Santa Clara Valley Water District
Board of Directors Meeting

HQ. Bldg. Boardroom, 5700 Almaden Expressway, San Jose, California
Join Zoom Meeting: https://valleywater.zoom.us/j/84454515597

SPECIAL BOARD MEETING
AGENDA

Tuesday, September 19, 2023
11:00 AM

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

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RICK L. CALLENDER, ESQ.
Chief Executive Officer

MICHELE L KING, CMC
Clerk of the Board
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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.

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Board of Directors

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1. CALL TO ORDER/ROLL CALL:

1.1. Roll Call.

1.2. Pledge of Allegiance/National Anthem.

1.3. 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/Committee on any item not listed on the agenda may do so by filling out a Speaker Card and submitting it to the Clerk or using the "Raise Hand" tool located in the Zoom meeting application to identify yourself to speak. Speakers will be acknowledged by the Board/Committee Chair in the order requests are received and granted speaking access to address the Board/Committee. Speakers' comments should be limited to three minutes or as set by the Chair. The law does not permit Board/Committee action on, or extended discussion of, any item not on the agenda except under special circumstances. If Board/Committee 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/Committee may take action on any item of business appearing on the posted agenda.

2. 11:00 AM - TIME CERTAIN

2.1. Receive Information and Provide Feedback on the Development of Valley Water's Water Supply Master Plan 2050. 23-0541

Recommendation:
A. Receive an update on the Water Supply Master Plan 2050 Development; and
B. Provide feedback and direction to staff on the Water Supply Master Plan 2050 planning framework and engagement plan.

Manager: Kirsten Struve, 408-630-3138

Attachments: Attachment 1: Demand Projection
Attachment 2: Project Description
Attachment 3: No-Regrets Package Update
Attachment 4: PowerPoint

Est. Staff Time: 30 Minutes

2.2. Water Supply Capital Workshop to Review the Capital Validation and Evaluation Processes, Review the Funding Filters for Prioritization, Introduce New Capital Funding Categories, and Provide an Overview of Capital Projects Included in the Capital Improvement Program Fiscal Years 2024-28 Five-Year Plan Funded by the Water Utility Enterprise Fund. 23-0889

Recommendation: Receive information and provide feedback, as necessary.

Manager: Luz Penilla, 408-630-2228

Attachments: Attachment 1: PowerPoint
*Handout 2.2-A: PowerPoint

Est. Staff Time: 15 Minutes

3. REPORTS/ANNOUNCEMENTS AND OTHER MATTERS:

3.1. Clerk Review and Clarification of Board Requests.

4. ADJOURN:

4.1. Adjourn to the 11:00 a.m. Closed Session and 1:00 p.m. Regular meeting on September 26, 2023, in the Santa Clara Valley Water District Headquarters Building Boardroom, 5700 Almaden Expressway, San Jose, California, and via Zoom teleconference.

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File No.: 23-0541 **Agenda Date:** 9/19/2023
Item No.: 2.1.

BOARD AGENDA MEMORANDUM

Government Code § 84308 Applies: Yes ☐ No ☒
(If “YES” Complete Attachment A - Gov. Code § 84308)

SUBJECT:
Receive Information and Provide Feedback on the Development of Valley Water’s Water Supply Master Plan 2050.

RECOMMENDATION:

A. Receive an update on the Water Supply Master Plan 2050 Development; and
B. Provide feedback and direction to staff on the Water Supply Master Plan 2050 planning framework and engagement plan.

SUMMARY:
The Water Supply Master Plan (WSMP) is the Santa Clara Valley Water District’s (Valley Water) guiding document for long-term water supply investments to ensure water supply reliability for Santa Clara County. Updated about every five years, this long-range plan assesses future county-wide demands and evaluates and recommends water supply and infrastructure projects to meet those demands to achieve Valley Water’s level of service (LOS) goal through the planning horizon. Valley Water’s LOS goal is “Meet 100 percent of annual water demand during non-drought years and at least 80 percent demand in drought years.”

The most recent plan, Water Supply Master Plan 2040, was adopted by the Valley Water Board of Directors (Board) in 2019. This memorandum presents the framework of and progress on the development of the WSMP 2050, including planning goals and strategies, water supply needs, list of projects under consideration, and project evaluation criteria. It also provides the plan for board, committee and stakeholder engagement, as well as a timeline for completing the plan.

Planning Goals and Strategies
The WSMP 2050 proposes establishing planning goals to guide what Valley Water intends to achieve. Valley Water’s mission is to provide a safe and reliable water supply now and in the future. To that end and consistent with Board Ends Policies, the proposed planning goals of the WSMP 2050 are to:

- Ensure reliability and sustainability of the existing water supply system
- Diversify water supplies to meet the Level of Service goal
- Minimize the risk of shortage and disruption

- Maintain affordable water rates through cost-effective water supply investments and management

The WSMP 2040 recommended three strategies to help guide water supply investment decisions. Staff recommends updating these strategies to be better aligned with the planning goals, while preserving the gist of the existing strategies. The proposed strategies are:

1. Secure existing supplies and infrastructure
2. Expand water conservation and reuse
3. Increase system reliability and flexibility

Together, these three strategies establish a framework for providing a sustainable, reliable, and affordable water supply and strike a balance between protecting what we have, investing for the future, and making the most use of the existing water supply system.

Planning Horizon

For the WSMP 2050, staff recommends using a planning horizon of around 30 years (i.e. to 2050), rather than the previously used 20 years. This longer timeframe strikes a good balance between data availability and the uncertainty related to future conditions and will enable the full benefits of large infrastructure projects to be captured, as they often take several decades to be fully implemented and functioning. In addition, the 2050 planning horizon will ensure consistency between the updated WSMP and next Urban Water Management Plan, which Valley Water is required to update in 2025.

Planning Approach

To explicitly account for uncertainty affecting many factors in water supply planning and provide further flexibility in decision-making, a scenario planning approach is recommended to present alternatives of how the future might unfold, rather than one single forecast as was done with past plans. The approach involves analyzing several possible future conditions that bookend future water supply and demand possibilities, and identifying projects and programs that can meet water supply needs under each future condition.

With this approach, Valley Water is proposing to analyze four alternative futures based on the combination of demand projections and forecasted imported water supplies. Imported water accounts for about half of Valley Water's annual supply and is often reduced during droughts. Imported water availability is the primary driver for reliability and therefore the most appropriate proxy for overall supply. The proposed four futures are:

A. Stable demand and stable imported supplies
B. Stable demand and reduced imported supplies
C. High demand and stable imported supplies
D. High demand and reduced imported supplies

The demand projections were developed from Valley Water's demand model as described in Attachment 1. Valley Water's demand modeling integrates the understanding of historic water use trends, housing and economic growth, climate change, and post-drought water use rebound. The stable demand, representing low end, assumes demands stay flat at 2025 levels through 2050, in part owing to the success in making water conservation a way of life and mitigating the impacts of growth on water use. The high demand assumes significant, unmitigated impacts from growth and severe climate change, which increases outdoor water use in particular. The forecasted 2050 countywide stable and high demands are approximately 330,000 acre feet per year (AFY) and 370,000 AFY, respectively, assuming Valley Water achieves its long-term conservation goals of 110,000 AFY by 2040. If water conservation goals are not achieved, demands are projected to be significantly higher, which highlights the importance of water conservation in reducing water demands. Staff is currently developing proposals for 2050 conservation targets as part of the WSMP 2050 development. The actual countywide water use for the year 2022, the last dry year of a three-year drought, was 283,900 AFY.

The imported water baseline supply scenarios were selected from Department of Water Resources (DWR) modeling. The modeling assumes existing regulatory conditions and State Water Project (SWP) and Central Valley Project (CVP) infrastructure and takes into account climate change impacts. The stable imports scenario represents SWP and CVP deliveries with small impact from climate change, while the reduced imports scenario represents significantly impacted deliveries, p articularly during droughts.

Baseline Needs Assessment Under Alternative Futures
Under each of the four future conditions, water supply needs under baseline condition were assessed using modeling analysis. With no new investment, the baseline condition assumes completion of planned local dam seismic retrofits by 2035 (Almaden, Calero, Guadalupe), achieving long-term water conservation goals (2040), and maintaining Valley Water assets.

Valley Water's current contract for participation in the Semitropic Water Storage District groundwater banking will expire in 2035. Given the challenges that Semitropic has faced related to water quality and new Sustainable Groundwater Management Act (SGMA) legislation and their potential impact on future groundwater banking at Semitropic, the modeling analysis considered two baselines - one with Semitropic still in place after 2035 and another one assuming Semitropic no longer available after 2035.

Under all four futures, Valley Water will experience water shortages if relying only on existing supplies and infrastructure, and the biggest challenge for meeting water supply needs will be multiple-year droughts. The shortages will start as early as 2030 in the future scenario of stable demand and reduced imported supplies. With Semitropic in place, the average shortages over a six-year drought in 2050 could range from 4,000 AFY to 76,000 AFY, and the shortages increase as demand increase and imported supplies decreases. Without Semitropic, the shortages could get worse, with a range from 30,000 AFY to 82,000 AFY, underscoring the importance of securing and diversifying groundwater banking. Valley Water's current system can handle the first two years of a multi-year drought, with shortage starting the third year. The projected shortages represent the targets that future water supply investment aim to meet to achieve Valley Water's LOS.

Projects Under Consideration
The WSMP 2040 evaluated a suite of projects, of which six were recommended for continued planning and investment. Staff has continued evaluating the rest of the projects, referred to as "backup projects," in case recommended projects do not work out. The WSMP 2040 project list was reviewed to remove the ones currently not under active consideration and add new ones. The updated project list (Table 1) includes 18 projects that will be evaluated through the WSMP 2050

development for meeting future needs/goals. For organizational purposes, these projects are grouped as shown in Table 1, although their benefits are often more complex than indicated by this grouping. More detailed description of each project is provided in Attachment 2. Several South County projects are included to evaluate how to ensure a sustainable water supply for that area. In addition, Valley Water will continue to implement the ‘no-regrets’ package of conservation and stormwater capture projects identified in the WSMP 2040. The status of the ‘no-regrets’ package is provided in Attachment 3.

Table 1 Projects Under Consideration

Project Type	Project
Alternative Supply	Potable Reuse – Palo Alto
	Potable Reuse – San Jose
	Refinery Recycled Project
	Local seawater desalination project
Surface Supply	Delta Conveyance Project
	Sites Reservoir
	Stormwater - Agricultural Land Recharge (FloodMar)
	Stormwater capture
Storage	Pacheco Reservoir Expansion
	Los Vaqueros Expansion
	Groundwater Banking
	B.F. Sisk Dam Raise
Recharge & Pipelines	Coyote Valley Recharge Pond
	Lexington Pipeline
	Lexington-Montevina Water Treatment Plant Connection
	Butterfield Channel Managed Aquifer Recharge
	Madrone Channel Expansion
	San Pedro Ponds Improvement Project

For major projects, the additional information on water supply benefits and cost is provided in Tables 2 and 3. For supply projects, a unit cost was calculated using 30-year lifecycle cost (capital + annual O&M) with financing relative to proposed annual supply benefit. For storage projects, a "storage capacity cost" or cost per AF of storage capacity was calculated using 30-year lifecycle cost (capital + annual O&M) with financing relative to proposed storage capacity. However, actual project lifecycles vary, 30-year was chosen for ease of comparison at this stage, and longer lifecycles may be used in the future. These costs will be updated to consider additional details and modeling that will be performed as part of portfolio development. All costs are represented in 2023 dollars.

Table 2 Preliminary Unit Cost of Major Supply Projects (2023$)

Project	Average Annual Supply (AF)	Capital Cost (Million$)	Annual O&M (Million$)	30 Year Lifecycle Cost Present Value (PV) (Million$)	Lifecycle Cost PV/ Supply PV ($/AF)
Potable Reuse - Palo Alto	8,000	782	14	1,169	7,842
Potable Reuse - San Jose	24,000	1,181	29	1,599	4,208
Refinery Recycled Project	8,000	265	9	445	2,834
Delta Conveyance Project	13,850	627	2.5	513	2,374
Sites Reservoir	380	10	0.05	10	1,270

Table 3 Preliminary Storage Capacity Cost of Major Storage Projects (2023$)

Project	Storage (AF)	Capital Cost (Million$)	Annual O&M (Million$)	30 year Lifecycle Cost (Million$)	Lifecycle Cost/ Storage Capacity ($/AF)
Pacheco Reservoir Expansion	134,000	2,210	2.5	2,700	20,149
B.F. Sisk Dam Raise	60,000	435	1.8	717	11,950
Los Vaqueros Expansion	30,000	100	3.8	258	8,600
Groundwater Banking	200,000	160	0.7	283	1,415

Project Evaluation Criteria

Project evaluation is a critical step in the WSMP 2050 development to identify the portfolios for recommendation. A list of 14 criteria (Table 4) was developed to evaluate and compare projects. The criteria are generally consistent with peer agency practices and the funding filters used by Valley Water's Capital Improvement Program. Among the proposed criteria, the water supply benefit and cost will be the most important and therefore the first criteria to be used to evaluate projects and portfolios. Following that, the remaining criteria will be used to further differentiate among options. The project evaluation framework is intended to present a systematic and holistic approach to evaluate and ultimately recommend projects for selection within the context of the WSMP and financial constraints.

Table 4 Project Evaluation Criteria

Evaluation Criteria	Description
Water Supply Benefit	Quantifiable water supply benefits of the project
Cost/Rate Impact	Construction, planning/design, O&M, and other cost
Timing	The year the project will be in service
Technical Feasibility	Technical ability to implement the project
Operation	How the project operates, specifically how it connects to existing system and moves water around
Reliability	Reliability of the project in providing its primary benefits during periods of dry year need
Readiness/Likelihood of Success	The readiness of project implementation and chance of success
Flexibility	Operation/implementation across a wide range of conditions and whether it can enhance overall system flexibility
Jurisdiction/Partnership	Primary jurisdiction and partners of the project
Permitting/Legal Issues	Permits required and any legal Issues/concerns
Environmental Impacts/Justice	Anticipated positive or negative impacts on the natural environment and environmental justice
Public Acceptance	Public opinion and political support for the project
Inter-dependence	Whether the project will need other projects to be functioning or can magnify other projects
Risk/Challenges	Any significant risks/challenges that could potentially derail the project

Board and Committee Engagement Plan
Throughout the WSMP 2050 development process, staff plans to engage the Board and committees to present major milestones and progress and seek input and approval as follows:

- Engaging the board at regular board meetings for update and special workshops for in-depth discussions
- Engaging board committees as needed for discussion/recommendation on topics within their jurisdiction
    - Water Conservation and Demand Management Committee

  - Water Storage Exploratory Committee
  - Recycled Water Committee

- Presenting at board advisory committees and stakeholder meetings for information sharing and feedback
  - Agricultural Water Advisory Committee
  - Water Retailer Meeting
  - Environmental and Water Resources Committee
  - Water Commission Meeting
  - Youth Commission

Stakeholder Engagement Plan
Stakeholder engagement is an important component of the WSMP update process and will be carried out throughout the plan development. Valley Water plans to hold four meetings with retailers at various stages of the plan development to seek input. Two retailer meetings were held in March and July 2023, respectively, and another two are tentatively planned for January and September 2024.

In addition to formal meetings, committee meetings, and workshops, Valley Water will use the WSMP webpage (<https://www.valleywater.org/your-water/water-supply-planning/water-supply-master-plan>), stakeholder email list, and communication newsletter or other channels as ongoing opportunities to provide updates. Valley Water will update the WSMP webpage and use it as a central place to advertise committee and board meetings when the WSMP is on the agenda, post meeting materials, and provide a point of contact to ensure the public is engaged.

Expert panel
The development of the WSMP 2050 involves comprehensive review and evaluation of Valley Water's future water supply needs and various projects and portfolios for providing a reliable supply of water for Santa Clara County. The primary analysis of the WSMP 2050 is being performed by Valley Water staff, but an independent review from outside experts can help ensure the data, assumptions, and analysis of the plan are sound and justifiable. Therefore, Valley Water convened a panel of four experts to review staff's analyses:

- David Sunding, PhD - Professor at University of California, Berkeley
- Newsha Ajami, PhD - Chief Development Officer for Research, Lawrence Berkeley National Lab
- Michael Anderson, PhD - State Climatologist, Department of Water Resources
- Yung-Hsin Sun, PhD - Senior Principal Consultant, Sunzi Consulting LLC

The expert review will be focused on overall planning framework and approach, demand projection, cost analysis, project evaluation, and climate change analysis.

WSMP Update Timeline
The proposed timeline for the plan development is as follows. Staff proposes to return to the full Board with preliminary portfolio analysis in December 2023/January 2024.

- **2023**
  - Establishment of overall framework and procedures
  - Project/portfolio analysis and evaluation
  - Stakeholder engagement

- **2024**
  - Portfolio analysis and recommendation
  - Plan development
  - Stakeholder outreach
  - Plan adoption

ENVIRONMENTAL JUSTICE IMPACT:
There are no Environmental Justice impacts associated with this item.

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: Demand Projection
Attachment 2: Project Description
Attachment 3: No-regrets Package Update
Attachment 4: PowerPoint

UNCLASSIFIED MANAGER:
Kirsten Struve, 408-630-3138

Valley Water

File No.: 23-0806 **Agenda Date:** 8/28/2023
Item No.: 4.4.

COMMITTEE AGENDA MEMORANDUM
Water Conservation and Demand Management Committee

Government Code § 84308 Applies: Yes ☐ No ☒
(If “YES” Complete Attachment A - Gov. Code § 84308)

SUBJECT:
Valley Water Demand Model and Forecast.

RECOMMENDATION:
Receive and discuss Valley Water demand model and forecast.

SUMMARY:
As part of the Water Supply Planning program, Valley Water developed and maintains an econometric-based demand model. A reliable water demand forecast is needed to determine the level of investment necessary to meet Santa Clara County’s future water supply needs. This memorandum summarizes Valley Water’s demand modeling approach and provides the demand forecasts Valley Water proposes to use in its Water Supply Master Plan 2050.

Demand Model Approach
Valley Water’s demand modeling integrates the understanding of historic water use trends, housing and economic growth, climate change, and post-drought water use rebound. The model was developed, calibrated, and validated using historic datasets, including sectoral water use provided by the retailers (e.g., residential, commercial, etc.), independent well owner pumping, weather, economic parameters, and housing information (Attachment 1).

The demand model is segmented by billing group (e.g., individual retailers, independent pumpers grouped by groundwater management zone, and agricultural users grouped by management zone). Each retailer is then further segmented into single family, multi-family, and commercial, industrial, and institution (CII) sectors. An econometric equation developed using historic datasets was created for each model segment. The model combines the segment-level equations with projected growth, climate, economic, and drought rebound parameters to forecast Santa Clara County demands. Given the uncertainty in each of the projected parameters, Valley Water is proposing to use a demand range for its Water Supply Master Plan 2050 analyses.

Forecasted Water Use

Valley Water used forecast information on housing and economic growth from the Association of Bay Area Governments (ABAG) Plan Bay Area 2040 and city general plans. Water rate forecasts were provided by the Valley Water Protection and Augmentation of Water Supplies (PAWS) analyses. Climate change data from global climate models were downscaled for Santa Clara County. Valley Water also included a drought rebound assumption that considered the muted rebound seen during the 2012-2016 drought and the Board of Directors (Board) June 2023 resolution to make water conservation a way of life.

Forecasted county-wide 2050 demands for Valley Water range from approximately 330,000-425,000 acre-feet per year (AFY) if Valley Water does not achieve its long-term water conservation goal of 110,000 AFY by 2040. If Valley Water achieves its conservation goal by 2040, then forecasted demands range from approximately 330,000 AFY-390,000 AFY. The lower bound, which is the same with and without conservation forecasts, assumes demands stay constant at 2025 levels through 2050, in part owing to the success in making water conservation a way of life and mitigating the impacts of growth on water use. From a historical perspective, water use dropped 25% in the last 5 years (from 148 gallons per person per day in 2017 to 111 gallons per person per day in 2022). In addition, the county population increased by 25% over the past 30 years, while water demand has decreased by about 8% in that time (1990-2020). The higher bound demand is significantly impacted by severe climate change and growth. As part of the Water Supply Master Plan update, Valley Water is developing a 2050 conservation target and will bring it to the committee for review when ready; thus, no conservation is accounted for between 2040-2050 in the reported forecasts.

Next Steps

Valley Water will continue to track growth, economic, and climatic factors that can impact demands and update forecasts as needed. Valley Water plans to use the demand forecast data in water supply modeling that will inform Water Supply Master Plan 2050 investment recommendations.

ENVIRONMENTAL JUSTICE IMPACT:

There are no Environmental Justice impacts associated with this item.

ATTACHMENTS:

Attachment 1: Demand Model Development
Attachment 2: PowerPoint Presentation

UNCLASSIFIED MANAGER:

Kirsten Struve, 408-630-3138

March 2, 2020

To: Samantha Greene, Ph.D.

From: Luke Wang
Jack Kiefer
Kinsey Hoffman
Leah Bensching

cc: Jing Wu, Metra Richert, Jessica Lovering

Technical Memorandum 3

Modeling Approach and Development

Introduction

Santa Clara Valley Water District (Valley Water) has developed a new model to forecast total water demand in Santa Clara County. Demand projections from the model will be used to support several planning initiatives and documents including:

- The 2021 Urban Water Management Plan (UWMP);
- Monitoring of and updates to the Water Supply Master Plan;
- Inputs to Valley Water's water supply planning model; and
- Evaluation of conservation programs and capital projects.

Valley Water manages a diverse portfolio of water supplies to provide water to Santa Clara County's 13 water supply retailers and non-retailer groundwater pumpers.[1] The majority of water users in Santa Clara County are customers of the water supply retailers. As a result, each retailer typically develops their own water demand forecasts. These forecasts are useful and have been used to inform Valley Water's prior UWMPs. However, Valley Water is responsible for County-wide water resource planning activities (e.g., groundwater management, treated water production, potable reuse development, surface water infrastructure management and development, and active conservation program implementation); collectively, these activities are better served by a consistent modeling approach and planning assumptions across the service area.

The purpose of this Technical Memorandum (TM 3) is to document the modeling approach selected to develop Valley Water's updated demand model. Major characteristics of the modeling approach include a statistical/econometric analytical framework, differentiation of rates of water use from drivers of growth, and model segmentation based on geography (e.g., retail agency), time of year, and water use sector. TM 3 also includes a summary of the statistical model fits and performance compared to historical

[1] Non-retail groundwater pumpers include private well owners that are outside of retailers' service areas.

observations of water consumption. Discussions of model fits and performance are organized based on water use sector segmentation and includes the following sectors:

- Single family;
- Multifamily;
- Commercial, Industrial, and Institutional (CII); and
- Non-retailer groundwater pumpers.

The model sectors are designed to establish baseline demand projections without considering additional future water conservation. Projections of future conservation savings are generated separately by Valley Water's water conservation model and then deducted from the baseline projections generated for the model sectors described herein.

Table of Contents

1. Modeling Approach

Valley Water's demand model is organized following the demand forecasting typology identified in TM 1.[2] This section provides a general overview of this approach to establish context for detailed discussions on model development in Sections 2 – 5 of this TM.

1.1 Model Segmentation

The demand model was segmented based on type of provider, i.e., retail agency or non-retail groundwater pumper. Within each provider type, the model was further segmented by geography, sector/billing classification, and time of year. For retail provided water, model geographies were based on each retail agency's service area within Santa Clara County. Billing classifications often differed among retail agencies necessitating standardization of billing classifications into common sectors (e.g., single family, multifamily, commercial, industrial, and institutional). Appendix A provides a detailed summary of the billing classifications for each retail agency, and the standardized sectors used for modeling; Valley Water directly solicited the retail agencies for input in standardizing billing classifications, particularly for classes that have the potential to span across multiple water use sectors (e.g., landscape irrigation and recycled water). Non-retail groundwater pumpers were organized geographically by groundwater basin charge zone, including W2 (representing the Santa Clara Plain sub-basin management area) and W5 (representing the Llagas sub-basin and Coyote Valley sub-basin management area). Water use classifications for non-retail groundwater pumpers are consistent across each charge zone and include agricultural, municipal, and domestic water use types. These water use classifications were ultimately organized into two model sectors, Municipal and Industrial (M&I) and Agricultural (Ag).

The retail agency demands were modeled using a monthly timestep, and non-retail groundwater pumper demands were modeled using an annual timestep. Non-retail groundwater pumper annual demands were then post-processed to monthly demands using a monthly distribution. Figure 1-1 further details the hierarchical structure of model segmentation.

[2] Technical Memorandum 1: Benchmark Analysis of Regional Demand Projection Models.

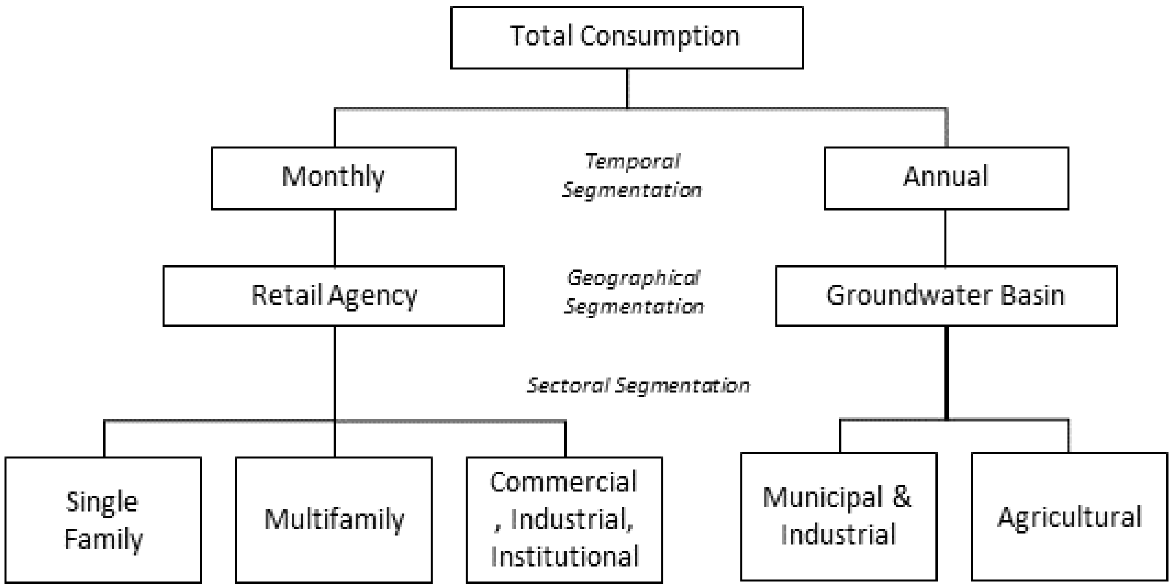


Figure 1-1: Hierarchy of Model Segmentation

1.2 Rate of Use Differentiation

Rate of use differentiation (i.e., characterizing consumption to reflect water using intensity) was applied in developing the retailer models. Rates of use were calculated given Equation (1) below, where for any given model sector Q reflects volumetric consumption, N is the count of driver units, and q is the rate of water use per driver unit.

$$Q \equiv N * \frac{Q}{N} \equiv N * q \qquad \textbf{(1)}$$

Rate of use differentiation requires a reliable and consistent historical driver unit dataset for model development and a corresponding future dataset representing projected driver unit counts. Consistent and reliable driver unit datasets for the retailer models were developed using data from the California Department of Finance (CADOF; historical data) and the Association of Bay Area Governments (ABAG; future projected data).[3] Corresponding driver units were not available for the non-retailer groundwater pumpers, so models were developed on a volumetric basis. Table 1-1 documents the driver units and corresponding rate of use for each retail model sector.

Table 1-1: Driver Units and Rate of Use for Each Retail Model Sector

Model Sector	Driver Unit (N)	Corresponding Rate of Use (q)
Single Family Multifamily	Housing units	Consumption per housing unit
CII	Employees	Consumption per employee
CII (Stanford)	Population	Consumption per capita

[3] Refer to Technical Memorandum 2: Data Collection and Review (TM 2).

1.3 Method / Statistical Approach

Valley Water collected historical consumption data from its retail agencies,[3] which generally spanned the period 2000-2018.[4] This dataset was sufficient from temporal, geographical, and sectoral perspectives (following sectoral standardization) to explore fitting customized statistical / econometric models identified in TM 1.[2] Development of historical econometric models provide a strong analytical benefit in forecasting demand, as they allow for the estimation of cause-effect relationships between weather, price, socioeconomic, and other factors that lead to variability in water demand. Quantifying these causal relationships allows for analysis of "what-if" scenarios that are uncertain, but important to consider for planning (e.g., climate change, development patterns, drought recovery).

Development of statistical / econometric models is an iterative process. Figure 1-2 and Table 1-2 outline the process used to fit the econometric models.

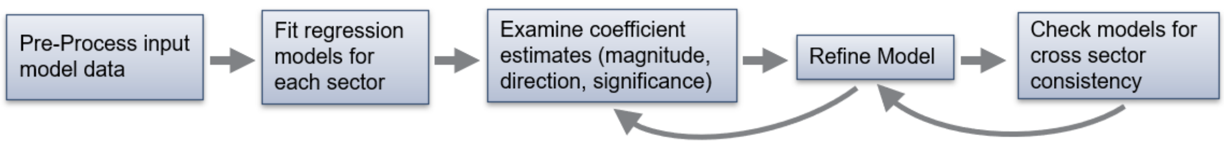


Figure 1-2: Process for Developing Statistical / Econometric Models

Table 1-2: Description of Model Fitting Procedures

Model Fitting Procedure	Description
Pre-process model input data[(a)]	Conduct necessary pre-processing calculations prior to model fitting, e.g.: • Geographical processing of driver units. • Calculate per-unit use. • Calculate natural logarithms of per-unit use and appropriate predictors. • Calculate departures from normal conditions for appropriate predictors (i.e., economic trend and weather). • Calculate any index, "dummy", or interacted parameters (e.g., seasonal cycle, geography, drought severity). • Smoothing monthly and bimonthly data to adjust for irregular billing cycles.
Fit regression models for each sector	Use statistical estimation software (e.g., R, SAS, EViews) to fit linear regression equations to per unit use with the initially selected predictor variables.
Examine coefficient estimates and measure of fit	Check measures of fit (e.g., R^2) and coefficient estimates for reasonable magnitude, direction/sign, and significance.
Refine model to improve measures of fit and coefficient estimates	If the model fit is poor or if coefficient estimates are illogical or insignificant, several actions can be taken, including but not limited to: • Identifying and removing outlier data points that have significant leverage on coefficient estimates. • Remove predictors with insignificant or illogical coefficient estimates from the regression equation. • Testing alternate specifications of predictor variables.
Check models for cross-sector consistency	Model fits and predictors are compared across sectors to judge estimates relative to prior expectations; e.g., testing if the relative effects of price and socioeconomic variables vary by sector in a logical way based on past experience.
[(a)] Model data pre-processing is detailed in TM 2.	

[4] Retail agencies submitted historical billing records of varying lengths. Sufficient retailers submitted records from 2000-2018 to establish model fits over the time period.

1.4 Summary of Model Predictors

Several model predictors were used to develop Valley Water's demand model. To be considered for use, potential predictors needed to pass the following conceptual criteria:

- Logical connection to explaining changes in water consumption;
- Historical record consistent with the time series of observed water consumption; and
- Availability of future projections consistent with the desired forecast horizon (i.e., 2020-2045) or a reasonable basis for assuming or generating projected values.

Initial selection of model predictors is discussed in detail in TM 2. However, during the model fitting process, derivatives of initial variables were also developed and included in subsequent model equations. One example is time lags on weather variables; supplementary variables were created from the temperature and precipitation time series at one to three-month lags. These lagged weather variables aimed to capture a delayed or persistent response in water use. A second example is an extended drought effect variable. The initial drought variables were directly calculated from historic water use restrictions. A supplemental drought variable was created that extended the last historic occurrence of mandatory water restrictions (2017) through the end of the historic dataset (2019); this "extended drought effect" variable was considered to represent inertia in behavioral changes in water use after the water use restrictions were no longer in place (i.e., delayed drought rebound). Table 1-3 details the predictors used to develop the demand models and identifies the expected sign and magnitude of the coefficient estimates resulting from the linear regression.

Table 1-3: Description of Demand Model Predictors

Predictor Variable	Log Transformed?	Expectations about Coefficient Estimates	Description
Departure from normal temperature[a]	Yes	Positive sign	Represents difference from long-term temperature. Higher than normal temperatures are associated with higher demands.
Departure from normal precipitation[a]	Yes	Negative sign	Represents difference from long-term precipitation. Higher than normal rainfall is associated with lower demands.
Seasonal index	No	Larger absolute magnitudes for agencies with greater seasonal peaking	Reflects the cyclical pattern in water use where demands a generally higher in the summer and lower in the winter. Represented in the model as a sine / cosine pair of variables.[b]
Price	Yes	Negative sign with absolute value between 0 and 1	Economic theory suggests negative correlation with demand.
Economic index	Yes	Positive sign	Several economic indices were explored as potential predictors[c] with the detrended Economic Cycles Research Institute (ECRI) selected as the index that produced the most reasonable coefficient estimates across model sectors. Water demand is positively correlated with economic fluctuations of the business cycle. The index is modeled in form of departures from long-term trend.
Housing density	Yes	Negative sign (commonly with absolute value between 0 and 1)	Housing density is negatively correlated with demand; on average, residences with more units per acre (or smaller parcel sizes) tend to use less water on outdoor uses.
Median income	Yes	Positive sign (commonly with absolute value between 0 and 1)	Economic theory suggests positive correlation of income with demand; generally geographical areas with higher median incomes tend to use more water.
Persons per household	Yes	Positive sign (commonly with absolute value between 0 and 1)	Positively correlated with demand; generally, residences with more people tend to use larger amounts of water.
Mix of Industries / economic activity[d]	Yes	N/A	The representation of industries / economic activity with a geographical area is related to the amount of water used within the CII sector. Fitted parameters for these variables are generally unique by utility, thus there is no generally accepted range of coefficient estimates.
Drought Severity	No	Negative sign	Reflects the effect of drought restrictions from the most recent drought (2014-2017, with extended restrictions though 2019) on water demand.[e] Defined as the presence of drought restrictions (represented as a binary) multiplied by the requested cutback (e.g. 0-30%).

[a] Lagged values of temperature and precipitation were also evaluated and included as model predictors as the influence of weather on water demand can persist several months.

[b] Most sectors have a single sine/cosine pair representing the seasonal cycle, except for Stanford. Stanford has two sine/cosine pairs to capture seasonal effects associated with the academic calendar. See Section 4.3 for additional discussion.

[c] Other economic indices explored as potential predictors are documented in TM 3.

[d] Detail on the derivation of specific predictors representing mix of industries / economic activity is documented in TM 3.

[e] A unique prediction variable was also evaluated for the 2008-2011 drought but was dropped during the model development process as the coefficient estimate was not statistically significant. The 2008-2011 drought overlapped with the severe economic downturn of the Great Recession which likely mutes its statistical significance.

2. Single Family Regression Development

This section reviews the development of the statistical regression for the single family residential sector.

2.1 Model Predictors and Fitted Coefficients

The fit for the final single family regression is presented in Table 2-1. Coefficient estimates are within the expected range for all explanatory variables.

Table 2-1: Single-Family Regression Predictors and Coefficients

Variable	Coefficient	Standard Error	t-Statistic	Probability
Intercept	3.821	0.324	11.776	<0.05
Seasonal index 1[a]	-0.283 (avg) -0.045 to -0.185	0.013 (avg) 0.008 to 0.026	-24.086 (avg) -7.379 to -24.086	<0.05
Seasonal index 2[a]	-0.262 (avg) -0.616 to -0.064	0.013 (avg) 0.008 to 0.026	-23.026 (avg) -44.960 to -3.786	<0.05
Departure from normal temperature	1.008	0.135	7.464	<0.05
Departure from normal temperature, 1-month lag	0.824	0.137	5.997	<0.05
Departure from normal temperature, 2-month lag	0.354	0.137	2.583	<0.05
Departure from normal temperature, 3-month lag	0.306	0.127	2.413	<0.05
Departure from normal precipitation	-0.008	0.003	-3.01	<0.05
Departure from normal precipitation, 1-month lag	-0.009	0.003	-3.649	<0.05
Departure from normal precipitation, 2-month lag	-0.004	0.003	-1.582	0.114
Price	-0.085	0.009	-9.942	<0.05
Economic index	0.945	0.101	9.316	<0.05
Housing density	-0.406	0.007	-60.745	<0.05
Median income	0.195	0.025	7.778	<0.05
Persons per household	0.473	0.04	11.907	<0.05
Drought severity, extended	-1.506	0.048	-31.109	<0.05
[a] Seasonal indices are unique to each retail agency.				

Variables with an increasing effect on water use (i.e., a positive coefficient) included temperature, economic index, median income, and persons per household. Variables with a decreasing effect on water use (i.e., a negative coefficient) included precipitation, price, housing density, and the extended drought effect.

2.2 Historical Model Performance

Figure 2-1 shows the observed and predicted per-unit use for the single family sector in gallons per unit per day (gpud) calculated as a unit-weighted average across all retail agencies. Performance of the single family regression is summarized in Table 2-2 which shows performance metrics for unit-weighted average County-wide demand. Visual inspection of the time series plot and review of the model fit parameters showed good performance at the County-wide level, including strong agreement with the observed seasonal cycle and ability to reproduce declining consumption during the Great Recession, recovery between the Great Recession and the recent drought, and the sharp decline and muted recovery following the most recent drought.

Historical performance of the single family regression was also strong at the retail agency-level. Model fit statistics calculated at the retail agency-level generally mirrored County-wide performance. Model fit statistics and time series plots for each retailer are presented in Appendix B.

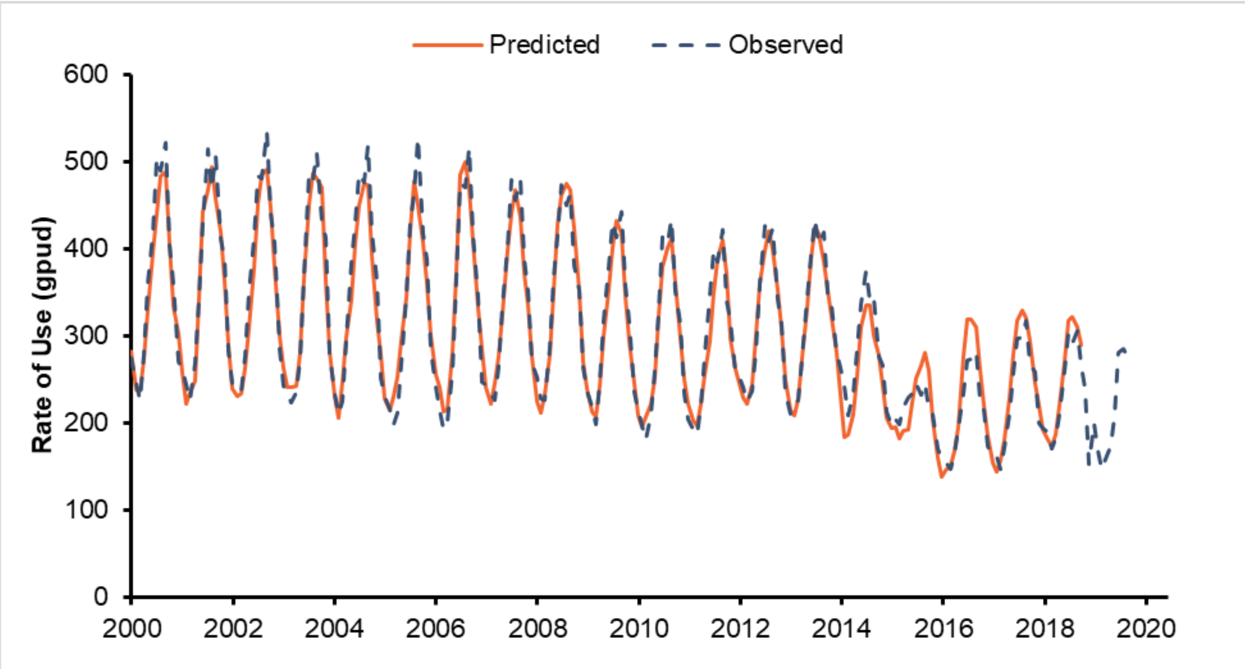


Figure 2-1: County-Wide Single-Family Observed and Predicted Per Unit Rate of Use

Table 2-2: County-Wide Single-Family Regression Performance Metrics

Regression Statistic[(a)]	Value
R-squared	0.95
Average Observed Value (gpud)	305.71
Mean Absolute Percentage Error	5.82%
Mean Bias	-1.13%
[(a)] Statistics calculated using County-wide unit-weighted average observations and predicted values from the regression fits.	

3. Multifamily Regression Development

This section reviews the development of the statistical regression model for the multifamily residential sector.

3.1 Model Predictors and Fitted Coefficients

The fit for the final multifamily regression is presented in Table 3-1. Though most predictors are the same as the single family sector, several predictors (e.g., median income and 2-month lagged departure from precipitation) were dropped and certain predictors (e.g., the intercept term and drought severity) were allowed to vary by retail agency. These modifications to the model design resulted in stronger measures of fit and more reasonable coefficient estimates. Final coefficient estimates presented in Table 3-1 are within the expected range for all explanatory variables.

Table 3-1: Multifamily Regression Predictors and Coefficients

Variable	Coefficient	Standard Error	t-Statistic	Probability
Intercept	5.209	0.074	70.141	<0.05
Agency-specific intercepts[(a)]	-0.223 (avg) -0.719 to 0.280	0.013 (avg) 0.007 to 0.023	-31.555 (avg) -104.09 to 15.203	<0.05
Seasonal index 1[(b)]	-0.161 (avg) -0.372 to -0.056	0.012 (avg) 0.006 to 0.031	-16.311 (avg) -35.651 to -3.872	<0.05
Seasonal index 2[(b)]	-0.138 (avg) -0.255 to -0.056	0.012 (avg) 0.006 to	-13.943 (avg) -29.588 to -13.943	<0.05
Departure from normal temperature	0.488	0.098	4.974	<0.05
Departure from normal temperature, 1-month lag	0.514	0.100	5.155	<0.05
Departure from normal temperature, 2-month lag	0.397	0.094	4.226	<0.05
Departure from normal temperature, 3-month lag	0.194	0.092	2.101	<0.05
Departure from normal precipitation	-0.002	0.002	-1.127	0.260
Departure from normal precipitation, 1-month lag	-0.006	0.002	-2.954	<0.05
Price	-0.055	0.013	-4.347	<0.05
Economic index	1.568	0.091	17.226	<0.05
Housing density	-0.205	0.011	-18.105	<0.05
Persons per household	0.900	0.057	15.788	<0.05
Drought severity, extended[(c)]	-0.718	0.044	-16.294	<0.05

[(a)] Several agencies including San Jose Water Company, San Jose Municipal Water, Great Oaks Water Company, City of Gilroy, California Water Service, and the City of Sunnyvale were fitted with agency-specific intercept terms in order to optimize historical model performance.

[(b)] Seasonal indices are unique to each retail agency.

[(c)] Recorded drought severity coefficient estimate is for all agencies except San Jose Water Company, which was fitted an agency-specific drought severity coefficient.

Variables with an increasing effect on water use (i.e., a positive coefficient) included temperature, economic index, and persons per household. Variables with a decreasing effect on water use (i.e., a negative coefficient) included precipitation, price, housing density, and the extended drought effect.

3.2 Historical Model Performance

Figure 3-1 shows the observed and predicted per-unit use for the multifamily sector in gpud calculated as a unit-weighted average across all retail agencies.[5] Performance of the multifamily regression is summarized in Table 3-2 which shows performance metrics for unit-weighted average County-wide demand. Visual inspection of the time series plot and review of the model fit parameters showed good model performance at the County-wide level, including strong agreement with the observed seasonal cycle and ability to reproduce declining consumption during the Great Recession, recovery between the Great Recession and the recent drought, and the sharp decline and muted recovery following the most recent drought.

Historical performance of the multifamily regression was also strong at the retail agency-level. Model fit statistics calculated at the retail agency-level generally mirrored County-wide performance. Model fit statistics and time series plots for each retailer are presented in Appendix C.

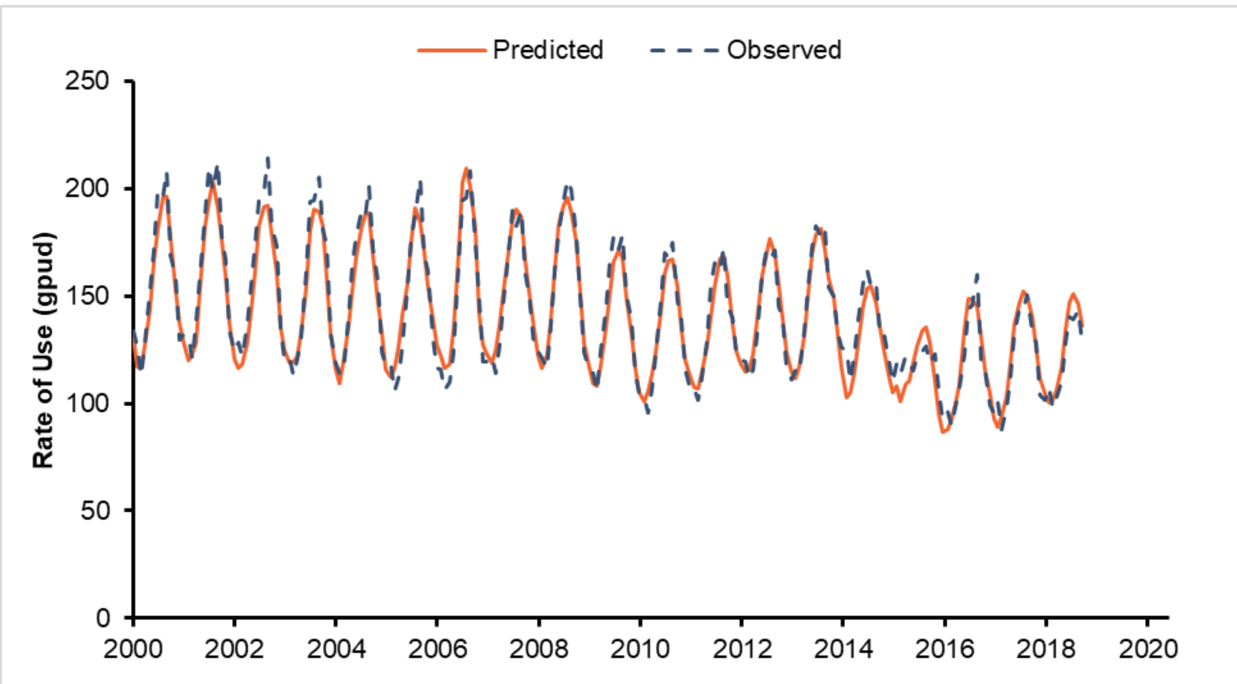


Figure 3-1: County-Wide Multifamily Observed and Predicted Per Unit Rate of Use

[5] Figure 3-1 excludes an outlier monthly observed datapoint for a single retail agency.

Table 3-2: County-Wide Multifamily Regression Performance Metrics

Regression Statistic[a]	Value
R-squared	0.94
Average Observed Value (gpud)	142.26
Mean Absolute Percentage Error	4.53%
Mean Bias	-0.87%
[a] Statistics calculated using County-wide unit-weighted average observations and predicted values from the regression fits.	

4. CII Regression Development

This section reviews the development of the statistical regression for the CII sector. Distinct regressions representing the commercial, industrial, and institutional water use sectors[6] were initially considered. However, different billing classification schemes among retail agencies introduced definitional uncertainty in sectoral water use and driver units. For example, certain agencies lacked a distinct industrial billing classification while others combined commercial and institutional categories. Additional verification of water use at the account-level was not possible given the data constraints for this project.[7] In response to these constraints and uncertainties, total use within the commercial, industrial, and institutional sectors was consolidated into a single composite CII regression. The benefit of combining these sectors is a more parsimonious representation with respect to number of sectors, while providing a means to use the mix of industries to explain CII water use variability across retail agencies.

4.1 Model Predictors and Fitted Coefficients

Model predictors for the final CII regression equation along with their statistics are in Table 4-1. Note that understanding/quantifying the types of economic activity occurring within the County are important to understanding changes in CII consumption over time. Since individual regressions for the commercial, industrial, and institutional sectors were not developed, predictor variables representing the relative proportion of employment among different industry groupings was used in the CII regression. Proportional employment based on industry grouping is meant to reflect the relative mix of industries / economic activity within each retail agencies' service area. Most CII model predictors are similar to those used for the single family and multifamily sectors, however certain variables (e.g., 3-month lagged departure from normal temperature) were excluded during the regression refinement process. Final coefficient estimates presented in Table 4-1 are within the expected range for all explanatory variables.

[6] Refer to Appendix A for a summary of standardized sectors by retail agency.

[7] The finest spatial resolution of all consumption data was at the retail agency-level.

Table 4-1: CII Regression Predictors and Coefficients

Variable	Coefficient	Standard Error	t-Statistic	Probability
Intercept	-0.186	0.268	-0.695	0.49
Seasonal index 1[(a)]	-0.29 (avg) -0.41 to -0.17	0.02 (avg) 0.01 to 0.03	-20.79 (avg) -33.3 to -9.2	<0.05
Seasonal index 2[(a)]	-0.34 (avg) -0.53 to -0.10	0.02 (avg) 0.01 to 0.03	-23.34 (avg) -39.2 to -3.5	<0.05
Departure from normal temperature	1.037	0.158	6.580	<0.05
Departure from normal temperature, 1-month lag	0.912	0.161	5.657	<0.05
Departure from normal temperature, 2-month lag	0.370	0.158	2.340	<0.05
Departure from normal precipitation	-0.003	0.003	-0.997	0.32
Departure from normal precipitation, 1-month lag	-0.007	0.003	-2.312	<0.05
Departure from normal precipitation, 2-month lag	-0.002	0.003	-0.692	0.49
Price	-0.062	0.025	-2.453	<0.05
Economic index	0.963	0.140	6.881	<0.05
Proportion of total Employment (Retail)	0.142	0.032	4.430	<0.05
Proportion of total Employment (Professional Services)	0.499	0.031	16.065	<0.05
Proportion of total Employment (Information, Government, and Construction)	0.093	0.026	3.508	<0.05
Proportion of total Employment (Industrial)	0.351	0.026	13.249	<0.05
Proportion of total Employment (Health Education, and Recreational Services)	0.466	0.059	7.923	<0.05
Drought severity, extended	-1.424	0.070	-20.232	<0.05
[(a)] Coefficients vary by retailer.				

Variables with an increasing effect on water use (i.e., a positive coefficient) included temperature, economic index, and the mix of industries/economic activity ratios. Variables with a decreasing effect on water use (i.e., a negative coefficient) included precipitation, price, and the extended drought effect.

4.2 Historical Model Performance

Figure 4-1 shows the observed and predicted per-unit use for the CII sector in gallons per employee per day (gped) calculated as a unit-weighted average for across all retail agencies. Performance of the CII model is summarized in Table 4-2 which shows regression performance metrics for county wide demand. Visual inspection and performance metrics showed good model performance including the same seasonal cycle and quantities. The CII regression was also able to reproduce declining consumption during the Great Recession, recovery between the Great Recession and the recent drought, and the sharp decline and muted recovery following the most recent drought.

Historical performance of the CII regression was also strong at the retail agency-level. Model fit statistics calculated at the retail agency-level generally mirrored County-wide performance. Model fit statistics and time series plots for each retailer are presented in Appendix D.

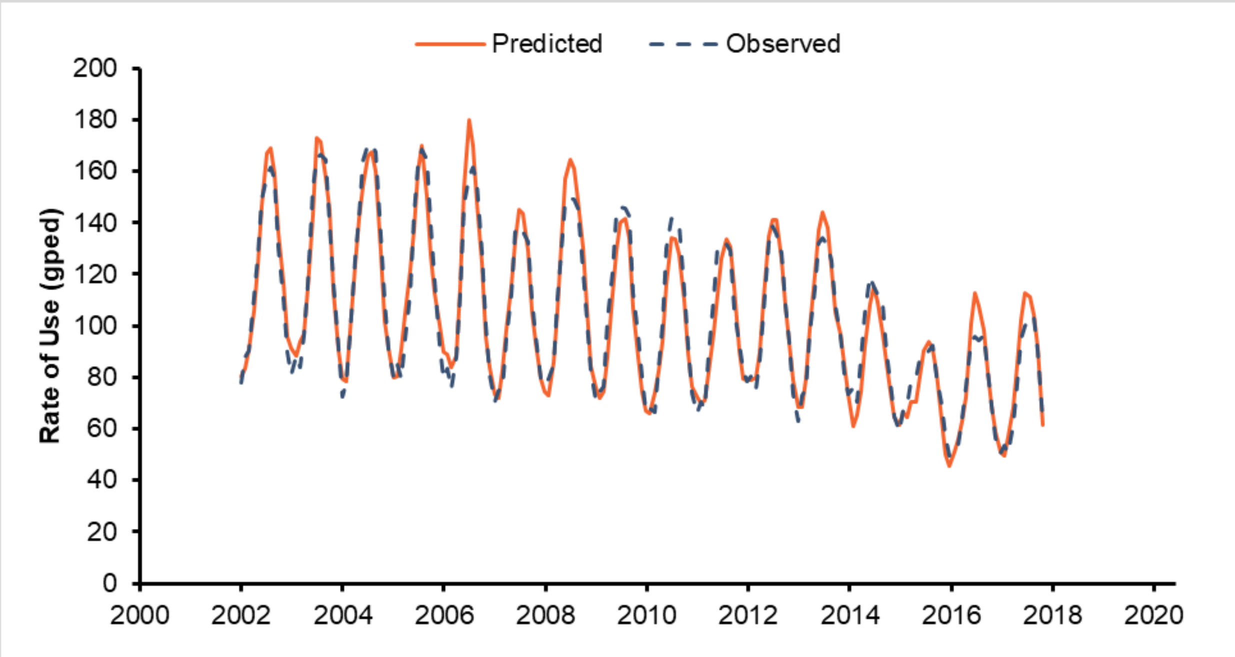


Figure 4-1: CII Observed and Predicted Rate of Use

Table 4-2: County-Wide CII Regression Performance Metrics

Regression Statistic[(a)]	Value
R-squared	0.96
Average Observed Value (gped)	103.89
Mean Absolute Percentage Error	5.08%
Mean Bias	-0.06%
[(a)] Statistics calculated using County-wide unit-weighted average observations and predicted values from the regression fits.	

4.3 Stanford University Regression Development

As an academic institution, Stanford University (Stanford) is considered part of the CII sector. However, an independent regression for Stanford was developed given its unique characteristics among retailers. Unlike other retail agencies, Stanford does not have accounts in the traditional sense as individual users are not billed. Additionally, employee water use as the sole driver unit (consistent with the CII sector for other retailers) is not appropriate for Stanford as students account for a significant portion of water use. This distinction informed the decision to use population (understood to be total faculty, staff, and students) as the driver unit for Stanford. Since the driver unit for the Stanford CII model was population, rather than jobs like the rest of the retailers' CII use, rate of use must be modeled separately. It is expected that the significant variables and/or magnitudes of coefficients would be different for Stanford than the other retailers' CII sectors due to the difference in driver units. A discussion of Stanford's regression predictors and fitted coefficients is presented in Appendix E. A summary of the Stanford's historical model performance is included in Appendix D.

5. Non-Retail Groundwater Pumper Regression Development

Historic water use for non-retail groundwater pumpers includes groundwater use by private well owners that are outside of retailers' service areas. Historic groundwater use was reported by groundwater basin and billing classification. The groundwater basins include Santa Clara Plain (referred to as charge zone "W2") as well as Coyote Valley sub-basin management area and the Llagas sub-basin and (referred to as charge zone "W5"). Water use was classified as either agricultural or municipal/industrial (M&I). M&I can include residential domestic water use.

Historical regression fits for non-retail groundwater pumpers were performed on annual water use. Agricultural water use was typically reported annually or semi-annually. M&I use was reported monthly or semi-annually. As a result, a monthly resolution for model fitting was not possible.

Further, historical model fits for non-retail groundwater pumpers were performed on a volumetric basis. Typical driver units for groundwater use, such as number of wells, did not support the "rate of use times driver" approach that was used for single family, multifamily, and CII model development.

Fitted models were only finalized for the M&I sector for the two groundwater basins. Agricultural use was often reported semi-annually (in January and July) and was estimated by a "table of averages" approach based on crop type, resulting in a lack of variability that could be modeled by predictor variables. Initial exploration of statistical/econometric model development showed that agricultural water use has been generally constant over the last twenty years and was not well-characterized by typical predictor variables.

5.1 Model Predictors and Fitted Coefficients

Model predictors for the non-retail groundwater pumpers M&I regression models along with their statistics are in Table 5-1. The two groundwater zones were modeled separately; a combined regression provided no improvement in the statistical significance of coefficients.

Table 5-1: Predictors for Non-Retail Groundwater Pumpers M&I Regression.

Basin	Variable	Coefficient	Std. Error	t-Statistic	Prob.
W2	Intercept	-0.59	4.08	-0.14	0.89
	Drought	-0.70	0.20	-3.54	<0.05
	Price	-0.81	0.06	-13.31	<0.05
	Temperature[a]	1.83	0.93	1.98	0.07
W5	Intercept	1.43	0.47	3.04	<0.05
	Number of Wells	0.19	0.04	5.56	<0.05
	Drought	-0.31	0.15	-2.09	0.06
	Price	-0.12	0.05	-2.41	<0.05
	Precipitation[a]	-0.09	0.02	-3.62	<0.05

[a] Temperature and precipitation for non-retail groundwater pumper models were in absolute terms, not departures from normal.

Variables with an increasing effect on water use (i.e., positive coefficient) included maximum temperature (used in the W2 model only) and number of wells (used in the W5 model only). Variables with a decreasing effect on water use (i.e., negative coefficient) included the extended drought effect, price, and precipitation (used in the W5 model only). Economic indices, density, and median income were not found to be statistically significant for the groundwater M&I regressions. Note that temperature was found to be statistically significant for the W2 charge zone but not for the W5 charge zone regression, while precipitation was found to be statistically significant for W5 but not W2.

5.2 Historical Model Performance

Performance of the groundwater M&I regressions is summarized in Table 5-2. Figure 5-1 and Figure 5-2 show the observed and predicted demand for the M&I sector for groundwater charge zone W2 and W5, respectively. The M&I W5 regression had a lower correlation coefficient than all other model fits described in this TM, likely due to the relatively constant annual average water use over the available period.

Table 5-2: Regression Performance Metrics for Groundwater M&I Models

Regression Performance Metric	M&I, W2	M&I, W5
R-squared	0.96	0.81
Average Observed Value (mgd)	7.81	7.68
Mean Absolute Percent Error	4.32%	3.54%
Mean Bias	-0.22%	-0.09%

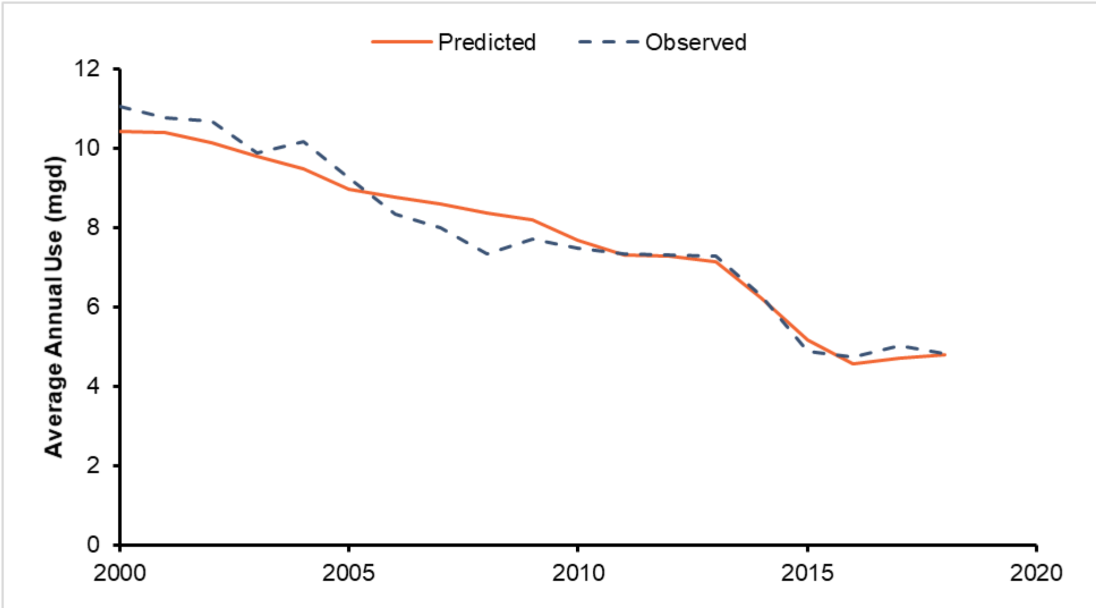


Figure 5-1: Observed and Predicted M&I Demand for Groundwater Basin W2

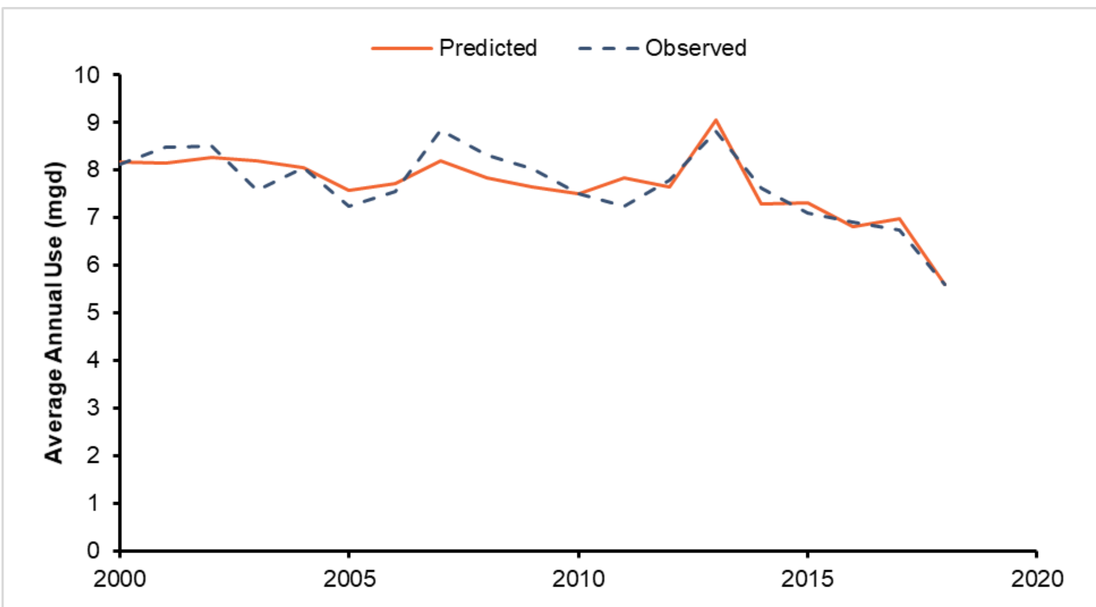
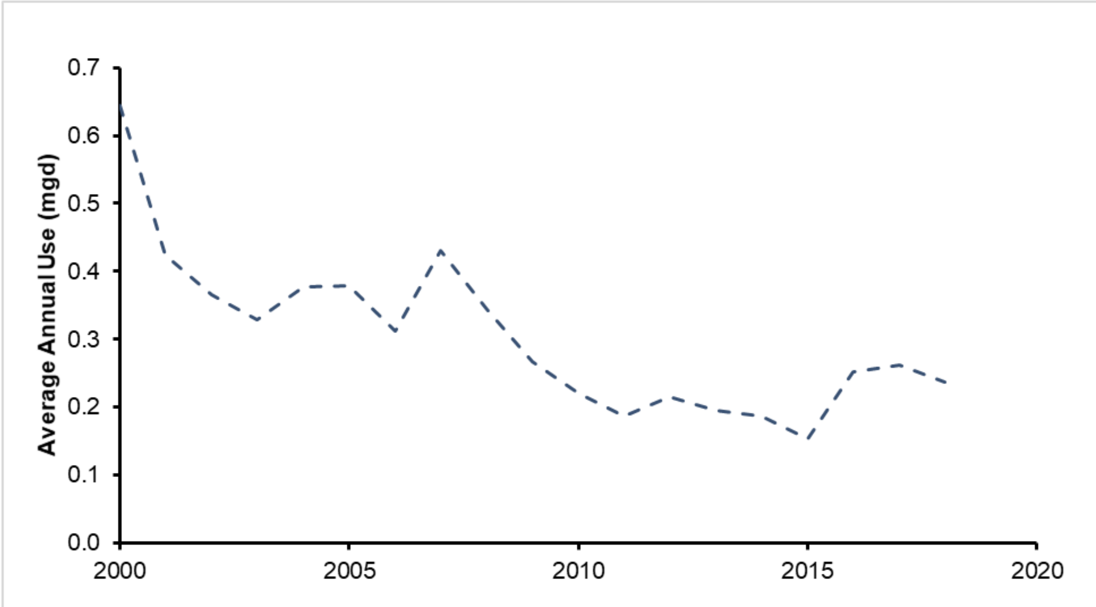


Figure 5-2: Observed and Predicted M&I Demand for Groundwater Basin W5

Figure 5-3 shows historic agricultural water use for the W2 and W5 charge zones. Agricultural water use in the W2 charge zone is less than 1 mgd and has been slightly declining over the last twenty years. Agricultural water use in the W5 charge zone has been generally constant over the last twenty years at approximately 23 mgd. Initial exploration of statistical/econometric model development showed that agricultural water use was not well-characterized by typical predictor variables. Agricultural water use in both charge zones would be well-represented by an average water use from a historical reference period that is then held constant into the future.



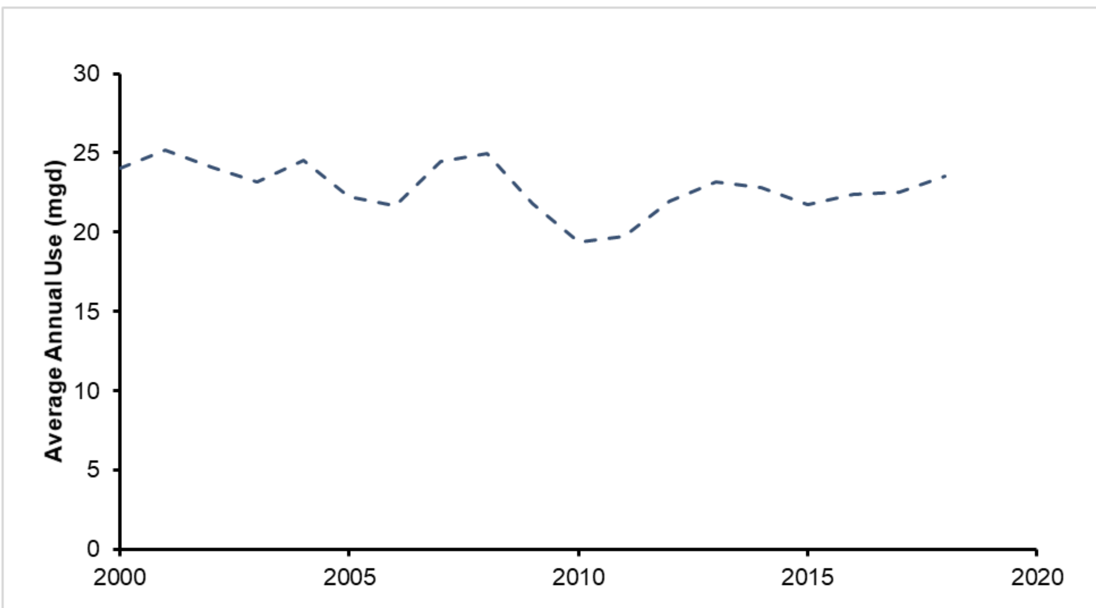


Figure 5-3: Observed Agricultural Demand for Groundwater Basin W2 (top) and W5 (bottom)

6. Summary / Conclusions

In summary, the statistical/econometric regressions presented in TM 2/4 show strong performance is explaining historical patterns of consumption over the last 20 years, including two major droughts and the Great Recession. All regressions had R-squared values of 0.81 or greater. The retailer-specific regressions, which represent the majority of water use in the County, had R-squared values of 0.94 or greater. None of the regressions demonstrated a large consistent bias. Based on this analysis, the regression reflect a suitable basis for forecasting.

The overall model approach allows for demand forecast scenario analysis based on varying assumptions of future conditions. Several forecast scenarios may be explored, including climate change-adjusted weather, alternate assumptions around the timing and magnitude of drought recovery, alternate assumptions around urban development, and/or different assumptions around future economic conditions. For any of these future scenarios, the model coefficients developed in this TM should be maintained as they reflect the best fitted estimates of causal relationships between external socioeconomic conditions and historical water demand given the available modeling data. Model scenarios can also be developed to address uncertainties in future predictor variables, such as housing / job growth and density. Future inputs in these scenarios could be conducted as a sensitivity analysis or be driven by alternate growth projections.

On a regular basis, overall model performance should be evaluated. Annually, forecasted consumption and input assumptions (e.g., driver unit counts, economic conditions, water rates, etc.) can be compared with observed conditions as data becomes available to monitor predictive performance. Less frequently (around every 5 years) model predictors should be revaluated using the process outlined in Figure 1-2. Major events, such as another drought or a severe economic recession may necessitate reexamination and/or refitting model coefficients and may cause changes in longer term expectations over the forecast period. As more data becomes available on the impacts of COVID-19 on County demographics and water use (e.g., potential shifts in CII to residential demand), reexamination of the underlying sectoral rates of water use as well as model coefficients should be conducted.

Attachment 2 Water Supply Master Plan Project Description

Project Type	Project Name	Description
Alternative Supply	**Potable Reuse – Palo Alto**	Construction of an Advanced Water Purification Facility in Palo Alto capable of producing up to 10 MGD of purified water, for groundwater replenishment at the existing percolation ponds within the Los Gatos Recharge System Complex (LGRS). This project is included in the CIP.
	Potable Reuse – San Jose	Constructs an expanded advanced water purification facility in San Jose to increase purified water for potable reuse.
	Refinery Recycled Project	Builds a tertiary recycled water facility in Contra Costa County through a partnership with Central San. Central San would provide the recycled water produced from the facility to two oil refineries in Contra Costa County. Valley Water would then receive Contra Costa Water District's (CCWD) Central Valley Project (CVP) water currently used by the refineries. This project has an existing committee.
	Local Seawater Desalination Project	Proposes a seawater desalination project in Santa Clara County using seawater from the South San Francisco Bay to obtain a reliable local water supply. The project would provide treated water supplies directly to Valley Water's treated water system for distribution to customers but would generate brine effluent that requires management. This project is at the pre-feasibility stage
Surface Water Supply	**Delta Conveyance Project**	Modernizes the State Water Project (SWP) infrastructure by constructing alternative conveyance to divert up to 6,000 CFS from the Sacramento River north of the Delta and deliver it to SWP facilities at the southern end of the Delta. The project helps restore and protect the reliability of SWP water deliveries and, potentially, CVP water supplies south of the Delta.

	Sites Reservoir	By partnering with other agencies, builds an off-stream water supply reservoir north of the Delta to collect flood flows from the Sacramento River. This project would provide dry year yield and would be operated in coordination with the SWP and CVP, which could improve flexibility of the statewide water system.
	Stormwater - Agricultural Land Recharge (FloodMar)	Recharge stormflows on open space during the winter months. Feasibility study under way.
	Stormwater Capture	Constructs a stormwater capture and infiltration system. Site selection is still underway and will most likely require partnerships with other agencies.
Storage	**Pacheco Reservoir Expansion**	Enlarges Pacheco Reservoir from about 5,500 AF to 140,000 AF and connects the reservoir to the Pacheco Conduit. The reservoir plans to be filled with natural inflow and CVP supplies. Potential project benefits include water for downstream fisheries, emergency storage, and managing water quality impacts. This project is in the CIP.
	Los Vaqueros Expansion	Secures an agreement with CCWD and other partners to expand Los Vaqueros Reservoir by 115,000 AF, use CCWD intakes, and constructs a new pipeline (Transfer-Bethany) connecting the reservoir to the South Bay Aqueduct. This would provide storage and deliveries of delta surplus supplies. This project has a JPA.
	Groundwater Banking	Explores options for securing out-of-county storage through the development of new groundwater banks.

	B.F. Sisk Dam Raise	Increases the height of B.F. Sisk Dam and expands the capacity of San Luis Reservoir by 130,000 AF. New capacity would be shared by Reclamation and project participants and would be operationally integrated with the CVP. Benefits are expected to include dedicated storage capacity and supplemental imported water supply.
Recharge & Pipelines	**Coyote Valley Recharge Pond**	Constructs a new percolation pond(s) in Coyote Valley off-stream of Coyote Creek and near the Cross-Valley Pipeline (CVP). This project would require purchasing land and creating a new turn-out and diversion pipeline from the CVP to the pond. This project helps create operational flexibility for managed recharge operations in Coyote Valley, reducing its reliance on Coyote Creek flows and operational constraints.
	Lexington Pipeline	Constructs a pipeline between Lexington Reservoir (or Vasona Reservoir) and the raw water system to allow surface water from Lexington to be put to beneficial use elsewhere in the county. The pipeline may also convey some wet-weather flows to treatment plants or recharge facilities.
	Lexington-Montevina Water Treatment Plant Connection	Sends water from Lexington Reservoir to San Jose Water Company's (SJWC) Montevina WTP to allow for Lexington water to be used in the SJWC service area. The project would require construction of a pump station and intake pipe from Lexington to Montevina.
	Butterfield Channel Managed Aquifer Recharge	Connects Butterfield Channel to Valley Water's raw water conveyance system so imported water can be recharged along Butterfield Channel during the summer months when it is not used for stormwater conveyance.
	Madrone Channel Expansion	Expand managed aquifer recharge in Madrone Channel by adding one or two dams/ponds downstream of the existing Madrone Channel Pond #10. There's a reach approximately 4,600 feet in length between

		the dam for pond #10 and the confluence with East Little Llagas Creek, located downstream.
	San Pedro Ponds Improvement Project	Implements a project or program to enable the ponds to be operated at full capacity without interfering with existing septic systems in the vicinity.

Santa Clara Valley Water District

Valley Water

File No.: 23-0808

Agenda Date: 8/28/2023
Item No.: 4.3.

COMMITTEE AGENDA MEMORANDUM
Water Conservation and Demand Management Committee

Government Code § 84308 Applies: Yes ☐ No ☒
(If "YES" Complete Attachment A - Gov. Code § 84308)

SUBJECT:
Water Supply Master Plan 2040 Conservation and Stormwater Capture Project Update - "No Regrets" Package Implementation.

RECOMMENDATION:
Receive information on the "No Regrets" package implementation. This is a discussion item, and no action is required.

SUMMARY:
As part of the Water Supply Master Plan 2040 development, Santa Clara Valley Water District's (Valley Water) Board of Directors (Board) approved a "No Regrets" package for implementation in September 2017. The "No Regrets" package of conservation and stormwater capture projects and programs is broadly supported by stakeholders, relatively low cost, and can be implemented independently of other projects and programs in the Water Supply Master Plan 2040. These projects and programs include:

1) Advanced Metering Infrastructure
2) Leak Repair Incentives
3) Graywater Rebate Program Expansion
4) Model Water Efficiency New Development Ordinance
5) Stormwater Capture

This memo provides an update on the efforts and progress to date on the implementation of the "No Regrets" package. Valley Water is currently in the process of updating the Water Supply Master Plan. The "No Regrets" package will remain part of the updated plan for continued implementation as Staff develops and improves programs to increase savings rates required to meet the long-term water conservation savings targets of 99,000 acre-feet per year by 2030 and 110,000 acre-feet per year by 2040.

ADVANCED METERING INFRASTRUCTURE (AMI)

Advanced Metering Infrastructure (AMI) in concert with a proposed customer-side leak repair incentive program are critical elements to have in place by 2040. AMI facilitates customer engagement with their water usage and enables water retailers to track water usage remotely and frequently.

In 2019, Valley Water partnered with the Bay Area Water Supply and Conservation Agency (BAWSCA) on a study to identify each water retailer's metering and related system, data gaps, and potential for collaborative procurement for AMI as an option for the region. This study, performed by Manage Water Consulting, Inc. and Don Schlenger and Associates, was completed in June 2019. BAWSCA and Valley Water held a joint meeting to review the findings of the study with water retailers from the BAWSCA and Valley Water service areas. The meeting included presentations from project leads of several pilot studies funded by Valley Water's Water Conservation Research Grant Program (funding through Safe, Clean Water), including San Jose Water Company, City of Mountain View and Purissima Hills Water District.

Based on this research and stakeholder engagement, Staff developed AMI Program Guidelines in 2020 to encourage the installation of AMI meters, and to maximize their savings potential by pairing the meters with software that will give near real-time water data on an accessible online database, leak alerts, and water use reports. These guidelines were updated in a stakeholder review process concluding in May 2023 with input from water retailers currently or potentially interested in participating in the AMI Program. The guidelines were presented to the Retailer Water Conservation Subcommittee prior to finalizing.

As of July 2023, Valley Water has cost-sharing agreements providing four million in AMI funding in the following service areas:

- City of Morgan Hill (approx. 17,000 AMI meters funded),
- City of Milpitas (approx. 16,700 AMI meters funded), and
- City of Palo Alto (approx. 21,000 AMI meters funded in June 2023).

Additionally, Purisima Hills Water District has received funding for approximately 1,000 AMI meters through the Safe, Clean Water Program, while the City of Gilroy has funded approximately 14,400 AMI meters through an Integrated Resources Water Management Proposition 1 grant applied for with Valley Water support. While AMI implementation progress across service areas varies, an estimated 48,000 AMI meters have been installed to date in the county through a combination of Valley Water cost-share agreement funding, Valley Water grant funding, and Valley Water support for external grant funding.

Valley Water's goal is to collaborate with retailers and cities throughout our service area to implement AMI through incentives, grants, and support letters (i.e., IRWM, California Public Utilities Commission, etc.). The conservation budget includes dedicated funding to assist in the implementation of this program.

LEAK REPAIR INCENTIVES

Though customers are alerted of possible leaks much more quickly with AMI, a trained workforce is required to fix leaks expeditiously. Valley Water and BAWSCA determined the need for a leak certification (i.e., establishing a licensing program) or certificate program to provide professionals with the necessary skills to identify and repair leaks. After completing this proposed training program, professionals will be placed on a reliable, objective resource list for landlords and homeowners to address leaks.

To conduct comprehensive research and offer training framework recommendations, Valley Water and BAWSCA collaborated on a contract in 2021 with the California Water Efficiency Partnership (CalWEP), a non-profit organization aiming to maximize urban water efficiency and conservation throughout California. The research and deliverables from this partnership will be utilized by Staff to determine logistical aspects of the future training program as well as to develop an RFP to procure a vendor responsible for managing and operating the future program. Phase 1 is complete and encompassed surveying agencies from multiple regions, interviewing and facilitating focus groups with industry experts, and conducting extensive online research. This process highlighted the interest and need across California for an affordable, relevant, and accessible leak detection and repair training program that highlights the importance of water conservation. Phase 2 will be completed later in Summer 2023.

Additionally, Valley Water is conducting two pilots focused on low-income, disadvantaged, or underrepresented communities:

Leak Assessment and Repair Pilot

This vendor-supported pilot is leveraging an existing program between Richard Heath and Associates, Inc. (RHA) and Pacific Gas and Electric's (PG&E's) Energy Savings Assistance (ESA) Program. The program retrofit leaking fixtures and sprinklers, in addition to performing a meter-check for leaks and providing water conservation resources.

Toilet Repair and Retrofit Pilot

This pilot is being performed concurrently with the Leak Assessment and Repair Pilot. This pilot project replaces 1.6 or greater gallon per flush (gpf) toilets with high-efficiency, WaterSense-certified 0.8 gpf toilets. To date, 43 toilet retrofits have taken place and an additional 25 are expected to take place for the month of July.

A total of 211 households have been served through both pilots. The pilots are expected to wrap up in mid-August. Staff will then evaluate water savings and resource requirements to determine whether evolving pilots into a full program is cost-effective in meeting the long-term water conservation savings targets.

GRAYWATER REBATE PROGRAM EXPANSION

In partnership with the non-profit Ecology Action between June 2019 and June 2020, the Graywater Direct Installation Program completed 307 site assessments and installed 71 laundry-to-landscape graywater systems. 64% of low-income participants chose the no-cost, self-installation option. Ecology Action provided construction assistance to all 36 self-installations throughout the installation process.

These graywater systems replaced potable water irrigation on nearly 31,700 square feet of landscaped area, resulting in a project water savings of 522,386 gallons/year, or 32.1 acre-feet over a 20-year project life. The average 2020 value in water utility bill savings for each participating household was $48/year. This pilot also trained 20 landscape professionals including 3 licensed contractors who performed work as subcontractors under Ecology Action.

Though at the time the pilot occurred, it was not deemed cost-effective to continue as a standalone program, Valley Water is considering including comparable installation services under its planned procurement to replace the current Lawn Busters Program with Our City Forest. The Outdoor Conservation Direct Install Program Request for Proposal update was discussed at the November 2022 Water Conservation and Demand Management Committee.

Valley Water has continued to develop its Graywater Laundry to Landscape Rebate Program by partnering with cost-sharing retailers to double the overall rebate from $200 to $400 in those service areas. In addition to the direct install pilot, Valley Water has issued an additional 42 rebates, for a total of 113 Graywater Laundry to Landscape systems installed in Santa Clara County. While Valley Water does not currently plan to rebate for more advanced Graywater systems, we have provided additional graywater system resources including guides, evaluation tools, virtual workshops and webinars, informational and instructional videos, and a list of local graywater installers available at www.watersavings.org <http://www.watersavings.org>.

MODEL WATER EFFICIENCY NEW DEVELOPMENT ORDINANCE

The Model Water Efficiency New Development Ordinance (MWENDO), developed in 2015 by the Santa Clara County Water Efficient New Development Task Force, composed of representatives from Santa Clara County, several cities, Valley Water, Sustainable Silicon Valley, and Joint Venture Silicon Valley, is intended to be adopted by jurisdictions in Santa Clara County to ensure water use efficient in new development. The ordinance, which has received support from the local Sierra Club chapter, is designed to be customizable depending on cities' needs and includes a variety of water efficiency measures for new developments such as:

- Single-Family Residential
- Multi-Family Residential and Nonresidential Projects
- Commercial Facilities

Valley Water continues to monitor actions related to the adoption of MWENDO and provide staff support to municipalities as part of ongoing efforts to support cities' and the County's interests in expanding water efficiency measures. To assist jurisdictions with MWENDO adoption, Valley Water has developed a template staff/Council agenda report, a cost-effectiveness study, and instructions for filing with the California Building Standards Commission (CBSC) and California Energy Commission (CEC). So far, Valley Water has reached out to every jurisdiction in the county at the City Manager or

City Council level for their consideration and adoption of the MWENDO. At this time, no cities in Santa Clara County have yet officially adopted MWENDO, however, some cities already have many of these measures as part of their existing municipal code and may consider additional measures to be included as part of the upcoming 2025 building code adoption cycle.

While the 2022 version of California's Title 24 building code update was effective January 1, 2023, jurisdictions can adopt additional reach codes like MWENDO at any time. Currently, Valley Water is finalizing updates to the ordinance to reflect the latest Title 24 updates and water conservation reach code best practices. The revised MWENDO will include a supplemental provision to encourage cities and the County to prohibit irrigation of decorative, non-functional turf with potable water on CII sites within their jurisdictions.

STORMWATER CAPTURE

Stormwater capture can have water quality, water supply, flood management, environmental, and community (e.g., aesthetics, recreation, and education) benefits. The "No Regrets" package proposed evaluating stormwater capture projects to develop at least 1,000 acre-feet per year (AFY) on average of stormwater water supply (which brings the 2040 target from 109,000 to 110,000 acre-feet saved per year). To this end, Valley Water is evaluating, and in part implementing, two different scales of stormwater capture projects - "centralized" and "decentralized":

"Centralized" projects are those that capture water from multiple parcels and/or are municipal projects, including "green streets" projects and stormwater recharge on open space (e.g., Flood-Managed Aquifer Recharge). "Decentralized" projects focus primarily on keeping stormwater onsite and/or private citizen projects. Valley Water has implemented two decentralized programs - rain barrel/cistern rebates and rain garden rebates.

Centralized Projects

To support the evaluation of centralized projects, Valley Water led the development of the Storm Water Resources Plans (SWRP) for the northern part of Santa Clara County flowing to the Bay and for the South County area flowing towards Pájaro Watershed. The SWRPs develop, prioritize, and plan "centralized" stormwater projects in Santa Clara County that are typically located on public lands. Valley Water will continue to track city and County efforts, develop partnerships where there may be complementary project interests; and seek grant funding for partnership projects.

In addition to the SWRPs, staff are also investigating the potential to use open space for stormwater recharge. An example of this type of project is in the Central Valley where floodwaters are diverted onto some orchards to recharge the aquifer. The planned flooding for groundwater recharge is referred to as flood-managed aquifer recharge (Flood-MAR). Staff are monitoring the pilot projects to determine impacts and benefits to crops, water quality, and water supply. As noted by the California Department of Water Resources (DWR), "complex technical, legal, and institutional barriers and challenges affect the planning and implementation of Flood-MAR projects" including water rights, permitting, and environmental considerations. However, recognizing the broad potential benefits of Flood-MAR, DWR is leading the statewide efforts to evaluate these issues with stakeholders with the goal of expanding Flood-MAR on agricultural lands and working with landscapes throughout California. Staff are engaging in these statewide efforts. In addition, Valley Water recently completed a preliminary feasibility analysis on Flood-MAR in Santa Clara County. The study indicates there may be sites that could support stormwater recharge, but site level analyses would need to be done to determine project feasibility. The preliminary feasibility study will be presented to the WCADM and EWRC in August.

Decentralized Projects

Regarding “decentralized” projects, Valley Water launched Rainwater Capture rebates under its Landscape Rebate Program on January 1, 2019. This program, which encourages customers to participate in decentralized stormwater capture, includes rebates for rain barrels, cisterns, and rain gardens.

The program rebate amounts are as follows: $35 per qualifying rain barrel installed to collect rainwater from existing downspouts; $0.50 per gallon for diverting existing downspouts to qualifying cisterns; and $1 per square foot of roof area diverted (up to $300 per site) into an installed rain garden to collect roof water runoff. Cities of Cupertino, Milpitas, Morgan Hill, and Santa Clara as well as San José Municipal Water Services have or currently cost share with Valley Water to increase Rainwater Capture rebate amounts. Since 2019, 56 cisterns (50,345 gallons), 657 rain barrels, and 90 rain garden (from ~61,000 sq ft of roof surface) rebates have been issued. Additional details are available at <https://valleywater.dropletportal.com/overview/>.

ENVIRONMENTAL JUSTICE IMPACT:
There are no Environmental Justice impacts associated with this item.

ATTACHMENTS:
Attachment 1: PowerPoint Presentation
Attachment 2: Water Conservation Flyer

UNCLASSIFIED MANAGER:
Kirsten Struve, 408-630-3138

Water Conservation Rebates and Programs

Valley Water

Say YES to Saving Water!

Valley Water's water conservation rebates and programs are designed to make water conservation easier, helping you say YES to saving water. Learn more about all of our conservation programs and resources by visiting ***watersavings.org***.

Online Shopping Cart

Valley Water offers free water conservation devices that can help you save water. You can request free water efficient devices and free resources to evaluate your water use efficiency. Visit ***cloud.valleywater.org/shopping-cart*** to order your FREE gear and literature today!

Landscape Rebate Program

The Landscape Rebate Program can help you create beautiful drought resilient landscapes. Get started by finding more information at ***valleywater.dropletportal.com***. Make sure you submit an online application for approval and schedule a pre-inspection **before beginning any work** on your project.

- ### Rebate Caps

  The following landscape rebate site caps apply to the combined program components, including Landscape Conversion, Large Landscape Lawn to Mulch, Irrigation Equipment Upgrade and Rainwater Catchment.

  - $3,000 for single-family or multi-family residential properties (4 or fewer units)
  - $100,000 for all commercial, industrial, institutional properties or multi-family residential properties (5 or more units)

  Rebate rates and caps may be higher in some areas. Other programs are capped separately.

- ### Landscape Conversion

  Any property with qualifying high-water using landscapes (i.e., lawn or functional swimming pools) can receive a rebate of at least $2 per square foot (sq. ft.) for converting to a drought resilient landscape.

- ### Large Landscape Lawn to Mulch

  Any commercial, industrial, institutional properties or multi-family residential properties can receive a rebate of at least $1 per sq. ft. for converting a qualifying lawn to a minimum of 3 inches of mulch (minimum 15,000 sq. ft. lawn area). The irrigation system watering any trees in the converted lawn area needs to be converted to a low-flow irrigation system. Golf course options are offered.

A converted low-water use garden featuring California poppies in bloom.

- ### Irrigation Equipment Upgrade

  Rebates are offered for replacing old, inefficient irrigation equipment with new, qualifying high-efficiency equipment, including:

  - High-efficiency nozzles (up to $5 each)
  - Rotor sprinklers or spray bodies with pressure regulation and or check valves (up to $20 each)
  - Rain Sensors (up to $50)
  - Flow sensors, hydrometers, and dedicated landscape meters (up to $1,000)
  - Smart irrigation controllers (up to $300–$2,000 each)
  - Sprinkler to In-Line Drip Conversion ($0.25 per sq. ft.)

- ### Rainwater Capture

  Rainwater capture or diversion projects collecting rainwater from existing downspouts can receive rebates for the following:

  - Rain barrels up to 199 gallons (up to $35 per barrel)
  - Cisterns 200 gallons or more ($0.50 per gallon)
  - Rain gardens ($1 per sq. ft. of roof area diverted, up to $300)

Graywater Rebate Program

Receive at least $200 per home for transforming your clothes washer into a graywater system. Plants don't need drinking water to thrive: reuse graywater in your yard! Apply online and find how-to videos at ***watersavings.org***. No pre-inspection is required but **wait for approval before beginning any work**.

Landscape Surveys

Request to have your landscape and irrigation system surveyed by a trained irrigation professional for FREE. Following the survey, the specialist will provide you with a customized report, outlining any apparent leaks or inefficiencies, suggestions for irrigation scheduling, and recommendations for money-saving landscape rebates. Whether your landscape is small or large, we have a program to fit your needs.

- ### Water Wise Outdoor Survey Program

  A Water Wise Outdoor Survey is for landscapes at single-family, small commercial, industrial, institutional properties or multi-family residential sites up to half an acre. To get started, have a recent copy of your water bill on hand and submit a request at ***valleywater.org/outdoor-survey***.

  Call **408-630-2000** or email ***waterwise@valleywater.org*** with questions. If you are a customer of San Jose Water Company, please contact them directly to schedule a CATCH survey at **408-279-7900** or ***customer.service@sjwater.com***.

- ### Large Landscape Program

  A Large Landscape Survey is for landscapes at commercial, industrial, institutional properties or multi-family residential common areas with over half an acre. Also, free landscape water budgets are available for some properties, which compare your actual irrigation use to a property specific budget. Visit ***waterfluence.com*** to see if your property already receives this free benefit. Request a survey at ***watersavings.org***.

Commercial and Facility Rebates

Receive up to $100,000 for replacing or updating equipment with water-efficient technology that results in measurable water savings. This custom rebate based on the measured amount of water saved is available to qualifying facilities including facilities like businesses, schools, hospitals and government buildings. The rebate is $4 per 100 cubic ft. of water saved per year, or 100% of the project cost (excluding labor and taxes), whichever is less.

Fixture Replacement Program

Replace old qualifying fixtures for FREE! Inefficient fixtures can be replaced for free by licensed plumbers at qualifying commercial, industrial, institutional properties or multi-family residential properties. Inefficient fixtures that qualify include toilets, urinals, showerheads, faucet aerators, and pre-rinse spray valves. Sign up at ***blusinc.com***, call **800-597-2835**, or ***customerservice@blusinc.com***.

Submeter Rebate Program

Submeters can save 10-30% of water used! Received at least $150 per installed water submeter by upgrading from a single meter. Accessory dwelling units (ADUs or granny units), mobile home parks, apartments, and condominium complexes can qualify. There is no rebate cap when all eligibility requirements are met.

Report Water Waste

Help local residents and businesses preserve our shared water supply by confidentially reporting water waste and violations of outdoor water-use restrictions. Any specific notes like location, date and time, or frequency will help our inspectors follow up. To report water waste, you may do one of the following:

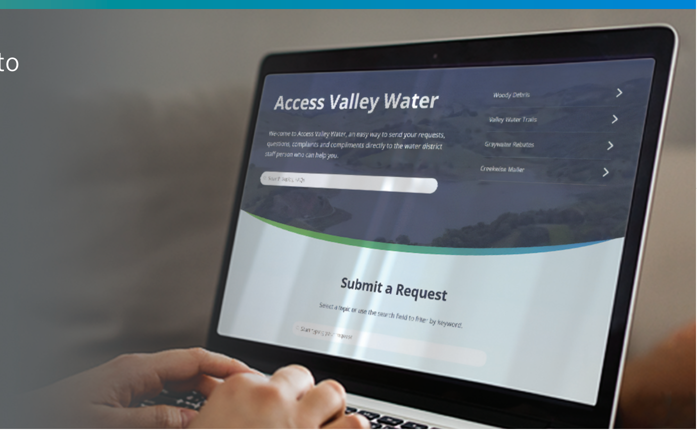
- Use our Access Valley Water app (by downloading or using the QR code)
- Email ***waterwise@valleywater.org***
- Call **408-630-2000**

Our rebates help make the change!

For more information, contact the Water Conservation Hotline at **(408) 630-2554** or by email at ***conservation@valleywater.org***.

CONTACT US

To find out the latest information on Valley Water projects or to submit questions or comments, use our **Access Valley Water** customer request system at ***access.valleywater.org***.



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- Join our mailing list: ***https://delivr.com/2uz9z***

Water Supply Master Plan 2050

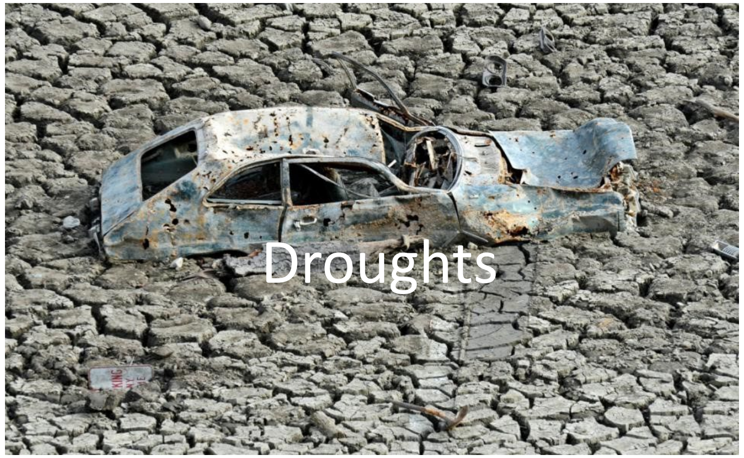
Special Board Meeting: September 19, 2023

Drivers for New Capital Projects

Ends Policies → Program Plans/ Master Plans/Asset Management Program → New Projects: Evaluation/Validation/ Financial Analysis → Capital Improvement Program (CIP)

Long-Range Water Supply Planning

- Uncertain future
- Aging infrastructure
- Incomplete information
- Imminent decisions on generational opportunities for investment



WSMP 2050 Updates

Goals

Planning horizon

Wider range of values

Portfolio approach

Recognition of uncertainty

Planning Goals to Achieve Level of Service

System reliability

Supply diversification

Reduced shortage risk

Affordable rates

Proposed Water Supply Strategy

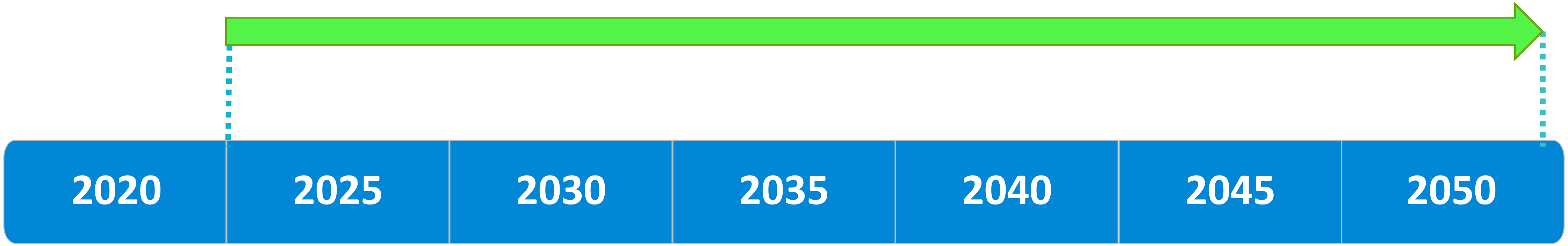
1. Secure existing supplies and infrastructure
2. Increase water conservation and reuse
3. Optimize the use of existing supplies and infrastructure

→

1. Secure existing supplies and infrastructure
2. Expand water conservation and Reuse
3. Increase system reliability and flexibility

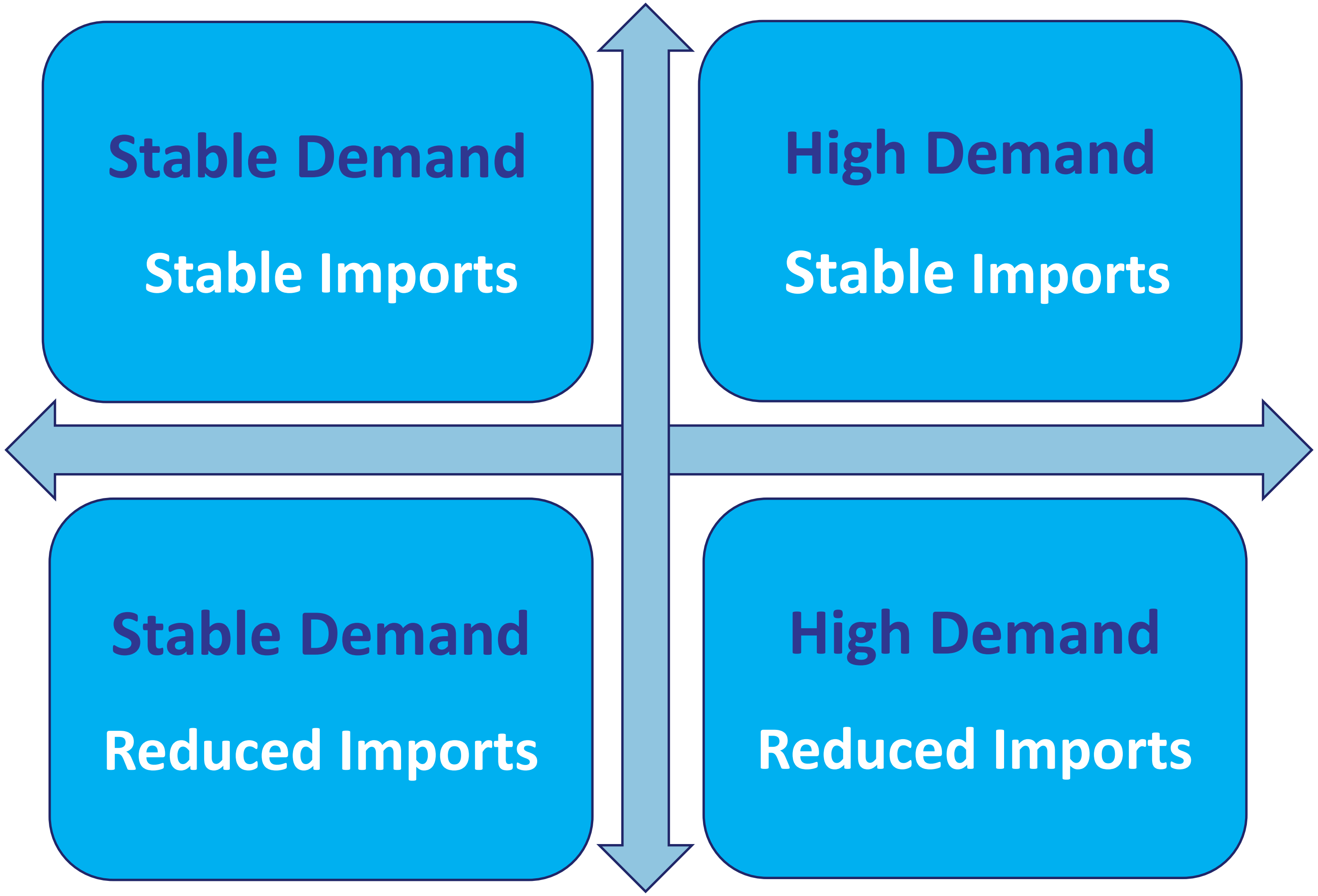
Planning Horizon

20 years → 30 years

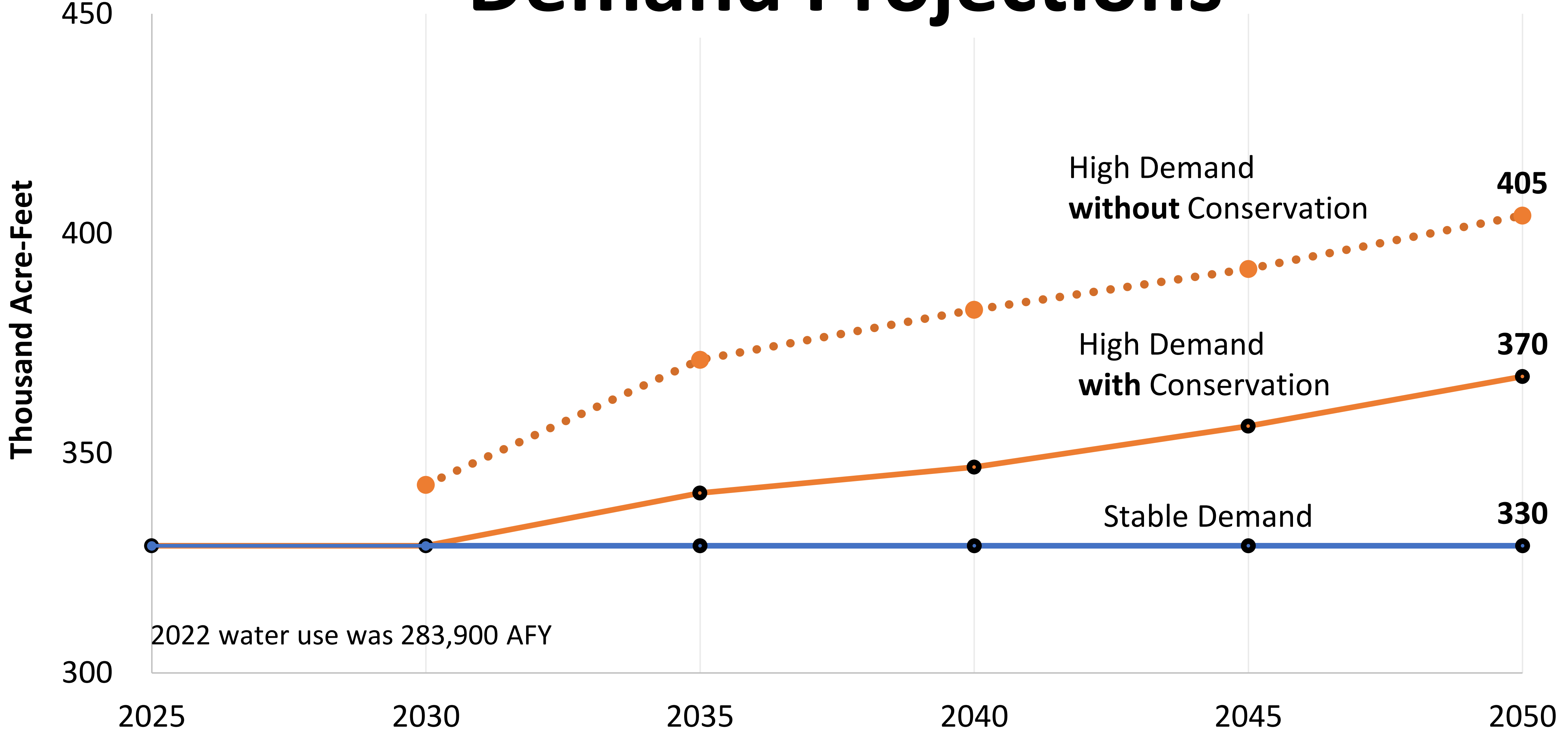


Questions and Feedback

Planning Approach – Scenario Planning



Demand Projections



Demand modeling integrates historic water use trends, housing and economic growth, climate change, and post-drought water use rebound.

Questions and Feedback

Imported Water Supply

Two imported water scenarios

- Stable imports
- Reduced imports

Climate change considered

Valley Water

Baseline Assumptions

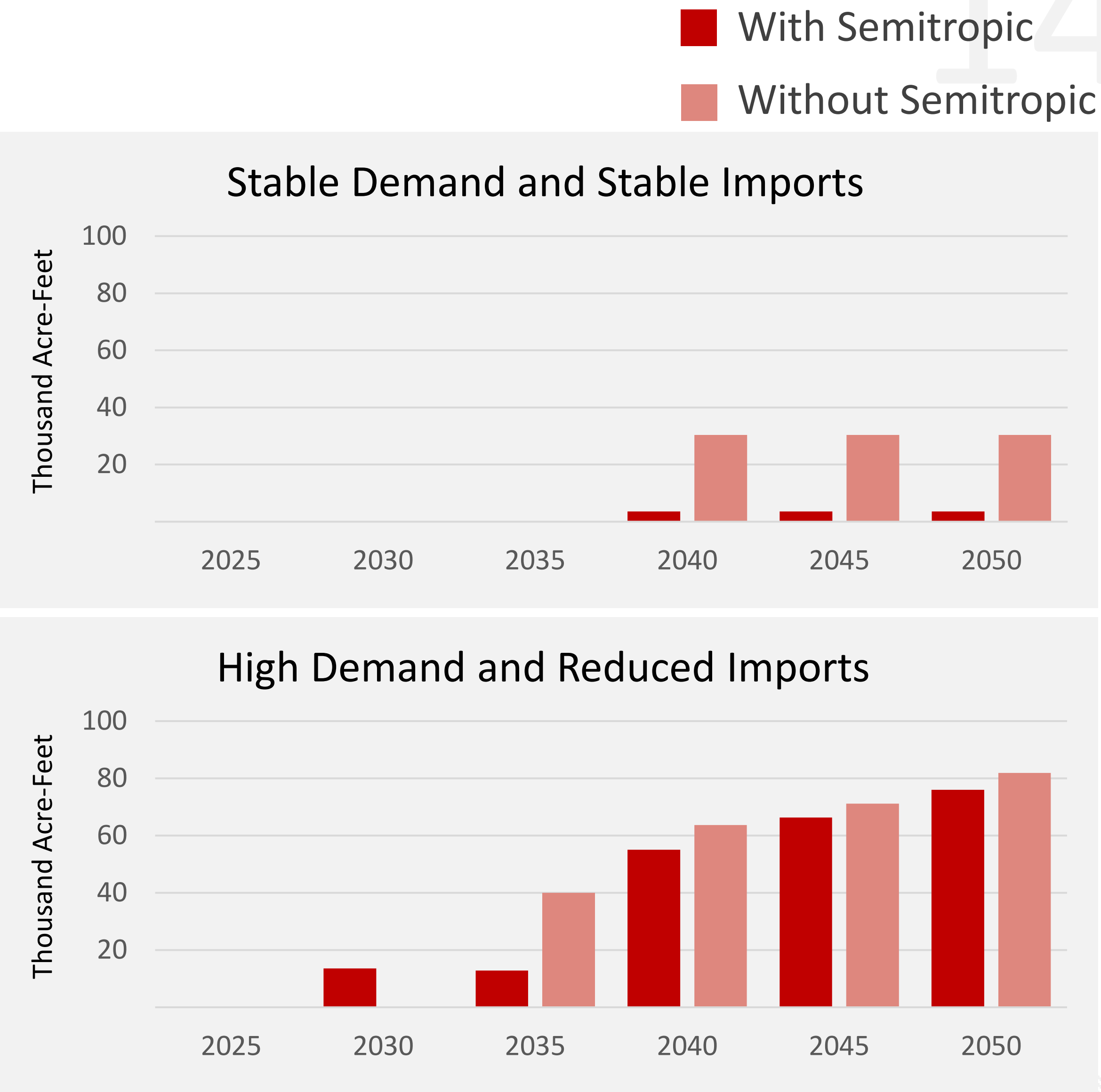
Achieve 2040 conservation goal

Complete dam seismic retrofits by 2035

Maintain Valley Water assets

Baseline Assessment – Planning Horizon

- Shortage in all scenarios and as early as 2030
- Average annual shortages 4-76 TAF in 2050
- Out-of-County groundwater storage important



valleywater.org

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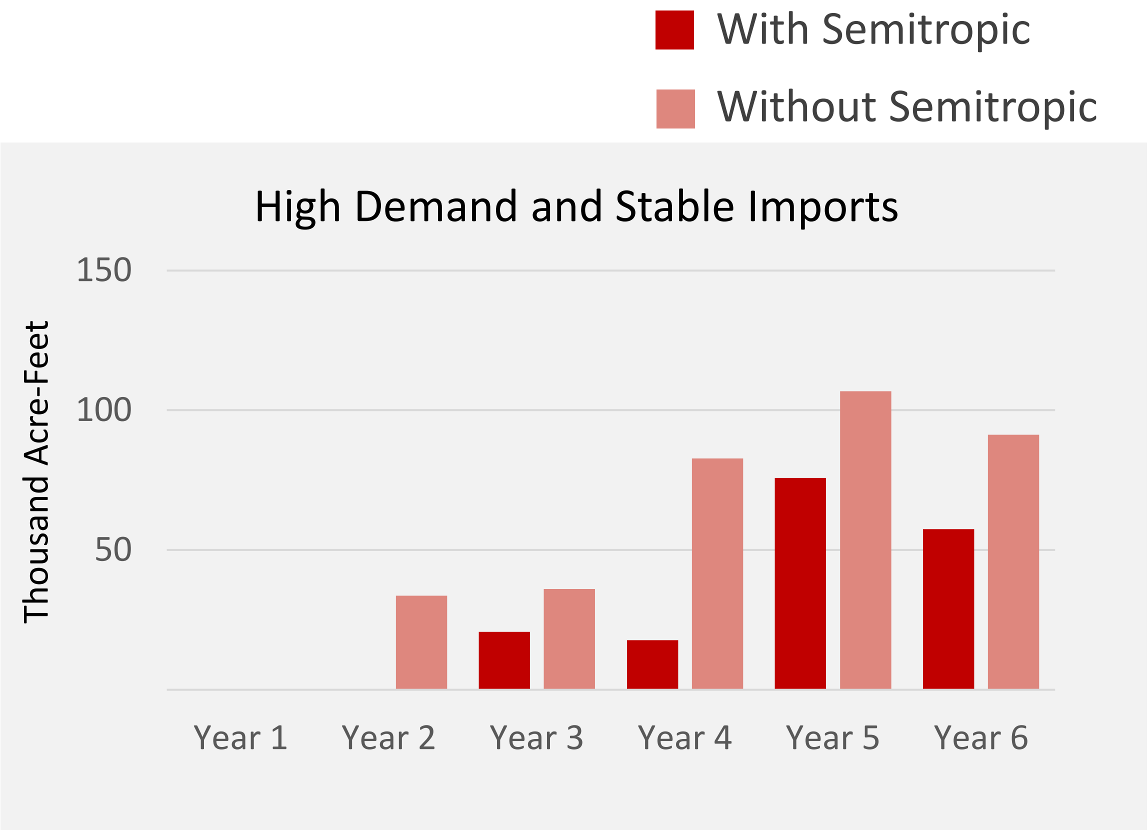
Baseline Assessment – Drought in 2050

- 2-year drought manageable
- Need for investment



Questions and Feedback

Future Investment Options

- Alternative supply - dependable during drought/year round
- Local and imported surface supply - increase reliability and resilience
- Storage - capture excess water supply in wet years to be used during drought years

Projects Under Consideration

- Conservation (20+)
- Alternative Supply (4)
- Surface Supply (4)
- Storage (4)
- Recharge & Pipelines (6)

Project Evaluation Criteria

- **Water Supply Benefit**
- **Cost/Rate Impact**

- Timing
- Technical Feasibility
- Operation
- Reliability
- Readiness/Likelihood of Success

- Flexibility
- Jurisdiction/Partnership
- Permitting/Legal issues
- Environmental Impacts/Justice
- Public Acceptance
- Inter-dependence
- Risk/Challenges

Questions and Feedback

Preliminary Unit Cost of Major Supply Projects

All costs are 2023 dollars

Project	Average Annual Supply (AF)	Capital Cost (M$)	Annual O&M (M$)	30 Year Lifecycle Cost Present Value* (M$)	Lifecycle Cost PV/ Supply PV ($/AF)
Potable Reuse - Palo Alto	8,000	782	14	1,169	7,842
Potable Reuse – San Jose	24,000	1,181	29	1,599	4,208
Refinery Recycled Project	8,000	265	9	445	2,834
Delta Conveyance Project	13,850	627	2.5	513	2,374
Sites Reservoir	380	10	0.05	10	1,270

* Project lifecycles vary, 30-year selected for comparison purpose

Preliminary Storage Capacity Cost of Major Storage Projects

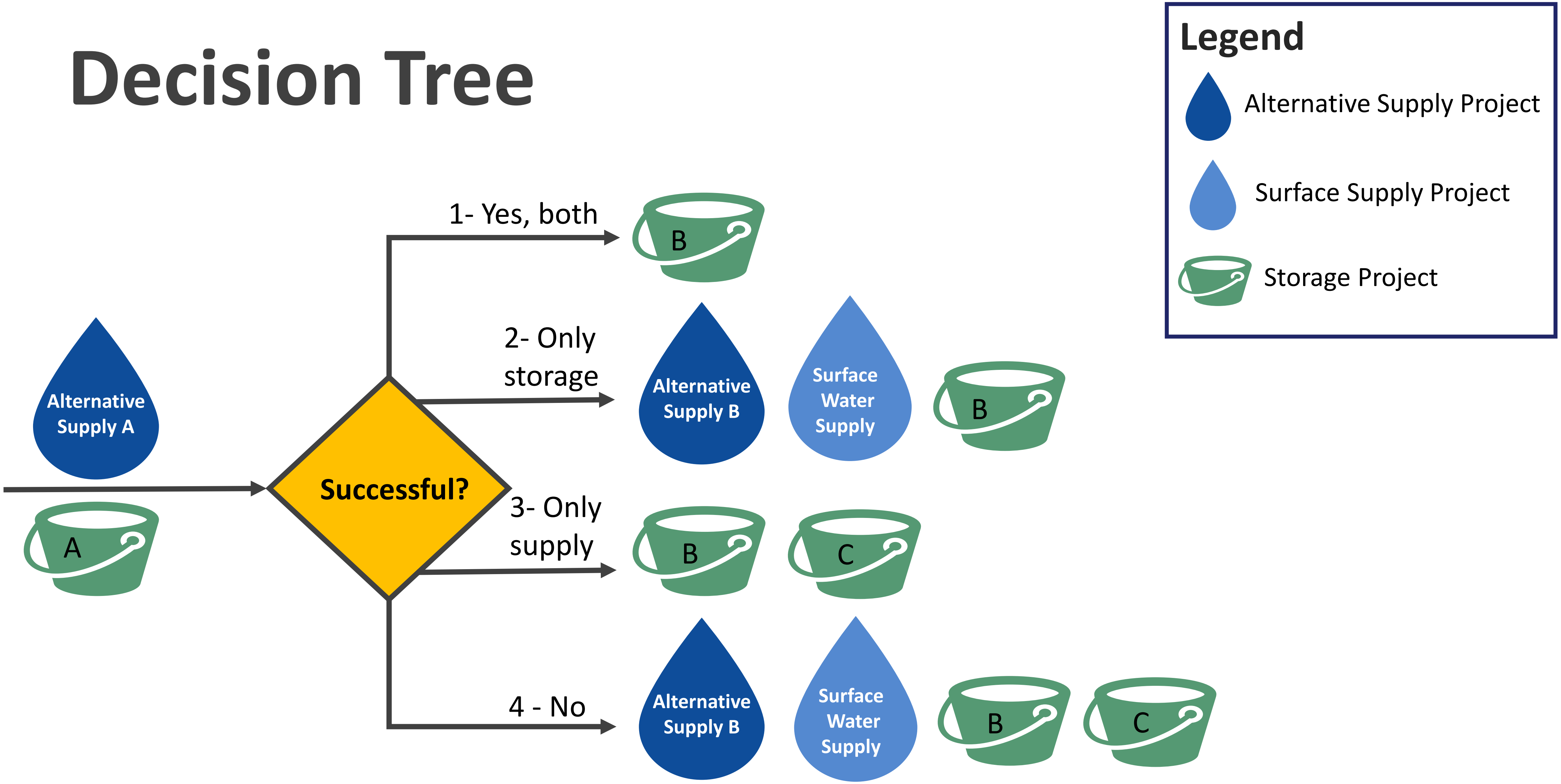
All costs are 2023 dollars

Project	Storage (AF)	Capital Cost (M$)	Annual O&M (M$)	30 Year Lifecycle Cost* (M$)	Lifecycle Cost /Storage Capacity ($/AF)
Pacheco Reservoir Expansion	134,000	2,210	2.5	2,700	20,149
B.F. Sisk Dam Raise	60,000	435	1.8	717	11,950
Los Vaqueros Expansion	30,000	100	3.8	258	8,600
Groundwater Banking	200,000	160	0.7	283	1,415

* Project lifecycles vary, 30-year selected for comparison purpose

Questions and Feedback

Decision Tree



valleywater.org

Valley Water

Board/Committee Engagement Plan

- Board meeting and workshop
- Board Committees
  - Water Conservation and Demand Management Committee
  - Water Storage Exploratory Committee
  - Recycled Water Committee
- Advisory Committees/Stakeholder meetings
  - Agricultural Water Advisory Committee
  - Water Retailer Meeting
  - Environmental and Water Resources Committee
  - Water Commission Meeting
  - Youth Commission

Stakeholder Engagement Plan

- Retailer meetings
- WSMP webpage for update and contact
- Stakeholder email list, communication newsletter or other channels as ongoing opportunities for updates

valleywater.org

Valley Water

Expert Panel

Provide independent review:

- Planning approach and framework
- Demand projection
- Project cost analysis
- Project evaluation
- Climate change analysis

WSMP Update Schedule

2023

- Establish overall framework and procedures
- Project/portfolio analysis and evaluation
- Stakeholder engagement

2024

- Portfolio analysis and recommendations
- Plan development
- Stakeholder outreach
- Plan adoption

Feedback Requested

- Planning goals
- Proposed strategies
- Planning approach
- Projects
- Evaluation criteria

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Valley Water

File No.: 23-0889 **Agenda Date:** 9/19/2023
Item No.: 2.2.

BOARD AGENDA MEMORANDUM

Government Code § 84308 Applies: Yes ☐ No ☒
(If "YES" Complete Attachment A - Gov. Code § 84308)

SUBJECT:
Water Supply Capital Workshop to Review the Capital Validation and Evaluation Processes, Review the Funding Filters for Prioritization, Introduce New Capital Funding Categories, and Provide an Overview of Capital Projects Included in the Capital Improvement Program Fiscal Years 2024-28 Five -Year Plan Funded by the Water Utility Enterprise Fund.

RECOMMENDATION:
Receive information and provide feedback, as necessary.

SUMMARY:
On May 16, 2023, upon adoption of the Capital Improvement Program (CIP) Fiscal Year (FY) 2024-28 Five-Year Plan, Santa Clara Valley Water District's (Valley Water) Board of Directors requested a workshop for all projects in the CIP. The majority of Valley Water's capital projects are funded primarily by three funds: the Watershed Stream Stewardship Fund (Fund 12); the Safe, Clean Water and Natural Flood Protection Program Fund (Fund 26); and the Water Utility Enterprise Fund (Fund 61). Today's Water Supply Workshop focuses on projects funded by Fund 61. The Fund 12 and Fund 26 Workshop will be conducted in January in alignment with the Board's review of the CIP Preliminary FY 2025-29 Five-Year Plan.

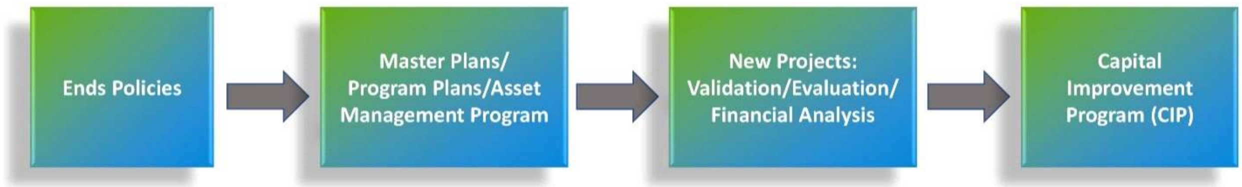
The majority of revenue for Fund 61 is generated by water charges. Valley Water's District Act provides that water charges may be levied to further the protection and augmentation of the water supplies as well as produce groundwater for beneficial use; may be collected from all those within a zone who own or operate water producing wells whether currently active or not; and that water charge revenue may be used to pay for: water supply, water quality, and infrastructure. CIP Water Supply Projects are funded primarily through water charges and are categorized into the following types of improvements: Storage Facilities, Transmission Facilities, Treatment Facilities, and Recycled Water Facilities.

Capital Project Validation and Evaluation Processes

The annual update of the CIP's Five-Year Plan includes a Validation Process to review and evaluate potential new projects for inclusion into the CIP. Many of these new projects are identified through

Master Plans, such as the Water Supply Mater Plan (WSMP), Program Plans, or through the Asset Management Plan (AMP). Additionally, new projects can be created by direction of the Board or requested by a Chief based on business needs or to improve Valley Water services.

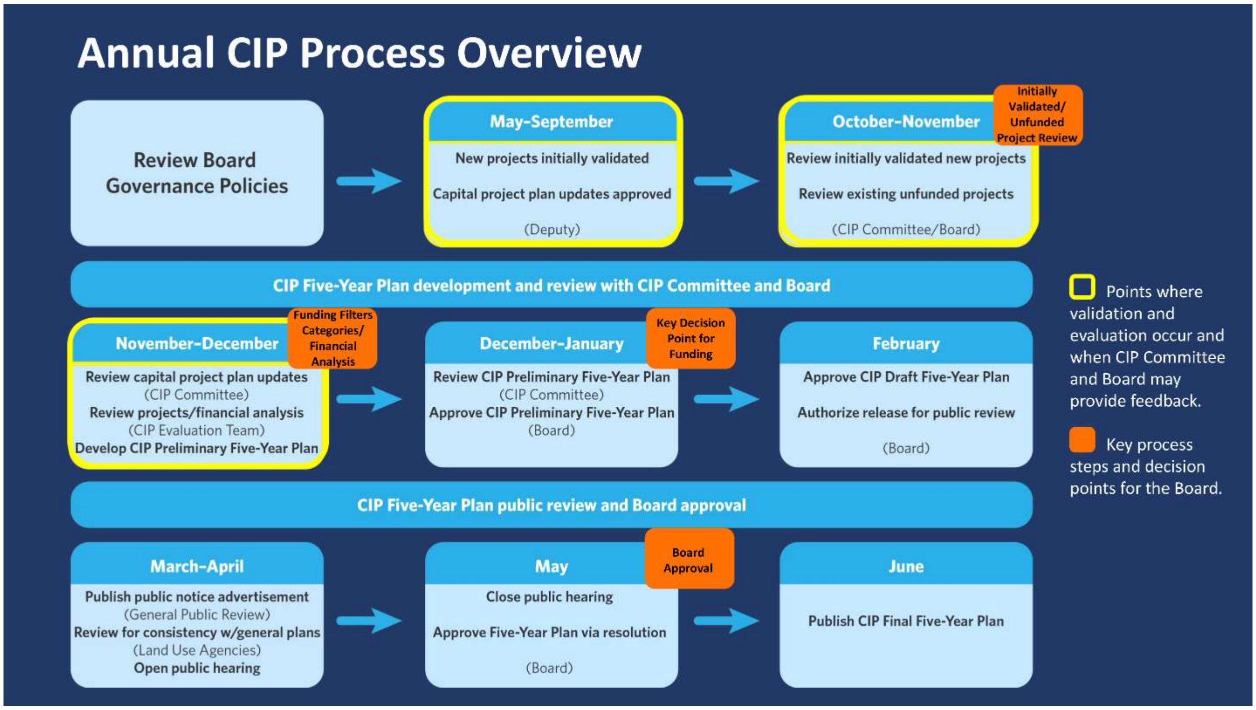
Below is a diagram illustrating the Validation Process:



For each potential new project, staff develops a business case to compare capital, non-capital, and non-asset alternative solutions; evaluate the lifecycle costs of these solutions; and identify a recommended solution that minimizes lifecycle cost while balancing service levels and risk. Staff then submits the business case for review by their respective Deputy Officer. Once approved, Initially Validated Projects are presented to both the CIP Board Committee (Committee) and the Board of Directors for feedback.

As illustrated in the Annual CIP Process graphic, capital project managers simultaneously perform an annual review of their projects to identify any changes to scope, schedule and/or cost and provide project plan updates, which are included in Valley Water's financial models for Funds 12, 26, and 61. Initially Validated Projects are assessed along with the impact the capital project plan updates have had on the financial health of each respective fund.

Each November, the CIP Evaluation Team, comprised of executive management and CIP staff, meets to consider Board feedback and review the fund models to prepare the CIP Preliminary Five-Year Plan for the CIP Committee review in December and for the Board to provide feedback and direction in January. The Board's review and approval of the CIP Preliminary Five-Year Plan is considered a key decision point in the annual cycle for the development of the CIP Five-Year Plan.



Capital Project Prioritization

Although all capital projects are important to fulfilling Valley Water's mission, funding constraints require the prioritization of projects to ensure the fiscal health of funds. While in 2019, Valley Water's Board of Directors deemed the Validation Process as robust and sufficient for prioritizing projects for inclusion in the CIP, in 2022, the Board approved the Funding Filters for Prioritization and ranked them by the order of their priority as follows:

Funding Filters for Prioritization

1. Repair/Replace Existing Infrastructure Projects
2. Public Health and Safety Projects
3. Shovel-Ready (Permits and Land Rights Secured) Projects
4. Multi-Benefit Projects
   A. Environmental Justice Benefit Projects
5. Partially Externally-Funded (Grants and Partnerships) Projects

As funding constraints due to rising capital costs continue to be addressed and in response to recent recommendations from the CIP Performance Audit, staff has developed Funding Categories. These categories will enhance the Funding Filters tool to improve transparency, ensure objectivity, and provide clarity to both the Board and the public.

To further prioritize projects, each Funding Filter has been assigned maximum points based upon the order of their priority as follows:

Funding Filters Point Scale

1. Repair/Replace Existing Infrastructure Projects **5 points**
2. Public Health and Safety Projects **4 points**
3. Shovel Ready (Permits and Land Rights Secured) Projects **3 points**
4. Multi-Benefit Projects **2 points**
   A. Environmental Justice Benefit Projects **½ point**
5. Partially Externally-Funded (Grants and Partnerships) Projects **1 point**

The Board determined its top priority is to repair and/or replace existing infrastructure. Since the majority of capital projects have this objective, additional points will be assigned based on the existing asset's risk score, as determined in the AMP, to further prioritize these projects.

Valley Water's AMP measures risk as Business Risk Exposure (BRE), which is a risk score derived from the multiplication of two factors: Probability of Failure (POF) and Consequence of Failure (COF). The calculation also includes a redundancy factor, which is applied to the POF. The POF score ranges from 1 to 5, with 1 being like new and 5 being failed. Valley Water's COF score ranges from 0 to 30, with 30 being the greatest consequence of failure. The Business Risk Exposure (BRE) scores for Valley Water assets can, therefore, range from 1 to 150 (POF = 5 x COF = 30), with 150 being the highest risk score for an asset.

Business Risk Exposure Adjustment Factor

1. Risk ≥ 88 = **Add 10 points**
2. Risk 76-87 = **Add 4 points**
3. Risk ≤ 75 = **Add 0 points**

Categories1 and 2 focus on further prioritizing those projects based upon their risk of failure. Category 3 applies to projects that have a lower risk of failure and new infrastructure projects. Further details of the three Categories are as follows:

1. **Category 1: ≥ 19 points**
   Category 1 Projects meet our obligation to repair/replace our existing infrastructure, targeting the inclusion of projects with an AMP BRE score that is ≥ 88 and are required for public health and safety. In addition, projects that are under construction or mandated (required by law, regulation, federal order, lawsuit, etc. …) are automatically included in Category 1.

2. **Category 2: 13-18.5 points**
   Category 2 Projects meet our obligation to repair/replace our existing infrastructure, targeting projects with an AMP BRE score that is between 76-87 and are required for public health and safety.

3. **Category 3: ≤ 12.5**
   Category 3 applies to projects that have a lower risk of failure, ≤ 75 for our existing infrastructure projects, and new infrastructure projects, as identified/prioritized in Valley

Water's Master Plans and Program Plans. In addition, small capital improvement projects and placeholder projects are automatically included in Category 3. Small capital projects cost less than $5 million (unless otherwise approved by the Board), can be completed within two fiscal years and do not require right-of-way acquisition. Placeholder projects are projects that are anticipated to be needed, but may not yet have defined scopes, schedules, or funding sources.

Valley Water's CIP Five-Year Plan includes projects that meet the criteria for all three Categories, all of which are critical to meeting Valley Water's mission. In alignment with Ends Policies, the Board may approve the funding of projects in any category.

The Funding Filters for Prioritization have been applied to all capital projects and in preparation for the Water Supply Capital Workshop, staff has also assessed the BRE scores for our existing infrastructure Water Supply Capital Projects. Based upon the points applied to each project, the Water Supply Capital Projects have been divided into the three Funding Categories outlined in this memo. These projects will be reviewed by Category during the presentation (Attachment 1).

During the Board's review of the CIP Preliminary FY 2025-29 Five-Year Plan, if funding constraints require prioritization, staff will bring forward recommendations for funding based upon the associated risk score for our existing infrastructure as established by Valley Water's AMP, and for new infrastructure, in alignment with our Master Plans and Program Plans.

Capital projects that the Board has deemed a lower priority may be postponed or moved to the CIP's Unfunded List. The Unfunded List is reviewed by the CIP Evaluation Team, CIP Committee and the Board on an annual basis and is considered for potential funding and inclusion in the annual CIP Five-Year Plan.

ENVIRONMENTAL JUSTICE IMPACT:

There are no Environmental Justice impacts associated with this item.

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: PowerPoint
*Handout 2.2-A: PowerPoint

UNCLASSIFIED MANAGER:
Luz Penilla, 408-630-2228

CAPITAL IMPROVEMENT PROGRAM

Water Supply Workshop

Presented by

Jessica Collins, Business Planning and Analysis Unit Manager
Office of Integrated Water Management

Valley Water

Presentation Outline

1. Annual CIP Process
2. Project Validation and Evaluation
3. Funding Filters for Prioritization
   A. Funding Categories
4. Water Supply Capital Projects
   A. Projects At-A-Glance
5. Next Steps/Questions/Discussion

Annual CIP Process Overview

Review Board Governance Policies

→

May–September

New projects initially validated

Capital project plan updates approved

(Deputy)

→

October–November — *Initially Validated/ Unfunded Project Review*

Review initially validated new projects

Review existing unfunded projects

(CIP Committee/Board)

CIP Five-Year Plan development and review with CIP Committee and Board

November–December — *Funding Filters Categories/ Financial Analysis*

Review capital project plan updates
(CIP Committee)
Review projects/financial analysis
(CIP Evaluation Team)
Develop CIP Preliminary Five-Year Plan

→

December–January — *Key Decision Point for Funding*

Review CIP Preliminary Five-Year Plan
(CIP Committee)
Approve CIP Preliminary Five-Year Plan
(Board)

→

February

Approve CIP Draft Five-Year Plan

Authorize release for public review

(Board)

CIP Five-Year Plan public review and Board approval

March–April

Publish public notice advertisement
(General Public Review)
Review for consistency w/general plans
(Land Use Agencies)
Open public hearing

→

May — *Board Approval*

Close public hearing

Approve Five-Year Plan via resolution

(Board)

→

June

Publish CIP Final Five-Year Plan

Points where validation and evaluation occur and when CIP Committee and Board may provide feedback.

Key process steps and decision points for the Board.

Drivers for New Capital Projects

Ends Policies → Master Plans/ Program Plans/Asset Management Program → New Projects: Validation/Evaluation/ Financial Analysis → Capital Improvement Program (CIP)

Funding Filters for Prioritization

1. Repair/Replace Existing Infrastructure Projects
2. Public Health and Safety Projects
3. Shovel Ready (Permits/Land Rights Secured) Projects
4. Multi-Benefit Projects
    A. Environmental Justice Benefit Projects
5. Partially External-Funded (Grants/Partnerships) Projects

CIP Performance Audit

Recommendation (summarized):

1. Enhance Funding Filters Tool to:
   A. Improve transparency
   B. Ensure objectivity
   C. Provide clarity

Solution:

1. Apply points to Funding Filters
2. Add adjustment factor for Business Risk Exposure (BRE)
   A. BRE established by Asset Management Program
   B. Used to further prioritize repair/replacement of existing infrastructure projects
3. Identify Project Categories
   A. Tool to aid Board in decision making when faced with funding constraints

Funding Filters Point Application

1. Repair/Replace Existing Infrastructure Projects	**5 points**
2. Public Health and Safety Projects	**4 points**
3. Shovel Ready (Permits/Land Rights Secured) Projects	**3 points**
4. Multi-Benefit Projects	**2 points**
A. Environmental Justice Benefit Projects	**½ point**
5. Partially External-Funded (Grants/Partnerships) Projects	**1 point**

Business Risk Exposure (BRE) Adjustment Factor:

1. BRE ≥ 88 = **Add 10 points**
2. BRE 76-87 = **Add 4 points**
3. BRE ≤ 75 = **Add 0 points**

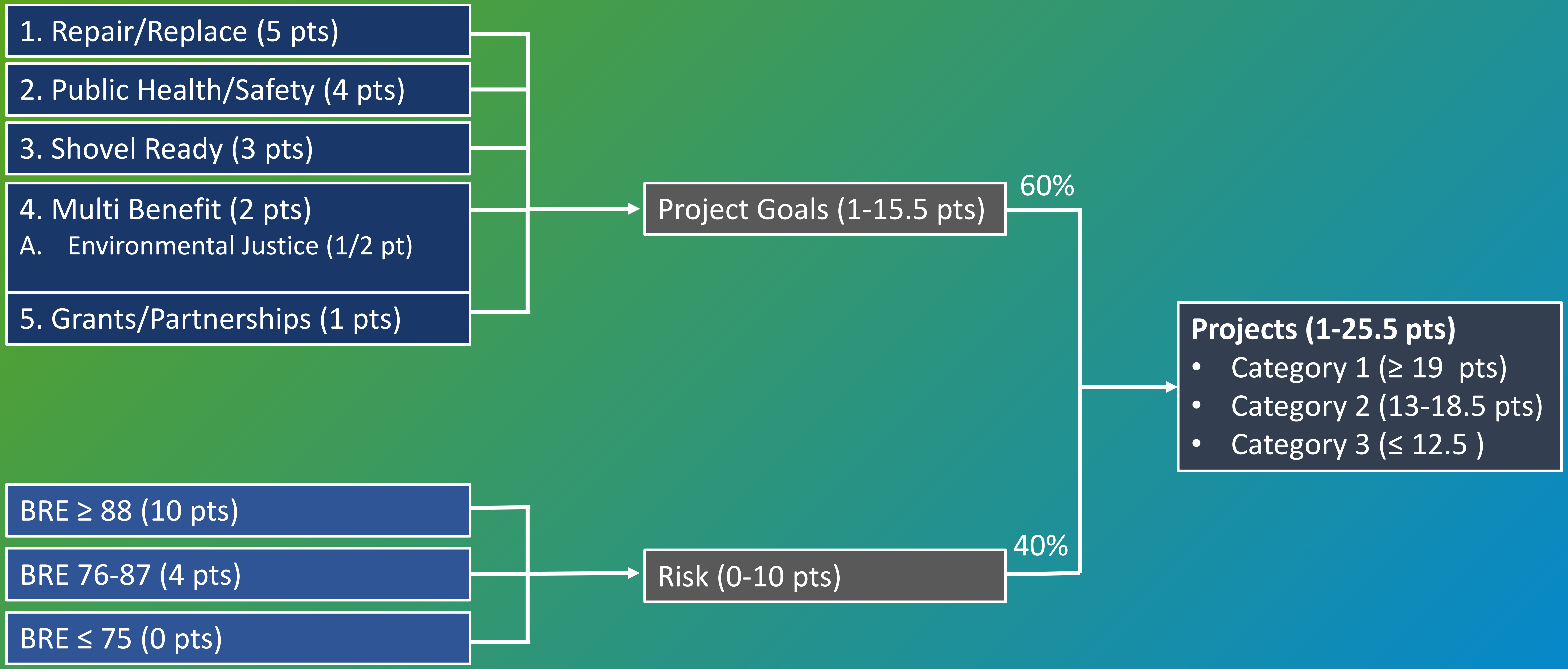
Business Impact Evaluation *(each criteria scored in detail on a 0-to-5 scale)*	
Social	Service Delivery
	Community Impacts
	Workplace Safety
Environmental	Environmental Impacts
Economic	Financial Impacts
	Impact to Reputation
Consqeuence of Failure (0 - 30)	

x

Condition Assessment *(scored on a 1-to-5 scale)*
1 = New or Recently Rehabiltated
2 = Good Condition, Only Minor Defects
3 = Defects Requiring Monitoring, But Fully Functional
4 = Requires Corrective Action, Functionality Threatened
5 = Failed, Unable to Satisfy LOS, Requires Immediate Action
Probability of Failure (1 - 5)

= *BRE (0 - 150)*

CIP Project Funding Categories



CIP Project Funding Categories

Category 1: ≥ 19 points

A. Repair/replace existing infrastructure

B. Risk of failure score is **≥ 88**

C. Required for public health and safety

D. Projects under construction or mandated (required by law, regulation, federal order, lawsuit, etc…) are automatically included in Category 1.

CIP Project Funding Categories

Category 2: 13-18.5 points

A. Repair/replace existing infrastructure

B. Risk of failure score is between **76-87**

C. Required for public health and safety.

CIP Project Funding Categories

Category 3: ≤ 12.5 points

A. Projects that have a lower risk of failure, **≤ 75**

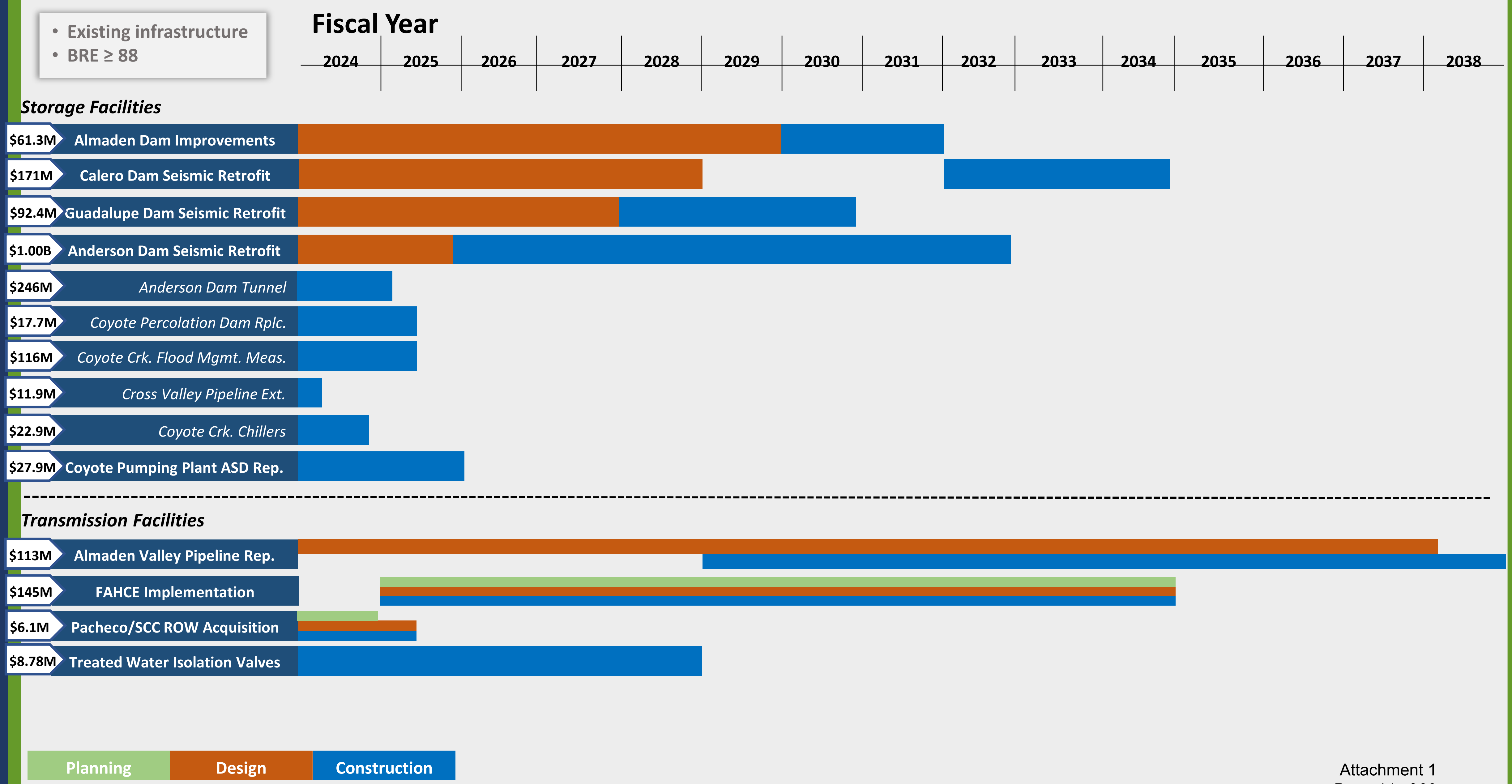
B. New infrastructure projects identified/prioritized in the Water Supply Master Plan and One Water Plan

C. Small capital improvement projects and placeholder projects are automatically included in Category 3.

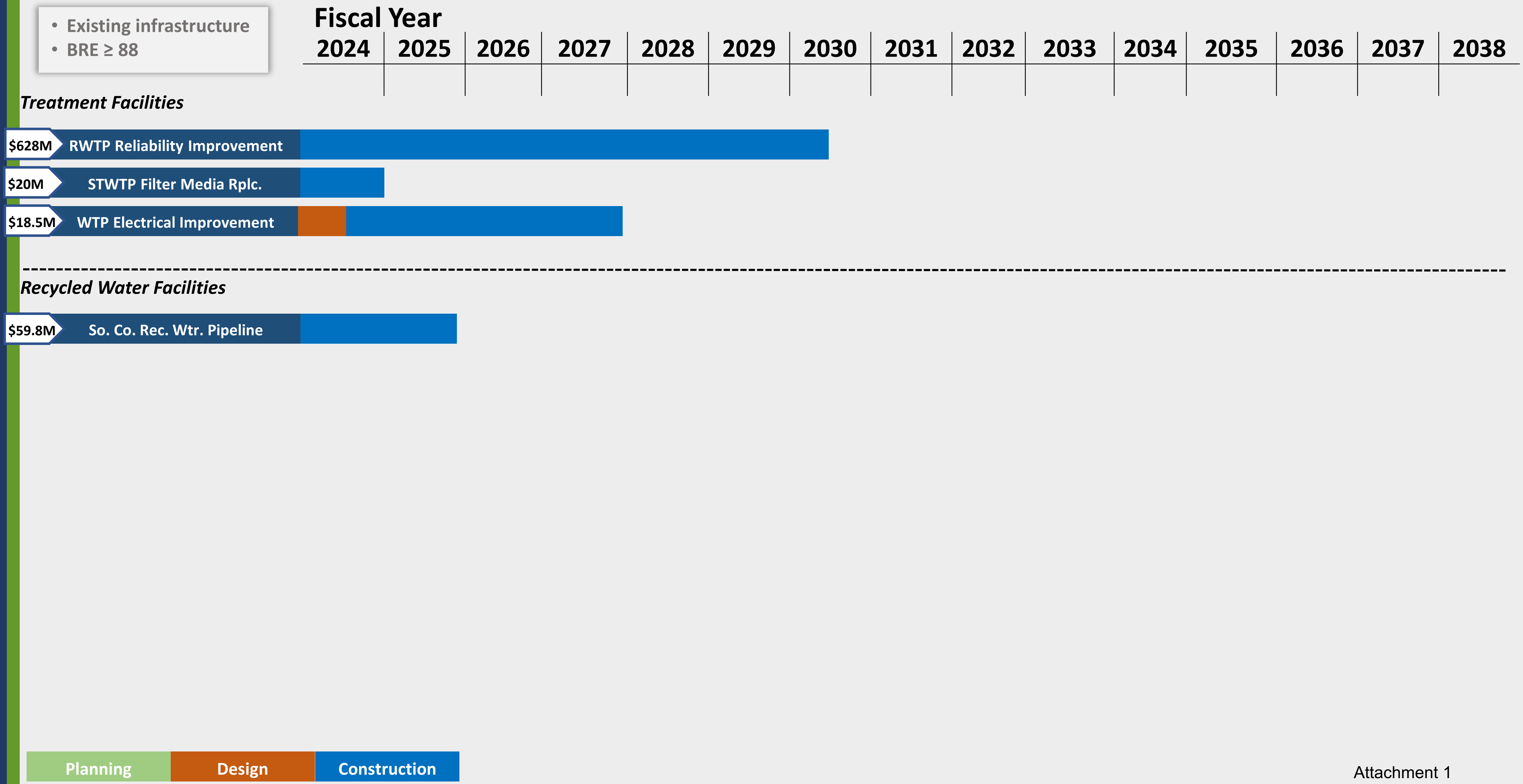
1) Placeholder projects are projects that meet Valley Water's mission and are anticipated to be needed, but may not yet have defined scopes, schedules, or funding sources.

PAUSE FOR QUESTIONS

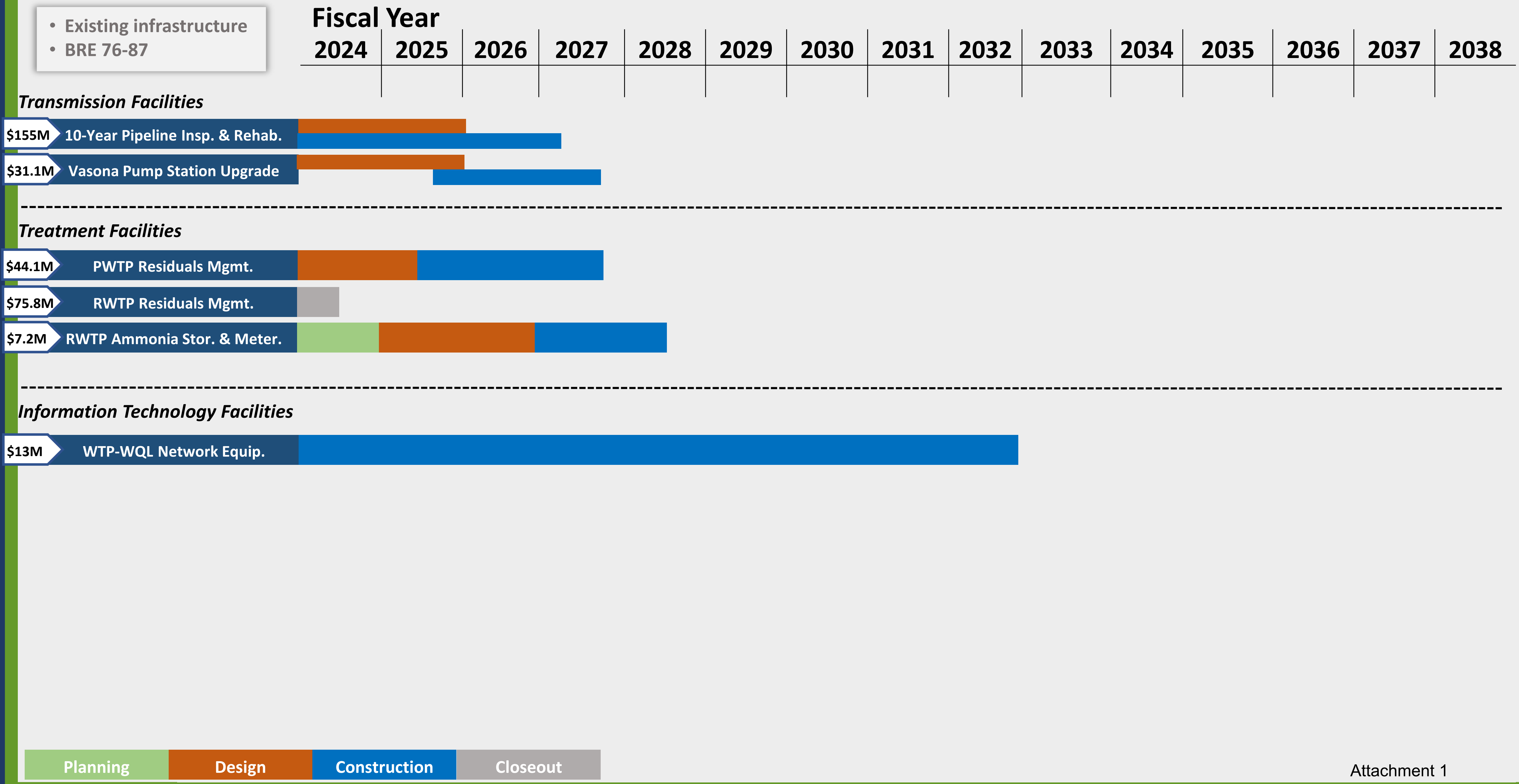
Category 1 Projects



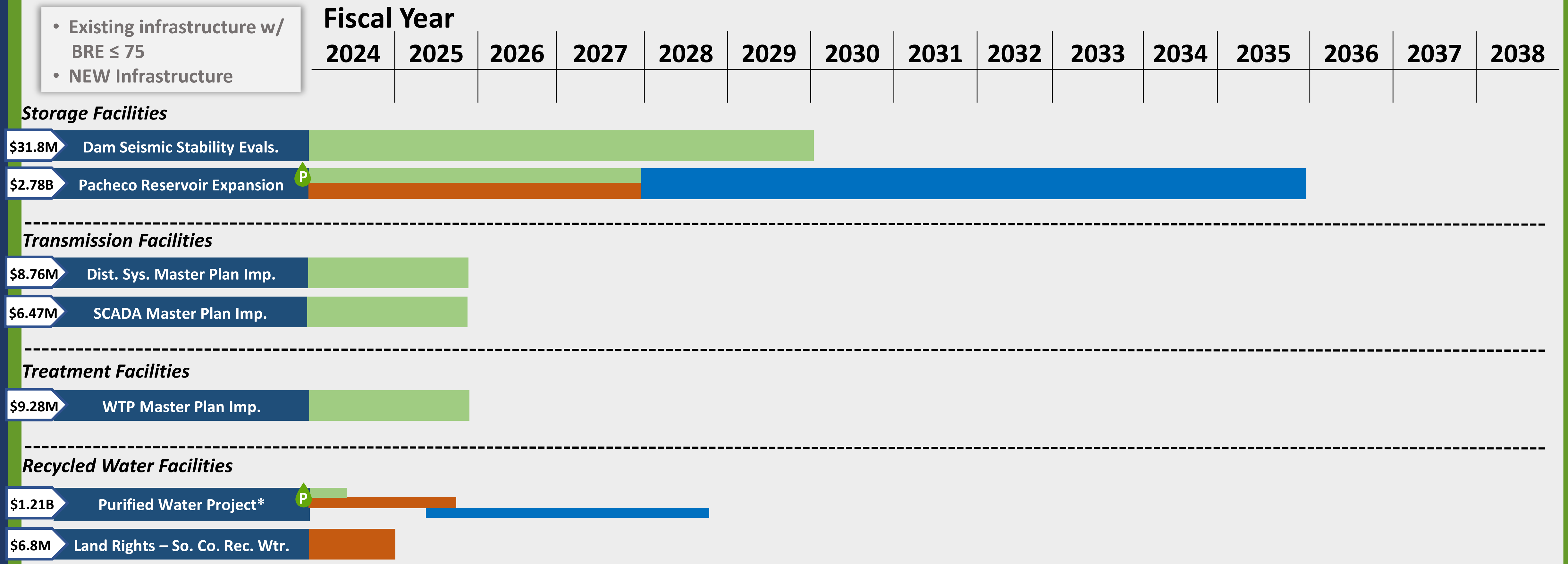
Category 1 Projects Continued



Category 2 Projects



Category 3 Projects



Planning | Design | Construction

P WSMP Potential Scenario Project

*The Purified Water Project is planned to be delivered via a Public-Private Partnership (P3); the P3 entity will finance the costs upfront; the capital cost estimate made in the CIP is for informational purposes only.

Category 3 Projects Continued

- Small Capital Imp. Proj.
- Placeholder Proj.

Fiscal Year

2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038

Small Capital Improvement Projects

- $81.1M San Felipe Reaches 1-3
- $15.5M Raw Water
- $1.36M Treated Water Transmission
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Placeholder Projects

- $66.7M WS Habitat Enhancements

Planning | Design | Construction | Closeout

PAUSE FOR QUESTIONS

Next Steps in CIP Process

Review Board Governance Policies

→

May–September

New projects initially validated

Capital project plan updates approved

(Deputy)

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December–January

Key Decision Point for Funding

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May

Board Approval

Close public hearing

Approve Five-Year Plan via resolution

(Board)

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June

Publish CIP Final Five-Year Plan

Points where validation and evaluation occur and when CIP Committee and Board may provide feedback.

Key process steps and decision points for the Board.

QUESTIONS

Valley Water

Clean Water • Healthy Environment • Flood Protection

CAPITAL IMPROVEMENT PROGRAM

Water Supply Workshop

Presented by
Jessica Collins, Business Planning and Analysis Unit Manager
Office of Integrated Water Management

Valley Water

Presentation Outline

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Handout 2.2-A
09/19/23

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4 = Requires Corrective Action, Functionality Threatened
5 = Failed, Unable to Satisfy LOS, Requires Immediate Action
Probability of Failure (1 - 5)

= BRE (0 - 150)

CIP Project Funding Categories

1. Repair/Replace (5 pts)
2. Public Health/Safety (4 pts)
3. Shovel Ready (3 pts)
4. Multi Benefit (2 pts)
   A. Environmental Justice (1/2 pt)
5. Grants/Partnerships (1 pts)

Project Goals (1-15.5 pts)

60%

BRE ≥ 88 (10 pts)

BRE 76-87 (4 pts)

BRE ≤ 75 (0 pts)

Risk (0-10 pts)

40%

Projects (1-25.5 pts)

- Category 1 (≥ 19 pts)
- Category 2 (13-18.5 pts)
- Category 3 (≤ 12.5)

CIP Project Funding Categories

Category 1: ≥ 19 points

A. Repair/replace existing infrastructure

B. Risk of failure score is **≥ 88**

C. Required for public health and safety

D. Projects under construction or mandated (required by law, regulation, federal order, lawsuit, etc…) are automatically included in Category 1.

CIP Project Funding Categories

Category 2: 13-18.5 points

A. Repair/replace existing infrastructure
B. Risk of failure score is between **76-87**
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CIP Project Funding Categories

Category 3: ≤ 12.5 points

A. Projects that have a lower risk of failure, **≤ 75**

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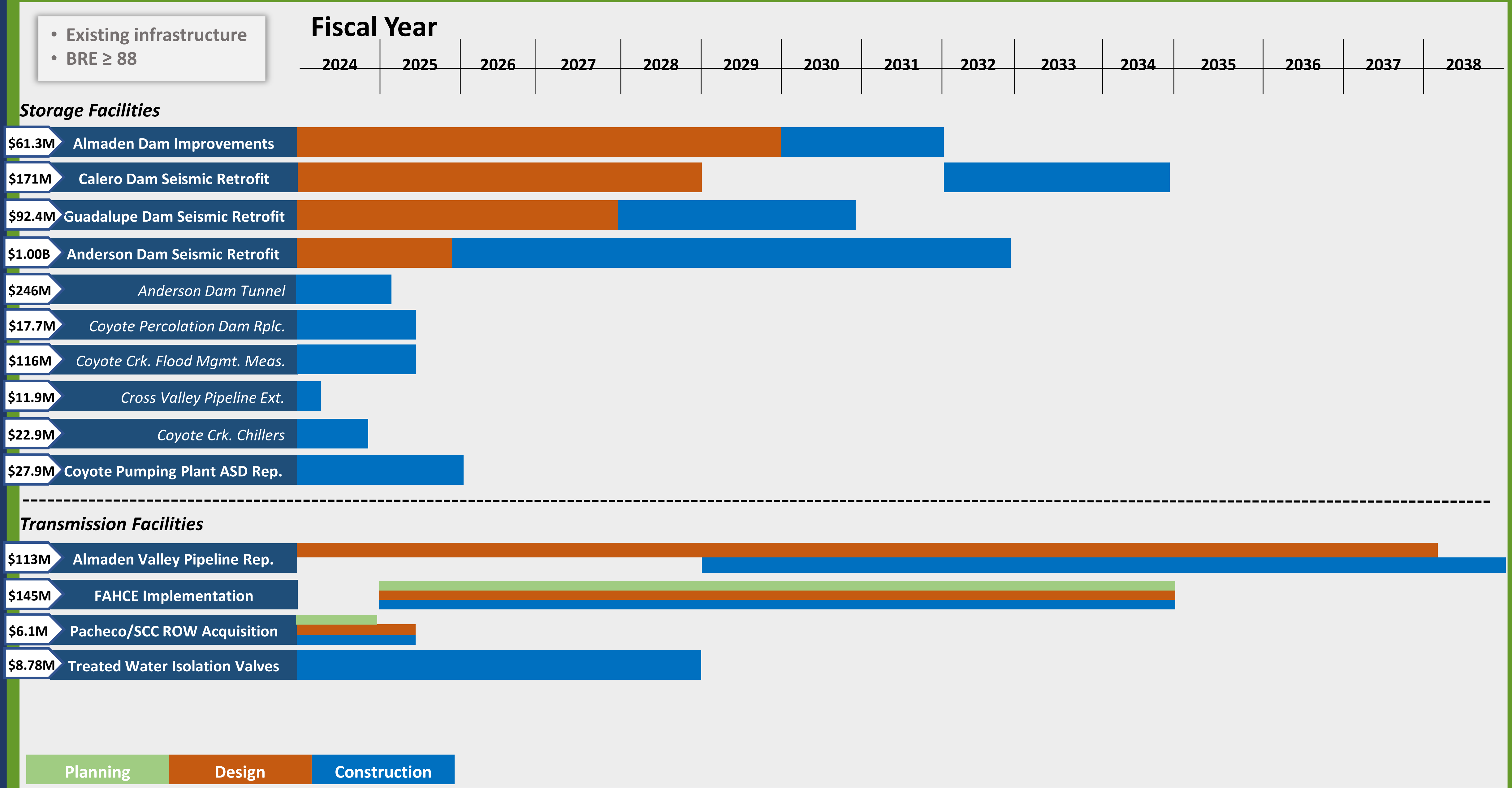
PAUSE FOR QUESTIONS

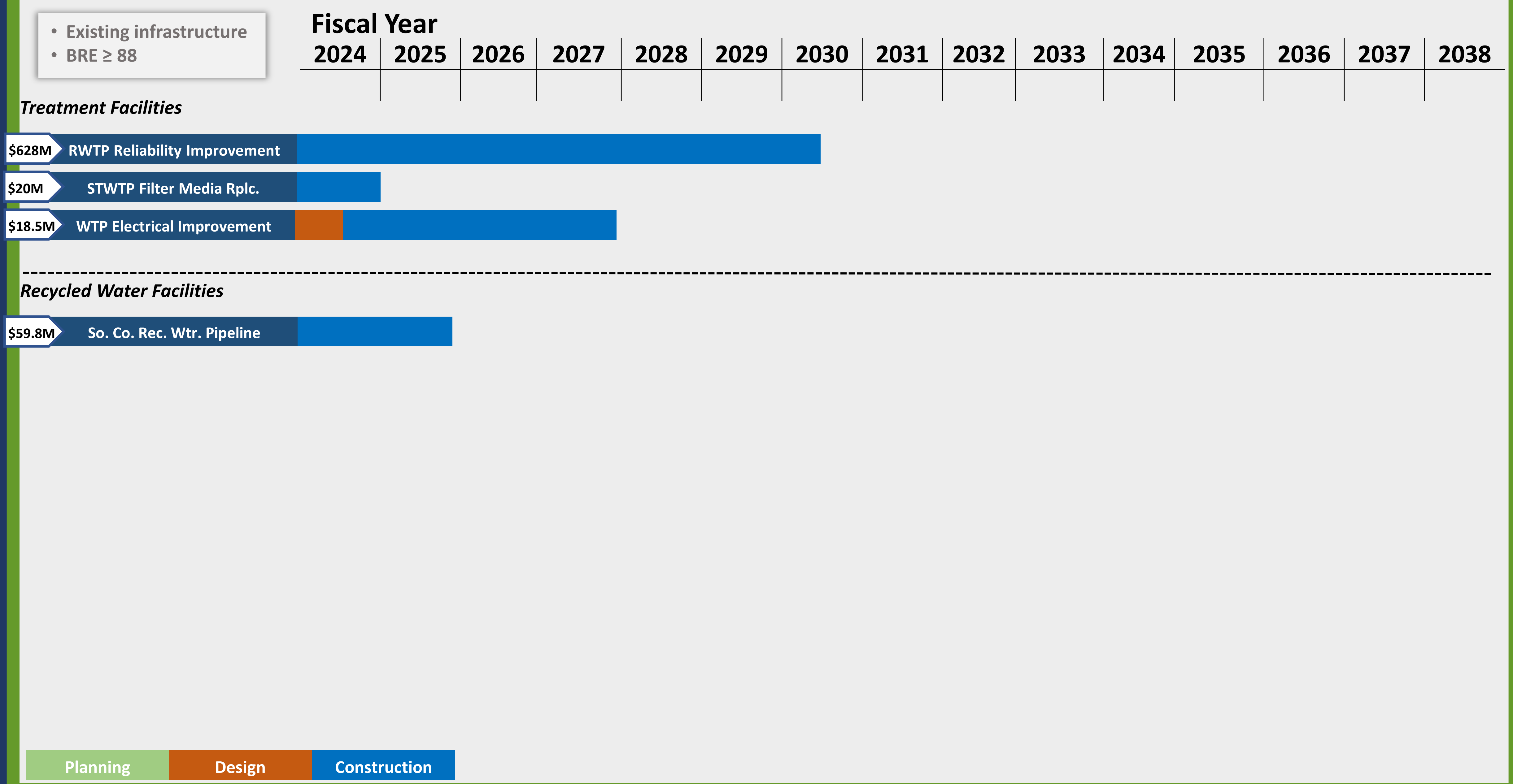
Category 1 Projects

Handout 2.2-A
09/19/23



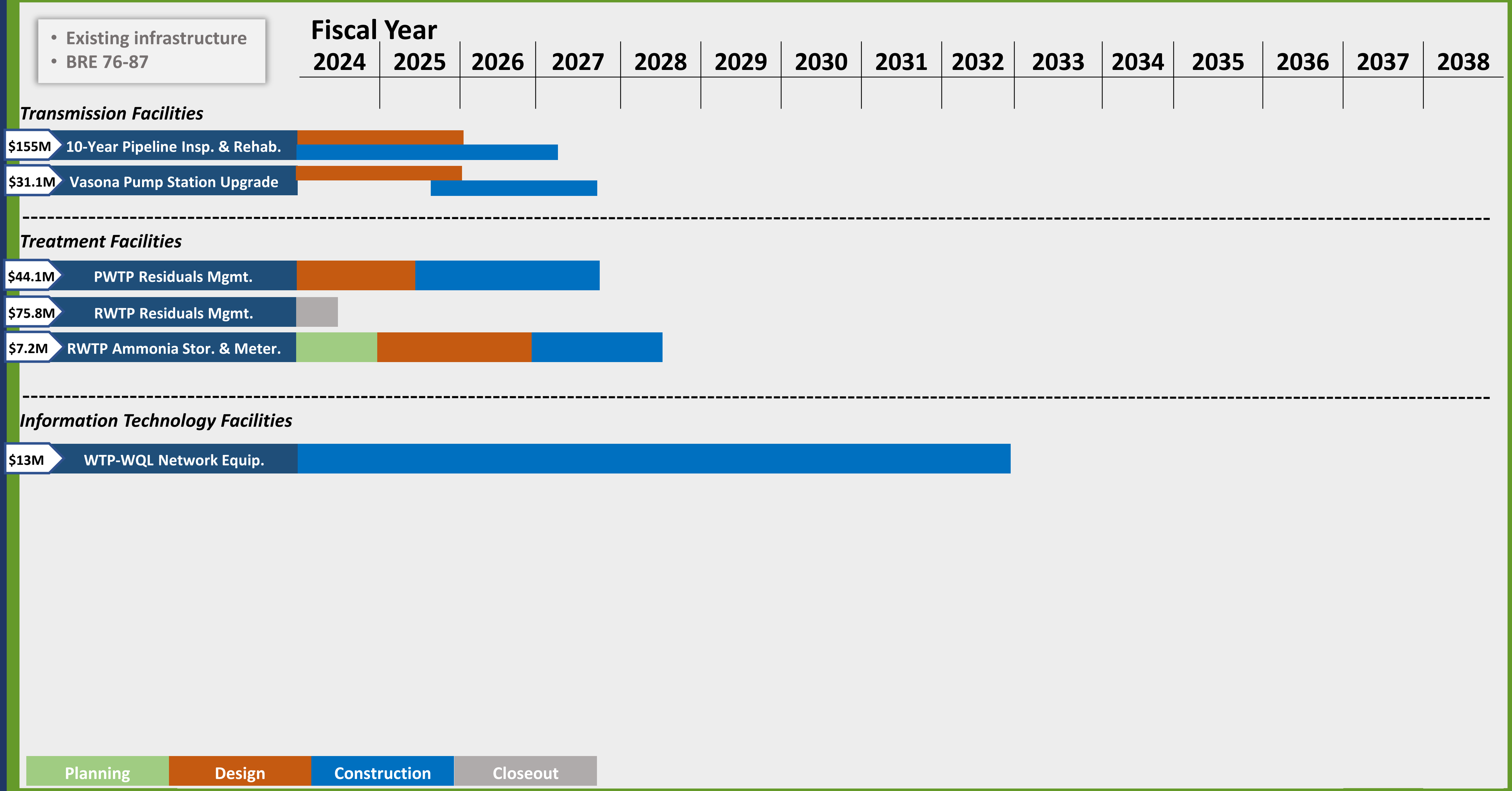
Category 1 Projects Continued

Handout 2.2-A
09/19/23



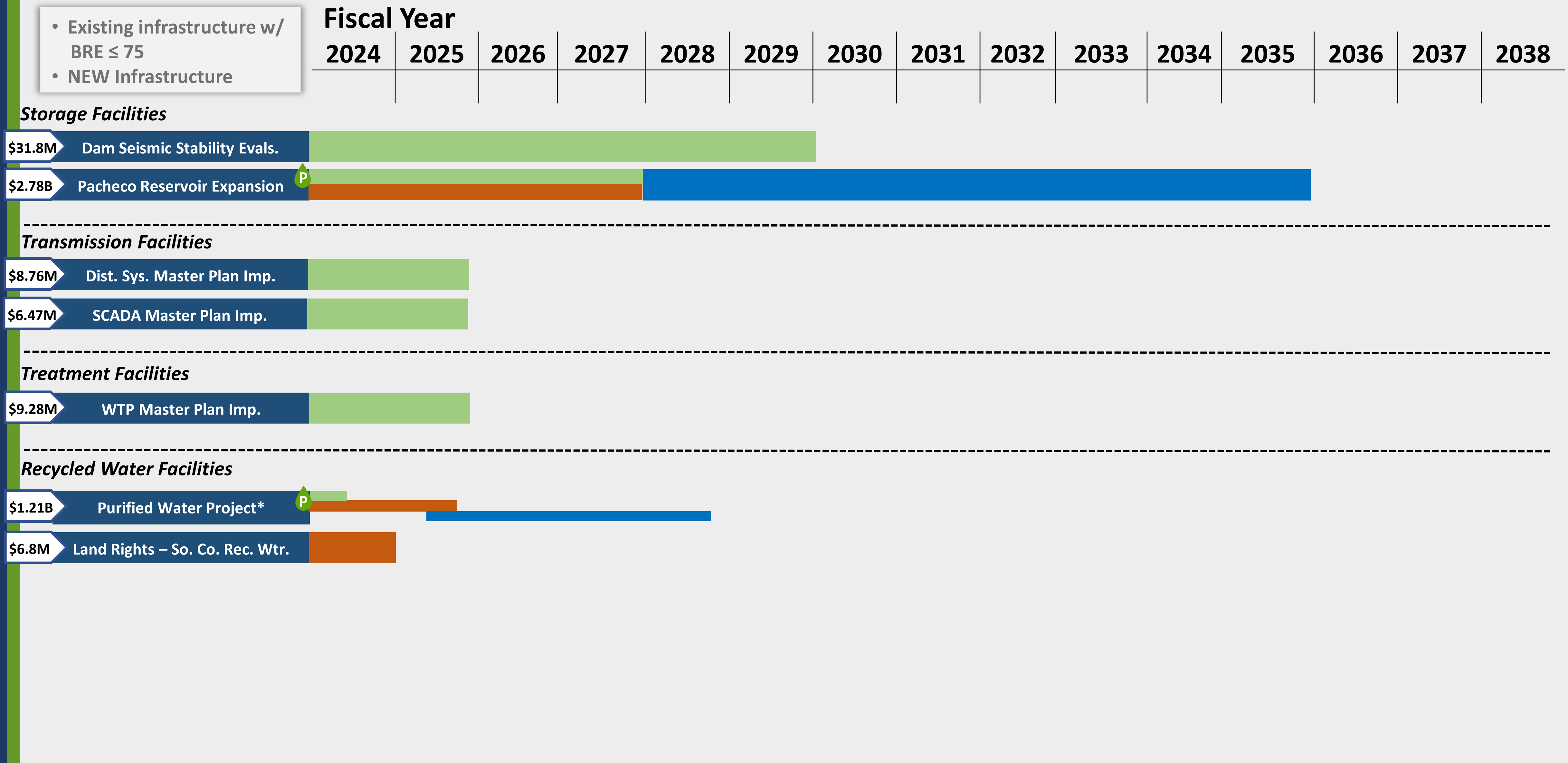
Category 2 Projects

Handout 2.2-A
09/19/23



Category 3 Projects

Handout 2.2-A
09/19/23



Planning | Design | Construction

P **WSMP Potential Scenario Project**

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Category 3 Projects Continued

Handout 2.2-A
09/19/23

- Small Capital Imp. Proj.
- Placeholder Proj.

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Placeholder Projects

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Planning | Design | Construction | Closeout

PAUSE FOR QUESTIONS

Handout 2.2-A
09/19/23

Next Steps in CIP Process

Review Board Governance Policies

→

May–September

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(Deputy)

→

October–November

Initially Validated/ Unfunded Project Review

Review initially validated new projects

Review existing unfunded projects

(CIP Committee/Board)

CIP Five-Year Plan development and review with CIP Committee and Board

November–December

Funding Filters Categories/ Financial Analysis

Review capital project plan updates
(CIP Committee)
Review projects/financial analysis
(CIP Evaluation Team)
Develop CIP Preliminary Five-Year Plan

→

December–January

Key Decision Point for Funding

Review CIP Preliminary Five-Year Plan
(CIP Committee)
Approve CIP Preliminary Five-Year Plan
(Board)

→

February

Approve CIP Draft Five-Year Plan

Authorize release for public review

(Board)

CIP Five-Year Plan public review and Board approval

March–April

Publish public notice advertisement
(General Public Review)
Review for consistency w/general plans
(Land Use Agencies)
Open public hearing

→

May

Board Approval

Close public hearing

Approve Five-Year Plan via resolution

(Board)

→

June

Publish CIP Final Five-Year Plan

Points where validation and evaluation occur and when CIP Committee and Board may provide feedback.

Key process steps and decision points for the Board.

QUESTIONS

Valley Water

Clean Water • Healthy Environment • Flood Protection