONDUIT. SLEEVING SIZE SHALL BE A MINIMUM OF TWO TIMES THE AGGREGATE DIAMETER OF ALL PIPE CONTAINED WITHIN SLEEVE. PROVIDE VERTICAL SWEEP FOR ALL ELECTRICAL CONDUIT ON EACH SIDE OF HARDSCAPE AND TERMINATE ENDS AT 12" MINIMUM DEPTH AND 12" FROM HARDSCAPE SURFACE
3. UNSIZED LATERAL LINE PIPE LOCATED DOWN STREAM OF 1" PIPING SHALL BE 3/4" IN SIZE (TYPICAL).
4. SIZING OF LATERAL PIPE SHALL BE AS FOLLOWS:

3/4"	0–6 GPM
1"	7–12 GPM
1 1/4"	13–20 GPM
1 1/2"	21–32 GPM
2"	33–50 GPM
2 1/2"	51–70 GPM

Figure 8—Contractor's Mark-Up Showing Actual Field Work

APPENDIX J

Parallel East Pipeline
Ventilation Structure Locations

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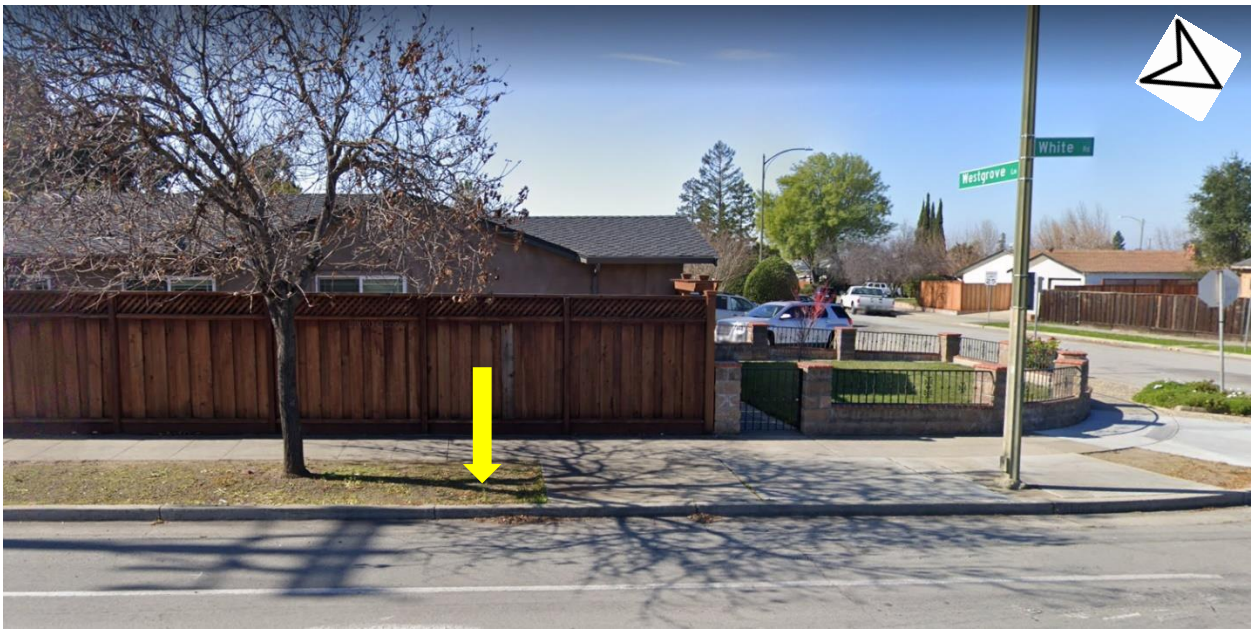
Appendix J - Parallel East Pipeline Ventilation Structure Locations

STA 11+75 – 10” CARV Assembly

Location of proposed 10” CARV is behind the sidewalk between gas station and shopping plaza entry.

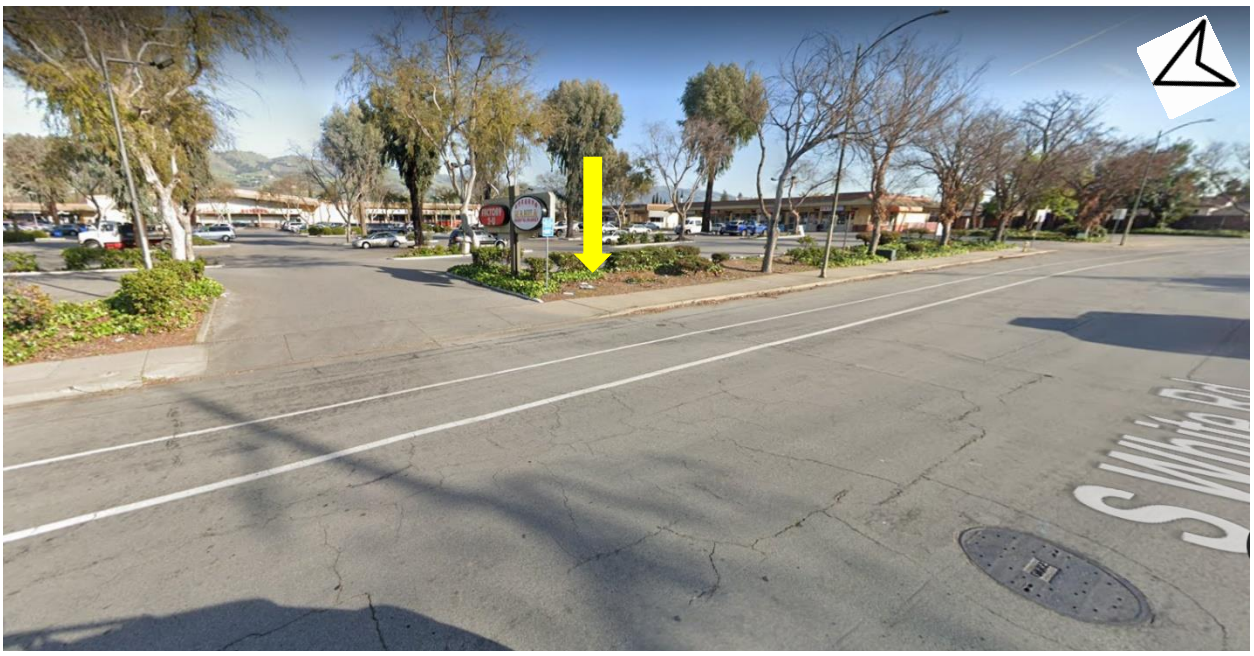


STA 23+22 – 2” ARV Assembly

Location of proposed 2” ARV is on the planting strip adjacent to tree and street light.

STA 28+30 – 10” CARV Assembly

Location of proposed 10” CARV is across the street from SCVWD manhole behind the sidewalk.



STA 47+40 – 2” ARV Assembly

Location of proposed 2” ARV is behind the sidewalk adjacent to the sign. Vegetation shall be removed and replaced.

STA 57+60 – 10” CARV Assembly

Location of proposed 10” CARV is in planting strip south of Vineyard Park Dr. past existing electrical box.

STA 61+90 – 2” ARV Assembly

Location of proposed 2” ARV is south of church entrance behind the sidewalk.

STA 69+90 – 10” CARV Assembly

Location of proposed 10” CARV is north of SCVWD manhole between the two existing trees.

STA 73+70 – 2” ARV Assembly

Location of proposed 2” ARV is north of street light behind the sidewalk.

STA 84+90 – 10” CARV Assembly

Location of proposed 10” CARV is north of SCVWD manhole between the two existing trees.

STA 89+75 – 2” ARV Assembly

Location of proposed 2” ARV is behind the sidewalk south of electrical vault.

STA 95+00 – 10” CARV Assembly

Location of proposed 10” CARV is behind the back of sidewalk line adjacent to right-of-way line.

STA 113+50 – 2” ARV Assembly

Location of proposed 2” ARV is behind the back of sidewalk line adjacent to right-of-way line.

STA 120+46 – 2” ARV Assembly

Location of proposed 2” ARV is in the planting strip between the two large trees. The tree in the middle of the two large trees shall be removed and replaced.

STA 133+70 – 10” CARV Assembly

Location of proposed 10” CARV is adjacent to Mt Pleasant High School entrance. It is in the corner of the sidewalk as shown.

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Santa Clara Valley Water District

File No.: 20-0628

Agenda Date: 8/11/2020
Item No.: 3.2.

BOARD AGENDA MEMORANDUM

SUBJECT:
Approve Amendment No. 2 to Agreement A4139F with Governmental Advocates, Inc., for State Lobbying Services, to Increase the Fee by $109,200 for a Total Revised Fee Not-to-Exceed $336,700 and Extend the Agreement Term to September 30, 2021.

RECOMMENDATION:
Approve Amendment No. 2 to Agreement A4139F with Governmental Advocates, Inc., for State Lobbying Services, to increase the fee by $109,200 for a total revised Fee Not-to-Exceed $336,700, and extend the Agreement term to September 30, 2021.

SUMMARY:
Staff desires to exercise its second one-year option to renew and extend the duration of the Agreement No. A4139F with Governmental Advocates, Inc., to renew and extend State Lobbying Services (Agreement) by 12 months, ending September 30, 2021. Execution of Amendment No. 2 will result in an increase of the Agreement not-to-exceed amount of $336,700. The monthly fixed fee amount for services provided by the Consultant will remain $9,100/month during the extended 12-month period.

The current Agreement was approved September 1, 2018 after the District issued a public Request for Proposal (RFP) for contract lobbying services. Several firms submitted proposals. The firm selected, Governmental Advocates, Inc., was approved after a rigorous process and continues to represent Valley Water. The agreement was approved for a 13-month period, with the option to renew and extend the Agreement for two additional 12-month periods. Amendment No. 1 was issued to renew and extend the first option term to September 30, 2020 and increase the not-to-exceed amount to $227,500. The approval of Amendment No. 2 would exercise the second option to renew the term to September 30, 2021 and increase the not-to-exceed amount to $336,700. The current Agreement is managed by the Assistant Officer in the Sacramento Government Relations Office, who is responsible for assigning issues to the Consultant and monitoring and evaluating performance. Although the scope of the Agreement is purposely broad, in general the District utilizes the Consultant only on the highest-priority issues.

The services provided by the Consultant are needed to allow the District to:

1) Provide supplemental communication to the Governor's office, Assembly and Senate leadership, and other legislators outside the Santa Clara delegation;
2) Efficiently respond to peaks in workload that are inherent in the legislative process;
3) Provide sufficient resources in Sacramento to support the District's legislative and policy agenda.

Approval of the recommended action will allow the Consultant to continue to provide critical state legislative advocacy and lobbying services on the District's behalf in Sacramento. These services will enable the District and its Board of Directors to achieve a high level of influence in state public policy issues and increase the probability for securing funding for local flood protection, water supply, and stream stewardship projects. Staff is requesting that the Board approve this Amendment No. 2, thereby extending the term of the Agreement from its current expiration date of September 30, 2020 to September 30, 2021.

FINANCIAL IMPACT:
Approval of Amendment No. 2 shall not exceed the amount of $336,700 for the 37-month period of September 1, 2018, through September 30, 2021. There are adequate funds in the Office of Government Relation's Board-adopted FY 2020-2021 budget, Project 60231004, State Government Relations, to encumber the necessary fees to support the Consultant's services through the remainder of the current fiscal year. Fees for work to be performed in the future fiscal years will be budgeted accordingly.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: Amendment No. 2

UNCLASSIFIED MANAGER:
Donald Rocha, 408-630-2338

AMENDMENT NO. 2 TO
STANDARD CONSULTANT AGREEMENT A4139F
BETWEEN THE SANTA CLARA VALLEY WATER DISTRICT
AND GOVERNMENTAL ADVOCATES

This Amendment No. 2 (Amendment), effective as of the date it is fully executed by the Parties, amends the term and conditions of the Standard Consultant Agreement A4139F (Agreement) dated September 1, 2018 as amended by Amendment No. 1 dated August 27, 2019 between SANTA CLARA VALLEY WATER DISTRICT (District) and GOVERNMENTAL ADVOCATES, incorporated in the State of California, (Consultant), collectively the "Parties."

WHEREAS, the Consultant is currently providing assistance and representation with state lobbying services on behalf of the District; and

WHEREAS, the Agreement currently expires on September 30, 2020; and

WHEREAS, the District now desires to exercise the second 1-year option to extend the term; increase the Not-to-Exceed fee to provide funds for Consultant to continue to perform lobbying services; to update Standard Consultant Agreement language; and to incorporate administrative changes; and

NOW, THEREFORE, in consideration for the mutual promises and agreements stated herein and notwithstanding anything to the contrary stated in the Agreement, District and Consultant hereby agree to amend the Agreement as follows:

1. Revised Standard Consultant Agreement, Section Twelve, Miscellaneous Provisions, subsection 21 (Appendices) is amended to read in its entirety as follows:

   "The following listed Revised Appendices are incorporated herein by this reference as though set forth in full:

   Appendix One to the Standard Consulting Agreement – Additional Terms (UNCHANGED)
   Revised Appendix Two to the Standard Consulting Agreement – Insurance Requirements (REVISED)"

2. Revised Standard Consulting Agreement, Section Twelve, Miscellaneous Provisions, subsection 22 (Schedule(s) and Attachments) is amended to read in its entirety as follows:

   "The following listed Revised Schedule(s) A-GEN, Scope of Services, and the following Attachments are incorporated herein by this reference as though set forth in full:

   Revised Attachment One to Revised Schedule A-GEN – Fees and Payments (REVISED)
   Revised Attachment Two to Revised Schedule A-GEN – Schedule of Completion (REVISED)
   Attachment Three to Schedule A-GEN – Consultant's Key Staff and Subconsultants (UNCHANGED)
   Attachment Four to Schedule A-GEN – Reference Materials (UNCHANGED)"

AMENDMENT NO. 2 TO
STANDARD CONSULTANT AGREEMENT A4139F
BETWEEN THE SANTA CLARA VALLEY WATER DISTRICT
AND GOVERNMENTAL ADVOCATES

3. New paragraph number 23 is added to Section Twelve (Miscellaneous Provisions) of the Agreement:

   "**23. No Third-Party Beneficiaries**
   Nothing in this Agreement, whether express or implied, shall be construed to give any person or entity, other than the Parties hereto, any legal or equitable right, remedy, or claim under or in respect of this Agreement or any covenants, conditions, or provisions contained herein."

4. New paragraph number 24 is added to Section Twelve (Miscellaneous Provisions) of the Agreement:

   "**24. Severability**
   If a court of competent jurisdiction holds any provision of this Agreement to be illegal, unenforceable, or invalid in whole or in part for any reason, the validity and enforceability of the remaining provisions, or portions of them, will not be affected, unless an essential purpose of this Agreement would be defeated by the loss of the illegal, unenforceable, or invalid provision."

5. New paragraph number 25 is added to Section Twelve (Miscellaneous Provisions) of the Agreement:

   "**25. Debt Limitation**
   This Agreement is contingent on the appropriation of sufficient funding by District for the services described in this Agreement. Valley Water is subject to laws or policies which limit its ability to incur debt in future years. Nothing in this Agreement shall constitute an obligation of future legislative bodies of District to appropriate funds for purposes of this Agreement."

6. Appendix Two to the Standard Consultant Agreement, Insurance Requirements, is modified to read in its entirety as set forth in the attached Revised Appendix Two, Insurance Requirements.

7. Schedule A-GEN, Attachment One, Fees and Payments, is modified to read in its entirety as set forth in the attached Revised Schedule A-GEN, Revised Attachment One, Fees and Payments.

8. Schedule A-GEN, Attachment Two, Schedule of Completion, is modified to read in its entirety as set forth in the attached Revised Schedule A-GEN, Revised Attachment Two, Schedule of Completion.

(SIGNATURES FOLLOW ON NEXT PAGE)
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AMENDMENT NO. 2 TO
STANDARD CONSULTANT AGREEMENT A4139F
BETWEEN THE SANTA CLARA VALLEY WATER DISTRICT
AND GOVERNMENTAL ADVOCATES

9. All other terms and conditions of the Agreement and Amendment No. 1 not otherwise amended as stated herein remain in full force and effect.

IN WITNESS WHEREOF, THE PARTIES HAVE SET FORTH BELOW THEIR CONSENT TO THE TERMS AND CONDITIONS OF THIS AMENDMENT NO. 2 TO AGREEMENT NO. A4139F THROUGH THE SIGNATURES OF THEIR DULY AUTHORIZED REPRESENTATIVES.

SANTA CLARA VALLEY WATER DISTRICT
District

By: _____
Nai Hsueh
Chair, Board of Directors

Date: _____

ATTEST:

_____
Michele L. King, CMC
Clerk, Board of Directors

GOVERNMENTAL ADVOCATES
Consultant

By: _____
Cliff Berg
President

Date: _____

Firm Address:

112 11th Street Suite 400
Sacramento, Ca. 95814

AMENDMENT NO. 2 TO AGREEMENT A4139F
REVISED APPENDIX TWO
INSURANCE REQUIREMENTS

Please Note: Failure to comply with the instructions below could result in a delay in receiving the Notice to Proceed. The District will not be responsible for time lost or costs incurred due to failure to comply with these requirements. Please note the check-list of documents needed at the end of this Revised Appendix IV insurance requirement.

Without limiting the Consultant's indemnification of, or liability to, the Santa Clara Valley Water District ("District"), the Consultant must provide and maintain at its own expense, during the term of this Agreement, or as may be further required herein, the following insurance coverages and provisions as listed below.

Consultant must provide its insurance broker(s)/agent(s) with a copy of these requirements and warrants that these requirements have been reviewed by Consultant's insurance agent(s) and/or broker(s), who have been instructed by Consultant to procure the insurance coverage required herein.

In addition to certificates, Consultant must furnish District with copies of all original endorsements affecting coverage required by this Appendix. The certificates and endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. **All endorsements and certificates are to be received and approved by District before the Agreement is executed**. In the event of a claim or dispute, District has the right to require Consultant's insurer to provide complete, certified copies of all required pertinent insurance policies, including endorsements affecting the coverage required by this Appendix insurance document.

If your insurance broker has any questions about the above requirements, please advise him/her to call Mr. David Cahen, District Risk Manager at (408) 630-2213.

Certificates of Insurance

Consultant shall furnish the District with a Certificate of Insurance. The certificates will be issued on a standard ACORD Form.

Consultant shall instruct their insurance broker/agent to submit all insurance certificates and required notices electronically in PDF format to the designated District Contract Administrator and email a copy to **valleywater@ebix.com**.

The certificates will:

1. Identify the underwriters, the types of insurance, the insurance limits, the deductibles and the policy term;
2. Include copies of all the actual policy endorsements required herein; and
3. In the "Certificate Holder" box include:

AMENDMENT NO. 2 TO AGREEMENT A4139F
REVISED APPENDIX TWO
INSURANCE REQUIREMENTS

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Agreement A4139F / CAS No. 4861

IMPORTANT: The agreement or CAS number must be included.

In the Description of Operations/Locations/Vehicles/Special Items Box:

1. Certificate Holder shall be named as Additional Insured;
2. District agreement or project number shall appear;
3. The list of policies scheduled as underlying on the Umbrella policy shall be listed; and
4. Waiver of Subrogation must be indicated as endorsed to all policies.

If Consultant receives any notice that any of the insurance policies required by this Revised Appendix IV Insurance may be cancelled or coverage reduced for any reason whatsoever, Consultant or insurer shall immediately provide written notice to the designated District Contract Administrator that such insurance policy required by this Appendix IV Insurance is canceled or coverage is reduced.

Maintenance of Insurance

If Consultant fails to maintain such insurance as is called for herein, District, at its option, may suspend payment for work performed and/or may order Consultant to suspend all Consultant's work at Consultant's expense until a new policy of insurance is in effect.

Renewal of Insurance

Consultant will provide the District with a current Certificate of Insurance and endorsements within thirty (30) business days from the expiration of insurance.

Consultant shall instruct its insurance broker/agent to:

1. Submit all renewals of insurance certificates and required notices electronically in PDF format to: **valleywater@ebix.com**

2. Provide the following information in the "Certificate Holder" box:

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Agreement A4139F / CAS No. 4861

IMPORTANT: The agreement or CAS number must be included.

AMENDMENT NO. 2 TO AGREEMENT A4139F
REVISED APPENDIX TWO
INSURANCE REQUIREMENTS

Consultant must, at its sole cost and expense, procure and maintain during the entire period of this Agreement the following insurance coverage(s).

Required Coverages

1. Commercial General/Business Liability Insurance with coverage as indicated:

$1,000,000 per occurrence / **$1,000,000** aggregate limits for bodily injury and property damage

General Liability insurance must include:

a. Coverage at least as broad as found in standard ISO form CG 00 01.
b. Contractual Liability expressly including liability assumed under this contract.
c. If Consultant must be working within fifty (50) feet of a railroad or light rail operation, any exclusion as to performance of operations within the vicinity of any railroad bridge, trestle, track, roadbed, tunnel, overpass, underpass, or crossway must be deleted, or a railroad protective policy in the above amounts provided.
d. Severability of Interest.
e. Broad Form Property Damage liability.

2. Business Auto Liability Insurance with coverage as indicated:

$1,000,000 combined single limit for bodily injury and property damage per occurrence, covering all owned, non-owned and hired vehicles.

3. Professional/Errors and Omissions Liability with coverage as indicated:

$1,000,000 per claim/ **$1,000,000** aggregate

Professional/Errors and Omission Liability appropriate to the Consultant's profession, and must include:

a. If coverage contains a deductible, or self-insured retention, it shall not be greater than one hundred thousand dollars ($100,000) per occurrence/event.
b. Coverage shall include contractual liability
c. If coverage is claims-made:

    i. Certificate of Insurance shall clearly state that the coverage is claims-made.
    ii. Policy retroactive date must coincide with or precede the Consultant's start of work (including subsequent policies purchased as renewals or replacements).
    iii. Policy must allow for reporting of circumstances or incidents that might give rise to future claims.
    iv. Insurance must be maintained and evidence of insurance must be provided for at least three (3) years after completion of the contract of work.

4. Workers' Compensation and Employer's Liability Insurance

Statutory California Workers' Compensation coverage covering all work to be performed for the District.

Employer Liability coverage for not less than $1,000,000 per occurrence.

General Requirements

With respect to all coverages noted above, the following additional requirements apply:

1. **Additional Insured Endorsement(s):** Consultant must provide an additional insured endorsement for Commercial General/Business Liability (for both on-going and completed operations) and Business Automobile liability coverage naming the **Santa Clara Valley Water District, its Directors, officers, employees, and agents, individually and collectively,** as additional insureds, and must provide coverage for acts, omissions, etc. arising out of the named insureds' activities and work. Other public entities may also be added to the additional insured endorsement as applicable and the Consultant will be notified of such requirement(s) by the District. **NOTE:** This section does not apply to the Workers' Compensation and Professional Liability policies.

   (**NOTE:** Additional insured language on the Certificate of Insurance is **NOT** acceptable without a separate endorsement such as Form CG 20 10, CG 2033, CG 2037, or CG 2038. Editions dated 07/04 are not acceptable.)

2. **Primacy Clause:** Consultant will provide evidence (either through the Certificate of Insurance, endorsement or language in the insurance contract) that consultant's insurance is primary with respect to any other insurance which may be carried by the District, its Directors, its officers, agents and employees, and the District's coverage must not be called upon to contribute or share in the loss. **NOTE:** This section does not apply to the Workers' Compensation policies.

3. **Cancellation Clause**: Consultant will provide endorsements for all policies stating that the policy will not be cancelled without 30 days prior notification to the District**.**

4. **Acceptability of Insurers:** All coverages must be issued by companies admitted to conduct business in the State of California, which hold a current policy holder's alphabetic and financial size category rating of not less than A- V, according to the current Best's Key Rating Guide or a company of equal financial stability that is approved by the District's Risk Manager. Non-Admitted companies may be substituted on a very limited basis at the Risk Manager's sole discretion.

5. **Self-Insured Retentions or Deductibles:** Any deductibles or self-insured retentions must be declared to and approved by the District. At the option of the District, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the District, its officers, officials, employees and volunteers; or the Consultant shall provide a financial guarantee satisfactory to the Entity guaranteeing payment of losses and related investigations, claim administration, and defense expenses. Consultant agrees that in the event of a claim they will pay down any agreed upon SIR in a prompt manner as soon as bills are incurred in order to trigger the insurance related to the SIR.

6. **Subconsultants:** The Consultant shall secure and maintain or shall be responsible for ensuring that all subconsultants performing the Contract Services secure and maintain all insurance coverages appropriate to their tier and scope of work in a form and from insurance companies reasonably acceptable to the District.

7. **Amount of Liability not Limited to Amount of Insurance:** The insurance procured by Consultant for the benefit of the District must not be deemed to release or limit any liability of Consultant. Damages recoverable by the District for any liability of Consultant must, in any event, not be limited by the amount of the required insurance coverage.

8. **Coverage to be Occurrence Based:** Except for Professional Liability, all coverage must be occurrence-based coverage. Claims-made coverage is not allowed.

9. **Waiver of Subrogation:** Consultant agrees to waive subrogation against the District to the extent any loss suffered by Consultant is covered by any Commercial General Liability policy, Automobile policy, Workers' Compensation policy described in **Required Coverages** above. Consultant agrees to advise its broker/agent/insurer and agrees to provide evidence (either through the Certificate of Insurance, endorsement or language in the insurance contract) that subrogation has been waived by its insurer.

10. **Non-compliance:** The District reserves the right to withhold payments to the Consultant in the event of material noncompliance with the insurance requirements outlined above.

AMENDMENT NO. 2 TO AGREEMENT A4139F
REVISED APPENDIX TWO
INSURANCE REQUIREMENTS

CHECK LIST OF DOCUMENTS NEEDED

General Liability:	A.	Limits **($1,000,000)**	
	B.	Additional Insured (Endorsement)	
	C.	Waiver of Subrogation (COI, Endorsement or policy language)	
	D.	Primacy (COI, Endorsement or policy language)	
	E.	Cancellation Endorsement	

Auto Liability:	A.	Limits **($1,000,000)**	
	B.	Additional Insured (Endorsement)	
	C.	Waiver of Subrogation (COI, Endorsement or policy language)	
	D.	Primacy (COI, Endorsement or policy language)	
	E.	Cancellation Endorsement	

Umbrella:	A.	Limits ($)	
	B.	Primacy (Endorsement or policy language)	

Workers Comp:	A.	Limits **($1,000,000)**	
	B.	Waiver of Subrogation (Endorsement or policy language)	
	C.	Cancellation Endorsement	

Professional Liability:	A.	Limits **($1,000,000)**	
	B.	Cancellation Endorsement	

Appendix IV ConsultantGL1AL1PL1_rev. 5/11/20

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AMENDMENT NO. 2 TO AGREEMENT A4139F
REVISED SCHEDULE A-GEN
REVISED ATTACHMENT ONE
FEES AND PAYMENTS

1. Total Authorized Funding

Total payment for Services performed, to the satisfaction of the District, as described in the Revised Schedule(s) will not exceed a total amount of **$336,700** (Fixed Fees). This fixed fee amount includes all expenses and costs related to the Consultant's performance of the Scope of Services. Under no conditions will the total compensation to the Consultant exceed this fixed fee payment amount without written approval in the form of an amendment to this Agreement executed by the District's Board of Directors (Board), or Chief Executive Officer, or designee, as authorized by the Board.

2. Cost Breakdown

The fixed fee total compensation of this Agreement consists of the following task fee breakdown. No Services will be performed or fees paid by District to the Consultant for Supplemental Services or sub tasks requiring the issuance of Task Orders without prior written authorization by the District as stated in Revised Schedule A-GEN, Scope of Services.

Task	Description	Monthly Fixed Fee 9/1/18 – 9/30/19	Amendment No. 1 Monthly Fixed Fee 10/1/19 – 9/30/20	Amendment No. 2 Monthly Fixed Fee 10/1/20 – 9/30/21	Revised Total Agreement Not-To-Exceed Fixed Fee Amount
1	State Advocacy & Representation	$9,100 per month for 13 months	$9,100 per month for 12 additional months	$9,100 per month for 12 additional months	
Total Fixed Fee Amount		**$118,300**	**$109,200**	**$109,200**	**$336,700**

3. Terms and Conditions

Payments for Services performed, as described in this attached Schedule, which applies to the specific Services, will be based on the following terms:

A. The District will pay for Services provided by the Consultant according to a monthly fixed fee amount for professional, technical, and administrative personnel as well as materials and supplies.

B. The stated monthly fixed fee is effective for the term of this Agreement unless otherwise revised as indicated. After twelve (12) months from the date this Agreement is entered into by parties ("anniversary date"), and each 12 months thereafter, this monthly fixed fee may be negotiated by the Consultant and the District, provided Consultant submits written notice to District of Consultant's request to revise the monthly fixed fee ninety (90) calendar days prior to the anniversary date of this Agreement. Both parties will use as a benchmark for negotiations the percent change for the previous twelve (12) months of the "Employment Cost Index (ECI), for total compensation for private industry workers, for the San Francisco-Oakland-San Jose, CA CSA Census region and metropolitan area (not seasonally adjusted)" as published by the U.S. Department of Labor, Bureau of Labor Statistics, or 2.5%, whichever is less. A negative index will result in rates remaining the same. Such rate revisions are subject to written approval by the District's Deputy Administrative Officer for the Office of Government Relations.

C. **Reimbursable Expenses.** All expenses are included in the fixed monthly fee. There are no reimbursements allowed under the contract.

4. Approval Required for Services Performed at Specified Rate

A. There are no hourly or unit rates allowed under the contract. All work performed shall be included in the monthly fixed fee amount.

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AMENDMENT NO. 1 TO AGREEMENT A4139F
REVISED SCHEDULE A-GEN
REVISED ATTACHMENT TWO
SCHEDULE OF COMPLETION

1. This Agreement commences on the Effective Date, subject to accomplishment of all of the conditions to formation of an agreement listed in the Agreement at Section Twelve, Miscellaneous Provisions, subsection 2. Formation of Agreement.

2. This Agreement expires on **September 30, 2021,** unless, prior to its expiration, its term is modified by a written amendment hereto, signed by both Parties.

3. District's Project Manager and Consultant may agree to modify the schedule specified for Consultant's performance as an administrative modification to the Agreement and will confirm such modification in writing.

PROJECT SCHEDULE

Task	Description	Duration From Notice to Proceed (months)
1	State Advocacy and Representation	Duration of Agreement

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Santa Clara Valley Water District

File No.: 20-0571

Agenda Date: 8/11/2020
Item No.: 3.3.

BOARD AGENDA MEMORANDUM

SUBJECT:
Notice of Completion of Contract and Acceptance of Work for the Vasona Pump Station Fence and Gate Replacement Project Phase 1, AAA Fence Company, Inc., Contractor, Project No. 92764009, Contract No. 0654 (Los Gatos) (District 7).

RECOMMENDATION:

A. Accept the work as complete for Vasona Pump Station Fence and Gate Replacement Project Phase 1, Project No. 92764009, Contract No. C0654; and

B. Direct the Clerk of the Board to sign the Notice of Completion of Contract and Acceptance of Work and submit for recording to the County of Santa Clara Office of the Clerk-Recorder.

SUMMARY:
The construction contractor, AAA Fence Company, Inc., has completed the Vasona Pump Station Fence and Gate Replacement Project Phase 1 (Project). The construction contract was awarded in the amount of $215,765.00 and the final contract amount is $207,679.96. Subject to any withholds required by law or the contract, acceptance of the work by the Board will allow for the release of $10,384.00 in retention to the contractor.

Project Background

The objective of the Vasona Pump Station Fence and Gate Replacement Project Phase 1 is to enhance the physical security of the facility. Project scope includes replacement of 1,600 linear feet (LF) of existing 6-foot high fencing with 8-foot high mini-mesh chain-link fence; installing 500 LF of new fencing along other segments of Valley Water's property line; replacing one existing and installing two new 6-foot wide pedestrian gates; replacing three existing and installing one new 24-foot long and one 10-foot long manual vehicular gate; and installing one new automatic vehicular security gate.

The Contractor has completed all work required by the contract.

Previous Board Actions

On June 11, 2019, the Board held a public hearing and adopted Resolution 19-51 approving the Engineer's Report and approved the Project.

On September 10, 2019, the Board adopted the plans and specifications and authorized advertisement for bids for the Project.

On November 26, 2019, the Board awarded the subject contract to AAA Fence Company, Inc. in the amount of $215,765.00 and approved a contingency fund of $21,576.00. The Board authorized the Chief Executive Officer (CEO) or designee to approve individual change orders up to the total amount of the contingency, with the Engineering Unit Manager as the designee to approve individual changes up to the total contingency amount.

Contract Change Orders

One contract change order totaling the credit amount of $8,085.04 was executed for this contract. Changes included:

A. $1,205.44 for additional work required to repair loose or missing fence foundation posts along the existing fence alignment.

B. $505.02 for staff-requested changes to add additional bottom rails to close gaps underneath the fence.

C. <$9,795.50> for credits back to the contract as a result of a reduction in the quantity of fence mesh fabric.

TABLE 1. SUMMARY OF CONSTRUCTION CONTRACT AND CONTINGENCY AMOUNTS

	Contract Amount	**Contingency Amount**
Original Contract	**$215,765.00**	**$21,576.00**
Change Order No. 1 (staff approved)	<$8,085.04>	$8,085.04
Final Contract Amount and Remaining Contingency	**$207,679.96**	**$29,661.04**

Acceptance of the Work and Recording Notice of Completion of Contract

The California Civil Code allows an owner or agent to execute a Notice of Completion of Contract after acceptance of the work by the Board. The Notice of Completion of Contract and Acceptance of Work is included in Attachment 1. The Designated Engineer has determined that the work has been completed, to the best of his knowledge, in accordance with the plans and specifications, and recommends acceptance. The Designated Engineer's recommendation of construction acceptance is included in Attachment 2. The Project Completion Letter is included as Attachment 3. Photos of the completed Project are included in the Construction Summary as Attachment 4.

Construction Contract Retention

California law requires Valley Water to release contract retention in accordance with certain time frames, which will commence once the Notice of Completion is recorded. Interest payment on retention due to the contractor may be avoided by meeting the requisite deadlines.

Valley Water is currently withholding retention funds totaling five percent (5%) of the contract items in accordance with the Public Contract Code. Per the construction contract documents, Valley Water is required to release retention funds associated with the contract 35 days after recording the Notice of Completion of Contract and Acceptance of Work, subject to any withholds required by law or the contract.

Recording a Notice of Completion is recommended for the work.

Total Project Expenditures

The original contract amount of $215,765.00 has been reduced by $8,085.04 to $207,679.96, a decrease of approximately 3.7 percent.

FINANCIAL IMPACT:

The Project has been completed and no additional funding is required.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: Notice of Completion and Acceptance of Work
Attachment 2: Construction Contract Acceptance
Attachment 3: Project Completion Letter
Attachment 4: Construction Photos
Attachment 5: Project Delivery Process Chart

UNCLASSIFIED MANAGER:
Heath McMahon, 408-630-3126

RECORD WITHOUT FEE UNDER SECTION 6103
GOVERNMENT CODE OF THE STATE OF CALIFORNIA
SANTA CLARA VALLEY WATER DISTRICT
5750 ALMADEN EXPRESSWAY, SAN JOSE, CA 95118

Recording Requested by: Michele L. King, Clerk, Board of Directors

When Recorded, Mail to:

Michele L. King, Clerk, Board of Directors
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

NOTICE OF COMPLETION OF CONTRACT AND ACCEPTANCE OF WORK

NOTICE IS HEREBY GIVEN by order of the Board of Directors of Santa Clara Valley Water District, State of California, pursuant to law, that work to be performed under the contract heretofore made and executed by and between Santa Clara Valley Water District, as Owner therein, and **AAA Fence Company, Inc., 2746 Scott Boulevard, Santa Clara, CA 95050** as Contractor therein, bearing the date **November 26, 2019** for the construction of **Vasona Pump Station Fence and Gate Replacement Project Phase 1, Contract No. C0654, and Project No. 92764009** and appurtenant facilities upon lands of said District known as **Vasona Pump Station** situated in the County of Santa Clara, State of California, was completed as called for and in the manner designated by the plans and specifications, by the said Contractor, and the said work was accepted by the said District Board of Directors on behalf of said District on **July 28, 2020**.

That upon said contract, **The Ohio Casualty Insurance Company, 1340 Treat Boulevard Suite 400, Walnut Creek, CA 94597 (Bond No. 14L000627),** was surety on the bond given by said **AAA Fence Company, Inc.** the said Contractor, as required by law;

That the title of said District to the real property upon which said work and contract was performed is that of **Fee** and;

That the address of said District is 5750 Almaden Expressway, San Jose, California 95118.

IN WITNESS WHEREOF, pursuant to the order of the Board of Directors made and given on **August 11, 2020** authorizing and directing the execution of this instrument, the said District has caused these presents to be executed in its name, authenticated by the signature of the Clerk of the said Board of Directors on **August 11, 2020**.

_____
Clerk, Board of Directors
Santa Clara Valley Water District

I, the undersigned, say that I am Clerk of the Board of Directors of the Santa Clara Valley Water District; that I make this declaration on its behalf; that said District is the owner of the real property interest described in the foregoing Notice; that declarant has read the foregoing Notice and knows the contents thereof, and the same is true of my own knowledge.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on **August 11, 2020**, at San Jose, California.

_____
Clerk, Board of Directors
Santa Clara Valley Water District

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SANTA CLARA VALLEY WATER DISTRICT

RECOMMENDATION OF CONSTRUCTION CONTRACT ACCEPTANCE

In accordance with **Article 9.14, Final Inspection of Work**, of the contract specifications, a final inspection was conducted on March 19, 2020 for the Vasona Pump Station Fence and Gate Replacement Project, Contract No. C0654, Project No. 92764009. The Project Completion Letter dated June 23, 2020 indicates that the work was completed in accordance with the requirements of the contract.

It is recommended that the work under this contract be accepted by Valley Water.

Recommended By:

DocuSigned by:
Brandon Ponce
B5C1670E237A4BE...

6/30/2020

Brandon Ponce, P.E.
Senior Civil Engineer
Designated Engineer's Representative

Date

Concurrence:

DocuSigned by:
Heath McMahon
0952F1708C2D418...

7/1/2020

Heath McMahon, P.E.
Deputy Operating Officer
Water Utility Enterprise

Date

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June 23, 2020

Mr. Scott Hutchings
AAA Fence Company, Inc.
2746 Scott Boulevard
Santa Clara, CA 95050

Subject: Vasona Pump Station Fence & Gate Replacement Project Phase 1
Contract No. C0654, Project No. 92764009
Project Completion Letter

Dear Mr. Hutchings:

In accordance with **Article 11.01.05 Project Completion,** this serves as the Project Completion Letter for Milestones 1-5 (Article 12.03.C).

A Final Inspection for the work associated with Milestones 1-5 was performed on March 19, 2020. Completion of all Deficiency List items has been attested to by Valley Water staff.

Valley Water is in receipt of the Project Completion Certification, dated June 19, 2020 from AAA Fence Company.

Therefore, in accordance with **Article 11.01.06 Acceptance of Work,** I will recommend that the Valley Water Board of Directors formally accept the work of this contract.

If you have any questions, contact me at (415) 407-2775 or by e-mail at bponce@valleywater.org.

Sincerely,

Brandon Ponce

Brandon Ponce, P.E.
Senior Civil Engineer
Construction Services Unit

cc: E. Aryee, M. Benitez-Garcia, N. Bullock, Y. Karoglou, A. Trinh, B. Ponce, K. Gonzales, Contract File

kg:bp
654

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Vasona Pump Station Fence and Gate Replacement Project Phase 1

Notice of Completion of Construction Contract

August 11, 2020

Construction Photos

Valley Water

Construction Photos

BEFORE

AFTER

Fence Replacement Along Highway 85

Valley Water

Construction Photos

BEFORE

AFTER

New Fence Alignment Along Pond

Valley Water

Construction Photos

New 12 Foot Wide Gate

Valley Water

Construction Photos

BEFORE

AFTER

New Automatic Roller Gate

Valley Water

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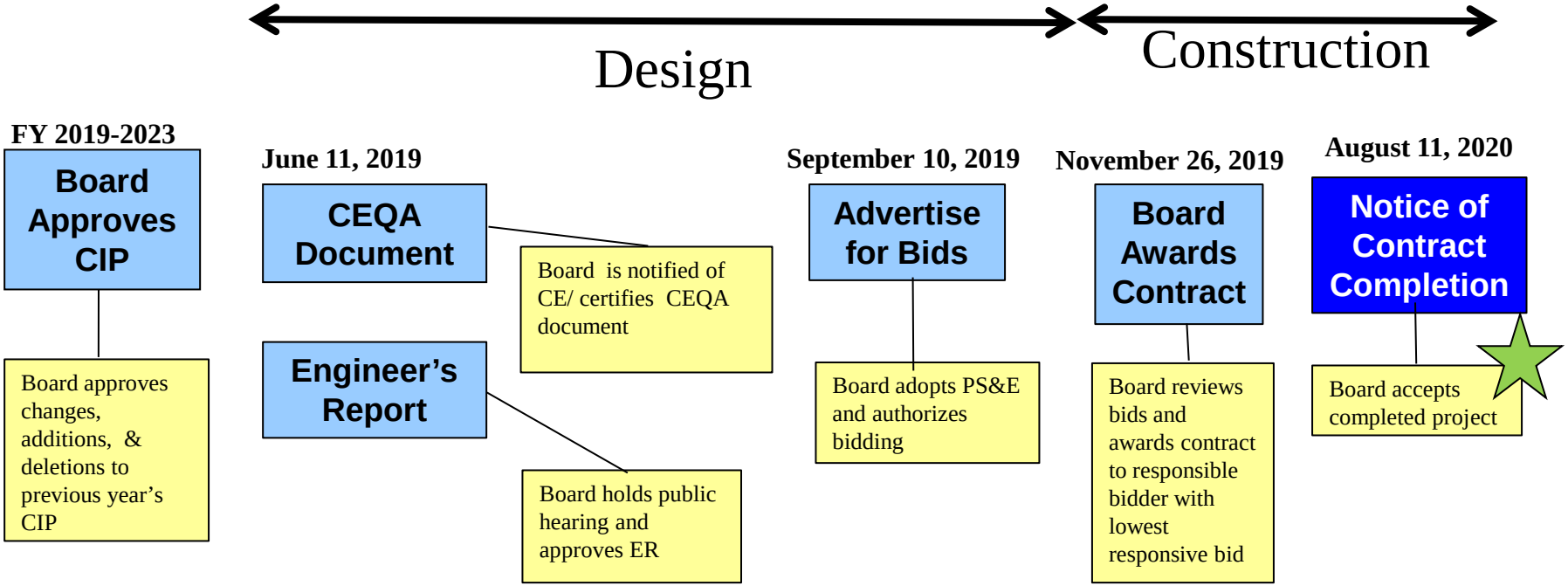
Project Delivery Process

Small Capital Improvement Projects

Vasona Pump Station Fence & Gate Replacement, C0654, Project No. 92764009



Proposed Board Action(s) requested by this Item

Attachment 5
Page 1 of 1

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Santa Clara Valley Water District

File No.: 20-0599

Agenda Date: 8/11/2020
Item No.: 3.4.

BOARD AGENDA MEMORANDUM

SUBJECT:
Receive Semi-Annual Lobbyist Report of Individuals Engaged in Compensated Lobbying Activities Aimed at Influencing District Decisions, in Accordance With District Ordinance No. 10-01.

RECOMMENDATION:
Receive the Semi-Annual Lobbyist Report of Individuals Engaged in Compensated Lobbying Activities for the period January 1, 2020 through June 30, 2020.

SUMMARY:
In accordance with reporting requirements of the Lobbyist Ordinance, Ordinance No. 10-01, adopted by the Board on June 5, 2010, the attached Semi-Annual Lobbyist Report of Individuals Engaged in Compensated Lobbying Activities (Attachment 1) for the period of January 1, 2020, through June 30, 2020, is provided for Board information.

The Lobbyist Ordinance was adopted by the Board to ensure that the public is aware of the identity of interests which attempt to influence decisions of the District.

A Lobbyist webpage (<https://www.valleywater.org/how-we-operate/lobbyist-ordinance>) has been created on the District's website providing the public access to the District's Lobbyist Ordinance, Lobbyist Report, filing forms and a frequently asked questions form.

Along with providing a semi-annual report, the Lobbyist Ordinance also requires that the Clerk recommend a fee schedule to the Board for adoption, based on the estimated cost of the services provided pursuant to the ordinance. With only two registered individuals at present, there has not been a significant amount of staff time spent in performing duties relevant to lobbyist registration. Therefore, no fee schedule is recommended at this time. The Clerk will continue to monitor staff time required to process lobbyist reports and return to the Board at a future date, if necessary, to recommend a fee schedule.

FINANCIAL IMPACT:
There is no financial impact associated with this item.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have the potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: Lobbyist Report

UNCLASSIFIED MANAGER:
Michele King, 408-630-2711

Santa Clara Valley Water District Registered Lobbyists - 2020

Lobbyist Entity / Firm	Clients	Individuals Lobbying under Entity	District Decisions
Pacific Gas and Electric Company		Daniel Cedeno	Working with District officials to ensure that necessary work on gas and electric infrastructure can be completed in a timely and cost effective fashion in order to provide safe, reliable, and affordable service to our customers. PG&E's lobbying may occasionally include advocating for District policy that ensures our customers continue to receive safe, reliable, and affordable gas and electric service.
Google LLC and its Affiliates		Joe Van Belleghem, Parham Khoshkbari, Andy Springer, Cindy Muller, Joel Cesare, Michelle McDermott, Jordan O'Brien, Ricardo Benavidez	Community outreach, environmental clearance, planning entitlements, masterplan approval process related to Google developments.

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Santa Clara Valley Water District

File No.: 20-0631

Agenda Date: 8/11/2020
Item No.: 3.5.

BOARD AGENDA MEMORANDUM

SUBJECT:
Accept the CEO Bulletin for the Weeks of July 17-30, 2020.

RECOMMENDATION:
Accept the CEO Bulletin.

SUMMARY:
The CEO Bulletin is a weekly communication for the CEO, to the Board of Directors, assuring compliance with Executive Limitations Policy EL-7: The BAOs inform and support the Board in its work. Further, a BAO shall: inform the Board of relevant trends, anticipated adverse media coverage, or material external and internal changes, particularly changes in the assumptions upon which any Board policy has previously been established; and report in a timely manner an actual or anticipated noncompliance with any policy of the Board.

CEO Bulletins are produced and distributed to the Board weekly as informational items, and then placed on the bimonthly, regular Board meeting agendas to allow opportunity for Board discussion on any of the matters contained therein.

FINANCIAL IMPACT:
There is no financial impact associated with this item.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: 073020 CEO Bulletin

UNCLASSIFIED MANAGER:
Rick Callender, 408-630-2017

CEO BULLETIN

To: Board of Directors
From: Rick L. Callender, CEO

Weeks of July 17 – July 30, 2020

Board Executive Limitation Policy EL-7:
The Board Appointed Officers shall inform and support the Board in its work. Further, a BAO shall 1) inform the Board of relevant trends, anticipated adverse media coverage, or material external and internal changes, particularly changes in the assumptions upon which any Board policy has previously been established and 2) report in a timely manner an actual or anticipated noncompliance with any policy of the Board.

Item	IN THIS ISSUE
1	Onsite Voluntary COVID-19 Testing for Valley Water
2	Rinconada Water Treatment Plant: Completion of Phase-2 Facilities Start Up and Commissioning Activity
3	Safe, Clean Water Grant Closeout: County of Santa Clara's FY15 D3 Calero Reservoir Oak Cove Trail Construction Project
4	Safe, Clean Water Grant Closeout: Ecology Action's FY17 A2 Investigation of Water Savings and Quality of Indoor, Non-Potable Rainwater Harvesting System Project
5	Safe, Clean Water Grant Closeout: Grassroots Ecology's FY16 D3 Byrne Preserve Riparian Enhancement Project
6	Safe, Clean Water Grant Closeout: Grassroots Ecology's FY16 D3 Pearson-Arastradero Preserve Watershed Enhancement Project
7	Safe, Clean Water Mini-Grant Closeout: Bay Area Older Adults' FY19 D3 Watershed and Wildlife Education Walks Project
8	Safe, Clean Water Mini-Grant Closeout: Grassroots Ecology's FY18 D3 Native Plant Nursery Phytosanitary Upgrades Project
9	Safe, Clean Water Mini-Grant Closeout: San Francisco Bay Bird Observatory's FY18 D3 Waterbird Monitoring in Santa Clara County Salt Ponds Project
10	Safe, Clean Water Mini-Grant Closeout: Trout Unlimited's FY18 D3 Little Arthur Creek Streamflow Stewardship Phase 2 Planning Project
11	Safe, Clean Water Partnership Closeout: County of Santa Clara's FY16 B3 Pollution Prevention and Zero Waste Project
12	Saratoga Creek Hazard Tree Removal and Restoration Project Update
13	Valley Water Eligible for Full-Site Battery Storage System Installation at Penitencia Water Treatment Plant
14	Valley Water Executes Amendment #1 to the Los Vaqueros Reservoir Expansion Multi-party Cost Share Agreement

15	**Valley Water Sent Formal Notice to Santa Clara County Parks and Recreation Department to Suspend Permitted Recreational Use at Anderson Dam/Reservoir**
16	**Varela** **Director Varela requests that staff contact Mr. Bergin in the below email (via email) to explain the District's portion of his tax bill, attached.** **I-20-0013**

1. Onsite Voluntary COVID-19 Testing for Valley Water

On July 23, 2020, Valley Water hosted voluntary COVID-19 testing for employees onsite at the headquarters campus Administration Building. The event was coordinated by Valley Water's Emergency Services and Security Unit and the Santa Clara County Public Health Department, with the testing performed by Santa Clara Valley Medical Center (SCVMC) personnel. Valley Water's Facilities Management Unit prepared the testing site, put up for canopies for shade in the outdoors line, and placed signage to direct people during the event. Facilities also placed 8.5-foot marking on the ground for the outdoors line to show where people should stand, which went well beyond the 6-foot social distancing requirement. Valley Water field staff and those still working onsite at Valley Water facilities were given priority to sign up for the event, and all remaining tests were opened to other staff. Registration was conducted through Eventbrite, with each person choosing a 15-minute window for their test. This helped the flow of the event and lessened the amount of waiting in line. A total of 184 tests were performed on Valley Water employees. Test results will take approximately seven days, as communicated by the testing personnel from SCVMC.

For further information, please contact Tina Yoke at (408) 630-2385

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2. Rinconada Water Treatment Plant: Completion of Phase-2 Facilities Start Up and Commissioning Activity

Over the past few years, Valley Water has been undertaking a major reliability improvement project at the Rinconada Water Treatment Plant (RWTP): the Rinconada Reliability Improvement Project (RRIP).

This past month, the startup and commissioning team (comprised of several Valley Water teams, RRIP contractor and consultant) successfully completed a 30-day start up and commissioning activity of Phase 2 facilities. The Phase 2 facilities that were commissioned and put into service are:

- Raw Water Flow Control Facility
- Ozone Contractor Structure (No ozone generation at this phase, structure will be used for flow through only)
- Flash Mix Facility
- Flocculation/Sedimentation Basins
- Wash Water Recovery Facility

During the startup and commissioning activities, as well as during the transition from old to new systems, the startup team minimized impacts to water treatment operations. As a result, treated water was delivered to our West Pipeline retailers with no service interruption or impact.

Currently, the project team is resolving and completing punch list items. Construction related activities at RWTP are taking place during daytime, weekday hours, and with some extended hours before and during plant shutdowns. Plant neighbors are updated regularly through Valley Water's

blog, social media and neighborhood meetings.

For further information, please contact Bhavani Yerrapotu at (408) 630-2735.

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3. Safe, Clean Water Grant Closeout: County of Santa Clara's FY15 Calero Reservoir Oak Cove Trail Construction Project

The Safe, Clean Water Program, D3 Project awarded the County of Santa Clara Parks and Recreation Department a $125,980 grant focused on habitat restoration, access to trails and open spaces, education, and outreach. The agreement was executed on June 12, 2015 and the project was completed on December 23, 2019.

The Calero Reservoir Oak Cove Trail Construction Project enhances the county's natural resources and promotes a positive visitor experience by constructing a new trail approximately five miles around Calero Reservoir in Santa Clara, California. The path was designed and built to meet the state's Park and Recreation Department's environmental sustainability standards and the Americans with Disabilities Act (ADA) outdoor recreation trail recommendations. The trail includes perpendicular crossings to promote drainage, minimize disturbance and provide long-term water quality protection. In addition, seeding and transplantation of native plant species were used to prevent erosion and to restore the trail to its original condition and rehabilitate destroyed areas.

Key Outcomes:

- The Oak Cove Trail officially opened in April 2020.
- The construction of a natural surface and single-track trail approximately five miles in Calero County Park located in Santa Clara, California.
- The path includes one culvert, one free-span bridge, 22 rock fords and 24 drainage crossings.

For further information, please contact Marta Lugo at (408) 630-2237.

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4. Safe, Clean Water Grant Closeout: Ecology Action's FY17 A2 Investigation of Water Savings and Quality of Indoor, Non-Potable Rainwater Harvesting System Project

As part of the Safe, Clean Water and Natural Flood Protection Program, Priority A project grant, Ecology Action received an award of $49,940 to investigate the water quality and savings from using rainwater harvesting systems. The agreement was executed on June 8, 2017 and the project was completed on June 30, 2019. Ecology Action utilized $25,727 (51.5%) of its total award as a result of limited interest and high construction cost of rainwater harvesting system.

Ecology Action, a nonprofit organization located in Santa Cruz, California, partnered with two residential property owners to monitor water use and quality of rainwater harvesting systems for indoor, non-potable purposes such as clothes washing and toilet flushing. Residential properties were in San Jose and Los Altos Hills, California.

The objectives of the water conservation research project include:

- Documentation of water savings from rainwater harvesting and greywater irrigation systems for reuse.
- Development of a case study showcasing the potential water savings and installation cost for Santa Clara County residents.
- Evaluation of cost-effective treatment methods to meet the Environmental Protection Agency (EPA) and the California Plumbing Code (CPC) water quality guidelines.

Key Outcomes:

- Both residential rainwaters harvesting systems reduced the demand for municipal-potable water used for indoor purposes by 15-16% annually.
- Annual water savings from the rainwater harvesting systems ranging between 7,866 to 9,768 gallons.
- Los Altos Hills combined rainwater and greywater system reduced municipal water use by 17,952 gallons (24 Centum Cubic Feet (CCF)) during the one-year monitoring period.
- Over 20 years, the Los Altos Hills residence combined rainwater/greywater reuse system is estimated to conserve 1.1 acre feet, and the San Jose residence rainwater harvesting system is expected to conserve 0.48 acre feet.
- The study found no significant difference in *E.coli* levels between the minimum code required 100-micron filtration and ultra-violet disinfection.

For further information, please contact Marta Lugo at (408) 630-2237.

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5. Safe, Clean Water Grant Closeout: Grassroots Ecology's FY16 D3 Byrne Preserve Riparian Enhancement Project

As of December 16, 2019, the Grassroots Ecology (Grantee) Byrne Preserve Riparian Enhancement Project (Agreement No. A3991R) has been completed and closed.

Grassroots Ecology received a $136,469 Safe, Clean Water Program FY16 D3 Grant for the Byrne Preserve Riparian Enhancement Project. The agreement was executed on June 14, 2016 and the project was completed on June 30, 2019.

The project monitored, restored, and enriched wildlife habitat along the moody creek tributary. By leveraging Grassroots Ecology's three-year contract with the Town of Los Altos Hills to serve as the Steward of Byrne Preserve, the grant augmented their stewardship activities at the Byrne Preserve with the focus on riparian habitat. Major grant activities included community engagement and education, vegetation surveys, channel geometry surveys, invasive plant removal, and native plant installation and maintenance.

Key Outcomes

- 800 community members participated in the project through native plant installation and invasive species removal over a period of 77 days.
- Prioritized and removed eight noxious invasive plant species, resulting in reduced population.
- Installed more than 1,000 locally sourced native plants, spanning over 20 species, to enhance the riparian corridor.
- Established 600 feet of willow cuttings, resulting in increased canopy cover, sediment deposition, and reduced erosion.
- Monitored 2,000 feet of creek geometry and surveyed 2,000 feet of creekside vegetation to document project effectiveness and assess progress over time.

For further information, please contact Marta Lugo at (408) 630-2237.

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6. Safe, Clean Water Grant Closeout: Grassroots Ecology's FY16 D3 Pearson-Arastradero Preserve Watershed Enhancement Project

As of December 16, 2019, the Grassroots Ecology (Grantee) Pearson-Arastradero Preserve Watershed Enhancement Project (Agreement No. A3976R) has been completed and closed.

Grassroots Ecology received a $107,651 Safe, Clean Water Program D3 grant for the Pearson-Arastradero Preserve Watershed Enhancement Project. The agreement was executed on June 14, 2016 and the project was completed on June 30, 2019.

The project supported habitat restoration and watershed enhancement along the Arastradero Creek. While Grassroots Ecology staff led and managed the project activities, volunteers played an instrumental role as well. Major grant activities included invasive plant removal, native plant installation, vegetation surveys, and in-channel geometry surveys.

Key Outcomes

- More than 1,200 community members participated in 101 volunteer events. Activities included invasive plant removal and native plant installation and maintenance.
- 2,500 feet of berms and swales created along the contour of a large drainage to slow, spread, and sink stormwater runoff.
- 50 young willow trees established along Arastradero Creek.
- Decreased invasive plant populations, including four priority noxious weed species.
- Enhanced riparian corridor with thousands of newly installed native plants.
- Monitored project activities through vegetation surveys, photo-monitoring, and in-channel geometric surveys.

For further information, please contact Marta Lugo at (408) 630-2237.

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7. Safe, Clean Water Mini-Grant Closeout: Bay Area Older Adults' FY19 D3 Watershed and Wildlife Education Walks Project

As of November 19, 2019, the Bay Area Older Adults (Grantee) Watershed and Wildlife Education Walk Project (Agreement No. A4252R) has been completed and closed.

The Bay Area Older Adults (BAOA) received a $5,000 Safe Clean Water D3 FY19 Mini Grant for the Watershed and Wildlife Education Walk Project. The program agreement was executed on May 6, 2019 and the project was completed on September 20, 2019. BAOA provided outdoor educational programs for older adults age 50+ to experience Valley Water watersheds. All five programs within the Watershed and Wildlife Education Walks Project were completed with 132 total participants.

Key Outcomes

- Five programs were delivered to 132 participants. Project areas included Don Edwards Wildlife Refuge (San Jose), Ulistac Nature Area (Santa Clara), Guadalupe River Park (San Jose), Alum Rock Park (San Jose) and McClellan Ranch Preserve (Cupertino).
- Post-survey results indicated that more than 90% of participants reported they learned something new about the watersheds and wildlife from the above areas. More than 72% of participants were "very satisfied" with the program.
- All programs were promoted with a monthly full-page print ad in a senior magazine that was distributed to over 30,000 readers throughout Santa Clara County.
- Valley Water-focused outreach materials were produced and distributed to participants and the Valley Water logo was added to BAOA's webpages as a partnered agency.

For further information, please contact Marta Lugo at (408) 630-2237.

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8. Safe, Clean Water Mini-Grant Closeout: Grassroots Ecology's FY18 D3 Native Plant Nursery Phytosanitary Upgrades Project

As of December 5, 2019, the Grassroots Ecology (Grantee) Native Plant Nursery Phytosanitary Upgrades Project (Agreement No. A4183R) has been completed and closed.

Grassroots Ecology received a $3,000 Safe, Clean Water Program FY18 D3 Mini-Grant for the Native Plant Nursery Phytosanitary Upgrades Project. The agreement was executed on September 11, 2018 and the project was completed on June 30, 2019.

The Grassroots Ecology Native Plant Nursery has been a leader in the effort to implement the phytosanitary best management practices. The purpose of the grant was to fund the purchase of new tables and host nursery tours to educate participants on best management practices. The tours emphasized the importance of using proper equipment to mitigate the spread of phytophthora tentaculata, a plant pathogen that causes root and stalk rot.

Key Outcomes

- (12) new 8'x12' steel tables were purchased, assembled, and put into service at the nursery. The new steel tables are easier to clean and are less likely to harbor pathogens.
- Hosted two educational tours for two different groups: Portola Valley Garden Club on September 2, 2018 with eight attendees and Our City Forest on May 15, 2019 with 12 attendees. Participants were led through the new Best Management Practices to better ensure healthy plants. These practices include spraying shoes upon entry with 70% Isopropyl alcohol, storing all plants on metal tables, and pasteurizing the soil.

For further information, please contact Marta Lugo at (408) 646-7441.

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9. Safe, Clean Water Mini-Grant Closeout: San Francisco Bay Bird Observatory's FY18 D3 Waterbird Monitoring in Santa Clara County Salt Ponds Project

As of July 29, 2019, the San Francisco Bay Bird Observatory (Grantee) Waterbird Monitoring in Santa Clara County Salt Ponds mini-grant project (Agreement No. A4161R) has been completed and closed out.

The San Francisco Bay Bird Observatory received a $5,000 Safe, Clean Water Program D3 mini-grant for the Waterbird Monitoring in Santa Clara County Salt Ponds Project. The agreement was executed on June 18, 2018 and the project was completed on June 30, 2019.

This monitoring project was to help the Grantee address questions pertinent to waterbird monitoring within the South Bay Salt Pond Restoration Project, and to also engage residents of Santa Clara County in waterbird conservation.

Key Outcomes:

- Submitted two reports to Restoration Project managers that assembled targets for waterbirds and outlined recommendations for waterbird monitoring.
- In partnership with the U.S. Geological Survey and the U.S. Fish and Wildlife Service, the Grantee surveyed all South Bay Salt Pond restoration sites and accessed tidal marsh areas to document breeding waterbirds. The U.S. Geological Survey's report will be provided to Restoration Project managers.
- Engaged thousands of community members with waterbird conservation, including:

- Volunteers of the Colonial Waterbird Program spent more than 50 hours training as citizen scientists and docents, more than 300 hours available to the public during colony visits, and 24 hours leading advertised colony visits and bird walks.
- Grantee participated in 117 outreach events, 74 of which occurred in Santa Clara County. During events, the Grantee reached 5,965 community members, with 4,492 community members attending events in Santa Clara County.
- Grantee successfully reached local and remote community members through newsletters and social media posts, with 1,544 subscribers receiving 12 newsletters and 61 other communications, 3,072 followers receiving 320 Facebook posts, 558 receiving 34 instagram posts, and 482 receiving Tweets.

For further information, please contact Marta Lugo at (408) 646-7441.

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10. Safe, Clean Water Mini-Grant Closeout: Trout Unlimited's FY18 D3 Little Arthur Creek Streamflow Stewardship Phase 2 Planning Project

Trout Unlimited (Grantee) was awarded a $5,000 Safe Clean Water D3 FY18 Mini-Grant for the Little Arthur Creek Streamflow Stewardship Phase 2 Planning Project (Project). The Project agreement was executed on April 1, 2018 and the Project scope was partially completed in March 2020. Due to early outreach findings, significant proposed scope changes, and timing, Grantee decided to cancel this Project to pursue alternative streamflow enhancement methods. Trout Unlimited received $2,500 for the grant work performed.

The original Project scope sought to enhance ecosystems and improved fish habitat by identifying and exploring opportunities for streamflow enhancement within the Little Arthur Creek sub-watershed through water storage and forbearance. This method allows residents to store creek water in the wet season rather than diverting water from the creek in the dry season. The scope included: performing outreach to local landowners; assessing landowner water usage; identifying streamflow enhancement opportunities at individual properties; and creating preliminary designs and larger project proposals for up to four new streamflow enhancement projects involving residential water storage and forbearance.

Once the Grantee began conducting landowner outreach, new opportunities emerged for enhancing streamflow utilizing flow releases from existing ponds; therefore, the initial scope of this Project was no longer pursued. The Project has successfully identified better enhancement opportunities to support the steelhead population.

Key Outcomes:

- Grantee completed legal analysis of public water rights, parcel records searches, and outreach to individual landowners on Redwood Retreat Road.
- Grantee identified existing ponds and reservoirs within the Little Arthur Creek watershed using aerial imagery, calculated effective storage capacities, and estimated the streamflow enhancement potentials from hypothetical flow releases from each of the available storage reservoirs.
- Grantee discovered the magnitude of streamflow enhancement possible from pond flow releases is more efficient than proposed residential storage and forbearance approach.
- Grantee is using initial work from this Project to discuss more potential flow releases with Santa Clara County Parks and additional private landowners.

For further information, please contact Marta Lugo at (408) 646-7441.

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11. Safe, Clean Water Partnership Closeout: County of Santa Clara's FY16 B3 Pollution Prevention and Zero Waste Project

The County of Santa Clara received a $200,000 Safe, Clean Water Program FY16 B3 Partnership agreement for the Pollution Prevention and Zero Waste project (Agreement No. A3972X). The agreement was executed on June 10, 2016, and the project was completed on June 30, 2019.

The Green Business Program is a compliance-based certification program operated in all 15 cities within Santa Clara County. Businesses seeking certification must meet the minimum requirements to achieve certification. The Program requires businesses to reduce environmental impacts in areas of energy, water, solid waste, transportation, and take initiatives on pollution prevention best practices. In addition, businesses must remain in compliance with all federal and state regulations relating to hazardous waste, hazardous materials, wastewater, stormwater, food permits, pool and spa safety, fire code, and all other permits as applicable to the business. The Green Business Program partners with city and county compliance inspection agencies to educate businesses as well as utility partners and haulers to look for rebate incentives to become more sustainable.

Key Outcomes:

- 259 businesses certified as Green Businesses
- Three ads were run in local community newspapers annually
- Attended a total of 38 outreach events
- Over 1,600 brochures were distributed throughout the community
- Posted over 150 posts on various social media platforms
- Conducted over 400 business site visits to walk applicants through the certification process, including providing pollution prevention and zero waste education, facilitating waste audits, and assisting with reducing waste generation through improved recycling and organics management strategies and purchasing policies
- Annual Green Business recognition events attended by elected officials and executives, including the County Board of Supervisors, to honor participants
- Attended quarterly meetings with bay area Green Business coordinators and bi-annual meetings with larger statewide network to improve and update program standards
- Maintained good relationships with all cities within Santa Clara County through monthly Technical Advisory Committee (TAC) meetings, through referrals from various city staff and working directly with certain city staff to assess businesses in person
- Maintained regular communication with city and county inspectors to ensure all businesses are complying with County regulations

For further information, please contact Marta Lugo at (408) 646-7441.

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12. Saratoga Creek Hazard Tree Removal and Restoration Project Update

Eucalyptus tree removal between Cox Avenue and the Brookside Club of Saratoga is scheduled to begin in August. Right of entry documents are still being finalized with property owners where access is needed. Also waiting on Water Board's approval of SWPPP that was finalized last week by contractor Dudek. The Creek is currently dry and biologists have been monitoring the site in preparation for upcoming work. This year's tree work is expected to last until early October. Seeding and winterization of work area will follow tree removal and before rains arrive.

A letter to the seven property owners in the first phase of tree removal was sent on February 7, 2020, requiring removal of encroached items, including fences and sheds. The letter provides a project status update and reminds the property owners of the Board's recent approval of an updated

encroachment remediation approach. Conversations with property owners continue and to date, one fence has been relocated to correct property line.

An informational mailer with additional project information is scheduled to go out to the greater Saratoga neighborhood later this week.

For further information, please contact Sue Tippets at (408) 630-2253.

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13. Valley Water Eligible for Full-Site Battery Storage System Installation at Penitencia Water Treatment Plant

In response to the recent Pacific Gas and Electric (PG&E) Power Safety Power Shutoff (PSPS) events, Valley Water has worked with Tesla, Inc. (Tesla) and determined that the Penitencia Water Treatment Plant (PWTP) is eligible to participate in the California Self-Generation Incentive Program (SGIP) under the Equity Resiliency Budget, which provides a significant rebate for a full-site backup battery storage system installation.

Through a proposed Purchase Agreement (Agreement), Tesla would apply for the SGIP funding on Valley Water's behalf and assume available SGIP incentives. In return, Tesla will design, procure, install, and maintain a full-site back-up battery system at PWTP at no cost to Valley Water. This full-site battery system would provide PWTP with an environmentally-friendly alternative to better respond to PSPS events and periodic unplanned utility interruptions, while also providing flexibility to help reduce peak utility demand from the grid. The battery backup system will be sized to the peak demand of the treatment plant and it is intended to provide full power backup for 4-12 hours depending on the plant load.

This SGIP incentive is available to critical PG&E gas or electric customers that have been impacted by PSPS events. The remaining major Valley Water facilities are currently ineligible for the SGIP rebate since they are either served by the Power and Water Resources Pooling Authority for electric service and do not have a PG&E gas service, or they have not been impacted by past PSPS events.

To allow Tesla to complete the SGIP application for PWTP and apply for SGIP funding, Valley Water will be routing the Agreement to the Chief Executive Officer for approval. Since there is a limited budget available through the program, Tesla's detailed site investigation and design will be completed after the SGIP incentives are secured. If the Agreement is executed and SGIP funding is secured, the proposed battery system could be operational as early as Summer 2021.

For further information, please contact Bhavani Yerrapotu at (408) 630-2735

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14. Valley Water Executes Amendment #1 to the Los Vaqueros Reservoir Expansion Multi-party Cost Share Agreement

Valley Water has been evaluating a potential long-term participation in the Los Vaqueros Expansion (LVE) Project as a Local Agency Partner (LAP). The LVE Project involves expansion of the existing reservoir owned by Contra Costa Water District in eastern Contra Costa County and construction of new conveyance facilities, including the Transfer-Bethany Pipeline. Valley Water has been participating in the LVE Project since LAP involvement started in 2016.

The Valley Water Board approved a Cost Share Agreement for LVE Project Planning on March 26, 2019. The multi-party agreement committed Valley Water to an equally cost-shared split among the LAPs of $314,782 to continue planning and design of the project through June 30, 2020.

Amendment #1 to the Cost Share Agreement was approved and executed by all LAPs on June 22, 2020 to extend the agreement term through the end of 2020. No additional funds are committed with the time extension. Valley Water's Board will be asked to consider Amendment #2 to the Cost Share Agreement in the Fall to fund planning and design as well as continue through the formation of a Joint Powers Authority.

Additionally, the Bureau of Reclamation recommended the LVE Project receive $7.845 million in Water Infrastructure Improvements for the Nation (WIIN) Act funding for FY2021 to fund pre-construction activities.

For more information, please contact Jerry De La Piedra at (408) 630-2257.

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15. Valley Water Sent Formal Notice to Santa Clara County Parks and Recreation Department to Suspend Permitted Recreational Use at Anderson Dam/Reservoir

On July 17, 2020, related to the Anderson Dam Federal Energy Regulatory Commission (FERC) Order Compliance Project, Valley Water sent a letter to Santa Clara County Parks and Recreation Department providing formal notice of need to suspend permitted recreational use at Anderson Dam commencing October 1, 2020. Noticing is pursuant to the terms of the existing 2018 Master Partnership Agreement between Valley Water and the County of Santa Clara. These are considered reasonable restrictions to specific permitted recreational uses on Valley Water's property. Valley Water is requiring this suspension to comply with the February 20, 2020 FERC Order to immediately lower the reservoir to elevation 488 feet (deadpool) beginning October 1, 2020 through end of construction of the new, low-level tunnel and Anderson Dam Seismic Retrofit Project.

Indefinite suspension of permitted recreational use on Valley Water property applies to the Toyon Group Picnic and Parking areas, the Serpentine Trail and Dam Crest. Temporary suspension of permitted recreational use on Valley Water property applies to the east end of the Live Oak Group Picnic area, boating and fishing, access to the boat and vehicle parking areas, boat ramp, Coyote Road from the toe of the dam to the boat and vehicle parking areas, and Lakeview Trail from Rosendin Trailhead to Rancho Laguna Seca Trail.

Valley Water and County Parks anticipate preparing joint outreach to notify the public of closures.

For further information, please contact Sue Tippets at (408) 630-2253.

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16. <u>Varela</u>
Director Varela requests that staff contact Mr. Bergin in the below email (via email) to explain the District's portion of his tax bill, attached.
I-20-0013

The customer was contacted via phone and email on July 16, 2020. The property tax bill was discussed with the customer in detail, including how the property tax amount is calculated. The customer was sent valleywater.org links with additional information on the Safe, Clean Water program. The customer is concerned that his property's land use is miscategorized. It is currently identified as General Industrial and he noted that as a grape grower it should be Mixed-Use/Agricultural. A request was sent by Valley Water to the County Assessor's Office, requesting confirmation of land use for his parcel. The customer was also encouraged to reach out to the Assessor's Office to independently verify details for his property. A commitment was made to follow up with the customer via email once confirmation was received from the Assessor's Office.

For further information, please contact Darin Taylor at (408) 630-3068.

Santa Clara Valley Water District

File No.: 20-0502

Agenda Date: 8/11/2020
Item No.: 4.1.

BOARD AGENDA MEMORANDUM

SUBJECT:
Receive Overview of Valley Water's Current Budget Processes and Consider the Benefits and Drawbacks Associated with Biennial Budgeting.

RECOMMENDATION:

A. Review Valley Water's current annual budget process in relation to a biennial budget process in order to identify the benefits and drawbacks associated with each; and
B. Direct staff to implement a rolling biennial budget process to be updated annually after implementation of, and demonstrated stability of, the Infor Enterprise Resource Planning system.

SUMMARY:
Valley Water is on an annual Capital Budget, Operating Budget, and Rate setting cycle. Based on staff's assessment, Valley Water could successfully transition to a biennial budget process, at the appropriate time, with investment of time and resources while also revising policies and procedures to accommodate the necessary budget process changes.

Background
Valley Water prepares the Operating Budget, Capital Budget and Rates on an annual basis. The Board has asked staff to examine the merits of adopting a biennial budget cycle conducive to long-term planning. Traditional biennial budgeting is defined as the practice of preparing and adopting budgets for two-year periods. As set forth below, staff is recommending a variation of the traditional biennial budgeting process. Staff evaluated the following budget process options for the purposes of this exercise:

- Traditional biennial budget with mid-cycle update - In a traditional biennial budget, staff submits, and the Board approves a 24-month appropriation. The budget is prepared in odd years and oversight is conducted in even years. A mid-cycle update process is employed to modify the second year of the budget.

- Rolling biennial budget updated annually - Under a rolling biennial budget process, the Board would adopt a one-year budget and approve an additional forecast that serves as the tentative spending plan for the non-budget development year. This results in the first year's

appropriations being formally adopted by the Board, whereas the subsequent year's appropriations are not.

- The rolling biennial budget is updated annually as the just completed year rolls off and the new second year is added.
- One-year budget with time saving options - Under this option, the annual budget process would continue, but time savings alternatives would be incorporated.
- One-year budget, maintain status quo - This option would continue Valley Water's current budget process.

Considerations

Guiding State, District Act and Valley Water Policies - after reviewing the regulating guidelines and polices guiding Valley Water operations, staff concludes that an annual meeting with the board and related public hearings will still be necessary.

California Government Code (§ 65403) requires special districts to convene annually, soliciting stakeholder and public input for adoption of a five-year Capital Improvement Program (CIP). In considering a biennial budget, we would still have to convene annually on the CIP to meet this requirement.

The District Act, Section 20 and 26, requires the Board to convene annually and solicit public input in order to adopt a yearly budget and associated rates. In considering a biennial budget, we would still have to convene annually on the Operating Budget and Rates Setting to meet this requirement.

Additionally, in order to implement a traditional biennial budget process, the Board Governance Policies, Board Appointed Officers (BAO) Interpretations, and internal policies and procedures would require review and adjustments

Time Commitment and Costs vs. Benefits

Past experience brings insight: Valley Water previously utilized a traditional biennial budget from fiscal years 2001 to 2005 but ultimately reverted back to an annual budget. The number of budget adjustments that occurred, coupled with the updates necessary to implement second year projects, necessitated staff to undertake a process akin to what an annual budget process would entail with the second year. As such, the preparation of supplemental budget documents and budget adjustments replicated the amount of work required to deliver the annual budget in prosperous economic conditions, Valley Water's operating budget is relatively straight-forward; nonetheless, the organization is strongly capital project based, which requires forecasting assumptions be continuously monitored.

Budgetary Uncertainty: The current budgeting calendar assumes Valley Water begins the

Long-Term Forecast process, which guides the organization's high-level projections for ten years of project spending, in September of every fiscal year. The Operating and Capital budget process begins in December and concludes in June for the following fiscal year, which begins in July. Biennial Budgeting would involve working on the second year's budget in advance. In Valley Water's case, Budget staff would begin to put together budgets for the second fiscal year, of a two-year cycle, at least 20 months before the second fiscal year would start.

Long lead-times due to budgeting far in advance would most likely lead to dated assumptions unless a robust mid-cycle update were employed as under a traditional biennial budget, or unless a rolling biennial budget process, updated annually, is utilized. Biennial budgeting would imply a long-term, strategic, planning approach, requiring more effort in the development phase. When deteriorating economic or social conditions unfold, such as the most recent COVID pandemic, the approach to biennial budgeting should allow the budgeting process to remain dynamic and responsive to the needs of the organization as most recently demonstrated in during the FY 2020-21 Budget process.

Budget/Accounting Systems: Valley Water is currently using the Vena budgeting system on an annual basis. Vena was implemented in FY18 and continues to be refined. Financial information in Vena is currently synched with the accounting software by fiscal year. There will be costs associated with changes to the budgeting and accounting processes to accommodate a rolling biennial budget.

- Should the district adopt a rolling biennial budget, there would be significant implementation costs associated with Vena revisions, user training, and ERP integration, as well as ongoing expenditures related to system modifications
- Moving to a rolling biennial budget process would involve a rebuild of our project-based budgeting templates in both operating and capital
- The organization is currently in the process of transitioning to a new financial management solution / enterprise resource planning software and it's advisable to implement a full fiscal year budget before transitioning to biennial budgeting to ensure a successful transition

Staff Recommendation

Staff has examined the merits of adopting a biennial budget cycle to allow more flexibility and achieve the goal of long-term planning. There are benefits and drawbacks to both annual and biennial budget cycles. A biennial budget facilitates long-term planning, whereas an annual budget cycle is more responsive to short term changes in economic conditions.

Staff recommends implementing a rolling biennial budget process to be updated annually, which is aligned with the guiding State, District Act and Valley Water Policies, and is conducive to long-term

planning while remaining responsive to the dynamic and ever-changing needs of the organization. Staff recommends implementing a rolling biennial budget process after completion of the Infor Enterprise Resource Planning system implementation and demonstrated ERP system stability.

Title 7 of the California Government Code § 65403
<https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=GOV&sectionNum=65403>
[2] "District Act". Santa Clara Valley Water District. Accessed February 2018.
<https://www.valleywater.org/sites/default/files/Santa%20Clara%20Valley%20Water%20District%20-%20District%20Act.pdf>

FINANCIAL IMPACT:
The Valley Water budget and accounting processes may be adjusted as appropriate to accommodate direction of the Board as a result of this discussion. Should the Board direct staff to implement a rolling biennial budget model, there will be costs associated with budget system modifications, staff time, as well as time to train end users. Upon Board's direction, Staff will return at a later time to discuss these with a more detailed analysis.

CEQA:
The recommended action does not constitute a project because it does not have the potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: PowerPoint

UNCLASSIFIED MANAGER:
Darin Taylor, 408-630-3068

Current Budget Processes and Consideration of Biennial Budgeting

August 11, 2020

Valley Water

Agenda

- Definition of Biennial Budgeting
- Current Process
- Pros and Cons
- Biennial Budget Process
- Recommendation

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Biennial Budgeting

Should Valley Water prepare a budget every two years rather than every year?

Board Request: Staff to explore a Biennial Budget including potential benefits and drawbacks compared to current Annual Budget process

Biennial Budget Definition:

- The practice of preparing and adopting budgets for two-year periods
- Central rationale: would improve efficiency of budget process
- Assumes annual budget process is time-consuming
- Could reduce budget process repetition and free time for other activities

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Operating and Capital Budget Process Options

There are several options depending on the objective

A. Traditional biennial budget with mid-cycle update

B. Rolling biennial budget updated annually

C. One-year budget with time saving options

D. One-year budget, maintain status quo

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Valley Water Budget Process Overview

Operating Budget, Capital Budget, and Rates are approved on an annual basis

Timeframe of current budget process includes these Board contributions:

Dec	Board Budget Update
Dec	Preliminary CIP to Committee
Jan	Preliminary CIP to BOD
Feb	First Pass Budget Update presented to BOD
Feb	Draft CIP to BOD
Mar	Preliminary Budget to BOD (Second Pass)
Apr	Board Workshop on Proposed Budget and Rates
May	Board Approval of: – Operating and Capital Budget – Groundwater Production Charges (rates) – 5 Year CIP

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Valley Water Budget Process Overview

Government Code and District Act require annual Board actions

Guiding State, District Act and Valley Water Policies

- California Government Code (§ 65403) – Requires special districts to convene annually, soliciting stakeholder and public input for adoption of a five-year CIP
- The District Act, Section 20 and 26 – Requires Board to convene annually and solicit public input to adopt budget and water rates
- Valley Water Governance policies – May require review and adjustment to incorporate biennial budget

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Pros and Cons Analysis – Annual vs Biennial

No clear advantage either way

	Annual Budget	Biennial Budget
Pros	• Budgeting is habitually an annual process • Organization is familiar with annual budget process • Ability to quickly address changes in economic cycles, such as revisions to revenue	• Reduction in number of Board presentations • Improve efficiency of budget process and reduce repetition of Board presentations • Flexibility and time to focus on other responsibilities, such as priority setting • Conducive to long-term planning
Cons	• Short-term planning • Frequent meetings and time commitment of the Board	• Dated assumptions and increase of uncertainty • Adjusting to rapidly changing budgetary and economic conditions becomes more difficult

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Biennial Process Comparison – Water Agencies

Processes vary across agencies to best serve budgeting needs

Valley Water	East Bay Municipal Water District	Metropolitan Water District of Southern California	Contra Costa Water District
• Adopts Operating and Capital Budgets each year • Adopts Rates annually • Multi-Fund • FY21 budget totals $610 million	• Adopts Operating and Capital Budgets in the same year Biennially • Adopts Rates Biennially • Two funds • FY21 budget totals $1,036 million	• Adopts Operating and Capital Budgets in the same year Biennially • Adopts Rates annually • Multi-Fund • FY21 budget totals $1,936 million	• Alternates adoption of Operating and Capital Budgets each year • Adopts Rates annually • Single fund • FY21 budget totals $200 million

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Transitioning to a Biennial Budget Process

Possible, at appropriate time, with investment of time and resources

- Implies long-term, strategic planning approach requiring more upfront effort
  - Biennial budgeting should allow flexibility to respond to uncertainty in dynamic economic environments

- Budget System Impact
  - Significant implementation cost to modify Vena budget system
  - Significant effort to integrate with ERP system
    - Finance resources currently devoted to ERP implementation
  - Most efficient to modify Vena budget system upon completion of Infor ERP implementation
    - Not efficient to modify Vena budget system now and integrate with Peoplesoft

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Potential Time Savings Considerations

Additional budget solutions to consider

1) Move majority of budget process to a committee level

2) Increase CEO, CFO, Budget office approval limit for appropriation adjustments to reduce number of meetings to accommodate budget changes

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Staff Recommendation

Pursue a rolling biennial budget process

- Implement rolling biennial budget, updated annually, with the following considerations:
  - After Infor ERP system go-live and demonstrated stability
  - Consider budget review at committee level
  - Consider increasing budget adjustment approval limits

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QUESTIONS

Santa Clara Valley Water District

File No.: 20-0636

Agenda Date: 8/11/2020
Item No.: 4.2.

BOARD AGENDA MEMORANDUM

SUBJECT:
Approve Amendment No. 3 to Agreement No. A4071A with TAP International, Inc. for Board Independent Auditing Services Increasing the Not-to-Exceed Fee by $250,000, for a Total Revised Fee of $1,255,000.

RECOMMENDATION:
Approve Amendment No. 3 to Agreement No. A4071A with TAP International, Inc. for Board Independent Auditing Services, increasing the not-to-exceed Fee by $250,000, for a revised total fee of $1,255,000.

SUMMARY:
On May 23, 2017, the Board approved an on-call consultant agreement with TAP International, Inc. (TAP International) for Board Independent Auditing Services. The agreement requires TAP International to work with the Board and the Board Audit Committee (BAC) to develop an annual audit program, assess operational risks, advise on potential audits to ensure Santa Clara Valley Water District (Valley Water) is in full compliance with its policies, procedures, and regulations, and conduct audits as directed by the Board and BAC.

On September 26, 2018, TAP International presented the final Risk Assessment Model to the BAC assessing operational risks to Valley Water. The Risk Assessment Model developed heat maps of Valley Water operational areas based on risk impact (low, moderate, and high risk). The results of the risk assessment include input from Valley Water's Board of Directors, management, and staff and would be used to assist in the development of an Annual Audit Work Plan. The highest risk areas include procurement, contract change order management, succession planning, and fraud prevention.

On December 3, 2018, TAP International presented a draft Audit Work Plan to the BAC. The draft Audit Work Plan identified 41 potential audits to conduct, ranked by highest risk, based on the results of the risk assessment previously conducted by Valley Water's independent auditor, Board of Directors, and management and staff. The BAC reviewed the draft Audit Work Plan and on January 22, 2019, identified and recommended three audits for the full Board's input and approval. These audits include a performance audit of Contract Change Order Management, the District Counsel's Office, and Real Estate Services.

On February 26, 2019, the Board approved the BAC's recommendation for TAP to conduct three performance audits and to direct staff amend the agreement to increase the not-to-exceed amount from $405,000 to $1,005,000 to complete all three proposed audits and approximately three additional future audits. The three audits include performance audits of the District Counsel's office, Contract Change Order Management processes, and Real Estate Services.

On June 7, 2019, Amendment No. 1 to the Board independent auditing services agreement was fully executed to increase the not-to-exceed amount from $405,000 to $1,005,000 to complete all three proposed audits and approximately three additional future audits.

Derived from the 41 potential audits identified in the Risk Assessment, the FY 2019-2021 Annual Audit Work Plan outlined 16 audits to be conducted. On June 25, 2019, the Board approved the Annual Audit Work Plan for FY 2019 through FY 2021. On January 14, 2020, the Board approved the revised FY 2019-2021 Annual Audit Work Plan as recommended by the BAC. This Board-approved Annual Audit Work Plan extends the original scope of 16 audits to include: Grant Management Adhoc Desk Review; Hiring Practices Adhoc Desk Review; Board Agenda Preparation Adhoc Desk Review; and the Property Management Audit for implementing encroachment licensing program practices. The extended scope under the FY 2019-2021 Annual Audit Work Plan does not alter the scope of Amendment No. 1 to the Agreement (A4071A) with TAP.

Amendment No. 1 with TAP International was set to expire on May 8, 2020. At the February 19, 2020, Board Audit Committee meeting, the Board Audit Committee discussed the option to extend, terminate, or allow the expiration of the contract for Board Independent Auditing Services with TAP International. On April 28, 2020, the full Board approved the Board Audit Committee's recommendation for an amendment (Amendment No. 2) to extend the Board Independent Auditing Services Agreement (Agreement No. A4071A) with TAP International to June 30, 2021. To provide the time extension for Amendment No. 2 and any future Board-approved audits related to this agreement, on April 28, 2020, the Board approved staff's recommendation to delegate the CEO authority to execute the time extension of the on-call consultant agreement with TAP International (Agreement A4071A).

On July 15, 2020, the Board Audit Committee discussed the option to increase the Board Independent Auditing Services Agreement Not-To-Exceed Amount. The Board Audit Committee recommends the full Board to approve an amendment (Amendment No. 3) to exercise the option to increase the Board Independent Auditing Services Agreement not-to-exceed amount by $250,000 from $1,005,000 to $1,255,000. All future audits related to this agreement will be approved by the Board before initiation.

FINANCIAL IMPACT:
Amendment No. 3 to Agreement No. A4071A with TAP International for Board Independent Auditing Services would increase the Board Independent Auditing Services Agreement not-to-exceed amount by $250,000 from $1,005,000 to $1,255,000. There are adequate funds in the Office of Chief Financial Officer's Board-adopted FY 2020-2021 budget, Project 60131014, Continual Improvement.

CEQA:
The recommended actions do not constitute a project under California Environmental Quality Act (CEQA) because it does not have a potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: Amendment No. 3

UNCLASSIFIED MANAGER:
Darin Taylor, 408-630-3068

AMENDMENT NO. 3 TO AGREEMENT A4071A
BETWEEN THE SANTA CLARA VALLEY WATER DISTRICT
AND TAP INTERNATIONAL, INC.

This Amendment No. 3 (Amendment), effective as of the date it is fully executed by the Parties, amends the terms and conditions of the Standard On-Call Consultant Agreement A4071A (Agreement) dated May 23, 2017 as amended by Amendment No. 1 dated June 7, 2019, Amendment No. 2 dated April 28, 2020 between SANTA CLARA VALLEY WATER DISTRICT hereinafter called (District) and TAP INTERNATIONAL, INC. (Consultant), collectively, the Parties.

RECITALS

WHEREAS, Consultant is currently performing Board independent audit and advisory services to the Board Audit Committee (BAC) under direction of the Board; and

WHEREAS, on May 23, 2017, the BAC recommended the Board to approve the implementation of three performance audits to be conducted by an on-call consultant agreement to perform Board Independent Auditing Services; and

WHEREAS, the Consultant was required to develop an annual audit work plan, assess operational risks, advise on potential audits to ensure the District is in full compliance with its policies, procedures, and regulations, and conducts audits as directed by the Board; and

WHEREAS, on September 26, 2018, the Consultant presented the final Risk Assessment Model to the BAC assessing operational risks to the District. The results of the risk assessment included input from the District's Board of Directors, management, and staff and was used to assist in the development of an Annual Audit Work Plan; and

WHEREAS, on December 3, 2018, the Consultant presented a draft Audit Work Plan to the BAC. The BAC reviewed the draft Audit Work Plan and on January 22, 2019, identified and recommended three audits for the full Board's input and approval; and

WHEREAS, on January 14, 2020, the Board approved the revised FY 2019-2021 Annual Audit Work Plan as recommended by the BAC. This Board-approved Annual Audit Work Plan extends the original scope of 16 audits to include: Grant Management Adhoc Desk Review; Hiring Practices Adhoc Desk Review; Board Agenda Preparation Adhoc Desk Review; and the Property Management Audit for implementing encroachment licensing program practices; and

WHEREAS, on April 28, 2020, the full Board approved the Board Audit Committee's recommendation for an amendment (Amendment No. 2) to extend the Board Independent Auditing Services Agreement (Agreement No. A4071A) with TAP International to June 30, 2021; and

WHEREAS, the Parties desire to increase the funding of the agreement to allow the Consultant to continue the performance audits as identified in the annual audit workplan by the Board of Directors.

AMENDMENT NO. 3 TO AGREEMENT A4071A
BETWEEN THE SANTA CLARA VALLEY WATER DISTRICT
AND TAP INTERNATIONAL, INC.

NOW, THEREFORE, in consideration of the mutual promises and agreements stated herein and notwithstanding anything to the contrary in the Agreement and Amendment No. 1 and Amendment No. 2, District and the Consultant hereby agree to amend the Agreement as follows:

1. STANDARD ON-CALL CONSULTANT AGREEMENT, SECTION TWELVE, MISCELLANEOUS PROVISIONS, subsection 20. Appendices. is amended to state as follows:

   "The Revised Standard On-Call Consulting Agreement, and the following listed Appendices are incorporated herein by this reference as though set forth in full:

   Revised Appendix One to the Revised Standard On-Call Consultant Agreement - Additional Legal Terms (UNCHANGED)
   Revised Appendix Two to the Revised Standard On-Call Consultant Agreement - Dispute Resolution (UNCHANGED)
   Revised Appendix Three to the Revised Standard On-Call Consultant Agreement - Task Order Template (UNCHANGED)
   Revised Appendix Four to the Revised Standard On-Call Consultant Agreement - Insurance Requirements (REVISED)"

2. STANDARD ON-CALL CONSULTANT AGREEMENT, SECTION TWELVE, MISCELLANEOUS PROVISIONS, subsection 21. Scope of Services and Attachments. is amended to state as follows:

   "Revised Schedule OC, Scope of Services, and the following listed Attachments are incorporated herein by this reference as though set forth in full:

   Revised Attachment One to the Revised Scope of Services - Fees and Payments (REVISED)
   Revised Attachment Two to the Revised Scope of Services - Schedule of Completion (UNCHANGED)
   Revised Attachment Three to the Revised Scope of Services - Consultant's Key Staff and Subconsultants (UNCHANGED)
   Attachment Four to the Revised Scope of Services - Reference Materials (UNCHANGED)"

3. New paragraph number 22 is added to Section Twelve (Miscellaneous Provisions) of the Agreement:

   "22. No Third-Party Beneficiaries

   Nothing in this Agreement, whether express or implied, shall be construed to give any person or entity, other than the Parties hereto, any legal or equitable right, remedy, or claim under or in respect of this Agreement or any covenants, conditions, or provisions contained herein."

4. New paragraph number 23 is added to Section Twelve (Miscellaneous Provisions) of the Agreement:

   "**23. Severability**

   If a court of competent jurisdiction holds any provision of this Agreement to be illegal, unenforceable, or invalid in whole or in part for any reason, the validity and enforceability of the remaining provisions, or portions of them, will not be affected, unless an essential purpose of this Agreement would be defeated by the loss of the illegal, unenforceable, or invalid provision."

5. New paragraph number 24 is added to Section Twelve (Miscellaneous Provisions) of the Agreement:

   "**24. Debt Limitation**

   This Agreement is contingent on the appropriation of sufficient funding by District for the services described in this Agreement. Valley Water is subject to laws or policies which limit its ability to incur debt in future years. Nothing in this Agreement shall constitute an obligation of future legislative bodies of District to appropriate funds for purposes of this Agreement."

6. Appendix Four to the Standard Consultant Agreement, Insurance Requirements, is modified to read in its entirety as set forth in the attached Revised Appendix Four, Insurance Requirements.

7. Attachment One to the Scope of Services, Fees and Payments, is amended as set forth in the attached Revised Attachment One, Fees and Payments, and is incorporated herein by this reference.

8. All other terms and conditions stated in Agreement A4071A, Amendment No. 1, and Amendment No. 2 not otherwise amended as stated herein, remain in full force and effect.

(SIGNATURES FOLLOW ON NEXT PAGE)

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AMENDMENT NO. 3 TO AGREEMENT A4071A
BETWEEN THE SANTA CLARA VALLEY WATER DISTRICT
AND TAP INTERNATIONAL, INC.

IN WITNESS WHEREOF, THE PARTIES HAVE SET FORTH BELOW THEIR CONSENT TO THE TERMS AND CONDITIONS OF THIS AMENDMENT NO. 3 TO AGREEMENT A4071A THROUGH THE SIGNATURES OF THEIR DULY AUTHORIZED REPRESENTATIVES.

SANTA CLARA VALLEY WATER DISTRICT
District

By: _____
Nai Hsueh
Chair, Board of Directors

Date: _____

ATTEST:

_____
Michele L. King, CMC
Clerk, Board of Directors

TAP INTERNATIONAL, INC.
Consultant

By: _____
Denise Callahan, MPA
Principal

Date: 7/25/2020

Firm Address:
3436 American River Drive, Suite 9A
Sacramento, CA 95864

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AMENDMENT NO. 3 TO AGREEMENT A4071A
REVISED APPENDIX FOUR
INSURANCE REQUIREMENTS

Please Note: Failure to comply with the instructions below could result in a delay in receiving the Notice to Proceed. The District will not be responsible for time lost or costs incurred due to failure to comply with these requirements. Please note the check-list of documents needed at the end of this Revised Appendix IV insurance requirement.

Without limiting the Consultant's indemnification of, or liability to, the Santa Clara Valley Water District ("District"), the Consultant must provide and maintain at its own expense, during the term of this Agreement, or as may be further required herein, the following insurance coverages and provisions as listed below.

Consultant must provide its insurance broker(s)/agent(s) with a copy of these requirements and warrants that these requirements have been reviewed by Consultant's insurance agent(s) and/or broker(s), who have been instructed by Consultant to procure the insurance coverage required herein.

In addition to certificates, Consultant must furnish District with copies of all original endorsements affecting coverage required by this Appendix. The certificates and endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. **All endorsements and certificates are to be received and approved by District before the Agreement is executed**. In the event of a claim or dispute, District has the right to require Consultant's insurer to provide complete, certified copies of all required pertinent insurance policies, including endorsements affecting the coverage required by this Appendix insurance document.

If your insurance broker has any questions about the above requirements, please advise him/her to call Mr. David Cahen, District Risk Manager at (408) 630-2213.

Certificates of Insurance

Consultant shall furnish the District with a Certificate of Insurance. The certificates will be issued on a standard ACORD Form.

Consultant shall instruct their insurance broker/agent to submit all insurance certificates and required notices electronically in PDF format to the designated District Contract Administrator and email a copy to valleywater@ebix.com.

The certificates will:

1. Identify the underwriters, the types of insurance, the insurance limits, the deductibles and the policy term;
2. Include copies of all the actual policy endorsements required herein; and
3. In the "Certificate Holder" box include:

   Santa Clara Valley Water District
   5750 Almaden Expressway
   San Jose, CA 95118
   Agreement A4071A / CAS No. 4757

AMENDMENT NO. 3 TO AGREEMENT A4071A
REVISED APPENDIX FOUR
INSURANCE REQUIREMENTS

IMPORTANT: The agreement or CAS number must be included.

In the Description of Operations/Locations/Vehicles/Special Items Box:

1. Certificate Holder shall be named as Additional Insured;
2. District agreement or project number shall appear;
3. The list of policies scheduled as underlying on the Umbrella policy shall be listed; and
4. Waiver of Subrogation must be indicated as endorsed to all policies.

If Consultant receives any notice that any of the insurance policies required by this Revised Appendix IV Insurance may be cancelled or coverage reduced for any reason whatsoever, Consultant or insurer shall immediately provide written notice to the designated District Contract Administrator that such insurance policy required by this Appendix IV Insurance is canceled or coverage is reduced.

Maintenance of Insurance

If Consultant fails to maintain such insurance as is called for herein, District, at its option, may suspend payment for work performed and/or may order Consultant to suspend all Consultant's work at Consultant's expense until a new policy of insurance is in effect.

Renewal of Insurance

Consultant will provide the District with a current Certificate of Insurance and endorsements within thirty (30) business days from the expiration of insurance.

Consultant shall instruct its insurance broker/agent to:

1. Submit all renewals of insurance certificates and required notices electronically in PDF format to: valleywater@ebix.com

2. Provide the following information in the "Certificate Holder" box:

   Santa Clara Valley Water District
   5750 Almaden Expressway
   San Jose, CA 95118
   Agreement A4071A / CAS No. 4757

IMPORTANT: The agreement or CAS number must be included.
Consultant must, at its sole cost and expense, procure and maintain during the entire period of this Agreement the following insurance coverage(s).

AMENDMENT NO. 3 TO AGREEMENT A4071A
REVISED APPENDIX FOUR
INSURANCE REQUIREMENTS

Required Coverages

1. **Commercial General/Business Liability Insurance** with coverage as indicated:

   $1,000,000 per occurrence / **$1,000,000** aggregate limits for bodily injury and property damage

   General Liability insurance must include:

   a. Coverage at least as broad as found in standard ISO form CG 00 01.
   b. Contractual Liability expressly including liability assumed under this contract.
   c. If Consultant must be working within fifty (50) feet of a railroad or light rail operation, any exclusion as to performance of operations within the vicinity of any railroad bridge, trestle, track, roadbed, tunnel, overpass, underpass, or crossway must be deleted, or a railroad protective policy in the above amounts provided.
   d. Severability of Interest.
   e. Broad Form Property Damage liability.

2. **Business Auto Liability Insurance** with coverage as indicated:

   $1,000,000 combined single limit for bodily injury and property damage per occurrence, covering all owned, non-owned and hired vehicles.

3. **Professional/Errors and Omissions Liability** with coverage as indicated:

   $1,000,000 per claim/ **$1,000,000** aggregate

   Professional/Errors and Omission Liability appropriate to the Consultant's profession, and must include:

   a. If coverage contains a deductible, or self-insured retention, it shall not be greater than one hundred thousand dollars ($100,000) per occurrence/event.
   b. Coverage shall include contractual liability
   c. If coverage is claims-made:

      i. Certificate of Insurance shall clearly state that the coverage is claims-made.
      ii. Policy retroactive date must coincide with or precede the Consultant's start of work (including subsequent policies purchased as renewals or replacements).
      iii. Policy must allow for reporting of circumstances or incidents that might give rise to future claims.
      iv. Insurance must be maintained and evidence of insurance must be provided for at least three (3) years after completion of the contract of work.

4. Workers' Compensation and Employer's Liability Insurance

Statutory California Workers' Compensation coverage covering all work to be performed for the District.

Employer Liability coverage for not less than $1,000,000 per occurrence.

General Requirements

With respect to all coverages noted above, the following additional requirements apply:

1. **Additional Insured Endorsement(s):** Consultant must provide an additional insured endorsement for Commercial General/Business Liability (for both on-going and completed operations) and Business Automobile liability coverage naming the **Santa Clara Valley Water District, its Directors, officers, employees, and agents, individually and collectively,** as additional insureds, and must provide coverage for acts, omissions, etc. arising out of the named insureds' activities and work. Other public entities may also be added to the additional insured endorsement as applicable and the Consultant will be notified of such requirement(s) by the District. **NOTE:** This section does not apply to the Workers' Compensation and Professional Liability policies.

   (**NOTE:** Additional insured language on the Certificate of Insurance is **NOT** acceptable without a separate endorsement such as Form CG 20 10, CG 2033, CG 2037, or CG 2038. Editions dated 07/04 are not acceptable.)

2. **Primacy Clause:** Consultant will provide evidence (either through the Certificate of Insurance, endorsement or language in the insurance contract) that consultant's insurance is primary with respect to any other insurance which may be carried by the District, its Directors, its officers, agents and employees, and the District's coverage must not be called upon to contribute or share in the loss. **NOTE:** This section does not apply to the Workers' Compensation policies.

3. **Cancellation Clause**: Consultant will provide endorsements for all policies stating that the policy will not be cancelled without 30 days prior notification to the District.

4. **Acceptability of Insurers:** All coverages must be issued by companies admitted to conduct business in the State of California, which hold a current policy holder's alphabetic and financial size category rating of not less than A- V, according to the current Best's Key Rating Guide or a company of equal financial stability that is approved by the District's Risk Manager. Non-Admitted companies may be substituted on a very limited basis at the Risk Manager's sole discretion.

5. **Self-Insured Retentions or Deductibles:** Any deductibles or self-insured retentions must be declared to and approved by the District. At the option of the District, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the District, its officers, officials, employees and volunteers; or the Consultant shall provide a financial guarantee satisfactory to the Entity guaranteeing payment of losses and related investigations, claim administration, and defense expenses. Consultant agrees that in the event of a claim they will pay down any agreed upon SIR in a prompt manner as soon as bills are incurred in order to trigger the insurance related to the SIR.

6. **Subconsultants:** The Consultant shall secure and maintain or shall be responsible for ensuring that all subconsultants performing the Contract Services secure and maintain all insurance coverages appropriate to their tier and scope of work in a form and from insurance companies reasonably acceptable to the District.

7. **Amount of Liability not Limited to Amount of Insurance:** The insurance procured by Consultant for the benefit of the District must not be deemed to release or limit any liability of Consultant. Damages recoverable by the District for any liability of Consultant must, in any event, not be limited by the amount of the required insurance coverage.

8. **Coverage to be Occurrence Based:** Except for Professional Liability, all coverage must be occurrence-based coverage. Claims-made coverage is not allowed.

9. **Waiver of Subrogation:** Consultant agrees to waive subrogation against the District to the extent any loss suffered by Consultant is covered by any Commercial General Liability policy, Automobile policy, Workers' Compensation policy described in **Required Coverages** above. Consultant agrees to advise its broker/agent/insurer and agrees to provide evidence (either through the Certificate of Insurance, endorsement or language in the insurance contract) that subrogation has been waived by its insurer.

10. **Non-compliance:** The District reserves the right to withhold payments to the Consultant in the event of material noncompliance with the insurance requirements outlined above.

AMENDMENT NO. 3 TO AGREEMENT A4071A
REVISED APPENDIX FOUR
INSURANCE REQUIREMENTS

CHECK LIST OF DOCUMENTS NEEDED

General Liability:	A.	Limits **($1,000,000)**	
	B.	Additional Insured (Endorsement)	
	C.	Waiver of Subrogation (COI, Endorsement or policy language)	
	D.	Primacy (COI, Endorsement or policy language)	
	E.	Cancellation Endorsement	

Auto Liability:	A.	Limits **($1,000,000)**	
	B.	Additional Insured (Endorsement)	
	C.	Waiver of Subrogation (COI, Endorsement or policy language)	
	D.	Primacy (COI, Endorsement or policy language)	
	E.	Cancellation Endorsement	

Umbrella:	A.	Limits ($)	
	B.	Primacy (Endorsement or policy language)	

Workers Comp:	A.	Limits **($1,000,000)**	
	B.	Waiver of Subrogation (Endorsement or policy language)	
	C.	Cancellation Endorsement	

Professional Liability:	A.	Limits **($1,000,000)**	
	B.	Cancellation Endorsement	

Appendix IV ConsultantGL1AL1PL1_rev. 5/11/20

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AMENDMENT NO. 3 TO AGREEMENT A4071A
REVISED SCHEDULE OC
REVISED ATTACHMENT ONE
FEES AND PAYMENTS

1. Total Authorized Funding (REVISED)

Total payment for Services performed, as described in the Revised Scope of Services and in all executed Task Orders will not exceed a total amount of **$1,255,000** (Not-to-Exceed Fees or NTE). Under no conditions will the total compensation to the Consultant exceed this payment amount without prior written approval in the form of an amendment to this Agreement executed by the District's Board of Directors (Board), or Chief Executive Officer, or designee, as authorized by the Board. It is understood and agreed that this total is an estimate, and the total amount of Services to be requested by the District may be less. There is no guarantee, either expressed or implied, as to the actual dollar amount that will be authorized pursuant to this Agreement.

2. Terms and Conditions (UNCHANGED)

Payments for services performed, as defined in this attached Schedule and in each Task Order, which applies to the specific Services, will be based on the following terms:

A. The District will pay for Services provided by the Consultant according to the schedule of rates for professional, technical, and administrative personnel as well as materials and supplies listed below in the Hourly Rate Schedule.

B. The stated hourly and unit rates are effective for the term of this Agreement unless otherwise revised as indicated. After 12 months from the Effective Date of this Agreement, and each 12 months thereafter, these hourly and unit rates may be negotiated by the Consultant and the District, provided Consultant submits written notice to District of Consultant's request to revise the hourly and unit rates ninety (90) calendar days prior to the Effective Date of this Agreement. Both Parties will use as a benchmark for negotiations the percent change for the previous 12 months of the "Employment Cost Index (ECI), for total compensation for private industry workers, for the San Francisco-Oakland-San Jose, CA CSA Census region and metropolitan area (not seasonally adjusted)" as published by the U.S. Department of Labor, Bureau of Labor Statistics, or 2.6% whichever is less. A negative index will result in rates remaining the same. Such rate revisions are subject to written approval by the District's Project Manager stated herein.

AMENDMENT NO. 3 TO AGREEMENT A4071A
REVISED SCHEDULE OC
REVISED ATTACHMENT ONE
FEES AND PAYMENTS

HOURLY RATE SCHEDULE (UNCHANGED)

CLASSIFICATION	ORIGINAL AGREEMENTH OURLY/ UNIT RATE EFFECTIVE MAY 23, 2017	AMENDMENT NO. 1 HOURLY/ UNIT RATE EFFECTIVE MAY 8, 2019	AMENDMENT NO. 2 HOURLY/ UNIT RATE EFFECTIVE MAY 8, 2020	AMENDMENT NO. 3 HOURLY/ UNIT RATE
Consultant: TAP International, Inc.				
Lead Auditor	$190	$195	$200	-
Team Auditor	$175	$180	$185	-
Staff Auditor	$148	$152	$156	-
Advisory Services	$200	$205	$210	-
Quality Assurance Reviewer	$175	$180	$185	-

C. **Reimbursable Expenses (UNCHANGED)**

1. All reimbursable expenses not already covered in overhead may include, but are not limited to, mapping, rendering, printouts, leased equipment, mailing and delivery services, printing services, film and processing, plotting, and supplies. These other direct expenses will be billed on a monthly basis at actual cost, as approved by the District Project Manager, provided that the Agreement total NTE amount is not exceeded. Consultant shall provide receipts for each other direct expense item(s) with monthly invoices submitted.

2. Equipment purchased on behalf of the District that costs $50 or more must receive the prior written approval of the District Project Manager. All equipment purchased on behalf of the District and paid for the District shall become the property of the District and be delivered to District prior to expiration of this Agreement.

3. Automobile travel mileage expenses will be paid at the current IRS rate. District will not reimburse Consultant and its subconsultants for travel to and from District Headquarters and surrounding campus located at 5700 Almaden Expressway, San Jose, California. District will reimburse Consultant and its subsconsultants for mileage incurred from District Headquarters or Consultant's and subconsultants' firm address, whichever is closer to the destination, to project site and to meeting locations with regulatory agencies and community meetings, and partnering meetings, if directed or authorized by the District.

4. Travel expenses are reimbursed at actual costs. Travel and overnight accommodations, including per diem, required for performance of this Agreement will be paid at reasonable cost not to exceed the U.S. General Services Agency Per Diem Rates for Sunnyvale/Palo Alto/San Jose, California area, provided prior approval has been obtained from the District Project Manager. For air travel, District will pay the cost of a coach class or equivalent ticket. Where air travel is required, District will pay the total cost of taxi, rideshare, public transportation, or a rental car, which may include insurance, gas, car fee, and taxes and will be paid at the actual costs incurred. Vehicle rental is limited to a compact or economy model.

5. Expenses incurred by the Consultant for Subconsultants, subcontractors and vendors, including lab services, will be reimbursed at actual cost. Consultant shall provide invoices for all such services regardless of cost.

D. For staff with rates exceeding the rate of $210/hr., the Consultant shall obtain written approval from the District Project Manager as to the numbers of hours per task prior to that individual working on the Project.

E. **Prevailing Wage Requirements** – NOT USED

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Santa Clara Valley Water District

File No.: 20-0638

Agenda Date: 8/11/2020
Item No.: 4.3.

BOARD AGENDA MEMORANDUM

SUBJECT:
Approve Fiscal Year 2020-2021 Board Work Plan.

RECOMMENDATION:
A. Review and approve the Fiscal Year 2020-2021 Board Work Plan; and
B. Discuss outreach plans, and provide additional direction, if necessary, to staff on how the Plan should be distributed.

SUMMARY:
The attached Fiscal Year 2020-2021 Board Work Plan (Plan) (Attachment 1), is presented for Board review, approval, and direction on distribution.

Background

On February 18, 2020, with the assistance of facilitator Lawrence Grodeska, CEO of CivicMakers, the Board conducted its annual planning session to develop goals and strategies around areas needing the Board's focus, engagement and monitoring during the following fiscal year (FY21). During the Strategic Planning session, the Board reviewed the Fiscal Year 2019-2020 (FY20) Board Work Plan, participated in a facilitated discussion around the FY20 Board Work Plan and other major topics of concern, and identified key areas to include in the FY21 Board Work Plan.
During the strategic planning meeting the Board directed the Board Policy and Planning Committee, in collaboration with CivicMakers, to review the information collected and develop a draft FY21 Board Work Plan for Board review and approval.

The BPPC met in February and July 2020 to review and synthesize the information collected during the February 2020 strategic planning session, and with this item presents the final draft FY21 Board Work Plan for Board review and approval, and direction on its distribution.

FINANCIAL IMPACT:
There is no financial impact associated with this item.

CEQA:

The recommended action does not constitute a project under CEQA because it does not have the potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: FY21 Board Work Plan

UNCLASSIFIED MANAGER:
Michele King, 408-630-2711

Valley Water

FY 2020-21

Board Work Plan

DRAFT

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Valley Water

Message from the Valley Water Board Chair

At the Santa Clara Valley Water District (Valley Water), we manage a complex water resource system that provides clean, safe water, flood protection and stewardship of streams and creeks to nearly 2 million residents and businesses here in Santa Clara County.

As part of our annual strategic planning process, my fellow board members and I have identified specific areas that we will be monitoring closely and engaging as necessary. The specific areas identified during the strategic planning process are outlined in the FY21 Board Work Plan. In FY21 we will focus on new water storage opportunities as well as advancing major water supply facilities such as Anderson Dam and leading efforts in recycled and purified water. We will prioritize funding to protect and maintain our flood protection assets. In all focus areas we will continue to engage the community and not lose sight of our environmental stewardship goals such as a net positive impact on the environment. We will also address impacts of climate change on our work. As policy makers for Valley Water we will engage through board committees and full board discussion to monitor progress in the focus areas highlighted in this plan.

Early 2020 has brought about unprecedented and challenging times for everyone. We want to assure the community that my fellow board members and I remain committed through policymaking to ensuring Valley Water remains a high performing organization.

I look forward to reporting our progress and hope you find this document informative.

Nai Hsueh
Board Chair
Santa Clara Valley Water District

Valley Water

Founded in 1929, the Santa Clara Valley Water District (Valley Water) is the primary water resources agency for Santa Clara County, with key water supply, water quality, flood protection, and environmental stewardship responsibilities.

Valley Water Mission

Provide Silicon Valley safe, clean water for a healthy life, environment, and economy.

Values

1. Valley Water is entrusted to serve the public by carrying out its mission for the benefit of the community.
2. Valley Water is committed to providing excellent service to all customers.
3. All individuals are unique and important, and will be treated with fairness, dignity, and respect.
4. Valley Water takes pride in its work and is accountable to carry out its responsibilities safely with honesty and integrity.
5. Initiative, leadership, personal development, and training are vital for continuous improvement.
6. Open communication, cooperation, and teamwork are shared responsibilities and essential to the successful performance of Valley Water work.
7. Valley Water is committed to creating an inclusive work environment, which reflects and supports the diversity of the community and enriches our perspectives.
8. Valley Water strives to support a work culture and workplace environment that attracts and retains superior employees empowered to make decisions about, and take responsibility for, how they do their jobs.
9. Valley Water is committed to its employees and supports market-based competitive compensation that is equitable and rewards accomplishment and encourages high performance.
10. Valley Water is committed to sustaining a healthy work-life balance for its employees and places a high value on all the things that provide enrichment and fulfillment, including work and career, health and fitness, family and relationships, spirituality, community service, hobbies and passions, intellectual stimulation, rest and recreation.

Board of Directors

The Santa Clara Valley Water District Board of Directors (Board) is comprised of seven members, each elected from equally-divided districts. Specific job outputs of the Board include connecting with the community in Santa Clara County, developing policies to further Valley Water's mission, and monitoring the performance of the organization.

The Board governs with an emphasis on outward vision, encouragement of diversity in viewpoints, strategic leadership more than administrative detail, and proactivity rather than reactivity.

The Board meets twice a month on the second and fourth Tuesday. All meetings are open to the public and may be viewed online.

Left to right: Tony Estremera, District 6; Richard Santos, District 3; John L. Varela, District 1; Gary Kremen, District 7; Barbara Keegan, District 2; Nai Hsueh, District 5; Linda J. LeZotte, District 4

Board Committees

The Board of Directors has established Board Committees to assist in performing its job. Committees meet regularly and are comprised of three members of the Board. They are open to the public.

- Agricultural Water Advisory Committee
- Board Audit Committee
- Board Ethics and Conduct Commitee
- Board Policy and Planning Committee
- Capital Improvement Program Committee
- Diversity and Inclusion Ad Hoc Committee
- Environmental and Water Resources Committee
- Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) Committee
- Homeless Encampment Committee
- Joint Recycled Water Advisory Committee (City of Palo Alto, City of East Palo Alto, City of Mountain View and SCVWD)
- Joint Recycled Water Committee (City of Sunnyvale and SCVWD)
- Joint Recycled Water Policy Advisory Committee (City of San Jose/SCVWD/City of Santa Clara)
- Joint Water Resources Committee (City of Gilroy, City of Morgan Hill, and SCVWD)
- Recycled Water Committee
- San Felipe Division Reach One Committee
- Santa Clara Valley Water Commission
- Water Conservation and Demand Management Committee
- Water Storage Exploratory Committee
- Youth Commission

Purpose of the Board Work Plan

The primary purpose of the Board's FY2020-2021 Work Plan is to communicate with the public, community and stakeholders, the Board's strategic focus for the fiscal year and how it supports Valley Water's mission and long-term goals and objectives.

To perform its job, the Board established long-term goals and objectives (also known as Board Governance Policies – see Appendix A) for each of Valley Water's core business areas (Water Supply, Natural Flood Protection, and Environmental Stewardship). Annually, the Board conducts planning sessions to develop strategies to accomplish the goals and objectives.

As part of their annual strategic planning process, the Board evaluates their goals, strategies, challenges and opportunities and identifies the specific areas requiring engagement and monitoring for the upcoming fiscal year. The Board outlines their focus areas and processes for monitoring progress in the Board Work Plan.

Throughout the year, the Board reviews and provides input and direction on Valley Water's budget, Capital Improvement Program, and other program and master plans, to ensure there is funding and support to enable staff to accomplish Valley Water's mission.

All strategy implementation is monitored by the Board through Executive Limitation requirements (see Appendix A), staff development of programs and plans, assigned Board Committee work, and Board Appointed Officer performance evaluations.

Board Goals	FY 2020-21 Work Plan Strategies
Water Supply	• Actively Pursue New Water Storage Opportunities. • Actively Participate in decisions regarding the CA Delta Conveyance. • Lead Recycled and Purified Water Efforts with committed partners. • Engage and educate the community, elected officials and staff on future water supply strategies in Santa Clara County. • Advance Anderson Dam Seismic Retrofit Project.
Natural Flood Protection	• Protect and maintain existing assets and infrastructure. • Pursue opportunities to improve internal capacity to acquire regulatory permits.
Environmental Stewardship	• Attain net positive impact on the environment when implementing flood protection and water supply projects. • Promote the protection of creeks, bay, and other aquatic ecosystems from threats of pollution and degradation. • Continue the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE).
Business Management	• Advance diversity and inclusion. • Maintain appropriate staffing levels and expertise. • Provide affordable and cost-effective level of services.
Climate Change	• Address future impacts of climate change to Valley Water's mission and operations.

GOAL: WATER SUPPLY

Strategy 1	Actively Pursue New Water Storage Opportunities.
Challenge/ Opportunity	Water storage capacity is an important tool for Valley Water for capturing wet-year water for use during drier periods. Such storage aids water supply, flood protection, and recreational uses and helps regulate downstream water quality and supply cold water flows for fish. Storage is also an important tool for managing unpredictable hydrology due to climate change and sea level rise. As such, water storage is important for both human and environmental objectives and must fit within a large and diverse water and environmental portfolio. Challenges include determining the appropriate level of participation for Valley Water and prioritizing sites within funding limitations across all projects.
Focus	▪ Explore opportunities to develop new surface and groundwater storage projects that align with Valley Water's mission. Additionally, seek water exchange and transfer opportunities. ▪ Determine level of participation for projects and decisions about partnerships
Monitoring	Continue to monitor through the Water Storage Exploratory Committee and provide updates to Board as necessary.
Related Staff Plans	Water Supply Master Plan

GOAL: WATER SUPPY

Strategy 2	Actively Participate in decisions regarding the CA Delta Conveyance.
Challenge/ Opportunity	As much as 40 percent of the water Santa Clara County uses each year comes through the Delta. But the Delta's aging network of earthen levees faces risks from rising seas, earthquakes and flooding, while the declining conditions for fish and wildlife have led regulators to put more restrictions on when water can move through the Delta. Participation in modernizing the delta conveyance is necessary to protect water supply in Santa Clara County and better manage Delta diversions to protect fish and wildlife. Challenges include permitting difficulties, potential legal challenges, and uncertainty around the Bureau of Reclamation's participation.
Focus	• As a voice for Northern California, continue to engage, negotiate, and increase public education of the project through serving on the Delta Conveyance Design and Construction Authority and Finance Authority and Stakeholder Engagement Committee in adherence to Board approved Guiding Principles, to protect Santa Clara County's interests.
Monitoring	Continue to monitor and update the Board on the project and project funding requirements and governance related to the JPAs as well as additional agreements related to state water and federal water.
Related Staff Plans	Water Supply Master Plan

GOAL: WATER SUPPY

Strategy 3	Lead Recycled and Purified Water Efforts with committed partners.
Challenge/ Opportunity	Recycled and purified water continue to play a key role in the long-term sustainability of our county's water supplies. Identifying and working with the appropriate agencies within the county to negotiate and execute various Memoranda of Understanding to expand the use of non-potable and the production and use of advanced purified water is a high priority. Opportunities exist to expand Valley Water's Silicon Valley Advanced Water Purification Facility (AWPF) and/or build additional AWPFs throughout the County. However, challenges include resolving previously identified issues of land, securing contractual rights to treated wastewater, treated wastewater quality and declining flows at treatment plants, and reverse osmosis concentrate management.
Focus	• Develop a portfolio of advanced purified water and secure treated wastewater as identified in the Water Supply Master Plan. • Elevate discussion with San Jose from staff to elected official level and include City of Santa Clara and other wastewater agencies in order to reach a decision point on a project by mid-September 2020. • Present a water reuse roadmap that clarifies position on Indirect Potable Reuse (IPR) vs Direct Potable Reuse (DPR). • Develop plan for South County including a governance model.
Monitoring	Continue to monitor through the Recycled Water Committee and present regular updates and seek policy guidance from the Board as necessary.
Related Staff Plans	Water Supply Master Plan Countywide Water Reuse Master Plan

GOAL: WATER SUPPY

Strategy 4	Engage and educate the community, elected officials and staff on future water supply strategies in Santa Clara County.
Challenge/ Opportunity	A reliable supply of clean water is necessary for the social, economic, and environmental wellbeing of Santa Clara County. Valley Water's strategies for providing a reliable and sustainable water supply in a cost-effective manner are challenging. The challenges include the cost of water, the public perception of costs of different types of water, and how to effectively implement our water supply strategies into the future.
Focus	▪ Clarify strategies for outreach and education programs and efforts. ▪ Develop metrics to understand the ROI of outreach strategies, such as the annual favorability survey. ▪ Increase efforts to educate the public about the mix of different types of water in Valley Water's portfolio, including the Delta Conveyance, and associated current and projected costs.
Monitoring	Monitor progress through the Water Conservation and Demand Management Committee.
Related Staff Plans	Water Supply Master Plan Countywide Water Reuse Master Plan

GOAL: WATER SUPPY

Strategy 5	Advance Anderson Dam Seismic Retrofit Project.
Challenge/ Opportunity	As our largest reservoir, Anderson serves not just as a critical water supply facility, but also supports Valley Water's mission of flood protection and environmental stewardship. Given the reservoir's critical importance to ensuring safe, clean water for our communities and to protect public safety, it is imperative that the Anderson Dam Seismic Retrofit Project (ADSRP) move forward proactively.
Focus	• Progress all elements on the Federal Energy Regulatory Commission Order Compliance Project (FOCP) into design/construction • Begin construction of the Anderson Dam Tunnel Project (ADTP). • Continue to work with appropriate regulatory agencies to review and obtain approval for all project design plans on the ADSRP. • Release for review the Draft Environmental Report for the ADSRP. • Continue to inform the public and neighborhoods of the project progress and construction timeline. • Balance flood protection, water supply, and environmental flow requirements appropriately for annual operations prior to completion of the construction of ADSRP.
Monitoring	Monitor project progress through to the Capital Improvement Program Committee.
Related Staff Plans	• Safe, Clean Water and Natural Flood Protection Program • Fish Habitat Restoration Plan • Coyote Feasibility Study • Water Supply Master Plan

GOAL: NATURAL FLOOD PROTECTION

Strategy 1	Protect and maintain existing assets and infrastructure.
Challenge/ Opportunity	Maintenance of Valley Water's flood protection infrastructure is crucial to ensuring continued protection of our communities; and ensuring the significant local, state, and federal investments in flood protection continue to provide benefits. Timely maintenance is the most cost-effective investment for flood protection, and deferred maintenance disproportionately increases costs. In addition, aging assets are reaching the end of the design life and will require major recapitalization.
Focus	• Prioritize funding for maintenance activities to ensure the most cost-effective flood protection investment. • Develop asset management approach to plan for major asset recapitalization. • Develop program to plan for multi-benefit opportunities when major maintenance work is required.
Monitoring	Provide periodic updates to the Board Planning and Policy Committee.
Related Staff Plans	Five-year Operations and Maintenance Plan Watershed Asset Management Plan Safe, Clean Water and Natural Flood Protection Program

GOAL: NATURAL FLOOD PROTECTION

Strategy 2	Pursue opportunities to improve internal capacity to acquire regulatory permits.
Challenge/ Opportunity	Valley Water continues to pursue legislative and administrative solutions to resolve regulatory and permitting issues at the federal and state levels. However, recognizing the limits of Valley Water's ability to change permitting processes, FY21 efforts will focus on improving internal capacity for applying for permits including centralizing permitting efforts, as well as building trust with regulatory agencies and staying current with the regulatory environment.
Focus	• Provide for Watershed-Wide regulatory planning and permitting effort and pursue other efforts at the state and federal level to expedite permit review. • Centralize permitting efforts amongst Valley Water staff to improve efficiency of applications and build closer relationships with regulatory agencies. • Build closer relationships with regulatory agencies and open dialogue with the environmental community.
Monitoring	Provide regular project updates to the Board Policy and Planning Committee.
Related Staff Plans	One Water Plan

GOAL: ENVIRONMENTAL STEWARDSHIP

Strategy 1	**Attain net positive impact on the environment when implementing flood protection and water supply projects.**
Challenge/ Opportunity	Valley Water's projects and programs encourage integrated planning to ensure capital improvements, operations, and maintenance activities are balanced with environmental stewardship goals. Valley Water strives to protect and restore habitats to support native species throughout the County.
Focus	▪ As part of the One Water planning process, develop an integrated water resource plan for each watershed, including appropriate metrics to monitor Valley Water's impacts on and benefit to the environment. ▪ Ensure that stewardship efforts are integrated and not focused primarily on mitigation. ▪ Seek input from a wide range of communities including tribal voices, disadvantaged communities, regulators, and the environmental community, whenever possible. ▪ Revisit Ends Policy 4 in light of climate change, trails, open space, stewardship, etc.
Monitoring	Revisions to policies to be reviewed by the Board Policy and Planning Committee. Provide regular project updates to the Board on One Water's Watershed Plans.
Related Staff Plans	One Water Plan Climate Change Action Plan

GOAL: ENVIRONMENTAL STEWARDSHIP

Strategy 2	**Promote the protection of creeks, bay, and other aquatic ecosystems from threats of pollution and degradation.**
Challenge/ Opportunity	Valley Water continues to coordinate with local cities and agencies to improve the health of our local waterways, including pollution prevention and addressing threats to water quality. Opportunities exist to further collaborate with the county and cities to improve surface water quality on issues such as: encampment abatement efforts, long-term solutions for homelessness, and non-point source pollution.
Focus	• Continue efforts to protect the ecosystem and water quality of our waterbodies, the integrity of our infrastructure, and ensure our employees have a safe work environment. Such efforts include preventing stormwater pollution, increased implementation of green stormwater infrastructure, addressing mercury pollution, and homeless encampment clean ups. • Continue partnerships and investments on a regional scale such as the South Bay Salt Pond Restoration and Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP).
Monitoring	Provide regular updates to the Board. Provide updates to the Homeless Encampment Committee on strategies to address homeless encampments.
Related Staff Plans	One Water Plan Santa Clara Valley Urban Runoff Pollution Prevention Program Stormwater Resource Plan Safe, Clean Water and Natural Flood Protection Program

GOAL: ENVIRONMENTAL STEWARDSHIP

Strategy 3	Continue the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE)
Challenge/ Opportunity	Valley Water has been working to resolve a water rights complaint surrounding fish, wildlife, water quality, and other beneficial uses in Coyote Creek, the Guadalupe River, and Stevens Creek. Challenges include: obtaining federal and state permits from multiple regulatory agencies, refining and processing water rights change petitions, the technical complexity of the fisheries impacts analysis, and managing stakeholder expectations.
Focus	• Expedite early implementation of feasibility studies, monitoring activities, and planning and construction of various fish passage improvements. • Integrate with Anderson Dam Seismic Retrofit Project, Coyote Creek, and other new projects. • Continue FAHCE effort on remaining two creeks: Guadalupe River and Stevens Creek. • Develop Adaptive Management Plan to encompass all three creeks.
Monitoring	Continue to monitor through the FAHCE Committee and provide updates to Board.
Related Staff Plans	Fish Habitat Restoration Plan One Water Plan Coyote Feasibility Study

GOAL: BUSINESS MANAGEMENT

Strategy 1	Advance diversity and inclusion.
Challenge/ Opportunity	The Board is committed to providing a work environment that is diverse, inclusive, free of discrimination and harassment, and provides equal opportunity employment. This includes both internal policies as well as improving access to opportunities at Valley Water by broadening recruitment efforts with a wide range of partners.
Focus	• Continue research on best practices to understand the changing landscape of diversity and inclusion to identify where continued investment is necessary. • Develop Board's vision for Valley Water as a diverse and inclusive organization.
Monitoring	Provide regular updates to Diversity & Inclusion Ad Hoc Committee and the full Board.
Related Staff Plans	Racial Equity, Diversity & Inclusion Master Plan (under development)

GOAL: BUSINESS MANAGEMENT

Strategy 2	Maintain appropriate staffing levels and expertise.
Challenge/ Opportunity	The Board recognizes that Valley Water's workforce is the critical component to accomplishing its mission and all the goals and strategies in this work plan. As such, the Board is very committed to ensuring that staff are able to recruit capable employees with knowledge and subject-matter expertise, and provide training to meet changing skills and capacity needs. Challenges include a high vacancy rate and limited number of recruiters, difficulties in prioritizing training aside work priorities, and changes in workforce needs.
Focus	• Finalize a long-term staffing strategy that aligns with Water Supply Master Plan, Capital Improvement Program, Operations & Maintenance plans, etc.. • Develop classification career ladders to provide understanding of requirements for professional growth. • Consider opportunities to grow the recruitment pipeline from high school and college students, workforce development programs, and the Valley Water intern program.
Monitoring	Regular updates will be provided to the Diversity & Inclusion Ad Hoc Committee and full Board. Monitoring should include regular updates on the four elements staffing strategy: 1) Grow Pipeline, 2) Recruitment Process, 3) Retention Program, and 4) Promotion Practices.
Related Staff Plans	Long-term Staffing Master Plan (under development)

GOAL: BUSINESS MANAGEMENT

Strategy 3	Provide affordable and cost-effective level of services.
Challenge/ Opportunity	The Board understands that it needs to regularly evaluate the financial status of the organization to ensure the level of services provided are reasonable and cost-effective. As such, continued research is necessary to pursue feasible revenue sources allowed by the District Act in order to deliver affordable and effective services while controlling expectations with regard to what Valley Water can achieve and what it can afford to do.
Focus	• Establish benchmarking with other agencies, particularly water agencies, in order to understand areas for improvement.
Monitoring	Utilize the Financial Sustainability Working Group to focus on potential new revenue sources and the Board Audit Committee to monitor the cost-effectiveness of services.
Related Staff Plans	Operating and Capital Budget Management and Board Audit Reports

GOAL: CLIMATE CHANGE

Strategy 1	Address future impacts of climate change to Valley Water's mission and operations.
Challenge/ Opportunity	Valley Water's ability to fulfill its missions may be challenged in the future by the potential of warmer temperatures, changing weather patterns, reduced snow pack and rising sea levels. Valley Water has been working on greenhouse reduction efforts since 2008, but seeks to do more to understand, mitigate and adapt to the future impacts of climate change.
Focus	• Develop a vision for how Valley Water thinks about and responds to Climate Change throughout the organization.
Monitoring	Provide periodic updates to the Board Policy and Planning Committee and the full Board.
Related Staff Plans	Climate Change Action Plan

Appendix A

Board Governance Policies/Long-Term Goals and Objectives

The Board has adopted **Board Governance Policies** which describe how the board conducts its business, what they have directed the CEO and other Board Appointed Officers (BAO) to accomplish, and constraints on the CEO and BAOs that establish prudent and ethical boundaries within which all activity and decisions must take place.

A full list of the Board Governance Policies can be found here: https://www.valleywater.org/how-we-operate/board-governance-policies

Ends Policies, also referred to as **Long Term Goals and Objectives**, provide direction to the CEO and BAOs to accomplish Valley Water's mission.

Long Term Goals and Objectives

Water Supply Long-Term Goals

Goal 1: Current and future water supply for municipalities, industries, agriculture, and the environment is reliable.

Objectives

a. Aggressively protect groundwater from the threat of contamination and maintain and develop groundwater to optimize reliability and to minimize landsubsidence and salt water intrusion.

b. Protect, maintain and develop local surface water.

c. Protect, maintain, and develop imported water.

d. Protect, maintain, and develop recycled water.

e. Maximize water use efficiency, water conservation, and demand management opportunities.

f. Prepare for and respond effectively to water utility emergencies.

Goal 2: Raw water transmission and distribution assets are managed to ensure efficiency and reliability.

Objective

a. Raw water transmission and distribution assets are managed to ensure efficiency and reliability.

Goal 3: Reliable high quality drinking water is delivered.

Objective

a. Meet or exceed all applicable water quality regulatory standards.

b. Maintain effective relationships with the retailer and other stakeholders to ensure high quality, reliable drinking water.

Natural Flood Protection Long-Term Goals and Objectives

Goal 1: Provide natural flood protection for residents, businesses, and visitors.

Objective

a. Protect parcels from flooding by applying an integrated watershed management approach that balances environmental quality and protection from flooding.

b. Preserve flood conveyance capacity and structural integrity of stream banks, while minimizing impacts on the environment and protecting habitat values.

Goal 2: Reduce potential for flood damages.

Objective

a. Promote the preservation of flood plain functions.

b. Reduce flood risks through public engagement.

c. Prepare and respond effectively to flood emergencies countywide to protect life and property.

Environmental Stewardship Long-Term Goals and Objectives

Goal 1: Protect and restore creek, bay, and other aquatic ecosystems.

Objective

a. Preserve creeks, bay, and ecosystems through environmental stewardship.

b. Improve watersheds, streams, and natural resources.

c. Promote the protection of creeks, bay, and other aquatic ecosystems from threats of pollution and degradation.

d. Engage and educate the community in the protection of water quality and stream stewardship.

e. Prepare and respond to emergencies that threaten local waterways.

f. To the extent within practicable control of the District, adopt a strategy to restore the salmonid fishery on identified salmonid streams within 15 years of strategy adoption by creating suitable accessible spawning and rearing habitats.

Goal 2: Improved quality of life in Santa Clara County through appropriate public access to trails, open space, and District facilities.

Objective

a. Support healthy communities by providing access to additional trails, parks, and open space along creeks and in the watersheds.

b. Support healthy communities by providing appropriate public access to District facilities.

Goal 3: Strive for zero net greenhouse gas emission or carbon neutrality.

Objective

a. Reduce greenhouse gas emissions to achieve carbon neutrality by 2020

Business Management

Executive Limitations (EL), provide boundaries to the CEO and BAOs in which all executive activity and decisions must take place. Executive Limitations have been established in the following areas:

EL-1 General Principles

EL-2 Customer Relations

EL-3 Human Resources

EL-4 Financial Management

EL-5 Procurement

EL-6 Asset Protection

EL-7 Communication and Support to the Board

EL-8 Inclusion, Equal Employment Opportunity, Discrimination/Harassment Prevention, and Diversity

Appendix B

Staff Program Plans and Master Plans

Program plans and master plans are developed by staff to achieve the Board's long-term goals and objectives in relation to Valley Water's mission and overall business management.

Below is a list of program and master plans that have been referenced in the Board Work Plan. Other plans can be obtained by contacting the Office of the Clerk of the Board at (408) 630-2277.

- Capital Improvement Program
  https://www.valleywater.org/how-we-operate/five-year-capital-improvement-program
- Climate Change Action Plan
  https://www.valleywater.org/your-water/water-supply-planning/climate-change
- Management and Board Audit Reports
  https://www.valleywater.org/board-audit-committee-audit-reports
- One Water Plan
  https://onewaterplan.wordpress.com
- Operating and Capital Budget
  https://www.valleywater.org/how-we-operate/financebudget
- Racial Equity, Diversity and Inclusion Master Plan
  https://www.valleywater.org/how-we-operate/about-the-water-district/ diversity-and-inclusion-program
- Safe, Clean Water and Natural Flood Protection Program
  https://www.valleywater.org/project-updates/safe-clean-water-and-natural-flood-protection-program
- Santa Clara Valley Urban Runoff Pollution Prevention Program
  https://scvurppp.org/
- Stormwater Resource Plan
  https://scvurppp.org/swrp/docs-maps/
- Urban Water Management Plan
  https://www.valleywater.org/your-water/water-supply-planning/urban-water-management-plan
- Water Supply Master Plan
  https://www.valleywater.org/your-water/water-supply-planning/ water-supply-master-plan

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Valley Water

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Santa Clara Valley Water District
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valleywater.org

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Santa Clara Valley Water District

File No.: 20-0658

Agenda Date: 8/11/2020
Item No.: 4.4.

BOARD AGENDA MEMORANDUM

SUBJECT:
Fiscal Year 2021 Board Policy Planning Calendar.

RECOMMENDATION:
Review and approve the Fiscal Year 2021 Board Policy Planning Calendar.

SUMMARY:
To better align with the Fiscal Year 2020-2021 Board Work Plan (FY21 Work Plan) and to provide real -time information on the Board's work, the Fiscal Year 2020-2021 Board Policy Planning (FY21 Calendar) has been revised and reformatted (Attachment 1). The FY21 Calendar identifies items in the Board's Work Plan, items assigned to Board Committees, regulatory items requiring regular Board monitoring, and additional items requested by Board members during Board meetings that are not already listed as a work plan or committee assignment.

This item provides the Board an opportunity to review, discuss and approve the FY21 Calendar and identify any other items for discussion and feedback to the Board. This calendar is intended to be a rolling four-month calendar that will be updated and presented to the Board monthly during the second regular Board meeting.

FINANCIAL IMPACT:
There is no financial impact associated with this item.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have the potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: FY21 Board Calendar

UNCLASSIFIED MANAGER:

Michele King, 408-630-2711

DRAFT FY21 BOARD POLICY PLANNING CALENDAR

FY21 Board Work Plan			Type of Board Meeting	Aug	Sept	Oct	Nov
1.	FAHCE (Assigned to FAHCE Group)	• Update on Guadalupe River and Stevens Creek					
		• Review of FAHCE Committee structure and Purpose					
2.	Water Storage Opportunity (Assigned to Water Storage Exploratory Committee)						
3.	Delta Conveyance						
4.	Recycled/Purified Water (Assigned to Recycled Water Committee)	• South County Recycled Water Governance	S				
		• Negotiations with cities of San Jose and Santa Clara	S		X		
		• P3	S				
		• Water Reuse Master Plan	S				
5.	Future Water Supply Strategies	• Water Demand Projection	S				
		• Water Supply Master Plan	S				
6.	Anderson Dam Project	• Alternative Contracting	R				
		• Permitting Status	R				
7.	Positive Environmental Impacts	• Climate Change Mitigation	R				
		• Climate Change Adaptation	R				
8.	Protecting Ecosystem from Pollution/Degradation (Assigned to the Homeless Encampment Committee)						
9.	Advance Diversity and Inclusion	• Project Labor Agreement • Racial Equity, Diversity and Inclusion Plan	R				
10.	Staffing Levels/Expertise	• Project Labor Agreement (Assigned to PLA Working Group)	R				
11.	Affordable/Effective Level of Service	• Customer Assistance Program	R				
		• FY20-21 Budget Review related to COVID-19 Impacts	S				

Board Meetings
R = Regular
S = Special
C = Closed Session

DRAFT FY21 BOARD POLICY PLANNING CALENDAR

Board Committee(s) Recommended Items (Committee Not Assigned to Board Work Plan Items)			Type of Board Meeting	Aug	Sept	Oct	Nov
1.	Audit Committee	• Grants Management Audit Report					
		• Board Audit Committee Charter Update					
2.	Policy and Planning Committee	• FY20-21 Board Work Plan	R	X			
		• FY20-21 Board Policy Planning Calendar	R	X			
		• E-2 Water Supply					
		• E-3 Flood Protection					
		• E-4 Environmental Stewardship					
		• FY22 Strategic Planning Workshop	S				
3.	Capital Improvement Program	• Preliminary FY21-22 Five-Year Capital Improvement Program					
		• Projects needing Board Attention ➢Water Supply Infrastructure Implementation Projects					

Items Regularly Monitored by Board			Type of Board Meeting	Aug	Sept	Oct	Nov
1.	BAO Performance		C		X		X
2.	BAO Compensation		C				
3.	Board Expense Report		R			X	
4.	Board Self-Assessment		R		X		

Board Meetings
R = Regular
S = Special
C = Closed Session

DRAFT FY21 BOARD POLICY PLANNING CALENDAR

Board Member(s) Requested Items			Type of Meeting	Aug	Sept	Oct	Nov
1.	Santos	Two-Year Budget	R	X			
2.	Santos	District Financial/Investment Status (To be Combined with FY20-21 Budget Review)	S				

Board Meetings
R = Regular
S = Special
C = Closed Session

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Santa Clara Valley Water District

File No.: 20-0562

Agenda Date: 8/11/2020
Item No.: 5.1.

BOARD AGENDA MEMORANDUM

SUBJECT:
Update on 2020 Water Supply Conditions and Initial 2021 Outlook Scenarios.

RECOMMENDATION:
Receive, review, and discuss information on water supply conditions.

SUMMARY:
On January 31, 2017, the Santa Clara Valley Water District (Valley Water) Board of Directors (Board) adopted a resolution to continue the call for a 20 percent reduction in water use and to limit the irrigation of ornamental landscapes with potable water to no more than three days per week. The resolution is in effect until further notice. This memorandum provides an update on water use reduction, 2020 water supply conditions, and initial 2021 outlook scenarios.

Water Use Reduction

During the most recent drought, the community and local water retailers did an excellent job in reducing water use, as shown in Table 1 below. Normally water use reductions achieved during a drought would dissipate over time once the drought is over. However, locally we are not seeing this. 2019 data indicates that water retailers in Santa Clara County achieved a 21 percent reduction in water use compared to 2013. Preliminary 2020 data through May indicates that water retailers achieved a 17 percent reduction in water use compared to 2013. If the remaining monthly reductions in 2020 reach 22 percent, the year-end cumulative reductions will meet the current 20 percent end of year target.

Table 1. Annual Retailer Water Savings

Calendar Year	2014[1]	2015	2016	2017	2018	2019
Annual Retailer Water Savings (compared to 2013)	13%	27%	28%	21%	20%	21%

[1] Retailer reporting to Valley Water began February 2014.

Valley Water is currently in the process of updating its long-term demand projections to account for this persistent water savings. The updated projection will be presented to the Board in the fall as part

of the Water Supply Master Plan Monitoring and Assessment Plan (MAP) item.

2020/21 Winter Outlook

As of May 2020, El Niño conditions remain neutral, signifying that neither El Niño nor La Niña is currently prevailing. As of June 2020, the National Oceanic and Atmospheric Administration (NOAA) predicts equal chances of above average, average, or below average precipitation for northern California for winter 2020-21. Therefore, it is still too early to predict whether water year 2020-21 will be wet, median, or dry.

2020 Water Supply Conditions

Despite dry conditions in 2020, the local water supply outlook is good due to healthy groundwater storage, adequate imported water supplies, and out-of-county groundwater storage.

- Groundwater conditions in the Santa Clara and Llagas Subbasins are very healthy. In particular, the Santa Clara Plain, which is the northern part of the Santa Clara Subbasin that covers North County, has been practically full since 2018. Heading into 2020, countywide groundwater storage was about 357,000 acre-feet (AF), which is well within the Stage 1 (Normal) of Valley Water's Water Shortage Contingency Plan (anything above 300,000 AF is considered Stage 1). Groundwater storage for the end of 2020 is estimated to be 350,000 AF, indicating continued healthy storage reserves.

- January to June 2020 managed groundwater recharge in the Santa Clara Plain, Coyote Valley, and Llagas Subbasin were 87 percent, 81 percent, and 103 percent of the five-year averages, respectively. Staff continues to closely track groundwater conditions through regular groundwater level measurements and subsidence monitoring, which indicate local groundwater subbasins are in good shape.

- According to the June 23, 2020 U.S. Drought Monitor for California, Santa Clara county drought severity ranges from "Abnormally Dry" to "Moderate Drought", depending on the location within the county.

- As of July 1, 2020, local reservoirs storage is at 63 percent of the 20-year average for this time of year and 55 percent of restricted storage capacity. Storage in key northern California reservoirs, Oroville and Shasta, is 75% and 86% of average for this time of year, respectively. Local (San Jose) rainfall for the 2020 water year, starting October 2019, is 8.82 inches or 62 percent of average to date.

- The current 2020 State Water Project (SWP) allocation is 20 percent, which provides 20,000 acre-feet of SWP supply to Valley Water. The 2020 South-of-Delta Central Valley Project (CVP) allocations are currently 20 percent for agriculture and 70 percent for M&I, which

provides 97,620 acre-feet to Valley Water.

- Local and imported supplies are less constrained than in the historical drought. Due to the improved water supply conditions, Valley Water continues with reduced recharge operations in North County, in collaboration with regulatory agencies, because the two groundwater subbasins in the county are in very good condition.

- As of May 31, 2020, current storage in Semitropic is 347,760 AF, or 99 percent of capacity. Valley Water's maximum capacity is 350,000 AF, and its five-year average storage quantity is 253,818 AF.

In summary, the water supply conditions of Valley Water are still in good shape despite a dry winter 2020. These conditions are favorable with respect to the pending drawdown of Anderson Reservoir, which was ordered by the Federal Energy Regulatory Commission (FERC) to start on October 1, 2020.

2021 Water Supply Outlook Scenarios

Although it is still early, staff has developed initial water supply planning scenarios for 2021, including conditions that may unfold if 2021 is a dry year. As part of Valley Water's annual operations planning, staff further refines scenarios and operational plans as additional information becomes available (most importantly, following the release of imported water allocations in the spring).

Each year, Valley Water raw water operators plan for and schedule a quantity of surface water carryover (for use in the following calendar year) in San Luis Reservoir. This is based on projected demands, recharge operations, imported water allocations, imported water transfers and exchanges, Semitropic Bank withdrawal, and utilization of local supplies in the current year.

2020-to-2021 Carryover Targets and Semitropic Bank Withdrawals

On February 20, 2020, FERC issued an order (FERC Order) to start the drawdown of Anderson Reservoir no later than October 1, 2020. The FERC Order will result in limited access to local surface supplies and little if any emergency supplies next year. Given that current year dry conditions would deepen any impact of a dry 2021, imported transfer water may be expensive and difficult to acquire next year if dry conditions continue. Therefore, a Semitropic withdrawal of 15,000 AF is planned for calendar year 2020 in order to augment the amount of imported water Valley Water will store in San Luis Reservoir at the end of 2020 for use in calendar year 2021. This will provide additional surface supplies to help meet treatment plant demands in the event 2021 is dry. Depending on the level of demand, water quality conditions in Anderson Reservoir, and allowable Coyote Reservoir storage levels, actual carryover amounts may range from 40,000 to 60,000 AF for 2020 going into 2021.

With this level of carryover and the projected supplies and demands (including a Semitropic take of 31,500 AF in 2021), the end of year 2021 local groundwater storage will likely remain in Stage 1 (Normal) of Valley Water's Water Shortage Contingency Plan, even if 2021 is a dry year.

A wet 2020-2021 winter and spring could result in the loss of all or a portion of Valley Water's

carryover if San Luis Reservoir fills and spills. “Spill” means that, after San Luis Reservoir fills completely, any water volume stored by Valley Water that is above its allocated share of storage space in the reservoir may be lost. However, carrying over water in San Luis Reservoir provides an insurance policy to reduce the risk of shortage should dry conditions persist for the next several years. The negative impact of a water shortage in the absence of emergency supplies will likely outweigh the cost of water spilled in a wet year, when water is plentiful and when a loss of water would not have material impact on water supply operations.

Next Steps

Staff is planning to bring to the Board the following:

- In Fall 2020: a Water Supply Master Plan update according to the monitoring and assessment plan (MAP), and updated demand forecasts; and
- In Spring 2021: an updated assessment of water supply conditions.

FINANCIAL IMPACT:
All costs associated with the operations described in this memo are included in the Board approved FY 2019-20 and FY 2020-21 budgets.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonably foreseeable indirect change in the physical environment.

ATTACHMENTS:
Attachment 1: PowerPoint
Attachment 2: July 2020 Water Tracker

UNCLASSIFIED MANAGER:
Aaron Baker, 408-630-2135

Valley Water

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Update on 2020 Water Supply Conditions and Initial 2021 Outlook Scenarios

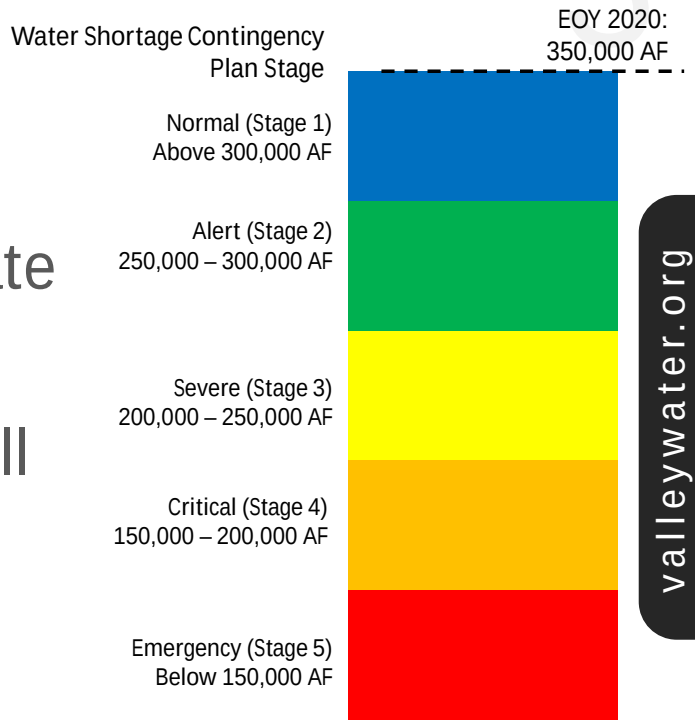
Presented by: Raw Water Division

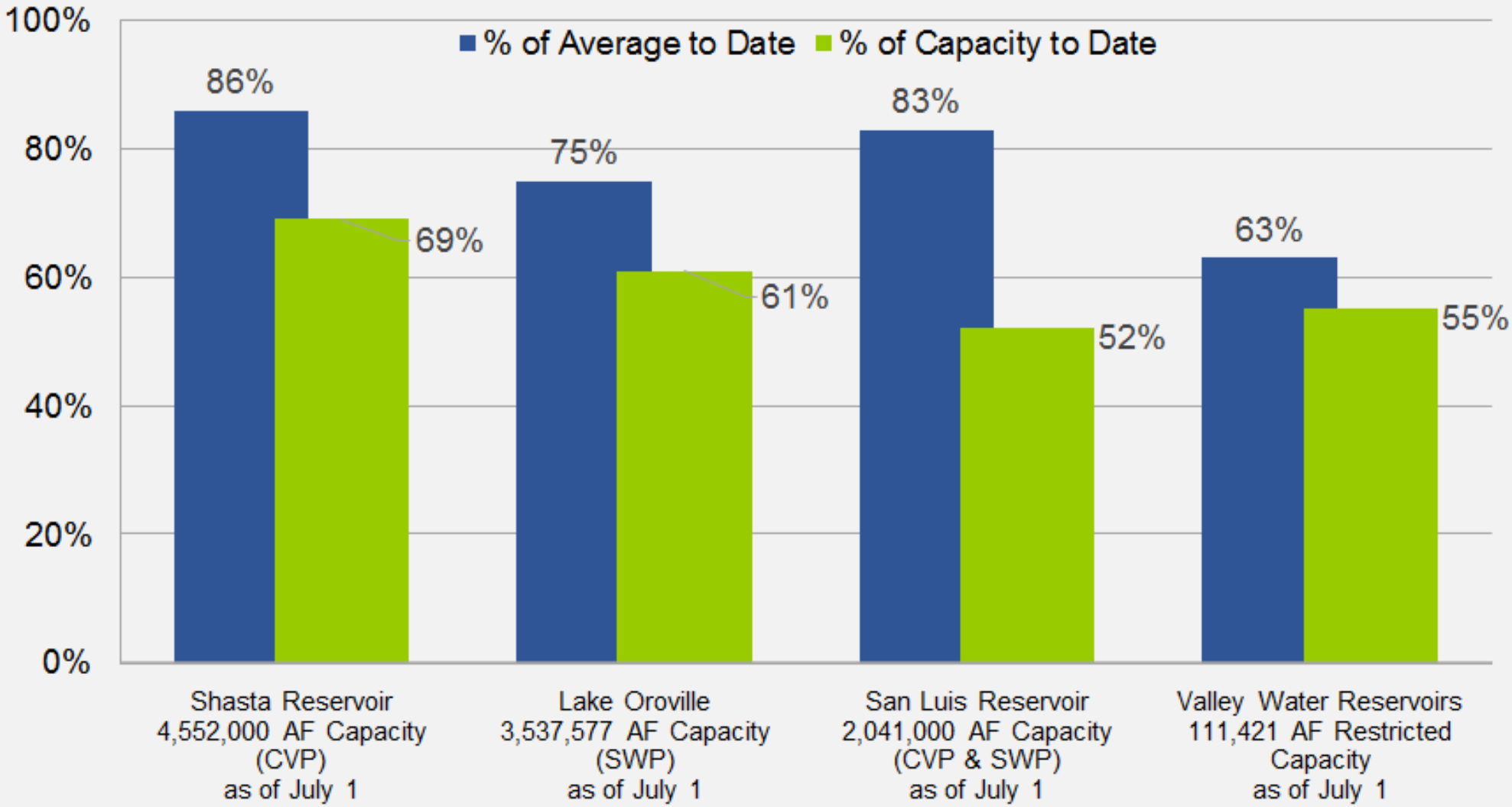
Valley Water

2020 Water Supply Conditions

- Dry 2020: San Jose rainfall 62% of average
- Local reservoirs: 63% of 20-year average to date
- Very healthy local groundwater basins
- Semitropic groundwater storage bank: 99% full
- Semitropic withdrawal: 15,000 acre-feet (AF)
- Water use reduction (Jan. to May 2020):

  17% compared to 2013





valleywater.org

2020 Water Supply Conditions (Cont'd)

- FERC Order dated Feb. 20, 2020: Start drawdown of Anderson Reservoir no later than Oct. 1
- Valley Water will maximize the beneficial use of Anderson water through:
  - Deliveries to water treatment plants
  - Recharge in Coyote Creek
- Water supply remains in good shape

2021 Outlook and Carryover Supply

- Too early to predict winter 2020-21 hydrology
- Even if 2021 is dry, groundwater storage at end of 2021 is likely to remain in Stage 1 (Normal)
- Carryover amount from 2020 to 2021: 40,000 to 60,000 AF
  - Carryover storage benefits vs. risk of San Luis Reservoir spill
  - Provides substantial cushion after Anderson drawdown

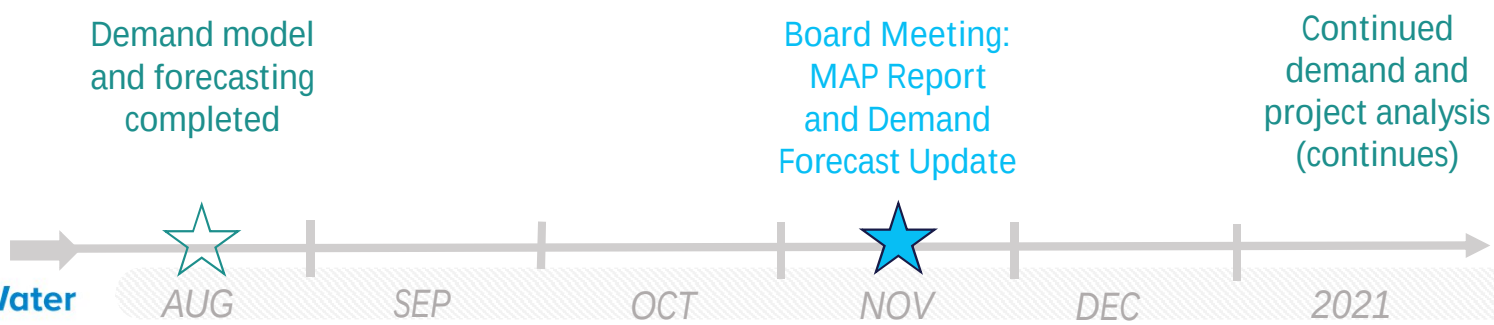
Water Supply Master Planning

- Water Supply Master Plan adopted November 2019
- Annual Monitoring and Assessment Plan (MAP) report and board update, fall 2020
  - Updated project information
  - Updated demand forecasts
- New demand model
  - Continued post-drought water conservation savings
  - Expect forecasts through 2040 to be lower than the Water Supply Master Plan 2040 projections

Calendar Year	2014[1]	2015	2016	2017	2018	2019
Annual Retailer Water Savings	13%	27%	28%	21%	20%	21%

[1]Retailer reporting to Valley Water began February 2014.

Near-term Timeline



Valley Water

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Board Update Schedule

- *Fall 2020:* Water Supply Master Plan 2040 MAP and demand forecasts
- *Spring 2021:* Updated assessment of water supply conditions

Valley Water

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July 2020

Water Tracker

Valley Water

A monthly assessment of trends in water supply and use for Santa Clara County, California

Outlook as of July 1, 2020

We began calendar year 2020 with groundwater storage well within Stage 1 (Normal) of the Water Shortage Contingency Plan of Valley Water. Despite well below-normal local rainfall and statewide snow pack, end of year groundwater storage for 2020 is projected to be well within Stage 1.

Weather

Rainfall in San Jose:

- Month of June, City of San Jose = 0.00 inch
- Rainfall year total = 8.82 inches or 62% of average to date (rainfall year is July 1 to June 30)
- Month of June, San Jose average daily high temperature = 82.8 degrees Fahrenheit

Local Reservoirs

- Total July 1 storage = 61,462 acre-feet
  - » 63% of 20-year average for that date
  - » 37% of total unrestricted capacity
  - » 55% of restricted capacity (166,266 acre-feet total storage capacity limited by seismic restrictions to 111,421 acre-feet)
- Approximately 716.6 acre-feet of imported water delivered into local reservoirs during June 2020
- Total estimated releases to streams (local and imported water) during June was 6,650 acre-feet (based on preliminary hydrologic data)

Treated Water

- Above average demands of 11,285 acre-feet delivered in June
- This total is 103% of the five-year average for the month of June
- Year-to-date deliveries = 43,343 acre-feet or 101% of the five-year average

Groundwater

- Groundwater conditions are good. Total storage at the end of 2020 is projected to be in Stage 1 (Normal) of Valley Water's Water Shortage Contingency Plan.

	Santa Clara Subbasin		Llagas Subbasin
	Santa Clara Plain	Coyote Valley	
June managed recharge estimate (AF)	4,100	1,200	2,550
January to June managed recharge estimate (AF)	22,300	5,950	8,950
January to June managed recharge, % of 5-year average	87%	81%	103%
May pumping estimate (AF)	7,750	1,200	2,900
January to May pumping estimate (AF)	29,500	4,200	13,000
January to May pumping, % of 5-year average	133%	105%	112%
Current index groundwater levels compared to last June	Lower	Lower	Lower

AF = acre-feet

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Imported Water

- Current 2020 State Water Project (SWP) and Central Valley Project (CVP) allocations:
  - » 2020 SWP allocation of 20%, which provides 20,000 acre-feet to Valley Water
  - » 2020 South-of-Delta CVP allocations are 70% for M&I and 20% for Agriculture, which provide 97,620 acre-feet to Valley Water
- Statewide reservoir storage information, as of July 1, 2020:
  - » Shasta Reservoir at 69% of capacity (86% of average for this date)
  - » Oroville Reservoir at 61% of capacity (75% of average for this date)
  - » San Luis Reservoir at 52% of capacity (83% of average for this date)
- Valley Water's Semitropic groundwater bank reserves are at 99% of capacity, or 347,757 acre-feet, as of May 31, 2020
- Estimated SFPUC deliveries to Santa Clara County:
  - » Month of May = 3,594 acre-feet
  - » 2020 total to date = 13,670 acre-feet
  - » Five-year annual average = 48,700 acre-feet
- Board Governance Policy No. EL-5.3.3 includes keeping the Board informed of imported water management activities on an ongoing basis. No imported water agreements were executed under EL-5.3.3 since the last Water Tracker update

Conserved Water

- Saved 73,531 acre-feet in FY19 from long-term program (baseline year is 1992). This will be updated in July for FY20
- Long-term program goal is to save nearly 100,000 acre-feet by 2030 and 110,000 acre-feet by 2040
- The Board continues its call for a 20% reduction and a limit of three days per week for irrigation of ornamental landscape with potable water
- Through May, achieved a 17% reduction in water use in calendar year 2020, compared to 2013

Recycled Water

- Estimated June 2020 production = 2,090 acre-feet
- Estimated year-to-date through June = 7,940 acre-feet or 119% of the five-year average
- Silicon Valley Advanced Water Purification Center produced an estimated 1.5 billion gallons (4,570 acre-feet) of purified water in 2019. Since the beginning of 2020, about 1,810 acre-feet of purified waster has been produced. The purified water is blended with existing tertiary recycled water for South Bay Water Recycling Program customers

Alternative Sources

- As of December 10, 2019, Valley Water's wastewater contract right from Palo Alto/ Mountain View remains at 10,000 acre-feet/year

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Santa Clara Valley Water District

File No.: 20-0601

Agenda Date: 8/11/2020
Item No.: 5.2.

BOARD AGENDA MEMORANDUM

SUBJECT:
Update on Per- and Polyfluoroalkyl Substances (PFAS).

RECOMMENDATION:
Receive information on Per- and Polyfluoroalkyl Substances (PFAS).

SUMMARY:
Santa Clara Valley Water District (Valley Water) continues to track the emerging technical and regulatory issues related to a group of widely used but unregulated chemicals known as PFAS (short for Per- and Polyfluoroalkyl Substances). PFAS are persistent in the environment and have known and suspected adverse health effects. This item provides background on PFAS and an update on local conditions.

Background
PFAS are a family of more than 7,000 chemicals found in many products that resist heat, oils, stains, and water. Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) are two common types of PFAS. Products manufactured with PFAS include non-stick cookware, food packaging, stain- and water-repellent fabrics, including clothing and carpets, and other products. They also were used in fire-fighting foam, a known source of groundwater contamination at airports and military bases.

PFAS have been called “Forever Chemicals” because they are extremely stable in the environment and in the human body, meaning that they do not break down and can accumulate over time. Health experts have identified PFOA as a possible carcinogen, and studies suggest PFAS exposure can cause other adverse effects.

Regulatory Status
State and federal lawmakers and regulators are moving toward stricter standards and guidelines for the detection, public notification, and treatment of PFOA and PFOS in drinking water. Currently, these compounds remain unregulated both at the federal and state level, with no maximum contaminant level established for drinking water. At both the federal and state level, non-enforceable health-advisory levels have been established; exceeding these health-advisory levels prompts certain state requirements and recommendations as described below.

The federal Environmental Protection Agency (EPA) has established a drinking water health advisory of 70 parts per trillion (ppt) for a combined concentration of PFOA and PFOS. For reference, a part per trillion is the equivalent of one grain of sand in an Olympic-size swimming pool. If exceeded, EPA recommends water providers assess the contamination, inform customers, and limit exposure. EPA will be establishing drinking water regulations for PFOA and PFOS by setting an enforceable Maximum Contaminant Level, a process that is expected to take several years.

The State Water Resources Control Board (State Board) has established drinking water notification levels for PFOA (5.1 ppt) and for PFOS (6.5 ppt). If exceeded, water providers are required to notify their governing bodies, and it is recommended that they inform customers. The State Board has also set response levels for PFOA (10 ppt) and for PFOS (40 ppt). If response levels are exceeded, the water provider must remove the drinking water source from service, treat the water delivered, or provide public notification.

In 2019, the State Board began issuing orders for phased well testing throughout the state to help inform potential drinking water standards. The first phase required testing at over 600 public water supply wells near airports, landfills, and chrome plating facilities. Additional phases focus on other potential sources, including non-airport fire training/response sites and wastewater treatment plants. In a March 2020 update, the State Board noted that PFOA, PFOS and other PFAS chemicals have been detected in roughly 50 percent of wells sampled, and that investigations at airports and landfills show a high number of PFAS detections. The State Board continues to issue monitoring orders and analyze related data to help inform potential regulations.

Local PFAS Testing
Valley Water conducts voluntary, ongoing groundwater testing of PFAS in limited areas near recycled water irrigation sites since PFAS are often found in wastewater. Results from this ongoing monitoring are summarized below:

- North County: PFOA and PFOS are sporadically detected above current health advisory levels in shallow monitoring wells.
- South County: PFOA and PFOS are consistently detected above current health advisory levels in some monitoring wells. These wells are not used for drinking water supply.

To assess the occurrence and extent of PFAS in groundwater beyond the limited areas tested through ongoing monitoring, Valley Water conducted voluntary sampling of 55 monitoring wells throughout Santa Clara County in February 2020. Results from this sampling do not indicate widespread presence of PFOA and PFOS above current health advisory levels in the county's groundwater basins. Results are summarized below.

- PFOA was not detected in 51 monitoring wells (93%).
- PFOS was not detected in 43 monitoring wells (78%).
- Low levels (below health advisory levels) were detected in two wells for PFOA and 10 wells for PFOS.
- Three monitoring wells (in North San Jose, Mountain View, and south of Gilroy) had PFOA or PFOS above current health-advisory levels. None of these wells is used for water supply.

As part of the State Board orders, Valley Water was required to test PFAS at the Campbell Well Field.

Valley Water detected PFOA and PFOS in two of the three water supply wells we own for emergency backup supply. No water from these wells has been delivered to water retailers (or consumers), and the levels of PFOA and PFOS detected are below the notification levels set by the State Board.

Several local water retailers have conducted voluntary PFAS testing in water supply wells. San Jose Water Company (SJWC) detected PFOS above the notification level in eight of their 83 active water supply wells. SJWC notified affected customers (Attachment 1) and discontinued the use of these wells out of an abundance of caution. Two additional wells that were out of service were also placed on standby due to PFOS. No water supply wells in Santa Clara County have had PFAS detections above the response level, which requires taking the source out of service, treatment, or notification.

Next Steps
Valley Water is currently analyzing all available data on PFAS, including data from State Board mandated sampling, contaminant release sites, and voluntary data provided by water retailers. This evaluation will focus on the extent of PFAS in groundwater, including specific areas and/or depths where PFAS is present. Modeling tools may also be used to assess potential source locations. Valley Water will continue to collaborate with water retailers and regulatory agencies to better understand PFAS occurrence, evaluate potential sources, and identify any action that may be needed to protect local water supplies.

Regulatory and treatment technology developments related to PFAS are evolving rapidly, and Valley Water continues to monitor and engage in these developments. Recently, our own water quality laboratory received state accreditation to analyze PFAS in drinking water.

Valley Water continues to maintain and share updated PFAS information to the community through fact sheets (Attachment 2) and social media tools like the Valley Water blog. Staff will continue to keep the Board of Directors updated on PFAS.

FINANCIAL IMPACT:
There is no financial impact associated with this item.

CEQA:
The recommended action does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

ATTACHMENTS:
Attachment 1: SJWC Customer Notifications
Attachment 2: PFAS Fact Sheet
Attachment 3: PowerPoint

UNCLASSIFIED MANAGER:

Aaron Baker, 408-630-2135

San Jose Water
Water Quality and Environmental Services
1221A S Bascom Ave, San Jose CA 95128

Nina Hawk, Chief Operating Officer
Valley Water
5750 Almaden Expressway
San Jose, CA 95118

Transmitted Electronically on January 3, 2020

Subject: PFOS Notification

Dear Official,

The purpose of this letter is to inform you that San Jose Water (SJW) has found concentrations of perfluorooctyl sulfonate (PFOS) in exceedance of the Notification Level in six of SJW's 83 groundwater wells. The Notification Level was adopted on August 23, 2019 by the California State Water Resources Control Board Division of Drinking Water (DDW). Pursuant to California Health and Safety Code Section 116455, SJW is required to inform its governing body and the governing body of any local agency whose jurisdiction includes the areas supplied with drinking water with concentrations exceeding the PFOS Notification Level of 0.0065 µg/L. Notification Levels are health-based advisory levels established by the DDW for chemicals in drinking water that lack maximum contaminant levels.

PFOS and perfluorooctanoic acid (PFOA) have been extensively produced and studied in the United States. These manmade substances have been synthesized for water and fat resistance. They have been used extensively in consumer products such as carpets, clothing, fabrics for furniture, paper packaging for food, and other materials (e.g., cookware) designed to be waterproof, stain-resistant or non-stick. In addition, they have been used in fire-retarding foam and various industrial processes. The origin of the contaminant in our water supply at this time is unknown; however, SJW is working with DDW and other agencies to determine how it was introduced into our groundwater supply.

SJW voluntarily began monitoring all of its wells for per- and polyfluoroalkyl substances (PFAS) beginning in 2019, ahead of the DDW order to monitor select wells issued on March 12, 2019. Once PFOS, a chemical in the PFAS group, was found in concentrations above the Notification Level in six of its wells, SJW immediately discontinued the use of these wells. This step was taken out of an abundance of caution in the absence of a regulatory limit and will not affect SJW's ability to deliver safe, high quality, and reliable water service to customers.

SJW customers are no longer receiving water with concentrations of PFOS above the Notification Level. The Notification Level for PFOS is 6.5 part per trillion. One part per trillion (ng/L) corresponds to a penny in $10 billion.

The concentration levels measured in SJW groundwater are summarized in Table 1. Maps of the affected areas are provided in Figures 1 and 2.

In addition to this notification, SJW plans to send a separate letter to all of its affected customers. More information about PFAS can be found at https://www.waterboards.ca.gov/pfas/ and www.sjwater.com/pfas.

Background:

If a chemical is present in drinking water that is provided to consumers at concentrations considerably greater than the Notification Level, for instance at the Response Level set by DDW, DDW requires that the drinking water system take the source out of service. SJW is continuing to monitor the levels in our source(s) and has not exceeded the Response Level at this time. Additional information will be provided to our customers in the SJW Consumer Confidence Report that will be published in April of 2020.

Potential Health Effects:

Per DDW, based on the current evaluation of recent human and animal toxicity data, exposure to PFOA and PFOS in tap water over certain levels may result in adverse health effects including hepatotoxicity, immunotoxicity, thyroid toxicity, reproductive toxicity, and cancer (pancreatic and liver).

Table 1 – Wells with detection of PFOS >0.0065 ug/L

Well ID	Sample Date	Parameter Name	Report Result	Report Units
Williams Rd 2	06/25/2019	Perfluorooctyl Sulfonate (PFOS)	0.0072	ug/L
Williams Rd 14	11/15/2019	Perfluorooctyl Sulfonate (PFOS)	0.0066	ug/L
Williams Rd 15	06/26/2019	Perfluorooctyl Sulfonate (PFOS)	0.0082	ug/L
Willow Glen Way 3	06/19/2019	Perfluorooctyl Sulfonate (PFOS)	0.0078	ug/L
Willow Glen Way 4	05/15/2019	Perfluorooctyl Sulfonate (PFOS)	0.0074	ug/L
Willow Glen Way 5	06/19/2019	Perfluorooctyl Sulfonate (PFOS)	0.0074	ug/L

Figure 1 – Map of area that may have received water from Willow Glen wells with PFOS concentrations >0.0065 ug/L

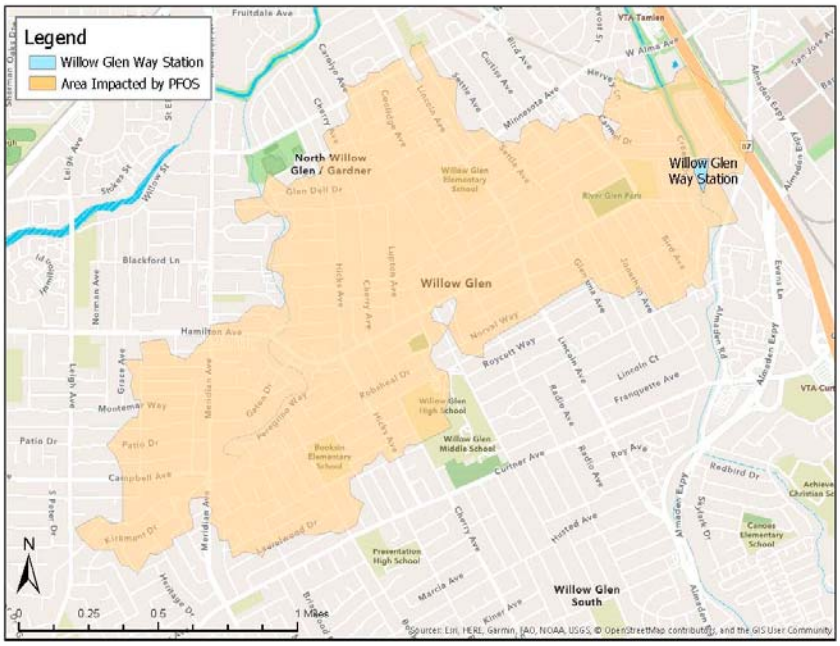
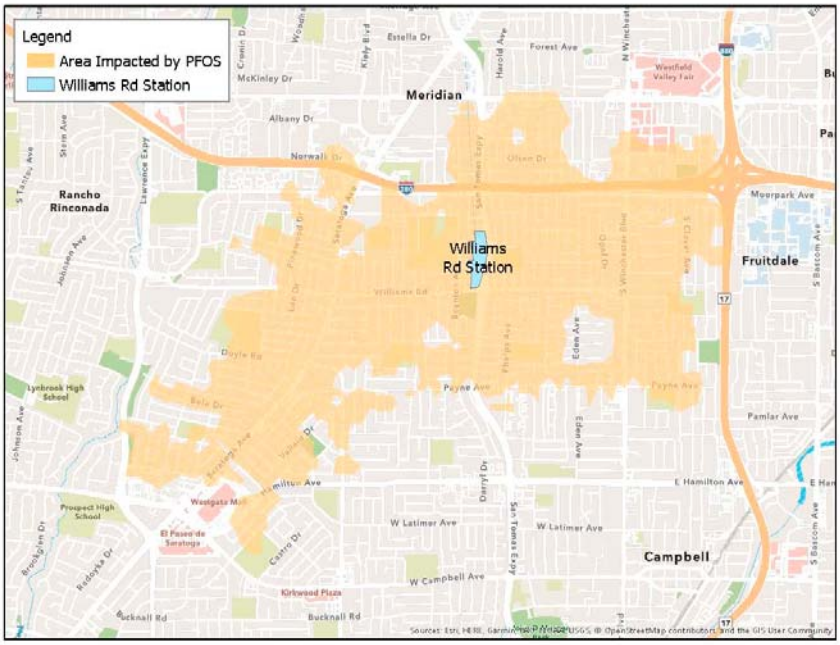


Figure 2 – Map of area that may have received water from Williams wells with PFOS concentrations >0.0065 ug/L



If you have any questions regarding this letter or would like more information on PFAS, please call Francois Rodigari, Director of Water Quality & Environmental Services, at (408) 279-7967.

Sincerely,

John Tang, P.E.
Vice President of Regulatory Affairs and Government Relations, San Jose Water Company

CC: SJW Board of Directors
Andrew R. Gere, P.E., SJW President & Chief Operating Officer
Curtis A. Rayer, SJW VP of Operations
Francois Rodigari, SJW Director of Water Quality & Environmental Services
Adam S. Feffer, P.E., SJW Manager of Water Quality
Liann Walborsky, SJW Director of Corporate Communications
California Public Utilities Commission
Eric Lacy, P.E., District Engineer, DDW Santa Clara District
Dr. Sara Cody, Public Health Officer, Santa Clara County

San Jose Water
Water Quality and Environmental Services
1221A S Bascom Ave, San Jose CA 95128

June 15, 2020

Peter Zhou, P.E., Water Quality Manager
Valley Water
5750 Almaden Expressway
San Jose, CA 95118

Transmitted electronically on June 15, 2020

Subject: PFOS Notification for Malone Wells

Dear Peter Zhou, P.E.:

We are writing to you today to let you know about the results of recent testing that took place on water wells at Malone Station. On June 1, 2020, SJW received laboratory results indicating that its two wells at this location had concentrations of perfluorooctane sulfonate (PFOS) above the Notification Level, a set level at which we are required to inform affected customers and public officials about the results.

A similar letter informing the 2,874 customers with water service in the area shown in the map below, will be mailed this week. As shown in the map, the affected customers mostly reside in District 6, with a smaller number in Districts 7 and 9 within the City of San Jose. All affected customers are within County Supervisorial District 2.

What did SJW do?

Upon learning of the test results, SJW **immediately discontinued the use of these wells** on the day this was discovered (June 1). As a result, **our impacted customers are no longer receiving water with concentrations of PFOS above the NL.** SJW took this step out of an abundance of caution. The PFOS concentrations in the wells did not rise to the level at which DDW recommends taking these wells out of service, but we always want to ensure the safest and highest quality water for our service areas.

Do customers need to take action based on this information?

In its letter to the affected customers, SJW has encouraged landlords, businesses and schools to share the information we provided with non-billed water customers at their locations.

What is a Notification Level?

Notification Levels are health-based advisory levels that are established for chemicals for which there are no formal regulatory standards. If one of these chemicals is identified in our wells in a concentration that is equal to or greater than the Notification Level, pursuant to California Health and Safety Code Section 116455, SJW is required to inform its affected customers, governing body (CPUC), the California State Water Resources Control Board Division of Drinking Water

(DDW), and the local agency whose jurisdiction includes the areas served by SJW. No other action is required to be taken under this provision.

In the absence of a Public Health Goal, DDW has adopted a health-based advisory NL for PFOS. The current Notification Level for PFOS was adopted on August 23, 2019. In addition to the NL, DDW has also adopted a Response Level (RL) for PFOS. The Response Level is the concentration at which DDW recommends taking the source of water out of service. The current NL and RL for PFOS are 0.0065 ug/L and 0.04 ug/L respectively.

What is PFOS?

PFOS is a manmade substance that has been extensively produced and studied in the United States. PFOS has been widely used in consumer products such as carpets, clothing, furniture fabrics, paper packaging for food, and other materials (e.g., cookware) designed to be waterproof, stain-resistant or non-stick. In addition, PFOS has been used in fire-retarding foam and various industrial processes.

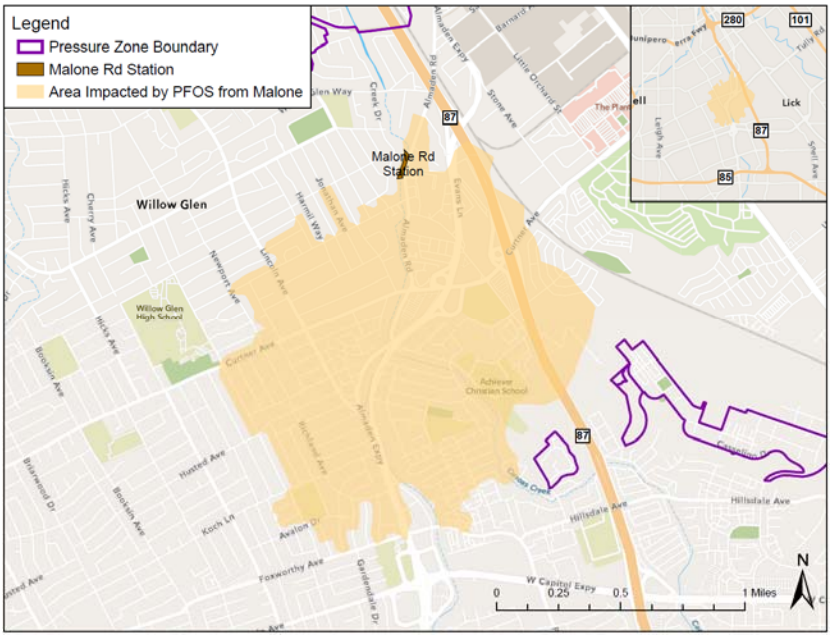
The origin of PFOS in our water supply at this time is unknown; however, SJW is working with DDW and Valley Water to determine the source of PFOS in our groundwater supply at Malone Station. More information about PFOS and per- and polyfluoroalkyl substances (PFAS), the group of chemicals that includes PFOS, is available at https://www.waterboards.ca.gov/pfas/, www.sjwater.com/pfas and www.sjwater.com/ccr.

The concentration levels measured in SJW groundwater at Malone Station are summarized in Table 1. A map of the affected areas is displayed in Figure 1.

Table 1 – Wells with detection of PFOS >0.0065 ug/L

Well ID	Data Received On	Parameter Name	Report Result	Report Units
Malone Rd 1	6/1/2020	Perfluorooctane sulfonate (PFOS)	0.0079	ug/L
Malone Rd 2	6/1/2020	Perfluorooctane sulfonate (PFOS)	0.0080	ug/L

Figure 1 – Map of area that may have received water from Malone wells with PFOS concentrations >0.0065 ug/L



Public Health Notice

PFOS is readily absorbed but not readily eliminated from the human body. Health effects associated with long-term exposure include harmful effects to a developing fetus or infant; harmful effects to the immune system, thyroid and liver; and cancer. The notification level and response level are based on recommendations that provide a margin of protection against these health effects in sensitive populations. They are also established at concentrations associated with a low cancer risk over a lifetime of exposure. The risk would be lower once the contaminant is eliminated or reduced in the water supply. In addition to water, humans can be exposed to PFOS through a variety of sources, including food, dust in homes and imported consumer products.

If you have any questions regarding this letter or would like more information on PFAS, please call Francois Rodigari, SJW Director of Water Quality & Environmental Services, at (408) 279-7967. **Our top priority is to deliver safe, high-quality and reliable water service to our customers every day. We encourage you to reach out if you have any questions or concerns.**

Sincerely,

John Tang P.E.
Vice President of Regulatory Affairs and Government Relations

CC: SJW Board of Directors
Eric Lacy, P.E., District Engineer, DDW Santa Clara District

FACT SHEET

Per- and Polyfluoroalkyl Substances (PFAS)

Valley Water

What are PFAS, PFOA, and PFOS?

Per- and Polyfluoroalkyl Substances (PFAS) are a grouping of more than 4,500 chemicals that resist heat, oils, stains and water. They have been widely used in consumer products such as carpets, clothing, furniture fabrics, paper packaging for food, firefighting foams, and other materials including waterproof/stain resistant/nonstick cookware. Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) are two common types of PFAS.

Certain PFAS chemicals (including PFOA and PFOS) are no longer manufactured in the United States (U.S.). However, they are still produced internationally and are imported into the U.S. in consumer goods.

What are the health effects of PFOA and PFOS?

PFOA is a possible human carcinogen according to the International Agency for Research on Cancer. Available studies suggest PFAS exposure can cause adverse effects in humans, including increased cholesterol, thyroid and liver disease, decreased fertility, lower birth weights, decreased vaccine response, and pregnancy-induced hypertension.

How are people exposed to PFAS?

These chemicals have been widely used for decades in industrial applications and consumer products. Most people have been exposed to these chemicals through consumer products but drinking water can be an additional source of exposure. The major sources of PFAS in water supplies are fire training/response sites, industrial sites, landfills, and wastewater treatment plants/biosolids. Because of their persistence in the environment, PFAS have the potential to accumulate in water supplies.

Are there drinking water standards for PFOA and PFOS?

State and federal lawmakers, along with regulators are moving toward stricter standards and guidelines for the detection, public notification, and treatment of PFOA and PFOS in drinking water.

Currently, the Environmental Protection Agency (EPA) has established a drinking water health advisory of 70 parts per trillion (ppt) for a combined concentration of PFOA and PFOS. If exceeded, EPA recommends water providers assess the contamination, inform customers, and limit exposure. EPA is working to establish drinking water regulations for PFOA and PFOS by setting an enforceable Maximum Contaminant Level.

In 2019, the State Water Resources Control Board (State Board) set a drinking water notification level for PFOA (5.1 ppt) and PFOS (6.5 ppt). If exceeded, water providers must notify their governing bodies, and the State Board recommends they inform customers. In the beginning of 2020, the State Board set the current response level at 10 ppt for PFOA and 40 ppt for PFOS. If exceeded, water providers are required to either take the water source out of service, provide treatment, or notify customers in writing.

Has local water been tested for PFOA and PFOS?

To better understand the occurrence of PFAS, the EPA required large public water systems to test for various PFAS, including PFOA and PFOS, between 2013 and 2015. There were no detections of PFAS in groundwater or surface water in Santa Clara County as part of this testing.

The ability to detect these chemicals at even lower levels has evolved since the EPA-required sampling. Based on limited sampling conducted since then, PFOA and PFOS have not been detected in Santa Clara Valley Water District's (Valley Water) imported water or treated water supplies.

In 2019, the State Board issued a monitoring order requiring Valley Water to test for PFAS at the Campbell Well Field. Valley Water detected PFOA and PFOS in two of the three water supply wells we own for emergency backup supply. No water from these wells has been delivered to water retailers (or consumers), and the levels of PFOA and PFOS detected are below the notification levels set by the State Board.

In February 2020, Valley Water voluntarily sampled PFAS at 55 monitoring wells throughout Santa Clara County. These results and other available data indicate that PFOA and PFOS are not widely present above current State Board health-advisory levels.

Several local water retailers have conducted PFAS testing in water supply wells. To date, PFOS has been found above the notification level in eight active water supply wells in San Jose and Campbell, prompting the water retailer to discontinue use

continued on back →

of the wells out of an abundance of caution. Two additional wells that were out of service were also placed on standby due to PFOS. PFOA or PFOS have not been detected in any water supply wells at levels where the State Board recommends removing the water source from service (also known as the response level) in Santa Clara County.

The State Board continues to order testing of wells throughout the state for PFOA and PFOS to help inform potential drinking water standards. The first phase targeted wells near landfills or airports, or those with prior detections of PFOA or PFOS. Future phases will target other potential PFAS sources like industrial sites and wastewater treatment systems. Results from this testing, which include wells in Santa Clara County, will help us better understand the presence of PFAS in local groundwater.

How can PFAS in drinking water be treated?

If PFAS is detected above State Board response levels, water providers may treat the water, remove it from service, or blend it with unaffected supplies. Treatment technologies that have shown to be effective in removing PFAS from drinking water include granular activated carbon, powdered activated carbon, high pressure membranes (reverse osmosis/nanofiltration) and ion exchange resin. More information can be found at ***https://www.epa.gov/pfas/treating-pfas-drinking-water*** and ***https://www.nsf.org/newsroom/pfoa-pfos-reduction-claims-requirements-added-to-nsf-standards***

Are PFAS found in bottled water?

Bottled water producers are not required to test for PFAS. We recommend consumers contact bottle water producers directly for information about their product's water quality.

Are PFAS found in purified recycled water?

Valley Water is exploring the use of purified recycled water as a drought-resilient water supply for groundwater recharge or other uses. While PFAS are present in wastewater, any purified recycled water used in Santa Clara County would be treated with multiple, proven technologies including reverse osmosis, which is effective in treating PFAS. Valley Water is carefully testing these technologies at our Silicon Valley Advanced Water Purification Center to ensure purified recycled water meets or exceeds drinking water standards and is protective of the environment.

What is Valley Water doing about PFAS?

We will continue to work with the state and with local water retailers to better understand the presence and potential sources of PFAS in local water supplies and to take action if needed to ensure a safe and reliable drinking water supply. To support this, we are exploring additional monitoring and our water quality laboratory has obtained accreditation to test for PFAS in drinking water.

We take our responsibility to provide safe, clean water and to protect local groundwater very seriously. Valley Water and local water retailers use proven technologies and best practices to ensure drinking water delivered to businesses and residents meets or exceeds all state and federal drinking water standards.

Si habla español y tiene preguntas sobre el contenido de este mensaje por favor de comunicarse con Paola Giles al ***PGiles@valleywater.org*** o **(408) 630-2880**.

Nếu bạn nói tiếng Việt và có thắc mắc về nội dung của thông báo này, xin vui lòng liên hệ với Hoan Cutler tại ***HCutler@valleywater.org*** hoặc **(408) 630-3135**.

如果你說中文並對上述訊息有疑問, 請聯繫 Julia Tat, 電郵 ***JTat@valleywater.org*** 或者電話: **(408) 630-3168**.

CONTACT US

To find out more about PFAS or to submit questions or comments, contact **George Cook** at **(408) 630-2964** or ***GCook@valleywater.org*** or use our **Access Valley Water** customer request system at ***https://deliver.com/2yukx.***

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Valley Water

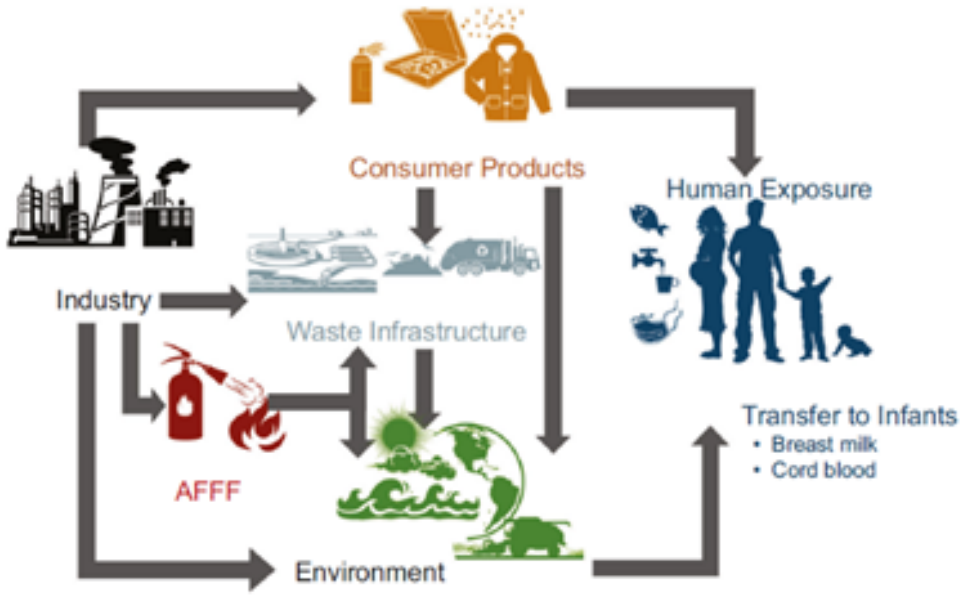
Clean Water • Healthy Environment • Flood Protection

PFAS Update

Board of Directors Meeting August 11, 2020

What are PFAS?

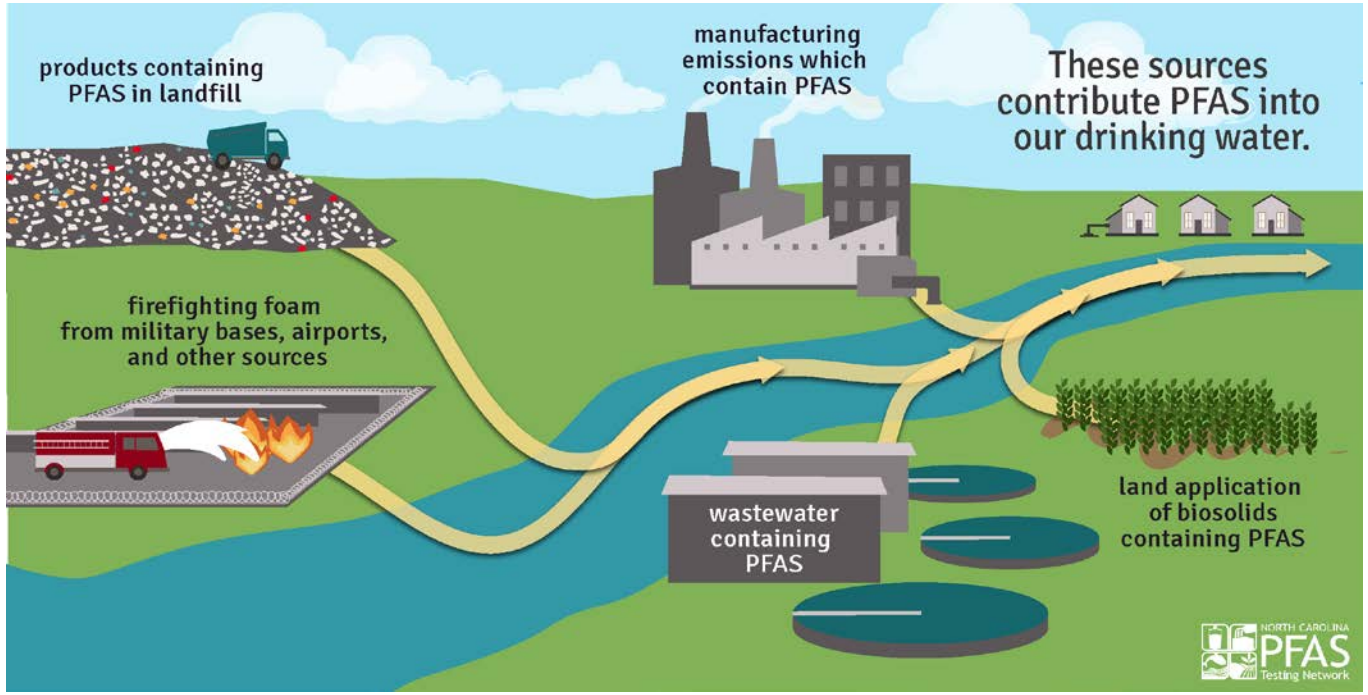
- Large group of man-made chemicals that make products resistant to heat, oils, stains, or water
- Thousands of chemicals used extensively in industrial and consumer products (cookware, clothing, food packaging, furniture, etc.)
- Potential adverse health effects include reproductive/developmental harm, immune system suppression, and cancer



Potential major exposure pathways of PFAS to humans.
Figure from Sunderland et. al. (2019)

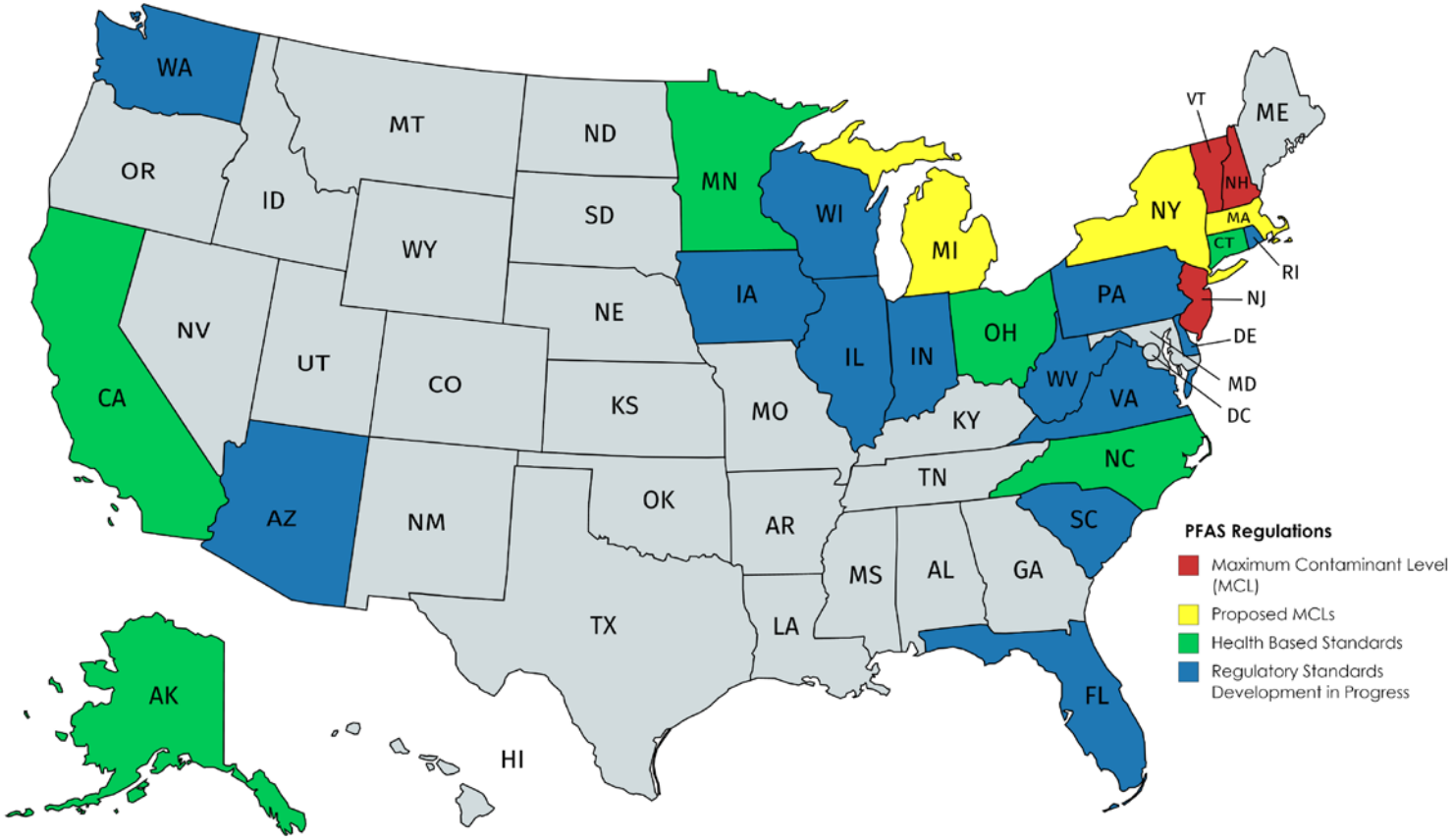
How do PFAS get into drinking water?

- Major environmental sources
  - fire training/fire response sites,
  - industrial sites,
  - landfills, and
  - wastewater treatment plants/biosolids
- PFAS accumulate in groundwater and are persistent in the environment



Status of drinking water regulations

- No federal standards for PFAS in drinking water
- A few states have adopted drinking water standards
- Some states working to develop standards



Status of PFAS regulations in California

- Health-based advisory levels in the part per trillion range for two common PFAS: PFOA and PFOS
  - Notification levels
    - If exceeded, water providers must notify their governing bodies, and the State Board recommends they inform customers
  - Response levels
    - If exceeded, water providers must take the source out of service, provide treatment, or notify customers
- State Board ordering sampling near potential sources and seeking guidance from Office of Health and Hazard Assessment to inform potential drinking water limits

Local PFAS testing in groundwater

- Mandated testing
  - EPA required large water systems to test PFAS between 2013 and 2015
    - No detections, but now able to detect at lower levels
  - State Board orders to test various wells beginning in 2019
  - Valley Water required to test Campbell well field under State Board order
    - PFOA and PFOS detected in two wells, no detections above notification levels

- Voluntary testing
  - Valley Water monitoring well testing
    - PFAS not widely present above notification levels, but detected in some wells
  - Some retailer testing of water supply wells
    - PFOS above notification level in 8 active San Jose Water Company wells
    - Active wells taken out of service out of abundance of caution and customers notified

PFAS in local groundwater

- Valley Water monitoring near recycled water irrigation sites shows consistent PFOA/PFOS detections above notification levels in some shallow monitoring wells not used for drinking water.

- Testing by Valley Water and others shows PFOA/PFOS not widely present above notification levels.

- No water supply wells have had PFAS detections above the response level, which requires taking the source out of service, treatment, or notification.

- The presence of PFAS in local groundwater is concerning and warrants further evaluation.
  - Valley Water is analyzing all available data to assess the extent of PFAS in groundwater.

Ongoing work

- Continue to coordinate with water retailers and regulatory agencies to understand PFAS occurrence and potential sources
- Continue to monitor evolving regulatory and treatment technology developments for PFAS
- Maintain updated information for interested stakeholders
- Assess the need for additional sampling
  - Valley Water lab now accredited to test for PFAS

FACT SHEET

Per- and Polyfluoroalkyl Substances (PFAS)

Valley Water

What are PFAS, PFOA, and PFOS?

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Certain PFAS chemicals (including PFOA and PFOS) are no longer manufactured in the United States (U.S.). However, they are still produced internationally and are imported into the U.S. in consumer goods.

What are the health effects of PFOA and PFOS?

PFOA is a possible human carcinogen according to the International Agency for Research on Cancer. Available studies suggest PFAS exposure can cause adverse effects in humans, including increased cholesterol, thyroid and liver disease, decreased fertility, lower birth weights, decreased vaccine response, and pregnancy-induced hypertension.

How are people exposed to PFAS?

These chemicals have been widely used for decades in industrial applications and consumer products. Most people have been exposed to these chemicals through consumer products but drinking water can be an additional source of exposure. The major sources of PFAS in water supplies are fire training/response sites, industrial sites, landfills, and wastewater treatment plants/biosolids. Because of their persistence in the environment, PFAS have the potential to accumulate in water supplies.

Are there drinking water standards for PFOA and PFOS?

State and federal lawmakers, along with regulators are moving toward stricter standards and guidelines for the detection, public notification, and treatment of PFOA and PFOS in drinking water.

Currently, the Environmental Protection Agency (EPA) has established a drinking water health advisory of 70 parts per trillion (ppt) for a combined concentration of PFOA and PFOS. If exceeded, EPA recommends water providers assess the contamination, inform customers, and limit exposure. EPA is working to establish drinking water regulations for PFOA and PFOS by setting an enforceable Maximum Contaminant Level.

In 2019, the State Water Resources Control Board (State Board) set a drinking water notification level for PFOA (5.1 ppt) and PFOS (6.5 ppt). If exceeded, water providers must notify their governing bodies, and the State Board recommends they inform customers. In the beginning of 2020, the State Board set the current response level at 10 ppt for PFOA and 40 ppt for PFOS. If exceeded, water providers are required to either take the water source out of service, provide treatment, or notify customers in writing.

Has local water been tested for PFOA and PFOS?

To better understand the occurrence of PFAS, the EPA required large public water systems to test for various PFAS, including PFOA and PFOS, between 2013 and 2015. There were no detections of PFAS in groundwater or surface water in Santa Clara County as part of this testing.

The ability to detect these chemicals at even lower levels has evolved since the EPA-required sampling. Based on limited sampling conducted since then, PFOA and PFOS have not been detected in Valley Water's imported water or treated water supplies.

In February 2020, Valley Water voluntarily sampled PFAS at 55 monitoring wells throughout Santa Clara County. These results and other available data indicate that PFOA and PFOS are not widely present above current State Board health-advisory levels.

PFOS was found above the notification level in six water supply wells in San Jose, prompting the water retailer to discontinue use of the wells out of an abundance of caution. PFOA or PFOS have not been detected in any water supply wells at levels where the State Board recommends removing the water source from service (also known as the response level) in Santa Clara County.

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