FERC Order Compliance Project for Anderson Reservoir and Dam

FERC Project 5737-007

Preliminary Project Description

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Santa Clara Valley Water District
5750 Almaden Expressway
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A. INTRODUCTION

1.0 Background

Anderson Reservoir is a critical water supply facility for Santa Clara County and Santa Clara Valley Water District's (Valley Water's) largest owned and operated reservoir (storage capacity of 89,073 acre-feet). Operations involve reservoir water releases for multiple purposes, including water supply, groundwater recharge, incidental flood control, power generation, downstream aquatic habitat, maintenance, and emergency purposes. Anderson Reservoir is located near the junction of Cochrane Road and Coyote Road in Santa Clara County, California, 0.8 mile east of U.S. Highway 101 (Cochrane Road exit), 18 miles southeast of downtown San Jose, and 2.5 miles northeast of downtown Morgan Hill (**Figure 1**). The dam is situated on Coyote Creek, a tributary to San Francisco Bay, and creates Anderson Reservoir.

In 2012, with oversight from the Federal Energy Regulatory Commission (FERC) and the California Department of Water Resources, Division of Safety of Dams (DSOD), the Anderson Dam Seismic Retrofit Project (ADSRP) was initiated to address seismic deficiencies present at Anderson Dam. Further studies and investigations also identified that the spillway at Anderson Dam does not meet modern safety standards because it lacks the capacity to safely pass flood flows associated with the probable maximum flood (PMF). Additionally, the dam outlet does not have the capacity to efficiently draw down the reservoir during an emergency and is vulnerable to seismic events. The proposed ADSRP (a separate project) involves retrofitting and upgrading Anderson Dam and associated facilities to meet FERC and DSOD requirements[1]. Throughout 2019 and into early 2020, project staff and consultants had been preparing the 90% design plans, specifications, and supporting environmental and permitting documents. Construction of the ADSRP was scheduled to start in the fall of 2022.

On February 20, 2020, under Part 12 of the Federal Power Act, FERC ordered Valley Water to implement interim risk reduction measures (IRRMs) associated with the Anderson Dam Seismic Retrofit Project immediately, due to limited existing outlet capacity at Anderson Dam (the existing outlet has a maximum capacity of 500 cfs) and the presence of densely populated areas downstream of the dam, in order to reduce the risk of dam failure from an earthquake as much as possible until the ADSRP can be fully implemented. (FERC Order).

FERC ordered Valley Water to implement IRRMs, namely to maintain the reservoir no higher than elevation 565 feet[2] effective immediately; to start lowering Anderson Reservoir to an elevation of 488 feet beginning no later than October 1, 2020; to take all appropriate measures to maintain and quickly lower the reservoir to deadpool in the event of significant inflow once the 488 feet elevation is reached; to assess and address the issue of potential rim instability during drawdown; and to expedite design, construction, and operations of a new, low-level outlet in advance of the ADSRP. FERC stated in its order that Valley Water should implement the dam safety directives, including design and construction of the proposed low-level outlet, while securing alternative water supplies and working with Commission staff, and federal, state and local resource agencies to minimize environmental effects.

Pursuant to FERC's Order, Valley Water immediately restricted the reservoir to 565 feet elevation, defined the FERC Order Compliance Project (FOCP or Project), and initiated emergency consultation processes with regulatory agencies, as appropriate. The FOCP is proposed to comply with the FERC

[1] https://www.valleywater.org/sites/default/files/SHELL_Anderson%20Dam_102418.pdf

[2] All elevations in this document refer to North American Vertical Datum of 1988.

Order to implement construction and operational activities to address seismic risks to the existing dam in the interim time period prior to construction and operation of the ADSRP. In response to FERC's recognition that Valley Water must take measures to secure alternative water supplies and minimize environmental effects, the FOCP also includes avoidance and minimization measures (AMMs). These AMMs are designed to minimize public health and safety and environmental impacts of complying with FERC's order, including AMMs related to alternative water supply and groundwater recharge, reservoir and dam bank stability, reservoir and downstream aquatic resources, and downstream flood risks.

While the FOCP and the ADSRP are two separate independent projects with independent utility,[3] FOCP infrastructure is being designed to allow later modification and incorporation of appropriate FOCP components into future ADSRP infrastructure and facilities. CEQA compliance and regulatory approval processes for the ADSRP would continue in parallel to the approval, construction and operation of the FOCP.

2.0 FOCP Project Objectives

The underlying purpose of the FOCP is to comply with the FERC Order, requiring immediate implementation of risk reduction measures to protect the public from risk of dam failure due to seismic activity, and development and implementation of necessary AMMs. Primary objectives of the FOCP are to construct improvements and implement operational activities necessary to:

- Allow Valley Water a way to safely, reliably, and expeditiously draw down Anderson Reservoir to deadpool and maintain lower reservoir elevations to comply with the FERC Order
- Minimize risks associated with exceeding the restricted reservoir level and undersized outlet structure by designing and constructing a new, low-level outlet tunnel (Anderson Dam tunnel)
- Prioritize the interim downstream protection of residents and property by decreasing immediate potential risks related to fault rupture from the maximum credible earthquake on the Coyote Creek–Range Front Fault Zone and the number of days that the reservoir elevation exceeds the restricted reservoir level by operating the new Anderson Dam tunnel
- Minimize the public health and safety and environmental impacts of reservoir draw down, Anderson Dam tunnel construction, and operations necessary to maintain the reservoir at the FERC ordered elevation through the implementation of AMMs. This includes lessening potential adverse impacts on reservoir and dam bank stability, the existing outlet, reservoir and downstream aquatic resources, downstream flood risks, and water supply and groundwater recharge, including downstream subsidence that may result from reductions in recharge.

[3] The FOCP would continue to achieve its objectives even if the ADSRP is not constructed.

B. PRELIMINARY PROJECT DESCRIPTION

1.0 Project Components Overview

The FOCP consists of four broad categories of actions, and of the following ten main components:

1. Reservoir Drawdown: Safe drawdown of Anderson Reservoir to deadpool, and reservoir operation until the Anderson Dam tunnel is operational.

2. Anderson Dam Tunnel Construction: The FOCP proposes to construct a new outlet system that would include a new low-level outlet tunnel, 8-foot-diameter lake tap, outlet structure, discharge channel, and reopening of the original Coyote Creek channel (northern channel) downstream of the existing dam The new outlet system, collectively called the Anderson Dam Tunnel, would be constructed at the base of Anderson Dam, through the right (looking downstream) abutment, along the southern side

3. Anderson Dam Tunnel Operation and Maintenance*:* Operation of the tunnel and water management procedures anticipated to occur until seismic deficiencies can be fully mitigated at Anderson Dam.

4. Avoidance and Minimization Measures:

a. *Bank and Rim Stability Improvements*. Geotechnical investigations will be carried out and monitoring devices will be installed in the areas of known landslides along Anderson Reservoir rim to address potential impacts of reservoir drawdown. If additional measures are determined necessary, the Project would include the installation of necessary structural improvements to protect against potential landslides.

b. *Existing Intake Structure Modifications*. Geotechnical investigations will be carried out and monitoring devices will be installed near the intake structure to address potential geotechnical impacts of dewatering on the existing outlet structure. If additional measures are determined necessary, the Project would include the installation of necessary structural improvements to reinforce the existing Anderson Dam intake structure.

c. *Creek Channel and Bank Erosion Control Modifications.* Modifications required to minimize erosion to accommodate drawdown and water management operations downstream of Anderson Dam.

d. *Imported Water Releases and Cross Valley Pipeline Releases Extension.* To maintain water supply, groundwater recharge, and prevent subsidence while Anderson is unavailable to provide current water storage and releases during the summer, provide for imported water releases to Coyote Creek and construction of a new Cross Valley Pipeline (CVP) segment to discharge downstream of the County of Santa Clara-owned Ogier Ponds.

e. *Coyote Percolation Dam Replacement*. To protect aquatic resources, water supply, and groundwater recharge, and to reduce subsidence from the effects of dewatering and maintaining a lower elevation in the reservoir, replacing the existing flashboard dam with an inflatable bladder dam that would quickly be deployed when inflows are low, and released to allow higher flows to pass safely.

f. *Coyote Creek Flood Management Measures*. To reduce flood risks from higher Coyote Creek flows during major storm events caused by maximum Anderson Dam tunnel flows combined with outflows from the existing outlet and local tributary inflows, acquisition or elevation of ten residential properties, and construction of six spans of off-stream floodwalls or levee are proposed.

g. *Implementation of Additional Project-specific Avoidance and Minimization Measures.* Implementation of project specific best management practices (BMPs), Coyote Creek avoidance and minimization measures,[4] and other environmental protection measures identified as needed for the FOCP, including measures to avoid and minimize adverse biological impacts to the reservoir and Coyote Creek.

2.0 Reservoir Drawdown to Deadpool

Pursuant to the FERC Order, initial reservoir drawdown to an elevation of 488 feet (deadpool) will commence no later than October 1, 2020. Reservoir drawdown will begin in advance of the onset of construction and the installation of the FOCP tunnel and low-level outlet works. Reservoir drawdown will occur gradually in order to minimize the potential for landslides or instability around the rim of the reservoir (see Section 5.1) or existing intake structure (see Section 5.2), to minimize sediment transport downstream, and to avoid potential harm to unhoused individuals that may be occupying areas in close proximity to Coyote Creek.

Subject to FERC approval, Valley Water proposes to dewater and maintain the reservoir elevation as close to deadpool as feasible by implementing releases at rates that are approximately net 100 cubic feet per second (cfs) greater than reservoir inflows. If the DSOD restricted reservoir level is reached (elevation 592 feet), then Valley Water would release the maximum rate though the existing outlet structure, which is approximately 500 cfs. Maximum releases would be expected during larger storm events or series of storm events. Assuming no inflow, this will result in the reservoir lowering at a rate of approximately 200 acre-feet (AF) per day, and attainment of deadpool between mid-December 2020 and January 2021. Runoff from storm events will reduce the rate of drawdown, with a high likelihood of the reservoir level increasing during most winters due to the small discharge capacity of the existing outlet works. Depending on winter precipitation levels, attainment of deadpool may not occur until April 2021, which is subject to further review and approval by FERC.

See Section 4.1 for additional details about operation of the reservoir-creek system from the start of reservoir drawdown to deadpool through implementation of Anderson Dam tunnel operations.

3.0 Anderson Dam Tunnel

3.1 Construction Schedule

Anderson Dam tunnel construction is anticipated to start in early 2021 and finish by the end of 2023. Primary construction activities directly related to the Anderson Dam tunnel include: site mobilization, site preparation (i.e., clearing and preparing staging and stockpile areas), Anderson Dam tunnel construction, downstream creek channel and bank erosion control modifications, and other ancillary activities necessary to allow tunnel operation and maintenance (**Figure 2).** Minor site restoration activities may also occur in areas that are not likely to be used as a part of ADSRP; see Section 3.13.

[4] These include measures that would be defined as “conservation measures” under the Endangered Species Act.

3.2 Safety and Environmental Awareness

The construction contractor for each FOCP component will prepare a Safety and Environmental Awareness Program (SEAP). The SEAP will describe the training for project workers on the following topics:

- General safety procedures
- General environmental procedures
- Fire safety
- Protection of biological, cultural and paleontological resources
- Hazardous materials protocols and Best Management Practices (BMPs)
- Stormwater pollution prevention plan (SWPPP) requirements[5]
- Noise abatement
- Compliance with County Health Department Orders regarding COVID-19

3.3 Construction Equipment

Table 1 provides a summary of construction equipment required for primary construction activities directly related to the Anderson Dam tunnel.

[5] Water quality during construction will be protected through MPs included in a Stormwater Pollution Prevention Plan (SWPPP) pursuant to a Construction General NPDES permit, as well as additional BMPs included in Appendix A.

Table 1 Anderson Dam Tunnel Construction Equipment

Equipment	No. of Equipment Required by Construction Activity									
	Site Preparation	Portal Excavation	Tunnel Excavation	Micro Tunnel Boring Machine (MTBM) Drive	Shaft Excavation	Tunnel and Shaft Linings	Channel and Streambanks	Anderson Force Main Relocation	Concrete Structures	Access Roads
Large excavator	1	1	--	--	1	--	1	1	1	1
Small excavator	--	--	--	--	1	--	--	--	--	--
Haul trucks	2	5	2	2	2	--	3	2	1	2
Compactor	--	--	--	--	--	--	--	--	--	1
Track Drills	--	2	--	--	1	--	--	--	--	--
Compressors	--	2	2	1	1	1	--	--	1	--
Shotcrete Batch Plant	--	1	1	--	1	--	--	--	--	--
Bobcat	1	1	--	--	--	--	--	--	1	--
Front End Loader	1	1	1	1	1	1	1	1	1	--
Manlift	--	1	--	--	1	1	--	--	1	--
Crane	--	--	--	1	1	1	--	--	1	--
Pumps	--	1	2	2	2	2	2	2	2	--
Ventilation Fan	--	--	2	2	1	1	--	--	--	--
Road-Header	--	--	1	--	--	--	--	--	--	--
Robotic Shotcrete Machine	--	--	1	--	1	--	--	--	--	--
MTBM	--	--	--	1	--	--	--	--	--	--
3 CY Scooptrams	--	--	4	--	--	--	--	--	--	--

Equipment	No. of Equipment Required by Construction Activity									
	Site Preparation	Portal Excavation	Tunnel Excavation	Micro Tunnel Boring Machine (MTBM) Drive	Shaft Excavation	Tunnel and Shaft Linings	Channel and Streambanks	Anderson Force Main Relocation	Concrete Structures	Access Roads
Slurry Separation Facility	--	--	--	1	--	--	--	--	--	--
Welding Machine	--	--	--	1	1	1	--	1	1	--
Concrete Pump Truck	--	--	--	--	--	1	--	--	1	--
Concrete Vibrators	--	--	--	--	--	4	--	--	3	--
Site Generator (2,000 kilowatts) [a]	--	--	1	1	1	1	--	--	1	--
Generator (1,000 kilowatts)	--	--	1	2 [b]	1	--	--	--	--	--
Generator (80 kilowatts)	--	--	1	1	1	1	--	1	1	--
Barge-mounted crane	--	--	--	1	--	--	--	--	--	--
Barge mounted drill rig	--	--	--	1	--	--	--	--	--	--
Barge mounted excavator	--	--	--	1	--	--	--	--	--	--

3.4 Site Mobilization and Preparation

3.4.1 Access and Haul Roads

The construction contractor will access the Project area predominantly via U.S. Highway 101, Cochrane Road, and Coyote Road. New temporary access and haul roads will be installed within the Project area to allow for the movement of heavy construction vehicles, construction equipment, and building materials between active work areas, staging areas, and the disposal site. This includes a haul road from Toyon Parking area diagonally up across the dam face to join the Coyote Road near the kiosk location. Access roads will be approximately 40 feet wide and surfaced with aggregate base.

Coyote Road Removal

Public access to County parklands, specifically Anderson Lake County Park and Toyon Picnic Area, will be terminated at the start of the FOCP. Construction of the Anderson Dam tunnel will involve removal of Coyote Road, a one-way access loop spurring off Cochrane Road, which traverses the existing dam crest and dam abutments and connects to the park's parking lots and trails. Three turnouts will be added to the one-lane portion of Coyote Road, between the kiosk (located off the intersection with Cochrane Road) up to the left side of the dam crest. The turnouts will be surfaced with compacted aggregate base. An aggregate base surface road will also be constructed within the Toyon Picnic Area that will provide access from the existing grade up to the access pad for the outlet control structure.

Upon completion of construction of the ADSRP, it is anticipated that Coyote Road will be replaced with a two-way roadway, within the existing alignment, crossing the dam where it will narrow to a single lane ending above the ADSRP's new outlet works systems (which will replace Anderson Dam tunnel and existing outlet). The new road will no longer be looped and a portion will become inaccessible to through traffic and private vehicles.

Temporary Barge Access

A temporary access road will be constructed from the end of the boat ramp down to the reservoir to allow for reservoir access by barge. A barge will be used to drill exploratory holes within the reservoir (to retain information pertaining to geotechnical conditions for tunnel construction activities); support dredging and preparation of the receiving area for tunnel construction; and support with equipment removal from the reservoir.

3.4.2 Staging and Disposal Areas

Designated staging areas will be used for office and equipment trailers, equipment and materials storage, equipment maintenance facilities, fuel pumps and fuel storage tanks, concrete batching, construction vehicle parking, and materials laydown. Staging areas are summarized in **Table 2** and shown on **Figure 2**. All park areas located within the Project area boundary will be closed to public use throughout the duration of construction.

To prepare the construction staging areas, the construction contractor will remove vegetative groundcover and debris, grade the sites to create a flat surface for the movement of construction vehicles and equipment, place gravel or a separation fabric over the ground surface depending on usage, install 6-foot security and/or perimeter fencing, and install silt fencing or berms along work areas adjacent to Coyote Creek, as necessary. Visual screening, such as fencing with mesh, may be installed along Cochrane Road at Staging Area 1. Access for Staging Area 2 will require construction of a driveway offof Cochrane Road.

Waste material excavated during construction will be temporarily stockpiled in a designated disposal area located within the main Anderson Lake County Park boat ramp parking area. Preparation of the disposal area will include removal of lighting from the portion of the parking area that will be used for stockpiling. By the time the Anderson Dam tunnel is completed, it is estimated the disposal area will contain up to 130,000 cubic yards of material. Disposed materials will be later hauled to a permanent disposal site in the reservoir during construction of the ADSRP.

Table 2. Anderson Dam Tunnel Staging and Disposal Areas

	Location	Existing Land Use	Proposed Use of During Construction
Staging Area 1	North side of Cochrane Road and Coyote Creek, approximately 500 feet west of the dam in Anderson Lake County Park.	Toyon Group Picnic Area	Staging and laydown area
Staging Area 2	Private residence located on the south side of Cochrane Road and Coyote Creek.	Private Residences (Giancola and Coyle Properties)	Contractor offices and working parking
Staging Area 3	Parking lot located on the south side of Coyote Road and Anderson Reservoir	Anderson County Park main boat ramp parking lot	Equipment and parking
Disposal Area	Parking lot located on the south side of Coyote Road and Anderson Reservoir	Anderson County Park main boat ramp parking lot	Temporary disposal of excavated materials until future placement in reservoir as part of ADSRP.

Source: URS 2018, URS 2017

3.4.3 Tree Removal

With the exception of distinct areas (discussed in AMMs below) where creek channel and streambank modifications are necessary for installation of flood control improvements, and access points for those channel modifications; existing mature trees along the riparian corridor of Coyote Creek will be preserved to the extent possible. Trees located outside of the riparian corridor, however, will likely be removed. This will include the majority of trees located within the Toyon Group Picnic Park Area (Staging Area 1). Barriers will be installed outside the drip line of trees associated with the bed and bank of the reservoir and creek channel to avoid impacts to those resources.

3.5 Outlet Pipe Clearance

Preliminary analysis of initial dewatering has identified potential blockage of the existing outlet pipe due to sediment, organic matter, trees, shrubs, and other debris as a serious concern. Measures will be taken to prevent blockages, , including initiating an interim reservoir drawdown to an elevation level that is lower than current 565 feet prior to October 1, 2020, and/or implementation of a dewatering schedule designed to prevent clogging. A debris boom may be installed to prevent some debris from entering the existing outlet pipes.

3.6 Anderson Dam Tunnel Construction

The Anderson Dam tunnel project component involves construction of a low-level outlet through the right (northern) abutment of Anderson Dam to release and regulate water flow from the reservoir[6].

The Anderson Dam tunnel will consist of three sections of tunnel and pipeline arrangements:

1. an approximate 400-foot-long, 8-foot-diameter "lake tap" pipe upstream of the dam; connected to
2. an approximate 925-foot-long, 19-foot-diameter reinforced concrete lining within an approximate 24-foot-diameter tunnel; connected to
3. an approximate 375-foot-long, 13-foot-diameter steel pipeline within an 18.5-foot-diameter horseshoe tunnel.

The 13-foot-diameter steel pipeline (arrangement 3 above) will end at a downstream outlet control structure housing two 132-inch diameter fixed cone valves (FCVs) connected to concrete-enclosed dissipation chambers. Tunnel releases from the outlet control structure will discharge into an 86-foot-wide 330-foot long riprap-lined discharge channel leading to Coyote Creek. The outlet control structure will also include a 24-inch diameter sleeve valve that will allow releases when flows are too low to effectively use the 132-inch diameter fixed cone valves. Construction of the outlet structure and discharge channel will require relocation (deepening) of approximately 500 feet of the Anderson Force Main, as further described below in Section 5.3). Additionally, a sloping-faced trash rack with bars spaced 6 inches apart will be located at the upstream end of the Anderson Dam tunnel. The trash rack will be designed to prevent damage to the FCVs cause by entry of large debris.

As described below in Section 5.3, *Creek Channel and Bank Erosion Control Modifications*, the downstream Coyote Creek channel will be modified to accommodate diverted water released from the new outlet tunnel and the existing outlet. Modifications will involve re-opening the historic reach of Coyote Creek (northern channel) that was decommissioned during construction of the original dam. Releases made during reservoir lowering will be conveyed by a combination of the southern channel and northern channel, as further described below.

Following completion of the Anderson Dam tunnel, the combined flow from the existing outlet works and the tunnel will have a capacity of up to about 2,500 cfs. See Section 4.0, *Anderson Dam Tunnel Operation and Maintenance,* for a description of outlet works operation following tunnel construction.

3.6.1 Construction Methods

Tunnel Portal

Construction of the 80-foot-high tunnel portal, located on the right abutment approximately 300-feet downstream of the dam, will require installation of eleven rows of soil nails and a protective facing of welded wire mesh and shotcrete. Material excavated from the portal will be hauled to the designated disposal area located in the main boat ramp parking lot (see Section 3.6.2).

Tunnel Excavation

Tunnel excavation will be accomplished using road headers, a micro-tunnel boring machine (MTBM), and controlled detonations. A road header is a boom-mounted cutting head mounted on a crawler that

[6] The Anderson Dam tunnel can later be used during the ADSRP construction to facilitate full reservoir drawdown, and converted into a larger diversion system to bypass flows during removal and replacement of the existing dam.

cuts through the rock face. In sections of harder rock, controlled detonations may be needed to fracture the rock in advance of the road header. These methods are described in detail below.

Starting from the tunnel portal, a road header will be used to cut through the rock in the right abutment of the dam to create the 19-foot-diameter and 350-foot-long tunnel segment. The road header will also be used to cut the approximately 24-foot-diameter and 1,050-foot-long tunnel segment in the mountainside between the dam and the spillway. As the road header advances, spoils will be transported in trucks to the appropriate disposal area. The tunnel will be supported as excavation proceeds using steel ribs and shotcrete. Shotcrete will be produced from an on-site batch plant. Blasting may occur within the tunnel if hard rock conditions are encountered.

The MTBM will be used to mine the rock material below the wetted reservoir, creating the 400-foot-long, 8-foot-diameter "lake tap" pipe upstream of the dam. The MTBM requires construction of a launching chamber and bulkhead (a structural safety device) at the upstream end of the tunnel. The bulkhead will be made of reinforced concrete with rock dowels that anchor the bulkhead to the rock mass.

The MBTM will be launched from the upstream tunnel bulkhead, jacked forward until it reaches a receiving area dredged in the lake sediment, referred to as the break-out location. The receiving area will have a nearly vertical dredged cut at the portal face, with sloping wings on either side. Riprap will be placed on the landing pad to support the MTBM as it enters the reservoir. Dredged lake sediment will be placed within the reservoir at a location approximately 200 feet upstream of the break-out location. Riprap may also be used to mitigate potential buoyancy of the 8-foot steel casing once the MTBM is recovered. The shape of the receiving area is intended to provide as much ground cover as practicable to minimize frac-out of bentonite and/or contact grout[7]. The bentonite and/or contact grout will be injected through side ports in the MTBM near the break-out location.

The receiving area will be separated from the rest of the reservoir by a system of turbidity curtains. The turbidity curtains will act as a containment measure to mitigate water quality during dredging operations and to support with potential frac-out during MTBM break-out. Cuttings excavated by the MTBM will be pumped down the tunnel to a slurry treatment facility where the slurry will be dewatered at a sludge treatment facility. The dewatered cuttings will be hauled and placed in the designated disposal area.

Once the MTBM reaches the reservoir, it will be detached exposing a bulkhead at the upstream end of the 8-foot steel pipe that isolates the reservoir from the pipe. The MTBM will be removed from the reservoir using a barge and crane. The 8-foot pipe bulkhead will remain in place until the outlet works are complete. At that time, with the valves in the outlet structure closed, a small valve in the pipe bulkhead will be opened to allow the tunnel to fill with water. Once the tunnel is filled, the pipe bulkhead will be removed and pulled from the reservoir using a barge and crane. Finally, a coarse trash rack will be installed over the end of the 8-foot pipe. Following completion of tunnel excavation, tunnel segments will be lined with reinforced concrete. Concrete grouting will be installed following the liners.

Outlet Control Structure

The reinforced concrete outlet control structure will be constructed in-place concurrently with the tunnel lining work. Following completion of structure construction, a crane will be used to install the 132-inch FCVs through openings in the structure roof. Installation of the piping and valves between the upstream end of the structure and the tunnel opening will occur concurrently. A temporary access

[7] A frac-out is an unintentional or inadvertent loss of drilling fluids during a drilling operation from the borehole to the surface from points other than its entry and exit points. In this case, the drilling fluid is bentonite and/or concrete grout.

road for the outlet control structure will be constructed along the right abutment of the dam. Fill material used for the access road will be obtained from other excavated areas (e.g., excavated material from Coyote Creek or from the tunnel portal.)

3.6.2 Materials and Spoils Management

Materials excavated from the Anderson Dam tunnel and the reopening of the northern channel will be placed in trucks and hauled directly to the disposal area (see **Figure 2**). Truck loads will be wetted to mitigate generation of dust during hauling.

During tunneling construction, spoils will be removed from the excavated face using muckers and hauled to a temporary spoils storage area located in Staging Area 2. Spoils will later be loaded and hauled from the temporary spoils storage area up to the disposal area during daylight hours. The temporary spoils storage area and the disposal area will be designed using best management practices, including BMPs in the General Construction Permit SWPPP and Appendix A, such as the installation of berms and silt fencing along Coyote Creek to prevent water from draining out of the spoils and entering into Coyote Creek. The temporary spoils area will be maintained in a wetted condition or covered to prevent migration of dust.

Best management practices including berms, silt fencing, wattles on sloping faces, and covering with plastic sheeting, including BMPs in the General Construction Permit SWPPP and Appendix A, will be incorporated into the disposal area to minimize erosion and transport of the disposed materials into the reservoir area.

Naturally Occurring Asbestos

Segments of the Anderson Dam tunnel will be excavated through naturally occurring asbestos (NOA) containing rock. Excavated NOA containing rock will be maintained in a moist condition and covered during hauling to mitigate generation of dust. The NOA-containing material will be placed in a designated portion of the disposal area and covered with a minimum of 3 feet of non-NOA containing material.

3.7 Other Supporting Facilities and Improvements

Completion of the Anderson Dam tunnel will include installation of an electrical building, valve controls, and a 350-kilowatt diesel generator.

Controls and instruments will be installed within an electrical building to operate the Anderson Dam tunnel, as well as monitoring dam safety and reservoir levels. Additionally, a 350-kilowatt diesel generator will be installed to allow for emergency power generation.

3.8 Electrical Power Requirements

If feasible, electrical power will be supplied by Pacific Gas and Electric Company (PG&E). Alternatively, electrical power will be supplemented and/or rely entirely on the use of generators. Depending on whether PG&E is able to provide supply, it is estimated that the use of one or two generators will be required to supply approximately 1,200 kilowatts during construction of the Anderson Dam tunnel.

3.9 Construction Water Supply and Stormwater Drainage

Depending on water quality following reservoir drawdown, water used for construction, including dust control and wetting of stockpiled materials, will be obtained either from the reservoir or local

municipalities using hydrant potable water. For batching shotcrete, water will be obtained from local municipalities using hydrant potable water.

In staging areas and stockpile areas without access to existing infrastructure, stormwater will be managed using BMPs including BMPs in the General Construction Permit SWPP and in Appendix A, B*est Management Practices and Santa Clara Valley Habitat Conservation Plan Conditions Incorporated in the Proposed Project*.

Nuisance groundwater will be generated during portal and tunnel excavations, dewatering of the backwater area formed following installation of the temporary dike within Coyote Creek, relocation of the Anderson Force Main, and re-opening of the northern channel. Nuisance groundwater will be collected and pumped to an on-site water treatment system and treated before being released back into Coyote Creek. The volume of groundwater that will be produced during tunneling is anticipated to be approximately 100 gallons per minute. Groundwater inflows into the northern channel of Coyote Creek may be greater. The contractor will be required to provide a water treatment system capable of treating up to 400 gallons per minute. For more details pertaining to erosion control, refer to Sections 5.3 *Creek Channel and Bank Erosion Control Modifications* and 5.7 *Erosion and Sediment Management*.

3.10 Light Pollution Measures

Components of the Project (e.g., tunneling excavation for the Anderson Dam tunnel) will require nighttime work and associated construction lighting. For work occurring overnight, outdoor lighting will adhere to local ordinance requirements for light and glare, as feasible[8]. Lighting will be shielded and not projected outside the limits of the staging, work areas, and property lines. Additionally, the following measures will be implemented to minimize potential effects related to light-pollution:

- Application of (at a minimum) the following light standards:
  - Illumination levels attributable to the lighting system will not exceed 0.5 maintained horizontal foot candle nor 2.0 initial vertical foot-candles, measured at the closest property line of any residential use.
  - Illumination levels attributable to the lighting system will not exceed 1.0 maintained horizontal foot candle nor 4.0 initial vertical foot-candles, measured at the closest property line on all other properties except public ways.
  - Vertical foot candles will be the initial foot-candle levels measured at 36 inches above the ground with a meter aimed toward the brightest light bank.
- To the extent feasible, backlight, uplight and glare will be minimized.
- Light fixtures will be properly maintained so as to prevent flickering of any light source.
- To the extent feasible, light fixtures will utilize soft yellow or orange lights instead of harsh white lights.
- Fixtures will not direct a concentrated beam of light to a point beyond the property line.
- To the extent feasible, light pollution will be controlled using conforming luminaires, shielding, landscaping, berms, and directional modification.

[8] Pursuant to Government Code Sections 53091(d) and (e), Valley Water is not subject to the building and zoning ordinances of a city or county for projects involving the production, generation, storage, treatment, or transmission of water. Nonetheless, Valley Water strives to consider the regulations and ordinances of local jurisdictions during construction where feasible and not contrary to its public purpose and responsibilities.

- After placement of lighting, light levels at the property line adjacent to areas sensitive to light pollution including, but not limited to residential properties and public ways, will be monitored. Monitoring data will be obtained as changes to type, number, or position of lighting are made.
- Owners of adjacent properties will be notified at least 2 weeks prior to commencement of lighting activities that might affect them.

3.11 Noise and Vibration Abatement

To reduce noise-related effects to nearby sensitive receptors, Valley Water will implement noise and vibration AMMs, as necessary. Valley Water will also be developing a Noise and Vibration Control Plan that will identify project-specific noise control measures, monitoring protocols, and notification procedures for noise exceedances and complaints. A Valley Water representative will be designated as responsible for responding to noise complaints during construction and signs will be posted at construction areas with representative contact information. Where activities are expected to exceed identified noise thresholds, the following noise control measures will be implemented, as determined necessary:

- Implementation of best available controls techniques, including mufflers, intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds for all construction-noise equipment and trucks.
- Avoidance of impact equipment use, whenever feasible. If impact equipment is required, use of hydraulic- or electric- powered impact equipment (e.g., jack hammers, pavement breakers and rock drills) instead of pneumatically-powered tools. Where use of pneumatic tools is unavoidable, mufflers on the compressed-air exhausts will be used (to achieve a reduction of 10 A-weighted decibels [dBA]) along with external jackets on the tools (to achieve a further reduction of 5 dBA).
- Installation of piles using drilling methods, where feasible. Pile driving that uses impact or vibratory methods will be prohibited except for locations and times specifically approved in writing by representatives from the cities of San Jose and Morgan Hill depending on the jurisdiction of the activity.
- Pile driving activities at approved locations will be prohibited during the evening and nighttime hours (7 p.m. to 7 a.m.).
- Operation of equipment requiring the use of back up beepers will be avoided near sensitive receptors to the extent feasible during nighttime construction work hours between 10 p.m. to 7 a.m. If nighttime work requires backwards movement and the use of backup alarms results in the exceedance of noise level thresholds, alternative methods, such as the use of “smart” alarms, radar activated backup alarms, or administrative controls, such as use of a spotter to direct the backing operation will be implemented.

3.12 Site Clean-up and Restoration

For certain areas where no further disturbance will occur as a result of the ADSRP, restoration will occur upon completion of impacts caused by Anderson Dam tunnel and directly related activities. Restoration work will include installation of biotechnical lining along portions of the north channel banks. Following completion of the ADSRP, areas where vegetation had been removed will be revegetated, and damaged roadways will be repaved.

3.13 Fire Safety and Emergency Access

During construction, Valley Water will adhere to all fire prevention and protection requirements and regulations of the County and Public Resources Code wildland fire safety measures, as applicable.

4.0 Anderson Dam Operation and Maintenance

Prior to operation of the Anderson Dam tunnel, an approved Emergency Response Plan (ERP) will be in place and the public will be notified.

4.1 Operation of the Reservoir-Creek System

Anderson Reservoir and Coyote Creek, which is prone to flooding, are home to a diverse ecosystem, and responsible for recharging the southern part of the Santa Clara Subbasin that is groundwater dependent. Anderson Reservoir operations depend on inflows into the reservoir and storage in the reservoir. In addition, releases from Anderson Reservoir impact Coyote Creek below Anderson Dam, including creek reaches that provide habitat for native sensitive species, including federally threatened Central California Coast steelhead (*Oncorhynchus mykiss*), as well as reaches that have limited flow conveyance capacity and are therefore prone to flooding.

The operation of the Anderson Reservoir is expected to vary with each phase of the FOCP, as discussed below.

4.1.1 Initial Dewatering Operation:

The initial drawdown of Anderson Reservoir will start in compliance with the FERC Order on October 1, 2020 to safely dewater the reservoir as quickly as feasible to a water surface elevation of 488 feet, also called deadpool level. Initial drawdown must be accomplished by releases through the existing reservoir outlet, which is undersized and has a maximum flow conveyance capacity of 500 cfs. To implement initial dewatering, the net release rate from Anderson Reservoir shall not exceed 100 cfs, which is to say that the release from Anderson Reservoir shall only exceed the inflows by up to 100 cfs. This limited net release rate is recommended by DSOD due to slope instability along the reservoir rim. This 100 cfs net drawdown rate corresponds to a change in storage of 200 AF per day. Limiting the net release rate to 100 cfs helps avoid creation of unstable conditions that may result from the soil drying out too abruptly in areas of the dam and reservoir embankments that have already exhibited geotechnical instability. If soils in these areas dry out too quickly, slumping or slides may result in those areas already known to be unstable. A portion of the reservoir release will be beneficially used in Coyote Creek for: a full groundwater recharge program in the fall of 2020, to sustain habitat and prevent dry conditions in the Creek during summer and fall dry weather, and to facilitate native fish rescue efforts in Coyote Creek, anticipated to begin in August 2020. See Section 5.8.2. Releases that are not directed to Coyote Creek will be diverted into the raw water distribution system and sent to the water treatment plants.

4.1.2 Wet Weather Operations To Maintain Deadpool Before Anderson Dam Outlet Tunnel Completion

After the initial dewatering in the fall of 2020, Anderson Reservoir will be operated in the following manner to limit, to the extent feasible, the number of days that precipitation and increased inflows cause the elevation in the reservoir to exceed elevation 488 feet. These operational rules will be followed at least until the Anderson Dam tunnel project is completed as ordered by FERC, which will allow more rapid dewatering of Anderson Reservoir once constructed. The existing outlet valve will remain open to allow inflows into Anderson Reservoir to pass through the outlet at maximum flow, provided it is safe to do so. When the downstream valve is in a fully open position, the existing outlet

pipe can discharge up to a maximum of 500 cfs into Coyote Creek when the reservoir is full, *i.e.,* the reservoir water surface level is at the level of the spillway crest (elevation 627.8 feet). However, the outlet valve will be partially or fully closed if the downstream conditions in Coyote Creek indicate a significant flood risk, thereby warranting a temporary reduction in outflow. Such temporary reduction in Anderson Reservoir releases are only anticipated to be necessary to avoid exacerbating a significant, natural, unavoidable flooding event should one occur.

In addition to releasing flow to the maximum design capacity of the existing outlet, if Valley Water determines in monitoring wet weather reservoir operations that Anderson Reservoir elevations are rising above elevation 488 too quickly or substantially, Valley Water can, if necessary, temporarily close the Coyote Reservoir outlet and allow Coyote Reservoir storage to exceed its rule curve, until Anderson Reservoir's water surface elevation can be brought back to elevation 488 feet. When Anderson Reservoir once again attains deadpool, releases from Coyote Reservoir will again be allowed to bring its storage back to its standard rule curve as soon as possible, without increasing the elevation in Anderson Reservoir.

To accommodate maintenance of the FERC order to dewater to, and maintain deadpool to the extent feasible, the Anderson Reservoir "full" condition will be defined as storage at water surface elevation of 488 feet. The "DSOD Storage Restriction Compliance Management Program at Coyote Reservoir Procedure" will be updated to reflect this interim change. Actual releases from Anderson Reservoir to maintain elevation 488 will depend on the specific hydrology of the given year. Releases could range from 0 cfs under dry conditions to the capacity of the outlet (about 500 cfs) in wet years.

4.1.3 Surface Water Augmentation Before Anderson Dam Tunnel Completion:

Currently, Anderson Reservoir typically operates between the elevations of 556 and 582 feet (the latter being 10 feet lower than the existing DSOD seismic restriction). At those elevations, regulated releases from the reservoir passed through the existing outlet range from 30 cfs to 60 cfs to provide groundwater recharge (in Coyote Creek and in the in-stream Coyote Percolation Pond just north of Metcalf Road in South San Jose), and in-stream flows for aquatic habitat and sensitive native species during summer and fall, when the Coyote Creek streambed would otherwise be dry. After the initial dewatering to elevation 488 feet and before completion of the tunnel construction project, because the reservoir storage would be minimal and the surface water elevation of the reservoir will be lower, releases from Anderson Reservoir are expected to be insufficient to meet the groundwater recharge capacity requirements of the Coyote Creek managed recharge system during many months of each year, and, during prolonged drought, it is likely to be impossible to meet groundwater recharge capacity requirements for one or more entire years. Without adequate recharge, groundwater supplies in this basin will lower rapidly, causing several undesirable effects, including the potential for reduced water quality, increased energy costs to pump groundwater, a need to dig deeper wells, and even potential for overdraft and renewed land subsidence in the northern part of the basin. In addition, reductions in Anderson Reservoir releases during dry summer and fall months would be expected to adversely affect sensitive species and habitat within Coyote Creek, including *O. Mykiss.*

This water shortage will be addressed by augmenting the releases of local water using another source of supply. Utilizing imported water supplies to supplement releases from Anderson Reservoir Coyote Creek is essential to meet the recharge requirements of the Coyote Creek recharge system and to provide in-stream environmental flows to minimize dryback conditions. With respect to in-stream flows, flows are necessary to support the Cold Water Management Zone below Anderson Dam, and, in addition, Valley Water is required to maintain a flow of 2.5 cfs past Edenvale streamflow station (SF58), which marks the end of the groundwater recharge zone. Such flow is required to keep the creek wet all the way to the San Francisco Bay, per the Lake or Streambed Alteration Agreement that Valley Water has signed with the California Department of Fish and Wildlife (CDFW).

During the initial dewatering beginning and continuing through fall of 2020, reservoir releases will provide flow augmentation for purposes of meeting recharge requirements and providing in-stream environmental flows. After initial dewatering and prior to construction of the Anderson Dam tunnel, imported water from the Cross Valley Pipeline will be released into Coyote Creek just below the dam via the Coyote Discharge Line. The amount of flow released from the Coyote Creek Discharge Line will depend on the time of year, the temperature of the flow, the amount of native water available for release from the reservoir to mix with the imported water, and actual hydrology at the time of the release. These releases of imported water to augment surface water flows in Coyote Creek are expected to range from 0 cfs up to 60 cfs. In the event that surface flow augmentation is needed during the summer and fall for in-stream environmental flows, but the temperature of the imported water (even after mixing with any native water available for release from the reservoir) is too high to be tolerated by *O. Mykiss,* then up to 10 cfs of imported water flow may be treated with electric chillers to reduce the flow temperature, and then the cooler temperature flows will be released into the Creek at the same location just below the dam. See Section 5.8.7.

In addition, to further minimize impacts on groundwater recharge, better ensure sufficient in-stream flows to, and downstream of Ogier ponds, and to improve flows for connectivity with the Bay while preserving reservoir releases for the upstream Cold Water Management Zone, Valley Water proposes to construct an extension of the Central Valley Pipeline to allow for discharges of imported water into Coyote Creek just downstream of Ogier Ponds (see Section 5.4). It is anticipated that from 20 to 50 cfs could be discharged from this pipeline extension when it is constructed and becomes operational in approximately the summer of 2021.

Imported water releases into Coyote Creek are necessary to mitigate adverse effects of the FERC-ordered drawdown on water supply, groundwater recharge, potential subsidence in the Santa Clara Plain from reductions in recharge, and sensitive aquatic species and habitats in the Cold Water Management Zone of Coyote Creek downstream of Anderson Dam, as well as the habitat and wildlife in Coyote Creek from Ogier Ponds to the San Francisco Bay.

4.1.4 Wet Weather Operations After Anderson Dam Tunnel Completion

After the Anderson Dam tunnel is completed and faster dewatering in the event of a seismic emergency is better assured, the Anderson Dam tunnel will be operated to maintain, to the extent feasible without causing flooding downstream, a reservoir elevation of 488 feet, or another higher surface water elevation proposed by Valley Water and determined appropriate by FERC.

Flexibility will be provided to keep the new tunnel valve fully open, and to keep the existing outlet valve open to ramp up outflows to a maximum of 2,000 cfs (through the tunnel) and 500 cfs to the existing outlet, for combined total releases of a maximum of 2,500 cfs (depending on condition of the existing outlet and elevation of the reservoir when releases occur). This flexibility is provided to minimize the number of days during wet weather that the reservoir elevation exceeds 488 feet, but maximum releases may cause downstream flooding. With the new tunnel in place, larger releases can be made from Anderson Reservoir to more quickly bring its level back to elevation 488 feet during rains, but these larger releases present a risk of flooding properties adjacent to Coyote Creek. The flood protection improvements and measures set forth in Section 5.6 are proposed to minimize downstream flooding that would result from maximum wet weather releases to Coyote Creek of 2,000 to 2,500 cfs combined with inflows from tributaries to Coyote Creek that should be expected in large precipitation events.[9] However, in addition to these flood protection measures, Valley Water could also close the outlet valves as necessary to prevent significant flooding downstream, and then resume

[9] For modeling purpose, the maximum design outlet releases were combined with anticipated Creek inflows for the above-average precipitation years of 1982 and 2017 to assess and determine the needed flood control improvements.

slower reservoir releases through one or both outlets to draw the reservoir back down to a lower elevation at a slower pace, and after downstream flooding subsides.

Once the Anderson Dam tunnel is operational and new operational rule curves have been reviewed by FERC and DSOD, FERC may allow additional water to be stored in the reservoir above elevation 488 feet. If more storage in the reservoir is approved by FERC to better control downstream flooding, and/or to increase operational releases to enhance surface water augmentation for groundwater recharge, in-stream environmental flows, or supply to the Santa Teresa Water Treatment Plan (as discussed in the next subsection), then new wet weather operational rules will be developed for opening and closing the Anderson Dam tunnel and existing outlet. These new operational rules would not result in wet weather releases that exceed 2,500 cfs, which is the maximum design capacity of the Anderson Dam tunnel and existing outlet. Accordingly, in case FERC does not approve storage in the reservoir above elevation 488 feet, the flood protection improvements and measures discussed in Section 5.6 below are designed to address wet weather releases of up to 2,500 cfs, combined with the volume of inflows that would be tributary to Coyote Creek in two of the wettest years of record for Santa Clara County.

4.1.5 Surface Water Augmentation After Anderson Dam Tunnel Completion

As discussed earlier, when Anderson Reservoir is maintained at or near elevation 488 feet, imported water releases into Coyote Creek are needed to augment Anderson Reservoir releases and maintain a full groundwater recharge program, which is necessary for healthy groundwater storage and appropriate groundwater quality in the Coyote Valley and South San Jose, as well as the prevention of the recurrence of overdraft land subsidence in the northern Santa Clara Subbasin. Also, augmentation of reservoir releases with imported water is important for a healthy ecosystem in the Coyote Creek Cold Water Management Zone, and to maintain flows of 2.5 cfs past Edenvale streamflow station (SF 58) downstream to San Francisco Bay. In addition, surface water augmentation allows more delivery of water to the Santa Teresa treatment plant for water supply purposes. The same program for surface water augmentation releases discussed prior to operation of the Anderson Dam Tunnel will continue after the tunnel is built.

In the event that FERC approves more storage within Anderson Reservoir after the Anderson Dam tunnel becomes operational, maintaining a higher elevation and deeper reservoir will provide both more water and colder temperature water for releases to Coyote Creek designed to recharge groundwater and provide in-stream flows for habitat and sensitive species, including *O Mykiss.* Maintaining the reservoir at a higher elevation than elevation 488 feet allows more native water to be made available for release at colder temperatures into Coyote Creek, reducing demand for imported water to augment recharge and in-stream flows, and potentially reducing or eliminating the need for the chillers discussed in Section 5.8.7, which can only accommodate a limited 10 cfs of flow. In addition, more storage within Anderson Reservoir after construction of the Anderson Dam tunnel would provide water to delivery to the Santa Teresa treatment plant, and better emergency supply and supply redundancy in the event of an outage in the raw water system (e.g., loss of power at the Pacheco Pumping Plant or a leak in one of the imported water transmission lines).

4.2 Facility Maintenance

As previously described, debris that could damage the fixed cone valve (FCV) will be prevented from entering the Anderson Dam tunnel by a trash rack located at the upstream end. Log booms will be placed upstream of the trash rack to keep debris away and prevent clogging of the trash rack and lower intake to the existing outlet pipe. The trash rack and log booms will need to be cleaned and maintained periodically.

FOCP post-construction maintenance will occur as needed and may require periodic, routine activities at Anderson Dam such as vegetation management, control of burrowing rodents, access road work, and erosion repair.

5.0 Avoidance and Minimization Measures

5.1 Reservoir Bank and Rim Stability Improvements

Initial dewatering of the reservoir, and keeping the reservoir drained for a prolonged period of time, may reactivate areas of inactive landslides. Five major landslides exist along the southern portion of Anderson reservoir. These landslides have a history of movement during previous drawdowns of the reservoir. A program to further investigate and monitor the movement of the slides will be implemented; the program will include satellite-based surveys, drone-based surveys, land-based surveys, piezometers, inclinometers, and on-site inspections. Over 50 survey monuments and 17 satellite reflectors will be installed in and around the landslide areas, within the reservoir and immediately upslope of the reservoir. Geotechnical borings on the dry slopes of the reservoir will also be completed prior to dewatering. Installation and maintenance of the satellite reflectors and access to the geotechnical borings will require construction of road on the southeastern reservoir slope, originating from the Holiday Estates boat ramp. The access road within the reservoir will consist of a balanced cut and fill path that will be graded from the Holiday Estates boat ramp to the areas of work using bulldozers or excavators along the reservoir slope.

Monitoring will commence prior to October 1 and will continue throughout the Project. If impacts to private property are observed, dewatering rates may be tapered down or ceased, allowing time for additional evaluations. The need for stabilization measures or improvements will be evaluated as the drawdown occurs and for the duration of the Project.

Stabilization improvements will depend on the results of the ongoing monitoring. The range of potential actions during drawdown, and afterwards to maintain deadpool, includes the following:

- *Monitor and make repairs.* In cases where damage does not result in structural damage that will make residences and/or roadways unsafe, repairs will occur. Repairs could include a wide range of actions, such as filling of cracks in driveways, concrete slabs, and roadways, replacing concrete slabs, replacing aesthetic walls or fences, regrading yards or roadways importing of fill to bring the roadway back to grade, repaving damaged portions of road, repairing or replacing swimming pools, etc. The size and scope of the repairs will depend on the amount of movement and damage that occurs during drawdown.
- *Buttressing of the slides.* Buttressing will involve placement of material at the toe of the slide to keep the slides from moving. Prior to drawdown, material will be placed through the water using barges. Design of the buttresses will require geotechnical borings to determine the depth of slide to be supported. Buttressing following drawdown may be able to be accomplished by regrading landslide materials below the road, potentially reducing the volume of imported materials. Buttressing following drawdown will require the use of heavy equipment including bulldozers, excavators, and compactors.
- *Retaining walls.* An engineered wall will be placed at or near the top of the region exposed to prevent progressive failures from impacting properties above them as the slide lower on the slope moves further into the reservoir. Wall types may include soldier pile, mechanically stabilized earth, gravity, and cantilever, all of which are likely to require tiebacks. Design of the walls will require geotechnical borings to determine the depth of slide to be supported. Installation, depending on the type of wall, will require use of heavy equipment including large drilling rigs, track drills, bulldozers, excavators, and compactors.

- *Anchors to retain slide mass.* Rock/soil nails will be installed throughout most or all of the slope to retain the upper portion of slide mass. Horizontal drains will also be installed to allow water drain from the slide mass as quickly as possible. Design of the walls will require geotechnical borings to determine the depth of slide to be supported. Installation will require a series of haul roads at different elevations on the banks of the reservoir. Equipment that will be required will include a bulldozer, an excavator, and track drills.
- *Regrading of the slides*. Regrading will involve re-sloping of the landslides to reduce the driving force at the top of the slide. To be most effective, regrading will include buttressing following drawdown as described above. Regrading will require the use of heavy equipment including bulldozers, excavators, and compactors.

Monitoring will require access to 13 private properties along Holiday Drive and three private properties along Hoot Owl Way in order to conduct visual inspections. Additional coordination will be needed with Santa Clara County Parks for use of the Holiday Estates boat ramp, for accessing satellite reflectors downslope of Dunne Avenue, and for staging areas in the Woodchopper picnic area and the Holiday Estates boat parking lot. If stabilization measures become necessary, additional construction and access easements may be needed. However, it is anticipated that major actions that require working on the reservoir slopes below private properties will be staged from the Holiday Estates boat ramp parking area.

5.2 Existing Intake Structure Modifications

Slopes in the vicinity of the existing intake structure are vulnerable to slope movements when the reservoir is being drawn down and operated at a restricted elevation level, such as elevation restrictions required by the FOCP because operating at lower elevations results in drying of embankment materials. Potential for landslides and slope instability during dewatering and after dewatering to maintain deadpool were studied in October 2019. Analysis revealed that sliding of fills above the boat ramp could potentially affect the utility trench and hydraulic piping that operates the existing intake gates. A monitoring program will be implemented that would include one or more of the following: satellite-based surveys, drone-based surveys, land-based surveys, piezometers, inclinometers, and on-site inspections that will be used to monitor the intake structure prior-to and during reservoir drawdown, and during releases to maintain deadpool. Following drawdown, two to three geotechnical borings will be drilled to evaluate the need for strengthening or stabilizing the existing intake for the current outlet structure.

Structure modifications will depend on the results of the monitoring during drawdown and the foundation conditions determined from the geotechnical borings. The range of potential actions includes:

- *Damage assessment.* Assessment will be performed immediately following an earthquake event and implementation of repairs will be performed, as needed.
- *Installation of anchors to stabilize slope.* Rock anchors will be installed throughout most, or all, of the slope on both sides of the existing sloping intake structure (above the lowest port) to provide greater resistance to deformation due to seismic shaking. Anchor installation typically requires an excavator and track drills.
- *Drilled piers to stabilize slope*. Drilled piers will be installed around the foundations of the two upper ports of the intake structure to reduce movement of the foundation under the structure. Equipment that will be required will include an excavator, a large drill rig, and a crane.
- *Reinforce intake structure*. Reinforcement of the intake ports may be required to accommodate increased loads due to foundation movement. Reinforcement could include thickening of structural sections.

- *Regrading of the slides above boat ramp*. Regrading will involve re-sloping of the landslides that might occur above the boat ramp. Regrading will require the use of heavy equipment including excavators and compactors.

Access to the existing intake ports will be along existing access roads from the boat ramp and below the boat ramp. Existing access roads may require maintenance, such as minor grading and shaping, prior to use. Staging and disposal for any potential stabilization actions will occur within Staging Area 3 and the designated disposal area.

5.3 Creek Channel and Bank Erosion Control Modifications

The reopened northern channel of Coyote Creek will be designed with erosion control measures to accommodate both initial reservoir drawdown to deadpool and wet season flows to maintain deadpool elevations to the extent feasible both before and after construction of the Anderson Dam tunnel. Channel modifications will provide erosion protection for increased flow capacities, designed to withstand high velocities associated with these flow releases. Modifications involve re-opening a historic reach of Coyote Creek (the northern channel) that was decommissioned during construction of the original dam. Reservoir releases will be conveyed through a combination of the Coyote Creek southern and northern channels.

The alignment of the re-opened northern channel will be in approximately the same location as the channel footprint was prior to dam construction in 1950. The 600-foot-long channel will be approximately 50 feet wide at the channel bottom, with the right side sloping to the top of the bank at a 50 percent grade, and the left side sloping to the top of bank at a 25 percent grade.

The northern channel banks will be protected against erosion from releases of water moving up to 7 feet per second. Channels will be modified using a biotech stabilization that will allow for revegetation. The distribution of flow between the two channels will be achieved by construction of a 72-foot-wide sharp-crested weir at the head of the northern channel, and a 5-foot-wide U-shaped channel invert weir at the head of the southern channel. The weirs are designed to split high flows so that the southern channel will operate with flow rates at or less than historical release rates (450 cfs), with the remainder of higher releases passing through the northern channel.

Prior to construction, security fencing will be installed at the east end of the Live Oak Group Picnic Area to separate the public from construction activities. Riparian vegetation may be cleared in various locations to allow for equipment access.

Dewatering of the Backwater Area

Construction within the creek channel will require that flow in Coyote Creek be temporarily diverted around the work area. At the start of construction, a dike will be installed to separate the existing Coyote Creek flows from the backwater area within Coyote Creek, located between Toyon Park and the Live Oak Group Picnic area. The backwater area will then be dewatered to allow for construction within the creek. Groundwater seepage into the dewatered pond will be pumped to the on-site water treatment system, treated, and released back into Coyote Creek. The dike will be removed after completion of the modifications.

Relocation of Anderson Force Main

Following dewatering of the backwater area, the 54-inch-diameter Anderson Force Main and an 18-inch return line from Valley Water's hydroelectric plant will be relocated by deepening the channel by up to 10 feet. Relocation will require trenching to expose the existing pipe, demolition of the existing pipe, deepening of the trench, installation of new pipe, and backfilling of the trench.

Demolished pipe will be recycled, and except for some imported pipe bedding material, the trench will be backfilled using the same material that was previously excavated.

Channel Excavation and Weir Installation

An excavator will be used to recontour the Anderson Dam tunnel outlet channel and reopened northern channel. Materials will be loaded into trucks that will haul spoils to the main disposal area via the haul road at the toe of the dam. Riprap bedding and riprap will be imported to the site for placement in the Anderson Dam tunnel outlet channel. Additionally, construction of the 5-foot-wide weir in southern channel will require temporary bypassing of flows being released from Anderson Reservoir by pumping around the location of the weir.

5.4 Imported Water Releases and Cross Valley Pipeline Extension

Without Anderson Reservoir storage to supplement natural flows, much of Coyote Creek would go seasonally dry, adversely affecting aquatic resources and groundwater recharge operations. To protect against dryback conditions anticipated to start as early as summer 2021, Valley Water will release imported water to Coyote Creek to continue providing managed groundwater recharge. This would be achieved by releasing 5-30 cfs of imported water to Coyote Creek, via the Coyote Discharge Line, when sufficient amounts of imported water are available for release to maintain dry-season connectivity. When available, Coyote Discharge Line releases would be initiated at the end of the wet season and would be continued until the onset of winter rains.

Valley Water will also extend the Cross Valley Pipeline (CVP) to discharge downstream of the County of Santa Clara-owned Ogier Ponds. By discharging imported water below Ogier Ponds, more reaches of the creek would stay wetted, which would enable recharge of the Coyote Valley and South San Jose (Santa Teresa area) throughout the construction period and support the maintenance of aquatic habitat for wildlife and riparian vegetation. The Coyote Valley and South San Jose areas recharged by Coyote Creek are part of the larger Santa Clara Subbasin. Groundwater provides nearly all water supply in these areas, which are dependent upon in-channel percolation to maintain sustainable groundwater supplies. Augmented releases of imported water would also reduce potential subsidence in downstream lands.

The pipeline will be designed to have a capacity to carry 50 cubic feet per second (cfs) of imported water. However, on average, it is expected to deliver about 30 cfs during the dry season and 20 cfs during the wet season to ensure managed recharge in Coyote Creek and the Coyote Percolation Pond. Expedited planning, design, and construction processes to implement the proposed pipeline extension would be expected to take approximately 15 months to complete.

5.5 Coyote Percolation Dam Replacement

The current Coyote Percolation Dam is a flashboard dam used to impound water in the Coyote Percolation Pond, an in-stream pond in Coyote Creek just north of Metcalf Road. Operation of the proposed Anderson Dam tunnel would result in flows well beyond the safe operating capabilities of Coyote Percolation Dam, which is not rated to handle flows higher than 800 cfs. The maximum release capacity of 2,500 cfs (new tunnel and existing outlet capacity combined) would overwhelm the Coyote Percolation Dam and removing the dam altogether to accommodate higher flows would further compromise Valley Water's ability to recharge the groundwater basins. To protect against potential risks to groundwater recharge and water supply reliability for the Coyote Valley and South San Jose residents in the Santa Teresa area, Valley Water proposes to replace the existing flashboard dam with an inflatable bladder dam that could quickly be deployed when inflows are low (to facilitate percolation) and then released to allow higher flows to pass safely.

The increased operational flexibility of a bladder dam would also reduce the impacts from sediment settling within the percolation zone, which would improve affected groundwater recharge capacities. Incidentally this also lessens sedimentation impacts to critical spawning and rearing habitats for *O.mykiss.*

Also, deflating the dam more frequently could benefit native aquatic species by reducing competition pressures and predation from non-native fish species. By occasionally draining the warm water pond behind the percolation dam, the stronghold of the non-native warm water adapted species will be disrupted and opportunities for native fish to utilize this habitat may arise[10].

Completion of the bladder dam facilities would be required by 2023, when the Anderson Dam outlet tunnel would be finished, to minimize the impacts to water supply, groundwater recharge, subsidence, and aquatic species and habitats.

5.6 Coyote Creek Flood Management Measures

Valley Water has identified areas within Coyote Creek where flooding would occur as a result of implementing the FOCP, namely from the operation of the Anderson Dam Tunnel. As a result, completion of some elements of flood management measures are needed along Coyote Creek as avoidance and minimization measures to prevent flooding within urbanized areas of Coyote Creek. Three flood protection measures will be constructed by the end of 2023, the same time the Anderson Dam tunnel construction is completed. The measures will be implemented along Mid-Coyote Creek in San Jose, between Highway 280 and Oakland Road, and will include: floodwalls, a levee, and acquiring or elevating low-lying residences (Figures 3a-3c). Measures would be implemented as indicated in the following reaches of Coyote Creek:

Reach 5

- Area 5A - Design and construct approximately 350 linear feet (LF) of 4-foot tall levee on the south end of the South Bay Mobile Home Park, east of the Union Pacific Railroad (UPRR) tracks
- Area 5B.1 - Design and construct approximately 350 LF of 2-foot tall floodwall to protect homes located on Notting Hill Drive, on east bank of Coyote Creek
- Area 5B.2 - Design and construct approximately 2,000 LF of 9-foot tall floodwall between Berryessa Road and UPRR tracks, on west bank of Coyote Creek
- Area 5C - Design and construct approximately 2,500 LF of 9-foot tall floodwall between Berryessa Road and Mabury Road, on west bank of Coyote Creek

Reach 6

- Area 6A – Design and construct approximately 1,200 LF of 6-foot tall floodwall on west bank from Mabury Road to Highway 101

Reach 7

[10] The Fisheries Technical Workgroup for Anderson Dam, comprised of representatives from Valley Water, California Department of Fish and Wildlife and National Marine Fisheries Service, recommended the increase in flushing events to benefit *O.Mykiss* immediately to encourage *O. mykiss* to migrate away from the Project area (See Spring Pulse Flow Section 5.8.1). The Fisheries Technical Workgroup also recommended the retrofit of the bladder dam to reduce the non-native fish stronghold in the Coyote Percolation Pond, so that invasive non-native fish species might be better managed through periodic disturbances.

- Area 7A.1 - Acquire or elevate three properties located on South 17th Street between Santa Clara Street and San Fernando Street
- Area 7A.2 - Design and construct approximately 550 LF of 5.5-foot tall floodwall behind the backyards of two properties located on South 17th Street just north of Arroyo Way
- Area 7B - Acquire or elevate four properties located east of Arroyo Way
- Area 7C - Acquire or elevate two properties located on South 17th Street between San Carlos Street and San Salvador Street
- Area 7D.1 - Design and construct approximately 700 LF of 9-foot tall floodwall along the western edge of Coyote Outdoor Classroom
- Area 7D.2 - Acquire or elevate one property located on East William Street, east of South 16th Street
- Area 7D.3 – Design and construct approximately 400 LF of 4-foot tall floodwall along the backyard perimeter of two properties located at the southern end of William Street Park

5.6.1 Floodwalls

Approximately 7,700 linear feet of floodwalls are proposed, in several sections. The sections will vary in height from 2 to 9 feet tall and will most likely be constructed with steel sheet piles. Sheet piles will be installed using silent piling technology that press in the sheets without hammering or vibrations. Such machines ride on top of the sheet piles and are supported by a mobile silent generator unit that travels next to the machine. A crane will be used to lift the machine into place and to move steel sheet piles. Some earthwork activities may be necessary for final grading and can be completed using a compact loader.

5.6.2 Levee

A single levee is also being considered to protect from flooding along Coyote Creek. The levee will be approximately 350-foot long and will begin at the upstream end of an existing levee and continue further upstream along Coyote Creek. The levee will be trapezoidal shaped, 12-foot wide at the top, with sides sloping down at 2:1, and will be 4 feet tall. Below the 20-foot wide base of the levee, the existing grade will be excavated to a depth of 5 feet below grade and backfilled with fill material similar to the levee material.

The design of the floodwalls and levee will require geotechnical borings to determine design parameters. These borings will include a combination of Hollow Stem Auger (HSA), Mud Rotary (MR), and Cone Penetration Test (CPT) borings in each reach. Generally, the HSA borings will be to a depth of approximately 45 feet with select borings to a depth of 60 feet for seismic analysis. The CPT borings will be drilled to an approximate depth of 30 feet.

Table 3 Geotechnical Borings for Coyote Creek Flood Management Measures Design

Reach	# of HSA/MR Borings	# of CPT Borings
5	11	11
6	3	3
7	5	6

5.6.3 Elevate or Acquire Low-Lying Homes

For low-lying properties, and where other measures are not feasible, Valley Water will acquire affected properties or elevate homes located within the Anderson Dam tunnel operational floodplain. The option to elevate or acquire the properties will vary depending on the feasibility to raise the structure, costs associated with buying or elevating the homes, and input from the homeowners.

Home elevation would involve specialized construction methods to raise the house above the specified flood water surface elevation. This involves trenching around a structure's foundation and lowering I-beams into the trenches and inserting the I-beams below the floor framing. Lifting jacks will be installed between a temporary footing on the ground and the I-beams. The number of jacks needed will depend on the size, shape, and type of house being lifted. The jacks will be used to raise the house to the desired elevation. The foundation, including the slab and walls, will be extended or raised to the new floor framing elevation. The house will then be lowered onto the extended foundation walls, the I-beams will be removed, and the holes where the beams passed through will be filled.

Acquiring properties would remove residents from the threat of inundation from operation of the Anderson Dam tunnel. No immediate changes to the acquired properties is currently proposed. Additional environmental review may be required should Valley Water propose future physical alterations to the properties, such as demolition of structures.

5.7 Erosion and Sediment Management

Sediment movement associated with the FOCP is primarily a function of erosion of exposed sediment by inflows to the reservoir as the reservoir is lowered, or during high flow events while the reservoir is lowered. After initial dewatering to deadpool, with the reservoir operating at a restricted level of elevation 488 feet, substantial volumes of sediment will be exposed to erosion. The estimated volume of sediment in the Los Animas Creek and Coyote Creek channels above elevation 488 is 1.0 million cubic yards (mcy) and 0.5 mcy, respectively. After dewatering and during construction of the Anderson Dam tunnel, some portion of this sediment above elevation 488 feet will be transported by erosion toward and into the reservoir. Coarse sediment (sand sized and larger particles) will quickly fall out and be deposited in the remaining reservoir basin. Coarse sediment that migrates downstream is actually beneficial for in-stream habitat in that it improves substrate conditions for native aquatic life within Coyote Creek. Fine sediment (silt and finer particles) is not likely to settle out in the reservoir, as it will likely be entrained in the reservoir water. High velocity outflows required to maintain the reservoir elevation at 488 feet, with little reservoir residence time, will carry fine sediment through the outlet works downstream into Coyote Creek. The total volume of fine sediment transported through the outlet works and the total suspended solids (TSS) in the water is a function of the size of the storm flows, the volume of sediment that can be eroded by those flows, the velocity and duration of outflows to maintain reservoir pool, and the amount of sediment residence time in the reservoir. Larger storm events will quickly raise the reservoir level, resulting in less erosion, but increase velocity of outflow.

Due to the flow rates and volumes involved, it is not practical to construct a large enough settling pond to capture all the fine sediment that would be entrained in the flows occurring during drawdown or during the winters when the reservoir is drawn down. Valley Water has determined that it would not be feasible to filter, capture, or otherwise retain the fine sediment on site. The potential measures are limited by the large volume of sediment and the large volume of potential high flow events that will pass through the reservoir. Treatment systems that can treat flows up to 2,500 cfs (1,000 cfs is equivalent to 5,600 standard 80-gallon bathtubs every minute) are unprecedented. Such a treatment system, if possible, would require a much greater area downstream of the dam than is available and would require a location to dispose of sediment removed from the water. Dredging the 1.5 million cubic yards of sediment exposed above elevation 488 feet would also require more space than is available downstream of the dam for settling ponds for the slurry (mixture of water and sediment)

resulting from the dredging process, along with a location to dispose of the dredged sediment. Therefore, measures to minimize the effects of the drawdown on downstream suspended sediment concentration, especially during periods of high flow, are limited.

Following completion of the Anderson Dam tunnel, sediment moving along the reservoir thalweg (the line of lowest elevation within the reservoir) will be able to directly be transported out of the reservoir when it is necessary to make releases through the tunnel. Release of some sediment can be beneficial for aquatic habitats in Coyote Creek, but release of too much coarse sediment could be detrimental to habitat. Therefore, in the unlikely event that too much coarse sediment may be transported downstream of the dam during these periods, measures that will be implemented to minimize transport of coarse sediment downstream of the dam area, include a 2-foot-high edge on the trash rack that will trap coarse sediment, and settling pools (up to 3.75 feet deep) that will form upstream of the weirs in the northern and southern channels.

Although it may not be possible to prevent streamflow from eroding accumulated fine sediment as it cuts a channel through the exposed reservoir bed, surficial erosion of sediment caused by rainfall and runoff directly onto the exposed reservoir sediments would be limited through seeding. The effectiveness of seeding exposed reservoir sediments could be limited by the fluctuations in the reservoir's surface elevation that would be expected to occur after drawdown and during construction. Once reservoir elevations are more consistently maintained with implementation of the Anderson Dam outlet tunnel, slopes would be evaluated for likely surficial erosion. Exposed reservoir sediments at risk of potential surficial erosion would be selectively seeded according to defined performance criteria.

Completion of a sediment transport analysis is underway. Results of the study will be used to evaluate potential erosion and sediment effects resulting from the FOCP and additional feasible AMMs.

5.8 Fish Protection Measures and Monitoring

Coyote Creek from the San Francisco Bay to Anderson Dam is designated critical habitat for the federally threatened *O. mykiss*. Reduction of Anderson Reservoir to elevation 488 feet would result in a loss of the reservoir's coldwater pool volume, with a consequent effect of decreased flows available for release into Coyote Creek, and increased water temperatures during the summer. Without avoidance and minimization measures in place, the reduction in available flows is anticipated to result in dryback conditions within Coyote Creek during each summer and fall for the duration of ordered drawdown. In order to augment flows during summer and fall, imported water will need to be released to the Creek, and when the CVP extension is complete, further downstream into the creek near Ogier Ponds (see Section 5.4). When available, the higher temperature water released to the creek may be unsuitable for steelhead, but beneficial for other native fish and maintenance of riparian and wetland habitat. Alteration of creek flows and the lack of a reliable coldwater pool from which to draw would impact steelhead and their habitat, particularly through the recognized Cold Water Management Zone (CWMZ) of Coyote Creek that extends about 5 miles from the base of the dam to Golf Course Drive. Operational flow guidance (also known as rule curves) discussed in Section 4.1 will be employed to guide and direct how flows are discharged from the reservoir after drawdown. Fish protection measures and monitoring of the CWMZ included as part of the FOCP to address anticipated impacts, particularly to steelhead, are described in detail below.

5.8.1 Spring Pulse Flow

Valley Water released "pulse flows" in May 2020 to encourage the outmigration of steelhead rearing in Coyote Creek downstream of Anderson Dam in advance of the implementation of Anderson Dam tunnel construction, before the creek begins to dryback. Prior to releasing the pulse flows, Valley Water drained the Coyote Percolation Pond to displace predatory fish species living in the pond in order to make a clearer migratory path for outmigrating smolts. Pulse flows occurred over a five-day

period beginning with an initial release of 120 cfs on the first day, ramping down to 90 cfs for 24 hours, and then down to 60 cfs for three to five days.

5.8.2 Coyote Creek Fish Rescue and Relocation

During initial reservoir drawdown, fish rescue and relocation efforts will be conducted in Coyote Creek CWMZ from Anderson Dam downstream to the Ogier Ponds. Due to the extensive area and complex fish habitat in this section of Coyote Creek, fish rescue efforts will use a multi-phased approach to maximize capture efficiency while minimizing handling and environmental stress that could result from dewatering activities. Fish that will be rescued from the CWMZ include steelhead, Pacific lamprey and blackfish. Each phase will occur during a different flow release rate. Capture methods include backpack electrofishing and seine nets. Fish relocation efforts will be initiated concurrent with dropping stream flows in Coyote Creek. Phase 1 will be conducted at 20 cfs. During Phase 2, flows would be decreased to concentrate fish in pool habitat while still maintaining continuous flow throughout the CWMZ. Phase 2 efforts would target flows of approximately 10 cfs. If conditions require flows to decrease below 10 cfs, a third phase of the fish rescue and relocation effort would be carried out. During Phase 3, focused beach seining efforts would be conducted in a subset of critical pool locations most likely to support *O. mykiss* during very low flows.

All *O. mykiss* captured during the Coyote Creek rescue and relocation effort will be relocated to Upper Penitencia Creek. All other fish species captured will be released into the nearest critical pool habitat location.

5.8.3 Weir Installation and Operation

At the end of the fish rescue effort and prior to the next migratory season for adult steelhead, Valley Water is considering a temporary weir and trap will be installed in Coyote Creek upstream of the confluence with Upper Penitencia Creek to prevent adult *O. mykiss* from entering the CWMZ. The weir will span the entire width of the creek and up the banks a short distance to minimize the potential for fish to swim around the ends during high flows. Once in place, upstream migrating steelhead will be directed into a holding trap in the center of the weir. The holding trap will be checked daily for fish. Any adult Pacific lamprey, Chinook salmon, or *O. mykiss* found within the holding trap will be placed in aerated holding containers, enumerated, measured, and then relocated to the lower reach of Upper Penitencia Creek.

5.8.4 Anderson Reservoir Fish Rescue and Relocation

To minimize potential impacts to fish during initial reservoir drawdown, efforts will be made to capture and relocate resident trout and other recreationally important gamefish species that occur in Anderson Reservoir.

Rapid dewatering of Anderson Reservoir may induce stranding of native fish and non-native game fish species important to local anglers. Based on bathymetry data, high potential stranding locations were identified and will be targeted during reservoir fish relocation efforts as the reservoir recedes. Capture methods include electrofishing and seine nets. All trout captured from the reservoir during reservoir drawdown will be released in suitable pool habitat within tributaries upstream of Anderson Reservoir (i.e., Coyote Creek or San Felipe Creek). All other fish species will be released in the remaining wetted portion of Anderson Reservoir with the exception of large game fish. Special consideration will be made in the event that large (>300 mm) game fish species are captured in high abundance (>100 fish) during any day. Optional release locations in Coyote Reservoir or in San Luis Reservoir may be proposed in collaboration with CDFW. If only low numbers of large game fish are captured during a given day of monitoring, they will be released back into Anderson Reservoir.

5.8.5 Fyke Trap Installation and Operation

Following relocation of fish from the CWMZ but prior to drawing down Anderson Reservoir, a fish trap known as a fyke trap will be installed in Coyote Creek downstream of the Anderson Reservoir outlet to capture fish passing through the existing reservoir outlet and reduce the risk of native trout in the reservoir entering the Coyote Creek CWMZ during the Anderson Dam tunnel construction. All captured fish will be held in aerated containers or the trap prior to being identified, enumerated, and measured prior to release. Captured trout will be relocated to tributaries upstream of Anderson Reservoir (i.e., Coyote Creek or San Felipe Creek), and other species will be relocated to unimpacted portions of Anderson Reservoir or in Coyote Reservoir.

5.8.6 Anderson Normal Operation of Coyote Reservoir

Valley Water will operate Coyote Reservoir normally throughout drawdown of Anderson Reservoir and construction and operation of the Anderson Dam tunnel. Through releases from Coyote Reservoir, a minimum streamflow of 5 cfs at Gage SF12 (downstream of Coyote Reservoir) would occur. Minimum streamflow would persist during the interim time period until ADSRP construction commences, as long as water is available for release.

5.8.7 Augment Streamflow Downstream of Anderson Dam

As discussed in Section 5.4, when the reservoir is drawn down to, and operating at or near deadpool (including during Anderson Dam tunnel construction and operation), Valley Water will augment dry-season streamflow in Coyote Creek (downstream of Anderson Dam) for water supply, groundwater recharge, and subsidence minimization, which will incidentally benefit native fish and aquatic and riparian habitats. This would be achieved by releasing 5-30 cfs of imported water to Coyote Creek, via the Coyote Discharge Line, when sufficient amounts of imported water are available for release to maintain dry-season connectivity. In addition, if the releases are determined to be too warm for *O.mykiss*, chillers would be installed to cool up to 10 cfs of imported water prior to its release into Coyote Creek. Streamflow augmentation releases would be initiated at the end of the wet season and would be continued until the onset of winter rains. This measure is intended to maintain suitable aquatic habitat for native species, and to provide habitat sufficient for *O. mykiss* survival within the CWMZ during the implementation of the FOCP. .

As described above in Section 5.4, a Cross Valley Pipeline Extension would augment streamflow downstream of Ogier Ponds and recharge groundwater supplies. Imported water would be discharged from the CVP extension below Ogier Ponds, downstream of the CWMZ to enable all the reaches of Coyote Creek to stay wet. This measure provides necessary water to maintain riparian and wetland habitats and provides some refuge for native aquatic species in Coyote Creek downstream of Ogier Ponds. In addition, this measure minimizes groundwater recharge reductions and potential subsidence issues associated with implementation of the FOCP.

5.8.8 Re-open Historical Coyote Creek Channel

The re-opening of Coyote Creek's northern channel to supplement the south channel and accommodate outflows without creating the potential for erosion, as described in Section 5.3, would increase stream habitat available downstream of Anderson Dam and avoid potential hardening of the south channel.

5.8.9 CWMZ Monitoring

As described above, Valley Water would augment dry-season streamflow in Coyote Creek by releasing imported water to maintain flows for water supply, groundwater recharge, subsidence minimization, and benefit of native fish. Habitat conditions (e.g., water temperature) and species

distribution within the CWMZ will be monitored to determine if conditions are suitable for *O. mykiss*. If conditions are suitable, the temporary weir and trap within Coyote Creek will be considered for removal and *O. mykiss* may be encouraged to spawn and rear in the CWMZ.

5.9 Environmental Management Plans

To guide implementation of the AMMs discussed above, and to minimize other environmental impacts associated with the FOCP, Valley Water will develop the following Project-specific plans with measures to avoid and minimize environmental effects of its construction activities.

- Dewatering and Sediment Management Plan
- Air Quality Monitoring and Dust Management Plan
- Slope Stability Plan
- Stormwater Pollution Prevention Plan
- Traffic Control Plan
- Reservoir Rim Landslide Mitigation and Monitoring Plan
- Frac-out Prevention Plan
- Groundwater Dewatering Management Plan
- Water Quality Sampling Plan for temporary diversions to accommodate in-stream work
- Light Pollution Plan
- Noise and Vibration Management Plan
- Security Fencing Plan
- County of Santa Clara Tree Removal Plan
- Creek and Reservoir Fish Relocation Plans

5.10 Best Management Practices

BMPs are standard operating procedures to prevent, avoid, or minimize effects associated with construction and other activities. Valley Water routinely incorporates a wide range of BMPs into project design and construction. During Project construction, Valley Water will incorporate BMPs to avoid or minimize adverse effects on the environment. BMPs for the FOCP are included in Appendix A, and will include BMPs specified in the SWPPP for the Construction General NPDES permit.

5.11 Valley Habitat Plan Commitments

The Santa Clara Valley Habitat Conservation Plan/Natural Community Conservation Plan (VHP) is a joint habitat conservation plan and natural communities conservation plan developed to serve as the basis for the issuance of incidental take permits and authorizations pursuant to Section 10 of the federal Endangered Species Act and the California Natural Community Conservation Planning Act. Valley Water is committed to implementing VHP conditions listed in Appendix A to avoid, minimize, and mitigate impacts of the covered FOCP activities on the species and habitats protected by the VHP (e.g., compensatory mitigation for effects of the FOCP on VHP-covered, listed species will be provided via payment of VHP fees in accordance with VHP requirements).

6.0 Right of Way and Real Estate Requirements

The Project will require right of way and real estate agreements with public entities, such as County of Santa Clara, City of Morgan Hill, and the City of San Jose. Namely, a Memorandum of Understanding will be needed to secure use of County of Santa Clara parklands during construction, and a small portion of parkland will need to be acquired (in fee or by land exchange) in order to fully build the proposed northern channel. Private landowner agreements will also be required to access and construct some portions of the project, particularly for the Coyote Creek Flood Control Measures and Reservoir Rim Monitoring and Stability Improvements.

The parcels that will be impacted by the project are provided in Appendix B, along with identified real estate or right or way requirements.

7.0 Permits, Approvals, and Consultations

Table 4 provides a list of regulatory agencies and applicable permits, approvals, and consultations that are anticipated for the proposed Project.

Table 4 Regulatory Permits, Approvals, and Consultations for the FOCP

Agency	Permit / Approval / Consultation
Federal Agencies	
National Oceanic and Atmospheric Administration- – National Marine Fisheries Service	Federal Endangered Species Act – Section 7 emergency consultation procedures
	Magnuson-Stevens Act – Emergency Essential Fish Habitat Assessment
U.S. Army Corps of Engineers	Emergency Section 404 of the Clean Water Act – permit
U.S. Fish and Wildlife Service	Federal Endangered Species Act – authorization under incidental take provisions of the Santa Clara Valley Habitat Plan and Section 7 emergency consultation procedures
Advisory Council on Historic Preservation	Section 106 of the National Historic Preservation Act
State Agencies	
California Department of Fish and Wildlife	Section 1600 *et seq.* of the California Fish and Game Code – Lake or Streambed Alteration Agreement
	California Endangered Species Act – authorization under incidental take provisions of the VHP
California Department of Water Resources, Division of Safety of Dams	California Water Code, Division 3 – approval of repairs or alterations to a dam or reservoir California Code of Regulations, Title 23 – approval of dam safety and dam repairs or alterations
State Water Resources Control Board in coordination with San Francisco Bay Regional Water Quality Control Board (Region 2)	Sections 401 of the Clean Water Act – water quality certification for Emergency USACE Section 404 Permit Construction stormwater Permit under Section 402 of the Clean Water Act – notification under Stormwater Construction General Permit Order No. 2009-0009-DWQ
State Office of Historic Preservation	Section 106 of the National Historic Preservation Act
Local Agencies	
City of San Jose	Municipal approvals
City of Morgan Hill	Encroachment permit, temporary right of entry
	Municipal approvals
Santa Clara County	Encroachment permit, tree removal permit

Appendix A Best Management Practices and Santa Clara Valley Habitat Conservation Plan Conditions Incorporated in the Proposed Project

Appendix B FERC Order Compliance Project Parcels and Real Estate Needs

FIGURE 1

FIGURE 2

FIGURE 3A

FIGURE 3B

FIGURE 3C