Draft Environmental Impact Report

Santiago Creek Dam Improvement Project

SCH No. 2023050097

Prepared for

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SECTION 1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

The environmental impact report (EIR) process, as set forth in the California Environmental Quality Act (CEQA), requires the lead agency to prepare an objective document that fully discloses its analysis of potential environmental impacts and feasible alternatives in order to: (1) inform agency decision makers and the general public of the direct and indirect potentially significant environmental effects of a proposed action; (2) identify feasible or potentially feasible mitigation measures to reduce or eliminate potential significant adverse impacts; and (3) identify and evaluate a reasonable range of alternatives to the proposed project. In accordance with Section 15168 of the CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, Sections 15000, *et seq*.), this EIR addresses the potential environmental impacts associated with the proposed Project--the Santiago Creek Dam Improvement Project (the "Project").

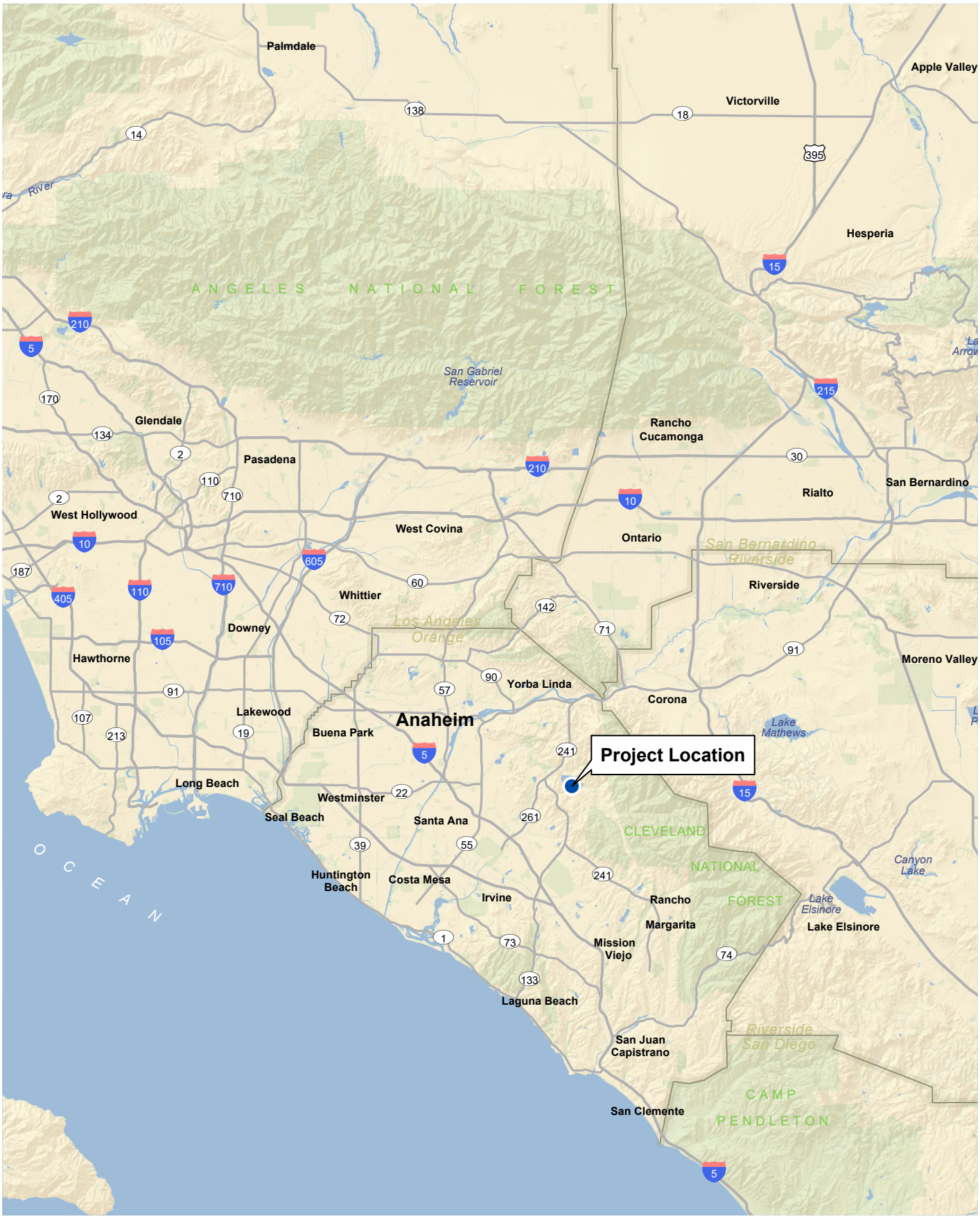
This EIR includes a detailed description of the proposed Project and the potential physical environmental impacts associated with the implementation of the Project. The Lead Agency, the Irvine Ranch Water District (IRWD), determined that this EIR should analyze all environmental topics, with the exception of agriculture and forest resources, mineral resources, and population and housing, and issued a Notice of Preparation (NOP) on May 4, 2023. The NOP and the comments received during the public review of the NOP are included in Appendix A to this EIR.

The environmental topics analyzed in detail in Section 4.0, Impact Analysis, of this EIR describe: (1) the physical conditions that existed at the approximate time this EIR's NOP was filed with the California State Clearinghouse (May 4, 2023); (2) the type and magnitude of potential environmental impacts resulting from Project planning, construction, and operation; and (3) if warranted, recommendations for feasible mitigation measures that would reduce or avoid significant adverse environmental impacts potentially caused by the proposed Project. A summary of the proposed Project's significant environmental impacts and the mitigation measures imposed by IRWD on the Project to lessen or avoid those impacts are included in this Executive Summary as Table 1-1. IRWD applies mitigation measures which it determines (1) are feasible and practical for the Project to implement; (2) are feasible and practical for IRWD to monitor and enforce; (3) are legal for IRWD to impose; (4) have an essential nexus to the Project's impacts; and (5) would result in a benefit to the physical environment. CEQA does not require the Lead Agency to analyze an exhaustive list of every imaginable mitigation measure, or measures that are duplicative of mandatory regulatory requirements.

1.2 PROJECT LOCATION

Santiago Creek Dam is located at the northwest end of Irvine Lake in unincorporated Orange County, California. The Project is south of State Route (SR) 261 and east of SR-241 and Santiago Canyon Road. Existing structures include the embankment dam, outlet tower in Irvine Lake, spillway channel, flashboard storage shed, control house/outlet works, energy dissipater structure, dam keeper's house, Irvine Lake pipeline (ILP), and dam access road. The regional and local vicinity of the Project site is depicted on Exhibit 1-1, Regional Location, and Exhibit 1-2[1], Aerial Photograph, respectively.

[1] Only a portion of the pipeline immediately downstream of Irvine Lake is considered the ILP; the majority of the pipeline was previously converted to a recycled water pipeline.



Regional Location

Exhibit 1-1

Santiago Creek Dam Improvement Project

N W E S

0 5 10 Miles

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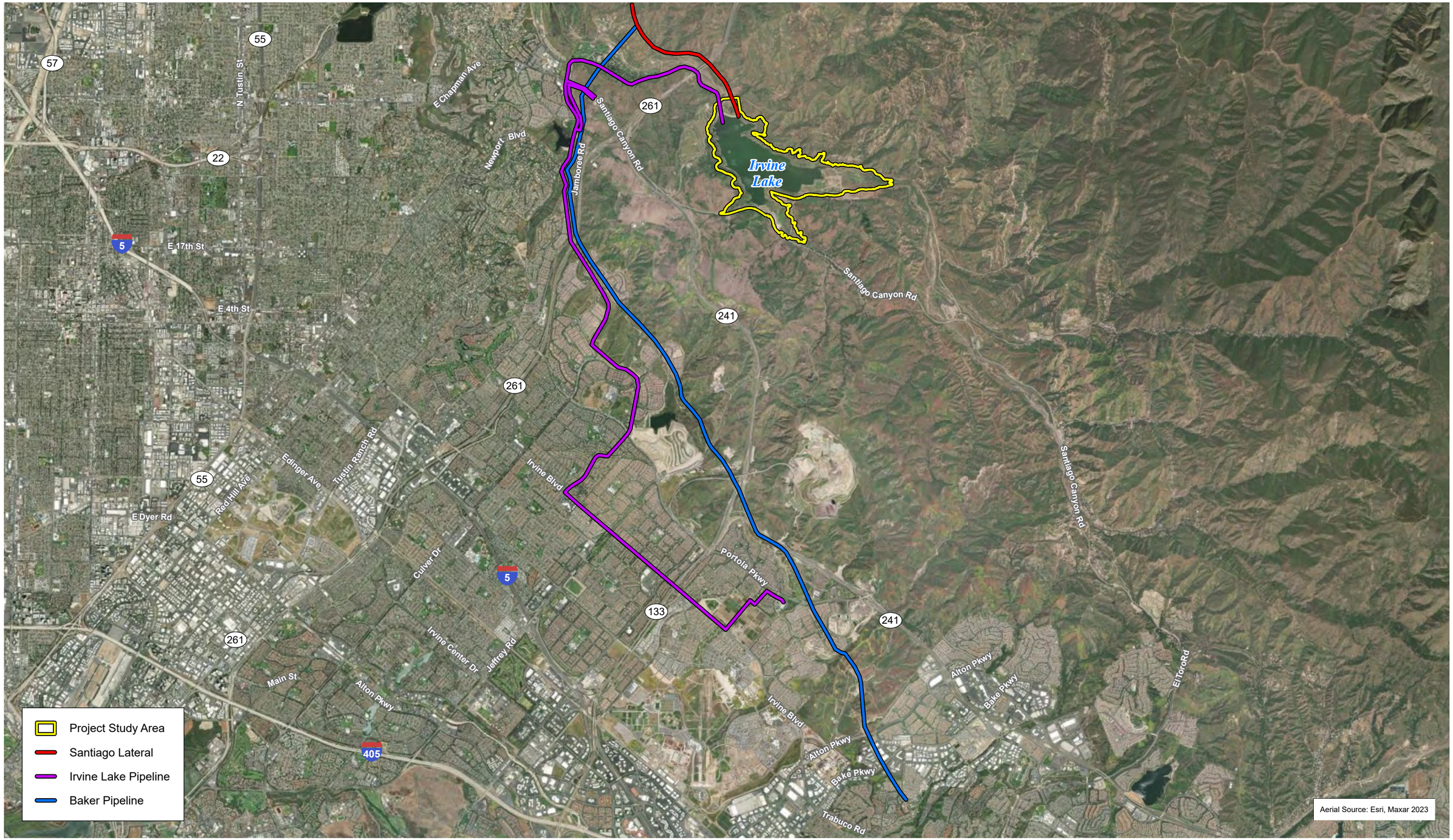

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Aerial Photograph

Santiago Creek Dam Improvement Project

Exhibit 1-2

N W E S

0 0.6 1.2 Miles

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1.3 PROJECT DESCRIPTION SUMMARY

General elements of each portion of the Project are included below. A more detailed description of the proposed facilities is included in Section 3.0, Project Description.

- The existing outlet tower would be demolished; with the portion of the tower located below the sediment to be filled with concrete and capped with a concrete plug or completely removed. A new inclined outlet structure consisting of a series of inclined concrete footings with metal platforms would be constructed on the left abutment of the dam. Each riser from the structure would include an intake fish screen.
- The proposed inclined inlet/outlet structure would be configured to incorporate the new outlet structure, including new valves and fittings. Water from the lake would enter the new inclined inlet/outlet structure and would convey lake water through an existing conduit under the dam. At the downstream toe of the dam, a new fitting would be installed to bifurcate the flow either to the Irvine Lake Pipeline (ILP) or the emergency outlet pipeline. Water that enters the ILP would reach the IRWD distribution system. Water that enters the emergency outlet pipeline would be released to the creek near the end of the new spillway.
- The existing ILP travels over Santiago Creek and is supported on piers. Historically, this pipeline has washed out during high flow events through the spillway and Santiago Creek. As part of the Project, approximately 1,000 linear feet of the ILP near the dam would be upsized from 36 inches to approximately 54 inches to match the inlet/outlet pipeline coming from the inclined inlet/outlet structure, as well as to increase the capacity of the line and improve the system's hydraulics.
- In addition to the modifications to the existing outlet works, the existing spillway would be demolished and replaced with a new side-channel spillway in a rock cut on the left abutment of the dam.
- A new approximately 12-foot-wide gravel-paved roadway would be constructed to provide access from the dam crest, across the spillway channel, and to the top of the new inlet/outlet structure. A new 160-foot-long steel bridge structure would be constructed to provide vehicle access from the dam crest, across the spillway channel, and to the top of the inlet/outlet structure. The bridge would be approximately 12 feet wide and span the upper portion of the spillway structure. The bridge would be supported on piles located on the left and right side of the spillway structure. The new access road would terminate in a cul-de-sac-type turn-around at the top of the inlet/outlet structure. A shotcrete tie-back wall would be required to cut the proposed roadway into the existing slope without affecting the existing OCWR Santiago Canyon Landfill facilities above.
- A new dam control building located on the dam crest near the spillway structure would be constructed to house the pneumatic system that would operate the valves on the inclined inlet/outlet structure, the lake aeration systems, and the electrical and control equipment. The dam control building would be approximately 60 feet wide by 20 feet deep with a height of approximately 18 feet. The building would have a gable-style roof and would be fire hardened and constructed of non-combustible materials. The height of the interior of the building would allow at least 12 feet of unobstructed clearance.
- The upper portion of the dam would be removed to a depth at least 15 feet below the dam crest. On the downstream side of the embankment, the Project includes removing the dam face, constructing a filter drain system, and encapsulating the filter drain system with embankment shell material which is composed of pervious material.
- The existing dam crest would be widened from 10 feet to between approximately 35 and 45 feet, the dam crest elevation would be raised up approximately one foot, and

improvements would be constructed to ensure vehicular traffic remains on the dam crest road. The paved dam crest would include protective railing on both sides of the road and replacement of piezometers to monitor the performance of the embankment dam. These embankment improvements would require excavations along the toe of the dam to key in the earthwork improvements to the face of the dam.

- The dam crest would also be raised up approximately one foot. This would raise the effective dam crest from an elevation of 811.9 feet to approximately 812.9 feet to meet Department of Safety of Dams (DSOD) freeboard requirements during a Probable Maximum Flood event.
- A new emergency access walkway (at least five feet wide) and stair system would be constructed along the left wall of the new spillway channel to provide access to the inlet/outlet structure and dam crest from the adjacent Santiago Canyon Landfill during a spillway event. The walkway would connect to the proposed inlet/outlet structure access road.
- The existing Southern California Edison (SCE) overhead power lines and power poles would be relocated to the downstream toe of the dam within the Project vicinity. SCE would relocate the existing overhead electrical lines. There would be an approximately 15-foot-wide right-of-way (ROW) easement for long-term maintenance.
- The Project would raise the spillway six feet to 797.9 feet, which is two feet higher than the existing maximum water storage elevation of 795.5 feet. Raising the spillway would allow the dam to impound water up to the 797.9-foot elevation contour year-round, which would allow storage of approximately 1,300 acre-feet of additional water.
- Before beginning construction of the dam improvements, the lake would be dewatered, and an access road would be graded along the edge of the dewatered lakebed to allow construction access between the staging area and the dam structure.
- IRWD would maximize withdrawals from Irvine Lake in the time leading up to construction initiation to minimize the amount required to be dewatered. The dewatering process would combine several methods including dewatering using the valves and outlet tower to allow water to flow downstream, implementing a temporary pumping system, and use of a subgrade dewatering system (e.g., dewatering wells). The temporary pumping system would include diesel driven pumps and temporary above ground piping that would convey the water from the lake to a discharge point along Santiago Creek near the existing Arizona crossing. Dewatering would be used throughout the year as needed to manage the water level during and after storm events and to maintain a dry work environment. IRWD would coordinate downstream releases with impacted agencies and entities.
- Once the lake is dewatered and before the first dry season, the contractor would construct a temporary diversion berm and access ramp. The temporary diversion would provide a physical barrier to protect the work area from seasonal storms and would provide an elevated access road to allow construction equipment to access the downstream side of the dam.
- During construction, concrete crushing would occur in one of the staging areas. Concrete crushing would be expected to occur intermittently for approximately three weeks during the demolition phase of the Project but may also occur at various stages of the Project as concrete is removed from the existing spillway or dam. When feasible, demolished and removed materials would be recycled or reused.
- IRWD may be required to obtain additional geotechnical investigations to support the Project's final design. These investigations would occur during the design phase and may include exploratory test pits, soil borings, packer testing, and/or non-intrusive geologic

investigations and observations. The additional geotechnical investigations would remain within the proposed limits of disturbance defined by the Project, are included in the analysis contained in this EIR, and would be mitigated as part of the overall Project.

1.4 PROJECT OBJECTIVES

Section 15124(b) of the CEQA Guidelines requires "[a] statement of objectives sought by the proposed project. A clearly written statement of objectives helps the lead agency develop a reasonable range of alternatives to evaluate in the EIR and would aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project." Not only is a project analyzed in light of its objectives, compatibility with project objectives is one of the criteria used in selecting and evaluating a reasonable range of project alternatives. Clear project objectives simplify the selection process by providing a standard against which to measure project alternatives.

Santiago Creek Dam was completed in 1933 and certified by the State of California, Department of Water Resources (DWR), DSOD. In 2012 and in collaboration with DSOD, IRWD initiated seismic evaluations of the existing outlet tower that resulted in a determination that the free-standing structure was seismically unstable. In 2017, IRWD initiated, at DSOD's request, a multi-phase spillway condition assessment. The assessment found that the aging spillway is nearing the end of its useful life and the design, while acceptable at the time of construction, does not meet current standards. In 2021, IRWD completed risk analysis on all of its dams as part of its transition to a Risk Informed Decision Making (RIDM) dam safety program and identified an opportunity to enhance the safety of the Santiago Creek Dam embankment by adding a filter drain system.

The primary objective of the proposed Project is the rehabilitation and replacement of the Santiago Creek Dam outlet tower and spillway facilities as well as the modification of the embankment to permit operation of the facilities to provide a long-term water resource benefit. In implementing the proposed Project, IRWD would also obtain the following benefits:

1. Construct new facilities and dam embankment modifications that will meet or exceed the current seismic, safety, and design requirements established by the DSOD, which is the governing State agency associated with this Project;
2. Satisfy IRWD's operational requirements in the present and the future;
3. Extend the useful life of the facilities;
4. Improve regional water supply reliability; and
5. Minimize impacts to local environmental resources and surrounding property owners.

1.5 PROJECT ALTERNATIVES

Section 15126.6(a) of the CEQA Guidelines requires that "an EIR describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives". Two alternatives have been evaluated. These alternatives are summarized below and discussed and depicted graphically in Section 5.0, Alternatives to the Proposed Project, of this EIR.

The alternatives were developed to avoid or minimize impacts associated with the proposed Project. The summaries of each alternative identify the potentially significant impacts associated with that alternative. Table 5-1, Compatibility Comparison of Alternatives With Project Objectives,

analyzes the compatibility of the alternatives with the proposed Project, and Table 5-2, Comparison of Project Alternatives Impacts to Proposed Project Impacts, provides a summary of alternative impacts as compared to the proposed Project.

1.5.1 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

This alternative assumes the site would continue to remain in its current state and would not meet current standards. The alternative would also reduce the useful life of the facilities, and reduce water supply reliability. The existing uses on the site would continue with restricted operations. The existing site improvements would remain unchanged, and no structures would be demolished. The No Project Alternative would avoid the following mitigable impacts: Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, and Tribal Cultural Resources. Additionally, there would be reduced impacts for the following environmental topics: Aesthetics, Energy, Greenhouse Gas Emissions, Hydrology and Water Quality, Land Use and Planning, Public Services, Noise Recreation, Transportation, and Utilities and Service Systems. The No Project Alternative would not meet any of the five Project Objectives.

1.5.2 ALTERNATIVE 2 – PURCHASING WATER ALTERNATIVE

This alternative assumes that IRWD would need to purchase, on average, 5,070-acre feet (AF) of imported supplies each year to meet demands currently met with the Irvine Lake native water supplies. This Alternative would generally have the same impacts as the No Project Alternative. The Purchasing Water Alternative would meet only one of the five Project Objectives.

1.5.3 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The No Project Alternative (Alternative 1) would have the least impact to the environment because it would not involve any construction or demolition activities, nor would it result in any environmental impacts. This alternative would avoid potentially significant impacts, albeit mitigable, of the proposed Project associated with Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, and Tribal Cultural Resources. This alternative would not meet any of the Project objectives.

The remaining alternative was, as required by CEQA, compared to the proposed Project when determining the environmentally superior alternative. When evaluating the proposed Project compared to Alternative 2, it may result in reduced impacts in some areas; however, it would result in increased impacts in other areas and would not satisfy the five Project objectives.

Based solely on the potential environmental impacts, Alternative 1, No Project Alternative, would have the greatest reduction in environmental impacts and would be deemed the environmentally superior alternative. However, this alternative would not meet any of the Project objectives. Therefore, as part of the alternative selection process, the Board of Directors will need to balance the environmental impacts of the alternatives and their ability to meet Project objectives. Also, according to Section 15126.6(e)(2) of the CEQA Guidelines, “If the environmentally superior alternative is the ‘no project’ alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.” Based upon the detailed analysis contained in Section 5.0, Alternatives, of the Draft EIR, the proposed Project would be the next environmentally superior alternative. For further comparison of the alternatives and identification of the environmentally superior alternative, see Section 5.4, Environmentally Superior Alternative.

1.6 ENVIRONMENTAL IMPACT REPORT FOCUS AND EFFECTS FOUND NOT TO BE SIGNIFICANT

In accordance with Section 15063 of the CEQA Guidelines, IRWD prepared a NOP for the proposed Project and distributed it to responsible and interested agencies and to key interest groups. The NOP was distributed to agencies and individuals for a 30-day review period beginning on May 4, 2023 and ending on June 5, 2023. In addition, notices regarding the availability of the NOP were distributed to all property owners and occupants of businesses within 500 feet of the Project site. The NOP was also posted on IRWD's website.

A Scoping Meeting was held on May 16, 2023, at 5 PM at IRWD's Board Room, 15600 Sand Canyon Avenue, in Irvine. IRWD staff were available to answer any questions about the proposed Project. A handout that provided an overview of the proposed Project, the scope of the EIR, and Project schedule was distributed. Comment cards were available for attendees to submit at the meeting or to mail to IRWD staff. There were no attendees, and thus no one signed the sign-in sheet.

A summary of the issues raised in the NOP comment letters is provided in Section 2.4, Environmental Review Process, of this EIR. The NOP and the comments received during the public review of the NOP are included in Appendix A to this EIR. A total of eight comment letters/emails were received during the 30-day NOP review period.

IRWD has determined that the EIR should address the following environmental topics as stand-alone sections.

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

Section 2.4, Environmental Review Process, provides an overview of the EIR review process and a summary of the environmental topics and threshold questions within topical areas that will not receive detailed evaluation in the EIR.

1.7 AREAS OF CONTROVERSY/ISSUES TO BE RESOLVED

Section 15123(b)(3) of the CEQA Guidelines requires that an EIR identify issues to be resolved, including the choice among alternatives and whether or how to mitigate the Project's significant effects on the environment. With respect to the proposed Project, as part of the NOP process, a number of concerns, which have been addressed and/or resolved, were expressed. Following is a summary of concerns raised in response to the NOP, and the Section of the EIR that addresses the concern:

- Biological Direct, Indirect, and Cumulative Impacts: Impacts to special status vegetation (coastal sage scrub, riparian, woodland), jurisdictional resources (U.S. Army Corps of

Engineers [USACE], Regional Water Quality Control Board [RWQCB], California Department of Fish and Wildlife [CDFW]), special status plant and wildlife species (mud nama, Crotch's bumble bee, western spadefoot, least Bell's vireo, and coastal California gnatcatcher); compliance with the County of Orange Central and Coastal Subregion Natural Community Conservation Plan/Habitat Conservation Plan; regulatory permitting; Biological Opinion (U.S. Fish and Wildlife Service [USFWS]) and Incidental Take Permit (CDFW); mitigation and avoidance of Project-related Biological Impacts (Section 4.3, Biological Resources)

- Consistency with the Southern California Association of Governments (SCAG) Plans and Projections (Section 4.10, Land Use and Planning)
- Tribal Cultural Resources (Section 4.15, Tribal Cultural Resources)
- Emergency and Construction Access, Traffic Operations, and Vehicle Miles Traveled (Section 4.14, Transportation)
- Cumulative Impacts (Sections 4.1 through 4.17)
- Hydrology and Hydraulics Impacts (Section 4.9, Hydrology and Water Quality)
- Impacts to Public Service Providers (Section 4.12, Public Services)
- Impacts to Parks and Recreation Facilities (Section 4.13, Recreation)
- Landfill Impacts (Section 4.16, Utilities and Service Systems)
- Wildfire Impacts (Section 4.17, Wildfire)

1.8 CEQA BASELINE

Section 15125 of the CEQA Guidelines requires that the analysis in the EIR compare the potential impacts against the existing conditions. Therefore, the analysis has been conducted with the baseline of current operations at the Santiago Creek Dam.

1.9 SUMMARY OF SIGNIFICANT EFFECTS AND MITIGATION PROGRAM

Table 1-1 presents a summary of the potential environmental effects of the Project; measures to mitigate impacts to the extent feasible; and the expected status of effects following implementation of the mitigation measures. A more detailed evaluation of these issues is presented in Sections 4.1 through 4.17. The level of significance provided in the 'Project Impact' columns is the level of significance prior to mitigation. The column identified as 'Level of Significance After Mitigation' contains the determination whether the mitigation measures would reduce the impact to a level of less than significant.

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TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
Section 4.1 – Aesthetics			
Threshold 4.1-1 Substantially degrade the existing visual character or quality of public views of the site and its surroundings (Public views are those that are those that are experienced from publicly accessible vantage points). If the project is in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.	The proposed Project would not substantially degrade the existing visual character or quality of public views of the site and its surroundings. Additionally, the Project would not conflict with applicable zoning and other regulations governing scenic quality. Impacts would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.1-2 Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	The proposed Project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. Impacts would be less than significant with implementation of PDF AES-1 and PDF AES-2, and no mitigation is required.	**PDF AES-1** The Project will design and operate lighting for construction, security, or equipment maintenance to conform to the requirements of the Occupational Safety and Health Administration, Code of Federal Regulations (CFR)-29, Standard 1926.56 and any Orange County light pollution regulations. Additionally, the Project will orient lighting to minimize effects to the community and adjacent sensitive habitat areas. **PDF AES-2** To the extent feasible, the Project will direct night lighting away from sensitive native habitats and provide low-sodium or similar lighting equipped with shields to focus light downward.	Less Than Significant.
Section 4.2 – Air Quality			
Threshold 4.2-1 Conflict with or obstruct implementation of the applicable air quality plan.	Based on the analysis presented in Section 4.2, Air Quality, pollutant emissions from the proposed Project would exceed the South Coast Air Quality Management District (SCAQMD) thresholds during construction and would result in a significant impact even with the implementation of mitigation measures and SCAQMD regulatory requirements. Additionally, the Project's construction activities would conflict with the 2022 Air Quality Management Plan's (AQMP's) goal of reducing criteria pollutant emissions. Subsequently, the Project would result in a temporary significant and unavoidable impact related to consistency with the AQMP, pursuant to Threshold 4.2-1.	**MM AQ-1** IRWD will require its construction contractor(s) to implement the following measures to minimize nitrogen oxide (NO_x) and volatile organic compound (VOC) emissions during construction: • All off-road diesel-powered construction equipment greater than 50 horsepower will meet U.S. Environmental Protection Agency Tier 4 Final emission standards to the extent that the equipment is available. In addition, all construction equipment will be outfitted with Best Available Control Technology devices certified by the California Air Resources Board. If Tier 4 Final equipment is not available to the best of the construction contractor's understanding, the construction contractor(s) will provide IRWD with documentation showing the reasons for non-availability. • Require the use of 2010 and newer diesel haul trucks (e.g., material delivery trucks and soil import/export). If the construction contractor(s) determines that 2010 model year or newer diesel trucks cannot be obtained, trucks that meet USEPA 2007 model year NO_x emissions requirements will be required. If 2007 model year or newer diesel trucks are not available, the construction contractor(s) will provide IRWD with reasonable documentation showing the reasons for non-availability. • Construction equipment will be properly serviced and maintained to the manufacturer's applicable standards.	Significant and Unavoidable Impact.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
Threshold 4.2-2 Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard.	Pursuant to Threshold 4.2-2, short-term construction emissions of nonattainment pollutants and their precursors would be cumulatively considerable and would result in a significant and unavoidable impact to regional air quality with implementation of MM AQ-1. Project operations would result in a less than significant impact to regional air quality.	MM AQ-1 as stated above.	Significant and Unavoidable Impact.
Threshold 4.2-3 Expose sensitive receptors to substantial pollutant concentrations.	The proposed Project would not increase congestion or result in a significant impact related to carbon monoxide hotspots. The construction period would be relatively short when compared to a 30- or 70-year exposure period. Additionally, combined with the highly dispersive properties of diesel particulate matter and additional reductions in particulate emissions from newer construction equipment, as required by U.S. Environmental Protection Agency and California Air Resources Board regulations, Project construction would not expose sensitive receptors to substantial emissions of toxic air contaminants. Also, the proposed Project would not have the potential to expose sensitive receptors to substantial toxic air contaminants from stationary or mobile sources. Overall, pursuant to Threshold 4.2-3, impacts would be less than significant, and no mitigation is required.	MM AQ-1 as stated above.	Less Than Significant.
Threshold 4.2-4 Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	Project-related odors are construction-related, low magnitude, and short-term in nature; no long-term operational odors would result. As such, the proposed Project would have less than significant impact in regard to other emissions, pursuant to Threshold 4.2-4.	**PDF AQ-1** Upon the initial dewatering of the reservoir at the start of construction, all exposed organic matter shall be removed from the reservoir by construction crews. Organic matter removal, including removal of plant and animal species, shall occur in accordance with all applicable laws, regulations, and permit conditions.	Less Than Significant.
Section 4.3 – Biological Resources			
Threshold 4.3-1 Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.	The Project has potential to impact special status plant and wildlife species. Significant or potentially significant impacts were identified for mud nama, Crotch's bumble bee, coastal California gnatcatcher, least Bell's vireo, bald eagle, and roosting bats. Additionally, wildlife using habitat adjacent to the Project could be indirectly impacted by construction noise, night lighting during construction, dust, and invasive plant species. Assuming implementation of PDF-BIO-1 through PDF-BIO-9 and with implementation of MM BIO-1 through MM BIO-7, these impacts would be reduced to less than significant and the potential impacts on special status species would be less than significant, pursuant to Threshold 4.3-1.	**PDF-BIO-1** Worker Environmental Awareness Program (WEAP) Training. Prior to the initiation of construction activities, IRWD will retain a qualified Biologist (i.e., Biological Monitor) to provide a WEAP training for construction personnel to review the mitigation measures and permit requirements applicable to the construction phase. The Biological Monitor will require trained personnel to sign the WEAP Log to document that they have been trained and understand the mitigation measures and permit conditions. The Biological Monitor will repeat the WEAP training as-needed for new construction personnel. **PDF-BIO-2** Project Limits. Prior to construction, the Project limits will be clearly staked by IRWD or IRWD's Contractor and verified by the Biological Monitor. **PDF-BIO-3** Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) Construction Minimization Measures. As required by the NCCP/HCP, IRWD will follow standard construction-related minimization measures. These include removal of coastal sage scrub outside the California gnatcatcher breeding season (i.e., February 15 to July 15); pre-construction surveys for coastal California gnatcatchers; identification of coastal sage scrub habitat areas for protection as Environmentally Sensitive Areas (ESAs); and biological monitoring during all clearing of coastal sage scrub. **PDF-BIO-4** Tree Protection. To protect western sycamore and coast live oak trees adjacent to Project impact areas, protective fencing will be	Less Than Significant (mud nama, Crotch's bumble bee, coastal California gnatcatcher, least Bell's vireo, bald eagle, and roosting bats).

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SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
		placed around all western sycamore and coast live oak trees located within 50 feet of the impact areas. The tree protection area will be 1.5 times the dripline of the tree. No stockpiling of materials will occur within the tree protection areas. Limbs of western sycamore and coast live oak trees can be pruned to allow construction equipment access. If large branches need to be removed or if more than 10 percent of the total canopy would be affected, pruning will be supervised by a Certified Arborist retained by IRWD. **PDF-BIO-5** Nesting Bird Protection. To the extent practicable, vegetation clearing will be conducted during the non-breeding season (i.e., September 16 to January 31). If vegetation clearing will be initiated during the breeding season for nesting birds/raptors (i.e., February 1–September 15), the construction activity will be conducted in compliance with the conditions set forth in the Migratory Bird Treaty Act. IRWD will retain a qualified Biologist to conduct a pre-construction survey for nesting birds and/or raptors within three days prior to clearing of any vegetation or work near existing structures. The nesting bird survey area will include a buffer of 100 feet around the work area for nesting birds and a buffer of 500 feet around the work area for nesting raptors. If an active nest is found, the Biologist will determine the appropriate protective buffer depending on the sensitivity of the species and the nature of the construction activity. The protective buffer will be 25–100 feet for nesting birds; 300–500 feet for special status bird species or nesting raptors; and 0.5 mile for golden eagle or prairie falcon. No work will be conducted in the protective buffer until a qualified Biologist determines that the nest is no longer active. The Biologist will map any nests found during survey efforts and their protective buffers and will provide the map to IRWD and the Contractor. **PDF-BIO-6** Speed Limit During Construction. The speed limit on construction access roads will be no more than 20 miles per hour. Signage will be posted throughout the construction areas and at multiple locations along the access road between the dam and the staging area at the upstream end of the lake. “Wildlife crossing” signage will also be posted along the access road between the dam and the staging area at the upstream end of the lake. Signage will be verified by the Biological Monitor. **PDF-BIO-7** Night Lighting. Night lighting will be directed away from adjacent habitat areas to the extent practicable. Shielding of night lighting during construction will be incorporated to ensure that ambient lighting is directed away from sensitive habitat areas. Appropriate shielding of night lighting will be verified by the Biological Monitor. **PDF-BIO-8** Prevent Spread of Invasive Species. Weed seeds entering the construction area via vehicles will be minimized by requiring construction vehicles to be washed prior to delivery to the Project site. Track-clean or other methods of vehicle cleaning will be used by the construction contractor to prevent weed seeds from entering/exiting the Project site on vehicles. Wattles used for erosion control will be biodegradable and certified as weed-free. Seed mixes and/or hydroseed applied to temporarily disturbed areas will consist of native species local to the Project vicinity. IRWD will retain a qualified Biologist to review and approve the	

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Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
		seed mix. Use of measures to prevent the spread of invasive species will be verified by the Biological Monitor. **PDF-BIO-9** Treatment of Invasive Species. During active construction, IRWD will retain a qualified Biologist to conduct surveys for non-native invasive plant species on the OC Parks target list on a monthly basis. If a target species is observed within 100 feet of the active construction area, IRWD will retain a qualified Contractor to remove and/or treat the non-native invasive plant species and to appropriately dispose of it. The target species will be removed/treated before they set seed. For a period of two years following completion of construction, IRWD will retain a qualified Biologist to conduct surveys for non-native invasive plant species on the OC Parks target list on a quarterly basis. If a target species is observed within 100 feet of the previously disturbed areas, IRWD will retain a qualified Contractor to remove and/or treat the non-native invasive plant species and to appropriately dispose of it. The target species will be removed/treated before they set seed. **MM BIO-1A** **Special Status Plants/Pre-construction Surveys:** During the peak blooming season prior to the initiation of construction (within the same year or the spring/summer prior), IRWD will retain a qualified Botanist to conduct a focused survey for mud nama. Although not required, the pre-construction survey will also include intermediate mariposa lily, many-stemmed dudleya, and Coulter's matilija poppy to minimize impacts on these species. The pre-construction survey will focus on these species in the general locations where they were previously observed within the impact area and will including a 100-foot survey buffer. The Botanist will record special status plant locations within the impact area and within 100 feet of the impact area using GPS and will clearly mark locations with pin flags or lathe and flagging. The Botanist will meet in the field with IRWD to discuss whether avoidance of these locations would be feasible (e.g., whether they could be protected within the temporary impact areas). No compensatory mitigation will be required if the locations of intermediate mariposa lily,[2] many-stemmed dudleya, and Coulter's matilija poppy cannot be avoided. However, IRWD will notify the Natural Communities Coalition (NCC) and allow the NCC to collect seed and/or salvage special status plants that will be impacted by the Project. Seed collection/salvage will be coordinated so that it does not delay the construction schedule. Compensatory mitigation will be required if more than 10 percent of the mud nama locations mapped in 2022 will be impacted, as described below under MM BIO-1B. Following the pre-construction survey and field meeting with IRWD, the Botanist will prepare a Pre-construction Special Status Plant Survey Report to document the results of the pre-construction surveys and will document the special status plant locations that will be avoided during construction. The Botanist	

[2] The NCCP/HCP covers impacts on this species up to 20 individuals; if more than 20 individuals would be impacted, additional consultation with the resource agencies would be required. However, this is not anticipated to be necessary because only six individuals have been observed in the BSA during focused surveys and only one individual is located in the impact area.

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		will calculate the percent of the mud nama population that will be impacted by comparing the amount of mud nama within the construction impact area to the mud nama locations mapped in 2022. The report will also document that the final engineering plans, coupled with construction avoidance areas, will impact less than 50 percent of the mud nama population mapped in 2022. After the field meeting with IRWD, the Botanists will work with IRWD/Contractor to clearly mark the locations that will be avoided during construction with lathe and flagging, orange snow fencing, stakes and rope, or other suitable fencing until the initiation of construction. During construction, the Biological Monitor will ensure that these areas are protected during construction as described below under MM BIO-1C. **MM BIO-1B** **Mud Nama/Compensatory Mitigation:** As described under MM BIO-1A, if compensatory mitigation is required for mud nama (i.e., more than 10 percent of the mud nama locations mapped in 2022 will be impacted by the Project), IRWD will retain a qualified Restoration Biologist to prepare a detailed Mud Nama Mitigation Plan. The Plan will describe collection of seed, salvage of individuals, salvage of soils (i.e., seed bank), and establishment of a new on-site location that will replace the area of mud nama impacted at a minimum 1:1 ratio (i.e., 1 acre impacted to 1 acre replaced). The on-site mitigation areas will provide similar microhabitat, including similar soils and elevation to provide similar inundation frequency to current conditions. The Mud Nama Mitigation Plan shall include the following topics: (1) responsibilities and qualifications of the personnel to implement and supervise the plan; (2) mitigation site selection criteria; (3) site preparation and planting implementation, including pilot studies (if needed); (4) implementation schedule; (5) maintenance plan/guidelines; (6) monitoring plan; (7) performance criteria and contingency planning; and (8) long-term preservation. IRWD will implement the Plan. IRWD will retain a qualified Restoration Biologist/Seed Collector to collect seed, salvage individuals, and salvage soils (i.e., seed bank) from the mud nama during the spring/summer prior to impacts upon this plant. IRWD will ensure that the seed/salvaged individuals/soil will be stored by a qualified Seed Collector in appropriate conditions to maintain the viability of the seed to be used in implementation of the Mud Nama Mitigation Plan. **MM BIO-1C** **Special Status Plants/Biological Monitoring:** Before the start of construction, IRWD will retain a qualified Biological Monitor to confirm that the special status plant locations to be avoided are clearly marked with lathe and flagging, orange snow fencing, stakes and rope, or other suitable fencing. The Biological Monitor will post signs to indicate each location as an “Environmentally Sensitive Area” and that no work activities may occur within the fencing. The Biological Monitor will conduct a WEAP training regarding the importance of Environmentally Sensitive Areas. Once Project activities begin, the Biological Monitor will check the fencing/signage weekly to ensure that it stays in place throughout construction activities and will notify IRWD and the construction	

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		contractor immediately if the fencing/signage needs to be repaired. **MM BIO-2** **Crotch's Bumble Bee:** If the California Department of Fish and Wildlife (CDFW) determines that listing of the Crotch's bumble bee is not warranted as threatened or endangered under the California Endangered Species Act prior to or during implementation of the Project, this measure will not be required. Until CDFW makes a determination, or if CDFW determines that listing of the Crotch's bumble bee as threatened or endangered under the California Endangered Species Act is warranted, the following measures will be required. **MM BIO-2A** **Incidental Take Permit:** IRWD will obtain an Incidental Take Permit (2081) prior to removal of suitable habitat for Crotch's bumble bee. IRWD will consult with CDFW to determine the appropriate mitigation to compensate for loss of floral resources associated with the species at a minimum 1:1 ratio of suitable habitat impacted (i.e., 1 acre impacted to 1 acre compensated). Potential compensatory mitigation options include on-site revegetation of temporarily disturbed areas using a seed mix of species preferred by Crotch's bumble bee at a minimum 1:1 ratio of temporarily impacted areas; payment of an in-lieu mitigation fee to an approved mitigation bank at a minimum 1:1 ratio of permanently impacted areas; long-term preservation of on-site or off-site habitat at a minimum 1:1 ratio of permanently impacted areas; or another strategy as approved by CDFW. Mitigation provided for under MM BIO-3 (Coastal Sage Scrub) may be used towards mitigation for Crotch's bumble bee. **MM BIO-2B** **Pre-construction Survey:** Prior to vegetation clearing or other ground-disturbance during each year of Project construction, IRWD will retain a qualified Biologist to conduct pre-construction focused surveys for active nests of Crotch's bumble bee following the most current CDFW guidelines[3] within 100 feet of Project impact areas with suitable habitat for Crotch's bumble bee. According to current guidelines (CDFW 2023), the Biologist will conduct three visual surveys during the species' active period (i.e., April to August). The timing between each visual survey may be reduced to accommodate the construction schedule, as long as the first and last survey are conducted at least one week apart during the active period. If no active nests of Crotch's bumble bee are observed, vegetation clearing, grading, and ground-disturbance may proceed. If a ground nest is observed, it will be protected in place until it is no longer active as determined by the qualified Biologist retained by IRWD. IRWD will implement applicable protective measures from the Incidental Take Permit for the species (see MM BIO-2A). Potential protective measures may include protective buffers coupled with biological monitoring to avoid take of an active ground nest. The protective buffer will be determined by the	

[3] The current guidelines for this species are CDFW 2023; guidelines may be updated as more is learned about this species' biology.

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		Biologist conducting the pre-construction survey, or as designated in conditions in the Incidental Take Permit. IRWD shall assure that a Letter Report is prepared to document the results of the pre-construction survey and will provide the letter to CDFW within 30 days of the completion of the survey. **MM BIO-2C** **Biological Monitoring**: Biological monitoring for Crotch's bumble bee will follow the most current CDFW guidelines at the time of construction. Per current guidelines (CDFW 2023), IRWD will retain a Biological Monitor to be present onsite during vegetation-clearing and/or ground disturbing activities that take place during the Crotch's bumble bee queen flight period (i.e., February to March), colony active period (i.e., April to August), or gyne flight period (i.e., September to October). No biological monitoring will be required for vegetation-clearing or ground-disturbance that occurs from November to January. If a ground nest of Crotch's bumble bee is observed during the monitoring, it will be protected in place until it is no longer active as determined by the qualified Biologist retained by IRWD. IRWD will also implement applicable protective measures from the Incidental Take Permit for the species (see MM BIO-2A). If establishment of a protective buffer and/or avoidance of the nest is not feasible, IRWD and its qualified Biologist will consult with CDFW regarding potential encroachment into the protective buffer that may result in take of Crotch's bumble bee pursuant to MM BIO-2A. **MM BIO-3** **Coastal Sage Scrub and Coastal California Gnatcatcher:** Potential direct and indirect impacts on coastal sage scrub and coastal California gnatcatcher are fully mitigated through IRWD's participation and contribution in the NCCP/HCP Mitigation Program. This participation not only provides mitigation for coastal sage scrub and the coastal California gnatcatcher, but also other Covered Species and Covered Habitats. IRWD will mitigate for impacts on coastal sage scrub and coastal California gnatcatcher through a combination of the following, as approved by U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW): (1) use of IRWD's NCCP/HCP take allocation at a 1:1 ratio for impacted coastal sage scrub; (2) restoration of coastal sage scrub habitat at a minimum 1:1 ratio in areas temporarily disturbed by construction including weeding and three years of restoration monitoring; and/or (3) restoration of coastal sage scrub habitat at an on-site or off-site location at a minimum 1:1 ratio, as described in a Habitat Mitigation and Monitoring Plan (HMMP) in order to preserve IRWD's remaining NCCP/HCP take allocation (if desired by IRWD). If a coastal sage scrub habitat establishment program is selected to mitigate for all or a portion of the impacts, IRWD will prepare a Coastal Sage Scrub HMMP and submit it to the resource agencies for review and approval prior to the initiation of construction activities. The Coastal Sage Scrub HMMP will include the following items: (1) responsibilities and qualifications; (2) performance criteria and contingency planning; (3) site selection; (4) seed materials procurement; (5) wildlife surveys and	

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Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
		protection; (6) site preparation and plant materials installation; (7) schedule; (8) maintenance program; (9) monitoring program; and (10) long-term preservation. IRWD will retain a qualified Restoration Ecologist to prepare the Coastal Sage Scrub HMMP and will retain a qualified Restoration Contractor to implement the HMMP. IRWD will be responsible for implementing the Coastal Sage Scrub HMMP and ensuring that the mitigation program achieves the approved performance criteria. **MM BIO-4** **Riparian Vegetation and Jurisdictional Permitting:** Before the start of construction, IRWD will obtain all necessary permits for impacts to U.S Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW), and/or Regional Water Quality Control Board (RWQCB) jurisdictional areas and will determine the compensatory mitigation needed for the loss of jurisdictional waters and wetlands. Potential compensatory mitigation options will include one or a combination of the following, as determined through consultation with the above-listed resource agencies: (1) establishment of riparian habitat (on site or off site) at a minimum 1:1 ratio for impacted jurisdictional areas; (2) payment to a resource agency approved mitigation bank or regional riparian enhancement program (e.g., invasive species removal) at a minimum 1:1 ratio for impacted jurisdictional areas; and/or (3) preservation of off-site riparian habitat on IRWD lands at a minimum 1:1 ratio for impacted jurisdictional areas. If in-lieu mitigation fees are required, IRWD will pay the in-lieu mitigation fee before the start of construction to a mitigation bank/enhancement program for the replacement of impacted jurisdictional resources. If a riparian habitat establishment program is selected to mitigate for all or a portion of the impacts, IRWD will retain a qualified Restoration Ecologist to prepare a Riparian Habitat Mitigation and Monitoring Plan (HMMP) and will submit it to the resource agencies for review and approval prior to the initiation of construction activities. The Riparian HMMP will include the following items: (1) responsibilities and qualifications; (2) performance criteria and contingency planning; (3) site selection; (4) seed materials procurement; (5) wildlife surveys and protection; (6) site preparation and plant materials installation; (7) schedule; (8) maintenance program; (9) monitoring program; and (10) long-term preservation. IRWS will retain a qualified Restoration Contractor to implement the HMMP. IRWD will be responsible for implementing the Riparian HMMP and ensuring that the mitigation program achieves the approved performance criteria. **MM BIO-5** **Least Bell's Vireo:** IRWD will consult with USFWS and CDFW under Section 7 of the Federal Endangered Species Act and Section 2080.1 of the California Fish and Game Code to approve the mitigation approach and whether NCCP/HCP Conditional Coverage would be extended to least Bell's vireo based on the measures below. A. IRWD will obtain concurrence from USFWS and CDFW that the riparian mitigation described in MM BIO4 will provide	

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		appropriate compensatory mitigation for the loss of riparian habitat. B. To the extent feasible, removal of riparian habitat will be conducted during the non-breeding season (i.e., September 16 to March 14) in order to minimize direct impacts on nests of least Bell's vireo. IRWD will retain a qualified Biologist to monitor vegetation clearing of riparian habitat. C. Before starting construction each spring, IRWD will retain a qualified Biologist to survey all habitat within 500 feet of the construction limits for the presence of least Bell's vireo. The Biologist will map any active nests/territories as Environmentally Sensitive Areas on an aerial photograph. IRWD will also ensure that the Biologist prepares a Letter Report and that it is submitted to USFWS and CDFW to document the results of the pre-construction survey within 30 days of completion of the survey. D. IRWD will retain a qualified Biologist to conduct weekly focused surveys during construction to update the location of active least Bell's vireo territories. The Biologist will map new territories as Environmentally Sensitive Areas and will remove inactive Environmentally Sensitive Areas from the map. Once construction is in progress, IRWD will provide Weekly Reports to USFWS and CDFW. E. IRWD will retain a qualified Biologist to establish a 500-foot protective buffer around each least Bell's vireo territory identified during pre-construction or weekly surveys. The Biologist will verify that occupied riparian habitat is protected with lathe and rope, orange snow fencing, or other suitable fencing to provide an adequate buffer from construction work. The Biologist will post signs to indicate that the area is an "Environmentally Sensitive Area" and that no work activities may occur within the fencing. The Biologist will conduct training to educate workers on the importance of Environmentally Sensitive Areas. F. If construction activities need to occur within 500 feet of an active least Bell's vireo territory, IRWD will consult with USFWS and CDFW to determine an appropriate noise reduction strategy. Appropriate noise reduction measures may include, but are not limited to, specifications for equipment type, siting of equipment, and temporary noise barriers. IRWD will retain a qualified Biologist to monitor the installation of any noise reduction measures. G. IRWD will retain a qualified Biologist to conduct daily monitoring when construction activities are conducted within 500 feet of an active least Bell's vireo territory or until the Biologist determines that the individuals are not being impacted by the noise (i.e., the noise measures are established and birds are acclimated to the activities). **MM BIO-6** **Bald Eagle:** IRWD will consult with USFWS and CDFW with regard to the bald eagle to determine whether any regulatory approval is necessary to comply with the California Endangered Species Act and the federal Bald Eagle Act. Because there would	

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		be no direct take of a nest, an informal consultation may be sufficient, but this approach will be confirmed by USFWS and CDFW. USFWS and CDFW will review and approve the monitoring strategy to be used during construction. IRWD will retain a qualified Biologist to visit the bald eagle nest multiple times over the course of the breeding season to determine whether the nest is active and/or to determine the stage of nesting. The Biologist will conduct the first visit in early March to determine whether the nest is active. The Biologist will conduct the second visit in late March or early April to confirm the nesting stage (i.e., presence of eggs/young), or to confirm that the nest is still inactive. If the nest is not active during the first two visits, no additional surveys will be needed. However, if the nest is active, the Biologist will conduct weekly surveys from five weeks post-hatching continuing until the young fledge or May 15, whichever comes last. The Biologist will complete the California Bald Eagle Nesting Territory Survey Form to document the survey results each year. IRWD will ensure that the form is submitted to USFWS and CDFW by September 1 of each year. **MM BIO-7** **Pre-Construction Bat Surveys:** IRWD will retain a qualified Biologist to conduct a pre-construction roosting bat survey (including both day and evening efforts) before construction begins. The day survey will involve inspection of the structures within the impact area to look for signs of bat roosting. The evening survey will involve monitoring each potential roost site for evening emergence, conducting exit counts, and acoustic monitoring (from a half an hour before sunset to no greater than three hours after sunset) near potential roosts within the impact area. If the Biologist determines that bats are actively roosting onsite, IRWD will retain a qualified Biologist to prepare a Project-specific Bat Roost Minimization Plan (BRMP) and will implement the plan. The BRMP will include relevant avoidance and minimization measures based on the survey results. If tree roosting bat species are found to be both foraging and potentially roosting onsite, IRWD will conduct tree removal only during the non-maternity season (September 1 through March 31). When potentially-occupied roost trees are removed, IRWD will implement a phased tree removal method (i.e., leaving the felled tree on the ground for 24-48 hours after the felling to allow any tree-roosting bats to leave). IRWD will avoid all Project-structures proposed for demolition that support an active day-roost until either the roost is no longer active, as determined by a qualified Biologist, or the occupants can be humanely evicted as described in the BRMP. IRWD will retain a qualified Biologist to conduct bat eviction during the fall months outside of the bat maternity season (i.e., September 1 through November 30).	

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Threshold 4.3-2 Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service.	The Project would impact coastal sage scrub, riparian, and woodland habitats. The additional inundation during implementation of the Project would also affect a limited amount of these habitats. With implementation of MM BIO-3, MM BIO-4, and MM BIO-8 these impacts would be less than significant. Therefore, the potential impact on riparian habitats and sensitive natural communities would be less than significant, pursuant to Threshold 4.3-2.	**MMs BIO-3** and **BIO-4** as stated above**.** **MM BIO-8** **Tree Survey/Replacement:** Before the start of construction, IRWD will retain a qualified Biologist or Certified Arborist to conduct a tree survey to identify the location and health of western sycamore trees within 100 feet of the Project impact area. To the extent practicable, temporary impact areas will be revised to avoid and minimize effects on western sycamore trees. Standard tree protection measures to fence western sycamores will be recommended for trees within or near the work area (PDF BIO-4). Any western sycamores that are greater than four inches diameter at breast height (dbh) removed by construction will be replaced at no less than a 1:1 ratio. Trees with a dbh of 4 inches to 8 inches will replaced at a 1:1 ratio with a minimum container size of 15 gallons. Trees with a dbh of greater than 8 inches to 16 inches will be replaced at a 1:1 ratio with a minimum container size of 25 gallons (i.e., 24-inch box). Trees with a dbh of greater than 16 inches to 24 inches will be replaced at a 3:1 ratio with a minimum container size of 25 gallons (i.e., 24-inch box). Trees with a dbh of greater than 24 inches to 36 inches will be replaced at a 5:1 ratio with a minimum container size of 25 gallons (i.e., 24-inch box). Trees with a dbh of greater than 36 inches will be replaced at a 10:1 ratio with a minimum container size of 25 gallons (i.e., 24-inch box). The replacement trees will be replaced either on-site or off-site in a location with appropriate microclimate conditions. The replacement trees will be incorporated into the Coastal Sage Scrub HMMP (described above).	Less Than Significant.
Threshold 4.3-3 Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	The Project would impact areas within the jurisdiction of the USACE, RWQCB, and CDFW. The Project also may significantly impact water quality during construction. With the implementation of MM BIO-4, these impacts would be less than significant. Therefore, the potential impact on state- and federally- protected wetlands and other jurisdictional resources would be less than significant, pursuant to Threshold 4.3-3.	**MM BIO-4** as stated above.	Less Than Significant.
Threshold 4.3-4 Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	Santiago Creek Dam represents an existing barrier to wildlife movement; therefore the Project would not impact wildlife movement along a regional wildlife corridor. However, the Project is located within a NCCP/HCP Reserve and wildlife movement in adjacent areas could be affected by noise, night lighting, and human activity during construction. With the implementation of PDF-BIO-1, PDF-BIO-6, and PDF-BIO-7 impacts would be less than significant under Threshold 4.3-4.	No mitigation is required.	Less Than Significant.
Threshold 4.3-5 Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	The Project has the potential to affect nesting birds/raptors, which are protected by the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code. With the implementation of standard pre-construction surveys and nesting bird protections (PDF-BIO-5), the impact would be less than significant, and no conflict with applicable requirements would occur pursuant to Threshold 4.3-5.	No mitigation is required.	Less Than Significant.
Threshold 4.3-6 Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan.	The Project is consistent with the NCCP/HCP. With implementation of MM BIO-3 and MM BIO-5, the impact would be reduced to less than significant., No conflict with the NCCP/HCP would occur under Threshold 4.3-6.	**MM BIO-3** and **MM BIO-5** as stated above.	Less Than Significant.

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Section 4.4 – Cultural Resources			
Threshold 4.4-1 Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.	The Santiago Creek Dam (P-30-176757) was determined eligible for the California Register of Historical Resources (CRHR) and listed in the CRHR. Although specific aspects of the dam would be modified, it would remain recognizable as an earthen embankment dam and would continue to perform the historic function for which it is eligible. Thus, the Project would not cause a substantial adverse change in the significance of an historical resource, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.4-2 Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.	The Project has potential to cause a substantial adverse change in the significance of an archaeological resource. However, potential effects would be mitigated to a less than significant level with the implementation of MM CR-1, which requires archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and MM CR-2, which identifies treatment of unanticipated discoveries.	**MM CR-1** IRWD will retain a certified archaeologist, defined as an archaeologist meeting the Secretary of the Interior's Standards for professional archaeology, to observe ground-disturbing activities (including but not limited to geotechnical excavations, vegetation removal, grubbing, grading, and excavation) within previously undisturbed soils below fill soils and to salvage and catalogue archaeological resources as necessary. Monitoring will not be required for secondary movement of soils, such as backfilling. The archaeologist will be present at the pre-construction meeting, will establish procedures for archaeological resource surveillance within previously undisturbed soils in coordination with IRWD throughout construction of the proposed Project, and will establish, in cooperation with IRWD, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of the artifacts as appropriate. The archaeological monitor will have the authority to temporarily halt or divert work away from any discoveries of archaeological resources in order to evaluate the resources pursuant to **MM CR-2**. The archaeologist may determine, in consultation with IRWD, to reduce monitoring to spot-checking or eliminate monitoring depending on site conditions observed, such as the presence of fill material, soil stratigraphy, encountering bedrock, or other factors. The archaeological monitor will keep daily logs detailing the types of activities and soils observed, and any discoveries. After monitoring has been completed, the certified archaeologist will prepare a monitoring report that details the results of monitoring. The report will be submitted to IRWD and any Native American groups who request a copy. The certified archaeologist will submit a copy of the final report to the California Historic Resources Information System South Central Coastal Information Center. **MM CR-2** If archaeological resources are inadvertently unearthed during excavation activities (within disturbed or undisturbed soils), the contractor will immediately cease all earth-disturbing activities within a 50-foot radius of the area of discovery, and the certified archaeologist and IRWD will be notified immediately. If the certified archaeologist determine the archaeological resources are potentially significant pursuant to CEQA Guidelines Section 15064.5 or California PRC Section 21083.2(g), the archaeologist, in consultation with IRWD and representatives from the tribal governments consulting under AB 52, will determine appropriate treatment, which may include avoidance of the area of the find, data recovery, documentation, testing, reburial, archival review,	Less Than Significant.

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Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
		and/or transfer to the appropriate museum or educational institution, or other appropriate actions. After the find has been appropriately avoided or mitigated, work in the area may resume.	
Threshold 4.4-3 Disturb any human remains, including those interred outside of formal cemeteries.	Pursuant to Threshold 4.4-3, Project activities are not expected to disturb human remains. However, if human remains are encountered during grading activities, RR CR-1 requires that any activity in the area of a potential find be halted, and the Orange County Coroner be notified. Implementation of RR CR-1 would reduce this impact to a less than significant level.	**RR CR-1** If human remains are found during ground-disturbing activities, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains will occur, in accordance with Section 7050.5 of the California Health and Safety Code. The County Coroner will be notified of the discovery immediately. If the County Coroner determines that the remains are or believed to be Native American, s/he will notify the NAHC within 24 hours of the discovery. In accordance with Section 5097.98 of the California Public Resources Code, the NAHC must immediately notify those persons it believes to be the most likely descended from the deceased Native American (i.e., the most likely descendant). The descendants will complete their inspection within 48 hours of being granted access to the site by IRWD. IRWD will discuss and confer with the most likely descendants regarding all reasonable options regarding the descendants' preferences for treatment of the human remains prior to disturbing the site by further construction activity.	Less Than Significant.
Section 4.5 – Energy			
Threshold 4.5-1 Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	Based on the analysis presented in Section 4.5, Energy, the Project would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. The Project's impact would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.5-2 Conflict with or obstruct a State or local plan for renewable energy or energy efficiency.	Implementation of the Project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Impacts would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Section 4.6 – Geology and Soils			
Threshold 4.6-1 Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: i) Strong seismic ground shaking	The Project site is in a seismically active area that would likely experience strong ground shaking during the life of any project developed thereon. However, compliance with existing regulations (2022 California Building Code) would reduce potentially significant impacts associated with strong seismic ground shaking to a less than significant level.	No mitigation is required.	Less Than Significant.
ii) Seismic-related ground failure, including liquefaction	Implementation of the Project would reduce the existing potential for substantial adverse effects to the Santiago Creek Dam involving seismic-related ground failure. There would be a less than significant impacts related to seismic-related ground failure, including liquefaction and lateral spreading, with implementation of engineering design requirements applicable to the Project and no mitigation would be required.	No mitigation is required.	Less Than Significant.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
iii) Landslides	Implementation of the Project would reduce the existing potential for substantial adverse effects to the Santiago Creek Dam involving landslides. There would be a less than significant impact related to landslides, including liquefaction and lateral spreading, with implementation of engineering design requirements applicable to the Project, and no mitigation would be required.	No mitigation is required.	Less Than Significant.
Threshold 4.6-2 Result in substantial soil erosion or the loss of topsoil.	Grading activities would increase the potential for soil erosion and loss of topsoil. With the incorporation of construction BMPs as described in Section 4.9, Hydrology and Water Quality, of this EIR and compliance with applicable laws and regulations (e.g., NPDES Construction General Permit), Project impacts on soil erosion and loss of topsoil would be less than significant. Long-term operation of the Project would also result in less than significant impacts. No mitigation measures are required.	No mitigation is required.	Less Than Significant.
Threshold 4.6-3 Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.	There would be less than significant impacts related to the presence of unstable geologic units with implementation of engineering design requirements applicable to the Project, and no mitigation would be required.	No mitigation is required.	Less Than Significant.
Threshold 4.6-4 Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.	The on-site soils were determined to have very low or non-existent expansion potential. There would be less than significant impacts related to expansive soils with implementation of engineering design requirements applicable to the Project, and no mitigation would be required.	No mitigation is required.	Less Than Significant.
Threshold 4.6-5 Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	The Project has a potential to disturb unique paleontological resources during construction. However, potential effects may be mitigated to a less than significant level with the implementation of MM GEO-1, which requires retention of a qualified Paleontologist to observe ground-disturbing activities, including geotechnical investigations, within undisturbed soils and MM GEO-2, which identifies treatment of unanticipated discoveries.	**MM GEO-1** Before beginning initial ground-disturbing activities (including but not limited to geotechnical excavations, vegetation removal, grubbing, grading, and excavation), IRWD will retain a paleontologist that meets the 2010 Society of Vertebrate Paleontology standards for paleontology. The paleontologist will observe ground-disturbing activities within previously disturbed or undisturbed soils with high paleontological sensitivity in geological formations, such as the Williams Formation or Pleistocene age alluvium, at the Project site. In the event of discovery, paleontological findings will be salvaged and catalogued by the paleontologist. Monitoring will not be required for secondary movement of soils, such as backfilling. The paleontologist will regularly meet with the contractor to ensure adequate involvement with ground-disturbing activities and will establish procedures for paleontological resource surveillance within previously undisturbed soils in coordination with IRWD throughout construction of the proposed Project. The qualified paleontologist will also establish, in coordination with IRWD, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of the fossils/unique geological units as appropriate. The paleontological monitor will have the authority to temporarily halt or divert work away from exposed fossils in order to recover the fossil specimens pursuant to MM GEO-2. The paleontologist may determine, in consultation with IRWD, to reduce monitoring to spot-checking or eliminate monitoring depending on site conditions observed, such as the presence of geologic units with low paleontological sensitivity or other factors. The	Less Than Significant.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
		paleontological monitor will prepare daily logs detailing the types of activities and soils observed and any discoveries. Upon the completion of initial ground-disturbing activities, the paleontologist will prepare a final monitoring and mitigation report to document the results of the monitoring effort. **MM GEO-2** If paleontological resources are inadvertently unearthed during excavation activities, the contractor will immediately cease all earth-disturbing activities within a 50-foot radius of the area of discovery and will contact the paleontologist and IRWD immediately. If the paleontologist determines the paleontological resources are potentially significant under CEQA, the paleontologist, in consultation with IRWD, will determine appropriate actions for treatment. Any significant fossils collected during project-related excavations will be salvaged and prepared to the point of identification following the standards of the Society of Vertebrate Paleontology (2010). Any salvaged fossils will be offered for donation to an accredited repository with a scientific interest in the materials. If no accredited repository accepts the donation, then the fossils may be donated to a local museum, historical society, school, or other institution for educational purposes. After the resource has been appropriately avoided or mitigated, work in the area may resume.	
Section 4.7 – Greenhouse Gas Emissions			
Threshold 4.7-1 Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	Pursuant to Threshold 4.7-1, the Project would not generate GHG emissions, either directly or indirectly, resulting in a significant impact on the environment. Impacts would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.7-2 Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	Pursuant to Threshold 4.7-2, the Project would be consistent with and would not conflict with regulations and policies adopted for the purpose of reducing GHG emissions. Impacts would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Section 4.8 – Hazards and Hazardous Materials			
Threshold 4.8-1 Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	A portion of the Project site is located on the former Irvine Park-Army Camp and is currently designated on the Cortese List. With the implementation of MM HAZ-1, which requires IRWD to follow and implement the 3Rs of Explosives Safety – Recognize, Retreat, and Report, impacts would be less than significant.	**MM HAZ-1** IRWD will require that all construction contractor(s) and their personnel receive, review, and adhere to the guidance published in *3Rs Safety Guide, Former Irvine Park-Army Camp, California, Orange County*. IRWD will require its construction contractor to provide training to all construction personnel on the implementation and application of the Safety Guide, which includes 1) Recognize that munitions are dangerous; 2) Retreat – do not approach, touch, move or disturb it, but carefully leave the area; and 3) Report immediately what you saw and where you saw it to local law enforcement.	Less Than Significant.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
Threshold 4.8-2 Expose people or structure, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	The Project site is located within a Very High Fire Hazard Severity Zone (FHSZ) in a State Responsibility Area. The areas surrounding the Project site are also located within a Very High FHSZ, with the exception of a portion of Irvine Lake, which is located within a High FHSZ within an State Responsibility Area. With regulatory compliance measures incorporated, the proposed Project would not exacerbate wildfire risk and impacts would be less than significant. No mitigation is required.	No mitigation is required.	Less Than Significant.
Section 4.9 – Hydrology and Water Quality			
Threshold 4.9-1 Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.	The proposed Project would not violate any water quality standards and waste discharge requirements, nor would it otherwise substantially degrade water quality, pursuant to Threshold 4.9-1. Water quality-related impacts would be less than significant. No mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.9-2 Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.	The Project would not deplete groundwater supplies or interfere substantially with groundwater recharge. No impacts would occur, pursuant to Threshold 4.9-2. No mitigation is required.	No mitigation is required.	No Impact.
Threshold 4.9-3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would: i) result in substantial erosion or siltation on- or off-site; ii) substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of **surface** runoff in a manner in which would result in flooding on- or off-site; iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. iv) impede or redirect flood flows.	The proposed Project would not alter the existing drainage pattern of the site or area, would not result in substantial erosion or siltation on or off-site, substantially increase the rate or amount of surface runoff in a manner in which would result in flooding on- or off-site, create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff, or impede or redirect flood flows. Impacts would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.9-4 In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.	The proposed Project would not introduce any uses that would expose people or structures to the release of pollutants during seiches and flooding due to breaches of the dam. Impacts would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.9-5 Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	The proposed Project would not conflict with or obstruct implementation of the applicable water quality control plan or sustainable groundwater management plan. Impacts would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Section 4.10 – Land Use and Planning			
Threshold 4.10-1 Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.	The Project would not conflict with any local applicable land use plan, policy, or regulation. Impacts would be less than significant.	No mitigation is required.	Less Than Significant.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
Section 4.11 – Noise			
Threshold 4.11-1 Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	Noise generated during Project construction would not exceed the daytime or nighttime noise thresholds established by the Federal Transit Administration (FTA). For the residential sensitive receptors located approximately two miles to the west, noise levels generated during Project construction would be attenuated by the substantial distances between the Project site and the aforementioned uses. Furthermore, Irvine Lake is surrounded by ridgelines which would also attenuate noise levels. As shown in Table 4.11-5, noise exposure levels are anticipated to range from 31 to 46 A-weighted decibels (dBA) equivalent noise level (L_{eq}) at Irvine Regional Park and are not anticipated to result in a substantial level of noise exposure. Additionally, Project construction would not exceed the 80 dBA L_{eq} daytime and 70 dba L_{eq} nighttime noise criteria and consequently would not expose Oak Canyon Park and Lakeview Park Camping Area to excessive levels of noise. No camping is allowed at Irvine Lake (OC Parks 2023) so there would be no nighttime noise exposure. No Project-related traffic noise impacts are anticipated. Impacts related to stationary sources of noise would be less than significant, and no mitigation is necessary pursuant to Threshold 4.11-1.	No mitigation is required.	Less Than Significant.
Threshold 4.11-2 Generation of excessive groundborne vibration or groundborne noise levels.	Vibration annoyance and building damage from typical construction activities have the potential to be excessive at nearfield distances of 100 feet or less. Because of the very substantial distances between the Project site and the nearest buildings, vibration-induced annoyance and building damage would not occur. The operations phase of the Project would not involve machinery or activities that generate perceptible levels of vibration. There would be a less than significant impact, and no mitigation is required pursuant to Threshold 4.11-2.	No mitigation is required.	Less Than Significant.
Threshold 4.11-3 For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.	The Project would not result in exposure of people residing or working in the Project area to excessive aircraft noise levels. Pursuant to Threshold 4.11-3, there would be no impact related to excessive aircraft noise exposure.	No mitigation is required.	Less Than Significant.
Section 4.12 – Public Services			
Threshold 4.12-1 Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: (i) Fire protection	The Project's temporary construction activities and periodic maintenance activities would only cause an incremental increase in demand on County fire services. No new or physically-altered fire facilities that would result in substantial adverse physical impacts would be required as a result of the Project. Therefore, the impact is less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
(ii) Police protection	The Project would not result in an increased demand for police protection services or result in a significant impact to police response. The Project would replace an existing use that is generating demand for police protection services. The Project would not result in the need for construction of new or physically-altered police facilities to maintain adequate levels of service. Therefore, the impact is considered less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
Section 4.13 – Recreation			
Threshold 4.13-1 Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	The proposed Project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. Less than significant impacts would occur.	No mitigation is required.	Less Than Significant.
Threshold 4.13-2 Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	The proposed Project would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. No impact would occur.	No mitigation is required.	No Impact.
Section 4.14 – Transportation			
Threshold 4.14-1 Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	Project construction and operation would not result in a significant impact. Based on the evaluation included in Section 4.14, Transportation, with compliance with the Traffic Control Plan and County requirements, Project construction impacts would be less than significant. Additionally, it is anticipated that routine inspection and maintenance trips would continue, and no new operational trips would occur with implementation of the proposed Project. Therefore, the potential operation impacts would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.14-2 Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).	The Project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b), pursuant to Threshold 4.14-2. No impact would occur, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.14-3 Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	No impact would occur related to hazards due to a design feature or incompatible uses, pursuant to Threshold 4.14-3. No mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.14-4 Result in inadequate emergency access.	No impact to local or regional emergency access routes would occur, pursuant to Threshold 4.14-4. No mitigation is required.	No mitigation is required.	Less Than Significant.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
Section 4.15 – Tribal Cultural Resources			
Threshold 4.15-1 Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1 (k), or	Potential impacts to archeological resources would be mitigated to a less than significant level with the implementation of MM CR-1, which requires archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and MM CR-2, which identifies treatment of unanticipated discoveries. Additionally, the Project would comply with the State requirements pertaining to the protection of human remains by implementing RR CR1. The Santiago Creek Dam Complex (P-30-176757) was determined eligible for the CRHR and listed in the CRHR. However, it would remain recognizable as an earthen embankment dam and would continue to perform the historic function for which it is eligible. Thus, pursuant to Threshold 4.15-1, the Project would not have an impact on a tribal cultural resource that is listed or eligible for listing on the CRHR or a local register.	**MM CR-1** IRWD will retain a certified archaeologist, defined as an archaeologist meeting the Secretary of the Interior's Standards for professional archaeology, to observe ground-disturbing activities (including but not limited to geotechnical excavations, vegetational removal, grubbing, grading, and excavation) within previously undisturbed soils below the fill soils and to salvage and catalogue archaeological resources as necessary. Monitoring will not be necessary for secondary movement of soils, such as backfilling. The archaeologist will be present at the pre-construction meeting, will establish procedures for archaeological resource surveillance within previously undisturbed soils in coordination with IRWD throughout construction of the proposed Project, and will establish, in cooperation with IRWD, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of the artifacts as appropriate. The archaeological monitor will have the authority to temporarily halt or divert work away from any discoveries of archaeological resources in order to evaluate the resources pursuant to MM CR-2. The archaeologist may determine, in consultation with IRWD, to reduce monitoring to spot-checking or eliminate monitoring depending on site conditions observed, such as the presence of fill material, soil stratigraphy, encountering bedrock, or other factors. The archaeological monitor will keep daily logs detailing the types of activities and soils observed, and any discoveries. After monitoring has been completed, the certified archaeologist will prepare a monitoring report that details the results of monitoring. The report will be submitted to IRWD and any Native American groups who request a copy. The certified archaeologist will submit a copy of the final report to the California Historic Resources Information System (CHRIS) South Central Coastal Information Center (SCCIC). **MM CR-2** If archaeological resources are inadvertently unearthed during excavation activities (within disturbed or undisturbed soils), the contractor will immediately cease all earth-disturbing activities within a 50-foot radius of the area of discovery, and the certified archaeologist and IRWD will be notified immediately. If the certified archaeologist determine the archaeological resources are potentially significant pursuant to CEQA Guidelines Section 15064.5 or California Public Resources Code (PRC) Section 21083.2(g), the archaeologist, in consultation with IRWD and representatives from the tribal governments consulting under AB 52, will determine appropriate treatment, which may include avoidance of the area of the find, data recovery, documentation, testing, reburial, archival review, and/or transfer to the appropriate museum or educational institution, or other appropriate actions. After the find has been appropriately avoided or mitigated, work in the area may resume. **RR CR-1** If human remains are found during ground-disturbing activities, no further excavation or disturbance of the site or	Less Than Significant.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
		any nearby area reasonably suspected to overlie adjacent remains will occur, in accordance with Section 7050.5 of the California Health and Safety Code. The County Coroner will be notified of the discovery immediately. If the County Coroner determines that the remains are or believed to be Native American, s/he will notify the NAHC within 24 hours of the discovery. In accordance with Section 5097.98 of the California Public Resources Code, the NAHC must immediately notify those persons it believes to be the most likely descended from the deceased Native American (i.e., the most likely descendant). The descendants will complete their inspection within 48 hours of being granted access to the site by IRWD. IRWD will discuss and confer with the most likely descendants regarding all reasonable options regarding the descendants' preferences for treatment of the human remains prior to disturbing the site by further construction activity.	
ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resource Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	Potential impacts to tribal cultural resources would be mitigated to a less than significant level with the implementation of MM TCR-1, MM TCR-2, and TCR-3, which detail procedures related to tribal monitoring and protocols for unanticipated discoveries.	**MM TCR-1** **Juaneño Band of Mission Indians, Acjachemen Nation – Belardes Tribal Monitoring.** At least one month prior to beginning earthwork activities (i.e. grading, excavation and trenching) related to the existing water line tie-in activities of the proposed project, located at the intersection of Santiago Canyon Road and Haul Road, IRWD will notify the representatives of the Juaneño Band of Mission Indians, Acjachemen Nation - Belardes ("Acjachemen Nation - Belardes") identifying the date of starting earthwork activities. The notification will invite the representative to be present at the project site, and IRWD will further coordinate with the Acjachemen Nation – Belardes for construction monitoring. Acjachemen Nation – Belardes will be provided reasonable access to the project site, at its own expense and in a manner that will not conflict construction activities or cause construction delays to the contractor, to observe these earthwork activities. If Native American artifacts and ancestral human remains related to Acjachemen Nation – Belardes are uncovered during earthwork activities, MM TCR-3 Protocols for Unanticipated Discoveries will be implemented. The Acjachemen Nation – Belardes will document and provide logs to IRWD detailing the time/date of the visit, the outcome of the site visit and detail proposed activities it intends to conduct at the next site visit. The logs will also specifically describe the relevant ground-disturbing activities, the type of construction activities performed, locations of ground-disturbing activities, soil types, cultural-related materials, and any other facts, conditions, materials, or discoveries of significance to the Acjachemen Nation - Belardes. The monitor logs will identify and describe any discovered tribal cultural resources, including but not limited to, Native American cultural and historical artifacts, remains, places of significance, etc., as well as any discovered Native American (ancestral) human remains and burial goods.	Less Than Significant.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
		MM TCR-2 **Gabrieleno Band of Mission Indians - Kizh Nation Tribal Monitoring.** During the AB 52 consultation process, the Gabrieleno Band of Mission Indians - Kizh Nation (Kizh Nation) informed IRWD's staff that the Gabrieleno tribe has a strong tribal cultural presence in the region from the past, including the project site area. Therefore, there could be Kizh Nation tribal cultural resources present at the project site area and Kizh Nation has requested Native American monitoring of ground disturbing activities. The project site area spans over a vast area and the proposed project would have multiple construction phases with varied activities and schedules. At least one month prior to beginning earthwork activities, IRWD will notify in writing the Native American representatives from the Kizh Nation (tribal representative) of the date of the start of earthwork activities. The tribal representative, at their own expense, and in a manner that does not interfere with earthwork activities, will be allowed to observe subsurface ground disturbing construction activities. Monitoring may include either direct observation of the earthwork activities or the examination of excavated soils prior to disposal for evidence of cultural resources. If Native American artifacts and ancestral human remains are uncovered during earthwork activities, then MM TCR-3 Protocols for Unanticipated Discoveries will be implemented. The Kizh Nation tribal representative will complete daily monitoring logs and provide logs to IRWD detailing the time/date of the visit and the outcome of the site visit and detail proposed activities for their next site visit. The logs will also specifically describe the relevant ground-disturbing activities, the type of construction activities performed, locations of ground-disturbing activities, soil types, cultural-related materials, and any other facts, conditions, materials, or discoveries of significance to the Kizh Nation. The monitor logs will identify and describe any discovered tribal cultural resources, including but not limited to, Native American cultural and historical artifacts, remains, places of significance, etc., as well as any discovered Native American (ancestral) human remains and burial goods. **MM TCR-3** ***Protocols for Unanticipated Discoveries.*** If a cultural resource is found, all construction activities in the immediate vicinity of the discovery (i.e., not less than the surrounding 50 feet) will cease and will not resume until the discovered cultural resource(s) is assessed by IRWD's consulting Qualified Archaeologist. If the Qualified Archaeologist determines that the resources may be significant under CEQA, then the Qualified Archaeologist, in consultation with IRWD, will develop an appropriate treatment plan for the resource(s). IRWD will also consult with the Native American tribes or other appropriate Native American representatives in determining appropriate treatment for unearthed cultural resources if the resources are prehistoric or Native American in nature. Under CEQA, preservation in place is the preferred manner of mitigating	

TABLE 1-1
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Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
		impacts to archaeological sites. However, if avoidance is infeasible, other appropriate measures will be instituted, which could include, among other options, detailed documentation, or data recovery excavation. Work may proceed on other parts of the project area while mitigation for cultural resources is being carried out.	
Section 4.16 – Utilities and Service Systems			
Threshold 4.16-1 Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which cause significant environmental effects.	The Project would not require or result in the relocation or construction of new or expanded wastewater treatment, storm drainage, natural gas, or telecommunications facilities. The Project would not result in additional demand for water supply. Construction of the Project would require relocation of the existing overhead power lines and power poles in the Project vicinity. This relocation would be completed by SCE prior to construction. The new poles would be placed outside of the construction limits for the Project and are not included as part of this Project. As such, impacts would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.16-2 Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.	The Project would not result in a significant additional demand for water. Less-than-significant water-related impacts would occur, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.16-3 Result in a determination by the wastewater treatment provider that serves or may service the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	The Project would result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments. No impacts would occur, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.16-4 Generate solid waste in excess of State or local standards or in excess of the capacity of Local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	The Project would not generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure or otherwise impair the attainment of solid waste reduction goals. Impacts would be less than significant, and no mitigation is required.	No mitigation is required.	Less Than Significant.
Threshold 4.16-5 Comply with federal, State, and Local Management and reduction statues and regulations related to solid wastes including the CIWMP (County Integrated Waste Management Plan).	The Project would comply with federal, State, and Local Management and reduction statues and regulations related to solid waste. No impact would occur, and no mitigation is required.	No mitigation is required.	No Impact.
Section 4.17 – Wildfire			
Threshold 4.17-1 Substantially impair an adopted emergency response plan or emergency evacuation plan.	The proposed Project would not substantially impair an adopted emergency response plan or emergency evacuation plan, as it would not prevent access to the local or regional circulation system and would improve an emergency access walkway in the case of a reservoir spill event with RR WILDF-1 and PDFs WILDF-1 through WILDF-3 incorporated. Therefore, the potential impacts associated with emergency access would be less than significant.	**RR WILDF-1** The Project will comply with the general provisions of the California Fire Code relating to fire safety, emergency access, and emergency egress routes. **PDF WILDF-1** The Project will comply with the general provisions of the Orange County Fire Authority fire prevention requirements, including prohibiting operation of any stationary equipment, welding equipment, cutting torches, tarpots, or grinding devices from which a spark, fire or flame may originate on or near any forest-covered land, brush covered land, or grass covered land, without: 1. Having an IRWD approved Hot Work Permit; 2. Prior to starting construction activities, soaking around the work area for a distance of 30 feet to reduce fire	Less Than Significant.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
		spread into wildlands, which shall remain soaked for the duration of the work; 3. Maintaining, at a minimum, one serviceable round point shovel with an overall length of not less than forty-six (46) inches and one backpack pump water-type fire extinguisher fully equipped and ready for use at the immediate area during the operation; 4. Stopping work when winds are 8 MPH during periods when relative humidity is less than 25%, or a Red Flag condition has been declared or public announcement is made, or when an official sign was caused to be posted by the Orange County Fire Authority or IRWD; or 5. Keeping a cell phone nearby and calling 911 immediately in case of a fire. **PDF WILDF-2** The Project will comply with the general provisions of the Orange County Fire Authority, including prohibiting operation of either mechanized or non-mechanized equipment during Red Flag Warnings as declared by the Orange County Fire Authority or other jurisdictional agency or IRWD determines hazardous conditions exist and informs the Project Contractor of such. **PDF WILDF-3** The Project will comply with the general provisions of the Orange County Fire Authority, including training all construction personnel in the requirements of the Fire Prevention and Response Plan prior to construction. The Plan will outline the responsibilities for prevention, pre-suppression and suppression activities associated with fire hazards for the Project. Additionally, fire safety information shall be disseminated to construction personnel during regular safety meetings and fire management techniques shall be applied during construction.	
Threshold 4.17-2 Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.	The proposed Project would be surrounded by open space areas, however, it would not exacerbate wildfire risks within the area, as it would incorporate RR WILDF-2, and comply with all applicable regulations including PRC Sections 4427, 4428, 4431, and 4442 and California Division of Occupational Safety and Health Administration. Therefore, the potential impacts associated with slope, prevailing winds, and other factors would be less than significant.	**RR WILDF-2** The Project will comply with PRC Sections 4427, 4428, 4431, and 4442, related to the handling of combustible fuels and equipment that can exacerbate fire risks, in addition to fire protection and prevention requirements specified by the California Code of Requirements and California Division of Occupational Safety and Health Administration. This includes various measures such as easy accessibility of firefighting equipment, proper storage of combustible liquids, no smoking in service and refueling areas, and worker training for firefighter extinguisher use.	Less Than Significant.
Threshold 4.17-3 Require installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.	The proposed Project would not exacerbate wildfire risks within the area as a result of the installation or maintenance of associated infrastructure, as it would comply with all applicable regulations such as California Code of Regulations Title 24, the California Building Code, and the County of Orange Safety Element. Therefore, the potential impacts associated with installation or maintenance of associated infrastructure would be less than significant.	No mitigation is required.	Less Than Significant.

TABLE 1-1
SUMMARY OF POTENTIAL IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE

Threshold of Significance	Project Impacts	Mitigation Measures (MM) / Project Design Features (PDF) / Regulatory Requirements (RR)	Level of Significance After Mitigation
Threshold 4.17-4 Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage change.	The proposed Project would not expose people or structure to risks subsequent to wildfire, such as flooding or landslides, as it would comply with all applicable regulations during construction and operations. Therefore, the potential impacts associated with wildfire risks such as flooding, and landslides would be less than significant.	No mitigation is required.	Less Than Significant.

SECTION 2.0 INTRODUCTION, PROJECT HISTORY, AND SETTING

2.1 PURPOSE OF THIS ENVIRONMENTAL IMPACT REPORT

Section 21002.1 of the California Environmental Quality Act (CEQA) (*California Public Resources Code* [PRC] Section 21000, et seq.) states that the purpose of an environmental impact report (EIR) is to identify the significant effects of a project on the environment, to identify alternatives to the project, and to indicate the manner in which those significant impacts can be mitigated or avoided. A detailed description of the proposed Santiago Creek Dam Improvement Project ("the Project") is provided in Section 3.0, Project Description, of this EIR.

For purposes of complying with CEQA, Irvine Ranch Water District (IRWD) is the Lead Agency for the Project. IRWD is also the approving body for the Project's discretionary actions.

In accordance with Section 15121(a) of the CEQA Guidelines (Title 14, *California Code of Regulations* [CCR] Section 15000, et seq.), this EIR is an informational document that will inform public agency decision makers and the general public of (1) the significant environmental effects of the proposed project, (2) possible ways to minimize the significant effects, and (3) reasonable alternatives to the proposed project. Decisionmakers are required to consider the information in the EIR in determining whether to approve, deny, or modify the proposed project.

2.2 TYPE OF ENVIRONMENTAL IMPACT REPORT AND STANDARDS OF ADEQUACY UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

This EIR has been prepared in accordance with CEQA and the CEQA Guidelines. CEQA Guidelines Section 15151 defines the standards of adequacy for an EIR as follows:

> An EIR should be prepared with a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure.

This Draft EIR is intended to serve as a project EIR under CEQA. Section 15161 of the CEQA Guidelines states, "the most common type of EIR examines the environmental impacts of a specific development project. This type of EIR should focus primarily on the changes in the environment that would result from the development project." This EIR shall examine all phases of the project including planning, construction, and operation.

Under CEQA, "The purpose of the Environmental Impact Report is to identify the significant effects of a project on the environment, to identify alternatives to the proposed project, and to indicate the manner in which significant environmental effects can be mitigated or avoided" (PRC Section 21002.1[a]). An EIR is the most comprehensive form of environmental documentation identified in CEQA and the CEQA Guidelines, and provides the information needed to assess the environmental consequences of a proposed project, to the extent feasible. EIRs are intended to provide an objective, factually supported, full-disclosure analysis of the environmental consequences associated with a proposed project that has the potential to result in significant, adverse environmental impacts.

An EIR is also one of the various decision-making tools used by a Lead Agency to consider the merits and disadvantages of a project that is subject to its discretionary authority. Prior to approving a proposed project, the Lead Agency must consider the information contained in the EIR, determine whether the EIR was properly prepared in accordance with CEQA and the CEQA Guidelines, determine that the EIR reflects the independent judgment of the Lead Agency, adopt findings concerning the project's significant environmental impacts and alternatives, and adopt a Statement of Overriding Considerations if the project would result in significant impacts that cannot be avoided.

IRWD staff has reviewed all submitted drafts and technical studies for consistency with IRWD's regulations and policies and has commissioned the preparation of this EIR to reflect its own independent judgment, including reliance on applicable IRWD technical personnel and review of all technical subconsultant reports.

2.3 FEDERAL CROSS-CUTTER REQUIREMENTS

As part of Project funding, IRWD may seek funding assistance through the Clean Water State Revolving Fund (CWSRF). Administered through the State Water Resources Control Board, the CWSRF Program offers financing for a variety of water quality projects. In order to qualify for CWSRF funding, a project must comply with CEQA and applicable federal environmental laws. Because the CWSRF Program is partially funded by the United States Environmental Protection Agency (USEPA), supporting documentation must meet specific federal cross-cutting requirements in the form of an Environmental Package. For purposes of this Project, this EIR will serve as an appendix and reference document to the Environmental Package to address relevant environmental requirements.

2.4 ENVIRONMENTAL REVIEW PROCESS

2.4.1 REVIEW OF AN EIR

IRWD, as the Lead Agency (and Project proponent), has the principal authority for approving the proposed Project, along with other public agencies with direct interest in the Project that may be responsible agencies and trustee agencies such as the California Department of Fish and Wildlife, Division of Safety of Dams, State Water Resources Control Board, State Historic Preservation Office, United States Fish and Wildlife Service, and the County of Orange, and other agencies, as appropriate. These agencies may use this EIR in their decision-making or permitting processes and will consider the information in this EIR in combination with other information that may be presented during the CEQA process. In addition, this EIR provides the analysis in support of the Mitigation Program that will be implemented as part of the Project if approved.

In accordance with CEQA, public agencies are required to make appropriate findings for each potentially significant environmental impact identified in the EIR if they decide to approve a project. If the EIR identifies significant environmental impacts that cannot be mitigated to a less than significant level through the adoption of mitigation measures or project alternatives, the Lead Agency (and responsible agencies using this CEQA document for their respective permits or approvals) must decide whether the benefits of the proposed project outweigh any identified significant environmental effects that cannot be mitigated to below a threshold of significance. If the decision-making agency decides that the project benefits outweigh the unavoidable impacts then the decision-making agency (i.e., Lead Agency or responsible agency) is required to adopt a Statement of Overriding Considerations, which states the reasons that support its actions pursuant to Section 15093 of the CEQA Guidelines. The proposed Project would result in significant and unavoidable air quality impacts, for which a Statement of Overriding Consideration would need to be adopted.

The Lead Agency's actions involved in implementation of the proposed Project are described in Section 3.0, Project Description. Other agencies that may have discretionary approval over the Project, or components thereof, including responsible and trustee agencies, are also identified in the Project Description.

2.4.2 ISSUES TO BE ADDRESSED IN THE EIR

IRWD made a determination that the Project may have a significant effect on the environment; as such, an EIR is required for the Project.

In compliance with Section 15082 of the CEQA Guidelines, IRWD oversaw preparation of the Notice of Preparation (NOP) of the Draft EIR for the Project, which was distributed on May 4, 2023 to the State Clearinghouse and other public agencies for a 30-day review and comment period, ending on June 5, 2023. Additionally, a Scoping Meeting was held on May 16, 2023, to facilitate public review and comment on the Project. IRWD staff members were available to answer any questions about the proposed Project. Notices were sent to the adjacent property owners and adjacent cities. The comments received on the NOP by IRWD, and the handout made available at the Scoping Meeting are included in Appendix A of this EIR.

A total of eight comment letters/emails (including the confirmation letter from the State Clearinghouse), were received during the 30-day NOP review period. Table 2-1 provides a summary matrix of the issues raised in the NOP comments.

TABLE 2-1
SUMMARY MATRIX OF NOTICE OF PREPARATION COMMENTS

Date	Commenters	Comment Category																				
		Project Description	Aesthetics/Lighting	Air Quality	Biological Resources	Cultural Resources	Energy	Geology /Soils	Greenhouse Gas Emissions	Hazards/Hazardous Mat.	Hydrology/Water Quality/Sea Level Rise	Land Use/Planning	Noise	Population and Housing	Public Services	Recreation	Trans./Traffic/Parking	Tribal Cultural Resources	Utilities/Service Systems	Wildfire	Cumulative Impacts	Miscellaneous
State Agencies																						
May 4, 2023	Native American Heritage Commission																	X				
June 5, 2023	California Department of Fish and Wildlife, South Coast Region		X		X						X	X	X								X	
Local Agencies																						
May 24, 2023	City of Irvine																					X
June 2, 2023	Orange County Fire Authority																					X
June 5, 2023	Southern California Association of Governments											X		X			X					
June 5, 2023	OC Public Works	X		X	X					X	X		X		X	X	X		X	X	X	
Organizations																						
June 2, 2023	Juaneño Band of Mission Indians, Acjachemen Nation-Belardes																	X				
June 5, 2023	Transportation Corridor Agencies																					X

[*] The letter from the Governor's Office of Planning and Research, State Clearinghouse and Planning Unit verified receipt of the NOP and provided a listing of the agencies that the document was forwarded to.

Source: Comment letters can be found in Appendix A.

At the onset of the CEQA process, IRWD determined that an EIR is required for the Project and an Initial Study was prepared to focus the required analysis included in the EIR. Through the Initial Study, it was determined that no impact would occur related to the following topics and/or threshold questions were adequately addressed. No further analysis on these topics is included in this EIR.

Aesthetics

- ***Have a substantial adverse effect on a scenic vista?***

  As described previously, Santiago Creek Dam is located at the north end of Irvine Lake, in unincorporated Orange County. The County of Orange General Plan (Chapter VI. Resources Element) states that "one of the roles of open space within the County is to provide areas for outdoor recreation (e.g., parks, beaches, trails) and areas with aesthetics, historic or cultural values" (County of Orange 2012). Although Irvine Lake provides these open space resources, the Project site is not specifically designated as a scenic vista or an aesthetic resource by the County of Orange. Due to the nature of the proposed Project, which includes abandonment of the existing Santiago Creek Dam outlet tower and construction of a new inclined outlet structure located on the left abutment of the existing dam in addition to structural improvements to the dam spillway, and because no scenic vistas are identified in the Project vicinity, no impacts would occur, and no mitigation is required.

- ***Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?***

  According to Caltrans' California Scenic Highway Mapping System, there are no officially designated or eligible State scenic highways within or in proximity to the Project site (Caltrans 2024). The Project is located south of State Route (SR) 261 and east of SR-241 and Santiago Canyon Road. The County of Orange Scenic Highways Plan designates Santiago Canyon Road as a Viewscape Corridor which is not considered a State scenic highway. Views of the Project site would be obstructed by intervening topography and vegetation and motorists traveling along Santiago Canyon Road would be largely unaffected by the Project. Any impacts would be related to construction and would be temporary in nature and would not represent substantial damage to scenic resources within a State scenic highway. Therefore, no impact would occur.

Agriculture and Forestry Resources

- ***Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?***

  and

- ***Conflict with existing zoning for agricultural use, or a Williamson Act contract?***

  According to the Farmland Mapping and Monitoring Program, the Project site and surrounding area are currently mapped as "Other Land" and "Urban and Built-Up Land," which is not considered to contain significant farmland resources (DLRP 2024). Further, the Project site has historically been subject to disturbance associated with the construction and maintenance of the Santiago Dam and Reservoir.

The proposed Project includes abandonment of the existing Santiago Creek Dam outlet tower, construction of a new inclined outlet structure located on the left abutment of the existing dam, structural improvements to the dam spillway, and improvements to the dam embankment. No expansion of facilities is contemplated beyond the existing Santiago Creek Dam footprint and the immediately surrounding and disturbed areas. Therefore, no agricultural-related impacts would result from Project implementation, and no mitigation is required.

- ***Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220[g]), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g])?***

  and

- ***Result in the loss of forest land or conversion of forest land to non-forest use?***

  According to Section 12220(g) of the *California Public Resources Code*, "forest land is land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits". The Project site does not meet the definition of forest land; therefore, no impacts would occur, and no mitigation is required.

- ***Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?***

  As discussed previously, the proposed Project site is not designated as farmland of significance and is not being used for agricultural production. Further, there are no forest lands in the vicinity of the Project site; therefore, the Project would not convert forest land to non-forest use. No impacts would occur, and no mitigation is required.

Geology and Soils

Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

- ***Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.***

  There are no mapped active faults or Alquist-Priolo Earthquake Fault Zones traversing the Project site (AECOM and GEI Consultants 2022). There would be no impact related to risks from surface rupture of a known fault, and no mitigation is required.

- ***Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?***

  The proposed Project would not involve the use of septic tanks or alternative wastewater disposal systems. No impacts would occur, and no mitigation is required.

Hazards and Hazardous Materials

- ***Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?***

  Project construction activities would require the transport and use of standard construction equipment and materials, some of which may include a hazardous component such as transport and storage of fuels. These activities would be conducted in compliance with existing federal, State, and local regulations.

  Daily Project operations would not involve the use or transport of hazardous materials. The Project site is located near several major transportation facilities and arterials, including East Santiago Canyon Road/East Chapman Avenue, Jamboree Road, SR-241, and SR-261. These roadways may be used to transport hazardous materials; however, the proposed Project would neither increase the frequency of transport, nor would it introduce hazards that would increase the likelihood for accidental release of hazardous materials into the environment. Additionally, the rehabilitation and replacement of the Santiago Creek Dam outlet works and spillway facilities as well as embankment improvements would not require any new or additional chemical storage or transport beyond existing operational activities. As such, a less than significant impact related to the transport, use, or disposal of hazardous materials or the release of hazardous materials into the environment would occur.

- ***Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?***

  Construction of the Project would involve the use of common hazardous materials such as gasoline, oil, paints, thinners, solvents, acids, curing compounds, grease, and other chemicals that could pose risks to construction workers or lead to soil and groundwater contamination, if not properly stored, used, or disposed. Standard construction practices would be observed such that any materials released are appropriately contained and remediated as required by local, State, and federal law. These materials are common to typical construction activities, and compliance with existing hazardous material regulations on the storage, use, and disposal of hazardous materials at construction sites would prevent hazards to the public or environment through reasonably foreseeable upset or accident conditions.

  The proposed Project includes abandonment of the existing Santiago Creek Dam outlet tower and construction of a new inclined outlet structure located on the left abutment of the existing dam, embankment improvements to the dam crest, and structural improvements to the dam spillway; this Project would not substantially change the nature of the existing facilities. As such, a less than significant impact related to the release of hazardous materials into the environment would occur.

- ***Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?***

  The nearest schools to the proposed Project site include Santiago Canyon Community College, located approximately 2 miles northwest of the Project site and Chapman Hills Elementary School, located approximately 2.5 miles west of Project site. Temporary construction activities may require the use of materials listed as hazardous; however, these materials would be routine construction materials and would not be required in large

quantities. Therefore, the potential impacts associated with the transport and use of hazardous materials during construction would be less than significant, and no mitigation is required.

- ***For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the Project area?***

  The Project site is not located within an adopted Airport Land Use Plan or in the vicinity of a private airstrip, heliport, or helistop. The nearest airport is John Wayne Airport, located approximately 10.8 miles southwest of the Project site. The Project would be located outside the John Wayne Airport influence area and would not expose additional people to safety hazards related to airport operations. Implementation of the proposed Project would not impact the airport facilities or their operation; no mitigation would be required.

- ***Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?***

  Construction of the proposed Project is not anticipated to physically interfere with an adopted emergency response plan or evacuation plan because all construction activities and staging areas would be within the boundaries of the existing Santiago Creek Dam. Implementation of the proposed Project would not alter traffic conditions or modify the local or regional circulation system. Additionally, should an emergency occur at the proposed Project site, the internal street systems would provide access to the outlying arterial roadway system. Therefore, no impacts related to the adopted emergency response or evacuation plans would occur, and no mitigation is required.

Land Use and Planning

- ***Physically divide an established community?***

  As discussed in Section 3.2, Project Location, Santiago Creek Dam is located at the north end of Irvine Lake. The closest residential uses are located approximately 1.8 miles from the Project site. Implementation of the proposed Project would not divide an established community. No impact would occur, and no mitigation is required.

Mineral Resources

- ***Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?***

  According to the California Department of Conservation, Division of Mines and Geology, the Project site is located within Mineral Resource Zones (MRZ)-1, MRZ-2, and MRZ-3 (CGS 1995). The State Geologist classifies these MRZs based on the following factors: (1) MRZ-1 are areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exhibits for their presence; (2) MRZ 2 are areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence; and (3) MRZ-3 are areas containing mineral deposits the significance of which cannot be evaluated from available data. As stated previously, the proposed Project involves abandonment of the existing Santiago Creek Dam outlet tower and construction of a new inclined outlet structure located on the left abutment of the existing dam in addition to embankment improvements to the dam crest and structural improvements to the dam

spillway. The Santiago Creek Dam is an existing structure, and proposed improvements would be limited to the existing development footprint. Therefore, impacts to mineral resources would be less than significant, and no mitigation is required.

- ***Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?***

  As discussed above, the Project site is located within MRZ-1, MRZ-2, and MRZ-3 (CGS 1995). The proposed Project involves abandonment of the existing Santiago Creek Dam outlet tower and construction of a new inclined outlet structure located on the left abutment of the existing dam in addition to embankment improvements to the dam crest and structural improvements to the dam spillway. The Santiago Creek Dam is an existing structure, and proposed improvements would be limited to the existing development footprint. Therefore, impacts to mineral resources would be less than significant, and no mitigation is required.

Noise

- ***For a project located within an airport land use plan or, where such plan has not been adopted, within two miles of a private or public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?***

  The Project is not located within an Airport Land Use Plan area or in the vicinity of a private airstrip or heliport, and it would not expose people to excessive noise levels associated with airport operations or aircraft travel. The closest airport to the Project site is John Wayne Airport, located more than 10 miles southwest of the Project site. No impacts would result, and no mitigation is required.

Population and Housing

- ***Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?***

  The proposed Project would involve abandonment of the existing Santiago Creek Dam outlet tower and construction of a new inclined outlet structure located on the left abutment of the existing dam in addition to embankment improvements to the dam crest and structural improvements to the dam spillway. Implementation of the Project would not increase employment and population in the area; therefore, the Project would not result in either direct or indirect population growth. No impacts would occur, and no mitigation is required.

- ***Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?***

  The proposed Project would involve abandonment of the existing Santiago Creek Dam outlet tower and construction of a new inclined outlet structure located on the left abutment of the existing dam, structural improvements to the dam spillway, and improvements to the dam embankment. The Project would not displace existing housing or population, resulting in construction of replacement housing elsewhere. Therefore, no impacts would occur, and no mitigation is required.

2.4.3 EIR REVIEW AND APPROVAL PROCESS

This Draft EIR was prepared under the direction and supervision of IRWD and will be circulated for a 45-day public review and comment period, as mandated by the CEQA Guidelines (14 CCR 15105). At any time during the public review period, written comments concerning the adequacy of the document can be submitted by interested public agencies and members of the public to:

Irvine Ranch Water District
Water Resources & Policy Department
Attention: Fiona Sanchez
15600 Sand Canyon Avenue
Irvine, California 92618
Email: sanchezf@irwd.com

After the public review comment period, written responses to all written comments received during the public review period pertaining to environmental issues will be prepared as part of the Final EIR. As required by CEQA, responses to comments submitted by responsible public agencies will be distributed to those agencies for review at least ten days prior to consideration of the Final EIR by the IRWD Board of Directors. A public hearing before the IRWD Board of Directors will be held to consider the Project and the adequacy of the Final EIR, at which time public testimony will be received.

The IRWD Board of Directors is the decision-making body for the Project. The Board of Directors will consider whether to certify the Final EIR and to adopt findings relative to the Project's environmental effects. It will then consider whether to approve or deny the Project.

2.5 PROJECT HISTORY

As indicated above, an NOP of the Draft EIR for the Project was distributed on May 4, 2023, to the State Clearinghouse and other public agencies for the required 30-day review and comment period. Subsequently, a Scoping Meeting was held on May 16, 2023, to facilitate agency public review and comment on the Project.

2.6 PLANNING CONTEXT

2.6.1 ON-SITE GENERAL PLAN AND ZONING DESIGNATIONS

The proposed Project site has a General Plan designation of Open Space (OS) and a zoning designation of General Agricultural (A1), both of which are consistent with the existing uses on the Project site (County of Orange 2024, 2015). The OS General Plan designation provides for limited land uses that do not require a commitment of significant urban infrastructure. The Project site is also within an Open Space Reserve (OSR) overlay. The OSR designation is intended to reflect the Resources and Recreation Elements of the General Plan. It identifies major parks, beaches, forests, harbors, and other territory that is to remain open space. It may also include recreational trails and similar facilities for alternative transportation. Since the proposed Project does not include changes to the existing land use or zoning designations and would not change the character or existing uses of the Project site, the proposed Project is considered to be consistent with both the Land Use Element of the County's General Plan and the County's Zoning Ordinance.

2.6.2 SURROUNDING GENERAL PLAN AND ZONING DESIGNATIONS

County of Orange General Plan designations in the vicinity of the Project site include Open Space and Open Space Reserve to the north and west; Public Facilities to the northwest; Open Space Reserve and Landfill Site (LS) to the south; Open Space Reserve and Rural Residential (0.25–0.5 dwelling unit [DU]/acre [ac]) to the east; and Rural Residential (0.25–0.5 DU/ac) and Suburban Residential (0.5–18 DU/ac) to the southeast of the Project site.

2.7 ENVIRONMENTAL SETTING

The Project site is located on the U.S. Geological Survey's (USGS') Black Star Canyon 7.5-minute quadrangle. It is within the Santa Ana Watershed. The drainage area for the Project encompasses approximately 63.4 square miles. Irvine Lake (also called the Santiago Creek Reservoir) was originally constructed in 1931 to store water for the benefit of the surrounding communities.

The Santiago Creek Dam is a compacted earthfill embankment completed in 1933 that is under the jurisdiction of the State of California, Department of Water Resources, Division of Safety of Dams. Santiago Creek Dam impounds Irvine Lake, a critical water supply reservoir for IRWD. The reservoir provides flood control, water supply, fisheries enhancement, and recreational opportunities for the surrounding area. The existing silt level within the lake varies throughout the lake; however, it is estimated that the accumulated sediment occupies approximately 2,150 acre-feet of the lake to date.

The outlet works for the dam consists of a tower, an outlet conduit, and a downstream control house. A concrete-encased welded steel pipe outlet conduit is located at the base of the outlet tower and runs beneath the dam to the toe of the dam where a bifurcation splits the flow into a main pipe and diverter pipe. The main pipe supplies water to IRWD.

The existing spillway is a reinforced concrete structure located on the left abutment of the dam and consists of an approach, control structure, chute, and flip bucket at the downstream end. The spillway has vertical reinforced concrete walls through the length and a bridge structure with piers at the spillway crest. The spillway crest is located at elevation 791.9 feet. Historical records of spillway flows at Santiago Creek Dam indicate that the spillway has flowed 24 times between 1937 and 2019 (82 years). The downstream end of the spillway was extensively modified in 1969 and 1970 after sustaining significant damage during a February 1969 flood event. The damaged spillway channel and spillway chute were removed (up to spillway Station [Sta.] 2+85.44) and a new flip bucket was constructed at the end of the existing spillway chute. Surrounding land uses primarily consist of undeveloped open space. Irvine Regional Park is located northwest of SR-241; Limestone Canyon Regional Park is located south of Santiago Canyon Road; and Oak Canyon Park is located at the southeast end of Irvine Lake. The closed Santiago Canyon Landfill is located adjacent to and west of Irvine Lake. Residential development is located west of and across SR-241 from Irvine Lake.

Irvine Lake was created by constructing a dam across Santiago Creek. Santiago Creek is a blueline stream which enters Irvine Lake from the east and continues downstream of the dam flowing north and then west, ultimately reaching the Santa Ana River. It has a relatively broad floodplain above and below the dam. The slopes around the western and northern portions of the lake are relatively steep while the areas to the southeast and east are relatively flat. Three unnamed blueline streams enter the lake from the north and eight unnamed blueline streams enter the lake from the west, southeast, and south. One unnamed blueline stream enters the Project site in the northwest, downstream of the Dam, while Fremont Canyon Creek merges with Santiago Creek downstream of the Project site. Elevations in the Project site range from approximately 657 to 996 feet above mean sea level.

The Project site is located in the Central/Coastal Subregion of the Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP). Santiago Dam and its associated structures are located within designated "Non-Reserve Open Space", while Habitat Reserve and Conservation Easements surround the lake; a Special Linkage is located southeast of the lake. The purpose of this plan is to provide regional protection and recovery of multiple species and habitat while allowing compatible land use and appropriate development. IRWD[1] is a participating jurisdiction and, as such, will comply with the terms of the NCCP/HCP Implementation Agreement (IA). The following vegetation types occur in the survey area: sagebrush scrub, disturbed sagebrush scrub, sagebrush-coyote bush scrub, southern cactus scrub, disturbed southern cactus scrub, disturbed floodplain sage scrub, toyon-sumac chaparral, annual grassland, ruderal, riparian herb, southern willow scrub, mulefat scrub, disturbed mulefat scrub, southern sycamore riparian woodland, southern sycamore-coast live oak riparian woodland, southern black willow forest, disturbed southern black willow forest, southern black willow forest/riparian herb, coast live oak woodland, and western sycamore, and vegetated fluctuating shoreline. Other landcover includes cliff, open water, fluctuating shoreline, perennial stream, ornamental, developed, and disturbed areas.

2.8 ORGANIZATION OF THE DRAFT EIR

This EIR is organized into eight sections, each containing its own references section. A list of the EIR sections and a brief description of their contents is provided below to assist the reader in locating information.

- **Section 1.0, Executive Summary:** This section provides summaries of the Project Description, alternatives to the proposed Project, environmental impacts, and mitigation measures.
- **Section 2.0, Introduction, Project History, and Setting:** This section briefly discusses the purpose of the EIR, describes the environmental review process, describes the environmental setting of the Project, and gives an overview of the EIR's organization.
- **Section 3.0, Project Description:** This section provides a detailed description of the Project characteristics and a statement of the Project Objectives.
- **Section 4.0, Existing Conditions, Impact Analysis, Cumulative Impacts, and Mitigation Program:** This section contains subsections 4.1, Aesthetics, through 4.17, Wildfire. Each subsection includes discussions on the following topics: regulatory setting (if applicable), methodology, existing conditions, thresholds of significance, impact analysis, cumulative impacts, mitigation program (if any), level of significance after mitigation, and references.
- **Section 5.0, Alternatives:** This section considers four alternatives to the proposed Project, including the No Project Alternative. The alternatives were developed to mitigate or avoid the significant effects the Project may have on the environment. In addition, this section identifies the environmentally superior alternative.
- **Section 6.0, Long-Term Implications:** This section contains a summary discussion of issues such as the balance of long-term versus short-term impacts; potential growth-inducing impacts; a discussion of energy (electricity and natural gas) in accordance with Appendix F of the CEQA Guidelines; and any significant irreversible environmental changes that would be caused by the Project.

[1] The Santiago Canyon Water District (SCWD) was also a participating jurisdiction in the NCCP/HCP. The SCWD consolidated with IRWD in 2006.

- **Section 7.0, Persons and Organizations Consulted:** This section lists the persons and organizations that were contacted to obtain data on the preparation of this EIR.
- **Section 8.0, Preparers:** This section lists the persons that directly contributed to preparation of this EIR.

2.9 REFERENCES

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SECTION 3.0 PROJECT DESCRIPTION

3.1 PURPOSE OF THE PROJECT DESCRIPTION

The purpose of the project description is to describe the proposed Project in a way that allows for meaningful review by the public, reviewing agencies, and decision makers. Section 15124 of the CEQA Guidelines requires that the project description for an EIR contain: (1) the precise location and boundaries of a proposed project; (2) a statement of objectives sought by the proposed project including the underlying purpose of the project; (3) a general description of the project's technical, economic, and environmental characteristics; and (4) a statement briefly describing the intended uses of the EIR, including a list of the agencies that are expected to use the EIR in their decision making; a list of the permits and other approvals required to implement the project; and a list of related environmental review and consultation requirements required by federal, State, or local laws, regulations, or policies. An adequate project description need not be exhaustive but should supply the detail necessary for evaluation of the Project.

An EIR is the most comprehensive form of environmental documentation identified in CEQA and the CEQA Guidelines. The following project description provides the information needed to assess the environmental effects associated with the development, construction, and operation of the proposed Project.

3.2 PROJECT LOCATION

Santiago Creek Dam is located at the northwest end of Irvine Lake in unincorporated Orange County, California. The Project is south of State Route (SR) 261 and east of SR-241 and Santiago Canyon Road. Existing structures include the embankment dam, outlet tower in Irvine Lake, spillway channel, flashboard storage shed, control house/outlet works, energy dissipater structure, dam keeper's house, a portion of the Irvine Lake pipeline (ILP), and dam access road. The regional and local vicinity of the Project site is depicted on Exhibit 1-1 Regional Location, and Exhibit 1-2 Aerial Photograph, respectively.

The Project site is located on the U.S. Geological Survey's (USGS') Black Star Canyon 7.5-minute quadrangle map. It is within the Santa Ana Watershed. The drainage area for the Project encompasses approximately 63.4 square miles. Irvine Lake (named the Santiago Creek Reservoir by the USGS) was originally constructed in 1931 to store water for the benefit of the surrounding communities.

Irvine Lake was created by constructing a dam across Santiago Creek. Santiago Creek, a named blueline stream, enters Irvine Lake from the east and continues downstream of the dam flowing north and then west, ultimately reaching the Santa Ana River. It has a relatively broad floodplain above and below the dam. The slopes around the western and northern portions of the lake are relatively steep while the areas to the southeast and east are relatively flat. Three unnamed blueline streams enter the lake from the north and eight unnamed blueline streams enter the lake from the west, southeast, and south. One unnamed blueline stream enters the Project site in the northwest, downstream of the dam, while Fremont Canyon Creek enters downstream of the Project site. Elevations on the Project site range from approximately 657 to 996 feet above mean sea level.

Surrounding land uses primarily consist of undeveloped open space. Irvine Regional Park is located northwest of SR-241; Limestone Canyon Regional Park is located south of Santiago Canyon Road; and Oak Canyon Park is located at the southeast end of Irvine Lake. The closed Orange County Waste and Recycling (OCWR) Santiago Canyon Landfill Facility is located

adjacent to the west of Irvine Lake. Residential development is located west of SR-241, with the closest residence located approximately 1.8 miles away.

The Project is within the Santa Ana Watershed (Hydrologic Unit Code 18070203). The drainage area for the Project encompasses approximately 63.4 square miles.

The following vegetation types occur in the survey area: sagebrush scrub, disturbed sagebrush scrub, sagebrush-coyote bush scrub, southern cactus scrub, disturbed southern cactus scrub, disturbed floodplain sage scrub, toyon-sumac chaparral, annual grassland, ruderal, riparian herb, southern willow scrub, mulefat scrub, disturbed mulefat scrub, southern sycamore riparian woodland, southern sycamore-coast live oak riparian woodland, southern black willow forest, disturbed southern black willow forest, southern black willow forest/riparian herb, coast live oak woodland, and western sycamore. Other landcover includes cliff, open water, fluctuating shoreline, vegetated fluctuating shoreline, perennial stream, ornamental, developed, and disturbed areas.

3.3 PROJECT BACKGROUND

Irvine Ranch Water District (IRWD) owns and operates Irvine Lake and the Santiago Creek Dam that serves as a critical water supply reservoir for IRWD's service area. The Santiago Creek Dam impounds water for Irvine Lake from the Santiago Creek, local storm water runoff, and raw water from the Metropolitan Water District of Southern California (MWD) and serves as a domestic and non-potable water supply for various cities in Orange County.

Irvine Lake is a reservoir of untreated water located east of Irvine Regional Park. The Lake's capacity is currently approximately 24,000 acre-feet (AF) but it can hold an additional 2,700 AF when flash boards are installed on the spillway, temporarily raising the maximum water elevation an additional 4 feet to 795.9 feet. IRWD uses water from Irvine Lake for two purposes: 1) as a source of water for non-drinking purposes, such as irrigation uses, and 2) as a source of water for the Baker Water Treatment Plant, which produces drinking water for an estimated 85,000 homes in Orange County. IRWD also provides lake water to Serrano Water District (SWD) through the Howiler Treatment Plant, which is owned and operated by IRWD to serve SWD's customers in the City of Villa Park and portions of the City of Orange. Per the terms of the Water Service Reliability Agreement executed between IRWD and SWD on December 12, 2024, IRWD can backstop and/or augment use of groundwater to enhance SWD's water supply reliability using water sourced from Irvine Lake. In the future, IRWD will construct an interconnection between SWD's and IRWD's potable system, which will allow IRWD to serve water from the Howiler Treatment Plant to IRWD customers. The construction and operation of the interconnection will be subject to separate environmental review.

Santiago Creek Dam is a compacted earthfill embankment completed in 1933 and certified by the State of California, Department of Water Resources (DWR), Division of Safety of Dams (DSOD), which identifies it as Dam No. 75-000. Santiago Creek Dam is located in Orange County, California and impounds water for Irvine Lake from the Santiago Creek, a tributary to the Santa Ana River. Santiago Creek Dam is approximately 136 feet high and 1,425 feet long. It is roughly 760 feet wide at the base and contains approximately 800,000 cubic yards of materials. IRWD has appropriative rights to the flows of Santiago Creek including a right to diversion by storage in Irvine Lake for municipal, domestic, and agricultural uses. The reservoir provides flood control, water supply, fisheries enhancement, and recreational opportunities for the surrounding area. The existing silt level varies throughout the lake; however, it is estimated that the accumulated sediment currently occupies approximately 2,150 AF of the lake.

The sources of water for the Lake are flows from Santiago Creek, local runoff captured during rainfall events and untreated (imported) water purchased from MWD. The imported water is conveyed to the Lake through MWD's Santiago Lateral Pipeline (SLP). When water is drawn from the Lake from the existing outlet tower, water is conveyed via the Irvine Lake Pipeline (ILP) to downstream customers. Exhibit 1-2 shows the location of the Project site in relation to the SLP and the ILP.

The outlet works for the dam consists of a tower, an outlet conduit, and downstream control house. The outlet works are the normal means of releasing water impounded by a dam. The tower sits above an outlet pipe or tunnel and is used to transport water out of the reservoir. The outlet conduit conveys water from the reservoir through, under, or around a dam in a controlled manner. The downstream control house contains (or houses) electrical and other equipment. A concrete-encased welded steel pipe outlet conduit is located at the base of the outlet tower and runs beneath the dam to the toe of the dam where the pipeline splits in a bifurcation valve vault to permit water to flow into a 36-inch main pipe and 30-inch diverter pipe. The main pipe supplies water to IRWD and the Howiler Water Treatment Plant. The diverter pipe can release water from the lake into the streambed immediately downstream of the control house in the event of an emergency or for dam safety purposes.

The existing dam spillway[1] is a reinforced concrete structure located on the left abutment of the dam and consists of an approach, broad crested weir control structure, chute, and flip bucket at the downstream end. The spillway has vertical reinforced concrete walls through the length and a bridge structure with piers at the spillway crest. The spillway crest is located at elevation 791.9 feet. Historical records of spillway flows at Santiago Creek Dam indicate that the spillway has flowed 24 times between 1937 and 2019 (82 years).

Irvine Lake is held at varying levels depending on the time of year. In the wet winter months, water can be stored up to the 791.9-foot elevational contour[2]. The height of the existing spillway with flashboards installed is at the 795.9-foot elevation contour; this is the current maximum capacity of the reservoir and is only permitted in the summer months. Historically, the inflow into the reservoir during storm events is high enough to cause the water to flow over the spillway crest, located at the 791.9-foot elevation, approximately once every four to five years (1937 to 2019). From October 2002 to September 2020, the reservoir has been filled to the spillway crest four times and water has been high enough to flow over the spillway twice. The water levels in the lake during this period (2002 to 2020) fluctuated between the approximately 736-foot elevation contour to the 795-foot elevation contour. Between 2002 and 2020, the longest consecutive period of time that water was stored in the upper two feet of the reservoir (i.e., 793.9 to 795.9 feet) was approximately 35 days.

3.4 PROJECT PURPOSE AND NEED

In 2012 and in collaboration with DSOD, IRWD initiated seismic evaluations of the existing outlet tower that resulted in a determination that the free-standing structure was seismically unstable (URS 2015). In 2017, IRWD initiated, at the request of DSOD, a multi-phase spillway condition assessment. The assessment found that the spillway is nearing the end of its useful life and its design, while acceptable at the time of construction, does not meet current design standards. IRWD has also conducted an assessment of seismic performance of the dam embankment and has determined that modifications to the embankment are necessary.

[1] A spillway is a structure on a dam that allows water to flow around the dam to safely release excess water from a reservoir.

[2] NAVD88 Datum is used throughout this document.

In view of the findings of the seismic evaluation of the existing outlet tower and dam embankment as well as the comprehensive assessment of the existing spillway, IRWD has elected to develop designs for an inclined outlet structure that would be placed near the left abutment of the existing dam, to modify the embankment, and to replace the existing spillway with a side-channel spillway on the left abutment as shown on Exhibit 3-1, General Arrangement Plan. The spillway crest would be raised by six feet, which is two feet higher than the top of the flashboards when installed, to regain operational storage capacity that was lost over the years due to sedimentation. The existing outlet tower would be demolished, and the new inclined outlet structure would connect to the existing outlet conduit within the reservoir. The embankment would be modified to include a filter and drain system and a new downstream shell.

3.5 PROJECT OBJECTIVES

Section 15124(b) of the CEQA Guidelines requires an EIR to contain "[a] statement of objectives sought by the proposed project. A clearly written statement of objectives helps the lead agency develop a reasonable range of alternatives to evaluate in the EIR and would aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project." Not only is a project analyzed in light of its objectives, compatibility with project objectives is one of the criteria used in selecting and evaluating a reasonable range of project alternatives. Clearly-described project objectives simplify the selection process by providing a standard against which to measure project alternatives.

The primary objective of the proposed Project is to rehabilitate and replace the Santiago Creek Dam outlet tower and spillway facilities and to modify the embankment to permit operation of the facilities for a long-term water resource benefit. In implementing the proposed Project, IRWD would also obtain the following benefits:

- Construct new facilities and dam embankment modifications that will meet or exceed the current seismic, safety, and design requirements established by the California DWR, DSOD, which is the governing State agency associated with this Project;
- Satisfy IRWD's operational requirements in the present and the future;
- Extend the useful life of the facilities;
- Improve regional water supply reliability; and
- Minimize impacts to local environmental resources and surrounding property owners.

As discussed in Section 5.0, Alternatives, the No Project Alternative (Alternative 1) would have the least impact to the environment because it would not involve any construction or demolition activities, nor would it result in any environmental impacts. This alternative would avoid potentially significant impacts, albeit mitigable, of the proposed Project associated with Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, and Tribal Cultural Resources. However, without the Project, no improvements to the dam and related facilities would occur, thus reducing the useful life of the facilities and reducing future regional water supply reliability. In addition, this alternative would not meet any of the Project objectives. When evaluating the proposed Project compared to Alternative 2, that alternative may result in reduced impacts in some areas; however, it would result in increased impacts in other areas and would not satisfy the five Project objectives identified above.

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General Arrangement Plan

Exhibit 3-1

Santiago Creek Dam Improvement Project

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3.6 PROJECT DESCRIPTION

General elements of each portion of the Project are shown on Exhibits 3-2a and 3-2b, Santiago Dam Construction Features, and discussed in detail below. The Project Description represents a conservative analysis to accommodate the range of uncertainty regarding the final design. Therefore, the quantities and measurements used throughout this section and the Draft EIR are estimates based on the best available information.

Inlet/Outlet Works

The proposed inlet/outlet works for the Santiago Creek Dam would consist of several interconnected facilities composed of the inclined inlet/outlet structure, emergency outlet pipe, ILP, bifurcation valve vault, emergency outlet valve vault, and dam control building. A general arrangement plan for the entire inlet/outlet works is shown on Exhibit 3-3, Inlet/Outlet Works General Arrangement Plan.

Inlet/Outlet Structure

The existing outlet tower would be demolished, with the portion of the tower located below the sediment filled with concrete and capped with a concrete plug or completely removed. A new inclined outlet structure would consist of a series of inclined concrete footings with metal platforms to be constructed on the left abutment of the dam and an approximately 54-inch steel pipe inclined along the slope that would act as the conveyance pipe for water into and out of the reservoir. The entirety of the concrete footings and concrete-encased steel pipe would be situated in firm bedrock and anchored to the slope by drilled foundation anchors to resist sliding and overturning of the structure.

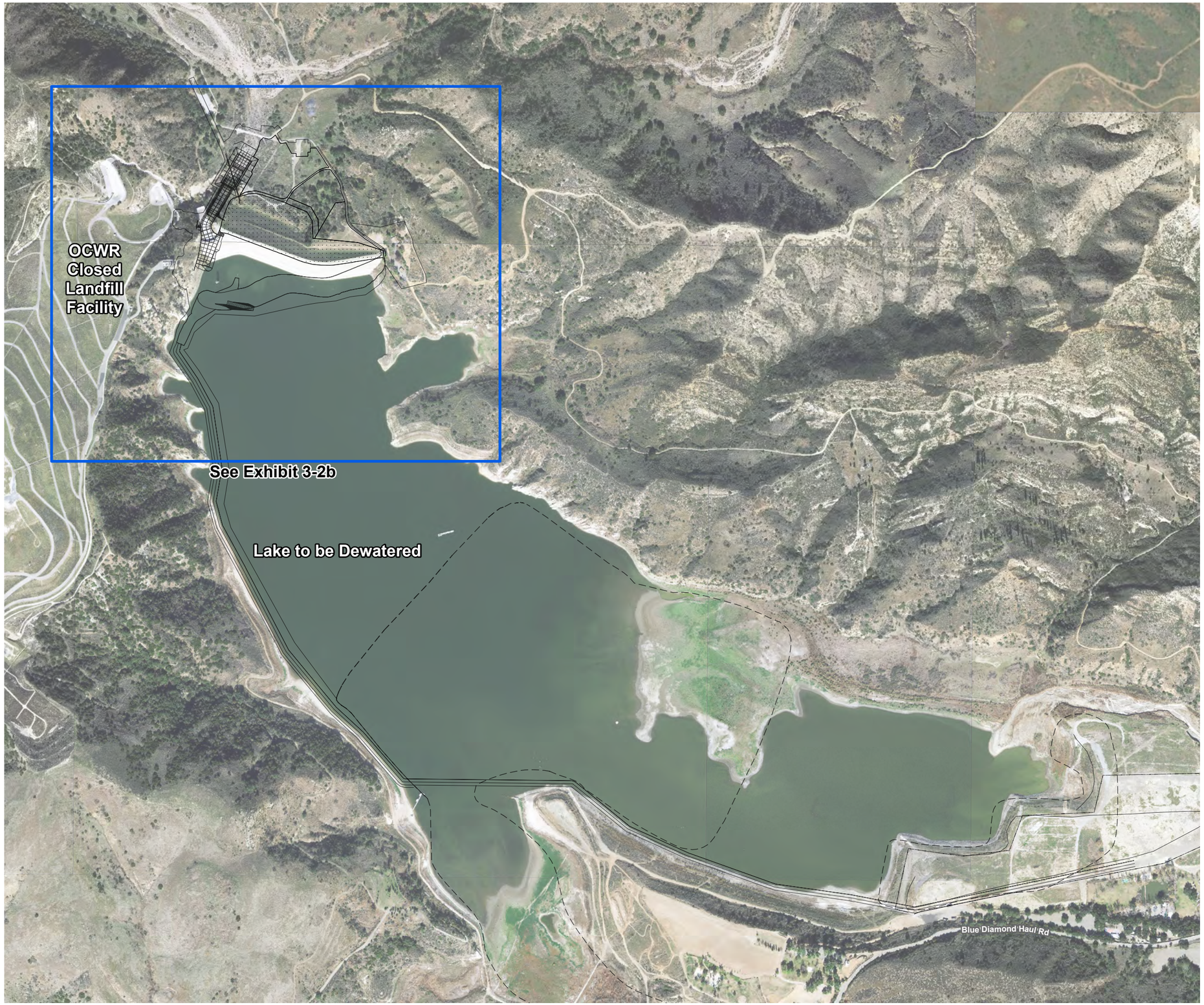
Each platform location would contain an approximately 30-inch steel riser pipe extending vertically from the inclined 54-inch steel pipe that would act as an intake for reservoir water into the 54-inch pipe. Each riser from the structure would include an intake fish screen. A plan and profile arrangement of the proposed inclined inlet/outlet structure is shown on Exhibit 3-4, Conceptual Inlet/Outlet Structure Plan and Profile.

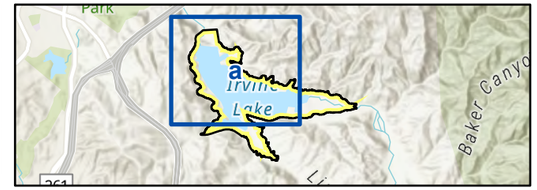
The proposed inclined inlet/outlet structure would be configured to incorporate the new outlet structure, including new valves and fittings. Water from the lake would enter the new inclined inlet/outlet structure and would convey lake water through an existing conduit under the dam. At the downstream toe of the dam, a new fitting would be installed to bifurcate the flow to the ILP or the emergency outlet pipeline. Water that enters the ILP would reach IRWD's distribution system. Water that enters the emergency outlet pipeline would be released to the creek near the end of the new spillway.

Intake Risers and Platforms

The proposed inclined inlet/outlet structure would consist of seven approximately 30-inch riser pipes spaced in approximately 10-foot vertical increments down the cut slope from approximately the 780-foot elevation contour to the 720-foot elevation contour. This spacing provides IRWD with operational flexibility by allowing water to be drawn from the reservoir at different depths depending on the water quality in the reservoir and other operational considerations.

Each riser pipe would be outfitted with an approximately 36-inch-diameter intake fish screen with an approximately 30-inch-diameter outlet that would act to inhibit debris, silt, and aquatic life from entering the 36-inch steel pipe. At each riser location, a metal platform consisting of stainless-steel posts, beams, grating, and guardrail would provide maintenance access when the reservoir





Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Santiago Dam Construction Features

Exhibit 3-2a

Santiago Creek Dam Improvement Project

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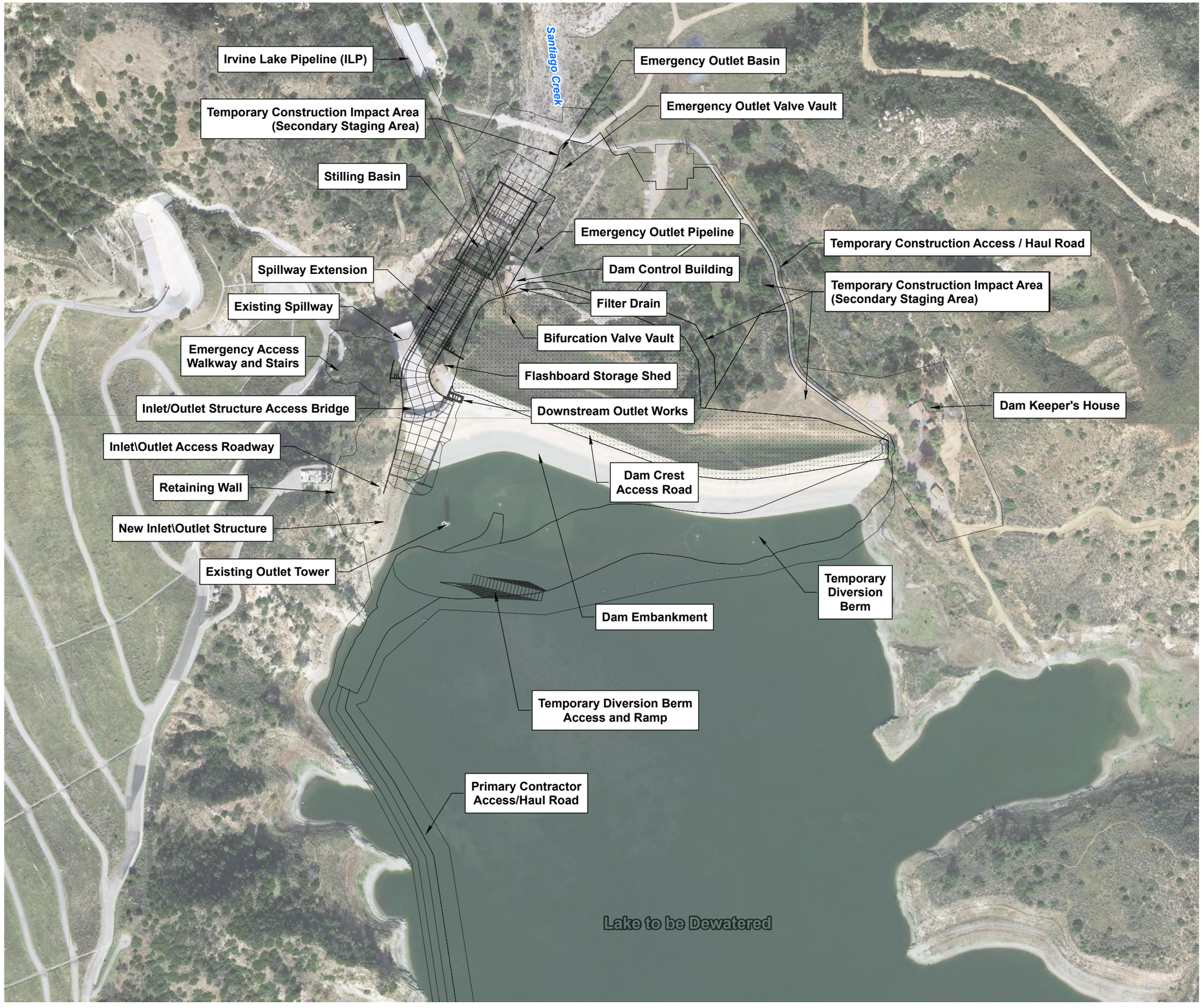

Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Santiago Dam Construction Features

Exhibit 3-2b

Santiago Creek Dam Improvement Project

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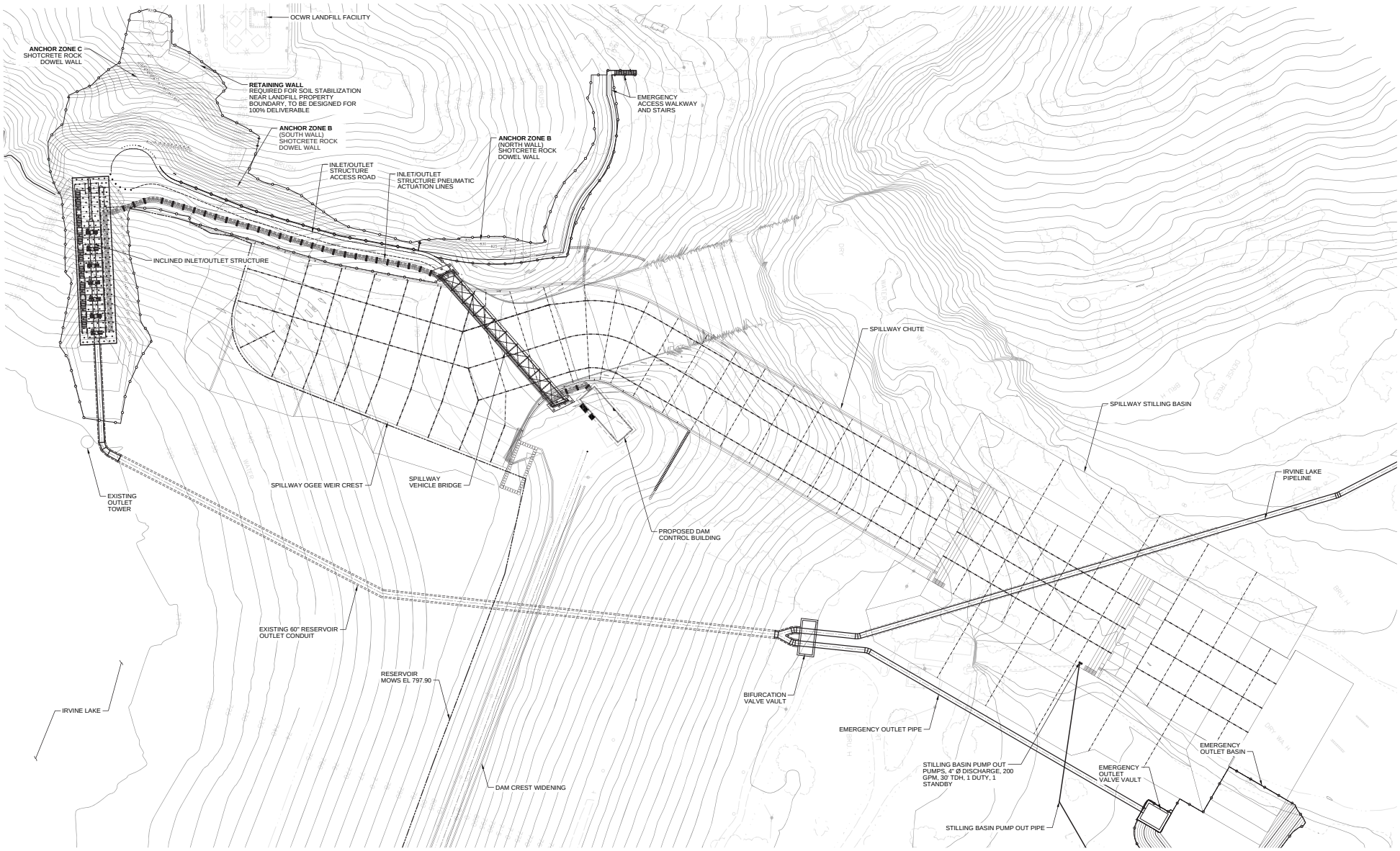

Source: AECOM and Irvine Ranch Water District, 2023

Inlet/Outlet Works General Arrangement Plan

Exhibit 3-3

Santiago Creek Dam Improvement Project

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Map not to scale

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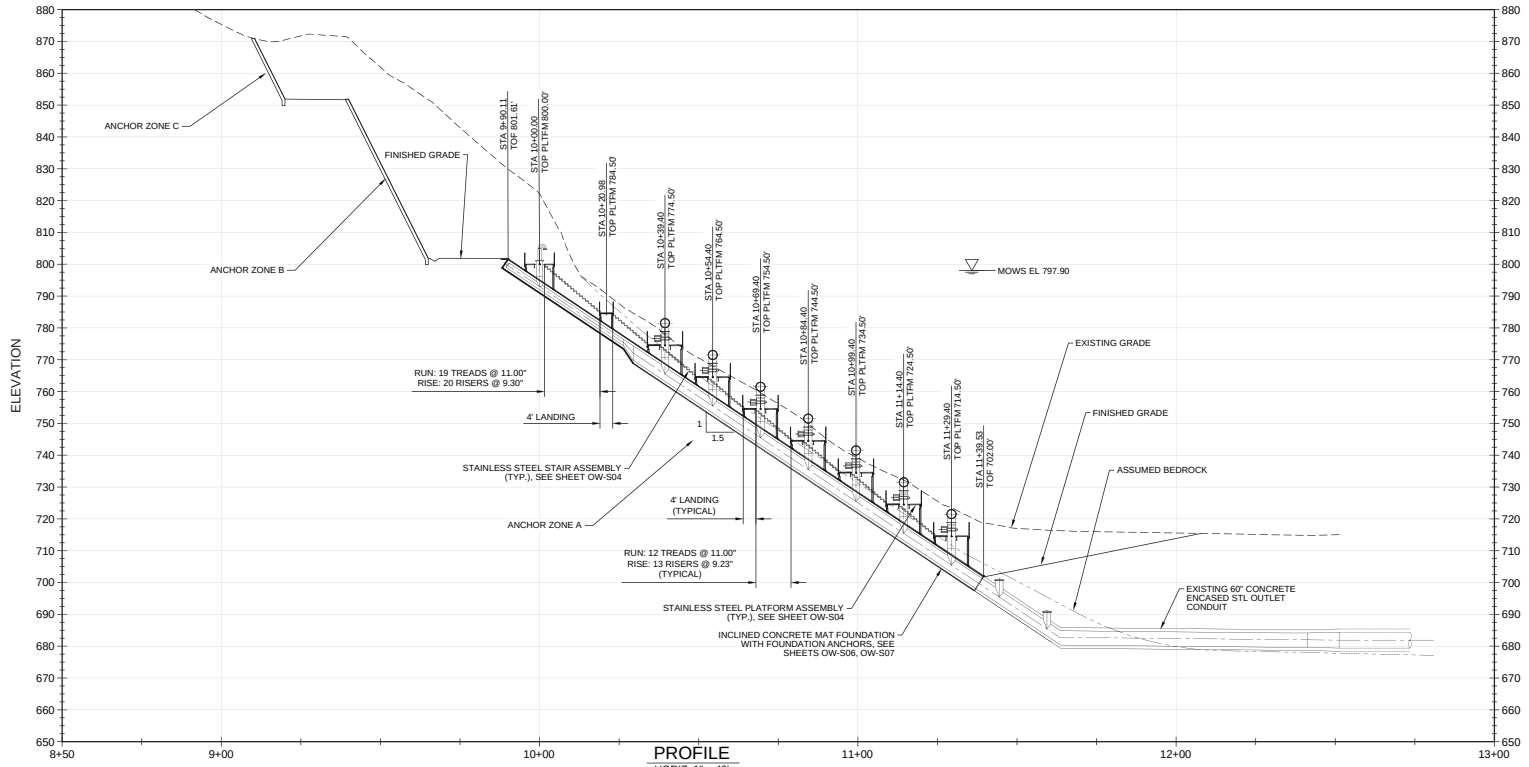
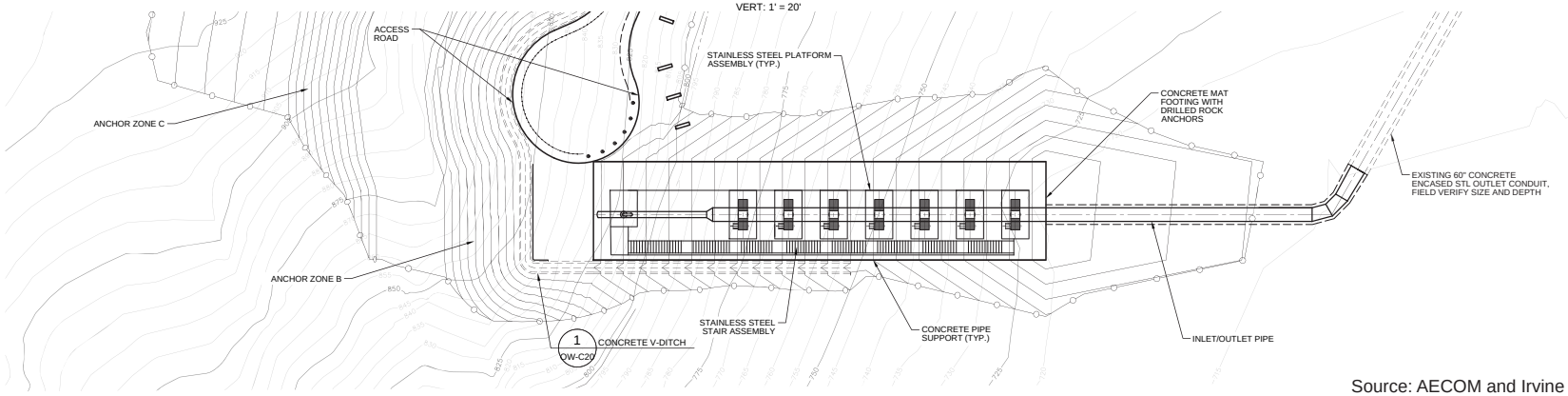


PROFILE
HORIZ: 1" = 40'
VERT: 1' = 20'



Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Inlet/Outlet Structure Plan and Profile

Exhibit 3-4

Santiago Creek Dam Improvement Project

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Map not to scale

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is drawn down. A metal stairway consisting of stringers, posts, handrail, and stair treads would also be provided to connect the individual platforms.

Downstream Outlet Works

Bifurcation Valve Vault

A new bifurcation valve vault would be constructed near the terminus of the new spillway structure to direct flow either to the ILP or Santiago Creek. Access to the interior of the vault would be through an access hatch and metal ladder with appropriate safety measures. Inside the vault would be two approximately 54-inch valves. One valve would direct flow to the downstream ILP, while the other valve would direct flow to the emergency outlet pipe. A conceptual layout of the bifurcation valve vault is illustrated on Exhibit 3-5, Conceptual Valve Vault Plan and Sections. The exact location would be determined based on final design within the Project boundary.

Emergency Outlet Valve Vault

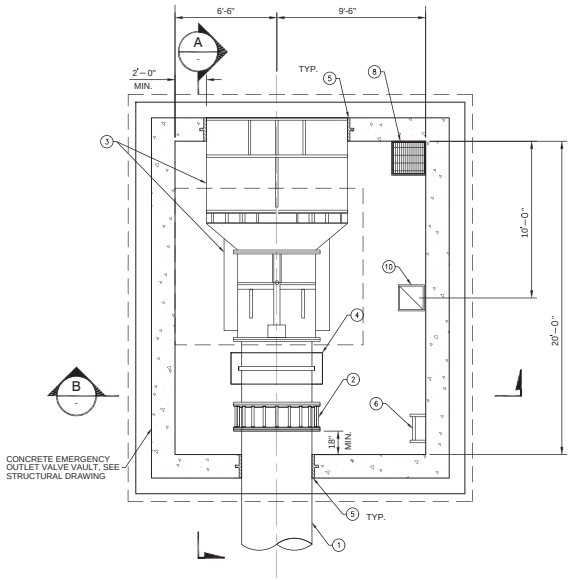
The proposed emergency outlet pipe would terminate at the emergency outlet valve vault to be located near the end of the proposed energy dissipater basin for the new spillway structure as described below. The emergency outlet facility would include a means to control flow and dissipate energy as water is released into Santiago Creek. Erosion control measures would be implemented to minimize the potential for erosion in the creek. The vault would contain an approximately 54-inch fixed-cone valve with discharge hood that would dissipate the energy of the high-velocity emergency discharge flow prior to release into the existing Santiago Creek. The proposed layout of the emergency outlet valve vault is illustrated on Exhibit 3-6, Conceptual Emergency Outlet Valve Vault Plan and Sections.

Spillway

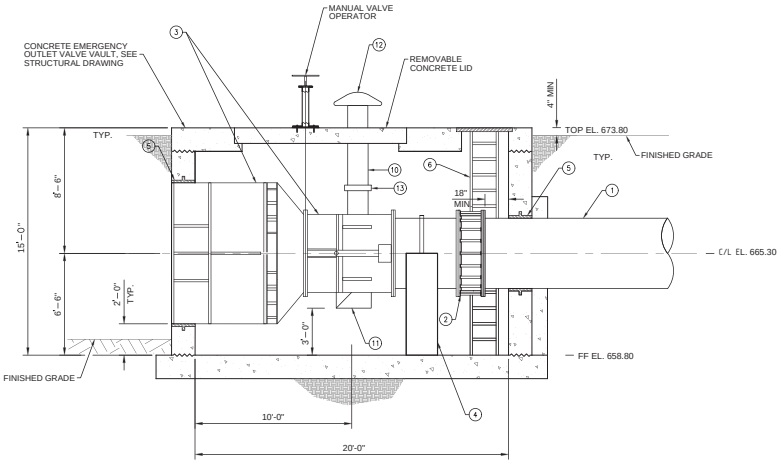
In addition to the modifications to the existing outlet works, the existing spillway would be demolished and replaced with a new side-channel spillway in a rock cut on the left abutment of the dam. The proposed replacement consists of three components: a concrete side-channel control structure, a concrete-lined rectangular chute, and a downstream stilling basin for energy dissipation. The overall length of the replacement spillway structure would be approximately 930 to 1,100 feet. The proposed layout of the spillway is illustrated on Exhibit 3-7, Conceptual Spillway General Arrangement.

The side-channel control structure would consist of a crest control structure, left and right tieback walls, and reinforced concrete slab. The spillway control structure would consist of an approximately 350-foot-long ogee weir with a crest at an approximate elevation of 797.9 feet. The long side of the weir would be approximately 260 feet long and generally perpendicular to the embankment, while the short side of the weir would be approximately 90 feet long and generally parallel to the embankment. The long side and short side would be joined by an approximately 50-foot-radius curve. The weir structure has an ogee-shaped cross section and, due to the longer weir length required to pass the probable maximum flood (PMF)[3] at an approximate elevation of 797.9 feet, the weir would extend into the reservoir in an L-shaped alignment. This alignment was selected as a result of several constraints at the site including the footprint of the dam embankment, the location of the sloped outlet structure, and the steeply sloped hillside along the left abutment.

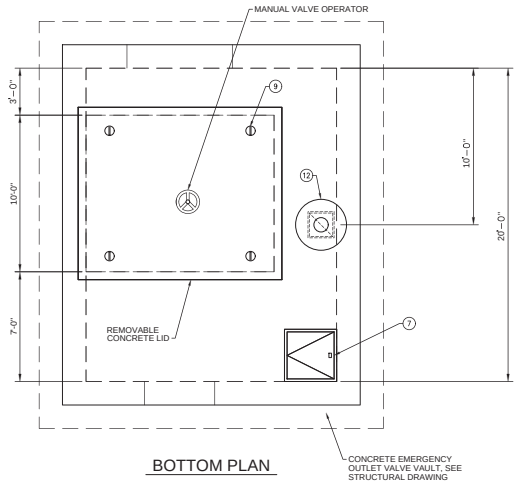
[3] The Probable Maximum Flood (PMF) is a hypothetical flood event. The definition of the PMF is a flood that can be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in a region.



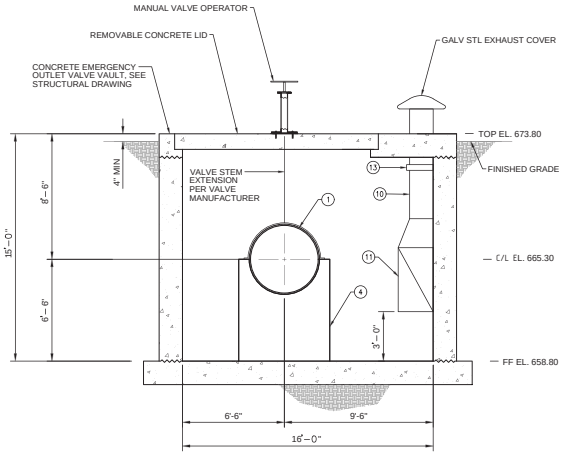
TOP PLAN



SECTION A



BOTTOM PLAN



SECTION B

CONSTRUCTION NOTES (DRAFT)

1. 54" CML&C STL EMERGENCY OUTLET PIPE, T=3/8", EXTEND MORTAR COATING MIN. 3" INSIDE VAULT
2. 54" DISMANTLING COUPLING
3. 54" FIXED CONE VALVE WITH 108" DISCHARGE HOOD
4. CONCRETE CRADLE SUPPORT PER DETAIL 1 SHEET OW-M05
5. WALL PENETRATION PER DETAIL 2 AND 3 SHEET OW-M05
6. METAL ACCESS LADDER WITH SAFETY POST PER DETAIL 8, SHEET OW-S13 IN ACCORDANCE WITH IRWD SPEC 05120
7. 36" SQ ACCESS HATCH, ALUMINUM CHECKER PLATE, DOUBLE LEAF, CHANNEL FRAME, SPRING ASSISTED, HINGED, RECESSED LOCKING, PEDESTRIAN RATED
8. 14" SQUARE X 18" DEEP CONCRETE SUMP WITH FIBERGLASS GRATE AND FRAME AND SUMP PUMP PER IRWD STD DWG G-6, TYPE 2
9. LIFTING LUG PER DETAIL 5 SHEET OW-M05
10. 12" SQ GALV STL EXHAUST AIR DUCTING
11. 2,400 CFM CENTRIFUGAL, DIRECT DRIVE, INLINE, EXHAUST FAN EF-3 (SEE ELECTRICAL SHEET E-06), MODEL SQ-12-M2-VG, 1.25 IN. W.G., 2 HP, 208V, 3PH, 60HZ
12. GALV STL EXHAUST COVER
13. DUCT SUPPORT
14. FOUNDATION SUBGRADE PREPARATION PER SPECIFICATION 02201

Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Emergency Outlet Valve Vault Plan and Sections

Exhibit 3-6

Santiago Creek Dam Improvement Project

PSOMAS

Map not to scale

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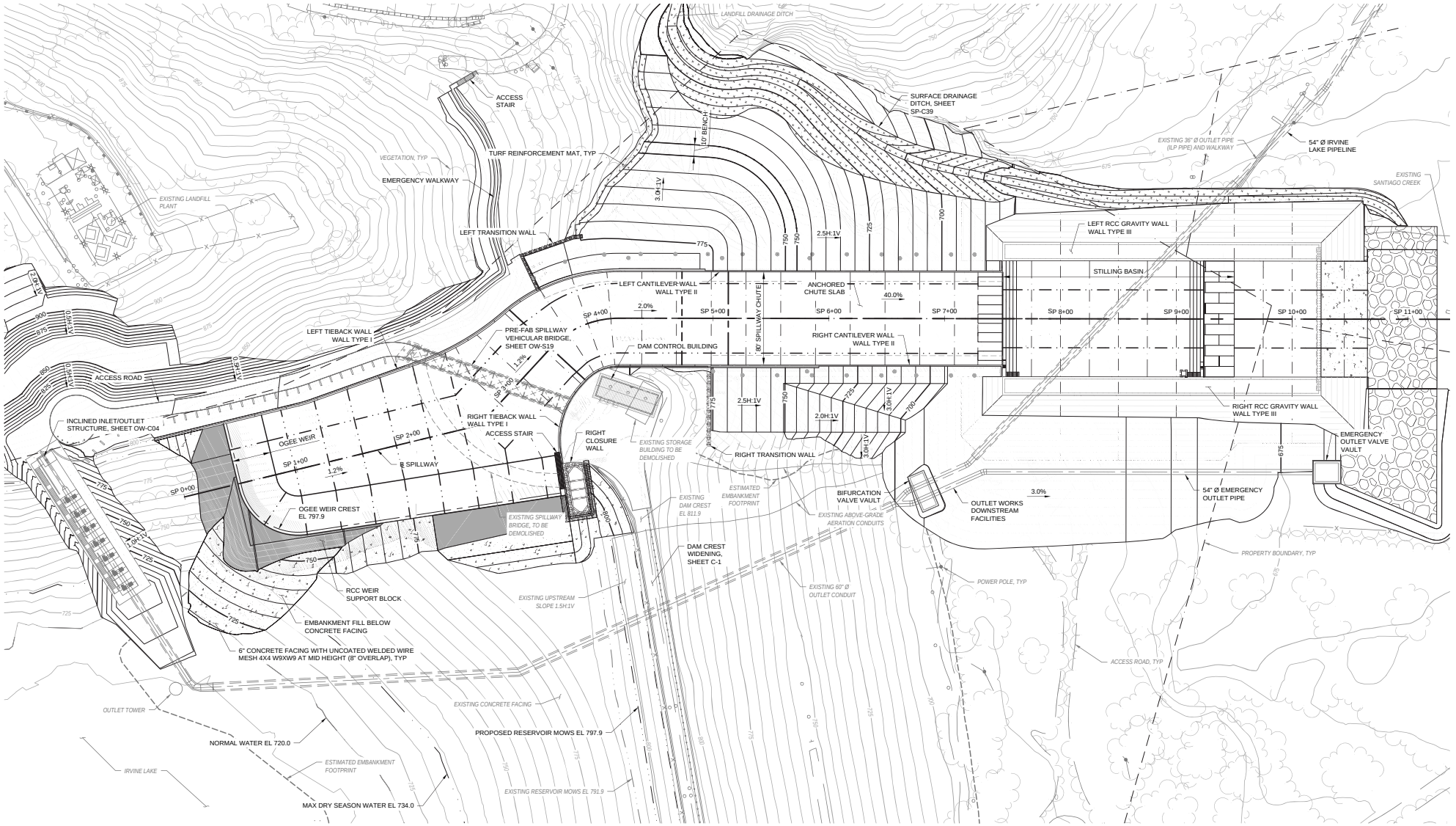

Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Spillway General Arrangement

Exhibit 3-7

Santiago Creek Dam Improvement Project

Map not to scale

PSOMAS

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To ensure the spillway structure is constructed on sound foundational material, many areas under the spillway structure would include the placement of roller compacted concrete (RCC). Placement of RCC would vary depending on the geologic conditions exposed during construction, but the majority of the spillway foundation is expected to receive RCC treatment. In addition, the floor of the spillway would be anchored into bedrock materials. This includes drilling, grouting, post-tensioning and securing the anchors into the spillway slab.

The spillway chute is reinforced concrete and has a rectangular cross section with a bottom width that varies between approximately 80 feet and 128 feet and a total length of approximately 300 to 500 feet. The spillway chute varies in slope from approximately 2 percent slope from the end of the side-channel control structure to an approximately 35 to 45 percent slope, where the stilling basin begins. The chute walls consist of two wall types: tieback and cantilever.

The stilling basin consists of an approximately 100-foot-long section with a vertical drop of approximately 10 to 15 feet, five baffle blocks, and an approximately 150- to 200-foot-long flat section before discharging to a concrete and riprap apron. The walls of the spillway structure range in height from approximately 40 feet to 60 feet high and consist of tieback walls and RCC walls. At the end of the stilling basin, a scour protection cutoff is provided for additional mitigation of head cutting that may occur during significant discharges.

During construction, concrete crushing would occur in one of the staging areas, which may include the primary staging area as shown on Exhibit 3-8, Conceptual Primary Contractor Staging Area Plan. Concrete crushing would be expected to occur intermittently for approximately three weeks during the demolition phase of the Project but may also occur at various stages of the Project as concrete is removed from the existing spillway or dam. When feasible, demolished and removed materials would be recycled or reused.

Pipelines

The existing ILP travels over Santiago Creek and is supported on piers. Historically, this pipeline has washed out during high flow events through the spillway and Santiago Creek. As part of the Project, approximately 1,000 linear feet of the ILP near the dam would be upsized from 36 inches to approximately 54 inches to match the inlet/outlet pipeline coming from the inclined inlet/outlet structure, as well as to increase the capacity of the line and to improve the hydraulic performance of the system. These relocation and upsizing improvements would protect the pipeline from future flood events, thereby enhancing the overall reliability of delivering water from Irvine Lake to customers and would improve the system's hydraulics. Increasing the pipe size from Irvine Lake to the opposite side of Santiago Creek would improve system pressures for downstream customers.

Irvine Lake Pipeline Relocation

The proposed spillway alignment would conflict with the existing 36-inch above-grade ILP and catwalk assembly that spans Santiago Creek downstream of the existing dam. The ILP would be relocated below ground and routed underneath the proposed spillway structure. A new portion of the ILP would extend from the dam to the opposite side of Santiago Creek where it would connect with the existing ILP. The preliminary horizontal and vertical alignment for the proposed ILP relocation is provided on Exhibit 3-9, Conceptual Irvine Lake Pipeline Plan and Profile. From the bifurcation valve vault, the ILP would be routed downward to get below the proposed spillway footing. Once the ILP has crossed the spillway, it would then angle upward again to connect back to the existing buried portion of the ILP.

NOTES

1. CONTRACTOR SHALL EXERCISE CAUTION IN THE VICINITY OF THE UTILITY LINE CROSSING THE ACCESS ROAD AND RELOCATE IT IF DEEMED NECESSARY FOR SAFETY.
2. SURPLUS FILL DISPOSAL AREA FOR TEMPORARY DIVERSION BERM SOIL DISPOSAL LOCATION AND VOLUME OF FILL TO BE APPROVED BY DISTRACT.
3. MULTIPLE AGENCIES HAVE ACCESS TO ROLLING GATE. CONTRACTOR SHALL INSTALL FENCING TO PROTECT LAYDOWN AREA AND TRAILERS AT THE ROLLING GATE DURING CONSTRUCTION. CONTRACTOR SHALL REPLACE GATE DURING CLOSEOUT.
4. CONTRACTOR SHALL TRIM TREES ALONG ACCESS ROAD TO ENSURE ALL CONSTRUCTION VEHICLES DO NOT DAMAGE LANDSCAPING AND SURROUNDING AREA.

Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Primary Contractor Staging Area Plan

Exhibit 3-8

Santiago Creek Dam Improvement Project

N W E S

Map not to scale

PSOMAS

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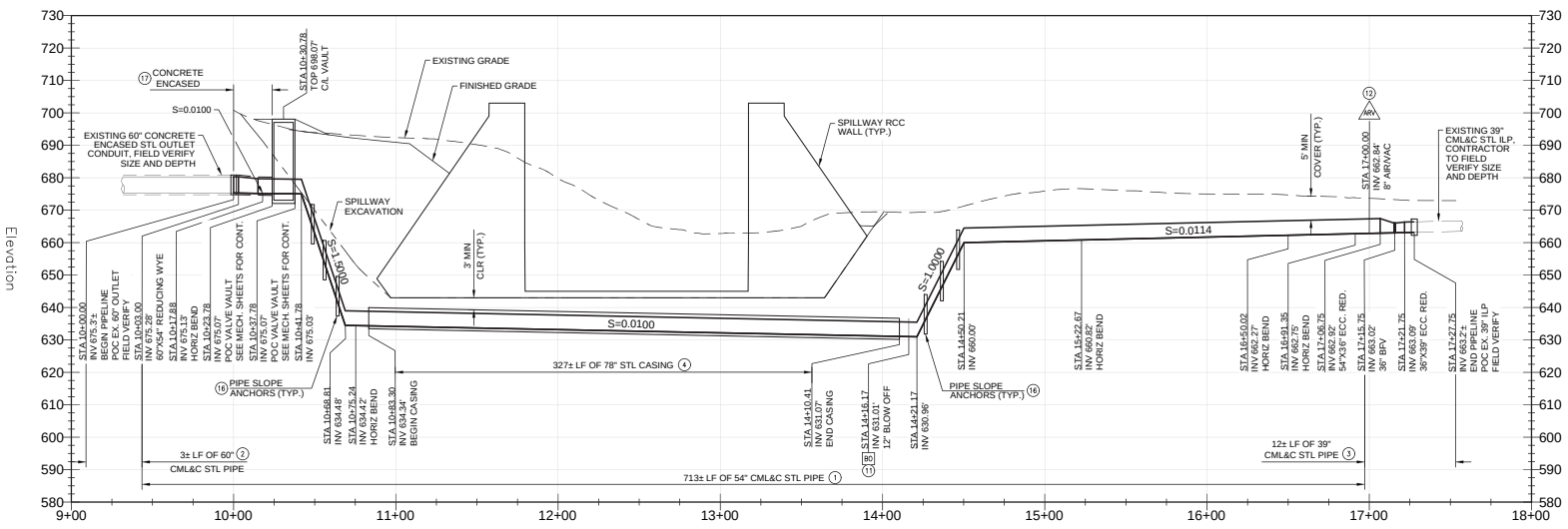
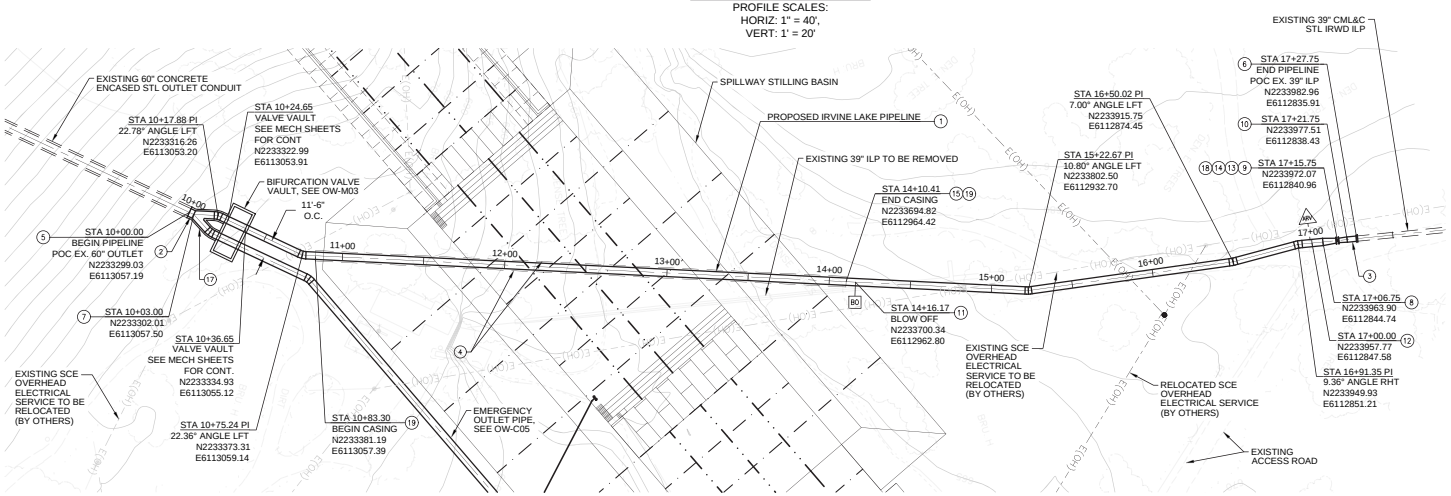


PROFILE

PROFILE SCALES:
HORIZ: 1" = 40',
VERT: 1' = 20'



GENERAL NOTES

1. CONTRACTOR TO FIELD VERIFY SIZE, LOCATION, AND DEPTH OF EXISTING OUTLET CONDUIT AND ILP PRIOR TO PIPE FABRICATION AND INFORM THE ENGINEER OF ANY DISCREPANCIES FROM WHAT IS PROVIDED HEREON.
2. MINIMUM PIPE DESIGN PRESSURE IS 100 PSI.
3. ALL PIPE TRENCHES SHALL BE IN ACCORDANCE WITH IRWD STD DWG W-17 SHOWN ON DETAIL 1, DWG OW-C12.
4. ALL NON-WELDED PIPE JOINTS SHALL BE BONDED PER IRWD STD DWG CP-9 SHOWN ON DETAIL 2, DWG OW-C14.
5. ALL BURIED PIPE JOINTS SHALL BE FULL FILLET WELDED LAP JOINTS, DOUBLE WELDED, WITH ONE INSIDE WELD AND ONE OUTSIDE WELD, MIN. TWO PASSES EACH, PER IRWD STD DWG W-20 SHOWN ON DETAIL 1 AND 2, DWG OW-C22.
6. CONTRACTOR SHALL PROVIDE INTERNAL PIPE ACCESS AS REQUIRED FOR INSPECTION AND APPROVAL.

CONSTRUCTION NOTES (DRAFT)

1. 54" CML&C STL PIPE, T=3/8", DOUBLE WELDED LAP JOINTS PER IRWD STD DWG W-20 SHOWN ON DETAIL 2, DWG OW-C22, TRENCH PER IRWD STD DWG W-17 SHOWN ON DETAIL 1, DWG OW-C22
2. 60" CML&C STL PIPE, T=3/8", DOUBLE WELDED LAP JOINTS PER IRWD STD DWG W-20 SHOWN ON DETAIL 2, DWG OW-C22, TRENCH PER IRWD STD DWG W-17 SHOWN ON DETAIL 1, DWG OW-C22
3. 39" CML&C STL PIPE, T=1/4", DOUBLE WELDED LAP JOINTS PER IRWD STD DWG W-20 SHOWN ON DETAIL 2, DWG OW-C22, TRENCH PER IRWD STD DWG W-17 SHOWN ON DETAIL 1, DWG OW-C22
4. 54" CML&C STL CARRIER PIPE IN 78" STL CASING PIPE, T=5/8", FULL CIRCUMFERENCE BUTT-WELDED JOINTS PER IRWD STD DWG W-17 SHOWN ON DETAIL 1, DWG OW-C22, TRENCH PER IRWD STD DWG W-17 SHOWN ON DETAIL 1, DWG OW-C12
5. CONNECT TO EXISTING 60" OUTLET CONDUIT PER DETAIL 1, DWG OW-C23
6. CONNECT TO EXISTING 39" CML&C STL ILP PER SHEET D-03
7. 60"X54" CML&C STL, T=3/8", ECCENTRIC REDUCING 22.5° TRUE-WYE WITH OUTLET REINFORCEMENT PER AWWA M11, CONCRETE ENCASED
8. 54"X36" CML&C STL, T=3/8", ECCENTRIC REDUCER
9. 36" BFV, CL 150, FE X FE, PER IRWD DWG W-22 AND W-23 SHOWN ON DETAIL 1, DWG OW-C18 AND DETAIL 1, DWG OW-C13
10. 39"X36" CML&C STL, T=1/4", ECCENTRIC REDUCER
11. 12" BLOWOFF ASSEMBLY PER IRWD STD DWG W-14 SHOWN ON DETAIL 1, DWG OW-C15
12. 8" AIR/VAC VALVE ASSEMBLY PER DETAIL 2, DWG OW-C20
13. FLANGE INSULATING KIT ASSEMBLY PER IRWD STD DWG CP-10 SHOWN ON DETAIL 2, DWG OW-C12
14. INSULATOR TEST STATION ASSEMBLY PER IRWD STD DWG CP-3 SHOWN ON DETAIL 3, DWG OW-C11
15. CASING CATHODIC PROTECTION TEST STATION PER IRWD STD DWG CP-3 SHOWN ON DETAIL 2, DWG OW-C11
16. CONCRETE SLOPE ANCHORS PER IRWD STD DWG G-10 SHOWN DETAIL 1, DWG OW-C14, EQUAL SPACING, 15' O.C. MAX
17. CONCRETE PIPE ENCASEMENT PER DETAIL 3 ON DWG OW-C22
18. INSTALL 39" BLIND FLANGE FOR TEMPORARY CONSTRUCTION ISOLATION TO ILP
19. REFER TO DETAIL 3, DWG OW-C20 FOR PIPE CASING INFORMATION

Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Irvine Lake Pipeline Plan and Profile

Exhibit 3-9

Santiago Creek Dam Improvement Project

Map not to scale

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Emergency Outlet Pipeline

The emergency outlet pipeline would be routed from the bifurcation valve vault to the emergency outlet valve vault as shown on Exhibit 3-10, Conceptual Emergency Outlet Pipe Plan and Profile. The horizontal alignment would parallel the right gravity wall of the proposed spillway structure, and the pipe would be placed in the backfill for the RCC gravity wall. The pipe would slope to drain to Santiago Creek.

Embankment Improvements

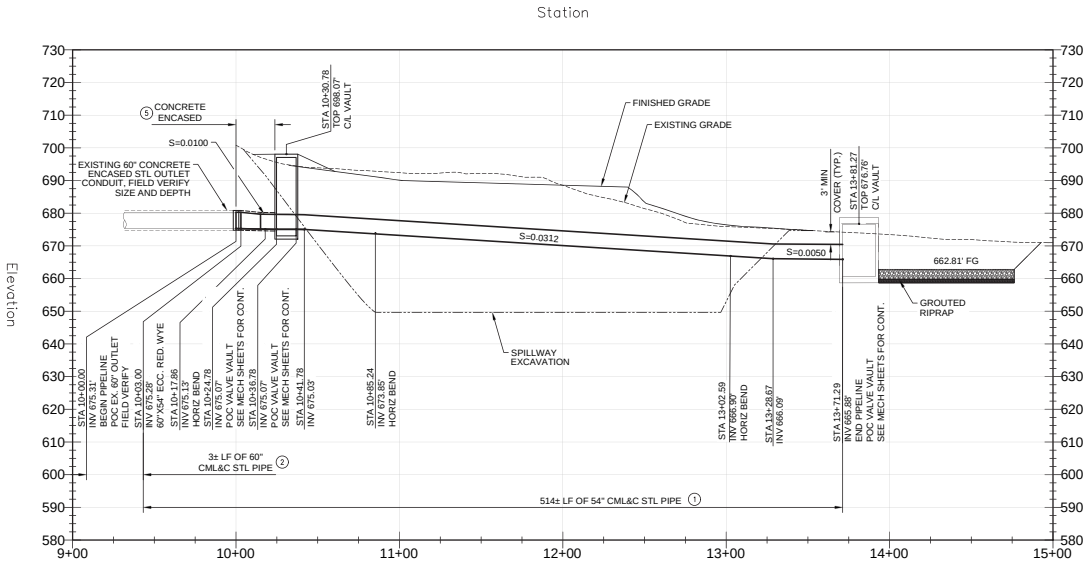
The Project includes improvements to the dam crest to improve the accessibility and overall and seismic performance of the embankment as shown in Exhibit 3-11, Conceptual Embankment Improvements. The improvements include removing the upper portion of the dam to a depth at least 15 feet below the dam crest as discussed in more detail in Section 3.12, Construction Detail, below. On the downstream side of the embankment, the Project includes removing the dam face, constructing a filter drain system, and encapsulating the filter drain system with embankment shell material which is composed of pervious material. The filter drain system would include a layer of filter material, then a layer of drain material, and then a layer of transition materials. The filter material would be designed to trap sediment. The drain layer would be more porous in nature and designed to allow filtered water to pass through. A layer of transition materials would be installed atop the filter and drain layers and would be composed of sandy materials intended to keep the drain in place. Finally, an outer shell layer comprised of pervious material would be installed to stabilize the underlying layers and minimize erosion along the embankment. The Project would also involve widening the dam crest to approximately 35 to 45 feet and raising the elevation by up to approximately one foot; which would improve access and safety for dam maintenance. The paved dam crest would include protective railings on both sides of the road and replacement piezometers to monitor the performance of the embankment dam. These embankment improvements would require excavations along the toe of the dam to key in the earthwork improvements to the face of the dam.

Ancillary Site Improvements

Ancillary site improvements proposed for the Project, including a new inlet/outlet access roadway and bridge, a new dam control building, widening and raising the existing dam crest, new emergency access walkway and stairs, and a new spillway bridge are discussed in more detail below.

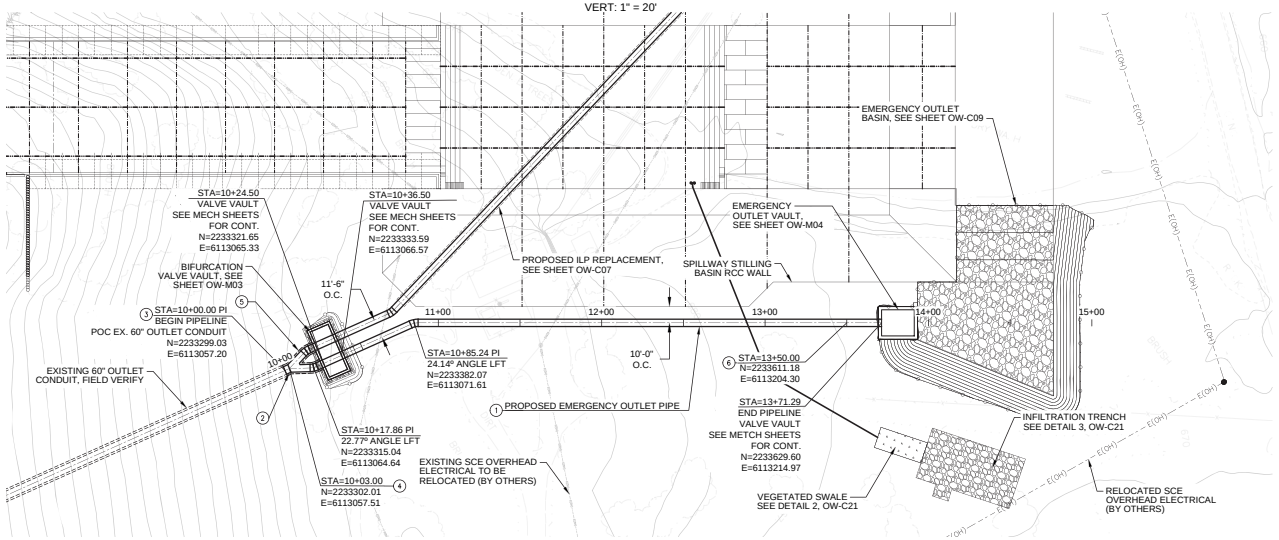
Inlet/Outlet Structure Access Roadway and Bridge

A new approximately 12-foot wide, gravel paved roadway would be constructed to provide access from the dam crest, across the spillway channel, and to the top of the new inlet/outlet structure as shown on Exhibit 3-12, Conceptual Inlet/Outlet Structure Access Road Plan and Profile. A new 160-foot-long steel bridge structure would be constructed to provide vehicle access from the dam crest, across the spillway channel, and to the top of the inlet/outlet structure. The bridge would be approximately 12 feet wide and span the upper portion of the spillway structure. The structure would be used to convey utilities to the inclined outlet structure and would be designed to support maintenance vehicles that would service the inclined outlet structure. The bridge would be supported on piles located on the left and right sides of the spillway structure. The new access road would terminate in a cul-de-sac type turn-around at the top of the inlet/outlet structure. A shotcrete tie-back wall would be required to cut the proposed roadway into the existing slope without affecting the existing landfill facilities above. The horizontal and vertical alignment of the proposed access road and vehicle bridge are illustrated on Exhibit 3-13, Conceptual Spillway Vehicle Bridge Plan.



EMERGENCY OUTLET PIPE PROFILE

PROFILE SCALES:
HORIZ: 1" = 40',
VERT: 1" = 20'



GENERAL NOTES

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3. ALL PIPE TRENCHES SHALL BE IN ACCORDANCE WITH IRWD STD DWG W-17 SHOWN ON DETAIL 1, DWG OW-C12.
4. ALL NON-WELDED PIPE JOINTS SHALL BE BONDED PER IRWD STD DWG CP-9 SHOWN ON DETAIL 2 ON DWG OW-C14.
5. ALL BURIED PIPE JOINTS SHALL BE FULL FILLET WELDED LAP JOINTS, DOUBLE WELDED, WITH ONE INSIDE WELD AND ONE OUTSIDE WELD, MIN. TWO PASSES EACH, PER IRWD STD DWG W-20 SHOWN ON DETAIL 1 AND 2 ON DWG OW-C22.
6. CONTRACTOR SHALL PROVIDE INTERNAL PIPE ACCESS AS REQUIRED FOR INSPECTION AND APPROVAL.

CONSTRUCTION NOTES

1. 54" CML&C STL PIPE, T=3/8", DOUBLE WELDED LAP JOINTS PER IRWD STD DWG W-20 SHOWN ON DETAIL 2, DWG OW-C22, TRENCH PER IRWD STD DWG W-17 SHOWN ON DETAIL 1, DWG OW-C12
2. 60" CML&C STL PIPE, T=3/8", DOUBLE WELDED LAP JOINTS PER IRWD DWG W-20 SHOWN ON DETAIL 2, DWG OW-C22, TRENCH PER IRWD STD DWG W-17 SHOWN ON DETAIL 1, DWG OW-C12
3. CONNECT TO EXISTING 60" OUTLET CONDUIT PER DETAIL 1, DWG OW-C23
4. 60"X54" CML&C STL, T=3/8", ECCENTRIC REDUCING 22.5° TRUE-WYE WITH OUTLET REINFORCEMENT PER AWWA M11, CONCRETE ENCASED
5. CONCRETE PIPE ENCASEMENT PER DETAIL 3 ON DWG OW-C22
6. TWO-WIRE TEST STATION PER IRWD STANDARD PLAN CP-1 SHOWN ON DETAIL 1, DWG OW-C11

Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Emergency Outlet Pipe Plan and Profile

Exhibit 3-10

Santiago Creek Dam Improvement Project

Map not to scale

PSOMAS

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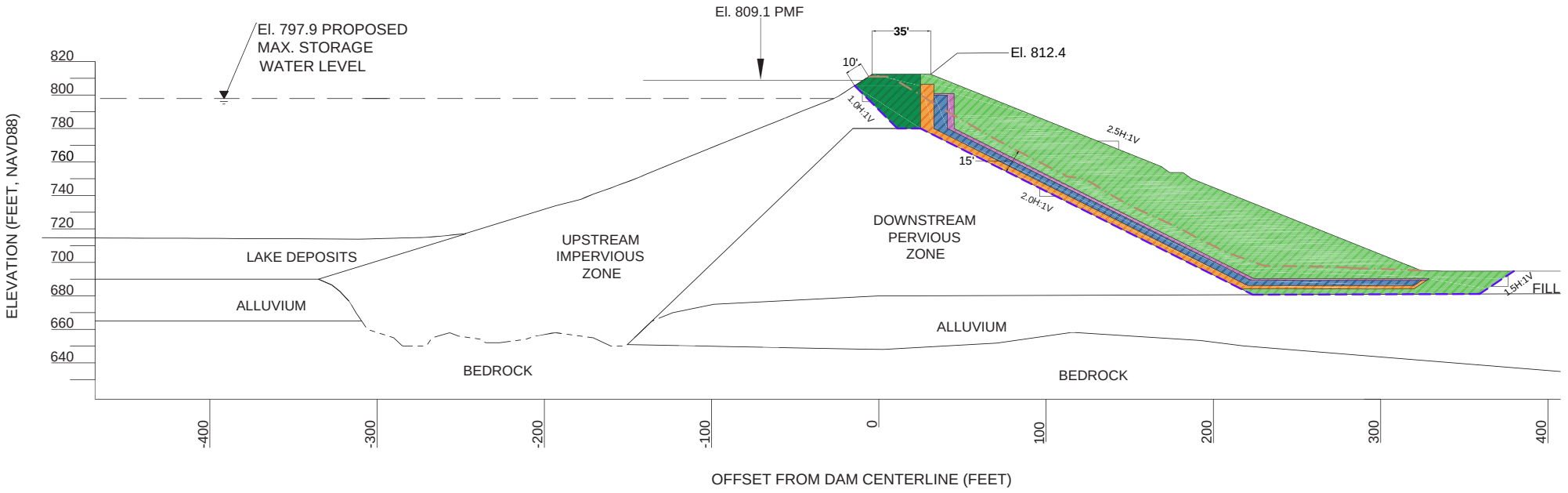

LEGEND:

PROPOSED MATERIALS

- SHELL
- TRANSITION
- DRAIN
- FILTER
- CORE
- EXCAVATION LIMITS
- EXISTING GRADE

NOTES:

1. ELEVATIONS PRESENTED CORRESPOND TO NAVD88 DATUM WHICH HAS BEEN CONVERTED FROM THE LOCAL PROJECT DATUM PRESENTED IN THE ORIGINAL CONSTRUCTION DOCUMENTS BY ADDING 1.9 FEET.
2. THE DAM CREST ELEVATION HAS BEEN RAISED TO 812.4 FT (0.5 FT INCREASE FROM THE EXISTING ELEVATION OF 811.9 FT) TO MEET DSOD PMF FREEBOARD REQUIRMENT.

Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Embankment Improvements

Exhibit 3-11

Santiago Creek Dam Improvement Project

PSOMAS

Map not to scale

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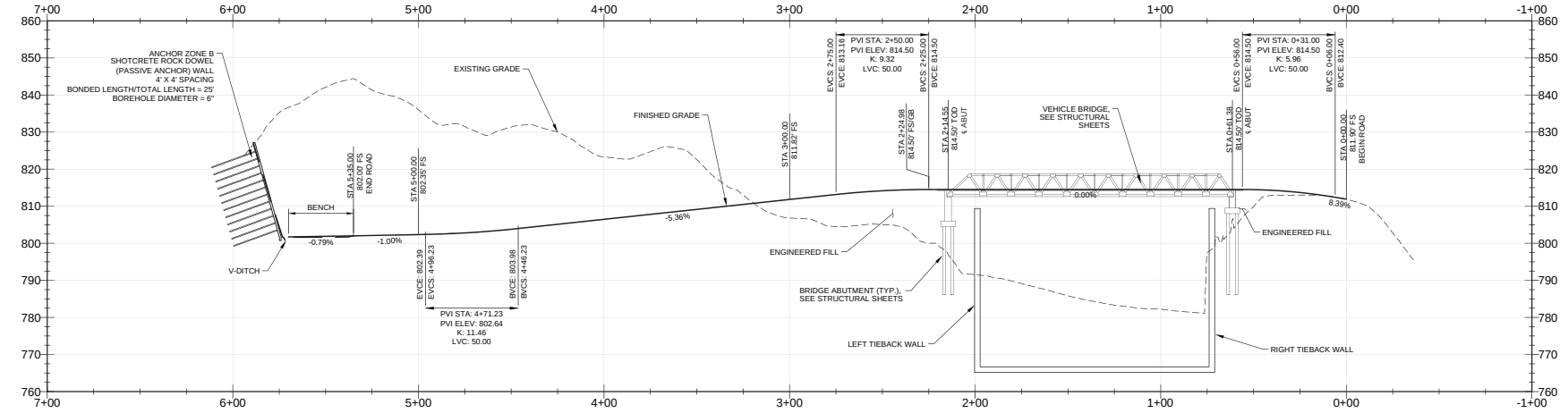
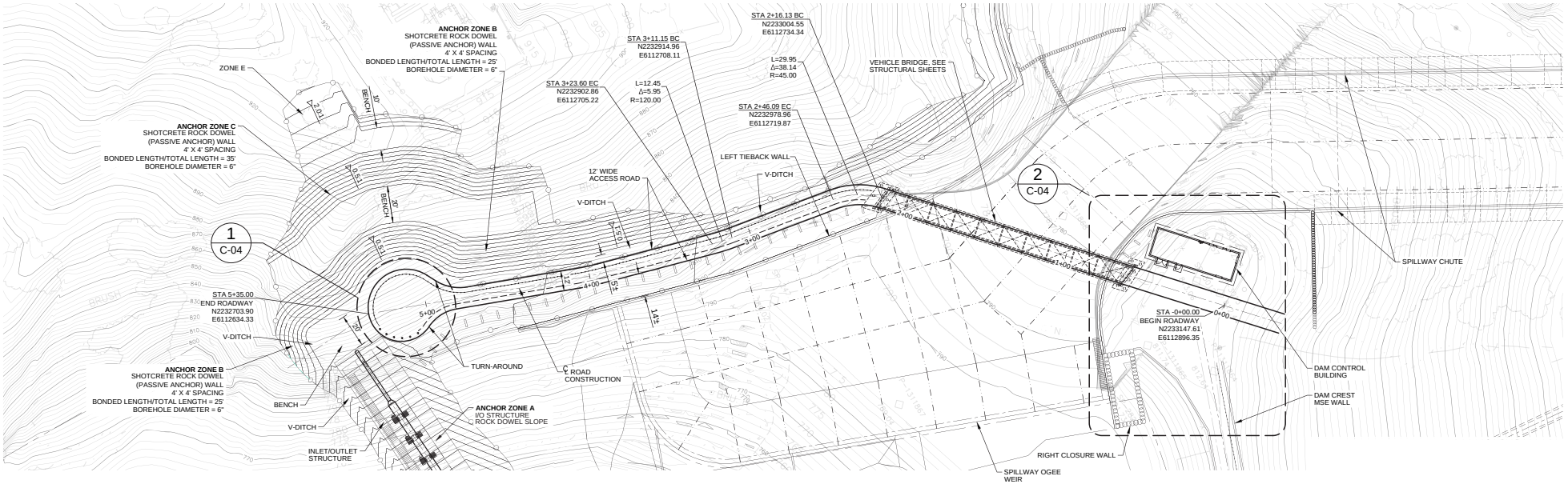


PROFILE

SCALES:
HORIZ: 1" = 30'
VERT: 1" = 15'



Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Inlet/Outlet Structure Access Road Plan and Profile

Exhibit 3-12

Santiago Creek Dam Improvement Project

Map not to scale

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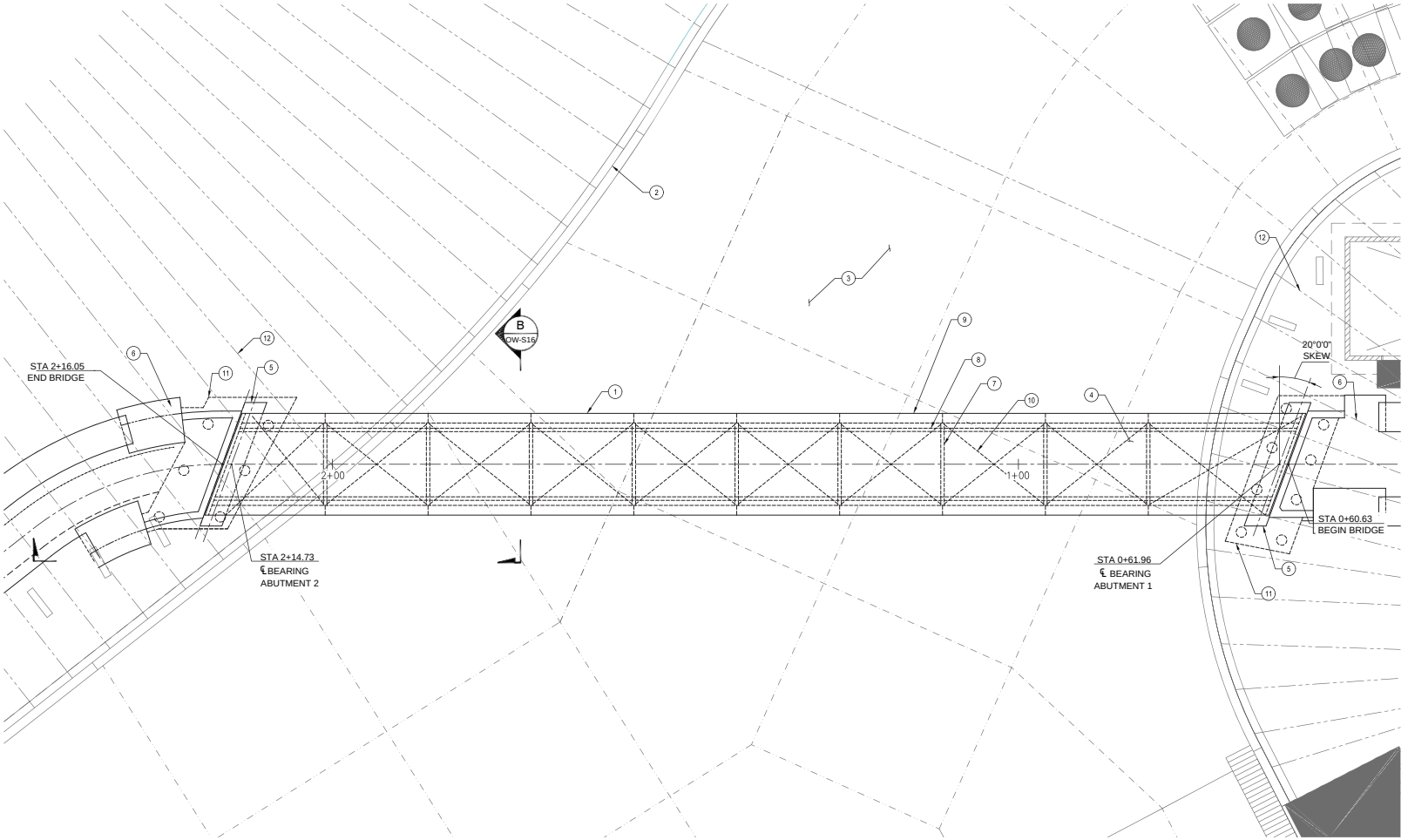

CONSTRUCTION NOTES (DRAFT)

1. PREFABRICATED/PRE-ENGINEERED STEEL TRUSS VEHICULAR BRIDGE
2. TIEBACK WALL
3. PROPOSED SPILLWAY
4. CIP CONCRETE BRIDGE DECK
5. ABUTMENT
6. WINGWALL
7. FLOOR BEAM
8. STRINGER
9. TOP CHORD
10. LATERAL BRACING
11. ABUTMENT FOUNDATION
12. TIEBACK

Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Spillway Vehicle Bridge Plan

Exhibit 3-13

Santiago Creek Dam Improvement Project

Map not to scale

PSOMAS

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Dam Control Building

A new dam control building located on the dam crest near the spillway structure would be constructed to house the pneumatic system that operates the valves on the inclined outlet structure, the lake aeration systems, and the electrical and control equipment. The dam control building would be approximately 60 feet by 20 feet with a height of approximately 18 feet. The building, which would have a gable style roof, would be fire-hardened and constructed of non-combustible materials. The height of the interior of the building would allow for at least 12 feet of unobstructed clearance. The building is preliminarily sized to include what is required to house the pneumatic actuation system equipment as well as the reservoir aeration system equipment. A preliminary layout of the proposed dam control building is shown on Exhibit 3-14, Conceptual Dam Control Building Profile and Sections.

Existing Dam Crest Raise and Widening

The existing dam crest is currently only 10 feet wide, with portions that have become even narrower because of localized erosion of the downstream embankment. To increase safety and accessibility of the proposed inclined outlet structure, the existing dam crest would be widened from 10 feet to between 35 and 45 feet. The dam crest elevation would be raised and improvements would be constructed to ensure that vehicular traffic remains on the dam crest road. Metal beam guardrails would be provided on both the upstream and downstream sides of the new dam crest for safety. The dam crest widening and embankment improvements would include a slope stability analysis to meet minimum acceptable design criteria.

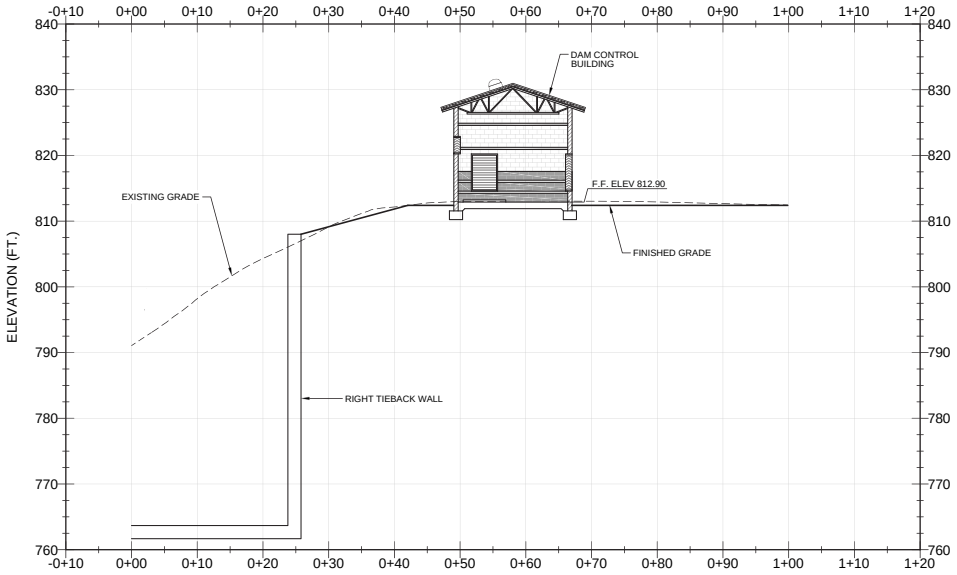
In addition to the dam crest widening, the dam crest would also be raised by up to approximately one foot on the upstream side of the dam crest. This would raise the effective dam crest from an elevation of 811.9 feet to up to approximately 812.9 feet for DSOD freeboard requirements during a PMF event, as well as help mitigate wave splashing and spray onto the dam crest during such an event. The wall would be designed for wave impact loads as well as vehicle impact loads.

Emergency Access Walkway and Stairs

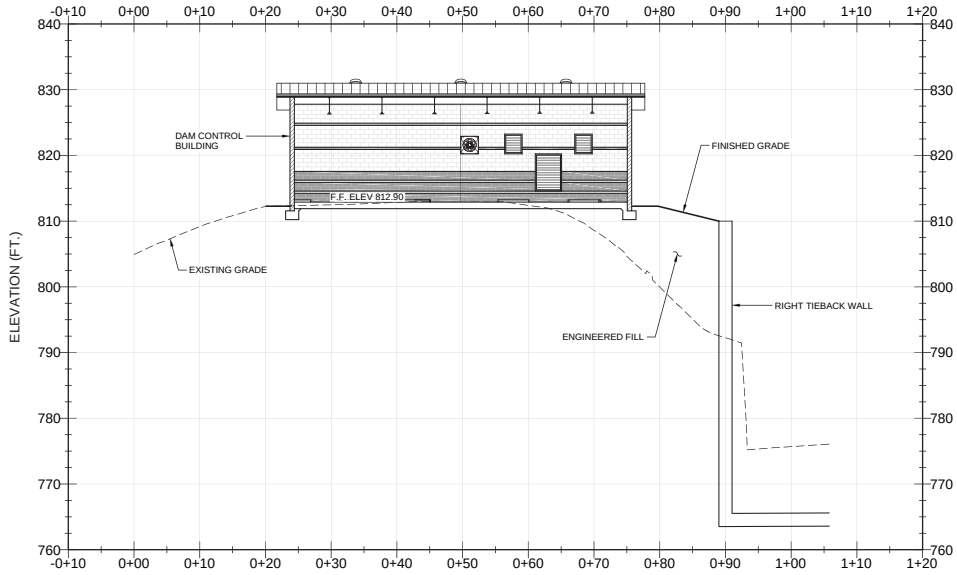
The existing orientation of the Santiago Creek Dam facilities does not allow for IRWD personnel to reach the crest of the dam during a reservoir spill event because the existing access road from Irvine Regional Park has an at-grade crossing through Santiago Creek, directly downstream of the new spillway outlet. Therefore, during a reservoir spill event, it would be impractical and unsafe for IRWD staff to use the existing access route to reach the dam crest. IRWD needs to have access to the dam crest during a spill event in order for operations staff to reach the new dam control building located on the dam crest. This control building would house the pneumatic actuation system as well as electrical and telemetry equipment for the new inclined inlet/outlet structure.

The primary emergency access route during a reservoir spill event would be from the adjacent closed Santiago Canyon Landfill Facility. At the termination of the landfill roadway, near the existing stormwater detention basin, a system of concrete walkways and stairs would be provided that would run along the left wall of the new spillway channel.

The walkway would be at least 5 feet wide to allow for mobile equipment and tools to have access. These structures would be cut into the existing hillside and be provided with handrailings for safety. The walkway would connect to the proposed inlet/outlet structure access road on the left abutment of the proposed spillway channel.



SECTION A C-04



SECTION B C-04

Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Dam Control Building Profile and Sections

Exhibit 3-14

Santiago Creek Dam Improvement Project

PSOMAS

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3.7 SITE DEMOLITION

The Project requires that some of the existing site facilities be demolished or removed and relocated prior to construction as shown on Exhibit 3-15, Conceptual Demolition General Plan. The following existing features would be demolished or removed: vertical outlet tower and portions of 60-inch outlet conduit, significant portions (or possibly all) of the spillway chute and walls, spillway bridge and piers, portions of the upstream dam embankment concrete facing, storage building on the dam crest, outlet works control building and valve vault, outlet works energy dissipator vault, portions of the ILP, catwalk and stairs assembly across Santiago Creek, the dam keeper's house, boat shop (unless re-purposed for IRWD use), and piezometers/monitoring wells. Site demolition activities are anticipated to occur in 2027/2028, and spillway demolition is expected to occur in 2028. The potential removal of the boat shop building would occur at the end of the construction period in 2030. When feasible, demolished materials would be recycled or reused, as discussed in more detail under Section 3.12, Construction Detail, below. The exact timing of such demolition work is subject to change.

3.8 UTILITY RELOCATION

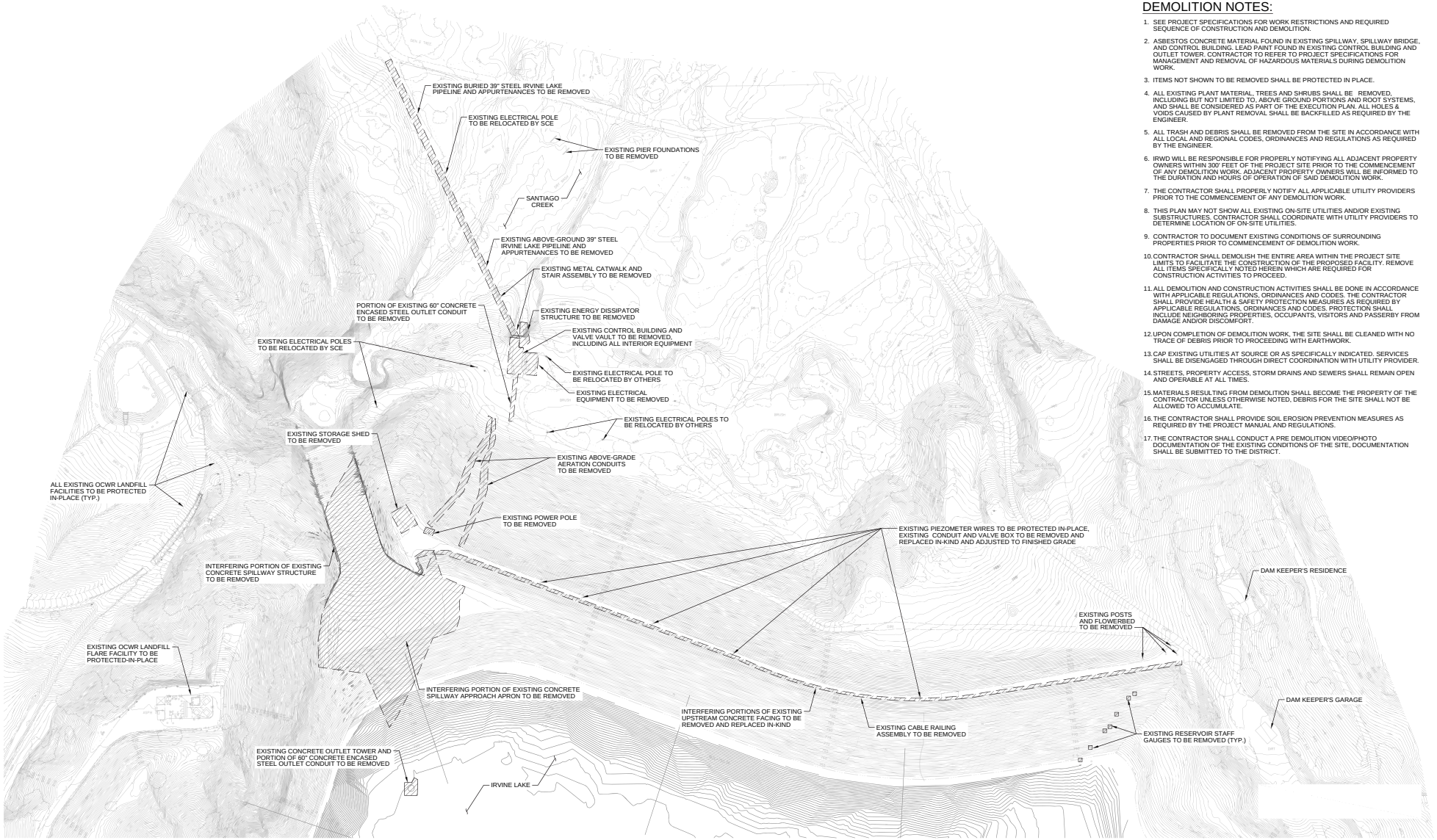
Construction of the Project would require the relocation of the existing Southern California Edison (SCE) overhead power lines and power poles located at the downstream toe of the dam within the Project vicinity. The existing power lines that currently pass over the existing spillway structure would be moved and placed outside of the construction limits. SCE would relocate the existing overhead electrical lines as shown on Exhibit 3-16, Conceptual SCE Site Plan. There is an approximately 15-foot-wide right-of-way (ROW) easement for long-term maintenance.

3.9 DEWATERING AND STREAM DIVERSION

Before beginning construction of the dam improvements, the lake would be dewatered, and an access road would be graded along the edge of the dewatered lakebed to allow construction access between the staging area and the dam structure as shown in Exhibit 3-1, General Arrangement Plan. IRWD would maximize withdrawals from Irvine Lake in the time leading up to construction initiation to minimize the amount required to be dewatered. The dewatering process would combine several methods including opening the critical valve to Santiago Creek to allow water from Irvine Lake to naturally flow downstream, modifying the existing outlet tower to allow the water level in Irvine Lake to be lowered further, implementing a temporary pumping system once the temporary diversion berm is constructed, and installing a subgrade dewatering system, which may consist of dewatering wells. The temporary pumping system includes diesel-driven pumps and temporary above ground piping that would convey the water from the lake to a discharge point along Santiago Creek near the existing Arizona crossing (a type of culvert crossing). Before discharging to the creek in compliance with discharge permits, the water may be treated for total dissolved solids if there are elevated levels of turbidity. The subgrade dewatering wells would operate as needed to maintain a dry work environment. All described means of dewatering may be used throughout the year as needed to successfully manage the water level during and after storm events and to maintain a dry work environment. As needed, IRWD would coordinate downstream releases with impacted agencies and entities.

Temporary Diversion Berm and Access Ramp

Once the lake is drained and before the first dry season, the contractor would construct a temporary diversion berm and access ramp. The access road on the temporary diversion berm would be generally 30 feet wide and traverse along the dam from the left abutment to the right abutment. The temporary diversion berm has a dual purpose - it serves as a physical barrier to protect the work area from seasonal storms, and it serves as an elevated access road to allow



DEMOLITION NOTES:

1. SEE PROJECT SPECIFICATIONS FOR WORK RESTRICTIONS AND REQUIRED SEQUENCE OF CONSTRUCTION AND DEMOLITION.
2. ASBESTOS CONCRETE MATERIAL FOUND IN EXISTING SPILLWAY, SPILLWAY BRIDGE, AND CONTROL BUILDING. LEAD PAINT FOUND IN EXISTING CONTROL BUILDING AND OUTLET TOWER. CONTRACTOR TO REFER TO PROJECT SPECIFICATIONS FOR MANAGEMENT AND REMOVAL OF HAZARDOUS MATERIALS DURING DEMOLITION WORK.
3. ITEMS NOT SHOWN TO BE REMOVED SHALL BE PROTECTED IN PLACE.
4. ALL EXISTING PLANT MATERIAL, TREES AND SHRUBS SHALL BE REMOVED, INCLUDING BUT NOT LIMITED TO, ABOVE GROUND PORTIONS AND ROOT SYSTEMS, AND SHALL BE CONSIDERED AS PART OF THE EXECUTION PLAN. ALL HOLES & VOIDS CAUSED BY PLANT REMOVAL SHALL BE BACKFILLED AS REQUIRED BY THE ENGINEER.
5. ALL TRASH AND DEBRIS SHALL BE REMOVED FROM THE SITE IN ACCORDANCE WITH ALL LOCAL AND REGIONAL CODES, ORDINANCES AND REGULATIONS AS REQUIRED BY THE ENGINEER.
6. IRWD WILL BE RESPONSIBLE FOR PROPERLY NOTIFYING ALL ADJACENT PROPERTY OWNERS WITHIN 300' FEET OF THE PROJECT SITE PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION WORK. ADJACENT PROPERTY OWNERS WILL BE INFORMED TO THE DURATION AND HOURS OF OPERATION OF SAID DEMOLITION WORK.
7. THE CONTRACTOR SHALL PROPERLY NOTIFY ALL APPLICABLE UTILITY PROVIDERS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION WORK.
8. THIS PLAN MAY NOT SHOW ALL EXISTING ON-SITE UTILITIES AND/OR EXISTING SUBSTRUCTURES. CONTRACTOR SHALL COORDINATE WITH UTILITY PROVIDERS TO DETERMINE LOCATION OF ON-SITE UTILITIES.
9. CONTRACTOR TO DOCUMENT EXISTING CONDITIONS OF SURROUNDING PROPERTIES PRIOR TO COMMENCEMENT OF DEMOLITION WORK.
10. CONTRACTOR SHALL DEMOLISH THE ENTIRE AREA WITHIN THE PROJECT SITE LIMITS TO FACILITATE THE CONSTRUCTION OF THE PROPOSED FACILITY. REMOVE ALL ITEMS SPECIFICALLY NOTED HEREIN WHICH ARE REQUIRED FOR CONSTRUCTION ACTIVITIES TO PROCEED.
11. ALL DEMOLITION AND CONSTRUCTION ACTIVITIES SHALL BE DONE IN ACCORDANCE WITH APPLICABLE REGULATIONS, ORDINANCES AND CODES. THE CONTRACTOR SHALL PROVIDE HEALTH & SAFETY PROTECTION MEASURES AS REQUIRED BY APPLICABLE REGULATIONS, ORDINANCES AND CODES. PROTECTION SHALL INCLUDE NEIGHBORING PROPERTIES, OCCUPANTS, VISITORS AND PASSERBY FROM DAMAGE AND/OR DISCOMFORT.
12. UPON COMPLETION OF DEMOLITION WORK, THE SITE SHALL BE CLEANED WITH NO TRACE OF DEBRIS PRIOR TO PROCEEDING WITH EARTHWORK.
13. CAP EXISTING UTILITIES AT SOURCE OR AS SPECIFICALLY INDICATED. SERVICES SHALL BE DISENGAGED THROUGH DIRECT COORDINATION WITH UTILITY PROVIDER.
14. STREETS, PROPERTY ACCESS, STORM DRAINS AND SEWERS SHALL REMAIN OPEN AND OPERABLE AT ALL TIMES.
15. MATERIALS RESULTING FROM DEMOLITION SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE NOTED, DEBRIS FOR THE SITE SHALL NOT BE ALLOWED TO ACCUMULATE.
16. THE CONTRACTOR SHALL PROVIDE SOIL EROSION PREVENTION MEASURES AS REQUIRED BY THE PROJECT MANUAL AND REGULATIONS.
17. THE CONTRACTOR SHALL CONDUCT A PRE DEMOLITION VIDEO/PHOTO DOCUMENTATION OF THE EXISTING CONDITIONS OF THE SITE, DOCUMENTATION SHALL BE SUBMITTED TO THE DISTRICT.

Source: AECOM and Irvine Ranch Water District, 2023

Conceptual Demolition General Plan

Exhibit 3-15

Santiago Creek Dam Improvement Project

Map not to scale

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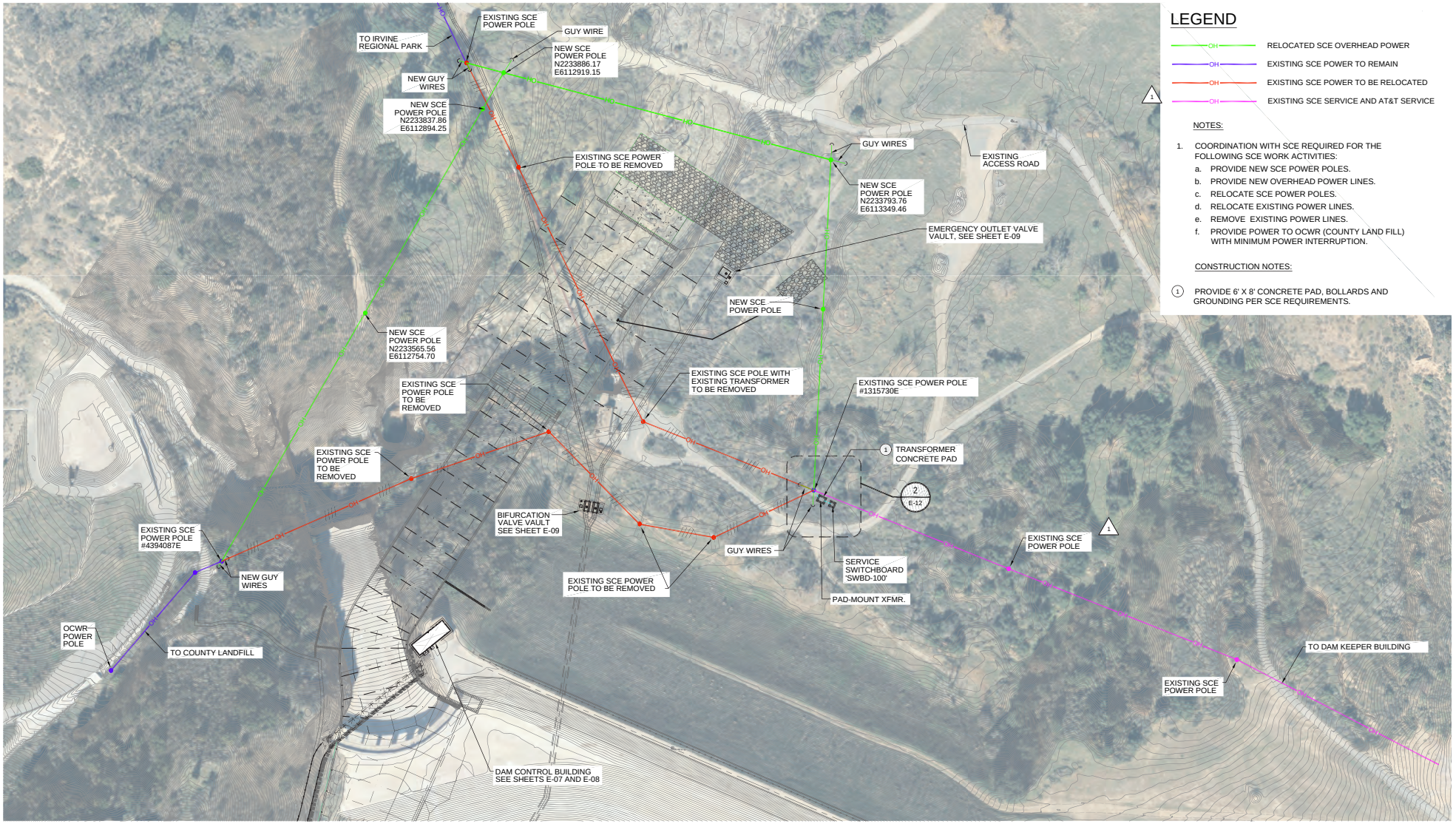

Source: AECOM and Irvine Ranch Water District, 2023

Conceptual SCE Site Plan

Exhibit 3-16

Santiago Creek Dam Improvement Project

N W E S

Map not to scale

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construction equipment to access the downstream side of the dam from the lake side of the dam. The temporary diversion berm would increase in elevation as it traverses from left abutment to right abutment and would ultimately reach the top of the dam crest to allow construction equipment and workers to gain access up and around the dam.

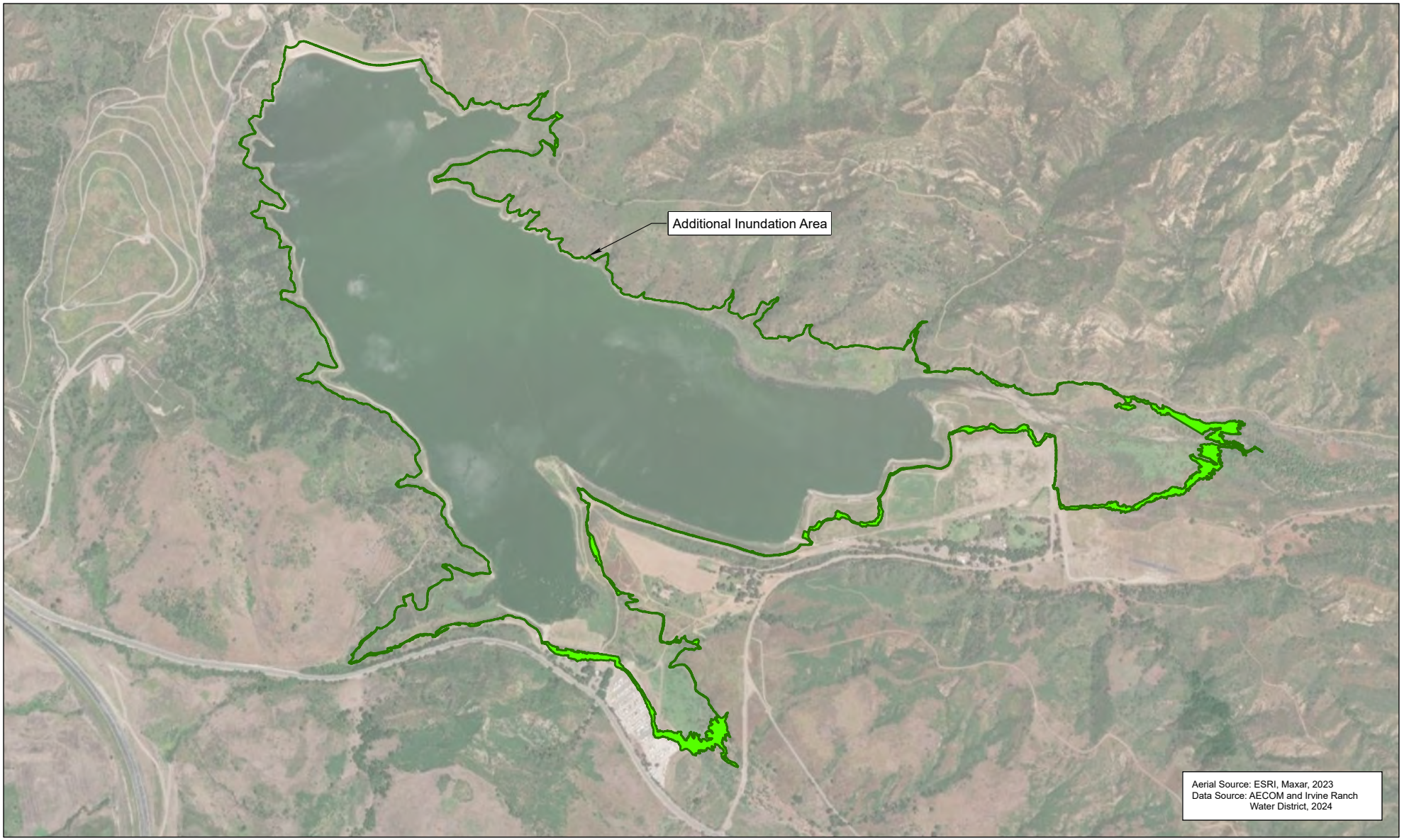
The temporary diversion berm would protect the work area from rain events that occur in the anticipated dry season (generally from April to October) and from incidental overflow discharges from the MWD Santiago Lateral, which feeds Irvine Lake with imported water. The contractor would implement a temporary pumping system to convey storm flows and incidental overflow discharges downstream of the dam to a discharge point along Santiago Creek near the existing Arizona crossing. The temporary pumping system is expected to be stationed on a barge system on the lake side of the temporary berm and would discharge flows around the right abutment of the dam. The diesel-driven generators that power the temporary diversion system may operate year-round until the Project is complete.

3.10 ADDITIONAL INUNDATION DURING OPERATIONS

The Project includes raising the spillway six feet to approximately 797.9 feet, which is two feet higher than the existing maximum water storage elevation of 795.9 feet. Raising the spillway would allow the lake to impound water up to the 797.9-foot elevation contour year-round, which would allow storage of approximately 1,300 AF of additional water. Under current operations, if Irvine Lake was full and water was conveyed to the Baker Water Treatment Plant at full production while also feeding the Howiler Water Treatment Plant, the water level in the lake would be lowered by approximately two feet in approximately 18 days, assuming no additional inflow into the reservoir and excluding evaporation. IRWD estimates that the upper two feet of the reservoir (i.e., 795.9 to 797.9 feet in elevation) could be inundated for an approximate maximum of 30 to 45 days in a year but typically would be inundated for less time and in some years not at all. As previously discussed, the existing lake capacity is currently approximately 24,000 AF, but it can hold an additional 2,700 AF when flash boards are installed on the spillway. With the proposed improvements, the lake would hold a maximum of 28,000 AF. The additional areas that would be inundated as a result of the increased storage capacity are shown on Exhibit 3-17, Additional Inundation Areas. Other than the impact of raising the spillway, all other operations would remain similar to the existing operations of the dam.

3.11 ADDITIONAL GEOTECHNICAL INVESTIGATIONS

Although IRWD previously completed geologic mapping in 2021 and subsequent geotechnical investigations in 2022 through 2024 to support Project design and the development of detailed construction documents, it has been determined that additional geotechnical investigations may be necessary to support the final design and construction of the Project. These investigations would occur during the design and construction phase to inform final design and may include the performance of exploratory test pits, soil borings, packer testing, and/or non-intrusive geologic investigations and observations. The additional geotechnical investigations would remain within the proposed limits of disturbance defined by the Project with any associated significant environmental impacts mitigated as part of the overall Project. IRWD would determine if additional CEQA documentation and/or permits are needed to facilitate the additional geotechnical investigations prior to proceeding with these activities.



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Additional Inundation Areas

Exhibit 3-17

Santiago Creek Dam Improvement Project

N W E S

0 750 1,500 Feet

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3.12 CONSTRUCTION DETAIL

Construction Access and Staging

Access to the dam and reservoir facilities is currently provided through Irvine Regional Park. Use of this entry during construction of the Project would likely result in a disruption to the Park's facilities and would require extensive coordination with and approval from Orange County Parks. Furthermore, the one-way access road leading up to the dam crest and the dam crest itself are relatively narrow and it would be difficult for heavy construction equipment to maneuver on that road. Therefore, the primary access to the Project site during construction would be from the drained Irvine Lake.

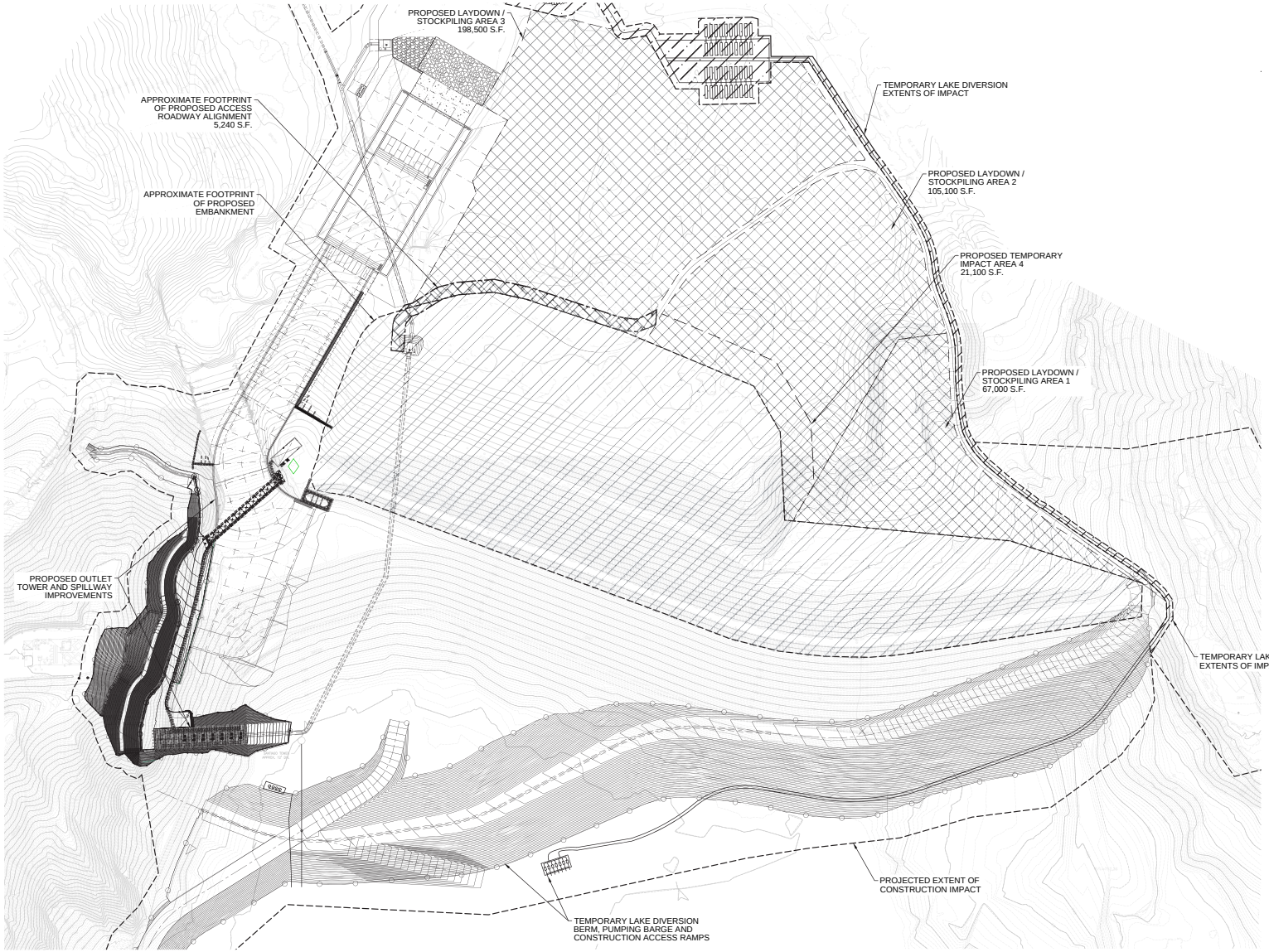
The primary construction access would lead into the lake from Santiago Canyon Road and Blue Diamond Haul Road. The primary contractor staging and equipment storage area would be located in the large, flat plateau area, known as the Flats, at the upstream end of the reservoir after the lake is dewatered. This area is at a higher elevation and is unlikely to flood from typical storm events during construction. It is also anticipated that the construction trailers, conventional concrete batch plant and concrete crushing equipment (if utilized) would be located at the primary contractor staging area. The primary construction access/haul road would connect the staging area to the existing dam within the lakebed. An earthen ramp would be constructed up the right abutment of the existing dam to allow construction vehicles to access the downstream area to construct the outlet works and spillway stilling basin facilities.

To facilitate construction of the downstream features, a secondary staging area would be generally located on the downstream toe of the dam near the existing outlet structure building as shown on Exhibit 3-18, Proposed Stockpiling and Impact Areas. It is anticipated that the secondary staging area would be utilized by the contractor to mobilize the RCC batch plant, which is usually established close to where material is being placed to maintain quality control of the material. The secondary staging area may also be used to stage formwork, rebar, raw materials, and other related materials and equipment required to successfully construct the dam improvements. Material from the embankment would be removed, staged, and repurposed within the Project site. In addition to staging, laydown, and stockpiling areas, Exhibit 3-18 also graphically depicts the extent of construction impacts and impact areas associated with the temporary lake diversion, including the berm, pumping barge, and construction access ramps.

Temporary Construction Water

Water would be utilized for various construction activities, including RCC production for the spillway stilling basin walls, as well as for general mass earthwork. The available water source in the Project vicinity is a 12-inch potable water line running along East Santiago Canyon Road south of Irvine Lake. It is estimated that construction activities for the inlet/outlet structure and spillway improvements would require approximately 100 gallons per minute (gpm) during the peak day of demand for construction water, and the RCC batch plant and staging area would require approximately 200 gpm during the peak day of demand for construction water.

IRWD would install a temporary highline from Santiago Canyon Road, along Blue Diamond Haul Road, to the staging area. The temporary construction water line would be routed above-ground through the Irvine Lake parking area and along the primary contractor access/haul road to the proposed work area for the inlet/outlet structure and spillway construction. Construction activities may also use untreated water from the ILP as an additional water source.



NOTES

1. TEMPORARY FEATURES TO BE CONSTRUCTED PER PROJECT SPECIFICATIONS AND DETAILS PROVIDED IN THE PROJECT PLANS.
2. TEMPORARY FEATURES TO BE REMOVED AT THE END OF CONSTRUCTION AND SITE RETURNED TO PRE-CONSTRUCTION CONDITIONS.
3. THE AREA INDICATED AS PART OF THE PROPOSED ROADWAY ALIGNMENT EXCLUDES THAT OF THE EMBANKMENT IMPACT AREA AND EQUIPMENT/MATERIAL IMPACT AREA. ROADWAY TO BE INSTALLED FOLLOWING EMBANKMENT CONSTRUCTION.

LEGEND

- AREA IMPACTED BY LOCATION OF TEMPORARY LAKE DIVERSION EQUIPMENT
- POTENTIAL AREA FOR EQUIPMENT LAYDOWN/IMPACT AND/OR MATERIAL STOCKPILING
- POTENTIAL AREA FOR FOOTPRINT OF PROPOSED EMBANKMENT
- POTENTIAL AREA FOR ACCESS ROADWAY ALIGNMENT

Source: AECOM and Irvine Ranch Water District, 2023

Proposed Stockpiling and Impact Areas

Exhibit 3-18

Santiago Creek Dam Improvement Project

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Map not to scale

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Construction Detail

Construction work is anticipated to begin in Fall 2027 and the Project is expected to be completed within four years as detailed in Table 3-1. The four-year construction window assumes downtime associated with weather restrictions with an average of 10-hour workdays during the wet season (October to April) and double 10-hour shifts (i.e., 20-hour workdays with nighttime work) during the dry season (April to October). The construction schedule assumes that a minimum of three dry seasons, which are generally between April to October, would be required to build the dam improvements in a systematic and phased fashion. It also assumes that the embankment improvements are built concurrently with the spillway improvements. The exact date that construction begins is subject to change. The construction schedule would be refined as Project design plans are developed and finalized.

TABLE 3-1
CONSTRUCTION PHASING

Construction Phase	Timeline
Initial Site Preparation including Construction of Temporary Diversion Berm, Stream Diversion System, and Dewatering System	2027
Spillway Demolition	2028
Spillway Construction	2028-2030
Outlet Works Improvements	2028
Embankment Improvements	2029-2030
Source: AECOM 2022	

Generally, construction activities would utilize the following equipment: Forklifts, Backhoes, Graders, Excavators, Loaders, Cranes, Dozers, Rollers, Generator Sets, Concrete Pumps, Concrete Mixers, Rock Drills, Concrete Batch Plant, Klemm Drills, Air Compressors, and Aerial Lifts.

As discussed in Section 4.2, Air Quality, the proposed Project would be required to comply with applicable South Coast Air Quality Management District (SCAQMD) rules and regulations, including Rule 403 for fugitive dust control. Rule 403 measures include regular watering of active grading areas and unpaved roads, limiting vehicle speeds on unpaved surfaces, stabilizing stockpiled earth, and curtailing grading operations during high wind conditions. Various public agencies (e.g., Orange County Fire Authority, Orange County Sheriff's Department, etc.) currently use portions of the proposed staging area for takeoff and landings associated with training and operational activities. During construction of the proposed Project, HeloPods[4] would be installed and operational near the Flats area at the eastern edge of the lake at the upstream end of the reservoir for use in the absence of stored water in Irvine Lake.

Project construction would involve the removal and on-site transport of approximately 360,000 cubic yards (CY) of soil from on-site borrow pits, located within the limits of the lake, to serve as source material for the dam embankment. These borrow areas are depicted on Exhibit 3-1. Approximately 12,000 haul truck trips, assuming 30 CY capacity trucks, would be required to haul this material from the borrow sites along the access road to the work area and to the dam. These materials would be moved from one on-site location to another and ultimately balanced on-site. The Project would also include importing approximately 200,000 CY of material and exporting

[4] Portable, tactical helicopter dip sources, which provide a water source to fire crews to refill the helicopters' water tanks closer to the location of a wildfire.

approximately 315,000 CY of material over the four-year construction period. Project construction is anticipated to require a total of approximately 28,000 one-way truck trips for the import and export of material. Daily truck trips would vary from approximately 4 to 101 trips per day depending on the stage of construction, with an average of 34 truck trips per day.

3.13 OPERATION AND MAINTENANCE

Once operational, all Project components would operate and be monitored through IRWD's Supervisory Control and Data Acquisition (SCADA) system. Reservoir level sensors would continue to monitor water levels in the reservoir. In addition, instrumentation and monitoring systems would continuously monitor the stability of the dam and identify situations that may require intervention, such as a controlled emergency release of water from the reservoir. Any upgrades to instrumentation and monitoring equipment would be determined during final design and may include, but are not limited to, survey monuments, inclinometers, seepage weirs, piezometers, reservoir level sensors, strong motion accelerographs, and a weather station.

Irvine Lake is generally operated in four IRWD operational modes as outlined in Table 3-2. Each mode has general operating parameters that allow for the safe, cost-effective operation of the lake while maximizing the potential average annual water runoff from storm events.

TABLE 3-2
IRWD/LAKE OPERATIONAL MODES

Season	
Winter[a]	During the Winter Mode any available rainfall is captured in the lake and stored for use. This period begins with the first rainfall event in November/December and reduces or eliminates the need to purchase untreated imported water from MWD if runoff equals or is greater than demands.
Spring[a]	During the Spring Mode under the first option, lake storage is evaluated to determine if available runoff captured during the winter will meet demands through October 1. If additional water is needed during a dry year, untreated imported water from MWD is purchased prior to May 1. Under the second option, water is not purchased prior to the summer season.
Summer	During the Summer Mode beginning May 1, under the first option, the lake is drafted down to meet IRWD demands. Under the second option water is purchased on a month-by-month basis to meet demands, which minimizes evaporation losses applied to imported supplies.
Fall	During the Fall Mode beginning October 1, purchased untreated imported water from MWD is used to maintain the Lake at the minimum operational level while maximizing available storage. Once sufficient runoff is received to meet demands or to begin filling the lake, staff transition to the Winter Mode.

[a] Under some water level and rain event conditions, the spillway may be utilized to pass storm flows around the dam. When the spillway is activated, the emergency outlet valve to Santiago Creek may be opened to release water and lower the water level in the reservoir and orders for untreated imported water are ceased.

Source: IRWD 2020.

Similar to the current reservoir, operation of the proposed Project would not require daily onsite staffing but would require only periodic maintenance. Water levels at Irvine Lake would fluctuate seasonally; water would be stored in winter when water supply exceeds demand, and the reservoir would be drawn down in summer when water demand exceeds supply. However, IRWD would develop a new operating plan for Irvine Lake that would be updated each year to set targets for the volume of water to be contained in the reservoir on a daily, monthly, annual, or seasonal basis. Reservoir operations would vary with time based upon a wide variety of factors, such as:

seasonal storage needs, water quality considerations, and impoundment requirements based on rainfall projections.

During precipitation events, IRWD may maintain reservoir levels well below the spillway crest to create sufficient space for stormwater runoff to enter the reservoir and avoid use of the spillway. The annual operating plan would identify an operating strategy that would reduce the potential for utilizing the spillway and maximize stormwater capture. Reservoir operations would be adjusted by IRWD during the year based on changes in projected demands and other factors as needed.

Under normal operating conditions, all regulated flow out of the reservoir would be conveyed through the inlet/outlet pipeline. In the event of an emergency or for dam safety reasons, IRWD would release water through the cone valve to the creek. IRWD staff would continue to conduct routine safety and security checks of the site, similar to existing protocols.

3.14 INTENDED USES OF THE EIR

Pursuant to Section 15121 of the CEQA Guidelines, an EIR is primarily an informational document intended to inform public agency decision makers and the general public of the potentially significant environmental effects of a project. Prior to taking action on the proposed Project, IRWD, as the lead agency, must consider the information in this EIR and certify the Final EIR.

Section 15367 of the CEQA Guidelines defines Lead Agency as follows:

> "Lead Agency" means the public agency which has the principal responsibility for carrying out or approving a project. The Lead Agency will decide whether an EIR or Negative Declaration will be required for the project and will cause the document to be prepared.

Responsible Agencies are public agencies that have a level of discretionary approval over some component of the Project. Section 15381 of the CEQA Guidelines defines Responsible Agency as follows:

> "Responsible Agency" means a public agency which proposes to carry out or approve a project, for which a Lead Agency is preparing or has prepared an EIR or Negative Declaration. For the purposes of CEQA, the term "Responsible Agency" includes all public agencies other than the Lead Agency which have discretionary approval power over the project.

A Trustee Agency is defined in Section 15386 of the CEQA Guidelines as "a state agency having jurisdiction by law over natural resources affected by a project which are held in trust for the people of the State of California."

Responsible agencies may rely upon the EIR prepared by the Lead Agency (See Section 15096 of the CEQA Guidelines). Permits and other approvals required to implement the Project are identified. As noted above, it is intended that this EIR be used by agencies in their consideration of approval of required subsequent permits and approvals. The anticipated approvals associated with the Project are listed further below.

3.15 PROJECT PERMIT AND APPROVALS

Table 3-3 presents a preliminary list of the agencies and entities that would use this Draft EIR in their consideration of specific permits and other discretionary approvals that may apply to the Project. This Draft EIR is intended to identify those agencies required to be listed in CEQA Guidelines Section 15124, including, "(A) A list of the agencies that are expected to use the EIR in their decision making, and (B) A list of permits and other approvals required to implement the Project" to support their decision-making processes. Additionally, discretionary approval may be needed from federal agencies to meet federal funding requirements.

TABLE 3-3
DISCRETIONARY PERMITS OR APPROVALS POTENTIALLY REQUIRED

Agency	Permits and Authorizations Required
California Department of Fish and Wildlife (CDFW)	• Lake or Streambed Alteration Agreement, California Fish and Game Code, Section 1602 • Incidental Take Permit for Crotch's Bumble Bee
California Department of Water Resources, Division of Safety of Dams	• Dam Safety Inspection and Approval
Federal Emergency Management Agency	• Letter of Map Revision
State Water Resources Control Board; Regional Water Quality Control Board	• Waste Discharge Requirements • Storm Water Pollution Prevention Plan (SWPPP)
State Historic Preservation Officer (SHPO)	• National Historic Preservation Act Section 106 compliance
U.S. Fish and Wildlife Service (USFWS); CDFW	• NCCP/HCP Compliance (provides Coverage under the Federal Endangered Species Act and Section 2080.1 under California Endangered Species Act)
County of Orange	• Division of Drinking Water (DDW) Drinking Water Permit Amendment Update • Well Permits • Encroachment Permit • Noise Ordinance Waiver
U.S. Army Corps of Engineers (USACE)	• Section 404 Individual Permit

3.16 REFERENCES

AECOM. 2022 (July 15). Santiago Creek Dam Outlet Tower and Spillway Improvements Project, PR 01813, *Preliminary Design Report Volumes I and II*. Orange, CA: AECOM.

Irvine Ranch Water District. 2020 (August). *Irvine Lake Management Plan*. Irvine, CA: IRWD.

URS Corporation (URS). 2015 (July). *Santiago Creek Dam Outlet Tower Seismic Evaluation Structural Engineering Services*. Oakland, CA: URS.

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SECTION 4.0 IMPACT ANALYSIS INTRODUCTION

In accordance with Sections 15125 and 15126(a) to (c) of the California Environmental Quality Act (CEQA) Guidelines, this section of the Environmental Impact Report (EIR) analyzes those environmental topics where the Project could result in "potentially significant impacts." Irvine Ranch Water District (IRWD) has determined that the EIR addresses all environmental topics with potential to result in significant effects. An Initial Study was prepared for the Project, and the environmental topics and issues within the topical areas with no potential for a significant impact are identified in Section 2.0, Introduction, Project History, and Setting, of the EIR and focused out from further analysis in the body of the EIR. Based on IRWD's determination and the comments received by IRWD on the Notice of Preparation, this EIR analyzes the following environmental topics:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

Each topical section includes the following information: description of applicable regulations; information on the existing setting; identification of methodology used for the analysis presented in the section; identification of thresholds of significance; analysis of potential Project effects and identification of significant impacts; cumulative impacts; identification of mitigation measures, if required, to reduce the impacts; level of significance after mitigation; and a list of references used to complete the analysis.

Section 15064.7 of the CEQA Guidelines addresses thresholds of significance and encourages each public agency to develop thresholds of significance through a public review process. IRWD has not formally adopted thresholds of significance. In accordance with CEQA and the CEQA Guidelines, the analysis and significance thresholds used in this EIR have been derived from several sources, including the General Plan standards and applicable regulatory standards.

In evaluating the potential impacts associated with the Project, the EIR, in addition to the mitigation measures in the EIR, identifies a number of components that will serve to avoid or minimize impacts. These measures have been incorporated into the Mitigation Program presented in this EIR and will be tracked in the Mitigation Monitoring and Reporting Program (MMRP) that would be adopted in conjunction with the Project approval.[1]

Where a potentially significant environmental effect has been identified, applicable Project-specific mitigation measures have been included where feasible. Any mitigation measure, and timing thereof, is subject to the approval of IRWD. The two components of the Mitigation Program are described below.

- **Regulatory Requirements.** Regulatory requirements are based on local, State, or federal regulations or laws that are frequently required independently of CEQA review and also serve to offset or prevent specific impacts. Typical regulatory requirements include compliance with the provisions of the California Building Code, South Coast Air Quality Management District Rules, local agency requirements, and other regulations and standards. IRWD does not have an adopted set of standard conditions; however, IRWD may impose additional conditions during the approval process, as appropriate. These requirements may be specific to the proposed Project or standard to all projects.
- **Mitigation Measures.** Where a potentially significant environmental effect has been identified and is not reduced to a level considered less than significant through the application of regulatory requirements, Project-specific mitigation measures have been identified.

4.0.1 CUMULATIVE IMPACT ASSUMPTIONS

Discussion of the cumulative impacts of the proposed Project is provided in Sections 4.1 through 4.17, relative to each CEQA topical issue evaluated herein. The following is an overview and introduction to the cumulative analysis per the CEQA Guidelines. This avoids the undue repetition of CEQA requirements relative to cumulative analysis within individual sections.

In requiring the State Office of Planning and Research to develop guidelines for the implementation of CEQA, Section 21083(b) of the *Public Resources Code* requires that the guidelines shall specifically include criteria for public agencies to follow in determining whether or not a proposed project may have a "significant effect on the environment." The criteria shall require a finding that a project may have a "significant effect on the environment" if one or more of the following conditions exist:

(1) A proposed project has the potential to degrade the quality of the environment, curtail the range of the environment, or to achieve short-term, to the disadvantage of long-term, environmental goals.

(2) The possible effects of a project are individually limited but cumulatively considerable. As used in this paragraph, "cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the

[1] The California Public Resources Code Section 21081.6 (Assembly Bill [AB] 3180) requires that a lead or responsible agency adopt a MMRP when approving or carrying out a project where an environmental document, either an EIR or a mitigated negative declaration, has identified measures to reduce potential adverse environmental impacts. The MMRP identifies the mitigation measure; the method by which the adopted measure will be implemented; the responsible party for verifying the measure has been satisfactorily completed; the method of verification; and the appropriate time or phase for the implementation of each mitigation measure. The MMRP is formally adopted by the Board in conjunction with the certification of the EIR.

effects of past projects, the effects of other current projects, and the effects of probable future projects.

(3) The environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.

This directive has been carried forth in Section 15064 of the CEQA Guidelines, which establishes the criteria for determining the significance of environmental effects caused by a project. Subsection 15064(h)(1) directs the preparation of an EIR in the following circumstance:

> [I]f the cumulative impact may be significant and the project's incremental effect, though individually limited, is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

Section 15355 of the CEQA Guidelines defines cumulative impacts as:

> Two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.
>
> (a) The individual effects may be changes resulting from a single project or a number of separate projects.
>
> (b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Pursuant to Section 15130(b) of the CEQA Guidelines:

> The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

Methodology

A project's cumulative impact is an impact to which that project contributes and to which other projects contribute as well. The project must make some contribution to the impact; otherwise, it cannot be characterized as a cumulative impact of that project.

Section 15130(b) of the CEQA Guidelines indicates:

> The following elements are necessary for an adequate discussion of significant cumulative impacts:
>
> (1) Either:
>
> (A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or

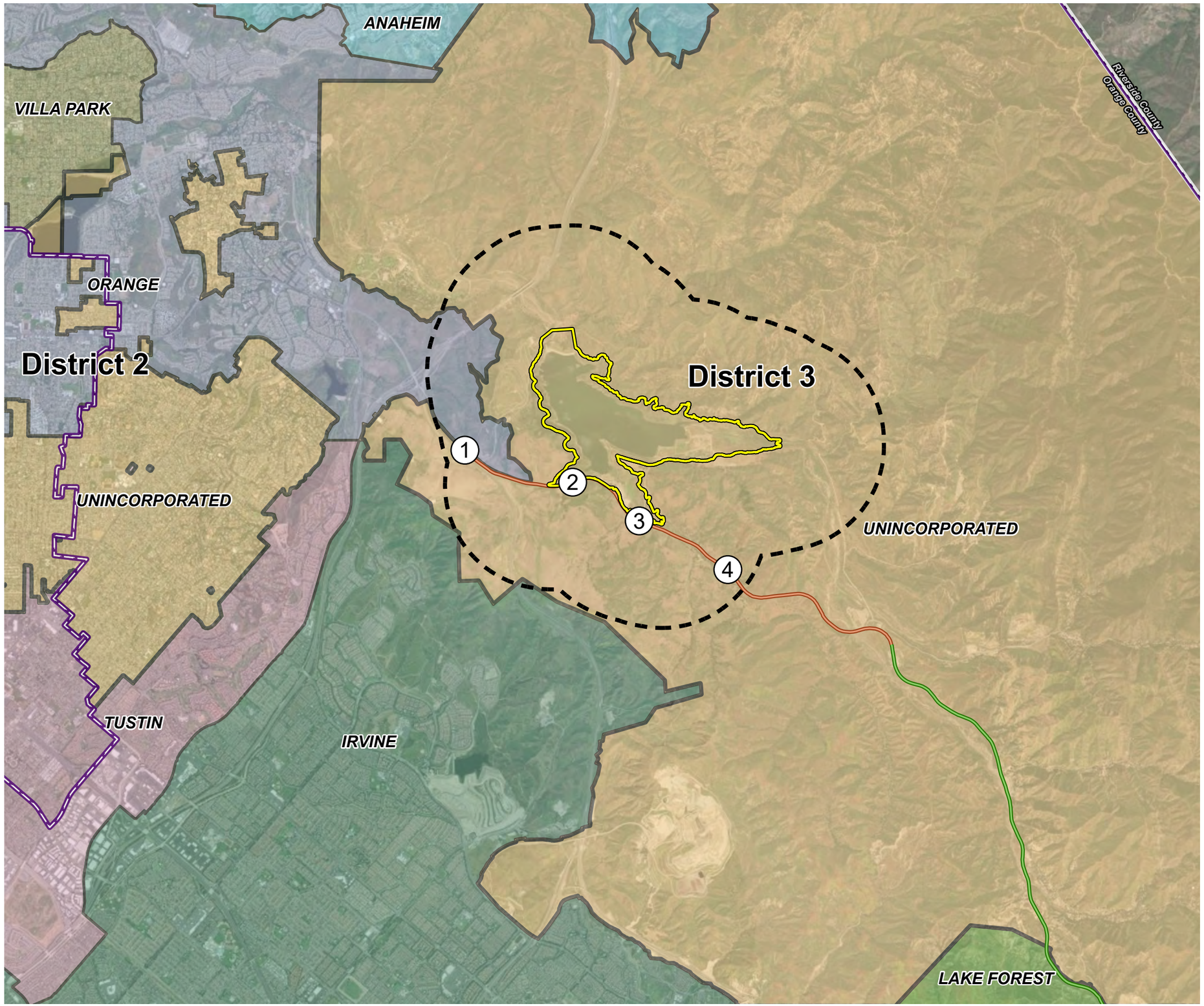
(B) A summary of projections contained in an adopted local, regional, or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include: a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program. Any such document shall be referenced and made available to the public at a location specified by the lead agency.

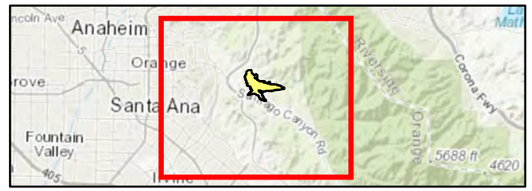
To provide an evaluation of the potential cumulative impacts for the proposed Project, both the list approach (Section 15130(b)(1)(A)) and the growth projections approach (Section 15130(b)(1)(B)) to the analysis have been used. In keeping with the CEQA Guidelines, this cumulative evaluation: (1) includes specific projects that, because of their size or proximity to the project site, have the potential to cause cumulative impacts ("related projects"); (2) considers the adopted general plans for the affected local jurisdictions; and (3) includes regional development projections. The following sections provide an overview of how the regional projections have been incorporated from adopted plans into the cumulative evaluation and a summary of the related projects that have been identified as potentially cumulative.

Reasonably Foreseeable Probable Future Projects

To ensure that the cumulative impact analysis is as comprehensive as possible, pending projects in surrounding cities are also included. Table 4-1 lists the approved and pending projects. It should be noted that, while the projects listed in Table 4-1 have been considered in the analysis, not all related projects would contribute to significant cumulative impacts for each topical area. The cumulative impact analysis in each topical area provides an evaluation of the cumulative projects that would contribute to that particular environmental topic's cumulative impacts. Some impacts are site-specific and would not compound the impacts associated with the proposed Project. Additionally, in certain cases, short-term impacts would not contribute to cumulative impacts because the construction of the cumulative projects and the development of the Project would not occur within the same time frame or in proximity to each other.

The locations of these projects listed in Table 4-1 are shown on Exhibit 4-1, Nearby Projects.





Biological Study Area

Biological Study Area - 1-mile Buffer

Supervisorial Districts

City Boundaries

- Anaheim
- Irvine
- Lake Forest
- Orange
- Tustin
- Unincorporated
- Villa Park

Projects within 1-mile Buffer

Santiago Canyon Road Safety Improvements Project

- SR-241 to Silverado Canyon Road
- Silverado Canyon Road to Live Oak Canyon Road
- 1 - Loma Ridge Jeep Trail
- 2 - Below Irvine Lake
- 3 - Haul Rd and SR-241
- 4 - Blue Diamond Haul Rd

City of Orange Housing Element*

County of Orange Housing Element*

**Housing Plan Elements apply to various areas throughout County of Orange and City of Orange and are not reflected in this map.*

N
W E
S

0 2,500 5,000 Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Nearby Projects

Exhibit 4–1

Santiago Creek Dam Improvement Project

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TABLE 4-1
APPROVED AND PENDING PROJECTS WITHIN 1-MILE RADIUS OF THE PROJECT SITE

Project	Proposed Land Uses/Project Description	Location	Determination/ Status
Santiago Canyon Road Safety Improvements Project - Loma Ridge Jeep Trail - Below Irvine Lake - Haul Rd and SR-241 - Blue Diamond Haul Rd	The Santiago Canyon Road Safety Improvements project includes various roadway measures designed to improve safety for road users, enhance driver awareness, and reduce the likelihood of vehicular accidents.	Santiago Canyon Road	In Construction
City of Orange Housing Element	This update is the 6th Cycle Housing Element update and will plan for the period from 2021–2029. The Housing Element provides the primary policy guidance for housing for the City's decisionmakers crafted to address housing opportunities and needs for present and future residents.	City of Orange	Planning
County of Orange Housing Element	The County of Orange is currently updating the Housing Element for the 6th cycle, which covers the planning period from 2021–2029.	County of Orange	Planning

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4.1 AESTHETICS

This section of the Environmental Impact Report (EIR) describes the existing aesthetic character and visual resources of the Project area and identifies associated potential aesthetic impacts related to development of the proposed Project.

4.1.1 REGULATORY SETTING

Federal

National Scenic Byway Program

The National Scenic Byways program is part of the U.S. Department of Transportation, Federal Highway Administration. The program was established under the Intermodal Surface Transportation Efficiency Act of 1991 and was reauthorized in 1998 under the Transportation Equity Act for the 21st Century. Under the program, the U.S. Secretary of Transportation recognizes certain roads as National Scenic Byways or All-American Roads based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. The only National Scenic Byway located within Southern California is the Arroyo Seco Historic Parkway–Route 110 in Los Angeles County (Federal Highway Administration 2023). This National Scenic Byway is located 38 miles from the proposed Project site.

State

California Department of Transportations (Caltrans)

The State Scenic Highway Program, created by the California Legislature in 1963, was established to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to the highways. A highway is designated under this program when a local jurisdiction adopts a scenic corridor protection program, applies to the California Department of Transportation (Caltrans) for scenic highway approval, and receives notification from Caltrans that the highway has been designated as a scenic highway. When a city or county nominates an eligible scenic highway for official designation, it defines the scenic corridor, which is land generally adjacent and visible to a motorist on the highway. The nearest officially designated State scenic highway is a segment of State Route (SR) 91, which is approximately 6 miles northwest of the Project site (Caltrans 2023).

Local

County of Orange General Plan

Resources Element

The County of Orange General Plan, Resources Element, contains a comprehensive strategy for the development, management, preservation and conservation of resources that are necessary to meet Orange County's existing and future demands. This strategy entails a framework of resource goals, policies, and programs. The General Plan identifies Landforms as a natural resource and discusses the aesthetic value of the diverse combination of mountains, hills, flatlands, and shoreline within the County of Orange. Additionally, the General Plan discusses policies in use to maintain scenic views such as sign restriction zoning and the Scenic Highway Component of the Transportation Element.

The Resources Element also discusses the value of Open Space within the County of Orange and how that relates to the aesthetic quality of the County. The value of open space to Orange County includes shaping the overall urban form, providing outdoor recreation opportunities, enhancing and protecting scenic vistas, ensuring public health and safety, preserving valuable natural resources, and providing areas for the managed production of resources.

The following are relevant policies, goals, and objectives related to aesthetic resources identified in the General Plan, Resources Element:

Natural Resources Component

Policy 5: To protect the unique variety of significant landforms in Orange County through environmental review procedures and community and corridor planning activities.

Open Space Component

Goal 1: Retain the character and natural beauty of the environment through the preservation, conservation, and maintenance of open space.

Policy 1.1: To guide and regulate development of the unincorporated areas of the County to ensure that the character and natural beauty of Orange County is retained.

Transportation Element

The County of Orange General Plan, Transportation Element, contains a Scenic Highway Plan, which designates “landscape corridors” and “viewscape corridors” within the county. No designated landscape corridors occur near the site. The closest viewscape corridor to the Project site is Santiago Canyon Road, approximately 1.3 miles west of the Project site. The Transportation Element defines the goals, objectives, and policies pertaining to the implementation of the Scenic Highways Plan. The following are relevant policies, goals, and objectives related to aesthetic resources identified in the General Plan, Transportation Element:

Scenic Highway Plan

Goal 1: Preserve and enhance unique or special aesthetic and visual resources through sensitive highway design and the regulation of development within the scenic corridor.

Objective 1.1: Protect and enhance the County’s beauty, amenities, and quality of life within the unincorporated areas.

4.1.2 METHODOLOGY

The aesthetics analysis in this section is based on a variety of data sources including field reconnaissance, site photographs, and evaluation of the Project in the context of surrounding existing land uses. Additionally, the Project was evaluated for potential conflicts with applicable zoning and other regulations governing aesthetics.

4.1.3 EXISTING CONDITIONS

Visual Character of the Site and Surrounding Areas

Santiago Creek Dam is located at the northwest end of Irvine Lake in unincorporated Orange County, California. The Project is south of SR-261 and east of SR-241 and Santiago Canyon Road. Existing structures include the dam, outlet tower in Irvine Lake, spillway channel, flashboard storage shed, control house/outlet works, energy dissipater structure, dam keeper's house, a portion of the Irvine Lake pipeline, and dam access road.

The Project site is located on the U.S. Geological Survey's Black Star Canyon 7.5-minute quadrangle. It is within the Santa Ana Watershed. The drainage area for the Project encompasses approximately 63.4 square miles. Irvine Lake (also called the Santiago Creek Reservoir) was originally constructed in 1931 to store water for the benefit of the surrounding communities.

The Santiago Creek Dam is a compacted earthfill embankment constructed in 1933 that is under the jurisdiction of the State of California, Department of Water Resources, Division of Safety of Dams. Santiago Creek Dam allows Irvine Ranch Water District (IRWD) to impound water within Irvine Lake, a critical water supply reservoir for IRWD. Per the terms of the Water Service Reliability Agreement between IRWD and Serrano Water District (SWD), water provided by IRWD to SWD to either backstop or augment SWD's use of groundwater may be sourced from Irvine Lake. The reservoir provides flood control, water supply, fisheries enhancement, and recreational opportunities for the surrounding area. The existing silt level within the lake varies throughout the lake; however, it is estimated that the accumulated sediment occupies approximately 2,150 acre-feet of the lake to date.

The outlet works for the dam consists of a tower, an outlet conduit, and downstream control house. A concrete-encased welded steel pipe outlet conduit is located at the base of the outlet tower and runs beneath the dam to the toe of the dam where a bifurcation valve splits the flow into a main pipe and diverter pipe. The main pipe supplies water to IRWD.

The existing spillway is a reinforced concrete structure located on the left abutment of the dam and consists of an approach, control structure, chute, and flip bucket at the downstream end. The spillway has vertical reinforced concrete walls through the length and a bridge structure with piers at the spillway crest. The spillway crest elevation is located at elevation 791.9 feet. Historical records of spillway flows at Santiago Creek Dam indicate that the spillway has flowed 24 times between 1937 and 2019 (82 years). The downstream end of the spillway was extensively modified in 1969 and 1970 after sustaining significant damage during a February 1969 flood event. The damaged waste channel and spillway chute were removed, and a new flip bucket was constructed at the end of the existing spillway chute.

This EIR includes a series of photographs depicting the Project site in its existing condition. Exhibit 4.1-1a depicts the site photograph locations. Exhibits 4.1-1b through 4.1-1d present photographs that depict the existing visual character of the site.

- **View 1 – View from the East Bank Looking Northwest Toward the Lake and Dam.** As shown in Exhibit 4.1-1b, the main focal point of this view is Irvine Lake, which is shown surrounded by sparse vegetation. The dam and accessory structures are visible in the background. Additionally, views of the surrounding Santa Ana Mountains can be seen beyond the dam.
- **View 2 – View from the Midpoint of the Dam Access Road Looking East Toward the Eastern Property Boundary.** As shown in Exhibit 4.1-1b, the access road is currently

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Site Photograph Locations

Exhibit 4.1-1a

Santiago Creek Dam Improvement Project

N W E S

0 900 1,800 Feet

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View 1: View from the East Bank Looking Northwest Toward the Lake and Dam.

View 2: View from the Midpoint of the Dam Access Road Looking East Toward the Eastern Property Boundary.

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Site Photographs

Exhibit 4.1-1b

Santiago Creek Dam Improvement Project

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View 3: View from the North Bank Looking North toward the North Side of the Dam from the Bridge.

View 4: View from the West Bank Looking East toward the Dock.

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Site Photographs

Exhibit 4.1-1c

Santiago Creek Dam Improvement Project

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View 5: View from Santiago Canyon Road Looking Northwest toward the Dam.

View 6: View from Santiago Canyon Road Looking East toward Oak Canyon Park.

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Site Photographs

Exhibit 4.1-1d

Santiago Creek Dam Improvement Project

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lined with metal safety poles. Irvine Lake is visible to the right in this view. In the distance, the dam keeper's house can be seen at the end of the access road and the Santa Ana Mountains can be seen in the background.

- **View 3 – View from the North Bank Looking North toward the North Side of the Dam from the Bridge.** As shown in Exhibit 4.1-1c, the main focal point of this view is the empty concrete spillway, which can be seen from the bridge. The spillway is surrounded by dense vegetation. Additionally, the Santa Ana Mountains can be seen in the background.
- **View 4 – View from the West Bank Looking East toward the Dock.** As shown in Exhibit 4.1-1c, the prominent view of this photograph is the dock located on the west bank. A boat can be seen moored along the dock. The bank is covered with sand and sparse vegetation. A trash bin and orange/reflective poles can be seen lining the bank. Past Irvine Lake, views of the Santa Ana Mountains can be seen in the background.
- **View 5 – View from Santiago Canyon Road Looking Northwest toward the Dam.** As shown in Exhibit 4.1-1d, the prominent view of this photograph is the boat ramp located on the south bank. Green, low-growing vegetation is present along the bank, and Irvine Lake is fully visible. The dam is visible from this location, and the Santa Ana Mountains are visible in the background.
- **View 6 – View from Santiago Canyon Road Looking East toward Oak Canyon Park.** As shown in Exhibit 4.1-1d, the main focal point of this view is Irvine Lake and the bank located to the south. Green, low-growing vegetation is visible in the mid-ground, and the bank areas farther to the northeast are comprised of sand and sparse vegetation. Additionally, the foothills of the Santa Ana Mountains can be seen in the background.

Surrounding land uses primarily consist of undeveloped open space. Irvine Regional Park is located northwest of SR-241; Limestone Canyon Regional Park is located south of Santiago Canyon Road; and Oak Canyon Park is located at the southeast end of Irvine Lake. The closed Santiago Canyon Landfill is located adjacent to the west of Irvine Lake. Residential development is located west of SR-241 approximately 1.8 miles away from the Project.

4.1.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, the Project would result in a significant aesthetics impact if it would:

Threshold 4.1-1 Substantially degrade the existing visual character or quality of public views of the site and its surroundings (Public views are those that are those that are experienced from publicly accessible vantage points). If the project is in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.

Threshold 4.1-2 Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

4.1.5 IMPACT ANALYSIS

Project Design Features

PDF AES-1 The Project will design and operate lighting for construction, security, or equipment maintenance to conform to the requirements of the Occupational Safety and Health Administration, Code of Federal

Regulations (CFR)-29, Standard 1926.56 and any Orange County light pollution regulations. Additionally, the Project will orient lighting to minimize effects to the community and adjacent sensitive habitat areas.

PDF AES-2 To the extent feasible, the Project will direct night lighting away from sensitive native habitats and provide low-sodium or similar lighting equipped with shields to focus light downward.

Threshold 4.1-1

Would the Project substantially degrade the existing visual character or quality of public views of the site and its surroundings (Public views are those that are experienced from publicly accessible vantage points)? If the Project is in an urbanized area, would the Project conflict with applicable zoning and other regulations governing scenic quality?

Less Than Significant Impact. As described above in Section 4.1.3, Existing Conditions, Santiago Creek Dam is located at the north end of Irvine Lake. The Project is located south of SR-261 and east of SR-241 and Santiago Canyon Road. Existing structures include the dam crest, outlet tower in Irvine Lake, spillway channel, flashboard storage shed, control house/outlet works, energy dissipater structure, dam keeper's house, a portion of the Irvine Lake pipeline, and dam crest access road.

As discussed in Section 3.0, Project Description, the proposed Project requires replacement of the existing Santiago Creek Dam outlet tower and construction of a new inclined outlet structure located near the left abutment of the existing dam and to replace the existing spillway with a side-channel spillway on the left abutment. The proposed outlet tower would be similar in size and height to the existing tower and would provide visual improvements over the older outlet tower. As replacement of the outlet tower would be similar to the existing visual setting, the Project would not significantly alter the long-term visual character of the site associated with these improvements. The Project would also modify the existing dam embankment by removing the dam face, constructing a filter drain system, and encapsulating the filter drain system with embankment shell material. The dam crest elevation would also be raised up to approximately one foot and widened to approximately 35 to 45 feet wide to accommodate a wider access road, and protective railings would be installed on both sides of the access road. The modifications would alter the dam embankment and crest; however, these components would remain similar in function and visual appearance to existing conditions, and these changes would not significantly alter the visual character of the site. In addition, no changes would be made to the property limits as part of this Project.

The proposed Project would modify the existing views of the site during short-term construction activities and long-term operation; long-term changes to views during Project operation would be associated with improvements to the dam, spillway, outlet tower, and dam embankment and crest; removal of existing minor features such as the existing dam keeper's house; and relocation of existing Southern California Edison (SCE) overhead power lines and power poles (refer to Exhibit 3-16, Conceptual SCE Site Plan). However, proposed visual changes associated with Project improvements would be mainly related to relocation, replacement, and upgrade of the existing site features, and would be consistent with the existing character of the Project site. As no new or visually unique uses are proposed, long-term operational impacts would be less than significant.

As Irvine Lake is visible from Santiago Canyon Road and SR-241, there would be temporary visual impacts during construction, due to the lake being drained and the presence of construction equipment. Draining the lake would temporarily alter the visual appearance of the site, exposing

the dry lakebed and creating a contrast with the surrounding vegetation and hills. However, these impacts would be short-term, and the lake would be refilled after construction is completed. Therefore, draining the lake would not result in a substantial or permanent degradation of the visual environment.

Also, primary viewers of construction activities would include passing motorists along Santiago Canyon Road and SR-241 who would have limited views of the Project site and visitors to Oak Canyon Park. However, construction and construction equipment staging impacts would be temporary in nature. Although the construction schedule would occur over approximately three years or 36-month period, the actual areas impacted by construction would shift among various locations on the Project site throughout this time, allowing for some visual relief from public viewpoints during this time period. Therefore, due to the temporary nature of construction, the Project would not substantially degrade the existing visual character or quality of public views of the site and its surroundings and a less than significant impact would occur. No mitigation is required.

Impact Conclusion: *The proposed Project would not substantially degrade the existing visual character or quality of public views of the site and its surroundings. Additionally, the Project would not conflict with applicable zoning and other regulations governing scenic quality. Impacts would be less than significant, and no mitigation is required.*

Threshold 4.1-2

Would the Project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less Than Significant Impact. Under existing conditions, the Santiago Creek Dam has on-site security lighting; this type of lighting would remain as part of the proposed Project. As with existing on-site security lighting, there would be minimal overspill beyond the physical limits of the facilities. Additionally, the Project would implement **PDF AES-1**, which requires conformance with all applicable light pollution regulations, and would orient lighting to minimize effects to the community and nearby sensitive habitat areas.

During Project construction, occasional nighttime lighting, primarily for safety and security reasons, would be required resulting in a temporary impact. However, the Project would implement **PDF AES-2**, which would direct construction lighting away from adjacent residences and nearby sensitive habitats, in addition to providing lighting equipped with shields to focus light downward. Due to the remote nature of the Project site and its distance from residential land uses, these temporary impacts would be less than significant. Project impacts pertaining to light or glare would be less than significant, and no mitigation is required.

Impact Conclusion: *The proposed Project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. Impacts would be less than significant with implementation of **PDF AES-1** and **PDF AES-2**, and no mitigation is required.*

4.1.6 CUMULATIVE IMPACTS

When evaluating cumulative aesthetic impacts, a number of factors must be considered. In order for a cumulative aesthetic impact to occur, the proposed elements of the cumulative projects would need to be visible together or in proximity to each other. If the projects were not in proximity to each other, the viewer would not perceive them in the same visual landscape. The context in

which a project is being viewed would also influence the significance of the aesthetic impact. The contrast the Project presents with its surrounding environment may actually be reduced by the presence of other cumulative projects. As it pertains to aesthetic impacts, the key projects in terms of cumulative impacts analysis would be the projects in proximity to the site. These projects include the following segments of the Santiago Canyon Road Safety Improvements project: Loma Ridge Jeep Trail, Below Irvine Lake, Haul Road and SR-241, and Blue Diamond Haul Road. Locations of these segments in relation to the Project site can be found on Exhibit 4-1, Nearby Projects, in Section 4.0, Impact Analysis. These related projects are all beyond the Project viewshed and would not be visible in combination with the proposed Project. Therefore, cumulative aesthetic impacts would be less than significant.

4.1.7 MITIGATION PROGRAM

Mitigation Measures

The proposed Project would not result in significant aesthetics impacts; therefore, no mitigation measures are required.

4.1.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Project-specific and cumulative impacts to aesthetics associated with the Project would be less than significant. No significant unavoidable impacts would occur.

4.1.9 REFERENCES

California Department of Transportation (Caltrans). 2023. California Scenic Highway Mapping System. https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways.

Federal Highway Administration. 2023 (March 28, date accessed). America's Byways: California. https://fhwaapps.fhwa.dot.gov/bywaysp/States/Show/CA. Washington, CA: FHA.

4.2 AIR QUALITY

This section identifies and evaluates the proposed Project's potential to have adverse effects related to air quality during construction and operation. Emission calculations associated with this Project can be found in Appendix B of this EIR. Impacts from greenhouse gas (GHG) emissions are addressed in Section 4.7, Greenhouse Gas Emissions, of this EIR.

4.2.1 BACKGROUND

The U.S. Environmental Protection Agency (USEPA) defines seven "criteria" air pollutants: Sulfur Dioxide (SO_2), Carbon monoxide (CO), Nitrogen Dioxide (NO_2), Ozone (O_3), inhalable particulate matter with particles equal to or smaller than 10 microns in size (PM_{10}), fine particulate matter, with particles smaller than or equal to 2.5 microns ($PM_{2.5}$), and lead. Criteria air pollutants are those that have established ambient air quality standards that are designed to protect public health. The characteristics and health effects of these criteria pollutants are described below:

Ozone (O_3)

O_3 is a secondary pollutant; it is not directly emitted. O_3 is formed by chemical reactions between volatile organic compounds (VOCs; also referred to as reactive organic gases [ROGs]) and nitrogen oxides (NO_x), which occur only in the presence of bright sunlight. VOC/ROG emissions are generally unburned hydrocarbons that are a result of motor vehicle travel and other combustion sources. NO_x is also a result of the combustion process, most notably due to the operation of motor vehicles. Sunlight and hot weather cause ground-level O_3 to form. (Not to be confused with the "ozone layer" which occurs very high in the atmosphere and shields the planet from some ultraviolet rays.) As a result, O_3 is known as a summertime air pollutant. Ground-level O_3 is the primary constituent of smog. Because ground-level O_3 is formed in the atmosphere, high concentrations can occur in areas well away from sources of its constituent pollutants.

People with lung disease, children, older adults, and people who are active are the most sensitive when O_3 levels are unhealthy. Numerous scientific studies have linked ground-level O_3 exposure to a variety of health problems, including:

- lung irritation that can cause inflammation;
- wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities;
- permanent lung damage to those with repeated exposure to O_3 pollution; and
- aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis.

Ground-level O_3 can also have detrimental effects on plants and ecosystems. These effects include:

- interfering with the ability of sensitive plants to produce and store food, making them more susceptible to certain diseases, insects, other pollutants, competition, and harsh weather;
- damaging the leaves of trees and other plants, negatively impacting the appearance of urban vegetation, national parks, and recreation areas; and
- reducing crop yields and forest growth, potentially impacting species diversity in ecosystems.

Currently, the South Coast Air Basin (SoCAB) is designated as a "Nonattainment Area" for the State and federal O_3 standards.

Particulate Matter (PM_{10}, $PM_{2.5}$, and UFP)

Particulate matter includes both aerosols and solid particles of a wide range of size and composition. Of particular concern are PM_{10}; $PM_{2.5}$; and ultrafine particulate matter (UFP), which are particles less than 0.1 micron in diameter. The size of the particulate matter refers to the aerodynamic diameter of the particulate. Smaller particulates are of greater concern because they can penetrate deeper into the lungs than large particles. $PM_{2.5}$ is directly emitted in combustion exhaust and fugitive dust and is formed from atmospheric reactions between various gaseous pollutants, including NO_x, sulfur oxide (SO_x), and VOCs. PM_{10} is directly emitted as a result of mechanical processes that crush or grind larger particles or from the re-suspension of dust, most typically through construction activities and vehicular travel. $PM_{2.5}$ and PM_{10} can remain suspended in the atmosphere for days and/or weeks and can be transported long distances. Ultrafine particles are the smallest particles and are good indicators of any kind of fuel burning, from diesel engines to refinery operations.

The principal health effects of airborne particulate matter are on the respiratory and cardiac systems. According to the USEPA, some people are more sensitive than others to breathing fine particles (USEPA 2023).

Short-term exposure to high $PM_{2.5}$ levels is associated with premature mortality and increased hospital admissions and emergency room visits. Long-term exposure to high $PM_{2.5}$ levels is associated with premature mortality and development of chronic respiratory disease. Short-term exposure to high PM_{10} levels is associated with hospital admissions for cardiopulmonary diseases, increased respiratory symptoms, and possible premature mortality. There are national and State 24-hour PM_{10} standards, but there is no annual long-term standard. With respect to long-term PM_{10} health effects, the USEPA concluded in a 2006 standards review that analysis of air quality data showed that the 24-hour PM_{10} standard generally resulted in annual average PM_{10} levels at or below the annual standard of 50 micrograms per cubic meter ($\mu g/m^3$) and that available evidence did not suggest an association between long-term exposure to PM_{10} at 2006 ambient levels and health problems. Based on this conclusion, the national PM_{10} annual standard was revoked (USEPA 2006). However, the State of California maintains an annual PM_{10} standard.

No federal or State standards have been established for UFP. Currently, the SoCAB is designated as a "Nonattainment area" for State standards for PM_{10} and an "Attainment/Maintenance area" for federal standards for PM_{10}. The SoCAB is designated as "Nonattainment area" for State and federal standards for $PM_{2.5}$.

Carbon Monoxide (CO)

CO is a colorless and odorless gas which, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. CO combines with hemoglobin in the bloodstream and reduces the amount of oxygen that can be circulated through the body. High CO concentrations can lead to headaches, aggravation of cardiovascular disease, and impairment of central nervous system functions. Carbon monoxide concentrations can vary greatly over comparatively short distances. Relatively high concentrations are typically found near crowded intersections; along heavily used roadways carrying slow moving traffic; and at or near ground level. Even under the most severe meteorological and traffic conditions, high CO concentrations are limited to locations within a relatively short distance (i.e., up to 600 feet or 185 meters) of heavily traveled roadways. Overall, CO emissions are decreasing as a result of the Federal Motor

Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973.

Currently, the SoCAB is in attainment for State and federal one-hour and eight-hour standards for CO.

Nitrogen Dioxide (NO_2)

Nitrogen gas, normally relatively inert (unreactive), comprises about 80 percent of the air. At high temperatures (i.e., in the combustion process) and under certain other conditions, it can combine with oxygen to form several different gaseous compounds collectively called nitrogen oxides (NO_x). Nitric oxide is converted to NO_2, a red-brown pungent gas, in the atmosphere. Motor vehicle emissions are the main source of NO_x in urban areas.

NO_2 is toxic to various animals and to humans. Its toxicity relates to its ability to form nitric acid with water in the eye, lung, mucus membrane, and skin. In animals, long-term exposure to NO_x increases susceptibility to respiratory infections, lowering their resistance to such diseases as pneumonia and influenza. Laboratory studies show susceptible humans, such as asthmatics, exposed to high concentrations of NO_2 can suffer lung irritation and, potentially, lung damage. Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes and with hospital admissions for respiratory conditions.

NO_x is primarily a combination of nitric oxide and NO_2. While the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) only address NO_2, the total group of nitrogen oxides is of concern. Nitric oxide and NO_2 are both precursors in the formation of O_3 and $PM_{2.5}$. Because of this and the fact that nitric oxide emissions largely convert to NO_2, NO_x emissions are typically examined when assessing potential air quality impacts. Currently, the SoCAB is in attainment for State and federal standards for NO_2.

Sulfur Dioxide (SO_2)

Sulfur oxides (SO_x) constitute a class of compounds of which SO_2 and sulfur trioxide (SO_3) are included. Ninety-five percent of pollution-related SO_x emissions are in the form of SO_2. SO_x emissions are typically examined when assessing potential air quality impacts of SO_2. Combustion of fossil fuels for generation of electric power is the primary contributor of SO_x emissions. Industrial processes, such as nonferrous metal smelting, also contribute to SO_x emissions. SO_x is also formed during combustion of motor fuels. However, most of the sulfur has been removed from fuels, greatly reducing SO_x emissions from vehicles.

SO_2 combines easily with water vapor, forming aerosols of sulfurous acid (H_2SO_3), a colorless, mildly corrosive liquid. This liquid may then combine with oxygen in the air, forming the even more irritating and corrosive sulfuric acid (H_2SO_4). Peak levels of SO_2 in the air can cause temporary breathing difficulty for people with asthma who are active outdoors. Longer-term exposures to high levels of SO_2 gas and particles cause respiratory illness and aggravate existing heart disease. SO_2 reacts with other chemicals in the air to form tiny sulfate particles which are measured as $PM_{2.5}$. SO_2 is monitored at several sites in the SoCAB, and the SoCAB is in attainment for the State and federal SO_2 standards.

Lead

Lead is a stable compound, which persists and accumulates both in the environment and in animals. In humans, it affects the blood-forming (or hematopoietic), the nervous, and the renal systems. In addition, lead has been shown to affect the normal functions of the reproductive, endocrine, hepatic, cardiovascular, immunological, and gastrointestinal systems, although there is significant individual variability in response to lead exposure. Since 1975, lead emissions have been in decline due in part to the introduction of catalyst-equipped vehicles and the decline in production of leaded gasoline. In general, an analysis of lead is limited to projects that emit significant quantities of the pollutant (e.g., lead smelters, battery manufacturers, and battery recyclers) and is not undertaken for transportation, residential, or commercial development projects. The SoCAB is in attainment for the State lead standard. The Los Angeles County portion of the SoCAB is classified nonattainment for the federal lead standard, but Orange County is in attainment.

Visibility Reducing Particles

Visibility reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consist of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The State standard is intended to limit the frequency and severity of visibility impairment due to regional haze. The SoCAB is “unclassified” for this pollutant. There are no federal standards for visibility reducing particulates.

Sulfates (SO_4)

Sulfates (SO_4) are the fully oxidized ionic form of sulfur. SO_4 occurs in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to SO_4 takes place comparatively rapidly and completely in California urban areas due to regional meteorological features.

The State SO_4 standard is designed to prevent aggravation of respiratory symptoms. Effects of SO_4 exposure at levels above the standard include a decrease in respiratory function; aggravation of asthmatic symptoms; and an increased risk of cardiopulmonary disease. SO_4 is particularly effective in degrading visibility and, due to fact that it is usually acidic, can harm ecosystems and damage materials and property. The SoCAB is in attainment for the State SO_4 standard.

Hydrogen Sulfide (H_2S)

H_2S is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. It can also be present in sewer gas and some natural gas, and it can be emitted as the result of geothermal energy exploitation. Breathing H_2S at levels above the standard will result in exposure to a very disagreeable odor. In 1984, a CARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance (California Air Resources Board [CARB] 20023. The SoCAB is “unclassified” for this pollutant.

Vinyl Chloride (Chloroethene)

Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.

Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure to vinyl chloride through inhalation and oral exposure causes liver damage. Cancer is a major concern from exposure to vinyl chloride via inhalation. Vinyl chloride exposure has been shown to increase the risk of angiosarcoma, a rare form of liver cancer in humans. Vinyl chloride is not routinely measured in the SoCAB. California has a vinyl chloride standard, but there is no corresponding federal standard.

Toxic Air Contaminants

In addition to criteria air pollutants, toxic air contaminants (TACs) emitted from mobile and stationary sources must be taken into consideration for projects proposing new sources of TAC emissions. TACs are those pollutants that are known or suspected to cause cancer or other serious health effects (e.g., reproductive effects or birth defects) or adverse environmental effects.

Installation and operation of stationary equipment that emit TACs generally require permits from the applicable air district, and a Health Risk Assessment (HRA) of TAC emissions may be a requirement under the permitting process. Land uses that would result in a long-term increase in mobile TAC emissions (e.g., distribution centers with diesel emissions from delivery trucks) also may require the preparation of an HRA. The HRA evaluates the risks posed to sensitive receptors (e.g., residents, schools, hospitals, and parks) in the vicinity of proposed TAC source(s) and must not exceed significance thresholds. Significance thresholds have been established in terms of cancer risk and hazard index.

Carcinogenic risks (i.e., cancer risks) are estimated as the incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a probability (e.g., 10 in 1 million). Hazard indices (HIs) express the potential for chemicals to result in non-cancer health impacts, and non-carcinogenic chemicals should not be present at levels expected to cause adverse health effects (i.e., HI greater than one). HIs are expressed using decimal notation (e.g., 0.001). If there is a reference exposure level of greater than 1, then impacts would be considered potentially significant. The National Contingency Plan (NCP, in accordance with *Code of Federal Regulations* [CFR], Title 40, Part 300) is commonly cited as the basis for target risk and hazard levels. According to the NCP, lifetime incremental cancer risks posed by a site should not exceed the range of between 1 in 1 million and 100 in 1 million.

Diesel Particulate Matter

Diesel particulate matter (DPM) is part of a complex mixture that makes up diesel exhaust emitted from a broad range of diesel engines, including on-road diesel engines of trucks, buses, and cars and the off-road road diesel engines that include locomotives, marine vessels, and heavy-duty equipment. Diesel exhaust is composed of gas and particles. The gas phase is composed of many urban hazardous air pollutants, such as acetaldehyde, benzene, and formaldehyde. The particle phase includes categories of fine and ultra-fine particles that, when inhaled, can cause immunological effects including lung inflammation and cellular changes in the lung. Human epidemiological studies demonstrate an association between diesel exhaust exposure and

increased lung cancer rates in occupational settings. In 1998, the California Office of Environmental Health Hazards listed DPM as a TAC based on its potential to cause cancer and other adverse health effects. Under California regulatory guidelines, diesel exhaust, as a mixture, is identified as a known carcinogen.

4.2.2 REGULATORY SETTING

Air quality in the SoCAB is regulated by USEPA, CARB, and the South Coast Air Quality Management (SCAQMD). Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although USEPA regulations may not be superseded, both State and local regulations may be more stringent. The Southern California Association of Governments (SCAG) is an important partner to the SCAQMD and produces estimates of anticipated future growth and vehicular travel in the basin that are used for air quality planning. The federal, State, regional, and local regulations for criteria air pollutants and TACs are discussed below.

Federal

The Federal Clean Air Act (CAA) requires the adoption of NAAQS, which are periodically updated to protect the public health and welfare from the effects of air pollution. The USEPA is responsible for setting and enforcing the NAAQS for criteria pollutants. Primary standards set limits to protect public health, including the health of at-risk populations such as people with pre-existing heart or lung disease (such as asthmatics), children, and older adults. Secondary standards set limits to protect public welfare, including protection against visibility impairment as well as damage to animals, crops, vegetation, and buildings.

Current federal standards are set for O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. These pollutants are called criteria pollutants because the USEPA has established NAAQS for the concentrations of these pollutants. CARB has also established standards for the criteria pollutants, known as CAAQS, and the State standards are generally more restrictive than the NAAQS. When a region has air quality that fails to meet the standards, the USEPA and the CARB designate the region as “nonattainment” and the regional air quality agency must develop plans to attain the standards. NAAQS are shown above in Table 4.2-1.

TABLE 4.2-1
CALIFORNIA AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary[a]	Secondary[b]
O_3	1 Hour	0.09 ppm (180 µg/m^3)	–	–
	8 Hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)	Same as Primary
PM_{10}	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary
	AAM	20 µg/m^3	–	Same as Primary
$PM_{2.5}$	24 Hour	–	35 µg/m^3	Same as Primary
	AAM	12 µg/m^3	9.0 µg/m^3	15.0 µg/m^3
CO	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	–
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	–
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
NO_2	AAM	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary
	1 Hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)	–
SO_2	24 Hour	0.04 ppm (105 µg/m^3)	–	–
	3 Hour	–	–	0.5 ppm (1,300 µg/m^3)
	1 Hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	–
Lead	30-day Avg.	1.5 µg/m^3	–	–
	Calendar Quarter	–	1.5 µg/m^3	Same as Primary
	Rolling 3-month Avg.	–	0.15 µg/m^3	
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per km – visibility ≥ 10 miles (0.07 per km – ≥30 miles for Lake Tahoe)	**No Federal Standards**	
Sulfates	24 Hour	25 µg/m^3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)		
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m^3)		

O_3: ozone; ppm: parts per million; µg/m^3: micrograms per cubic meter; PM_{10}: respirable particulate matter 10 microns or less in diameter; AAM: Annual Arithmetic Mean; –: No Standard; $PM_{2.5}$: fine particulate matter 2.5 microns or less in diameter; CO: carbon monoxide; mg/m^3: milligrams per cubic meter; NO_2: nitrogen dioxide; SO_2: sulfur dioxide; km: kilometer.

[a] *National Primary Standards:* The levels of air quality necessary, within an adequate margin of safety, to protect the public health.

[b] *National Secondary Standards:* The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Note: More detailed information on the data presented in this table can be found at the CARB website (www.arb.ca.gov).

Source: CARB 2024

Specific geographic areas are classified as either “attainment” or “nonattainment” areas for each pollutant based upon the comparison of measured data with the NAAQS. Attainment areas have concentrations of the criteria pollutant that are below the NAAQS, and a Nonattainment classification indicates the criteria pollutant concentrations have exceeded the NAAQS. When an area has been reclassified from a nonattainment to an attainment area for a federal standard, the status is identified as “maintenance”, and there must be a plan and measures that will keep the

region in attainment for the following ten years. Areas designated as nonattainment are required to prepare regional air quality plans, which set forth a strategy for bringing an area into compliance with the standards. These regional air quality plans, which are developed to meet federal requirements, are included in an overall program referred to as the State Implementation Plan (SIP).

State

CARB, a part of the California Environmental Protection Agency (CalEPA), has also established the CAAQS shown in Table 4.2-1, which are generally more restrictive than the NAAQS. CARB conducts research; compiles emissions inventories; develops suggested control measures; provides oversight of local programs; and prepares the SIP. For regions that do not attain the CAAQS, CARB requires the local air districts to prepare plans for attaining the standards. CARB establishes emissions standards for motor vehicles sold in California, consumer products (e.g., hair spray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

Based on monitored air pollutant concentrations, the USEPA and the CARB designate an area's status in attaining the NAAQS and the CAAQS, respectively, for selected criteria pollutants. These attainment designations are shown in Table 4.2-2. As identified in Table 4.2-2, Orange County is a nonattainment area for O_3, PM_{10}, and $PM_{2.5}$.

TABLE 4.2-2
ATTAINMENT STATUS OF CRITERIA POLLUTANTS
IN THE SOUTH COAST AIR BASIN

Pollutant	State	Federal
O_3 (1 hour)	Nonattainment	No standard
O_3 (8 hour)		Extreme Nonattainment
PM_{10}	Nonattainment	Attainment/Maintenance
$PM_{2.5}$	Nonattainment	Serious Nonattainment
CO	Attainment	Attainment/Maintenance
NO_2	Attainment	Attainment/Maintenance
SO_2	Attainment	Attainment
Lead	Attainment	Attainment/Nonattainment*
All others	Attainment/Unclassified	No standards

O_3: ozone; PM_{10}: respirable particulate matter 10 microns or less in diameter; $PM_{2.5}$: fine particulate matter 2.5 microns or less in diameter; CO: carbon monoxide; NO_2: nitrogen dioxide; SO_2: sulfur dioxide; SoCAB: South Coast Air Basin.

* Los Angeles County is classified nonattainment for lead; the remainder of the SoCAB is in attainment of the State and federal lead standards.

Source: SCAQMD 2016.

Regional

South Coast Air Quality Management District and Southern California Association of Governments

In the SoCAB, the SCAQMD is the agency responsible for protecting public health and welfare through the administration of federal and State air quality laws, regulations, and policies. Included in the SCAQMD's tasks are the monitoring of air pollution; the preparation of the Air Quality Management Plan (AQMP) for the SoCAB; and the promulgation of rules and regulations.

In the Project area, SCAG is the federally designated Metropolitan Planning Organization and the State-designated transportation planning agency for six counties: Riverside, San Bernardino, Los Angeles, Ventura, Imperial, and Orange. On April 4, 2024, SCAG's Regional Council adopted the 2024–2050 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS; Connect SoCal). The RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The RTP/SCS includes a strong commitment to reduce emissions from transportation sources in order to improve public health and to meet the NAAQS as set forth by the CAA.

The SCAQMD and SCAG are jointly responsible for formulating and implementing the AQMP for the SoCAB. SCAG's Regional Mobility Plan and Growth Management Plan form the basis for the land use and transportation control portion of the AQMP.

Air Quality Management Plan

Air quality in Orange County is partially regulated by the SCAQMD, which is the agency principally responsible for comprehensive air pollution control in the SoCAB. The SCAQMD develops rules and regulations; establishes permitting requirements for stationary sources; inspects emissions sources; and enforces such measures through educational programs or fines, when necessary. The SCAQMD is directly responsible for reducing emissions from stationary (area and point), mobile, and indirect sources.

The Federal CAA requires the preparation of plans to demonstrate attainment of the NAAQS for which an area is designated as being in nonattainment. Furthermore, the CAA requires the revision of these plans every three years to address reducing pollutant concentrations that exceed the CAAQS. The SCAQMD and SCAG, in coordination with local governments and the private sector, develop the AQMP for the SoCAB to satisfy these requirements. The AQMP is the most important air management document for the SoCAB because it provides the blueprint for meeting State and federal ambient air quality standards.

The current regional plan applicable to the Project is the SCAQMD's 2022 AQMP. The SCAQMD is responsible for ensuring that the SoCAB meets the NAAQS and CAAQS by reducing emissions from stationary (area and point), mobile, and indirect sources. To accomplish this goal, the SCAQMD prepares AQMPs in conjunction with the SCAG, County transportation commissions, and local governments; develops rules and regulations; establishes permitting requirements for stationary sources; inspects emissions sources; and enforces such measures through educational programs or fines, when necessary.

The 2022 AQMP was adopted on December 2, 2022, by the SCAQMD Governing Board. The 2022 AQMP evaluates integrated strategies and measures to meet the following NAAQS (SCAQMD 2022):

- 8-hour O_3 target of 80 parts per billion (ppb) by 2024, 75 ppb by 2032, 70 ppb by 2038;
- Annual $PM_{2.5}$ (12 micrograms per cubic meter [µg/m^3]) by 2025;
- 1-hour O_3 (120 ppb) by 2023; and
- 24-hour $PM_{2.5}$ (35 µg/m^3) by 2023.

South Coast Air Quality Management District Rules

The Project will be required to comply with existing SCAQMD rules for the reduction of fugitive dust and criteria pollutant emissions. The following rules are most relevant to the proposed Project:

SCAQMD Rule 402, Nuisance, states that a project shall not "discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property".

SCAQMD Rule 403, Fugitive Dust, requires actions to prevent, reduce, or mitigate fugitive particulate matter emissions. These actions include applying water or chemical stabilizers to disturbed soils; managing haul road dust by applying water; covering all haul vehicles before transporting materials; restricting vehicle speeds on unpaved roads to 15 miles per hour (mph); and sweeping loose dirt from paved site access roadways used by construction vehicles. In addition, Rule 403 requires that vegetative ground cover be established on disturbance areas that are inactive within 30 days after active operations have ceased. Alternatively, an application of dust suppressants can be applied in sufficient quantity and frequency to maintain a stable surface. Rule 403 also requires grading and excavation activities to cease when winds exceed 25 mph.

Local

Unincorporated Orange County

There are no County regulations applicable to the Project's potential impacts on air quality. However, the Orange County General Plan addresses air quality in the unincorporated territory where the Project takes place. Within its Transportation Element, updated in 2020, the General Plan states that it is responsive to the AQMD objectives, and regional planning objectives of the SCAG.[1] Similarly, the Land Use Element notes that "the purpose of the Enhancement of Environment Policy is to ensure that all land use activities seek to enhance the physical environment, including the air, water, sound levels, landscape, and plant and animal life."[2] The Resources Element (2013) has the most robust discussion on air quality affecting the area. It advances the goal to promote optimum sustainable environmental standards for air resources with an explicit policy to develop and support programs which improve air quality or reduce air pollutant emissions.[3] The Project is consistent with these General Plan goals, plans, and objectives to enhance the physical environment including air and water in Orange County.

4.2.3 METHODOLOGY

California Emission Estimator Model

Proposed Project emissions were calculated by using California Emissions Estimator Model (CalEEMod) version 2022.1.1.20 (CAPCOA 2023). CalEEMod is a computer program accepted by the SCAQMD that can be used to estimate criteria pollutant and GHG emissions associated

[1] Orange County General Plan, Chapter IV. Transportation Element Update 2020. Accessed June 2023, https://ocds.ocpublicworks.com/sites/ocpwocds/files/2020-12/Chapter%20IV-%20Transportation%202020.pdf

[2] Orange County General Plan, Chapter III. Land Use Element Update 2024. Accessed November 2024, https://ocds.ocpublicworks.com/sites/ocpwocds/files/2024-07/Adopted%20Land%20Use%20Element%20Amendment%20-%20June%202024.pdf

[3] Orange County, General Plan, Resources Element 2013. Accessed June 2013, https://ocds.ocpublicworks.com/sites/ocpwocds/files/import/data/files/40235.pdf

with land development projects in California. CalEEMod has separate databases for specific Counties and air districts. The Orange County database was used for the Project. The model calculates emissions of CO, SO_2, PM_{10}, $PM_{2.5}$, and the O_3 precursors VOC and NO_x. For this analysis, the results are expressed in pounds per day (lbs/day) and are compared with the SCAQMD mass daily thresholds to determine impact significance.

Specific inputs to CalEEMod include land uses and acreages. Construction input data include, but are not limited to, (1) the anticipated start and finish dates of each Project construction activity (e.g., grading, building, and paving);[4] (2) inventories of construction equipment to be used during each Project activity; (3) areas to be excavated and graded for development; (4) volumes of materials to be imported to and exported from the Project site; and (5) areas to be paved. The input data and assumptions are discussed below and are shown in notes on the CalEEMod data in Appendix B. The CalEEMod has the capability to calculate reductions in construction emissions from the effects of dust control, off-road diesel-engine classifications, low-emission paints, and other selected measures.

Due to the lack of changes in operations between the existing dam and conditions under the proposed dam improvements, operations phase emissions have been addressed qualitatively.

Local Concentrations of Criteria Pollutants from On-Site Sources

As part of the SCAQMD's environmental justice program, attention has focused on localized effects of air quality and the exposure of persons to criteria pollutants generated on a project site. The SCAQMD developed localized significance threshold (LST) methodology and mass rate look-up tables that public agencies can use to determine whether or not a project may generate significant adverse localized air quality impacts. In addition to the mass daily emissions for regional thresholds, the SCAQMD established California Environmental Quality Act (CEQA) significance thresholds for ambient air quality to address localized impacts. The localized impact analysis is based on the concentration of a pollutant at a receptor site. The concentration standard is either the same as the NAAQS or CAAQS or is based upon a health-based standard. It is possible for a pollutant to have a significant impact regionally and a less than significant impact locally or vice versa. It is also possible for both impacts (i.e., regional and local) to be significant or less than significant. The look-up tables allow the evaluation of impacts without the complex task of dispersion modeling.

The analysis was not performed for operations because there would be no substantial on-site stationary sources of criteria pollutants with the proposed Project. The LST methodology translates the concentration standards into emissions thresholds.

The LST methodology addresses NO_2, CO, PM_{10}, and $PM_{2.5}$ emissions. SO_2 and lead are not included because these pollutants are generated in very small amounts in construction projects. O_3 is not included because it is a secondary pollutant, and local concentrations cannot be estimated from precursor emissions. For NO_2 and CO, the one-hour standards are used and receptors that could be exposed for one hour are considered. For PM_{10} and $PM_{2.5}$, the 24-hour standards are used, and the receptors of interest are those where persons could be exposed for 24 hours, such as residences. Because emissions are based on the ambient air quality standards, exceedance of the LST represents a potential health impact. As noted above, even if a standard

[4] Construction emissions were modeled in CalEEMod assuming a start date of 2024, which provides a conservative estimate of emissions given that construction equipment and vehicles generally become more efficient over time due to increasingly stringent regulations.

is exceeded, the potential impact can be confirmed or found to be less than significant by a more detailed analysis.

4.2.4 EXISTING CONDITIONS

Existing Air Quality Conditions

Air quality data for the Project site is represented by the Saddleback Valley monitoring station located in Lake Forest. Pollutants measured at the Saddleback Valley Monitoring Station include CO, O_3, PM_{10}, $PM_{2.5}$, and NO_2. The monitoring data presented in Table 4.2-3, Air Quality Levels Measured at the Saddleback Valley Monitoring Station, were obtained from the SCAQMD. Federal and State air quality standards are presented with the number of times those standards were exceeded.

TABLE 4.2-3
AIR QUALITY LEVELS MEASURED AT THE SADDLEBACK VALLEY MONITORING STATION

Pollutant	California Standard	National Standard	Year	Max. Level	Days State Standard Exceeded	Days National Standard Exceeded
O_3 (1 hour)	0.09 ppm	None	2020	0.171	20	—
			2021	0.105	2	—
			2022	0.110	1	—
O_3 (8 hour)	0.070 ppm	0.070 ppm	2020	0.122	32	32
			2021	0.081	8	8
			2022	0.088	6	5
CO (1 hour)	20 ppm	35 ppm	2020	1.7	0	0
			2021	0.8	0	0
			2022	1.2	0	0
CO (8 hour)	9 ppm	9 ppm	2020	0.8	0	0
			2021	1.0	0	0
			2022	1.0	0	0
PM_{10} (24 hour)	50 µg/m^3	150 µg/m^3	2020	53	0	1
			2021	35	0	0
			2022	31	0	0
PM_{10} (AAM)	20 µg/m^3	None	2020	16.8	0	0
			2021	15.6	0	0
			2022	15.3	0	0
NO_2 (1 Hour)	0.18 ppm	0.100 ppm	2020	—	—	—
			2021	—	—	—
			2022	—	—	—
$PM_{2.5}$ (24 Hour)	None	35 µg/m^3	2020	35	—	0
			2021	28.7	—	0
			2022	—	—	—

O_3: ozone; ppm: parts per million; —: Data Not Reported or insufficient data available to determine the value; CO: Carbon Monoxide; PM_{10}: respirable particulate matter with a diameter of 10 microns or less; µg/m^3: micrograms per cubic meter; AAM: Annual Arithmetic Mean; NO_2: nitrogen dioxide; $PM_{2.5}$: fine particulate matter with a diameter of 2.5 microns or less. N/A indicates that there is no applicable standard.

Source: SCAQMD 2024.

The monitoring data shows that O_3 is the air pollutant of primary concern in the Project area. At the monitoring station, the State 1-hour O_3 standard was exceeded 1–20 days annually between 2020–2022. The State and federal O_3 8-hour standard was also exceeded 6–32 days annually over the same time period. O_3 is a secondary pollutant and is not directly emitted from a source; it occurs as the result of photochemical reactions from O_3 precursors, which include VOCs and NO_2 and sunlight.

Sensitive Air Quality Receptors

Sensitive receptors include, but are not limited to, children, the elderly, persons with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. These sensitive receptors include, but are not limited to, schools, athletic facilities, hospitals, residential areas, parks, and convalescent homes. The Project site is located in a remote area with the nearest residential land uses located approximately 9,500 feet to the west. There are nearby parks which include Oak Canyon Park, which abuts Irvine Lake to the southeast; Irvine Regional Park, which is located approximately 1 mile northwest of Irvine Lake; and Irvine Lake Park, which abuts Irvine Lake to the southwest.

4.2.5 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant air quality impact if it would:

Threshold 4.2-1 Conflict with or obstruct implementation of the applicable air quality plan.

Threshold 4.2-2 Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State Ambient Air Quality Standard.

Threshold 4.2-3 Expose sensitive receptors to substantial pollutant concentrations.

Threshold 4.2-4 Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The SCAQMD's Air Quality Analysis Handbook (CEQA Handbook) provides significance thresholds for both construction and operation of projects within the SCAQMD's jurisdictional boundaries (SCAQMD 2023). The SCAQMD recommends that projects be evaluated in terms of the quantitative thresholds established to assess both the regional and localized impacts of project-related air pollutant emissions. Irvine Water Ranch District (IRWD) uses the current SCAQMD thresholds to determine whether a proposed project would have a significant impact. These SCAQMD thresholds are identified in Table 4.2-4.

TABLE 4.2-4
SOUTH COAST AIR QUALITY
MANAGEMENT DISTRICT AIR QUALITY
SIGNIFICANCE THRESHOLDS

Mass Daily Thresholds (lbs/day)		
Pollutant	**Construction**	**Operation**
VOC	75	55
NO_X	100	55
CO	550	550
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150
Lead	3	3

lbs/day: pounds per day; VOC: volatile organic compound; NO_x: nitrogen oxides; CO: carbon monoxide; PM_{10}: respirable particulate matter 10 microns or less in diameter; $PM_{2.5}$: fine particulate matter 2.5 microns or less in diameter; SO_x: sulfur oxides.

Source: SCAQMD 2023

4.2.6 IMPACT ANALYSIS

Project Design Feature

PDF AQ-1 Upon the initial dewatering of the reservoir at the start of construction, all exposed organic matter shall be removed from the reservoir by construction crews. Organic matter removal, including removal of plant and animal species, shall occur in accordance with all applicable laws, regulations, and permit conditions.

Threshold 4.2-1

Would the Project conflict with or obstruct implementation of the applicable air quality plan?

Significant and Unavoidable Impact. The SCAQMD develops rules and regulations; establishes permitting requirements for stationary sources; inspects emissions sources; and enforces such measures through educational programs or fines, when necessary. It is directly responsible for reducing emissions from stationary (area and point), mobile, and indirect sources and has prepared an AQMP that establishes a program of rules and regulations directed at attaining the NAAQS and CAAQS. As discussed previously, the current regional plan applicable to the Project is the SCAQMD's 2022 AQMP.

The main purpose of an AQMP is to bring an area into compliance with the requirements of federal and State air quality standards. For a project to be consistent with the AQMP, the pollutants emitted from the project should not (1) exceed the SCAQMD CEQA air quality significance thresholds or (2) conflict with or exceed the assumptions in the AQMP. As shown in Threshold 4.2-2 below, while long-term air pollutant emissions associated with Project operations would be less than significant, short-term air pollutant emissions associated with Project construction would exceed the SCAQMD thresholds and would result in a significant impact during construction even with the implementation of mitigation measures and compliance with SCAQMD regulatory requirements.

The County of Orange's General Plan designates the Project site as Open Space (5) (County of Orange 2015); additionally, the Project site falls within an Open Space Reserve (OSR) overlay. The Open Space (5) designation indicates the current and near-term use of the land, while the OSR overlay identifies lands of scenic and natural attraction, and areas of ecological, cultural, historical and recreational significance that are permanently preserved as and restricted to open space and compatible uses (County of Orange 2024). The County's General Plan allows for the development of water resource areas within these designations; moreover, the proposed Project is consistent with existing uses at the Project site. As such, the Project is consistent with the Zoning and Land Use designation of the County's General Plan. The General Plans of cities and counties within the SoCAB are used to determine the regional emissions of the Basin; therefore, emissions related to the Project site are therefore consistent with the growth expectations for the region.

While the operations phase of the Project is consistent with the AQMP, construction emissions associated with the Project would exceed the SCAQMD's significance thresholds despite the implementation of **MM AQ-1** due to the large amount of construction equipment that would be in operation as well as the proposed 20-hour workdays, which would result in greater emissions than over a standard eight-hour workday. As such, the Project's construction activities would conflict with the 2022 AQMP's goal of reducing criteria pollutant emissions. Consequently, the Project would result in a temporary significant and unavoidable impact related to consistency with the AQMP.

Impact Conclusion: *Based on the analysis presented, air pollutant emissions from the proposed Project would exceed the SCAQMD thresholds during construction and would result in a significant impact even with the implementation of mitigation measures and compliance with SCAQMD regulatory requirements. As a result, the Project's construction activities would conflict with the 2022 AQMP's goal of reducing criteria pollutant emissions. Subsequently, the Project would result in a temporary significant and unavoidable impact related to consistency with the AQMP, pursuant to Threshold 4.2-1.*

Threshold 4.2-2

Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?

Significant and Unavoidable Impact. A project may have a significant impact where project-related emissions would exceed federal, State, or regional standards or thresholds, or where project-related emissions would substantially contribute to an existing or projected air quality violation. As identified in Table 4.2-2, Orange County is a nonattainment area for O_3, PM_{10}, and $PM_{2.5}$. The Project would generate PM_{10}, $PM_{2.5}$, NO_2, and O_3 precursors (NO_x and VOC) during short-term construction and long-term operations. The SCAQMD has developed construction and operations thresholds to determine whether projects would result in a cumulatively considerable net increase of criteria pollutants. A project with daily emission rates below the SCAQMD's established air quality significance thresholds (shown previously in Table 4.2-4) would have a less than significant effect on regional air quality. Project emissions were estimated using the CalEEMod. CalEEMod is designed to model construction and operational emissions and allows for the input of project- and county-specific information. CalEEMod modeling results can be found in Appendix B.

Construction Emissions

Air pollutant emissions would occur from construction equipment exhaust; grading; exhaust and particulate emissions from trucks hauling building materials to and from the Project site; from automobiles and light trucks driven to and from the Project site by construction workers; and VOCs from asphalt paving operations. The proposed Project would comply with applicable SCAQMD rules and regulations, including Rule 403 for fugitive dust control. Rule 403 measures include regular watering of active grading areas and unpaved roads, limiting vehicle speeds on unpaved surfaces, stabilizing stockpiled earth, and curtailing grading operations during high wind conditions. Watering of active grading areas is included in the CalEEMod emissions analysis and results in reduced PM_{10} and $PM_{2.5}$ emissions. The emission reductions associated with compliance with Rule 403 have been included in the emissions calculations.

Regional Emissions Thresholds – Maximum Daily Regional Emissions

Project construction activities are those associated with the development of the Project components. Table 4.2-5 presents the estimated unmitigated maximum daily emissions during construction of the Project and compares the estimated emissions with the SCAQMD's daily regional emission thresholds.

TABLE 4.2-5
UNMITIGATED PROJECT MAXIMUM DAILY
REGIONAL CONSTRUCTION EMISSIONS

Year[1]	Emissions (lbs/day)					
	VOC	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Summer						
Year 1	5	49	43	<1	5	2
Year 2	241	468	573	1	68	35
Year 3	46	374	433	1	52	32
Winter						
Year 1	23	205	179	1	21	13
Year 2	55	472	501	1	56	35
Year 3	34	280	349	1	37	19
Year 4	7	59	56	<1	31	15
Maximum Project (Years 1 to 4)	**241**	**472**	**573**	**1**	**68**	**35**
SCAQMD Thresholds (Table 4.2-4)	*75*	*100*	*550*	*150*	*150*	*55*
Exceeds SCAQMD Thresholds?	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**

lbs/day: pounds per day; VOC: volatile organic compound; NO_x: nitrogen oxides; CO: carbon monoxide; SO_x: sulfur oxides; PM_{10}: respirable particulate matter 10 microns or less in diameter; $PM_{2.5}$: fine particulate matter 2.5 microns or less in diameter; SCAQMD: South Coast Air Quality Management District.

Source: SCAQMD 2023 (thresholds); see Appendix B for CalEEMod model outputs.

As shown in Table 4.2-5, Project related construction emissions would exceed the SCAQMD's significance thresholds for VOC and NO_x in Year 1; VOC, NO_x, and CO in Year 2; and NO_x and CO in Year 3. These exceedances are primarily due to the large number of construction equipment that would be in operation as well as the proposed 20-hour workdays, which would result in greater emissions than over a standard eight-hour workday. and would result in a significant impact to regional air quality prior to the implementation of mitigation measures. The Project would implement **MM AQ-1** which requires use of Tier 4 offroad construction engines to

minimize emissions during construction of the Project. Table 4.2-6 shows the emissions with the use of cleaner engines required under **MM AQ-1.**

TABLE 4.2-6
MITIGATED PROJECT MAXIMUM DAILY REGIONAL CONSTRUCTION EMISSIONS

Year	Emissions (lbs/day)					
	VOC	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Summer						
Year 1	2	22	69	<1	4	1
Year 2	221	147	749	1	61	25
Year 3	16	112	617	1	41	21
Winter						
Year 1	6	46	293	1	15	7
Year 2	19	137	733	1	44	22
Year 3	14	87	560	1	35	17
Year 4	2	9	76	<1	29	13
Maximum Project (Years 1 to 4)	**221**	**147**	**749**	**1**	**61**	**25**
SCAQMD Thresholds (Table 4.2-4)	*75*	*100*	*550*	*150*	*150*	*55*
Exceeds SCAQMD Thresholds?	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**

lbs/day: pounds per day; VOC: volatile organic compound; NO_x: nitrogen oxides; CO: carbon monoxide; SO_x: sulfur oxides; PM_{10}: respirable particulate matter 10 microns or less in diameter; $PM_{2.5}$: fine particulate matter 2.5 microns or less in diameter; SCAQMD: South Coast Air Quality Management District.

Source: SCAQMD 2019 (thresholds); see Appendix B for CalEEMod model outputs.

As shown in Table 4.2-6, even with implementation of **MM AQ-1**, Project construction would exceed established thresholds for VOC, CO and NO_x for Maximum Daily Regional Construction Emissions. Additionally, as shown in Table 4.2-6, implementation of **MM AQ-1** requiring use of Tier 4 offroad engine standards may result in higher CO emissions than for equipment with other engine standards. While CO emissions are higher with implementation of **MM AQ-1**, VOCs and NO_x would be reduced. VOCs and NO_x contribute to O_3 (smog) which has more health/environmental implications than CO; additionally, the region is in a state of attainment for CO pursuant to the ambient air quality standards. Therefore, **MM AQ-1** would reduce overall impacts associated with this threshold. Because the Project would exceed the SCAQMD's construction emissions thresholds even with implementation of **MM AQ-1**, construction emissions would be cumulatively considerable, and the impact would be significant and unavoidable.

Relating Adverse Air Quality Impacts and Health Effects

Estimating a project's pollutant concentration levels relies on a range of assumptions and uncertainties, leading to a high margin of error. Therefore, modeling these concentrations using existing tools would produce unreliable data and results. Moreover, due to the complexity of O_3 formation, a specific amount of NO_x or VOCs emitted in a particular area does not directly translate to a specific concentration of O_3 in that area. For example, areas with relatively low emissions of NO_x or VOCs can have high O_3 concentrations due to wind transport and other meteorological conditions such as temperature inversion and high-pressure systems. Conversely, areas with significantly higher NO_x and VOC emissions might experience lower O_3 concentrations due to factors like sea breezes, which disperse emissions. For projects where regional construction and operational emissions exceed the SCAQMD's recommended daily significance thresholds, it is not feasible to accurately determine the concentration of O_3 that would be created at or near the

project site on a specific day or month, or the specific human health effects that may occur as a result. Factors such as meteorology, sunlight, geographical distribution of emissions, and other complex photochemical processes all combine to determine the ultimate concentrations and locations of O_3 (City of Los Angeles 2019).

According to the Brief of Amicus Curiae (Brief) by the SCAQMD in the Friant Ranch case (April 6, 2015), SCAQMD staff lack a method to accurately quantify ozone-related health impacts from NO_x or VOC emissions from relatively small projects, due to photochemistry and regional model limitations. The Brief concludes that, for the Friant Ranch Environmental Impact Report (EIR), even if data were input into a methodology, the results would not be reliable or meaningful. Additionally, it should be noted that the occurrence of specific health conditions depends on numerous other factors that are difficult to quantify, such as an individual's genetic predisposition, diet, exercise regimen, stress, and other behavioral characteristics (SCAQMD 2015).

Conversely, SCAQMD does state in the Brief that this analysis may be feasible for very large regional projects and that SCAQMD has been able to correlate potential health outcomes with significant emission sources. For instance, emissions of 6,620 lbs/day of NO_x and 89,180 lbs/day of VOC were projected to cause approximately 20 premature deaths per year and 89,947 school absences due to O_3. As shown in Table 4.2-5, and Table 4.2-6, Project construction would not generate emissions of this magnitude. With implementation of **MM AQ-1**, Project construction would produce approximately 147 lbs/day of NO_x and 221 lbs/day of VOCs during construction. Therefore, although the Project's construction emissions would be significant and unavoidable, the emissions are too low to use a regional modeling program to correlate health effects on a basin-wide level (SCAQMD 2015). However, as discussed in Section 4.2.1, Background, elevated levels of ground-level O_3 are generally linked to respiratory issues, such as lung irritation, aggravated asthma, and breathing difficulties, and elevated levels of CO can lead to headaches, aggravation of cardiovascular disease, and impairment of central nervous system functions. Because the SoCAB is currently nonattainment for State and federal O_3 standards, adverse health effects are already occurring in the region, and Project construction emissions would temporarily contribute to this nonattainment status and its associated health effects on a regional scale. The SoCAB is in attainment for State and federal CO standards; therefore, Project construction emissions are not expected to contribute to health effects from CO on a regional scale.

Furthermore, this Draft EIR includes an assessment of the Project's localized impact on air quality for emissions of CO, NO_x, PM_{10}, and $PM_{2.5}$ by comparing the Project's on-site emissions to SCAQMD's applicable LST thresholds, as shown in Threshold 4.2-3 below. According to this analysis, the Project would not result in emissions exceeding SCAQMD's LSTs. Thus, the Project is not expected to surpass the most stringent federal or state ambient air quality standards for CO, NO_x, PM_{10}, and $PM_{2.5}$ emissions.

Operational Emissions

The Project involves improvements to existing dam infrastructure and would not result in substantial increases in air pollutant sources such as vehicular or energy consumption. Existing operations related to dam inspection and maintenance activities would be comparable to those which would occur under the proposed Project. As such, air pollutant emissions would likewise be essentially the same as existing conditions and would result in a less than significant impact related to operations phase emissions contributions to regional air quality.

Impact Conclusion: *Pursuant to Threshold 4.2-2, short-term construction emissions of nonattainment pollutants and their precursors would be cumulatively considerable and would result in a significant and unavoidable impact to*

*regional air quality with implementation of **MM AQ-1**. Project operations would result in a less than significant impact to regional air quality.*

Threshold 4.2-3

Would the Project expose sensitive receptors to substantial pollutant concentrations?

Less than Significant Impact. Exposure of sensitive receptors is addressed for the following situations: CO hotspots (based on the methodology provided in the California Department of Transportation CO Protocol [Institute of Transportation Studies - University of California, Davis 1997]); criteria pollutants from on-site construction; and TACs from on-site construction.

Carbon Monoxide Hotspot

A CO hotspot is an area of elevated CO concentrations that is caused by severe vehicle congestion on major roadways, typically near intersections. If a project substantially increases average delay at signalized intersections that are operating at Level of Service (LOS) E or F or causes an intersection that would operate at LOS D or better without the Project to operate at LOS E or F with the Project, there is a potential for a CO hotspot. As such, a CO hotspot is an area of localized CO pollution caused by severe vehicle congestion on major roadways, typically near intersections. The Project would not result in a substantial change in vehicle trips associated with the operation of the dam infrastructure. Existing operations of the dam involve minimal amounts of vehicle trips associated with maintenance and inspection operations, which do not substantially result in local traffic congestion. Therefore, the proposed Project would not increase congestion and would result in a less than significant impact related to CO hotspots.

Criteria Pollutants from On-Site Construction

In addition to the mass daily emissions thresholds, the SCAQMD has developed localized significance thresholds (LSTs) to evaluate short-term localized impacts to nearby sensitive receptors from on-site emissions of NO_2, CO, PM_{10}, and $PM_{2.5}$. LSTs represent the maximum emissions that can be generated at a project site without expecting to cause or substantially contribute to an exceedance of the most stringent national or state ambient air quality standards. LSTs are based on the distance to the nearest sensitive receptor and the ambient concentrations of pollutants within a project's source receptor area (SRA). The SCAQMD provides LST lookup tables for one-, two-, and five-acre projects emitting CO, NO_X, $PM_{2.5}$, and/or PM_{10}. The assessment of localized air quality impacts was developed to provide a conservative estimate of the level of Project-generated air pollutants that have the potential to exceed the NAAQS or CAAQS, which could consequently result in adverse health impacts. Exceedance of these air quality standards does not describe the prevalence, magnitude, or specific health effects, but rather assesses the potential for a Project-related health effect to occur.

For the purposes of an LST analysis, SCAQMD considers receptors where it is possible that an individual could remain for 1 hour for NO_2 and CO exposure and 24 hours for PM_{10} and $PM_{2.5}$ exposure. The LSTs utilized for this analysis account for the Project site's location within SRA 19, Saddleback Valley and receptors located at 500 meters (1,640 feet) of the Project site. The nearest residential uses along Jamboree Road are located approximately 2,596 meters (9,500 feet) to the west of the Project site, and use of the 500-meter separation distance provides a conservative analysis of potential impacts.

The LST methodology is recommended for projects that have five acres or less of site disturbance per day. Per SCAQMD guidance, site disturbance is calculated by the number of acres a particular piece of equipment would likely disturb per day. The disturbance values provided by the SCAQMD

to determine site disturbance are provided below in Table 4.2-7 SCAQMD Disturbance Area by Equipment Type.

TABLE 4.2-7
SCAQMD DISTURBANCE AREA BY EQUIPMENT TYPE

Equipment Type	Acres/8hr-day
Crawler Tractors	*0.5*
Graders	*0.5*
Rubber Tired Dozers	*0.5*
Scrapers	*1*

The Project would actively disturb a maximum of approximately 4 acres during the peak day (Roadway Excavation and Cleanup) of all construction phases. Therefore, the LST thresholds for 4 acres were used for the construction LST analysis. The emissions limits in the lookup tables are based on the SCAQMD's Ambient Air Quality Standards (SCAQMD 2016). As stated above, the Project site is located within SRA 19, Saddleback Valley and the nearest receptors are located along Jamboree Road, approximately 2,596 meters (9,500 feet) to the west of the Project site. The LSTs for receptors located at 500 meters (1,640 feet) of the Project site were utilized.

Table 4.2-8, Construction-Phase Localized Significance Threshold Emissions shows the maximum daily on-site emissions for construction activities compared with the SCAQMD LST screening thresholds. The thresholds shown are from the lookup tables for a site disturbance area of 4 acres. The Project's maximum daily on-site emissions would occur during the roadway excavation and site preparation phase for all pollutants. As shown in Table 4.2-8, localized unmitigated emissions for all analyzed criteria pollutants would be less than the applicable SCAQMD LSTs and therefore would be less than significant.

TABLE 4.2-8
UNMITIGATED CONSTRUCTION-PHASE
LOCALIZED SIGNIFICANCE THRESHOLD EMISSIONS

Emissions and Thresholds	Emissions (lbs/day)			
	NO_x	CO	PM_{10}	$PM_{2.5}$
Project maximum daily on-site emissions	148	147	37	19
Localized Significance Threshold	263	9,820	142	85
Exceed threshold?	No	No	No	No

lbs/day: pounds per day; NO_x: nitrogen oxides; CO: carbon monoxide; PM_{10}: respirable particulate matter 10 microns or less in diameter; $PM_{2.5}$: fine particulate matter 2.5 microns or less in diameter.

Note: Data is for SCAQMD Source Receptor Area 19, Saddleback Valley.

Source: SCAQMD 2009 (thresholds); see Appendix B for CalEEMod model outputs.

Although unmitigated localized construction emissions would not exceed SCAQMD LSTs, estimated localized construction emissions with implementation of **MM AQ-1** (described under Threshold 4.2-2) are presented in Table 4.2-9 for informational purposes and are likewise below the applicable SCAQMD LSTs.

TABLE 4.2-9
MITIGATED CONSTRUCTION-PHASE
LOCALIZED SIGNIFICANCE THRESHOLD EMISSIONS

Emissions and Thresholds	Emissions (lbs/day)			
	NO_x	CO	PM_{10}	$PM_{2.5}$
Project maximum daily on-site emissions	20	152	34	17
Localized Significance Threshold	263	9,820	142	85
Exceed threshold?	No	No	No	No

lbs/day: pounds per day; NO_x: nitrogen oxides; CO: carbon monoxide; PM_{10}: respirable particulate matter 10 microns or less in diameter; $PM_{2.5}$: fine particulate matter 2.5 microns or less in diameter.

Note: Data is for SCAQMD Source Receptor Area 19, Saddleback Valley.

Source: SCAQMD 2009 (thresholds); see Appendix B for CalEEMod model outputs.

Toxic Air Contaminant Emissions from On-Site Construction

Construction activities would result in short-term, Project-generated emissions of DPM from the exhaust of off-road, heavy-duty diesel equipment used for site preparation (e.g., excavation and grading); paving; and other miscellaneous activities. CARB identified DPM as a TAC in 1998. The dose to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer time period. According to the Office of Environmental Health Hazard Assessment, health risk assessments—which determine the exposure of sensitive receptors to TAC emissions—should be based on a 30-year or 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the Project.

Health risks associated with DPM are due to substantial long-term exposure to this pollutant. While there are park uses nearby, exposure to construction related DPM would occur to park visitors on a short-term (1–7 days) and intermittent basis as compared to the same individuals at residential uses being exposed on a 24-hour basis for a period of 30 or 70 years, which is typically utilized in evaluating health risk. DPM does not have any identified health effects associated with short-term acute exposures and is evaluated relative to long-term chronic and carcinogenic exposures. As such, park users would not be substantially affected by DPM emitted during construction activities due to the relative brevity that individual park visitors would be exposed when they are at the park and the infrequency of attendance of an individual park visitor. As such, park visitors are not anticipated to be significantly affected by TACs related to construction activities. The nearest residential uses are located approximately 1.8 miles away from construction activities. This substantial distance would disperse, and dilute air pollutants generated at the Project site. As indicated in CARB's *Air Quality and Land Use Handbook: A Community Health Perspective*, decreases in DPM emissions occur substantially within the first 300 feet and stabilize to background levels at approximately 500 feet (CARB 2005). Considering that the nearest residential uses are approximately 9,500 feet away, Project-related construction DPM emissions would have a negligible impact on health risks at the nearest residential uses. As such, construction emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. The impact would be less than significant. In addition, **MM AQ-1** (described under Threshold 4.2-2) would require the use of Tier 4 offroad engines, which would lead to reductions in exhaust particulate emissions.

Impact Conclusion: *The proposed Project would not increase congestion or result in a significant impact related to CO hotspots. The construction period would be relatively short when compared to the 30- or 70-year exposure period typically used in health risk assessments. Additionally, combined with the highly dispersive properties of DPM and additional reductions in particulate emissions from newer construction equipment, as required by USEPA and CARB regulations, Project construction would not expose sensitive receptors to substantial emissions of TACs. Also, the proposed Project would not have the potential to expose sensitive receptors to substantial TACs from stationary or mobile sources. Overall, pursuant to Threshold 4.2-3, impacts would be less than significant, and no mitigation is required.*

Threshold 4.2-4

Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less than Significant Impact. According to the SCAQMD's *CEQA Air Quality Handbook* (1993), land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding (SCAQMD 1993). The Project does not propose any of these land uses and would not otherwise produce objectionable long-term operational odors. In addition, the SCAQMD has not identified dam/reservoir projects as sources of odors, which implies that dam/reservoir projects are not common sources of odor. Nevertheless, the dewatering of the reservoir for Project construction may result in the exposure organic matter, including vegetation and remains of fish. All residual organic matter would be removed from the reservoir by construction crews, in accordance with **PDF AQ-1**. Furthermore, the substantial distance between the Project site and the nearest sensitive receptors and the presence of SR-241 and SR-261 would further minimize potential odors emanating from the reservoir once the reservoir has been dewatered. During Project operations, the Project consists of dam infrastructure and would not result in any substantial onsite emissions that would result in a public nuisance.

Short-term construction equipment and activities would generate odors, such as diesel exhaust emissions from construction equipment and paving activities. There may be situations where construction activity odors would have an olfactory presence at nearby park uses, but these odors would not rise to the magnitude of a public nuisance. The odors would be temporary and would dissipate rapidly from the source with an increase in distance. The Project use is also regulated from nuisance odors or other objectionable emissions by SCAQMD Rule 402. Rule 402 prohibits discharge from any source of air contaminants or other material, which would cause injury, detriment, nuisance, or annoyance to people or the public. As such, all Project-related odors are construction related and short term in nature; no long-term operational odors would result. Consequently, the proposed Project would have less than significant impact in regard to other emissions, and no mitigation is required.

Impact Conclusion: *Project-related odors are construction related, low magnitude, and short-term in nature; no long-term operational odors would result. As such, the proposed Project would have less than significant impact in regard to other emissions, pursuant to Threshold 4.2-4.*

4.2.7 CUMULATIVE IMPACTS

The SCAQMD, in their White Paper on Regulatory Options for Addressing Cumulative Impacts from Air Pollution Emissions (presented to the Board on September 5, 2003), states that impacts that are less than significant on a Project level are also considered to be less than significant on a cumulative basis. The AQMD uses the same significance thresholds for project-specific and cumulative impacts analyzed in an Environmental Impact Report, except for the Hazard Index for TAC emissions (SCAQMD 2003). Any projects that are found to result in less than significant impacts on a project level are not considered to be cumulatively considerable and consequently would not result in a considerable contribution to cumulative impacts. Significant cumulative air quality impacts are already occurring in the SoCAB for those pollutants for which it is designated nonattainment (i.e., O_3, PM_{10}, $PM_{2.5}$). Construction activities associated with the proposed Project would result in significant project-level construction-related regional air quality impacts pertaining to ozone precursors VOC and NO_X as well as CO, as quantified above in Tables 4.2-5 and 4.2-6, respectively. Since the SCAQMD recommends that a project's potential contribution to cumulative impacts be assessed utilizing the same significance criteria as those for project-specific impacts, the Project's significant and unavoidable air quality impacts related to ozone precursors VOC and NO_X during construction would likewise be cumulatively considerable.

As discussed previously, the Project would not result in significant impacts to human health due to the substantial distance between the Project site and the nearest sensitive receptors. In terms of cumulative localized air quality impacts, the Project is located in a remote area with low potential for nearby concurrent development. As such, localized air quality impacts would not be cumulatively considerable.

4.2.8 MITIGATION PROGRAM

Mitigation Measures

The proposed Project would result in significant impacts related to exceedance of the SCAQMD's construction phase emission thresholds and consequently result in significant impacts to air quality. The following mitigation measure is necessary to minimize Project-related impacts.

MM AQ-1 IRWD will require its construction contractor(s) to implement the following measures to minimize nitrogen oxide (NO_x) and volatile organic compound (VOC) emissions during construction:

- All off-road diesel-powered construction equipment greater than 50 horsepower will meet U.S. Environmental Protection Agency Tier 4 Final emission standards to the extent that the equipment is available. In addition, all construction equipment will be outfitted with Best Available Control Technology devices certified by the California Air Resources Board. If Tier 4 Final equipment is not available to the best of the construction contractor's understanding, the construction contractor(s) will provide IRWD with documentation showing the reasons for non-availability.
- Require the use of 2010 and newer diesel haul trucks (e.g., material delivery trucks and soil import/export). If the construction contractor(s) determines that 2010 model year or newer diesel trucks cannot be obtained, trucks that meet USEPA 2007 model year NO_x emissions requirements will be required. If 2007 model year or newer diesel trucks are not available, the construction contractor(s) will provide IRWD with reasonable documentation showing the reasons for non-availability.

- Construction equipment will be properly serviced and maintained to the manufacturer's applicable standards.

According to CEQA Guidelines Section 15126.4, lead agencies must consider feasible mitigation measures to avoid or substantially reduce a project's significant environmental impacts. Per Public Resources Code Section 21061.1, feasible means "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors." (Public Resources Code Section 21061.1) IRWD, as Lead Agency, reviewed additional potential mitigation measures involving implementation of a longer construction schedule and/or shorter construction workdays and found them to be infeasible. Both potential mitigation measures could reduce air pollutant emissions during Project construction to a degree by reducing the intensity of daily construction activities. However, construction of the proposed Project necessitates 20-hour workdays during the dry season to accomplish construction within a reasonable timeframe due to seasonal restrictions associated with work during the wet season. In addition, extending the overall duration of Project construction by another year would significantly increase the Project cost; would extend the amount of time the unimproved dam, outlet tower, and spillway would present safety risks to IRWD and the community; and would unduly prolong the length of time this critical water storage reservoir is out of service. Therefore, IRWD determined both of these potential mitigation measures to be infeasible.

4.2.9 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Construction emissions from the Project would exceed the SCAQMD's regional construction emissions thresholds and would result in a significant and unavoidable temporary impact related to regional air quality despite the application of mitigation measures (**MM AQ-1**). Localized construction emissions would be less than significant due to the large distance between the Project's construction activities and the nearest sensitive land uses. Because construction emissions would exceed the SCAQMD's regional thresholds, it would also not be consistent with the goals of the AQMP and would result in a significant impact relative to consistency with local air quality plans.

Long-term operational emissions, and exposure of sensitive receptors to long-term criteria pollutant and TAC emissions from stationary or mobile sources would be less than significant due to the lack of additional emission sources attributable to the Project. The Project would also not exceed the growth assumptions in the AQMP and would not result in impacts related to consistent with local air quality plans for the operations phase. The proposed Project would not increase congestion or result in a significant impact related to CO hotspots.

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4.3 BIOLOGICAL RESOURCES

The information in this section is based on the Biological Technical Report for the *Santiago Creek Dam Improvements Project, Orange County, California* prepared by Psomas in March 2025 and the *Jurisdictional Delineation Report for the Santiago Creek Dam Improvements Project, Orange County, California* prepared by Psomas in April 2025. The Biological Technical Report summarized focused surveys for special status plant species conducted in 2020, 2022, 2024, and 2025; Quino checkerspot butterfly (*Euphydryas editha quino*) conducted in 2022; western spadefoot (*Spea hammondii*) conducted in 2025; arroyo toad (*Anaxyrus californicus*) conducted in 2020 and 2022; California gnatcatcher (*Polioptila californica californica*) conducted in 2020 and 2022; least Bell's vireo (*Vireo bellii pusillus*) conducted in 2020 and 2022; southwestern willow flycatcher (*Empidonax traillii extimus*) conducted in 2022; western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) conducted in 2022; Crotch's bumble bee (*Bombus crotchii*) conducted in 2024; and southwestern [western] pond turtle (*Actinemys pallida* [*Emys marmorata*]) conducted in 2024. All focused survey reports and the Jurisdictional Delineation are included as appendices to the Biological Technical Report. The Biological Technical Report is included as Appendix C.

4.3.1 REGULATORY SETTING

Federal

Federal Endangered Species Act

The Federal Endangered Species Act (FESA) protects plants and animals that the USFWS has listed as "Endangered" or "Threatened." A federally listed species is protected from unauthorized "take," which is defined in the FESA as acts to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" (16 USC Sections 1532[19] and 1538[a]). In this definition, "harm" includes "any act which actually kills or injures fish or wildlife, and emphasizes that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife" (50 *Code of Federal Regulations* [CFR], Title 50, Section 17.3). Unless performed for scientific or conservation purposes with the permission of the USFWS, take of listed species is only permissible if the USFWS issues an Incidental Take Permit (ITP). When issuing an ITP, all federal agencies, including the USFWS, must ensure that their activities are "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species" (16 USC 1536[a]). Enforcement of the FESA is administered by USFWS.

The FESA also provides for designation of Critical Habitat: specific areas within the geographical range occupied by a species where physical or biological features "essential to the conservation of the species" are found and "which may require special management considerations or protection" (16 USC 1538[5][A]). Critical Habitat may also include areas outside the current geographical area occupied by the species that are nonetheless essential for the conservation of the species.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act requires consultation with the USFWS and the fish and wildlife agencies of States where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified" by any agency under a federal permit or license. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources."

Sections 404 and 401 of the Clean Water Act of 1972

Section 404 of the Clean Water Act (CWA) (33 USC 1251 et seq.) regulates the discharge of dredged or fill material into waters of the United States (WOTUS), including wetlands. The USACE is the designated regulatory agency responsible for administering the 404permit program and for making jurisdictional determinations. This permitting authority applies to all waters of the United States where the material has the effect of (1) replacing any portion of WOTUS with dry land or (2) changing the bottom elevation of any portion of WOTUS. These fill materials would include sand, rock, clay, construction debris, wood chips, and materials used to create any structure or infrastructure in WOTUS. Dredge and fill activities are typically associated with development projects; water resource-related projects; infrastructure development; and wetland conversion to farming, forestry, or urban development.

The definition of WOTUS has been the subject of shifting regulations. Past federal revisions to regulations addressing the extent of USACE jurisdiction and the definition of WOTUS have been issued by the Obama Administration in 2015 and the Trump Administration in 2020. On January 18, 2023, the United States Environmental Protection Agency (USEPA) published a final Water Rule in the Federal Register that went into effect on March 20, 2023 ("the 2023 Rule") (USACE and USEPA 2023a).

The definition of WOTUS changed again in response to the Supreme Court decision in the case of *Sackett v. USEPA*. On September 8, 2023, the USEPA and the USACE amended the Code of Federal Regulations to conform the definition of WOTUS to the Supreme Court decision (USACE and USEPA 2023b). This conforming rule amends the provisions of the agencies' definition of WOTUS that were invalid under the Supreme Court's interpretation of the CWA under *Sackett*. Based on these changes, tributaries must have at least relatively permanent flow to be considered WOTUS from the federal definition. This would exclude ephemeral drainages from being WOTUS. This represents a substantial change to areas under federal jurisdiction in the arid west. This report provides interpretations of WOTUS under the Amended 2023 Rule.

Under Section 401 of the CWA, an activity requiring a USACE Section 404 permit must obtain a State Water Quality Certification (or waiver thereof) to ensure that the activity will not violate established federal or State water quality standards. The State Water Resources Control Board (SWRCB), in conjunction with the nine California RWQCBs, is responsible for administering the Section 401 water quality certification program. The SWRCB's and RWQCB's jurisdiction also extend to all "waters of the State" when no WOTUS are present, including wetlands and non-wetland waters of the State (isolated and non-isolated).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703–711), as amended in 1972, makes it unlawful at any time, by any means or in any manner, unless permitted by regulations, to "pursue; hunt; take; capture; kill; attempt to take, capture, or kill; possess; offer for sale; sell; offer to barter; barter; offer to purchase; purchase; deliver for shipment; ship; export; import; cause to be shipped, exported or imported; deliver for transportation; transport or cause to be transported; carry or cause to be carried; or receive for shipment, transportation, carriage, or export, any migratory bird; any part, nest, or eggs of any such bird; or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof. . . ." (16 USC 703).

The MBTA covers the taking of any nests or eggs of migratory birds, except as allowed by permit pursuant to 50 CFR, Part 21. This regulation seeks to protect migratory birds and active nests. The MBTA protects over 800 species, including geese, ducks, shorebirds, raptors, songbirds, and

many relatively common species. Bird species protected under the provisions of the MBTA are identified by the List of Migratory Birds (50 CFR 10.13), as updated by the 1983 American Ornithologists' Union (AOU) Checklist and published supplements by the USFWS.

In 1972, the MBTA was amended to include protection for migratory birds of prey (e.g., raptors). Six families of raptors occurring in North America were included in the amendment: Accipitridae (kites, hawks, and eagles); Cathartidae (New World vultures); Falconidae (falcons and caracaras); Pandionidae (ospreys); Strigidae (typical owls); and Tytonidae (barn owls). The provisions of the 1972 amendment to the MBTA protect all species and subspecies of these families.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668) provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) and the golden eagle (*Aquila chrysaetos*) by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act and strengthened other enforcement measures. A 1978 amendment authorized the Secretary of the Interior to permit the taking of golden eagle nests that interfere with resource development or recovery operations.

The Bald and Golden Eagle Protection Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Regulations further define "disturb" as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (50 CFR 22.6).

In addition to immediate impacts, this definition also covers effects that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

A 1994 Memorandum from President William Clinton to the heads of Executive Agencies and Departments established the policy concerning collection and distribution of eagle feathers for Native American religious purposes.

State

California Endangered Species Act

The State of California implements the CESA, which is enforced by the CDFW. While the provisions of the CESA are similar to the FESA, CDFW maintains a list of California Threatened and Endangered species, independent of the FESA Threatened and Endangered species list. It also lists species that are considered Rare and Candidates for listing, which also receive protection. The California list of Endangered and Threatened species is contained in Title 14, Sections 670.2 (plants) and 670.5 (animals) of the *California Code of Regulations*.

State-listed Threatened and Endangered species are protected under provisions of CESA. Activities that may result in take of individuals (defined in CESA as acts to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") are regulated by CDFW. While habitat degradation or modification is not included in the definition of "take" under CESA, the

CDFW has interpreted "take" to include the destruction of nesting, denning, or foraging habitat necessary to maintain a viable breeding population of protected species.

If it is determined that the "take" would not jeopardize the continued existence of the species, an ITP can be issued by CDFW per Section 2081 of the *California Code of Regulations*. If a State-listed species is also federally listed, and the USFWS has issued an ITP that satisfies CDFW's requirements, CDFW may issue a consistency finding in accordance with Section 2080.1 of the *California Fish and Game Code*.

CEQA Guidelines Section 15380

With regards to plants and animals, Section 15380 of the CEQA Guidelines independently defines "Endangered" and "Rare" species separately from the definitions of the California Endangered Species Act (CESA). Under CEQA, Endangered species of plants or animals are defined as those whose survival and reproduction in the wild are in immediate jeopardy, while Rare species are defined as those that (1) have such low numbers that they could become Endangered if their environment worsens or (2) are likely to become endangered within the foreseeable future (i.e., "threatened" as used in the FESA). In addition, a Lead Agency can consider a non-listed species (e.g., species with a California Rare Plant Rank [CRPR], California Species of Special Concern, or species of Local Concern) to be treated as if it were Endangered, Rare, or Threatened for the purposes of CEQA if the species can be shown to meet the criteria in the definition of "Rare" or "Endangered" in the Project region.

California Fish and Game Code

CDFW administers the *California Fish and Game Code*. Particular sections of the Code are applicable to natural resource management.

Native Plant Protection

Sections 1900–1913 of the *California Fish and Game Code* were developed to preserve, protect, and enhance Endangered and Rare plants in the State of California. The act requires all State agencies to use their authority to carry out programs to conserve Endangered and Rare native plants. Provisions of the Native Plant Protection Act prohibit the taking of listed plants from the wild and require notification of the CDFW at least ten days in advance of any change in land use that would adversely impact listed plants. This allows the CDFW to salvage listed plant species that would otherwise be destroyed.

Unlawful Take or Destruction of Nests or Eggs

These sections duplicate federal protection under the MBTA. Section 3503 of the *California Fish and Game Code* makes it unlawful to take, possess, or destroy any bird's nest or any bird's eggs. Further, any birds in the orders *Falconiformes* or *Strigiformes* (i.e., birds of prey, such as hawks, eagles, and owls) and their nests and eggs are protected under Section 3503.5 of the *California Fish and Game Code*. Section 3513 of the *California Fish and Game Code* prohibits the take and possession of any migratory nongame bird, as designated in the MBTA.

California Fully Protected Species

The State of California created the "Fully Protected" classification in an effort to identify and provide additional protection to those animals that are rare or that face possible extinction. Lists were created for fish, amphibians and reptiles, birds, and mammals. Most of the species on these

lists have subsequently been listed under the State and/or Federal Endangered Species Acts; however, some have not been formally listed.

Various sections of the *California Fish and Game Code* provide lists of Fully Protected reptile and amphibian (§ 5050), bird (§ 3511), and mammal (§ 4700) species that may not be taken or possessed at any time, except as provided in Sections 2081.7, 2081.9, or 2835. CDFW is unable to authorize the issuance of permits or licenses to take these species, except for necessary scientific research.

Natural Communities Conservation Planning Act

The Natural Community Conservation Planning Act, codified in Sections 2800–2835 of the *California Fish and Game Code* and signed into law in October 1991, authorizes the preparation of Natural Community Conservation Plans (NCCPs). The Act is a State of California effort to protect critical vegetative communities and their dependent wildlife species. The purpose of an NCCP is to sustain and restore those species and their habitat identified by CDFW that are necessary to maintain the continued viability of those biological communities impacted by human changes to the landscape. The NCCP process provides an alternative to protecting species on a "single species basis" as in the federal and State ESAs. Under the Act, CDFW is responsible for creating process planning and conservation guidelines for NCCP programs. Local governments and landowners may then prepare the NCCPs so that they comply with the CESA.

California Fish and Game Code (Sections 1600 through 1616)

California Fish and Game Code Sections 1600 et seq. establish a process to ensure that projects conducted in and around lakes, rivers, or streams do not adversely impact fish and wildlife resources or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided.

California Fish and Game Code Section 1602 requires any person, State, or local governmental agency or public utility to notify CDFW before beginning any activity that will do one or more of the following:

- substantially obstruct or divert the natural flow of a river, stream, or lake;
- substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or
- deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

Section 1602 of the *California Fish and Game Code* applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State. CDFW's regulatory authority extends to include riparian habitat (including wetlands) supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. Generally, CDFW takes jurisdiction to the top bank of the stream or to the outer limit of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation. A Section 1602 Lake or Streambed Alteration Agreement would be required if impacts to identified CDFW jurisdictional areas occur.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act broadly defines "waters of the State" as any surface water or groundwater, including saline waters, within the boundaries of the State." In 2020, the Office of Administrative Law (OAL) began implementing the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to waters of the State. Under these new regulations, the SWRCB and its nine RWQCBs assert jurisdiction over all existing WOTUS, and all waters that would have been considered WOTUS under any historical definition.

Impacts to WOTUS are authorized by the RWQCBs through a Water Quality Certification per Section 401 of the CWA. Impacts to "waters of the State" that are not considered WOTUS would be authorized by Waste Discharge Requirements (WDRs) issued by the RWQCB, pursuant to California's Porter-Cologne Water Quality Control Act.

Pursuant to the California Porter-Cologne Water Quality Control Act, the SWRCB and the nine RWQCBs may require permits (known as "Waste Discharge Requirements" or WDRs) for the fill or alteration of the waters of the State. The term "waters of the State" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (*California Water Code,* Section 13050[e]). The SWRCB and RWQCB have interpreted their authority to require WDRs to extend to any proposal to fill or alter waters of the State, even if those same waters are not under USACE jurisdiction. Pursuant to this authority, the State and Regional Boards may require the submission of a "report of waste discharge" under Section 13260, which is treated as an application for WDRs.

The Porter-Cologne Water Quality Control Act charges the SWRCB and the nine RWQCBs statewide with protecting water quality throughout California. Typically, the SWRCB and RWQCB act in concert with the USACE under Section 401 of the CWA in relation to permitting fill of federally jurisdictional waters. SWRCB and the RWQCBs may require permits (i.e., WDRs) for the fill or alteration of the waters of the State.

Local

Central-Coastal Natural Community Conservation Plan/Habitat Conservation Plan

On August 30, 1991, the State Fish and Game Commission considered a petition in support of listing the coastal California gnatcatcher. The Commission decided not to list the coastal California gnatcatcher as an Endangered species in favor of pursuing preparation of a NCCP program as proposed by Assembly Bill (AB) 2172 (AB 2172/Natural Community Conservation Planning Act). AB 2172 authorized CDFW[1] to enter into agreements with any person for the purpose of preparing and implementing NCCPs and to prepare guidelines for development and implementation of NCCPs. AB 2172 also permits NCCPs to be prepared by local, State, or federal agencies independently or in cooperation with other persons and requires CDFW to be compensated for costs incurred in preparing and implementing NCCPs.

The purpose of the NCCP program is to provide regional or area wide protection and perpetuation of natural wildlife diversity while allowing compatible and appropriate development and growth. AB 2172 was designed in recognition of the fact that individual species protection under the state Endangered Species Act and the federal Endangered Species Act (FESA) is costly and historically ineffective as a mechanism for protection or prevention of extinction of plant and wildlife species, and that a habitat-based, multispecies or ecosystem-driven preservation

[1] The California Department of Fish and Wildlife (CDFW) was formerly known as the California Department of Fish and Game (CDFG).

approach has greater potential for long-term success. The focus of the NCCP program represents a dramatic shift from “individual species” to “habitat”.

On March 25, 1993, the U.S. Department of the Interior listed the coastal California gnatcatcher as a “Threatened” species and adopted a special rule in accordance with Section 4(d) of the FESA that authorized landowners and local jurisdictions to voluntarily participate in the State of California NCCP Act of 1992.

The County of Orange, in conjunction with the state and federal resource agencies, local jurisdictions, utility companies (including IRWD), the Transportation Corridor Agencies, and major private landowners, prepared the NCCP/HCP for the Central–Coastal NCCP Subregion (NCCP/HCP approved on April 16, 1996, and Implementation Agreement [IA] executed on July 17, 1996). The plan is intended to ensure the long-term survival of the coastal California gnatcatcher and other special status coastal sage scrub-dependent plant and wildlife species while allowing for reasonable economic growth in accordance with state-sanctioned NCCP program guidelines. The Project occurs within the NCCP Central/Coastal Subregion.

The Habitat Reserve includes core habitat along the frontal slopes of the Lomas de Santiago and provides high densities of NCCP target species, including coastal California gnatcatcher and coastal cactus wren (*Campylorhynchus brunneicapillus couesi*). In addition, the Habitat Reserve provides linkages with other core habitat areas via a long strip of natural habitat between Portola Parkway and the Foothill Transportation Corridor, and other large blocks of core habitat in the vicinity of the frontal slopes of the Lomas de Santiago, including Syphon Reservoir and Rattlesnake Reservoir. The Habitat Reserve supports the largest subpopulation of coastal California gnatcatchers in the Central Subarea of the NCCP Central/Coastal Subregion Reserve System Design for Orange County (County of Orange 1996a).

The County of Orange has been issued a 10(a) permit as part of the approval of the NCCP/HCP which authorizes the “take” of coastal sage scrub and other specified habitats (e.g., oak woodland, cliff and rock, Tecate cypress) and provides regulatory coverage for a number of “Covered Species”. Potential direct and indirect impacts are fully mitigated through the County’s participation and contribution in the NCCP/HCP Mitigation Program. The participation not only provides mitigation for coastal sage scrub and the coastal California gnatcatcher, but also other special status species designated as Covered Species by the NCCP/HCP. Mitigation measures outlined in the NCCP/HCP Mitigation Program are summarized below:

1. Creation of a Habitat Reserve System that will include coastal sage scrub and representative habitat of virtually all of the major habitat types currently existing within the Central/Coastal Subregion;
2. Creation and funding of an NCCP Non-Profit Corporation to coordinate management of the Reserve System;
3. Designation of Special Linkage Areas and Existing Use Areas to enhance biological connectivity within the Reserve System and Central/Coastal Subregion;
4. Implementation of the Adaptive Management Program, including specific management plans, defined by the NCCP/HCP, within the Reserve System, including provisions for restoration and enhancement funded both by Participating Landowners and Non-Participating Landowners as provided herein.

4.3.2 METHODOLOGY

This section summarizes survey methods used to conduct biological surveys for the Project. The Biological Study Area (BSA) discussed in this report generally includes the area around Santiago Creek Dam and Irvine Lake. Initial work (spring/summer 2020) was focused north (downstream) of the dam structure in a Project study area provided by IRWD. The BSA was expanded in fall 2020 to south (upstream) of the dam, including the entirety of Irvine Lake, to assess potential effects related to raising the spillway and additional staging/access areas in Oak Park. The BSA was developed by adding a 250-foot buffer around the 797.9-foot elevation contour. Where the buffer did not include the 811.9-foot contour, the BSA was extended 50-feet beyond the 811.9-foot contour[2]. However, the BSA was truncated at the ridgeline adjacent to Irvine Lake and at Santiago Canyon Road because indirect effects (e.g., noise) would not be expected to extend over the ridgeline. This BSA allows for an assessment of indirect impacts of inundation effects and construction activities on surrounding habitat (Exhibit 4.3-1).

The focused surveys that Psomas conducted in spring/summer 2020 were limited to the area downstream of the dam, while the focused surveys conducted in spring/summer 2022 were generally conducted upstream of the dam. Focused surveys conducted in 2024 and 2025 were conducted throughout suitable habitat within the BSA. The survey area for each species varied depending on target habitat and details of each species protocol. Vegetation mapping and the jurisdictional delineation were conducted throughout the BSA. It should be noted that when the term “survey area” is used, it does not refer to the entire BSA.

The methods in this section have been summarized; the detailed methods are included in the Biological Technical Report, which includes appendices with all focused survey reports and the Jurisdictional Delineation (Appendix C).

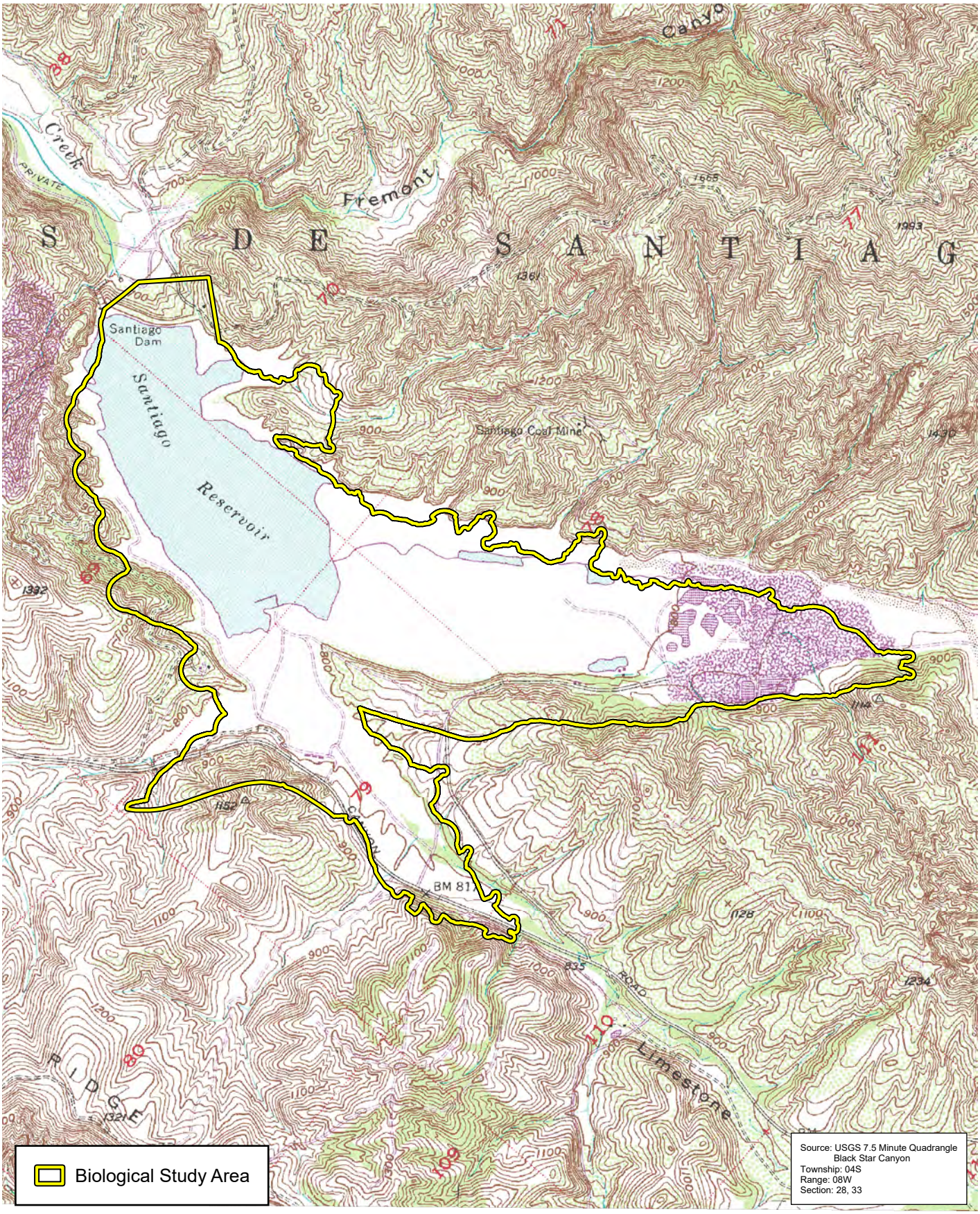
Literature Review

Prior to the start of surveys, Psomas conducted a literature search to identify special status plants, wildlife, and habitats reported from the vicinity of the BSA. The literature review was updated prior to the 2022 focused surveys and again in 2023 as documentation was completed; the most recent citation is given below. The BSA region is generally defined as the Central Subregion of the NCCP/HCP. Psomas reviewed the following sources of information:

- CDFW’s California Natural Diversity Database (CNDDB); USGS Black Star Canyon, Orange, Tustin, and El Toro 7.5-minute quadrangles (CDFW 2025a)
- The California Native Plant Society’s (CNPS’) Inventory of Rare and Endangered Plants; USGS Black Star Canyon, Orange, Tustin, and El Toro 7.5-minute quadrangles (CNPS 2025)
- CDFW’s *Natural Communities List* (CDFW 2025b), *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW 2025c), and *Special Animals* List (CDFW 2025d)
- Jepson eFlora (Jepson Flora Project 2024)
- County of Orange *Natural Community Conservation Plan and Habitat Conservation Plan* (County of Orange 1996a) and *Implementation Agreement* (County of Orange 1996b)
- USFWS Information for Planning and Consultation (IPAC) Database[3] (USFWS 2024)

[2] The study area extended to the elevation of the dam crest (811.9 feet) because the impact boundary had not yet been developed when the surveys began.

[3] The USFWS Official Species List is included in the Biological Technical Report (Appendix C).



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U.S. Geological Survey 7.5-minute Digital Quadrangle

Exhibit 4.3-1

Santiago Creek Dam Improvement Project

N W E S

0 1,000 2,000 Feet

PSOMAS

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Vegetation Mapping and General Surveys

Psomas Senior Biologist Allison Rudalevige performed a general survey and vegetation mapping north (downstream) of the dam on February 25, 2020. Ms. Rudalevige and Psomas Senior Biologist Lindsay Messett performed a general survey and vegetation mapping south (upstream) of the dam on September 16 and 17, 2020. Psomas biologists documented all plant and wildlife species detected during the survey. Representative photographs of the BSA are included in the Biological Technical Report (Appendix C).

Nomenclature of vegetation types generally follows Gray and Bramlet (1992) but is cross-referenced[4] to *A Manual of California Vegetation* (CNPS 2024), which is the most current vegetation classification system used by CDFW for assessing sensitive natural communities (CDFW 2025b). Nomenclature of plant taxa conform to the *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW 2025c) for special status species and the Jepson eFlora (Jepson Flora Project 2024) for all other taxa. Nomenclature for wildlife follows the *Special Animals List* (CDFW 2025d) for special status species and, for other species, Crother (2017) for amphibians and reptiles, the American Ornithological Society (AOS 2023) for birds, and the Smithsonian National Museum of Natural History (SNMNH 2011) for mammals.

Jurisdictional Delineation

The jurisdictional delineation for the portion of the BSA downstream of the dam was conducted by Psomas on March 24, 2020. The jurisdictional delineation for the portion of the BSA upstream of the dam was conducted on October 14, 20, and 21, 2020. Psomas Senior Regulatory Specialist Allison Rudalevige performed all surveys with assistance from Psomas Senior Biologist Jonathan Aguayo on October 14 and 20, 2020 and Psomas Senior Biologist Lindsay Messett on October 21, 2020.

Jurisdictional water resources considered for this report include waters of the United States (WOTUS) under the regulatory authority of the USACE; waters of the State under the regulatory authority of the RWQCB; and the bed, bank, and channel of all lakes, rivers, and/or streams (and associated riparian vegetation), under the regulatory authority of CDFW.

Psomas assessed the presence of WOTUS by determining connectivity or adjacency of on-site features to points of discharge at a Traditional Navigable Waterway. Non-wetland WOTUS are delineated based on the limits of the Ordinary High Water Mark (OHWM), which can be determined by a number of factors, including (1) the presence of a clear, natural line impressed on the bank; (2) shelving; (3) changes in the character of the soil; (3) destruction of terrestrial vegetation; and (4) the presence of litter and debris. The OHWM limits (i.e., active floodplain) occurring in the BSA were further verified using methods contained in A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and McColley 2008) and the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Curtis and Lichvar 2010).

In September 2008, the USACE issued the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). This regional supplement is designed for use with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). Both the 1987 Wetlands Manual and the Arid West Supplement to the manual provide technical methods and guidelines for determining the presence of wetland WOTUS. Both

[4] The cross-referencing to *A Manual of California Vegetation* is included in the Biological Technical Report (Appendix C).

documents prescribe using a three-parameter approach to identify wetlands. The three parameters needed to assign a site as a wetland include evidence of wetland hydrology, hydrophytic vegetation, and hydric soils. However, problem areas may periodically or permanently lack certain indicators due to seasonal or annual variability or the nature of the soils or plant species on site. Atypical wetlands lack certain indicators due to recent human activities or natural events. Guidance for determining the presence of wetlands in these situations is presented in the regional supplement.

Psomas determined the limits of RWQCB jurisdiction in the field following the methods described for USACE jurisdiction, above. RWQCB shares USACE jurisdiction unless isolated conditions are present. If isolated waters are present, RWQCB takes jurisdiction using USACE's definition of the OHWM. In 2019, SWRCB adopted a new wetland definition, which includes areas with (1) continuous or recurrent saturation of the upper substrate of sufficient duration to cause anaerobic conditions and (2) vegetation dominated by hydrophytes or lacking vegetation (SWRCB 2019).

CDFW's jurisdiction was determined by measuring the distance between the top of the bank to the top of the bank of the water features on site or, if present, to the outer limit of riparian vegetation located within or immediately adjacent to the feature. CDFW jurisdiction within Irvine Lake extended to the top of the existing dam embankment.

The Jurisdictional Delineation is included as an appendix to the Biological Technical Report (Appendix C).

Special Status Plant Species

Psomas conducted the botanical surveys consistent with the protocols created by CDFW (2018); therefore, the surveys were floristic in nature. Surveys downstream of the dam were conducted on April 30, May 21, and June 4, 2020, by Psomas Senior Biologist Allison Rudalevige. Surveys upstream of the dam were conducted on March 24, 2022, by Ms. Rudalevige; on April 25, 26, and 28, 2022, by Ms. Rudalevige and Consulting Botanist Sandra Leatherman; on May 23 and 26 by Ms. Rudalevige and Psomas Biologist Erin Ruckman; and on September 13, 2022, by Ms. Rudalevige and Psomas Biologist Sarah Thomas. A systematic survey was conducted in all areas of suitable special status plant habitat in the survey area. Inaccessible areas (e.g., steep cliffs), were observed remotely with binoculars.

Many annual and perennial herb species' germination capability are dependent on receiving a certain amount of rainfall in the winter and spring. The region received approximately 17.7 inches of precipitation between August 2019 and July 2020 (data taken from Irvine – South Coast Valleys Station No. 75) (CIMIS 2020). The region received approximately 9.3 inches of precipitation between July 2021 and June 2022 (data taken from Irvine – South Coast Valleys Station No. 75) (CIMIS 2022). The average annual precipitation for this area is between 10 and 13 inches. Therefore, rainfall was considered within normal ranges and conditions should have been adequate for germination of most plant species. Additionally, reference populations were monitored for annual and difficult-to-detect target species to ensure that the surveys were comprehensive.

All plant species observed were recorded in field notes. Plant species were identified in the field or collected for future identification. Plants were identified using taxonomic keys, descriptions, and illustrations in Jepson Flora Project (2024), Baldwin et al. (2012), Hickman (1993), and Munz (1974). Nomenclature of plant taxa conform to the *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW 2025c) for special status species and the Jepson eFlora (Jepson Flora Project 2024) for all other taxa.

Any special status plant species observed in the survey area were mapped on an iPad loaded with Avenza Maps software or with a handheld Garmin GPS unit. Data were collected on the number and phenology of individuals (estimated for large populations) and microsite characteristics (e.g., slope, aspect, soil texture, surrounding habitat, and associated species).

The results of the special status plant survey efforts are included as an appendix in the Biological Technical Report (Appendix C).

Quino Checkerspot Butterfly

Psomas conducted Quino checkerspot butterfly surveys following guidelines from the USFWS Survey Protocol (USFWS 2014) to maximize detection of adults during the flight season. Per the USFWS protocol, surveys consist of an initial site assessment to determine if the Project site contains areas recommended for Quino checkerspot butterfly surveys. The assessment was conducted by Psomas Senior Biologist Lindsay Messett (USFWS Permit No. TE 067064-5) on February 15 and 16, 2022. Per USFWS protocol, Psomas completed five weekly focused surveys beginning the third week of February and continuing into March.

Per the USFWS protocol, orchards, developed areas, or small in-fill parcels (plots smaller than one acre that are completely surrounded by urban development) largely dominated by non-native vegetation, active/in-use agricultural fields, closed-canopy forests or riparian areas, dense chaparral, and small openings (less than one acre) completely enclosed within dense chaparral, were considered unsuitable and designated as “excluded areas”. Areas outside of excluded areas, regardless of the presence/absence of host plants and nectar sources, were considered potential habitat areas.

All areas that were not excluded were surveyed for Quino checkerspot butterfly, regardless of host plant presence, absence, and/or density. The Quino checkerspot butterfly is generally associated with sage scrub, open chaparral, grasslands, and vernal pools. Within these communities, they are usually observed in open or sparsely vegetated areas (including trails and dirt roads), on hilltops, and on ridgelines.

The survey area contained approximately 308 acres of suitable habitats that could not be excluded per USFWS protocol; two days were required to complete each survey visit. Surveys were conducted once per week (weather permitting) on non-consecutive days during the peak of the flight season on February 18, 19, 25, 27; March 3, 4, 10, 11, 17, and 18, 2022. Surveys focused on likely breeding areas (host plant patches), feeding areas (nectaring plant patches), and topographical features conducive to detecting the Quino checkerspot butterfly (ridgelines, hilltops, rock outcrops, dirt roads, and open ground with clay soils).

The results of the Quino checkerspot surveys are included in an appendix of the Biological Technical Report (Appendix C).

Crotch’s Bumble Bee

In June 2023, the California Department of Fish and Wildlife (CDFW) issued survey guidelines for Candidate bumble bee species recommending at least three visual surveys conducted two to four weeks apart during the appropriate Colony Active Period (April to August for Crotch’s bumble bee) to ensure the highest probability of detecting the species (CDFW 2023). Surveys must be conducted at a rate of three acres per hour within optimal habitat by a qualified Biologist (i.e., one with appropriate permits and experience in the identification of bee species). Psomas Senior

Biologist Lindsay Messett (Scientific Collecting Permit [SCP]; 182810004-20009-001[5]) conducted all focused surveys for Crotch's bumble bee. The survey included all suitable foraging and potential nesting habitats for the Crotch's bumble bee in the survey area. Surveys were conducted on June 20 and 21; July 16 and 17; and August 5 and 6, 2024.

Ms. Messett conducted the surveys by walking meandering transects, slowly across the survey area, through all appropriate habitats, to obtain a 100 percent survey cover. The surveys were paced at approximately three acres per hour in optimal habitats but were more quickly paced in areas lacking available nectar sources. Ms. Messett scanned for bee activity on the ground and spent additional time at any flowering plants to look for foraging bees. Potential nest sites (e.g., forest edges, unmowed areas, and cavities such as mammal burrows) were inspected with binoculars for evidence of bumble bee use. If multiple exiting/entering bumble bees were observed at a cavity, further observation was made until nesting could be confirmed (e.g., multiple individuals entering the cavity).

Surveys were non-lethal (capture, photograph, release) and were conducted in accordance with the CDFW Survey Considerations for California Endangered Species Act Candidate Bumble Bee Species (CDFW 2023) and authorizations in Ms. Messett's SCP and Memorandum of Understanding issued by CDFW. All bumble bees observed were captured using a butterfly net. Bees were carefully transferred to a clear, plastic vial and placed in a cooler with ice to chill. Once the bees were cooled, they were removed from the vial and photographed. Photographs focused on specific identifiable areas of the bees (i.e. the top of the abdomen, side of the thorax and abdomen, and the front and side views of the head). The bees were processed within 15 minutes of capture and were released within 100 feet of the capture site. Bumble bee species were identified by Ms. Messett using *Bumble Bees of North America: An Identification Guide* (Williams *et al.* 2014). Photographs of the bumble bees observed during the surveys were also provided to taxonomist Dr. Keng-Lou James Hung, PhD (University of Oklahoma) to confirm species identification.

The results of the Crotch's bumble bee surveys are included as an appendix of the Biological Technical Report (Appendix C).

Western Spadefoot

There is currently no standardized survey protocol in place for this species. Survey methods were based on the biology of the western spadefoot and survey protocols for other currently listed anurans (i.e., frogs and toads) to maximize the likelihood of detection.

Focused surveys for this species were conducted throughout the BSA. Three surveys were conducted; one in February, one in March, and one in April. Each of the surveys was conducted within three days following rain events. These surveys included diurnal and nocturnal components to search for the presence of egg masses, tadpoles, and adults. The diurnal portion of the survey focused on searches for the presence of egg masses and tadpoles. Nocturnal surveys focused on searches for active juveniles and calling adults. Flashlights and headlamps were used at night to search for and visually identify any toads detected. Because spadefoots can be sensitive to sounds and light, the Biologists stopped and remained still for extended periods to listen for calls.

Psomas Senior Biologists Jonathan Aguayo and Lindsay Messett conducted the focused surveys in all potentially suitable habitat for western spadefoot in the BSA. Mr. Aguayo and Ms. Messett

[5] Lindsay Messett's SCP includes a MOU to allow her to capture and handle Crotch's bumble bee according to the survey guidelines.

conducted focused surveys for the western spadefoot on February 14; March 13; and April 4, 2025, during favorable weather conditions conducive to good toad activity.

The focused survey report documenting the results of these surveys is in preparation. When available, the results of the western spadefoot surveys will be included in an appendix of the Biological Technical Report (Appendix C).

Arroyo Toad

USFWS survey protocol for the arroyo toad requires that a minimum of six surveys be performed during the breeding season (i.e., March 15–July 1), with at least one survey conducted in April, one in May, and one in June. The surveys included diurnal and nocturnal searches to determine the presence of eggs, tadpoles, and adults. During the diurnal surveys, water was examined for the presence of arroyo toad (*Anaxyrus californicus*) egg masses and tadpoles. Nocturnal surveys began one hour after dusk during weather conditions conducive to toad activity. Nocturnal search methods included walking along the creek banks and stopping periodically to listen for the breeding calls of adult males. Headlamps and flashlights were used to visually identify toads when a breeding call was heard. If any arroyo toads were found, the individual or population was documented, recorded with a GPS unit, and mapped on an aerial photograph. The number of individuals were noted on each subsequent visit, and data were collected on general habitat characteristics for any arroyo toads observed.

Psomas Senior Biologists Jonathan Aguayo and Lindsay Messett conducted the focused surveys in all potentially suitable habitat for arroyo toad in the survey area according to the survey methodology described above. The 2020 survey area included all suitable habitat downstream of the dam along Santiago Creek, extending 0.62 mile (1 kilometer) downstream of the BSA, which included a tributary from Fremont Canyon. Mr. Aguayo and Ms. Messett conducted focused surveys for the arroyo toad on April 17 and 24; May 15 and 22; and June 12 and 19, 2020. The 2022 survey area included all suitable habitat along Santiago Creek upstream of the dam. Mr. Aguayo and Ms. Messett conducted focused surveys for the arroyo toad on March 25; April 1 and 8; May 27; and June 10 and 23, 2022.

Diurnal surveys were conducted from approximately 4:00 PM until dusk, and nocturnal surveys were conducted from one hour after dusk until approximately 11:00 PM. Surveys focused on detecting toads by visual identification; listening for the advertising call of adult males; and checking potentially suitable breeding habitat for tadpoles and/or eggs. Biologists scanned pools for eggs, larvae, metamorphs, juveniles; breeding and/or calling adults in potentially suitable breeding locations along the creek; and foraging individuals in the adjacent riparian and upland areas. Nocturnal surveys were conducted during appropriate environmental conditions conducive to the activity patterns of the arroyo toad. Generally, these conditions are nighttime temperatures greater than 50 degrees Fahrenheit (°F) at dusk, with low winds (less than 10 miles per hour). Surveys were not scheduled on nights with a full or nearly full moon because arroyo toad activity is lower on these nights due to higher predation risk.

The results of the arroyo toad surveys are included in an appendix of the Biological Technical Report (Appendix C).

Southwestern Pond Turtle

Visual Surveys

There is currently no standardized USFWS protocol in place for the southwestern pond turtle; therefore, surveys generally followed the Visual Survey Protocol for the Southcoast Ecoregion

(USGS 2006a). Survey methods were focused on the detection of southwestern pond turtle adults and juveniles through visual observation; the visual surveys did not include dip netting or seining. Any southwestern pond turtles observed would have been documented and recorded using a GPS or iPad to map the location on an aerial photograph.

Psomas Senior Biologist Jonathan Aguayo conducted visual surveys across all potentially suitable habitats for the southwestern pond turtle within the BSA. He walked slowly up the stream channel, either in the water or immediately adjacent to the water, visually searching for pond turtles with and without binoculars, concentrating on pools, surface water, banks, and suitable basking sites within the BSA. He searched aquatic habitat with and without binoculars for the presence of basking or underwater pond turtles. He observed open pools or possible basking areas from a distance and then approached slowly and quietly to help prevent disturbing basking turtles. He listened for the splash of water, which could indicate possible unseen turtles entering the water. If a splash was heard, he spent additional time observing the area for a turtle to resurface. Visual surveys were performed on August 20 and 30, 2024, during weather conditions favorable for turtle activity.

Turtle Trapping

Trapping surveys follow the methodology outlined in the Western Pond Turtle Trapping Survey Protocol for the Southcoast Ecoregion (USGS 2006b). A five-day/four-night trapping program was conducted in August 2024. Nylon mesh hoop traps and floating basking traps were placed in suitable locations in Irvine Lake, baited with cans of sardines in oil to attract turtles. Traps were set near habitat features likely to be used by pond turtles (possible basking areas, areas with underwater refugia). The hoop traps measured 2.5 feet in diameter by 6 feet long with 1-inch square mesh and featured a one-way funnel entrance. Floating basking traps measured 20 inches wide by 28 inches long and 13 inches deep, with two 13-inch wings. Both hoop and basking traps were equipped with floats and securely fastened to immovable objects to prevent submersion to allow for captured turtles (and other animals) to surface for air.

Traps were left in place for a maximum of 24 hours before being checked by Biologists to retrieve captured turtles and other aquatic species (e.g. fish, frogs, invertebrates). General weather data (i.e., ambient air temperature, sky conditions, wind speed) and water temperature were recorded at the start and end of each trapping session. Two trapping sessions, one on the west side of Irvine Lake and another on the east side of Irvine Lake, were required to adequately cover Irvine Lake. As described above, Santiago Creek was surveyed visually because it was not deep enough for trap placement.

Mr. Aguayo (Scientific Collecting Permit [SCP] ID: S-190310010-20076-001) and Senior Biologist Lindsay Messett (SCP ID: S-182810004-20009-001) were the Principal Investigators for the trapping sessions, with assistance from Psomas Biologists Trevor Bristle, Jack Underwood, Cristina Juran, and Tyler Glaser. Both Mr. Aguayo and Ms. Messett are knowledgeable about the southwestern pond turtle and hold the necessary CDFW authorization to trap and handle the species. All traps were tagged with Mr. Aguayo's CDFW SCP number, under which the live trapping was conducted.

Trapping sessions were conducted from August 19–23, 2024, on the west side of Irvine Lake and from August 26–30, 2024, on the east side of Irvine Lake. Surveys were conducted during weather conditions favorable for turtle activity. A total of 24 hoop traps and 3 basking traps were set in Irvine Lake. Trap locations were selected based on suitable habitat with traps spaced 820 feet (i.e., 250 meters) apart. The number of traps set was proportionate to the overall size of the lake.

The results of the southwestern pond turtle surveys are included as an appendix of the Biological Technical Report (Appendix C).

Coastal California Gnatcatcher

USFWS survey protocol for the coastal California gnatcatcher requires three visits, conducted at least one week apart, to all potentially occupied habitat areas for surveys within an NCCP area (USFWS 1997a, 1997b). All visits must be conducted between 6:00 AM and 12:00 PM, and no more than 100 acres of suitable habitat may be surveyed per visit.

Psomas Senior Biologist Lindsay Messett (USFWS Permit No. TE 067064-5) conducted all focused surveys for coastal California gnatcatcher. The 2020 survey area for the gnatcatcher surveys included all suitable habitat (i.e., sagebrush scrub, disturbed sagebrush scrub, and disturbed floodplain sagebrush scrub) downstream of the dam and within a 500-foot buffer around the tentative impact footprint. The 2022 survey area for the gnatcatcher surveys includes all suitable habitat upstream of the dam in the BSA. The Biologist reduced the survey area boundary where offsite areas were not accessible due to property boundaries (i.e., Santiago Landfill), topography (i.e., cliff), and where there was no suitable habitat (i.e., Irvine Lake). The 2020 surveys were conducted on April 30, May 27, and June 25, 2020. The 2022 surveys were conducted on March 25, April 4, and June 9, 2022.

Ms. Messett avoided weather conditions that were too cold (i.e., below 55 degrees Fahrenheit [°F]), too hot (i.e., above 95°F), or too windy (i.e., wind speed greater than 15 miles per hour) to comply with USFWS survey protocol requirements. Ms. Messett conducted the surveys by slowly walking through all appropriate habitats while listening and watching for gnatcatcher activity and by using a combination of recordings of gnatcatcher vocalizations and “pishing” sounds to elicit responses from any gnatcatchers present. The frequency of vocalization playback and “pishing” varied depending on conditions such as habitat patch size, topography in each area, and ambient noise conditions.

The results of the coastal California gnatcatcher surveys are included as an appendix of the Biological Technical Report (Appendix C).

Least Bell’s Vireo/Southwestern Willow Flycatcher

USFWS protocol for the least Bell’s vireo (*Vireo bellii pusillus*) requires that at least eight surveys be conducted from April 10 to July 31 with a ten-day interval between each site visit (USFWS 2001). The USFWS protocol for the southwestern willow flycatcher requires a total of five surveys, with the first survey conducted between May 15 and May 31; the second and third surveys between June 1 and June 24; and the fourth and fifth surveys between June 25 and July 17 (Sogge et al. 2010).

Psomas Senior Biologist Lindsay Messett conducted all 2020 focused surveys for least Bell’s vireo downstream of the dam. The 2020 survey area for the least Bell’s vireo surveys included all suitable habitat (i.e., southern willow scrub and mule fat scrub) downstream of the dam and within a 500-foot buffer north of the BSA along Santiago Creek. The Biologist reduced the survey area boundary where offsite areas were not accessible due to property boundaries (i.e., Santiago Landfill), topography (i.e., cliff), and where there was no suitable habitat (i.e., Irvine Lake). Surveys were conducted on April 30, May 12 and 27, June 9, and 25, and July 6, 17, and 28, 2020.

Psomas Senior Biologist Jonathan Aguayo (USFWS Permit No. TE 96514A-3) conducted all focused surveys for least Bell’s vireo and southwestern willow flycatcher upstream of the dam. Because the survey area contained more than 80 acres of suitable habitat, 2 days were required

to cover the entire survey area for each of the 8 visits. Mr. Aguayo conducted focused surveys for the least Bell's vireo on April 13, 14, 24, and 25; May 12, 13, 25, and 26; June 7, 8, 21, and 22; and July 1, 4, 13, and 14, 2022. Focused surveys for southwestern willow flycatcher were conducted on May 25 and 26; June 7, 8, 21, and 22; and July 1, 4, 13, and 14, 2022. Per guidance issued from the USFWS, focused surveys for least Bell's vireo and southwestern willow flycatcher were not conducted concurrently. During the last five surveys, surveys were conducted for southwestern willow flycatcher first; surveys for least Bell's vireo followed.

Ms. Messett and Mr. Aguayo systematically surveyed the riparian habitats by walking slowly and methodically along their margins; habitat is narrow enough that transects through the habitat were not necessary. Following the willow flycatcher protocol, recorded vocalizations were used to elicit a response from any potentially territorial southwestern willow flycatchers. As the least Bell's vireo survey protocol does not require the playback of least Bell's vireo vocalizations, recorded least Bell's vireo vocalizations were not used during the surveys. Any least Bell's vireos or southwestern willow flycatchers detected were recorded with a GPS unit (Garmin Vista) or an iPad. Because of the high density of least Bell's vireos in the survey area upstream of the dam, great care was taken in the field to verify that adjacent territories were occupied by distinct males. Although not required during a presence/absence survey, time was also taken to visually observe any individuals detected to identify their sex and age to determine the fate of the territory over the course of the surveys (e.g., juveniles observed indicate successful nesting).

All surveys were conducted under optimal weather conditions and during early morning hours when bird activity is at its peak. All bird species detected during the survey were recorded, including notable observations of special status species or other birds (e.g., brown-headed cowbird [*Molothrus ater*]).

The results of the least Bell's vireo/southwestern willow flycatcher surveys are included as an appendix to the Biological Technical Report (Appendix C).

Western Yellow-billed Cuckoo

The USFWS survey protocol for western yellow-billed cuckoo requires a minimum of four surveys be conducted in three time periods that span the peak of breeding activity for the western populations of this species: (1) one survey is required from June 15 to June 30 when migrating yellow-billed cuckoos are passing through but breeding birds are also arriving; (2) two surveys are required from July 1 to July 31 when individual cuckoos encountered are mostly breeders but are occasionally migrants, wandering individuals, or young of the year; and (3) one survey is required from August 1 to August 15 when most breeding yellow-billed cuckoos have finished breeding activities and are departing. Each survey needs to be conducted 12 to 15 days apart. Focused surveys were conducted by Lindsay Messett (TE-067064-5).

The survey area for the western yellow-billed cuckoo includes all suitable riparian habitats upstream of the dam. The Biologist reduced the survey area boundary where offsite areas were not accessible due to property boundaries (i.e., Santiago Landfill), topography (i.e., cliff), and where there was no suitable habitat (i.e., Irvine Lake).

Ms. Messett systematically surveyed the riparian habitats by walking slowly and methodically along the margins of riparian habitat and using meandering transects through the riparian habitat in the survey area. Per USFWS survey protocol for the species, Ms. Messett played recorded contact or "kowlp" calls of western yellow-billed cuckoo five times at one-minute intervals at each calling station (or point) established in the survey area. Compact speakers capable of broadcasting recorded bird calls in excess of 70 decibels were used during all surveys. Upon arriving at each calling point, Ms. Messett listened and watched for cuckoos for one minute prior

to playing the broadcast contact calls. Calling points were established approximately every 328 feet in riparian habitat that provided potentially suitable or marginally suitable habitat for the western yellow-billed cuckoo. All surveys were conducted under optimal weather conditions (i.e., between 55 degrees Fahrenheit [°F] and 95°F with wind speeds between 0 and 15 miles per hour) and during the morning hours when bird activity is at a peak.

The results of the western yellow-billed cuckoo surveys are included as an appendix to the Biological Technical Report (Appendix C).

4.3.3 EXISTING CONDITIONS

Physical Environmental Setting

The Project is generally located in the coastal foothills of eastern Orange County. Topographically, this region exhibits low-lying ridgelines and hills with interspersed relatively broad valley and canyon bottoms.

Within the eastern Orange County area, there are numerous designated open space areas. The largest areas in proximity to the BSA include the following: the 1,000-acre NCCP Reserve, Limestone Canyon Regional Park, Whiting Ranch Wilderness Park, Santiago Oaks Regional Park, Irvine Regional Park, and Cleveland National Forest. In addition to designated open space, other non-designated open space areas within the region include other undeveloped land in the foothills of Santiago Canyon.

Irvine Lake (named Santiago Creek Reservoir by the USGS, Exhibit 4.3-1) was created by constructing a dam across Santiago Creek. Santiago Creek, a named blueline stream, enters Irvine Lake from the east and continues downstream of the dam flowing north and then west. It has a relatively broad floodplain both above and below the dam. The slopes around the western and northern portions of the lake are relatively steep while the areas to the southeast and east of the BSA include areas that are relatively flat. Three unnamed blueline streams enter the lake from the north and eight unnamed blueline streams enter the lake from the west, southeast, and south. One unnamed blueline stream enters the BSA in the northwest, downstream of the dam, while Fremont Canyon Creek merges with Santiago Creek downstream of the BSA. Elevations in the BSA range from approximately 657 to 996 feet above mean sea level (msl).

Vegetation Types

The following vegetation types occur in the BSA: sagebrush scrub, disturbed sagebrush scrub, sagebrush-coyote bush scrub, southern cactus scrub, disturbed southern cactus scrub, disturbed floodplain sage scrub, toyon-sumac chaparral, annual grassland, ruderal, riparian herb, southern willow scrub, mulefat scrub, disturbed mulefat scrub, southern sycamore-coast live oak riparian woodland, southern black willow forest, disturbed southern black willow forest, southern black willow forest/riparian herb, coast live oak woodland, and western sycamore, and vegetated fluctuating shoreline (Exhibit 4.3-2; Table 4.3-1). Other landcover includes cliff, open water, fluctuating shoreline, perennial stream, ornamental, developed, and disturbed areas. Note that the number following each vegetation type name corresponds to the code in Gray and Bramlet (1992).

TABLE 4.3-1
VEGETATION TYPES AND OTHER AREAS IN THE BSA

Vegetation Type or Other Area	Gray and Bramlet (1992) Vegetation Code	Sensitive Vegetation Community (CDFW 2025b)	Total Vegetation in BSA (acres)
Coastal Sage Scrub			
Sagebrush Scrub	2.3.6	No	115.81
Disturbed Sagebrush Scrub	2.3.6	No	19.39
Sagebrush – Coyote Brush Scrub	2.3.12	No	10.59
Southern Cactus Scrub	2.4	Provisional[a]	17.48
Disturbed Southern Cactus Scrub	2.4	Yes	10.62
Disturbed Floodplain Sage Scrub	2.6	Yes	0.48
Subtotal Coastal Sage Scrub			*174.37*
Chaparral			
Toyon – Sumac Chaparral	3.12	No	29.91
Subtotal Chaparral			*29.91*
Grassland			
Annual Grassland	4.1	No	15.59
Ruderal	4.6	No	92.38
Subtotal Grassland			*107.97*
Riparian			
Riparian Herb	7.1	No	13.15
Southern Willow Scrub	7.2	Yes	0.43
Mulefat Scrub	7.3	No	1.50
Disturbed Mulefat Scrub	7.3	No	26.67
Southern Sycamore Riparian Woodland	7.4	Yes	20.48
Southern Sycamore Riparian Woodland/Southern Coast Live Oak Riparian Forest	7.4/7.5	Yes	5.46
Southern Black Willow Forest	7.7	Yes	83.61
Disturbed Southern Black Willow Forest	7.7	Yes	35.34
Southern Black Willow Forest/Riparian Herb	7.7/7.1	No[b]	26.01
Subtotal Riparian			*212.65*
Woodland			
Coast Live Oak Woodland	8.1	No	31.09
Western Sycamore	8.x	Yes	0.36
Subtotal Woodland			*31.45*
Cliff and Rock			
Cliff	10.0	No	1.62
Subtotal Cliff and Rock			*1.62*
Lakes, Reservoirs, and Basins			
Open Water	12.1	No	313.28
Fluctuating Shoreline	12.2	No	26.31
Vegetated Fluctuating Shoreline	12.2	No	45.13
Subtotal Lakes, Reservoirs, and Basins			*384.72*
Watercourses			
Perennial Stream	13.1	No	6.97
Subtotal Watercourses			*6.97*

TABLE 4.3-1
VEGETATION TYPES AND OTHER AREAS IN THE BSA

Vegetation Type or Other Area	Gray and Bramlet (1992) Vegetation Code	Sensitive Vegetation Community (CDFW 2025b)	Total Vegetation in BSA (acres)
Developed Areas			
Ornamental	15.5	No	20.77
Developed	15.6	No	20.98
Subtotal Developed Areas			*41.75*
Disturbed Areas			
Disturbed	16.1	No	25.42
Subtotal Disturbed Areas			*25.42*
Total			**1,016.83**

[a] Ranked as sensitive based on less than 10 stands sampled; may be more widespread (CDFW 2025b).
[b] This blended community would be characterized more as riparian herb than southern black willow forest; therefore, it would not be considered a sensitive community.

BSA: Biological Survey Area

Sagebrush Scrub (2.3.6)

Sagebrush scrub is distributed throughout the BSA on the slopes surrounding Irvine Lake. This vegetation type is dominated by relatively dense California sagebrush (*Artemisia californica*). Other native shrubs are also scattered throughout these areas and include leafy California buckwheat (*Eriogonum fasciculatum var. foliolosum*), deerweed (*Acmispon glaber*), laurel sumac (*Malosma laurina*), lemonade berry (*Rhus integrifolia*), and toyon (*Heteromeles arbutifolia*). The density of these co-occurring species varies across the BSA. Where present, openings between shrubs have native herbs, such as erect plantain (*Plantago erecta*) and narrow-toothed pectocarya (*Pectocarya linearis* ssp. *ferocula*). Sparse amounts of scaly scale-broom (*Lepidospartum squamatum*) extend into this vegetation where it occurs along Santiago Creek downstream of the dam.

Disturbed Sagebrush Scrub (2.3.6)

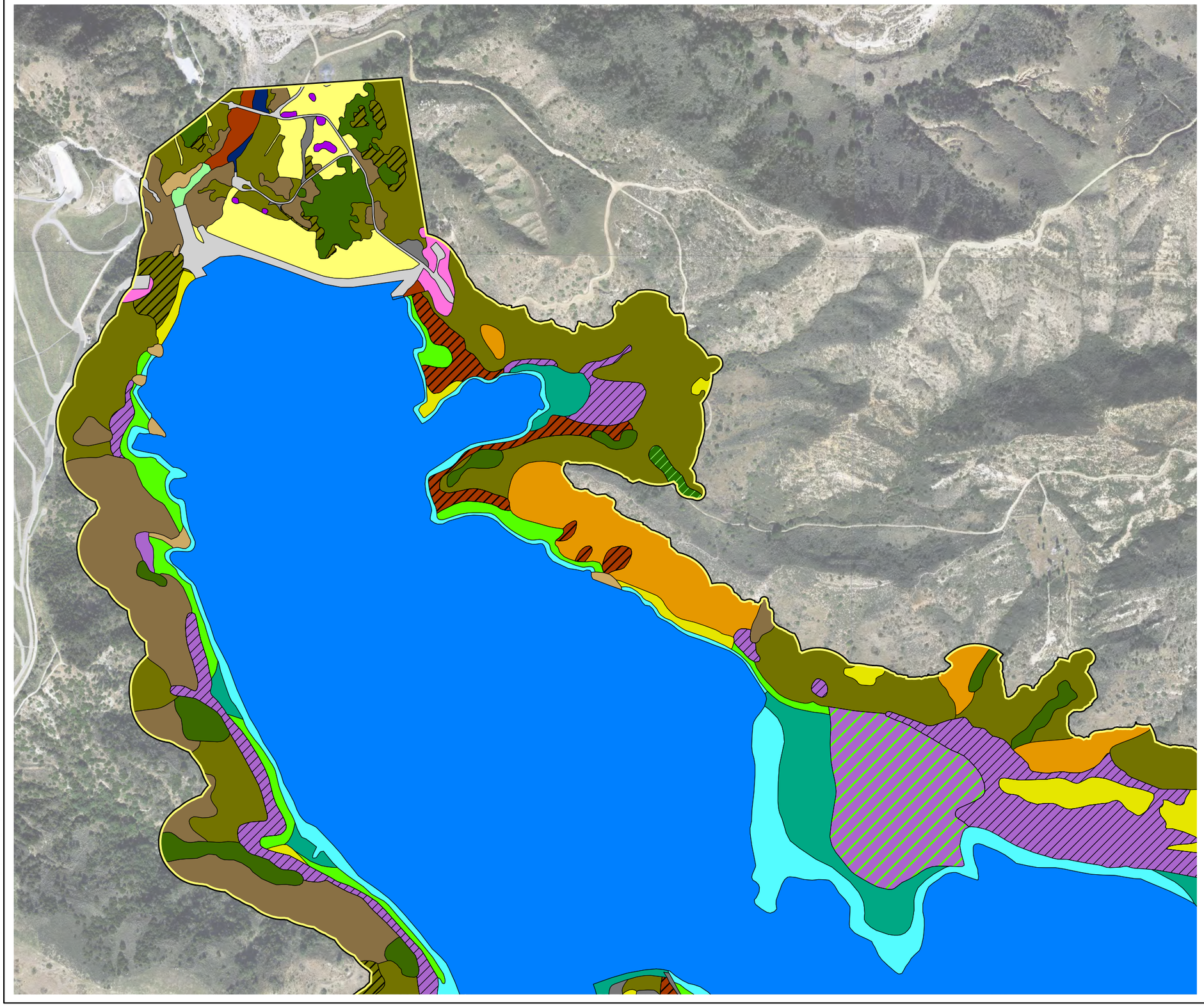
Disturbed sagebrush scrub is distributed downstream of the dam and along slopes in the southern portion of the BSA. It is similar in composition to sagebrush scrub but it has an open canopy and the spaces between the shrubs are degraded (disturbed) by the presence of non-native grasses and herbs such as bromes (*Bromus* spp.), oats (*Avena* spp.), grayish shortpod mustard (*Hirschfeldia incana*), and/or black mustard (*Brassica nigra*).

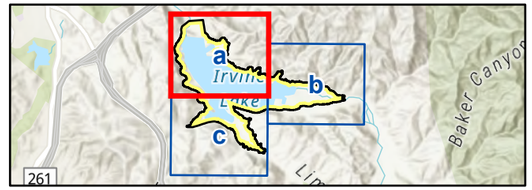
Sagebrush – Coyote Brush Scrub (2.3.12)

Sagebrush – coyote brush scrub is distributed on slopes in the southern portion of the BSA. This vegetation type is co-dominated by California sagebrush and coyote brush (*Baccharis pilularis* ssp. *consanguinea*) with lesser amounts of leafy California buckwheat, laurel sumac, lemonade berry, toyon, and white sage (*Salvia apiana*).

Southern Cactus Scrub (2.4)

Southern cactus scrub is distributed on slopes on the northern side of Irvine Lake. This vegetation type is characterized by approximately 20 percent cover of prickly-pear (either *Opuntia littoralis*





Biological Study Area

Vegetation Types and Other Areas

- Sagebrush Scrub (2.3.6)
- Disturbed Sagebrush Scrub (2.3.6)
- Southern Cactus Scrub (2.4)
- Disturbed Floodplain Sage Scrub (2.6)
- Toyon - Sumac Chaparral (3.12)
- Annual Grassland (4.1)
- Ruderal (4.6)
- Riparian Herb (7.1)
- Southern Willow Scrub (7.2)
- Mulefat Scrub (7.3)
- Disturbed Mulefat Scrub (7.3)
- Southern Sycamore Riparian Woodland/Southern Coast Live Oak Riparian Forest (7.4/7.5)
- Southern Black Willow Forest (7.7)
- Disturbed Southern Black Willow Forest (7.7)
- Southern Black Willow Forest/Riparian Herb (7.7/7.1)
- Coast Live Oak Woodland (8.1)
- Western Sycamore (8.x)
- Cliff (10)
- Open Water (12.1)
- Fluctuating Shoreline (12.2)
- Vegetated Fluctuating Shoreline (12.2)
- Ornamental (15.5)
- Developed (15.6)
- Disturbed (16.1)

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Biological Resources **Exhibit 4.3-2a**

Santiago Creek Dam Improvement Project

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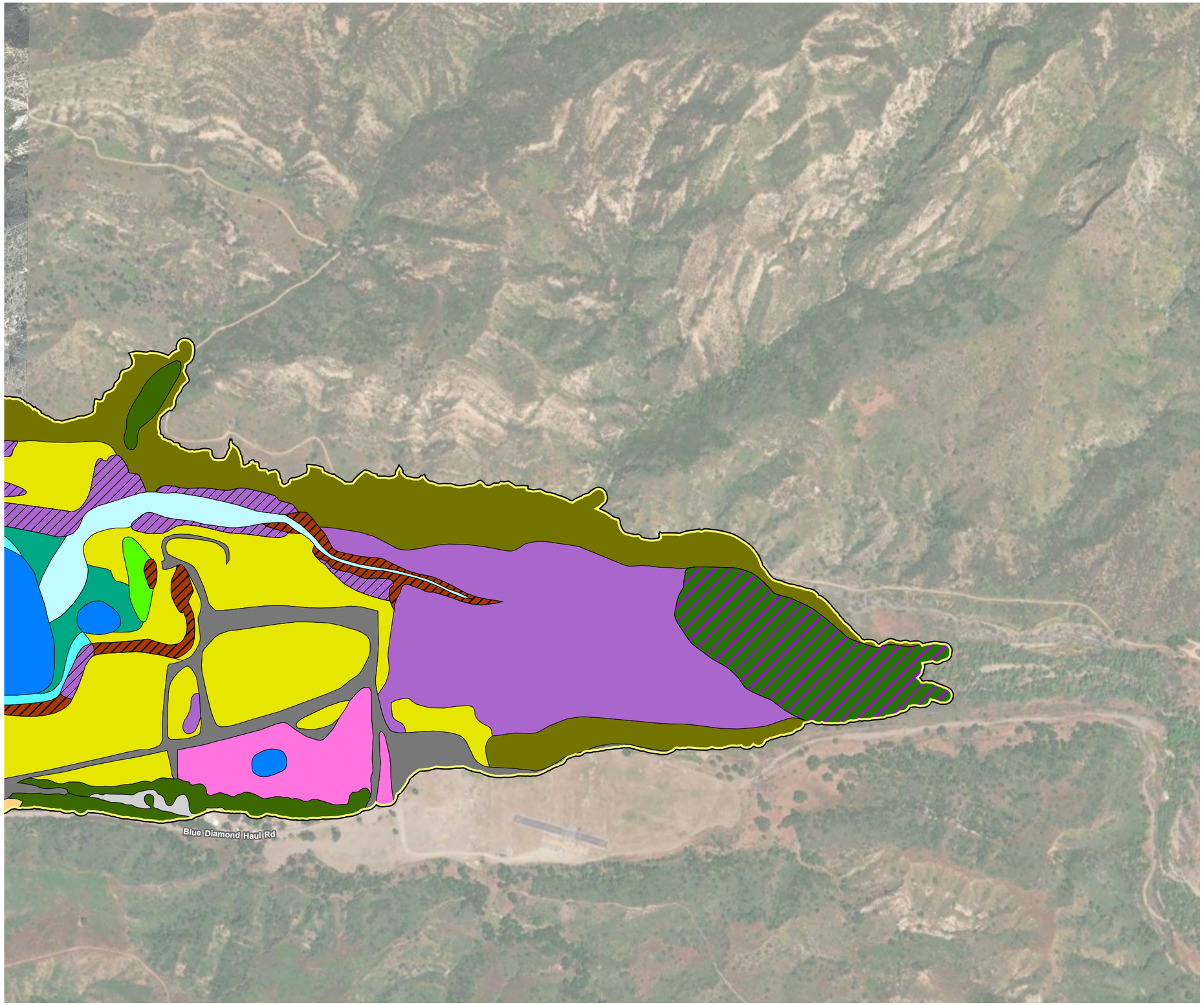

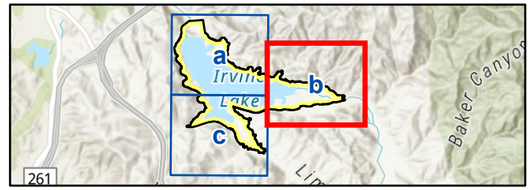

Biological Study Area

Vegetation Types and Other Areas

- Sagebrush Scrub (2.3.6)
- Sagebrush - Coyote Brush Scrub (2.3.12)
- Ruderal (4.6)
- Riparian Herb (7.1)
- Disturbed Mulefat Scrub (7.3)
- Southern Sycamore Riparian Woodland (7.4)
- Southern Black Willow Forest (7.7)
- Disturbed Southern Black Willow Forest (7.7)
- Coast Live Oak Woodland (8.1)
- Open Water (12.1)
- Fluctuating Shoreline (12.2)
- Vegetated Fluctuating Shoreline (12.2)
- Perennial Stream (13.1)
- Ornamental (15.5)
- Developed (15.6)
- Disturbed (16.1)

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Biological Resources **Exhibit 4.3-2b**

Santiago Creek Dam Improvement Project

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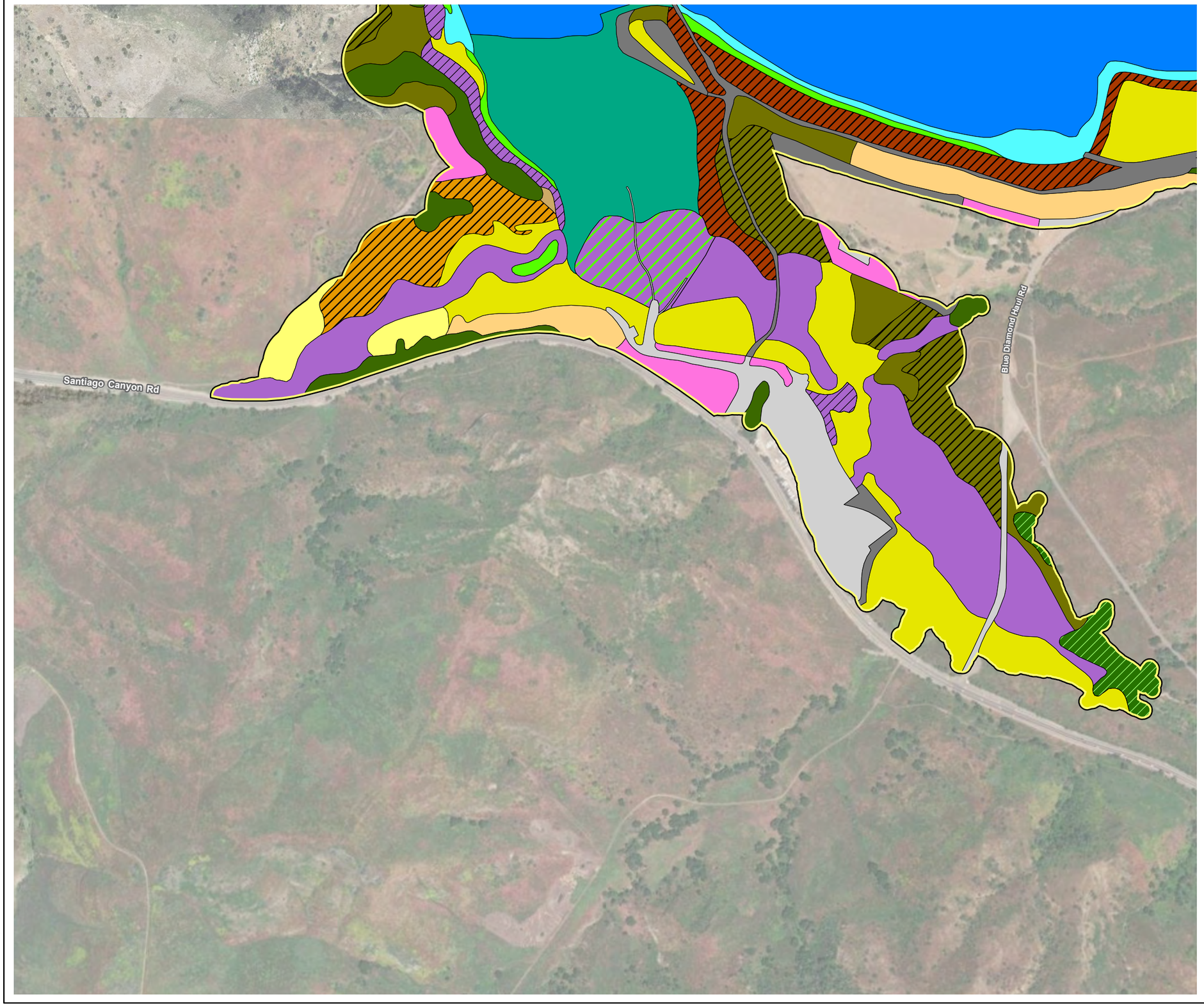

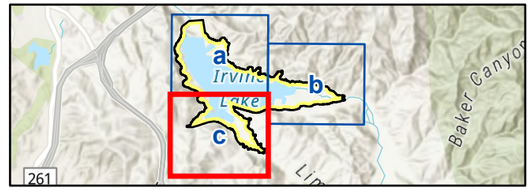

Biological Study Area

Vegetation Types and Other Areas

- Sagebrush Scrub (2.3.6)
- Disturbed Sagebrush Scrub (2.3.6)
- Sagebrush - Coyote Brush Scrub (2.3.12)
- Disturbed Southern Cactus Scrub (2.4)
- Annual Grassland (4.1)
- Ruderal (4.6)
- Riparian Herb (7.1)
- Disturbed Mulefat Scrub (7.3)
- Southern Sycamore Riparian Woodland/Southern Coast Live Oak Riparian Forest (7.4/7.5)
- Southern Black Willow Forest (7.7)
- Disturbed Southern Black Willow Forest (7.7)
- Southern Black Willow Forest/Riparian Herb (7.7/7.1)
- Coast Live Oak Woodland (8.1)
- Cliff (10)
- Open Water (12.1)
- Fluctuating Shoreline (12.2)
- Vegetated Fluctuating Shoreline (12.2)
- Ornamental (15.5)
- Developed (15.6)
- Disturbed (16.1)

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Biological Resources **Exhibit 4.3-2c**

Santiago Creek Dam Improvement Project

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or *Opuntia x vaseyi*). These areas also contain California sagebrush, leafy California buckwheat, laurel sumac, and other sagebrush scrub species.

Disturbed Southern Cactus Scrub (2.4)

Disturbed southern cactus scrub is located in the southwestern portion of the BSA. This vegetation type is characterized by the presence of prickly-pear with other native shrubs such as California sagebrush and leafy California buckwheat. However, it is degraded (disturbed) by the presence of non-native grayish shortpod mustard and pepper tree (*Schinus molle*).

Disturbed Floodplain Sage Scrub (2.6)

Disturbed floodplain sage scrub occurs along the active floodplain/low terrace of Santiago Creek downstream of the dam. This vegetation type is characterized by the presence of scaly scale-broom along a rocky alluvial wash. As is typical of this vegetation type, shrub density is relatively low. Other species that co-occur include California sagebrush, California brickellbush (*Brickellia californica*), straw-colored cudweed (*Pseudognaphalium stramineum*), and chilicothe (*Marah macrocarpa*). This vegetation type is degraded (disturbed) by the presence of non-native fennel (*Foeniculum vulgare*) and non-native grasses.

Toyon – Sumac Chaparral (3.12)

Toyon – sumac chaparral is distributed downstream of the dam and on the slopes in the western portion of the BSA. The dominant shrub is laurel sumac; however, lemonade berry, toyon, blue elderberry (*Sambucus mexicana*), and coast live oak (*Quercus agrifolia*) co-occur in some areas. The patch on the east side of Santiago Creek downstream of the dam also contains Coulter's matilija poppy (*Romneya coulteri*), a special status plant species. This vegetation type intergrades with coastal sage scrub and annual brome grassland.

Annual Grassland (4.1)

Annual grassland is distributed primarily downstream of the dam but also occurs in small patches in the southwestern portion of the BSA. This vegetation type is dominated by non-native grasses, including red brome (*Bromus rubens*), ripgut grass (*Bromus diandrus*), slender wild oat (*Avena barbata*), wild oat (*Avena fatua*), and wall barley (*Hordeum murinum*). Other non-native species, such as grayish shortpod mustard, black mustard, and tocalote (*Centaurea melitensis*) are also present. Most areas contain scattered native species such as miner's-lettuce (*Claytonia perfoliata*), fascicled tarplant (*Deinandra fasciculata*), telegraph weed (*Heterotheca grandiflora*), turkey-mullein (*Croton setiger*), and fiddleneck (*Amsinckia* spp.). The slope up to the dam contains a greater cover of native species, including miniature lupine (*Lupinus bicolor*), common goldfields (*Lasthenia gracilis*), erect plantain, and valley popcorn flower (*Plagiobothrys canescens*). This slope may have been seeded with a native seed mix following a previous disturbance.

Ruderal (4.6)

Ruderal (weedy) vegetation occurs in broad, flat areas and slopes in the eastern and southern portions of the BSA and along small portions of the shoreline around Irvine Lake. This vegetation type is dominated by grayish shortpod mustard. The area adjacent to the west of the dam is a monoculture of common castor bean (*Ricinus communis*), a non-native species.

Riparian Herb (7.1)

Riparian herb is distributed just above the shoreline around Irvine Lake throughout the BSA. This vegetation type is dominated by cocklebur (*Xanthium strumarium*) with lesser amounts of white sweetclover (*Melilotus albus*), alkali-mallow (*Malvella leprosa*), and grayish shortpod mustard.

Southern Willow Scrub (7.2)

Southern willow scrub occurs in one location along Santiago Creek downstream of the dam. This vegetation type is dominated by arroyo willow (*Salix lasiolepis*) with scattered white alder (*Alnus rhombifolia*), western sycamore (*Platanus racemosa*), and Fremont cottonwood (*Populus fremontii* ssp. *fremontii*). The understory contains scattered mule fat (*Baccharis salicifolia* ssp. *salicifolia*), California sagebrush, flatsedge (*Cyperus* sp.), and non-native grasses. A depression in the streambed holds standing water surrounded by broad-leaved cattail (*Typha latifolia*).

Mulefat Scrub (7.3)

Mulefat scrub primarily occurs along the low flow channel of Santiago Creek downstream of the dam. It also occurs upstream of the dam in one patch adjacent to the east end of the dam structure. It is dominated by a varying cover of mule fat; scaly scale-broom also occurs. Downstream of the dam, this vegetation type includes some low cover of non-native fennel and mustards.

Disturbed Mulefat Scrub (7.3)

Disturbed mulefat scrub is distributed above the shoreline of Irvine Lake and extending upstream of the lake along the low-flow channel of Santiago Creek. This vegetation type is dominated by scattered mule fat; however, it is degraded (disturbed) by the presence of saltcedar (*Tamarix ramosissima*), giant reed (*Arundo donax*), and grayish shortpod mustard.

Southern Sycamore Riparian Woodland (7.4)

Southern sycamore riparian woodland is located in one location at the upstream end of Santiago Creek in the eastern portion of the BSA. This vegetation type consists of a closed riparian canopy dominated by western sycamore. Other species in the tree canopy include Goodding's black willow, arroyo willow, Fremont cottonwood, and coast live oak; a few scattered gum trees (*Eucalyptus* spp.) are also present. The understory and margins contain mule fat.

Southern Sycamore Riparian Woodland/Coast Live Oak Riparian Forest (7.4/7.5)

Southern sycamore riparian woodland/coast live oak riparian forest is distributed in a few patches in the southeastern portion of the BSA and in one location north of Irvine Lake. This vegetation type is co-dominated by western sycamore and coast live oak trees in a savannah-like setting. The understory and area between trees are dominated by grayish shortpod mustard and tree tobacco (*Nicotiana glauca*).

Southern Black Willow Forest (7.7)

Southern black willow forest occurs along tributary drainages in the southern portion of the BSA, upstream of the lake along Santiago Creek, and in a few patches above the shoreline of Irvine Lake. This vegetation type is dominated by a tree canopy of Goodding's black willow (*Salix gooddingii*); mule fat is abundant in the understory, along the margins, and between the tree canopy.

Disturbed Southern Black Willow Forest (7.7)

Disturbed southern black willow forest is distributed above the shoreline of Irvine Lake and upstream of the lake along Santiago Creek. This vegetation type is characterized by the presence of Goodding's black willow and mule fat; however, it is degraded (disturbed) by the presence of non-native species such as saltcedar, giant reed, grayish shortpod mustard, and non-native grasses. In many areas, the tree canopy is sparse.

Southern Black Willow Forest/Riparian Herb (7.7/7.1)

Southern black willow forest/riparian herb is distributed in broad, flat areas near fluctuating shoreline and vegetated fluctuating shoreline near the upstream end of Irvine Lake and in the southern portion of the BSA. This vegetation type contains sparse Goodding's black willow scattered throughout an area dominated by cocklebur. Based on historic aerial images, these areas are inundated or partially inundated when the water level in the lake is higher.

Coast Live Oak Woodland (8.1)

Coast live oak woodland occurs scattered throughout the BSA. This vegetation type is dominated by coast live oak. In some areas, the understory consists of lemonade berry, toyon, laurel sumac, and California sagebrush while in other areas understory is primarily non-native grasses, miner's-lettuce, and chilicothe. At its margins, coast live oak intergrades with sagebrush scrub, toyon – sumac chaparral, and annual grassland.

Western Sycamore (8.x)

Western sycamore trees occur scattered throughout the central portion of the BSA downstream of the dam. Areas mapped as western sycamore consists of individual trees and small groups of western sycamore trees in a savannah-like setting. The understory consists of non-native grasses.

Cliff (10.0)

Cliffs occur on the western side of Santiago Creek downstream of the dam and along the slopes of Irvine Lake in the western portion of the BSA. This landcover consists of a steep, bare rock face with little to no vegetation.

Open Water (12.1)

Open water occurs in Irvine Lake. Areas mapped as open water were inundated at the time of the survey and unvegetated.

Fluctuating Shoreline (12.2)

Fluctuating shoreline is distributed along the margins of Irvine Lake above the waterline and where the water level has recently receded at the upstream end of the lake. These areas are submerged frequently enough that vegetation has not established. Based on historic aerial images, these areas are inundated or partially inundated when the water level in the lake is higher. These areas fluctuate between open water, unvegetated shoreline, and/or partially vegetated depending on water level.

Vegetated Fluctuating Shoreline (12.2)

Vegetated fluctuating shoreline is distributed along portions of Irvine Lake where the water level has receded long enough for vegetation to become established. These areas are dominated by the non-native swamp prickly grass (*Crypsis schoenoides*) with lesser amounts of flatsedge, seaside healiotrope (*Heliotropium curassavicum* var. *oculatum*), willow weed (*Persicaria lapathifolia*), alkali-mallow, and Bertero's burhead (*Echinodorus berteroi*). Based on historic aerial images, these areas are inundated or are partially inundated when the water level in the lake is higher.

Perennial Stream (13.1)

Perennial stream is located along Santiago Creek upstream of Irvine Lake. It includes a low flow channel and lower portions of the active floodplain; this area broadens as it discharges into Irvine Lake. The low flow channel was primarily unvegetated and flowing water was present at the time of the site visit. The upstream portion of the channel contains seedlings and low-growing vegetation, indicating that it is periodically scoured. Vegetation includes mule fat seedlings (approximately 6 inches high), marsh pulicaria (*Pulicaria paludosa*), white lamb cudweed (*Pseudognaphalium luteoalbum*), fringed willowherb (*Epilobium ciliatum*), willow weed, white sweetclover, annual beard grass (*Polypogon monspeliensis*), southern cattail (*Typha domingensis*), and broad-leaved cattail.

Ornamental (15.5)

Ornamental vegetation is primarily located in association with development and consists of species planted for landscaping purposes. This vegetation type consists of non-native tree species (i.e., pepper tree [*Schinus* sp.], European olive (*Olea europaea*), and gum tree [*Eucalyptus* spp.]), sometimes intermixed with planted native trees such as coast live oak, western sycamore, and Fremont cottonwood. In some areas, the understory is dominated by turf grass.

Developed (15.6)

Developed areas consist of an impermeable landcover and include the dam embankment, spillway channel, buildings, parking lots, and paved roads. These areas are unvegetated.

Disturbed (16.1)

Disturbed areas occur throughout the BSA and consist of bare ground (e.g., graded access roads). Note that graded areas overgrown with vegetation were mapped according to the vegetation. Smaller access roads were not mapped separately from the surrounding vegetation.

Wildlife

Vegetation in the BSA provides habitat for many wildlife species. Common wildlife species observed or expected to occur in the BSA are discussed below.

Fish

Irvine Lake is stocked with fish, including rainbow trout (*Oncorhynchus mykiss*), bass (*Morone* sp.), catfish (*Ictalurus* sp.), common carp (*Cyprinus carpio*), bluegill (*Lepomis macrochirus*), and crappie (*Pomoxis* sp.). Non-native fish are predators on native species; no native fish (with the exception of the stocked rainbow trout) are expected to occur in Irvine Lake.

Amphibians

Amphibians require moisture for at least a portion of their life cycle, and many require standing or flowing water for reproduction. Terrestrial species may or may not require standing water for reproduction; they survive in dry areas by aestivating (i.e., remaining beneath the soil in burrows or under logs and leaf litter and emerging only when temperatures are low and humidity is high). Many of these species' habitats are associated with water, and they emerge to breed once the rainy season begins. Soil moisture conditions can remain high throughout the year in some habitat types, depending on factors such as amount of vegetation cover, elevation, and slope/aspect.

Amphibian species observed in the BSA include western toad (*Anaxyrus boreas*), California treefrog (*Pseudacris cadaverina*), Baja California treefrog (*Pseudacris hypochondriaca*), and the non-native American bullfrog (*Lithobates catesbeianus*). Other amphibian species expected to occur include garden slender salamander (*Batrachoseps major major*), black-bellied salamander (*Batrachoseps nigriventris*), and arboreal salamander (*Aneides lugubris*).

Reptiles

Reptiles are well-adapted to life in arid habitats. They have several physiological adaptations that allow them to conserve water. Reptiles can also become dormant during weather extremes, allowing them to survive prolonged droughts and paucity of food (Ruben and Hillenius 2005). Reptilian diversity and abundance typically vary with vegetation type and character.

Common reptile species observed in the BSA include common side-blotched lizard (*Uta stansburiana*), western fence lizard (*Sceloporus occidentalis*). Other reptile species expected to occur include southern alligator lizard (*Elgaria multicarinata*), western skink (*Plestiodon skiltonianus*), red racer (*Coluber flagellum piceus*), California striped racer (*Coluber lateralis lateralis*), California kingsnake (*Lampropeltis californiae*), gopher snake (*Pituophis catenifer*), northern three-lined boa [rosy boa] (*Lichanura orcutti*), and southern Pacific rattlesnake (*Crotalus oreganus helleri*).

Birds

A variety of bird species are expected to be residents in the BSA, using the habitats throughout the year. Other species are present only during certain seasons. For example, the white-crowned sparrow (*Zonotrichia leucophrys*) is expected to occur in the BSA during the winter and migrate to the northern forests for breeding in the spring.

The following resident bird species were observed in the BSA: mallard (*Anas platyrhynchos*), California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), double-crested cormorant (*Phalacrocorax auritus*), snowy egret (*Egretta thula*), acorn woodpecker (*Melanerpes formicivorus*), northern flicker (*Colaptes auratus*), black phoebe (*Sayornis nigricans*), Say's phoebe (*Sayornis saya*), California scrub jay (*Aphelocoma californica*), American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), oak titmouse (*Baeolophus inornatus*), Bewick's wren (*Thryomanes bewickii*), blue-gray gnatcatcher (*Polioptila caerulea*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), house finch (*Haemorhous mexicanus*), lesser goldfinch (*Spinus psaltria*), California towhee (*Melozone crissalis*), song sparrow (*Melospiza melodia*), and common yellowthroat (*Geothlypis trichas*).

Migratory species observed in the BSA that are present during the nesting season include lesser nighthawk (*Chordeiles acutipennis*), barn swallow (*Hirundo rustica*), and black-headed grosbeak (*Pheucticus melanocephalus*). Other migratory species that would be expected to occur in the

spring/summer include black-chinned hummingbird (*Archilochus alexandri*), Pacific-slope flycatcher (*Empidonax difficilis*), ash-throated flycatcher (*Myiarchus cinerascens*), phainopepla (*Phainopepla nitens*), hooded oriole (*Icterus cucullatus*), and Bullock's oriole (*Icterus bullockii*). Wintering species observed or expected to occur in the BSA include ruby-crowned kinglet (*Regulus calendula*), cedar waxwing (*Bombycilla cedrorum*), yellow-rumped warbler (*Setophaga coronata*), Townsend's warbler (*Setophaga townsendi*), and white-crowned sparrow.

Raptors (birds of prey) observed or expected to occur in the BSA include Cooper's hawk (*Accipiter cooperii*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), great-horned owl (*Bubo virginianus*), barn owl (*Tyto alba*), western screech owl (*Megascops kennicottii*), and American kestrel (*Falco sparverius*). The turkey vulture (*Cathartes aura*), a scavenger, was also observed. Each of these species also has potential to nest in the BSA.

Mammals

Small mammals observed in the BSA include Eastern fox squirrel (*Sciurus niger*), California ground squirrel (*Otospermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), mouse (*Peromyscus sp.*), and desert cottontail (*Sylvilagus audubonii*). Medium to large-sized mammals, or their sign, observed include mountain lion (*Puma concolor*), coyote (*Canis latrans*), northern raccoon (*Procyon lotor*), and southern mule deer (*Odocoileus hemionus*).

Bats occur throughout most of Southern California and may use any portion of the BSA as foraging habitat. Most of the bats that could potentially occur in the BSA are inactive during the winter and either hibernate or migrate, depending on the species. Bats may roost in cliffs or rocky outcroppings, crevices of structures, or large oak or sycamore trees in the BSA. Bat species that may occur in the BSA for foraging and roosting include greater bonneted bat [western mastiff bat] (*Eumops perotis californicus),* Brazilian free-tailed bat (*Tadarida brasiliensis*), big brown bat (*Eptesicus fuscus*), canyon bat (*Parastrellus hesperus*), pallid bat (*Antrozous pallidus*), California myotis (*Myotis californicus*), and Yuma bat (*Myotis yumanensis*).

Wildlife Movement

Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization creates isolated "islands" of wildlife habitat. In the absence of habitat linkages that allow movement to adjoining open space areas, various studies have concluded that some wildlife species, especially the larger and more mobile mammals, will not likely persist over time in fragmented or isolated habitat areas because they prohibit the infusion of new individuals and genetic information (MacArthur and Wilson 1967; Soule 1987; Harris and Gallagher 1989; Bennett 1990). Corridors mitigate the effects of this fragmentation by (1) allowing animals to move between remaining habitats, thereby permitting depleted populations to be replenished and promoting genetic exchange; (2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk that catastrophic events (such as fire or disease) will result in population or local species extinction; and (3) serving as travel routes for individual animals as they move in their home ranges in search of food, water, mates, and other necessary resources (Noss 1983; Farhig and Merriam 1985; Simberloff and Cox 1987; Harris and Gallagher 1989).

It is important to note that in a large, open space area with few or no man-made or naturally occurring physical constraints to wildlife movement, wildlife corridors (as defined above) may not yet exist. Given an open space area that is both large enough to maintain viable populations of species and to provide a variety of travel routes (e.g., canyons, ridgelines, trails, riverbeds, and others), wildlife will use these "local" routes while searching for food, water, shelter, and mates and will not need to cross into other large, open space areas. Based on their size, location,

vegetative composition, and availability of food, some of these movement areas (e.g., large drainages and canyons) are used for longer lengths of time and serve as source areas for food, water, and cover, particularly for small- and medium-sized animals. This is especially true if the travel route is within a larger open space area. However, once open space areas become constrained and/or fragmented as a result of urban development or construction of physical obstacles (such as roads and highways), the remaining landscape features or travel routes that connect the larger open space areas become corridors as long as they provide adequate space, cover, food, and water and do not contain obstacles or distractions (e.g., man-made noise, lighting) that would generally hinder wildlife movement.

The BSA is contiguous with large undeveloped open space areas in the NCCP Reserve, OC Regional Parks, and the Cleveland National Forest. Due to the undeveloped nature of the BSA, wildlife movement is generally unconstrained in and around the BSA. Santiago Creek likely functions as a regional movement corridor and connects with several canyons both upstream and downstream of the BSA. The existing dam structure and associated reservoir may be a barrier to movement for amphibians, reptiles, and small mammals moving along the drainage; however, like larger mammals, these small animals can move around the lake and dam over time using the adjacent drainages and ridgelines as travel routes. Santiago Canyon Road to the south of the BSA may be a barrier to wildlife movement for small animals; however, small animals could use drainage structures under the road as wildlife crossings. The roadway would not be expected to be a barrier to movement for medium and large-sized mammals due to the relatively low level of traffic on the road; the medium and large-sized mammals would be expected to cross over the roadway when traffic is low.

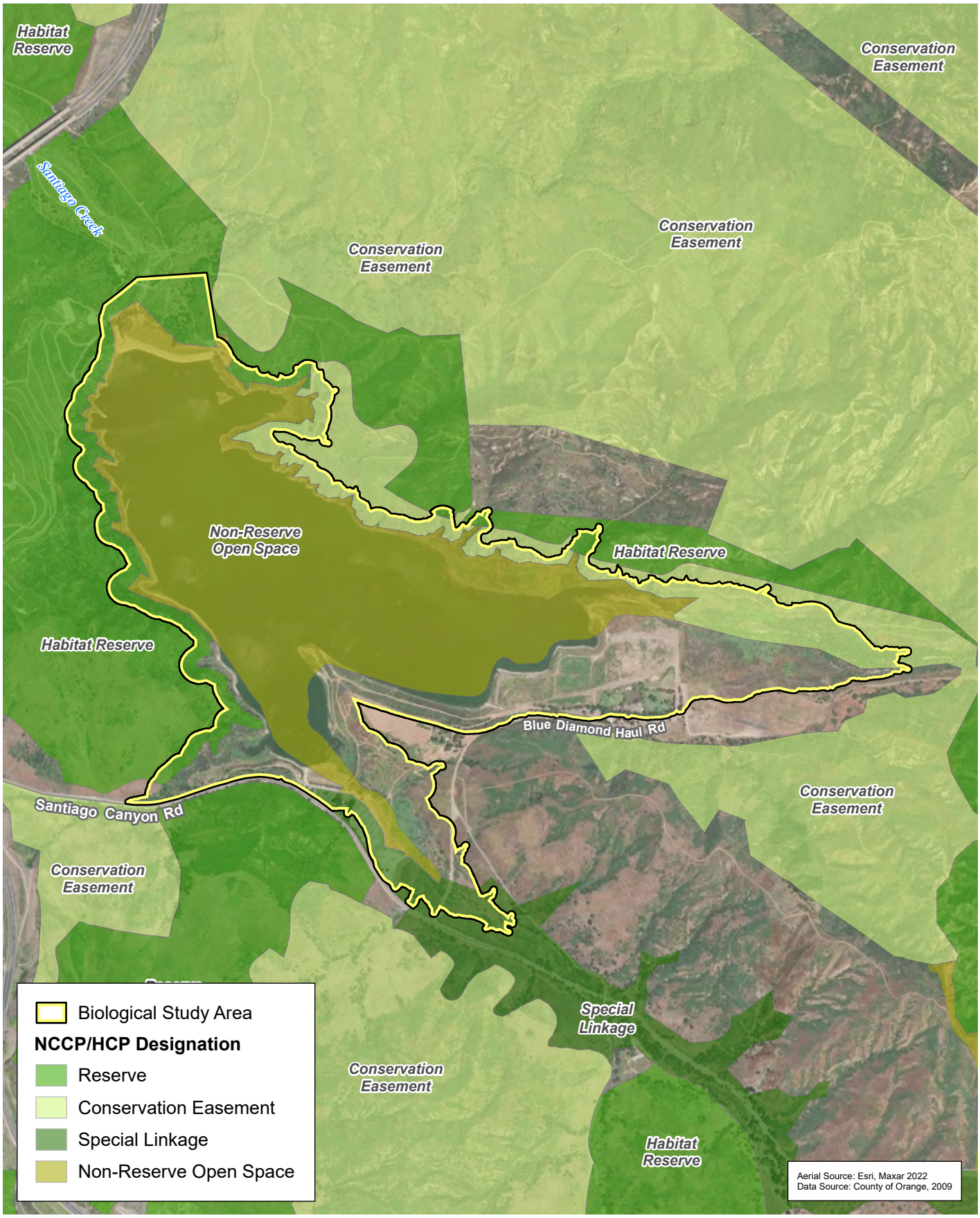
A NCCP “Special Linkage” area occurs in the southern portion of the BSA, extending southeast along Santiago Canyon Road (Exhibit 4.3-3). It connects Habitat Reserve areas to the west and north of Irvine Lake to Habitat Reserve areas south of Santiago Canyon Road (i.e., Limestone Canyon). Special Linkages include areas where proposed development or existing uses would provide either an opportunity to conserve habitat useful for biological connectivity or support target species while permitting compatible non-habitat uses. Special Linkages are not part of the Reserve System. Existing uses within the Special Linkage in the BSA include development associated with Irvine Lake and Santiago Canyon Road.

Special Status Biological Resources

Sensitive Natural Communities

Coastal sage scrub vegetation (i.e., sagebrush scrub, disturbed sagebrush scrub, sagebrush – coyote brush scrub, southern cactus scrub, disturbed southern cactus scrub and disturbed floodplain sage scrub) is considered a special status vegetation type in the Central–Coastal NCCP/HCP area because of its potential to support NCCP/HCP Covered Species. Additionally, southern cactus scrub and disturbed southern cactus scrub are considered sensitive natural communities by CDFW (2025b; Table 4.3-2).

Riparian vegetation types are often considered special status because they are often under the regulatory authority of the resource agencies (i.e., USACE, CDFW, and RWQCB); jurisdictional resources are discussed in the next section. Riparian vegetation types in the BSA include riparian herb, southern willow scrub, mulefat scrub, disturbed mulefat scrub, southern black willow forest, disturbed southern black willow forest, and southern black willow forest/riparian herb. Other mapped areas that may be considered riparian and jurisdictional resources include open water, fluctuating shoreline, vegetated fluctuating shoreline, and perennial stream. Of these riparian vegetation types, southern willow scrub, southern black willow forest, and disturbed southern black willow forest are considered sensitive natural communities by CDFW (2025b; Table 4.3-2).



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Orange County Central/Coastal NCCP/HCP

Exhibit 4.3-3

Santiago Creek Dam Improvement Project

N W E S

0 1,000 2,000 Feet

PSOMAS

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Sycamore and oak woodlands provide high quality habitat for wildlife. These trees are large enough to provide cavities for shelter (e.g., roosting) and breeding (e.g., cavity-nesting) for wildlife species. Downed wood provides important cover for amphibians, reptiles, and small to medium sized mammals; nest sites for cavity-nesting and ground-nesting birds; nutrients into the soil as they decompose; and favorable microhabitat for emerging seedlings (Tietje et al. 2005). Southern sycamore riparian woodland/coast live oak forest and western sycamore are considered sensitive natural communities by CDFW (2025b; Table 4.3-2). Coast live oak woodland is not considered a sensitive natural community but is generally considered of local concern because of the habitat value that it provides.

Toyon–sumac chaparral, annual grassland, ruderal, and ornamental are not considered sensitive natural communities by CDFW (2025b). Cliff, disturbed and developed are not given threat rankings because they are unvegetated landcovers.

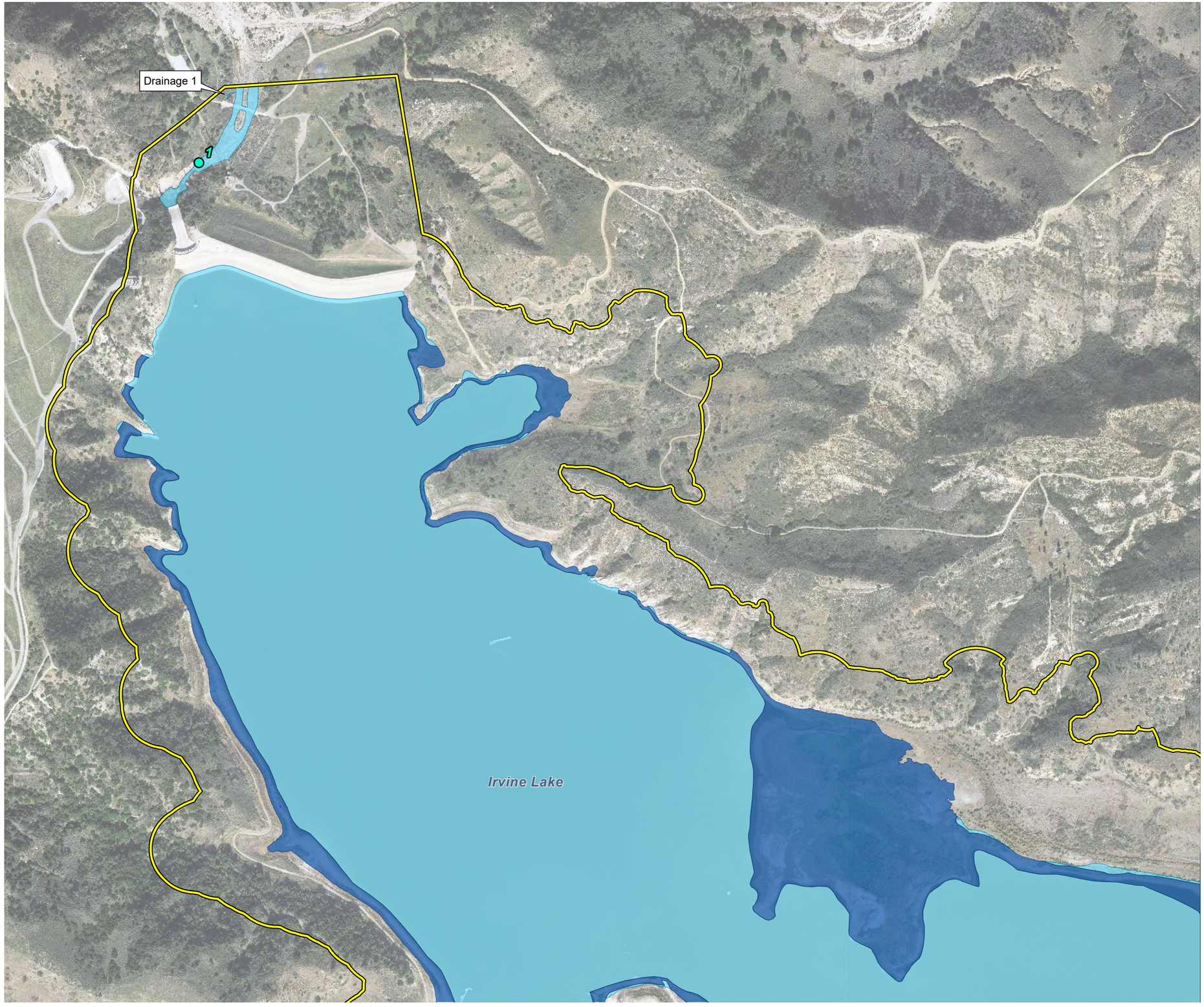
Jurisdictional Resources

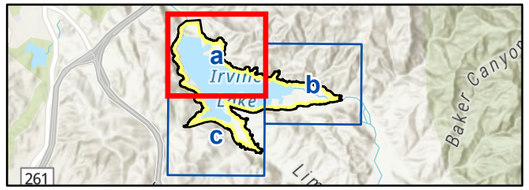
Seventeen potential jurisdictional features were mapped in the BSA: Irvine Lake, Santiago Creek, and 15 smaller drainages that discharge into either Irvine Lake or Santiago Creek. Based on an assessment of jurisdictional waters, a total of 428.476 acres of WOTUS under the regulatory authority of the USACE, 435.205 acres of waters of the State under the regulatory authority of the RWQCB, and 669.630 acres of waters under the regulatory authority of CDFW occurs in the BSA (Table 4.3-2, Exhibits 4.3-4, 4.3-5, and 4.3-6).

TABLE 4.3-2
SUMMARY OF JURISDICTIONAL RESOURCES IN THE SURVEY AREA

	Jurisdiction (acres)						
	USACE WOTUS			RWQCB Waters of the State			CDFW Jurisdictional Resources
Feature	Wetland	Non-wetland	Total	Wetland	Non-wetland	Total	Total
Irvine Lake	94.582	312.959	407.541	94.582	312.959	407.541	614.135
Santiago Creek	7.124	13.803	20.927	7.124	13.803	20.927	36.024
Drainage 1	—	0.008	0.008	—	0.008	0.008	0.027
Drainage 2	—	—	—	—	0.025	0.025	0.074
Drainage 3	—	—	—	—	0.071	0.071	0.168
Drainage 4	—	—	—	—	0.048	0.048	0.094
Drainage 5	—	—	—	—	0.144	0.144	0.359
Drainage 6	—	—	—	—	0.369	0.369	0.149
Drainage 7	—	—	—	—	0.100	0.100	0.148
Drainage 8	—	—	—	—	0.024	0.024	0.042
Drainage 9	—	—	—	—	0.066	0.066	1.237
Drainage 10	—	—	—	—	0.167	0.167	0.245
Drainage 11	—	—	—	—	0.114	0.114	0.318
Drainage 12	—	—	—	—	4.894	4.894	13.517
Drainage 13	—	—	—	—	0.039	0.039	0.114
Drainage 14	—	—	—	—	0.235	0.235	0.416
Drainage 15	—	—	—	—	0.433	0.433	2.563
Total	**101.706**	**326.770**	**428.476**	**101.706**	**333.499**	**435.205**	**669.630**

USACE: U.S. Army Corps of Engineers; WOTUS: waters of the United States; RWQCB: Regional Water Quality Control Board; CDFW: California Department of Fish and Wildlife.





Survey Area

Sampling Point Location

Waters of the United States

Wetland

Non-Wetland

N
W
E
S

0 300 600 Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Jurisdictional Resources –
USACE Waters of the United States

Exhibit 4.3–4a

Santiago Creek Dam Improvement Project

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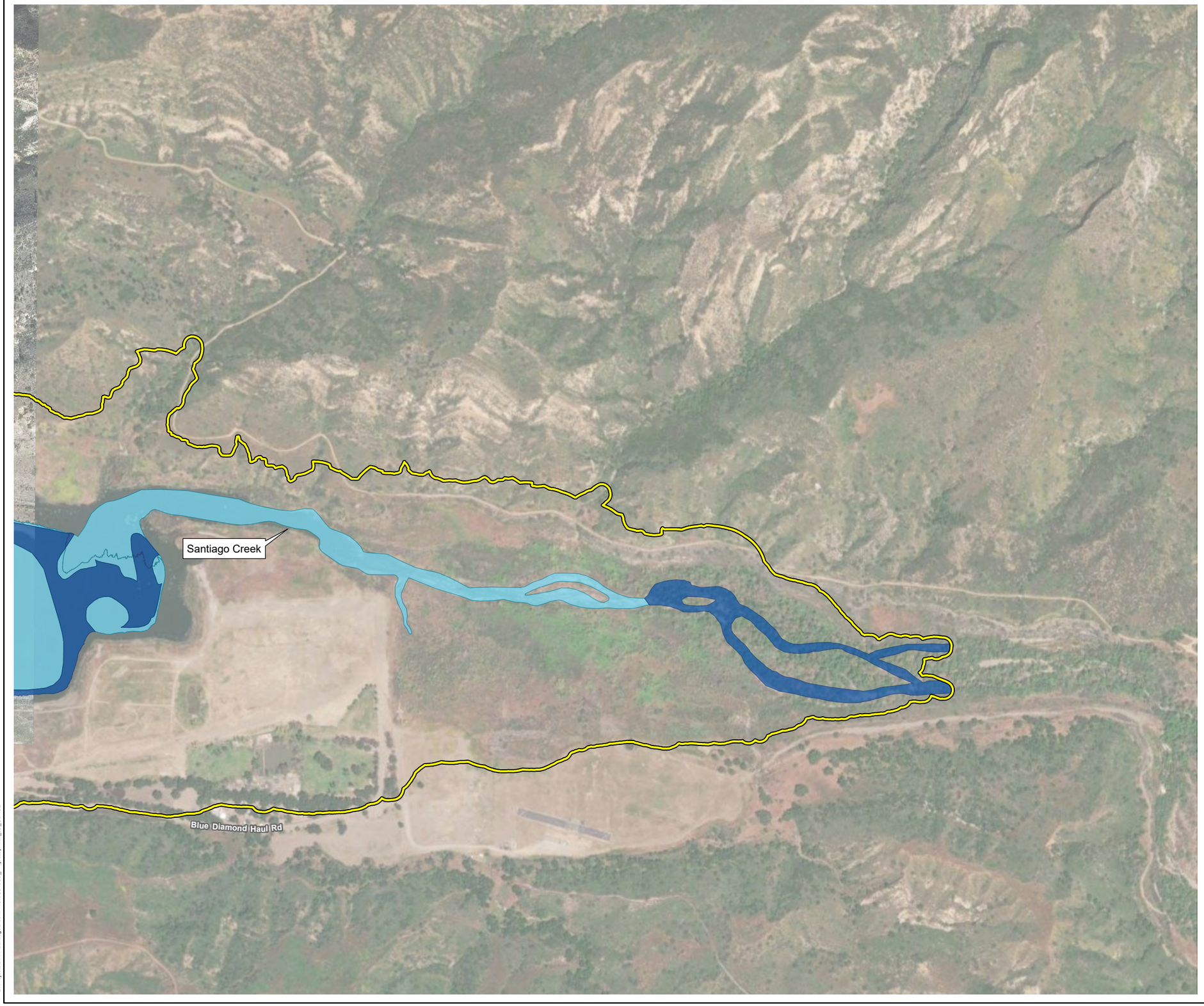

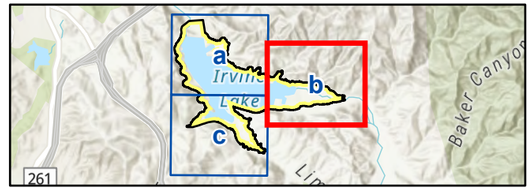

Survey Area

Sampling Point Location

Waters of the United States

Wetland

Non-Wetland

N
W
E
S

0 300 600 Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Jurisdictional Resources –
USACE Waters of the United States

Exhibit 4.3–4b

Santiago Creek Dam Improvement Project

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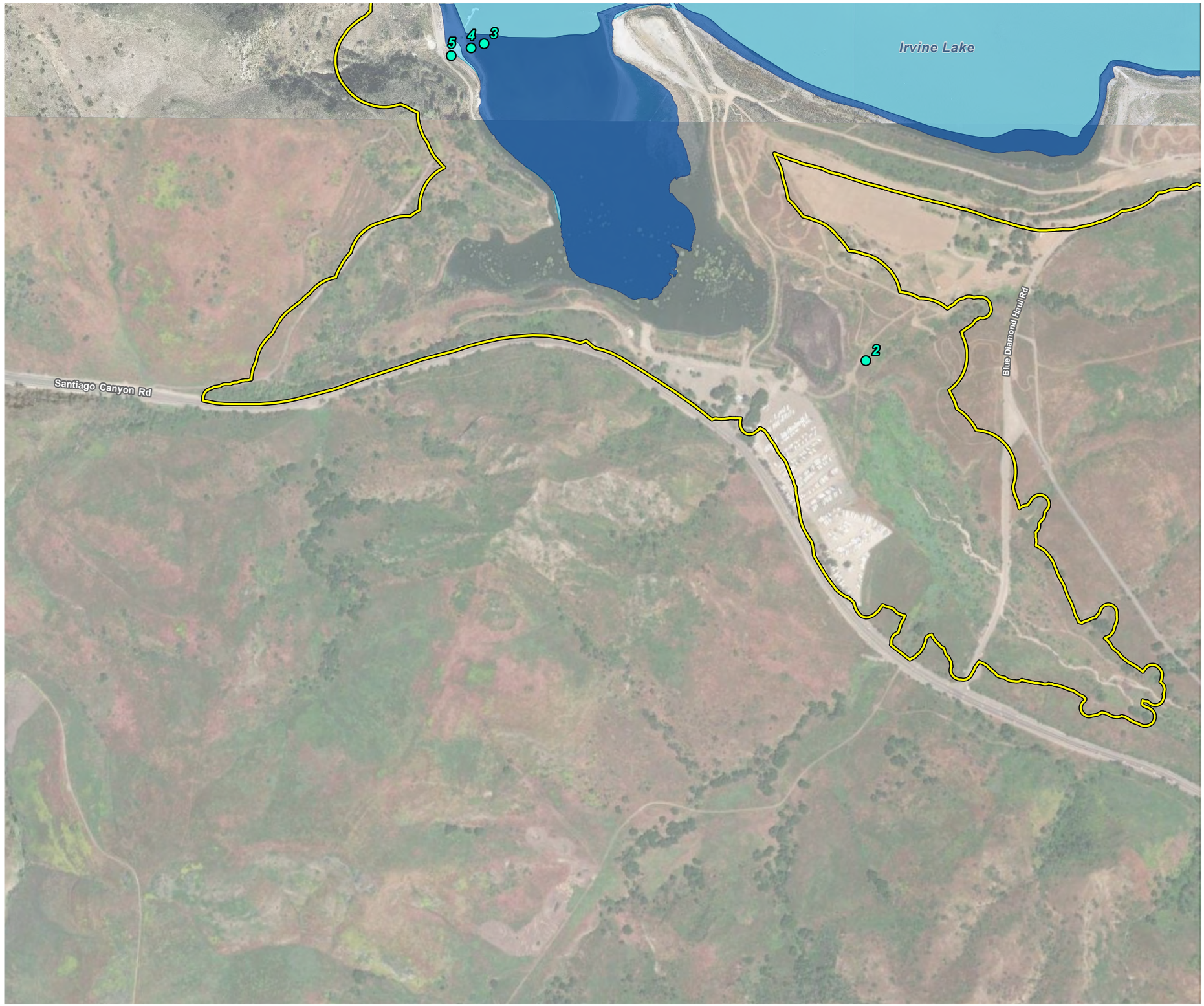

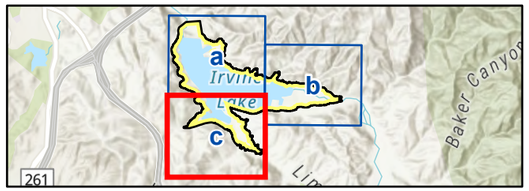

Survey Area

Sampling Point Location

Waters of the United States

Wetland

Non-Wetland

N
W
E
S

0 300 600

Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Jurisdictional Resources –
USACE Waters of the United States

Exhibit 4.3-4c

Santiago Creek Dam Improvement Project

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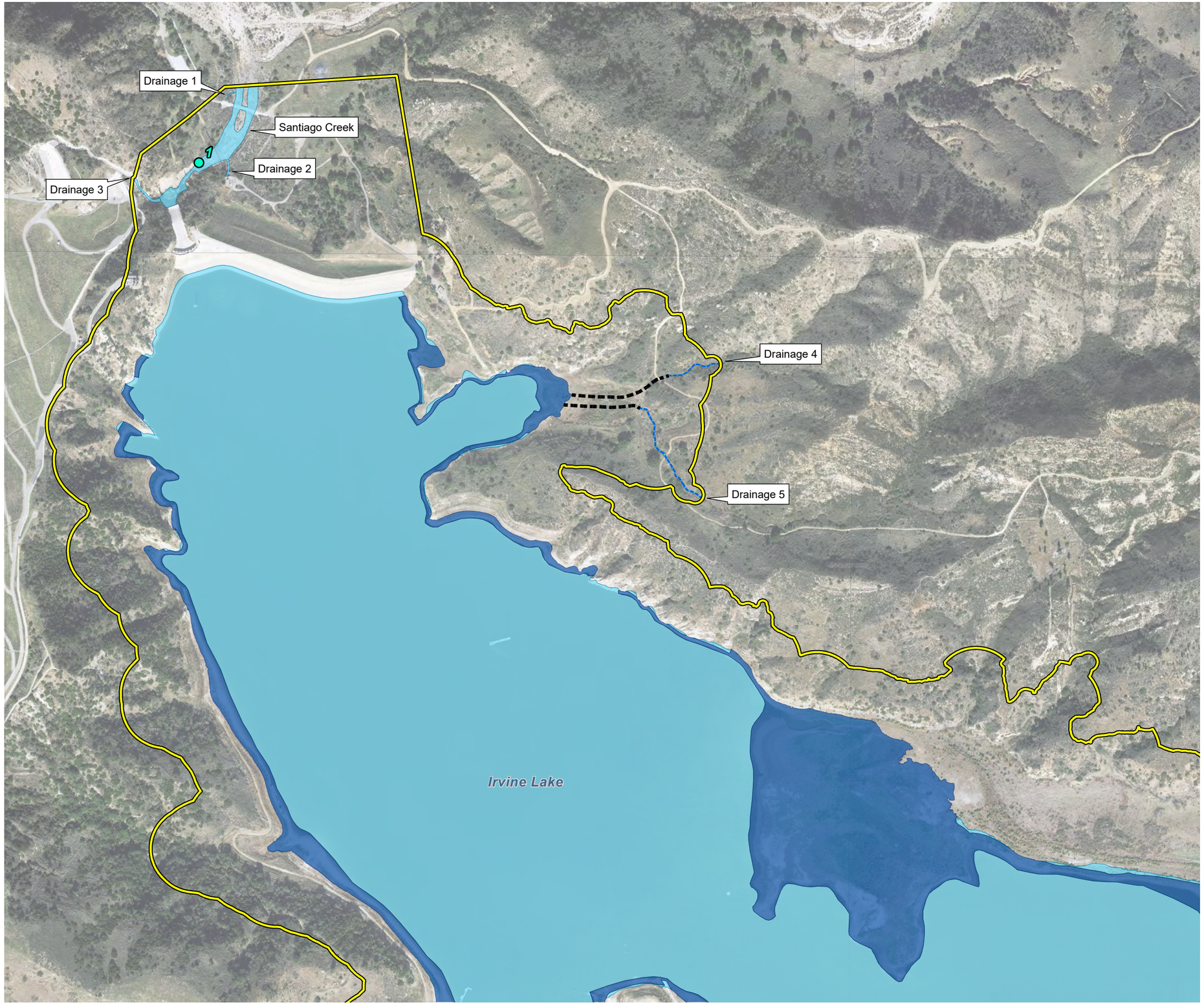

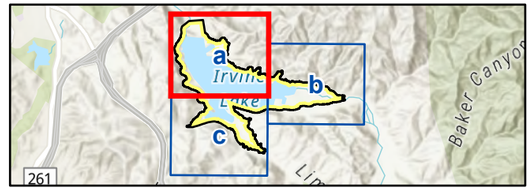

Survey Area

Sampling Point Location

Sheet Flow (non-jurisdictional)

Waters of the State

Wetland

Non-Wetland

Non-Wetland Drainage Centerline

N
W
E
S

0 300 600 Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Jurisdictional Resources – RWQCB Waters of the State

Exhibit 4.3–5a

Santiago Creek Dam Improvement Project

PSOMAS

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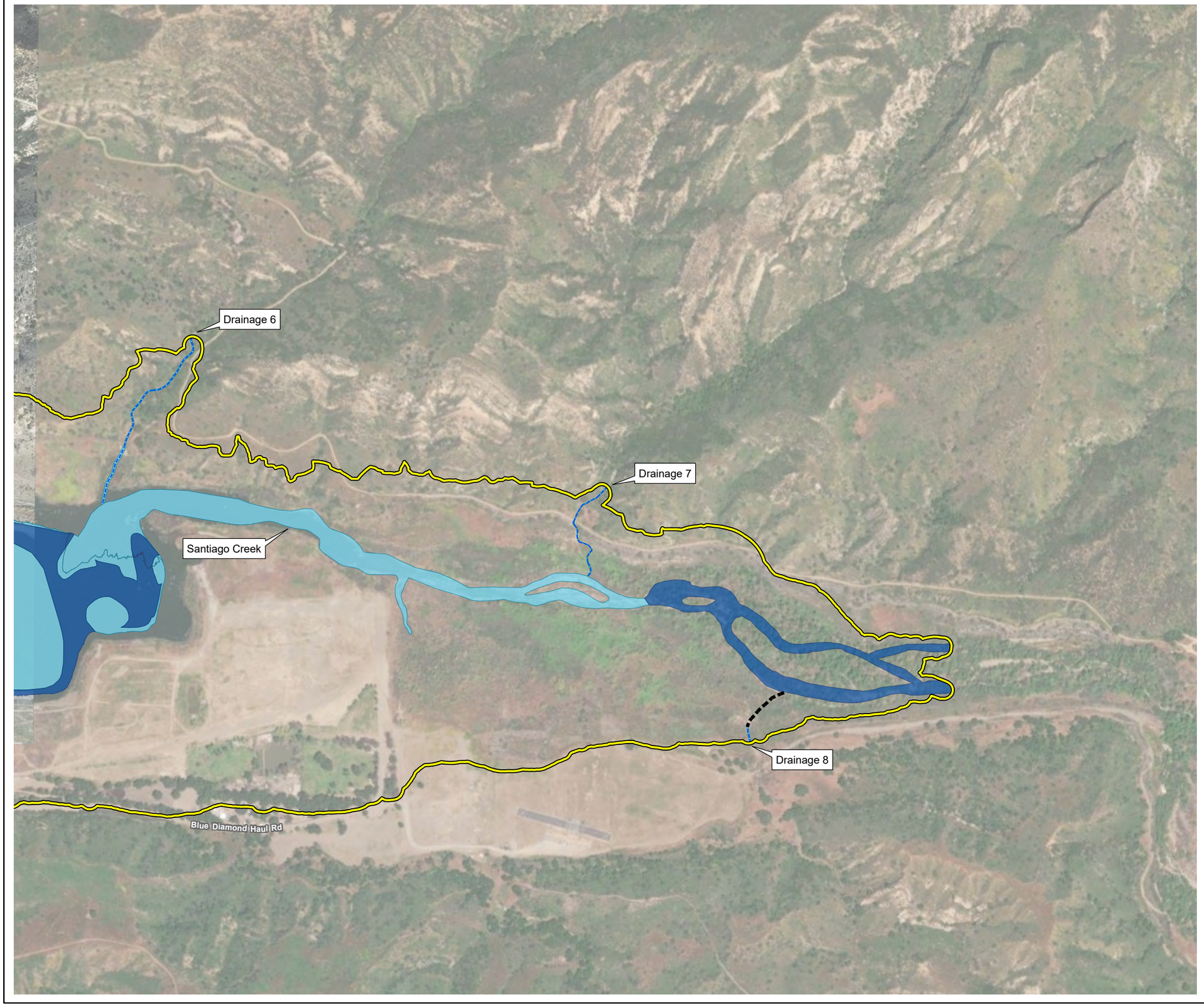

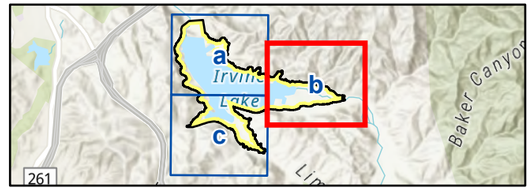

Survey Area

Sheet Flow (non-jurisdictional)

Waters of the State

Wetland

Non-Wetland

Non-Wetland Drainage Centerline

N
W
E
S

0 300 600

Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Jurisdictional Resources – RWQCB Waters of the State

Exhibit 4.3–5b

Santiago Creek Dam Improvement Project

PSOMAS

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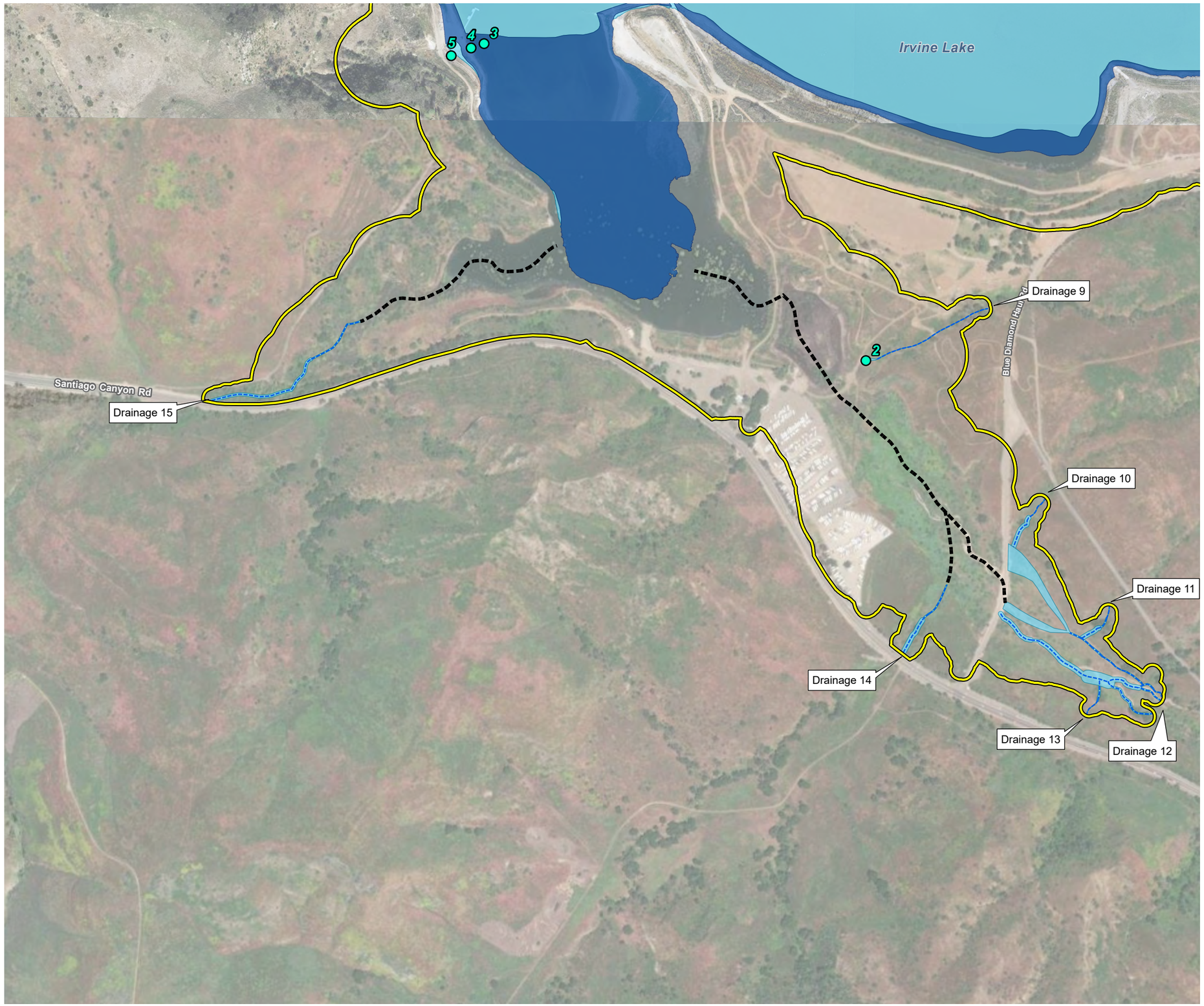

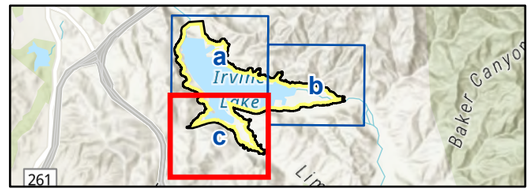

Survey Area

Sampling Point Location

Sheet Flow (non-jurisdictional)

Waters of the State

Wetland

Non-Wetland

Non-Wetland Drainage Centerline

N
W
E
S

0 300 600 Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Jurisdictional Resources – RWQCB Waters of the State

Exhibit 4.3–5c

Santiago Creek Dam Improvement Project

PSOMAS

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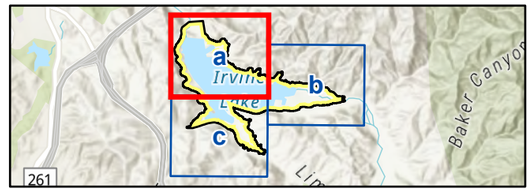

Survey Area

Sampling Point Location

CDFW Jurisdictional Waters

CDFW

Drainage Centerline

N

W E

S

0 300 600

Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Jurisdictional Resources – CDFW Jurisdictional Waters

Exhibit 4.3-6a

Santiago Creek Dam Improvement Project

PSOMAS

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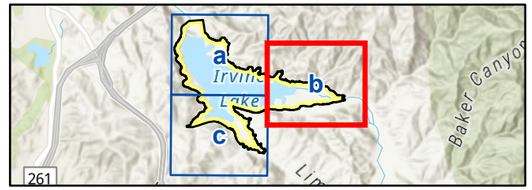

Survey Area

CDFW Jurisdictional Waters

CDFW

Drainage Centerline

N
W
E
S

0 300 600 Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Jurisdictional Resources – CDFW Jurisdictional Waters

Exhibit 4.3-6b

Santiago Creek Dam Improvement Project

PSOMAS

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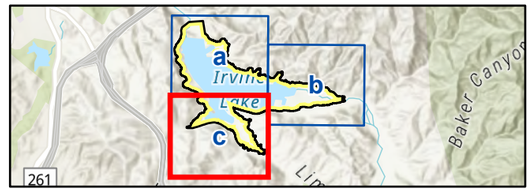

Survey Area

Sampling Point Location

CDFW Jurisdictional Waters

CDFW

Drainage Centerline

N

W E

S

0 300 600

Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Jurisdictional Resources – CDFW Jurisdictional Waters

Exhibit 4.3-6c

Santiago Creek Dam Improvement Project

PSOMAS

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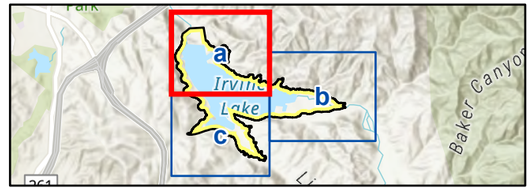
Sensitive Plant Species

Table 4.3-3 provides a summary of special status plant species reported to occur in the Project region (i.e., the USGS' Black Star Canyon, Orange, Tustin, and El Toro 7.5-minute quadrangles). This list includes species reported by the CNDDB and the CNPS, supplemented with species from the Project Biologist's experience that either occur nearby or could occur based on the presence of suitable habitat. The table includes information on the status, NCCP/HCP coverage, species habitat, and potential for occurrence. Note that these species are listed alphabetically according to their scientific name.

Focused surveys were conducted for all special status plant species with potential to occur in the BSA based on the presence of suitable habitat. Three special status plant species, intermediate mariposa lily (*Calochortus weedii* var. *intermedius*), many-stemmed dudleya (*Dudleya multicaulis*), and Coulter's matilija poppy, were observed downstream of the dam during the 2020 focused surveys (Exhibit 4.3-7; Psomas 2020d). Four special status plant species, Braunton's milkvetch (*Astragalus brauntonii*), intermediate mariposa lily, mud nama (*Nama stenocarpa*), and Coulter's matilija poppy, were observed upstream of the dam during the 2022 focused surveys (Exhibit 4.3-7; Psomas 2022a). Higher status species that were observed in the BSA are discussed in more detail following the table; all species that were observed are discussed in more detail in the Biological Technical Report (Appendix C). The remaining species would not be expected to occur because the BSA lacks suitable habitat or because they were not observed during the focused surveys.



Biological Study Area
Arroyo Toad Survey Area

Special Status Plants

- Coulter's Matilija Poppy Population
- Intermediate Mariposa Lily Population
- Many-Stemmed Dudleya Population
- Mud Nama Population (mapped polygon)

Special Status Species

- American Peregrine Falcon
- American White Pelican
- Coastal Cactus Wren
- Coastal California Gnatcatcher
- Grasshopper Sparrow
- Least Bell's Vireo
- Southern California Rufous-Crowned Sparrow
- White-Tailed Kite
- Yellow-Breasted Chat
- Two-Striped Gartersnake

N
W E
S

0 300 600
Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Special Status Species Locations

Exhibit 4.3-7a

Santiago Creek Dam Improvement Project

PSOMAS

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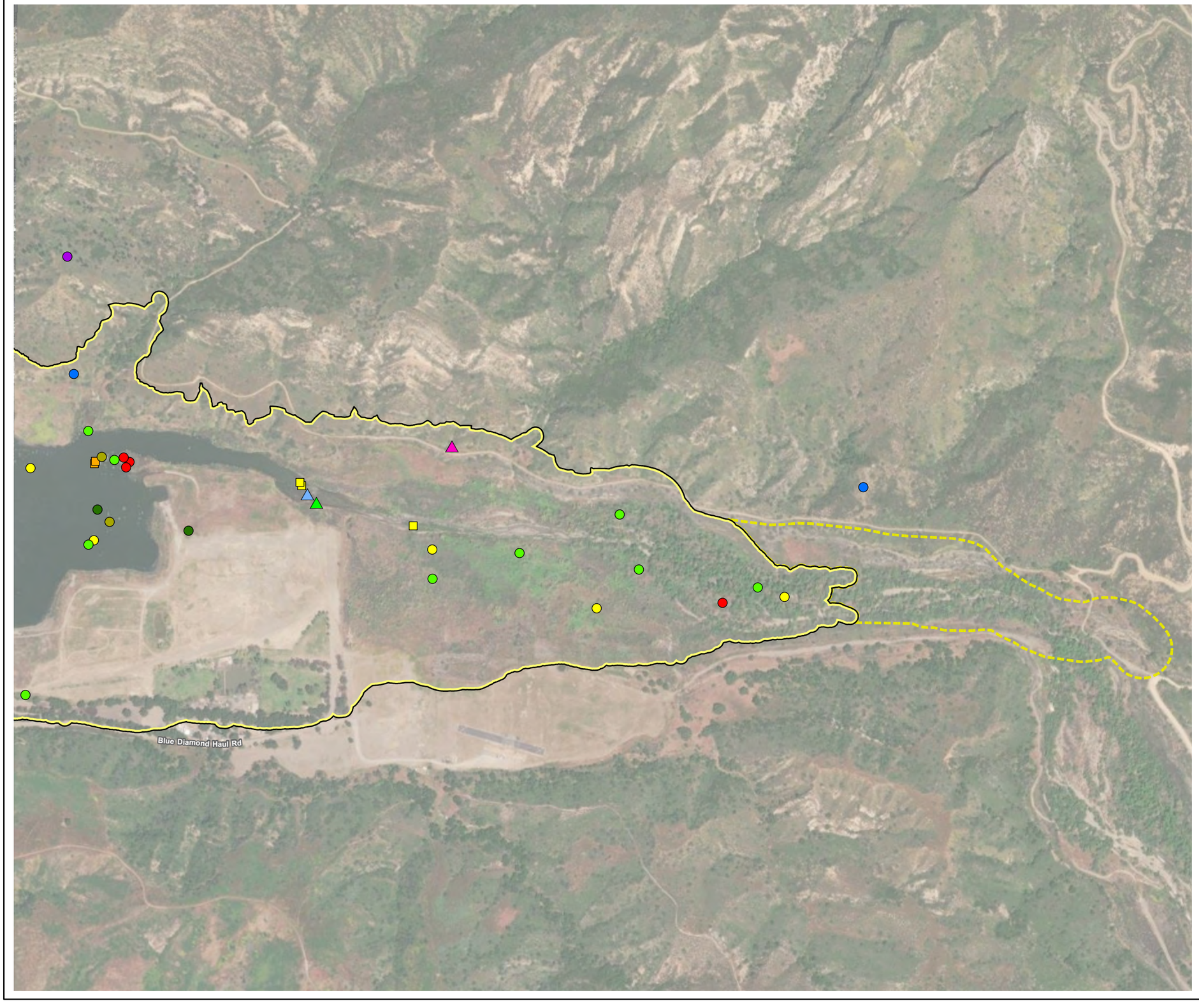

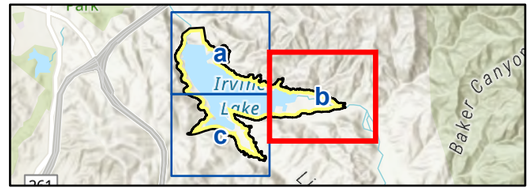

Biological Study Area

Arroyo Toad Survey Area

Special Status Plants

- Coulter's Matilija Poppy Population
- Intermediate Mariposa Lily Population
- Braunton's Milkvetch Population

Special Status Species

- Bald Eagle (Nest)
- Coastal Cactus Wren
- Grasshopper Sparrow
- Least Bell's Vireo
- Willow Flycatcher (migrant)
- Yellow Warbler
- Yellow-Breasted Chat
- Belding's Orange-Throated Whiptail
- Two-Striped Gartersnake

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Special Status Species Locations

Exhibit 4.3-7b

Santiago Creek Dam Improvement Project

PSOMAS

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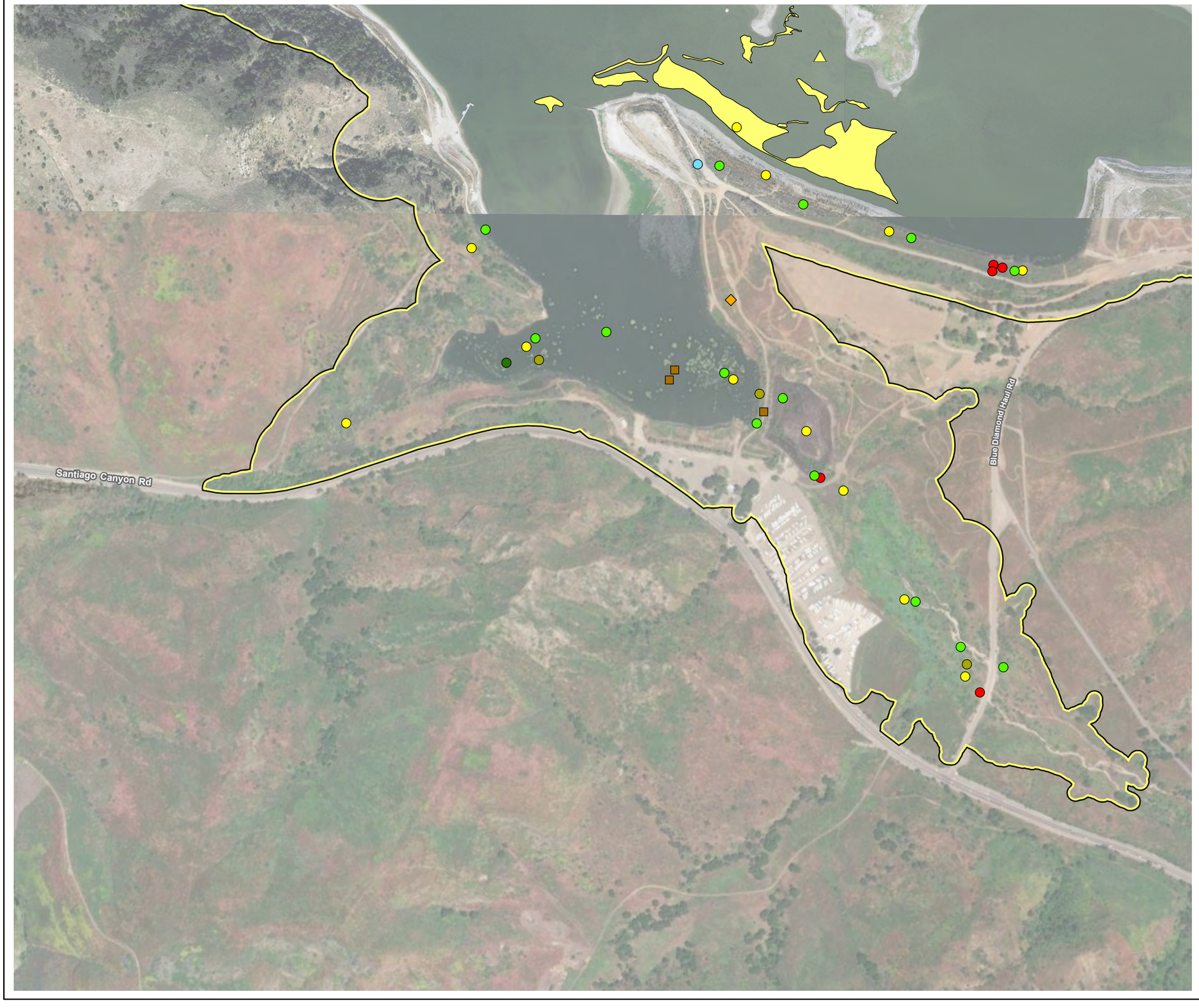

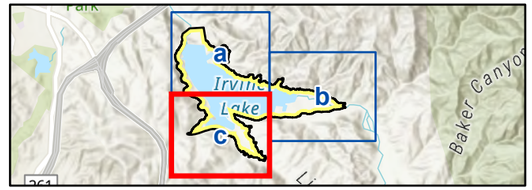

Biological Study Area

Special Status Plants

- Mud Nama Population (point location)
- Mud Nama Population (mapped polygon)

Special Status Species

- Crotch's Bumble Bee
- Coastal California Gnatcatcher
- Grasshopper Sparrow
- Least Bell's Vireo
- Willow Flycatcher (migrant)
- Yellow Warbler
- Yellow-Breasted Chat
- Coastal Whiptail

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Special Status Species Locations

Exhibit 4.3-7c

Santiago Creek Dam Improvement Project

PSOMAS

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TABLE 4.3-3
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Common Name	Federal Status	State Status	CRPR	NCCP/HCP Covered Species	Habitat*	Potential to Occur
Abronia villosa var. *aurita*	chaparral sand-verbena	—	—	1B.1	No	Sandy areas in chaparral, coastal scrub, desert dunes.	Not expected to occur; not observed during focused surveys; suitable habitat.
Allium marvinii	Yucaipa onion	—	—	1B.2	No	Dry slopes and ridges in chaparral.	Not expected to occur; outside current known range.
Astragalus brauntonii	Braunton's milk-vetch	FE	—	1B.1	No	Recent burns or disturbed areas, usually on sandstone with carbonate layers in chaparral, coastal scrub, valley and foothill grassland. Reported immediately north of the BSA in 2012 (CDFW 2025a).	**Observed in the survey area**
Atriplex coulteri	Coulter's saltbush	—	—	1B.2	No	Alkaline or clay soils in coastal bluff scrub, coastal dunes, coastal scrub, and valley and foothill grassland.	Not expected to occur; not observed during focused surveys; marginally suitable habitat.
Atriplex pacifica	south coast saltscale	—	—	1B.2	No	Alkaline soils in coastal scrub, coastal bluff scrub, playas, coastal dunes.	Not expected to occur; not observed during focused surveys; marginally suitable habitat.
Atriplex serenana var. *davidsonii*	Davidson's saltscale	—	—	1B.2	No	Alkaline soils in coastal bluff scrub, coastal scrub.	Not expected to occur; not observed during focused surveys; marginally suitable habitat.

TABLE 4.3-3
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Common Name	Federal Status	State Status	CRPR	NCCP/HCP Covered Species	Habitat*	Potential to Occur
Baccharis malibuensis	Malibu baccharis	—	—	1B.1	No	In Conejo volcanic substrates in coastal scrub, chaparral, cismontane woodland, and riparian woodland. Reported immediately north of the BSA in 2000 (CCH 2020).	Not expected to occur; not observed during focused surveys; suitable habitat.
Bahiopsis laciniata	San Diego County viguiera	—	—	4.3	No	Chaparral and coastal scrub	Not expected to occur; not observed during focused surveys; suitable habitat.
Brodiaea filifolia	thread-leaved brodiaea	FT	SE	1B.1	No	Chaparral openings, cismontane woodland, coastal scrub, playas, valley and foothill grassland, vernal pools.	Not expected to occur; not observed during focused surveys; suitable habitat.
Calandrinia breweri	Brewer's calandrinia	—	—	4.2	No	Sandy or loamy soils in disturbed sites and burns in chaparral and coastal sage scrub.	Not expected to occur; not observed during focused surveys; suitable habitat.
Calochortus catalinae	Catalina mariposa lily	—	—	4.2	Covered	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland.	Not expected to occur; not observed during focused surveys; suitable habitat. Incidentally observed on access road outside survey area.

TABLE 4.3-3
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Common Name	Federal Status	State Status	CRPR	NCCP/HCP Covered Species	Habitat*	Potential to Occur
Calochortus plummerae	Plummer's mariposa-lily	—	—	4.2	No	Rocky and sandy sites, usually of granitic or alluvial material, in coastal scrub, chaparral, valley and foothill grassland, cismontane woodland, lower montane coniferous forest.	Not expected to occur; not observed during focused surveys; suitable habitat.
Calochortus weedii var. *intermedius*	intermediate mariposa-lily	—	—	1B.2	Conditionally Covered	Dry, rocky calcareous slopes and rock outcrops in coastal scrub, chaparral, valley and foothill grassland.	**Observed in the survey area.**
Camissoniopsis lewisii	Lewis' evening-primrose	—	—	3	No	Sand or clay substrate in coastal bluff scrub, cismontane woodland, coastal dunes, coastal scrub, valley and foothill grassland.	Not expected to occur; not observed during focused surveys; suitable habitat.
Centromadia parryi ssp. *australis*	southern tarplant	—	—	1B.1	No	Disturbed sites and alkaline soils in marshes and swamp margins, valley and foothill grassland, and vernal pools.	Not expected to occur; not observed during focused surveys; suitable habitat.
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	—	SE	1B.1	No	Sandy soils in coastal scrub, valley and foothill grasslands. Historic (1902) occurrence within 0.5 mile of the BSA, but the BSA is outside the current known range of the species (CDFW 2025a).	Not expected to occur; historic (1902) occurrence within 0.5 mile but outside current known range.

TABLE 4.3-3
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Common Name	Federal Status	State Status	CRPR	NCCP/HCP Covered Species	Habitat*	Potential to Occur
Chorizanthe polygonoides var. *longispina*	long-spined spineflower	—	—	1B.2	No	Gabbroic clay or sandy soil in chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools. BSA is at the edge of the current known range.	Not expected to occur; not observed during focused surveys; suitable habitat.
Convolvulus simulans	small-flowered morning-glory	—	—	4.2	No	Clay, occasionally serpentine soils in chaparral openings, coastal scrub, valley and foothill grasslands. Reported just west of Irvine Lake in 2016 (CCH 2020).	Not expected to occur; not observed during focused surveys; suitable habitat.
Deinandra paniculata	paniculate tarplant	—	—	4.2	No	Usually vernally mesic, sometimes sandy substrate in coastal scrub, valley and foothill grassland, and vernal pools.	Not expected to occur; not observed during focused surveys; suitable habitat.
Diplacus clevelandii	Cleveland's bush monkeyflower	—	—	4.2	No	Disturbed areas and open borders of chaparral, cismontane woodland, and lower montane coniferous forest.	Not expected to occur; outside current known elevational range.
Dodecahema leptoceras	slender-horned spineflower	FE	SE	1B.1	No	Sandy soil in chaparral, cismontane woodland, and alluvial fan coastal scrub.	Not expected to occur; outside current known range.
Dudleya cymosa ssp. *ovatifolia*	Santa Monica Mountains dudleya	FT	—	1B.1	Covered	Volcanic or sedimentary, rocky sediment in chaparral and coastal scrub.	Not expected to occur; not observed during focused surveys; suitable habitat.

TABLE 4.3-3
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Common Name	Federal Status	State Status	CRPR	NCCP/HCP Covered Species	Habitat*	Potential to Occur
Dudleya multicaulis	many-stemmed dudleya	—	—	1B.2	No	Heavy, often clayey soils or grassy slopes in chaparral, coastal scrub, valley and foothill grassland. Reported in immediate vicinity of the BSA in 2008 (CDFW 2025a).	**Observed in the 2020 plant focused survey area.**
Eriastrum densifolium ssp. *sanctorum*	Santa Ana River woollystar	FE	SE	1B.1	No	Sandy soils on river floodplains or terraced fluvial deposits in coastal scrub and chaparral.	Not expected to occur; outside current known range (i.e., the Santa Ana River watershed).
Harpagonella palmeri	Palmer's grapplinghook	—	—	4.2	Covered	Clay soils in open grasses areas in chaparral, coastal scrub, and valley and foothill grassland.	Not expected to occur; not observed during focused surveys; suitable habitat.
Helianthus nuttallii ssp. *parishii*	Los Angeles sunflower	—	—	1A	No	Coastal and freshwater marshes and swamps.	Not expected to occur; not observed during focused surveys; presumed extinct; suitable habitat.
Hesperocyparis forbesii	Tecate cypress	—	—	1B.1	Covered	Clay or gabbro soils in closed-cone coniferous forest and chaparral.	Not expected to occur; perennial species not observed during general plant surveys or focused surveys.
Hesperocyparis goveniana	Gowen cypress	FT	—	1B.2	No	Closed-cone coniferous forest, mixed evergreen forest, chaparral, and coastal terraces. Perennial species observable year-round.	Not expected to occur; perennial species not observed during general plant surveys or focused surveys.

TABLE 4.3-3
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Common Name	Federal Status	State Status	CRPR	NCCP/HCP Covered Species	Habitat*	Potential to Occur
Hordeum intercedens	vernal barley	—	—	3.2	No	Coastal dunes, coastal scrub, saline flats and depressions of valley and foothill grassland, vernal pools. Reported just south of Irvine Lake in 1998 (CCH 2020).	Not expected to occur; not observed during focused surveys; marginally suitable habitat.
Horkelia cuneata var. *puberula*	mesa horkelia	—	—	1B.1	No	Sandy or gravelly soils in chaparral, cismontane woodland, and coastal scrub.	Not expected to occur; not observed during focused surveys; suitable habitat.
Juglans californica	Southern California black walnut	—	—	4.2	No	Chaparral, cismontane woodland, coastal scrub, and riparian woodland. Perennial species observable year-round.	Not expected to occur; perennial species not observed during general plant surveys or focused surveys.
Juncus acutus ssp. *leopoldii*	southwestern spiny rush	—	—	4.2	No	Moist, saline places including coastal dunes, marshes and swamps, and meadows and seeps. Perennial species observable year-round.	Not expected to occur; perennial species not observed during focused surveys; marginally suitable habitat.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	—	—	1B.1	No	Usually on alkaline soils in coastal salt marsh, playas, vernal pools. Reported from oak woodland in 2008 (CCH 2020).	Not expected to occur; not observed during focused surveys; no suitable habitat.
Lepechinia cardiophylla	heart-leaved pitcher sage	—	—	1B.2	Covered	Closed-cone coniferous forest, chaparral, cismontane woodland.	Not expected to occur; outside current known elevational range.

TABLE 4.3-3
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Common Name	Federal Status	State Status	CRPR	NCCP/HCP Covered Species	Habitat*	Potential to Occur
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass	—	—	4.3	No	Dry soils in chaparral and coastal scrub.	Not expected to occur; not observed during focused surveys; suitable habitat.
Lilium humboldtii ssp. *ocellatum*	ocellated Humboldt lily	—	—	4.2	No	Openings in chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and riparian woodland.	Not expected to occur; not observed during focused surveys; suitable habitat.
Lycium californicum	California box-thorn	—	—	4.2	No	Coastal bluff scrub and coastal scrub. Perennial species observable year-round.	Not expected to occur; outside current known range.
Monardella hypoleuca ssp. *intermedia*	intermediate monardella	—	—	1B.3	No	Chaparral, cismontane woodland, and sometimes lower montane coniferous forest.	Not expected to occur; not observed during focused surveys; marginally suitable habitat.
Nama stenocarpa	mud nama	—	—	2B.2	No	Lake shores, riverbanks, intermittently wet areas, marshes, and swamps. BSA is at the edge of the current known range.	**Observed in the survey area.**
Nasturtium gambelii	Gambel's water cress	FE	ST	1B.1	No	Freshwater and brackish marshes at the martins of lakes and along streams; in or just above the water level.	Not expected to occur; not observed during focused surveys; suitable habitat.
Nolina cismontana	chaparral nolina	—	—	1B.2	No	Primarily sandstone and shale substrates in chaparral and coastal scrub.	Not expected to occur; not observed during focused surveys; suitable habitat.

TABLE 4.3-3
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Common Name	Federal Status	State Status	CRPR	NCCP/HCP Covered Species	Habitat*	Potential to Occur
Penstemon californicus	California beardtongue	—	—	1B.2	No	Sandy or granitic soils and stony slopes in chaparral, lower montane coniferous forest, pinyon and juniper woodland.	Not expected to occur; outside current known range.
Pentachaeta aurea ssp. *allenii*	Allen's pentachaeta	—	—	1B.1	No	Openings in coastal scrub and valley and foothill grasslands.	Not expected to occur; not observed during focused surveys; suitable habitat.
Phacelia hubbyi	Hubby's phacelia	—	—	4.2	No	Open gravelly or rocky slopes of chaparral, coastal scrub, and valley and foothill grassland.	Not expected to occur; not observed during focused surveys; suitable habitat.
Pickeringia montana var. *tomentosa*	woolly chaparral-pea	—	—	4.3	No	Gabbroic, granitic, or clay soil in chaparral.	Not expected to occur; no suitable habitat.
Pseudognaphalium leucocephalum	white rabbi-tobacco	—	—	2B.2	No	Sandy, gravelly areas of riparian woodland, cismontane woodland, coastal scrub, and chaparral.	Not expected to occur; not observed during focused surveys; suitable habitat.
Rhinotropis [*Polygala*] *cornuta* var. *fishiae*	Fish's milkwort	—	—	4.3	No	Chaparral, cismontane woodland, riparian woodland.	Not expected to occur; not observed during focused surveys; suitable habitat.
Romneya coulteri	Coulter's matilija poppy	—	—	4.2	Covered	Chaparral and coastal scrub, often in burns.	**Observed in the survey area.**

TABLE 4.3-3
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Common Name	Federal Status	State Status	CRPR	NCCP/HCP Covered Species	Habitat*	Potential to Occur
Senecio aphanactis	chaparral ragwort	—	—	2B.2	No	Drying alkaline flats of chaparral, cismontane woodland, coastal scrub.	Not expected to occur; not observed during focused surveys; marginally suitable habitat.
Sidalcea neomexicana	salt spring checkerbloom	—	—	2B.2	No	Alkali springs and marshes in playas, chaparral, coastal scrub, lower montane coniferous forest, and Mojavean desert scrub.	Not expected to occur; not observed during focused surveys; marginally suitable habitat.
Suaeda esteroa	estuary seablite	—	—	1B.2	No	Coastal salt marshes in clay, silt, and sand substrates.	Not expected to occur; no suitable habitat.
Suaeda taxifolia	woolly seablite	—	—	4.2	No	Coastal bluff scrub, coastal dunes, and salt marshes.	Not expected to occur; outside current known range; no suitable habitat.
Symphyotrichum defoliatum	San Bernardino aster	—	—	1B.2	No	Disturbed areas, vernally mesic grassland, or near ditches, streams, and springs in meadows and seeps, cismontane woodland, coastal scrub, lower montane coniferous forest, marshes and swamps, valley and foothill grassland.	Not expected to occur; not observed during focused surveys; suitable habitat.

TABLE 4.3-3
SPECIAL STATUS PLANT SPECIES REPORTED FROM THE PROJECT REGION

Species	Common Name	Federal Status	State Status	CRPR	NCCP/HCP Covered Species	Habitat*	Potential to Occur
Viguiera laciniata	San Diego County viguiera	—	—	4.3	No	Chaparral and coastal scrub.	Not expected to occur; not observed during focused surveys; suitable habitat.

CRPR: California Rare Plant Rank; NCCP/HCP: Natural Community Conservation Plan/Habitat Conservation Plan

LEGEND:

Federal Status		**State Status**	
FE	Endangered	SE	Endangered
FT	Threatened	ST	Threatened

CRPR

1A	Plants presumed extirpated in California and either rare or extinct elsewhere
1B	Plants Rare, Threatened, or Endangered in California and elsewhere
2B	Plants Rare, Threatened, or Endangered in California but more common elsewhere
3	Plants about which we need more information – A Review List
4	Plants of limited distribution – A Watch List

CRPR Threat Code Extensions

None	Plants lacking any threat information
.1	Seriously threatened in California (over 80% of occurrences threatened; high degree and immediacy of threat)
.2	Fairly threatened in California (20–80% of occurrences threatened; moderate degree and immediacy of threat)
.3	Not very threatened in California (<20% of occurrences threatened; low degree and immediacy of threat or no current threats known)

Species that were observed on site are shown in **boldface type.**

* Sources include CDFW 2025a, CNPS 2025, and Jepson Flora Project 2024.

Braunton's Milkvetch

Braunton's milkvetch is a federally listed Endangered species and has a CRPR of 1B.1. It is not a Covered species in the Central Coastal NCCP/HCP. It typically blooms between January and August (CNPS 2025). This perennial herb occurs in chaparral, coastal scrub, and valley and foothill grassland at elevations between approximately 15 and 2,100 feet above msl (Jepson Flora Project 2024; CNPS 2025). It generally occurs after recent burns or in disturbed areas, usually in sandstone with carbonate layers (CNPS 2025). This species is known from the western portion of the Western Transverse Ranges, the San Gabriel Mountains, tentatively from the San Gabriel Mountains/South Coast, and the northern Peninsular Ranges (Jepson Flora Project 2024); it is known from a few canyons in Orange County (Allen and Roberts 2013).

One individual Braunton's milkvetch was observed in the 2022 survey area (Psomas 2022a; Exhibit 4.3-7). It was observed in the sandy channel of Santiago Creek, upstream of the lake. The species associated with the Braunton's milkvetch observed in the survey area include mule fat, cicuta-leaved phacelia (*Phacelia cicutaria*), and horseweed (*Erigeron canadensis*).

Intermediate Mariposa Lily

Intermediate mariposa lily has a CRPR of 1B.2. It is a Conditionally Covered species[6] in the Central–Coastal NCCP/HCP (i.e., populations less than 20 individuals are fully authorized). It typically blooms between May and July (Jepson Flora Project 2024; CNPS 2025). This perennial bulbiferous herb occurs on dry, rocky, open slopes in chaparral and coastal sage scrub at elevations between sea level and approximately 2,231 feet above msl (Roberts 2008; Jepson Flora Project 2024). It is sometimes locally common following fire (Roberts 2008). This species is known from the South Coast and northern Peninsular Ranges (Jepson Flora Project 2024).

One individual intermediate mariposa lily was observed in the 2020 focused survey area (Psomas 2020d, Exhibit 4.3-7). This individual was observed in the eastern portion of the 2020 focused survey area on a moderately steep, south facing slope in disturbed sagebrush scrub with Ceineba-rock outcrop complex soil. The species associated with the intermediate mariposa lily observed include California sagebrush, black mustard, coast morning glory (*Calystegia macrostegia*), and oats.

Four individual intermediate mariposa lilies were observed in the 2022 focused survey area and an additional individual was observed just outside the survey area (Psomas 2022a; Exhibit 4.3-7). The four individuals were observed in two populations in the northwestern portion of the 2022 survey area on moderately steep, southeast- to east-facing slopes in sagebrush scrub. The species associated with the intermediate mariposa lilies observed in the survey area include California sagebrush, black sage (*Salvia mellifera*), chilicothe, mule fat, California encelia (*Encelia californica*), and smilo grass (*Stipa miliacea* var. *miliacea*).

Many-stemmed Dudleya

Many-stemmed dudleya has a CRPR of 1B.2. It is not covered by the Central–Coastal NCCP/HCP. It typically blooms between April and June (Jepson Flora Project 2024; CNPS 2025). This perennial herb occurs on heavy, often clayey soils or grassy slopes in chaparral, coastal scrub, valley, and foothill grassland at elevations between approximately 5 and 2,975 feet above msl (Roberts 2008; Jepson Flora Project 2024). This species is known from the South Coast (Jepson Flora Project 2024).

[6] The NCCP/HCP refers to this species by its former common name – foothill mariposa lily.

Approximately 810 many-stemmed dudleya individuals were observed in 2 locations in the 2020 focused survey area (Psomas 2020d, Exhibit 4.3-7). Approximately 800 individuals were observed in the eastern portion of the 2020 focused survey area and 10 individuals were observed on a steep, east-facing cliff in the western portion of the 2020 focused survey area. The majority of individuals (eastern location) were observed in disturbed sagebrush scrub with Ceineba-rock outcrop complex and pits soil. The smaller population (western location) was observed in toyon-sumac chaparral with Sorrento loam soil. The species associated with the many-stemmed dudleya included California sagebrush, California buckwheat, daggerleaf cottonrose (*Filago gallica*), white sage, splendid mariposa lily (*Calochortus splendens*), common goldfields (*Lasthenia gracillis*), osmadenia (*Osmadenia tenella*), and little California melica (*Melica imperfecta*).

Mud Nama

Mud nama has a CRPR of 2B.2. It is not a Covered species in the Central Coastal NCCP/HCP. It typically blooms between January and October (Jepson Flora Project 2024; CNPS 2025). This annual herb occurs in intermittently wet areas of marshes and swamps, including lake margins and riverbanks at elevations between approximately 15 and 1,640 feet above msl (Jepson Flora Project 2024; CNPS 2025). This species is known from the San Joaquin Valley, South Coast, southern Channel Islands, western Peninsular Ranges, and southeastern Sonoran Desert (Jepson Flora Project 2024). The CNDDB contains 22 records of this species in Imperial, Kings, Los Angeles, Orange, Riverside, and San Diego Counties. Of these, seven locations are reported from Orange County (i.e., Anaheim Marsh [historic occurrence, 1932], Laguna Lakes in Laguna Canyon, Emerald Canyon, Lambert Reservoir, Peters Canyon Channel, Fairview Park, and Ladera Ranch); all the records are over 25 years old. Of these records, the largest reported population was 30 individuals, most other records did not include a count or reported less than 10 individuals (CDFW 2025a).

Multiple populations of mud nama were observed in the southern portion of Irvine Lake in the 2022 focused survey area (Psomas 2022a; Exhibit 4.3-7). This area experiences periodic inundation and was mapped as open water during the 2020 vegetation mapping upstream of the dam. At the time of the special status plant survey, the substrate was exposed and consisted of riparian herb vegetation; the species was growing in more open areas, including along disturbed roads/trails. The species associated with the mud nama observed in the survey area were primarily annual beard grass, white sweetclover, and sourclover (*Melilotus indicus*) with scattered saltcedar, alkali heliotrope, mule fat, flatsedge, everlasting (*Pseudognaphalium* sp.), water cress (*Nasturtium officinale*), and willow weed.

Individuals covered a large area and the species is small in stature. To estimate the population sizes, ten quadrats one-square-foot in size were sampled in a relatively dense population of mud nama. This resulted in an average of 37.7 individuals per square foot. Therefore, a “high density” population was considered to have between 35 and 40 individuals per square foot. A “moderate density” population was considered to have between 20 and 25 individuals per square foot and a “low density” population was considered to have between 5 and 10 individuals per square foot. Based on these approximate population densities, the total number of individuals in the survey area was estimated using the square footage of each population. The total population was estimated to be between 3.5 and 5.5 million. This is the largest population currently known for this species.

Sensitive Wildlife Species

Table 4.3-4 provides a summary of special status wildlife species reported to occur in the Project region (i.e., the USGS' Black Star Canyon, Orange, Tustin, and El Toro 7.5-minute quadrangles). This list includes species reported by the CNDDB, supplemented with species from the Project Biologist's experience that either occur nearby or could occur based on the presence of suitable habitat. This table includes information on the status, NCCP/HCP coverage, species habitat, and potential for occurrence. Note that these species are listed taxonomically. Species observed in the BSA are discussed further below. Exhibit 4.3-7 shows the locations of special status species.

Of the 60 species reported from the Project region, 40 species have potential to occur in the BSA based on the presence of suitable habitat and the results of focused surveys. The remaining species would not be expected to occur because the BSA lacks suitable habitat or because they were not observed during the focused surveys. Sixteen special status wildlife species were observed during the 2020, 2022, and 2024 focused surveys; these species are discussed in more detail in the Biological Technical Report (Appendix C). Higher status species with potential to occur are discussed in more detail following the table. Two federally listed species (i.e., coastal California gnatcatcher and least Bell's vireo) and one federally Proposed Threatened species (i.e., monarch butterfly [*Danaus plexippus*; overwintering not expected]are known to occur in the BSA. Two State listed species (i.e., bald eagle and least Bell's vireo) and four State Candidate species (i.e., Crotch's bumble bee, white sturgeon [*Acipenser transmontanus*; only sterile individuals], burrowing owl [*Athene cunicularia*], and mountain lion) are known to occur or have potential to occur in the BSA.

TABLE 4.3-4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT VICINITY

Species	Common Name	Federal Status	State Status	NCCP/HCP Covered Species	Habitat[a]	Potential to Occur
Invertebrates						
Branchinecta sandiegonensis	San Diego fairy shrimp	FE	—	Conditionally Covered	Inhabits vernal pools and ephemeral depressions.	Not expected to occur; no suitable habitat.
Streptocephalus woottoni	Riverside fairy shrimp	FE	—	Conditionally Covered	Inhabits vernal pools and ephemeral depressions.	Not expected to occur; no suitable habitat.
Danaus plexippus (overwintering populations)	monarch butterfly	FPT	—	No	Overwintering sites consist of forested areas that provide protection from the elements and moderate temperatures, as well as nectar and clean water sources located nearby. Overwintering sites are within 1.5 miles of the Pacific Ocean at elevations of 200-300 feet above msl. Reproduction is dependent on the presence of milkweed (*Asclepias* sp.).	**Observed (individual foraging during spring); hostplant present**; not expected for overwintering because BSA is too far inland and is outside the known elevational range for overwintering.
Euphydryas editha quino	quino checkerspot butterfly	FE	CE	Conditionally Covered	Inhabits openings in chaparral and sage scrub and grasslands; erect plantain is one of the specific host plants where females lay eggs.	Not expected to occur; not observed during focused surveys; suitable habitat.
Bombus crotchii	Crotch's bumble bee	—	CE	No	Inhabits areas with appropriate food sources (e.g., *Fabaceae, Apocynaceae, Asteraceae, Lamiaceae, and Boraginaceae*).	Observed; suitable habitat.

TABLE 4.3-4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT VICINITY

Species	Common Name	Federal Status	State Status	NCCP/HCP Covered Species	Habitat[a]	Potential to Occur
Fish						
Acipenser transmontanus	white sturgeon	—	CT	No	Inhabits large rivers with deep waters (>12 feet deep) and swift currents; brackish and estuarine environments.	Sterile individuals known to be stocked in Irvine Lake by OC Parks; no suitable habitat and outside current known range of natural populations.
Oncorhynchus mykiss irideus pop. 10	steelhead – southern California DPS	FE	CE	No	Inhabits streams; can tolerate warmer water and more variable conditions.	Not expected to occur; no suitable habitat; outside current known range.
Rhinichthys gabrielino [*osculus* ssp. 8]	Santa Ana speckled dace	FPT	SSC	No	Inhabits permanently flowing streams, usually in shallow cobble and gravel riffles.	Not expected to occur; outside current known range[b].
Catostomus santaanae	Santa Ana sucker	FT	—	No	Inhabits coastal streams; prefer sand-rubble-boulder bottoms; cool, clear water; and algae.	Not expected to occur; outside current known range.
Amphibians						
Taricha torosa	Coast Range newt	—	SSC	No	Breeds in ponds, reservoirs, and slow-moving streams and lives in terrestrial habitats.	May occur; suitable habitat.
Spea hammondii	western spadefoot	FPT	SSC	Not Covered	Breeds in vernal pools in grassland habitats, but also hardwood woodlands.	Not expected to occur; not observed during focused surveys; suitable foraging habitat; limited suitable breeding potential in pools or along slow-moving portions of Santiago Creek.

TABLE 4.3-4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT VICINITY

Species	Common Name	Federal Status	State Status	NCCP/HCP Covered Species	Habitat[a]	Potential to Occur
Anaxyrus californicus	arroyo toad	FE	SSC	Conditionally Covered	Inhabits rivers with sandy banks, willows, cottonwoods, and sycamores. Not observed during surveys for NCCP/HCP but area not thoroughly surveyed (County of Orange 1996).	Not expected to occur; not observed during focused surveys; suitable habitat.
Reptiles						
Actinemys pallida [*Emys marmorata*]	southwestern [western] pond turtle	FPT	SSC	No	Inhabits marshes, rivers, streams, and irrigation ditches, usually with aquatic vegetation and basking sites and suitable upland habitat.	Not expected to occur; not observed during focused surveys; suitable habitat.
Phrynosoma blainvillii	coast horned lizard	—	SSC	Covered	Inhabits a wide variety of habitats with open areas for sunning, bushes for cover, and patches of loose soil for burial.	Expected to occur; suitable habitat.
Aspidoscelis hyperythra	orange-throated whiptail	—	WL	Covered	Inhabits coastal scrub, chaparral, and hardwood woodlands; prefers washes and other sandy areas with patches of brush and rocks.	**Observed in the survey area.**
Aspidoscelis tigris stejnegeri	coastal whiptail	—	SSC	Covered	Inhabits deserts and semi-arid areas with sparse vegetation and open areas, woodland, and riparian areas.	**Observed in the survey area.**
Anniella stebbinsi	southern California legless lizard	—	SSC	No	Inhabits a variety of habitats, generally in moist, loose soil.	May occur; suitable habitat.

TABLE 4.3-4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT VICINITY

Species	Common Name	Federal Status	State Status	NCCP/HCP Covered Species	Habitat[a]	Potential to Occur
Arizona elegans occidentalis	California glossy snake	—	SSC	No	Inhabits a range of scrub and grassland habitats, often with loose or sandy soils.	May occur; suitable habitat.
Salvadora hexalepis virgultea	coast patch-nosed snake	—	SSC	No	Inhabits brushy or shrubby vegetation with small mammal burrows for refuge and overwintering sites.	May occur; suitable habitat.
Thamnophis hammondii	two-striped gartersnake	—	SSC	No	Found in or near permanent fresh water, often along streams with rocky beds and riparian growth.	**Observed in the survey area.**
Crotalus ruber	red-diamond rattlesnake	—	SSC	Covered	Inhabits rocky areas with dense vegetation in chaparral, woodland, grassland, and deserts.	Expected to occur; suitable habitat.
Birds						
Accipiter cooperii	Cooper's hawk	—	WL (nesting)	No	Forages in woodland. Nests in riparian growths of deciduous trees, such as canyon bottoms on river floodplains and in live oaks.	Expected to occur for foraging; may occur for nesting; suitable foraging and nesting habitat.
Buteo regalis	ferruginous hawk	—	WL (wintering)	No	Inhabits open grasslands, sagebrush flats, desert scrub, low foothills, and fringes of pinyon and juniper woodland.	May occur during migration and wintering; suitable habitat.
Elanus leucurus	white-tailed kite	—	FP (nesting)	No	Inhabits open grasslands, meadows, or marshes close to isolated, dense -topped trees for nesting and perching.	**Observed in the survey area.**

TABLE 4.3-4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT VICINITY

Species	Common Name	Federal Status	State Status	NCCP/HCP Covered Species	Habitat[a]	Potential to Occur
Haliaeetus leucocephalus	bald eagle	Delisted	SE/FP (nesting & wintering)	No	Nests in large, old-growth trees with open branches near water. Forages along ocean shore, lake margins, and rivers.	**Observed (nesting) immediately adjacent to the survey area; observed foraging in the survey area.**
Aquila chrysaetos	golden eagle	—	WL/FP (nesting & wintering)	Conditionally Covered	Variety of open habitats (desert, grassland, shrubland, agriculture, streams) especially near mountains, hills, and cliffs.	May occur for foraging; not expected to occur for nesting; suitable foraging habitat; no suitable nesting habitat but potentially suitable nesting habitat adjacent.
Falco mexicanus	prairie falcon	—	WL (nesting)	Conditionally Covered	Variety of open habitats (desert, grassland, shrubland, agriculture, streams) especially near bluffs and cliffs that are used for nesting.	May occur for foraging; not expected to occur for nesting; suitable foraging habitat; no suitable nesting habitat but potentially suitable nesting habitat adjacent.
Falco peregrinus anatum	American peregrine falcon	Delisted	Delisted	Covered	Nests in a scrape, depression, or ledge in an open site on cliffs, banks, dunes, and mounds near wetlands, lakes, rivers, or other water.	**Observed in the survey area.**
Coturnicops noveboracensis	yellow rail	—	SSC	No	Inhabits freshwater marshlands.	Not expected to occur; no suitable habitat.
Laterallus jamaicensis coturniculus	California black rail	—	ST/FP	No	Inhabits freshwater marshes, wet meadows, and shallow margins of saltwater marshes bordering larger bays.	Not expected to occur; no suitable habitat.
Rallus obsoletus levipes	light-footed Ridgway's rail	FE	SE/FP	No	Inhabits salt marshes with dense growth of pickleweed or cordgrass.	Not expected to occur; no suitable habitat.

TABLE 4.3-4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT VICINITY

Species	Common Name	Federal Status	State Status	NCCP/HCP Covered Species	Habitat[a]	Potential to Occur
Sternula antillarum browni	California least tern	FE (nesting colony)	SE/FP (nesting colony)	No	Colonial breeder on bare or sparsely vegetated, flat substrates such as sand beaches, alkali flats, landfills, or paved areas along the coast.	Not expected to occur; no suitable habitat.
Coccyzus americanus occidentalis	western yellow-billed cuckoo	FT (nesting)	SE (nesting)	No	Nests in riparian forests along broad, lower flood-bottoms of larger river systems with willows, often mixed with cottonwoods, with understory of blackberry, nettles, or wild grape.	Not expected to occur; not observed during focused surveys; suitable habitat.
Asio otus	long-eared owl	—	SSC (nesting)	No	Inhabits riparian bottomlands with tall willows and cottonwoods, also belts of live oak along stream courses.	May occur for foraging and nesting; suitable foraging and nesting habitat.
Athene cunicularia	burrowing owl	—	CT/E (burrow sites & some wintering sites)	No	Inhabits open, dry annual or perennial grasslands, deserts, and scrublands with low-growing vegetation; uses California ground squirrel burrows and similar openings for breeding.	Limited potential to occur; suitable habitat; limited numbers in the region.
Empidonax traillii extimus	southwestern willow flycatcher	FE (nesting)	SE (nesting)	Conditionally Covered	Inhabits riparian habitat along rivers, stream, and other wetlands with dense growths of willows, mule fat, etc., often with a scattered overstory of cottonwood.	Not expected to occur; not observed during focused surveys; suitable habitat.

TABLE 4.3-4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT VICINITY

Species	Common Name	Federal Status	State Status	NCCP/HCP Covered Species	Habitat[a]	Potential to Occur
Lanius ludovicianus	loggerhead shrike	—	SSC (nesting)	No	Inhabits grasslands and other dry, open habitats.	May occur; suitable habitat.
Vireo bellii pusillus	least Bell's vireo	FE (nesting)	SE (nesting)	Conditionally Covered	Inhabits riparian forest, riparian scrub, and riparian woodland, usually nesting in willows, mule fat, or mesquite.	**Observed in the survey area.**
Eremophila alpestris actia	California horned lark	—	WL	No	Inhabits short-grass prairie, “bald” hills, mountain meadows, open coastal plains, fallow agricultural fields, and alkali flats.	May occur; suitable habitat.
Campylorhynchus brunneicapillus sandiegensis	coastal cactus wren	—	SSC	Covered	Inhabits coastal sage scrub with tall prickly-pear cactus for nesting and roosting.	**Observed in the survey area.**
Polioptila californica californica	coastal California gnatcatcher	FT	SSC	Covered	Inhabits coastal sage scrub in arid washes, on mesas, and slopes.	**Observed in the survey area.**
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	—	WL	Covered	Inhabits coastal sage scrub and sparse mixed chaparral, frequently on relative steep, rocky hillsides with grass and forb patches.	**Observed in the survey area.**
Ammodramus savannarum	grasshopper sparrow	—	SSC (nesting)	No	Inhabits dense grasslands on rolling hills, lowland plains, and valleys and on hillsides on lower mountain slopes.	**Observed in the survey area.**
Passerculus sandwichensis beldingi	Belding's savannah sparrow	—	SE	No	Inhabits coastal salt marshes, nesting in pickleweed on and about the margins of tidal flats.	Not expected to occur; no suitable habitat.

TABLE 4.3-4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT VICINITY

Species	Common Name	Federal Status	State Status	NCCP/HCP Covered Species	Habitat[a]	Potential to Occur
Icteria virens	yellow-breasted chat	—	SSC (nesting)	No	Inhabits riparian thickets of willow and other brushy tangles near watercourses; nests in low, dense riparian vegetation consisting of willows, blackberry, and wild grape.	**Observed in the survey area.**
Agelaius tricolor	tricolored blackbird	—	ST/SSC (nesting colony)	No	Inhabits freshwater marsh, swamps, and wetlands with open water and protected nesting substrate.	Not expected to occur; limited amount of suitable habitat.
Setophaga petechia	yellow warbler	—	SSC (nesting)	No	Inhabits riparian forest, riparian scrub, and riparian woodland, foraging and nesting in willow shrubs and thickets, cottonwoods, sycamores, ash, and alders.	**Observed in the survey area.**
Mammals						
Sorex ornatus salicornicus	southern California saltmarsh shrew	—	SSC	No	Inhabits coastal marshes with dense vegetation and woody debris for cover.	Not expected to occur; no suitable habitat.
Choeronycteris mexicana	Mexican long-tongued bat	—	SSC	No	Inhabits riparian scrub, pinyon and juniper woodland, and Sonoran thorn woodland; roosts in caves and in and around buildings.	Limited potential to occur for foraging and roosting; marginally suitable foraging and roosting habitat.
Antrozous pallidus	pallid bat	—	SSC	No	Inhabits deserts, grasslands, shrublands, woodlands, and forest, most commonly in open, dry habitats with rocky areas for roosting.	May occur for foraging and roosting; suitable foraging and roosting habitat.

TABLE 4.3-4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT VICINITY

Species	Common Name	Federal Status	State Status	NCCP/HCP Covered Species	Habitat[a]	Potential to Occur
Nyctinomops femorosaccus	pocketed free-tailed bat	—	SSC	No	Inhabits pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis. Roosts in crevices of cliffs and rocky outcroppings.	May occur for foraging and roosting; suitable foraging and roosting habitat.
Nyctinomops macrotis	big free-tailed bat	—	SSC	No	Rugged and rocky terrain; roosts in buildings, caves, rock crevices in cliffs, and rocky outcroppings.	May occur for foraging and roosting; suitable foraging and roosting habitat.
Lasiurus frantzii	western red bat	—	SSC	No	Riparian habitat near water. Roosts exclusively in trees, particularly sycamore, cottonwood, ash, and elderberry (*Sambucus* sp.).	May occur for foraging and roosting; suitable foraging and roosting habitat.
Lasiurus xanthinus	western yellow bat	—	SSC	No	Inhabits valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees.	May occur for foraging and roosting; suitable foraging and roosting habitat.
Eumops perotis californicus	western mastiff bat	—	SSC	No	Inhabits many open, semi-arid to arid habitats including conifer and deciduous woodlands, coastal scrub, grasslands, and chaparral. Roosts in crevices in cliff faces, high buildings, trees, and tunnels.	May occur for foraging and roosting; suitable foraging and roosting habitat.

TABLE 4.3-4
SPECIAL STATUS WILDLIFE SPECIES REPORTED FROM THE PROJECT VICINITY

Species	Common Name	Federal Status	State Status	NCCP/HCP Covered Species	Habitat[a]	Potential to Occur
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	—	SSC	No	Inhabits coastal scrub, chaparral, grasslands, and sagebrush, usually in association with rocks or coarse gravel.	May occur; suitable habitat.
Perognathus longimembris pacificus	Pacific pocket mouse	FE	SSC	Conditionally Covered	Inhabits coastal scrub with fine alluvial sands; only occurs within a few miles of the coast.	Not expected to occur; outside current known range.
Neotoma bryanti [*lepida*] *intermedia*	Bryant's San Diego desert woodrat	—	SSC	Covered	Inhabits coastal scrub with moderate to dense canopies, rock outcrops, rocky cliffs, and slopes.	May occur; suitable habitat.
Onychomys torridus ramona	southern grasshopper mouse	—	SSC	No	Inhabits desert areas, especially scrub habitats with friable soils for digging with low to moderate shrub cover.	Not expected to occur; outside current known range
Puma concolor	mountain lion–Southern California/Central Coast Evolutionary Significant Unit (ESU)	—	CE	No	Inhabits various habitats within foothill and mountain areas typically where deer can be found.	**Observed (tracks) in the survey area.**

NCCP/HCP: Natural Community Conservation Plan/Habitat Conservation Plan; BSA: Biological Study Area

LEGEND:

Federal (USFWS)
FE Endangered
FT Threatened
FPT Proposed Threatened

State (CDFW)
SE Endangered
ST Threatened
CE Candidate Endangered
FP Fully Protected
CT Candidate Threatened
CT/E Candidate Threatened or Endangered
SSC Species of Special Concern
WL Watch List
SA Special Animal

[a] Sources include CDFW 2025a and 2025d.
[b] CDFW is currently considering a translocation of Santa Ana speckled dace to Santiago Creek near its confluence with Black Star Canyon, about a mile upstream of Irvine Lake. Details are still being determined and are not yet available.

Monarch Butterfly

The monarch butterfly is proposed as a federally Threatened species by the USFWS; California overwintering sites would be protected by this status. Monarch butterflies lay their eggs on the obligate milkweed (*Asclepias* sp.). Multiple generations of monarchs are produced through the breeding season, with most adult butterflies living two to five weeks. Overwintering adults enter reproductive diapause and live for six to nine months (USFWS 2023). Each spring, monarchs leave overwintering sites and disperse across California and eventually migrate to all western states, searching for milkweed plants on which to lay their eggs. Several generations are produced throughout the spring, summer, and fall, with each generation spreading further across the landscape. The last generation then migrates all the way back to the overwintering grounds on the Pacific coast in the fall. Monarchs return to the same groves of trees each year (Xeres Society 2023). In the western U.S., monarchs overwinter at groves of trees along the Pacific Coast with a large concentration overwintering in California. Currently, the most common overwintering groves consist of non-native blue gum (*Eucalyptus* sp.), but they also use native Monterey pine (*Pinus radiata*), Monterey cypress (*Hesperocyparis macrocarpa*), western sycamore, coast live oak, and redwood (*Sequoia sempervirens*) (USFWS 2024b). The majority of overwintering sites are found within 1.5 miles of the Pacific Ocean, which moderates temperatures, at lower elevations (i.e., 200 to 300 feet above msl) and situated on slopes oriented to the south, southwest, or west that provide the most solar radiation (Xeres Society 2016).

Along with the proposed listing, the USFWS is proposing 4,395 acres of Critical Habitat for this species to protect overwintering sites in Alameda, Marin, Monterey, San Luis Obispo, Santa Barbara, Santa Cruz, and Ventura Counties, California (USFWS 2024b). The BSA is not within proposed Critical Habitat for this species.

Monarch butterfly was recorded as an incidental observation during the Quino checkerspot butterfly surveys and its hostplant, milkweed, was noted during botanical surveys. Western sycamore and coast live oak woodlands are present in the BSA; however, the BSA is over 20 miles from the Pacific Ocean and the elevation of the BSA is too high (i.e., 657 to 996 feet above msl). Additionally, there are no known overwintering sites mapped in the BSA (Xeres Society 2023). Therefore, monarch butterfly is not expected to overwinter in the BSA.

Crotch's Bumblebee

The Crotch's bumble bee (*Bombus crotchii*) is proposed as a Candidate[7] to be State listed as Endangered. The Crotch's bumble bee is a ground nester and often makes its nest in abandoned mammal burrows and can be found in most native habitat types, although it prefers grassland and scrub habitats. It is primarily associated with plants from the following families: *Fabaceae, Apocynaceae, Asteraceae, Lamiaceae,* and *Boraginaceae* (Richardson 2017, Thorp et. al. 1983). Grassland and scrub habitat, as well as several plant species from these families are present; therefore, suitable habitat is present for this species. This species has been recently observed at multiple locations in the Project region. The most recent observations of this species were in 2020 in the Irvine Ranch Open Space along Santiago Creek in 2016 and in Trabuco Canyon in 2020 (CDFW 2025a).

Focused surveys were conducted in summer 2024; one male Crotch's bumble bee was observed foraging in a small patch of leafy California buckwheat, in the southern portion of the survey area (Exhibit 10). At the time of the focused surveys in the summer months, most plants were no longer flowering; floral resources were likely higher in the spring and early summer. The estimated percent cover of floral resources during the focused surveys was approximately 20 to 30 percent

[7] The CDFW treats Candidate species as if they are listed while they determine if they will be formally listed.

of the survey area during the June visit. During the focused surveys, the species in bloom consisted primarily of leafy California buckwheat, deerweed, short-podded mustard, and black mustard. Potential bumble bee nest sites and overwintering habitat included small rodent burrows and leaf litter.

White Sturgeon

White sturgeon is a Candidate to be listed as State Threatened. This species occurs in deep rivers (more than 12 feet deep) with swift flows. White Sturgeon can live in excess of 100 years, and historically grew to sizes of approximately 20 feet and 1,300 pounds (Moyle 2002). White Sturgeon are an anadromous fish native to California, where they primarily occur in San Francisco Bay and the Delta and spawn in the Sacramento and San Joaquin rivers and associated tributaries (CDFW 2024c). White sturgeon are not expected to occur in southern California streams, and therefore, are not expected to occur naturally in the BSA as it is outside the species' known range and does not provide suitable habitat. However, sterile individuals of white sturgeon are stocked in Irvine Lake by OC Parks (Hayes, pers. comm. 2023).

Santa Ana Speckled Dace

Santa Ana speckled dace (*Rhinichthys gabrielino* [*osculus* ssp. 8]) is proposed as a federally Threatened species by the USFWS. The Santa Ana speckled dace is a small freshwater fish that occurs in perennial streams and rivers. The species was historically found throughout the upper and middle reaches of the Los Angeles, San Gabriel, Santa Ana, and San Jacinto Rivers. Currently, Santa Ana speckled dace is restricted to the headwaters of those river systems, with limited connectivity for populations in the Santa Ana River and San Jacinto River. Santa Ana speckled dace inhabit a variety of stream habitats, with a preference for cool, moving water and gravel substrate that have aquatic invertebrates as a food source (USFWS 2024a). This species was reported from Modjeska Canyon near its confluence with Santiago Creek in 1999 (CDFW 2025a). The BSA is outside the current known range of the Santa Ana speckled dace. However, CDFW is currently considering translocating this species to a site along Santiago Creek near its confluence with Black Star Canyon, approximately 1.25 mile upstream of Irvine Lake (Pareti, pers. comm. 2024). If this species is translocated, the translocation success will be monitored by CDFW. Therefore, while this species is not currently expected to occur in the BSA, it could occur along Santiago Creek upstream of the lake in the future.

Bald Eagle

The bald eagle is a State-listed Endangered species, a California Fully Protected species, and is also protected by the Federal Bald Eagle Act. Through protection under the Endangered Species Act, bald eagle populations recovered through captive breeding programs, reintroduction efforts, the banning of DDT, and public education (USDA 2023). This species was delisted by the USFWS in 2007 and will be monitored for 20 years as part of the Post-Delisting Monitoring Plan for the species. This species requires large bodies of water or free-flowing rivers with abundant fish and adjacent snags or perches, and nests in large, old-growth trees or snags in remote stands near water (Zeiner et al. 1990). Bald eagles are usually found close to water because their diet is primarily made up of fish and waterfowl. When waterfowl migrate south for the winter, bald eagles follow and winter in southern California from November to March (USDA 2023). Most breeding territories are in northern California, but the eagles also nest in scattered locations in the central and southern Sierra Nevada mountains and foothills, in several locations from the Central Coast Range to inland southern California, and on Santa Catalina Island (CDFW 2024a). Breeding populations of bald eagles in southern California were extirpated in the 1950s until reintroduction efforts began on Catalina Island in the 1980s. Since 2003, several pairs of bald eagles have nested in southern California at Lake Hemet, Lake Skinner, Lake Matthews, and Big Bear Lake

(USDA 2023). CDFW tracks information on occupied territories for bald eagles in California; the location at Irvine Lake has been mapped as the only bald eagle nesting location in Orange County (CDFW 2024a).

An individual bald eagle was incidentally observed during vegetation mapping upstream of Santiago Creek Dam in fall 2020 and a nesting pair was observed during focused surveys in spring/summer 2022 (Exhibit 4.3-7). The pair nested in a pine tree in a canyon adjacent to the BSA. Suitable foraging and wintering habitat for this species is present throughout the BSA. While the ornamental trees within the BSA are not suitable because they are not mostly gum trees or too small for eagle nesting, suitable nesting habitat is adjacent to the BSA.

Least Bell's Vireo

Least Bell's vireo is a federal and state Endangered species. The least Bell's vireo was formerly considered a common breeder in riparian habitats throughout the Central Valley and other low-elevation riverine systems throughout California and Baja California, Mexico (USFWS 1998). The decline of least Bell's vireo is attributed to the widespread loss of riparian woodlands coupled with the increase in brown-headed cowbirds (USFWS 1986). Cowbirds are nest parasites that lay their eggs in the nests of other birds and leave the host bird to raise their young, often to the detriment of the host's own young (USFWS 1998). With the implementation of intensive brown-headed cowbird management programs, the least Bell's vireo numbers have dramatically increased (USFWS 1998). The least Bell's vireo is an obligate riparian species (i.e., nests exclusively in riparian habitat) that generally nests in early-successional stages of riparian habitats. The most critical factor in habitat structure is the presence of a dense understory shrub layer from approximately three to six feet above ground, where nests are typically placed, and a dense stratified canopy for foraging (Goldwasser 1981; Gray and Greaves 1981; Salata 1981, 1983; RECON 1989).

A total of 29 least Bell's vireo locations were observed during the 2022 focused surveys upstream of the dam (Exhibit 4.3-7). A total of 27 locations consisted of territories occupied by breeding pairs, 1 location consisted of a territory occupied by an unpaired male, and 1 location consisted of a transient male. A territory is defined as a singing male observed or heard consistently in the same general location on multiple surveys (i.e., defending a territory). A transient male is one observed during only one survey. The territory points shown on Exhibit 4.3-7 represent either a nest location or the general area where least Bell's vireos were observed and/or detected most of the time. A total of 25 pairs were observed to have successfully nested; a total of 38 juveniles were observed during the 2022 focused surveys. The survey results include only the number of nestlings/fledglings that were visually or aurally confirmed; additional fledglings may have been undetected in the habitat. Suitable riparian habitat for this species is present along Santiago Creek throughout the BSA.

On February 2, 1994, the USFWS published a final critical habitat for the least Bell's vireo, designating approximately 37,560 acres of land in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties, California (USFWS 1994). The Project site is not located in designated critical habitat for this species.

Coastal California Gnatcatcher

The coastal California gnatcatcher is a federally Threatened species and a California Species of Special Concern. It is a Covered species in the Central–Coastal NCCP/HCP. This species occurs in most of Baja California, Mexico's arid regions, but this subspecies is extremely localized in the United States, where it predominantly occurs in coastal regions of highly urbanized Los Angeles, Orange, Riverside, and San Diego Counties (Atwood 1992). In California, this subspecies is a

resident of coastal sage scrub vegetation types. The breeding season for the coastal California gnatcatcher ranges from late February to August. Nests are generally placed in a shrub about three feet above ground. Brood parasitism by brown-headed cowbirds and loss of habitat to urban development have been cited as causes of coastal California gnatcatcher population decline (Unitt 1984; Atwood 1990).

One California gnatcatcher territory was observed during the 2020 focused California gnatcatcher surveys downstream of Santiago Creek Dam (Exhibit 4.3-7). This territory included a breeding pair, which successfully fledged at least three chicks. No coastal California gnatcatchers were observed breeding upstream of the dam within the BSA during the 2022 focused surveys; however, one coastal California gnatcatcher was detected just outside the BSA (Exhibit 4.3-7). Additionally, four gnatcatcher locations were incidentally observed during vegetation mapping and the jurisdictional delineation upstream of Santiago Creek Dam (Exhibit 4.3-7). These four locations consisted of two individual juveniles, one male, and one unidentified individual. Suitable habitat for this species is present throughout the BSA. Coastal California gnatcatcher was also incidentally observed downstream of the dam during focused surveys conducted in summer 2024 (Exhibit 4.3-7).

USFWS published a Revised Final Rule designating Critical Habitat for the coastal California gnatcatcher in 2007 (USFWS 2007). This Revised Critical Habitat designates 197,303 acres in San Diego, Orange, Riverside, San Bernardino, Los Angeles, and Ventura Counties. The Project is not located within the designated Revised Critical Habitat for the coastal California gnatcatcher.

Mountain Lion

The mountain lion is currently a Candidate to be State listed as Threatened as an Evolutionary Significant Unit comprised of the following subpopulations: (1) Santa Ana Mountains; (2) Eastern Peninsular Ranges; (3) San Gabriel/San Bernardino Mountains; (4) Central Coast South (Santa Monica Mountains); (5) Central Coast North (Santa Cruz Mountains); and (6) Central Coast Central. CDFW is in the process of reviewing the petition for listing and evaluating available information (CDFW 2024b). CDFW status review report was expected in November 2021; as of June 2023, its status has not been updated (CDFW 2024b). The mountain lion occurs throughout most of California except for the Mojave and Colorado Deserts and the croplands of the Central Valley. Mountain lions occur in a variety of habitats, especially brushy habitats and riparian areas with interspersed irregular terrain, rocky outcrops, and tree/brush edges. Mountain lions use caves, natural cavities and thickets for cover. Mountain lions use habitat connections for movement among fragmented core habitat (Zeiner 1988). A major threat to this species is fragmentation of habitat by spread of human developments and associated roads. Estimates of effective population size highlight genetic isolation and raise significant concerns for viability in Southern California and the Central Coast (Center for Biological Diversity 2019).

Tracks of a mountain lion were observed during the 2020 focused arroyo toad survey downstream of Santiago Creek Dam and during the 2022 focused surveys upstream of Santiago Creek Dam. Suitable habitat for this species is present throughout the BSA.

4.3.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in significant biological resources if it would:

Threshold 4.3-1 Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Threshold 4.3-2 Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?

Threshold 4.3-3 Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

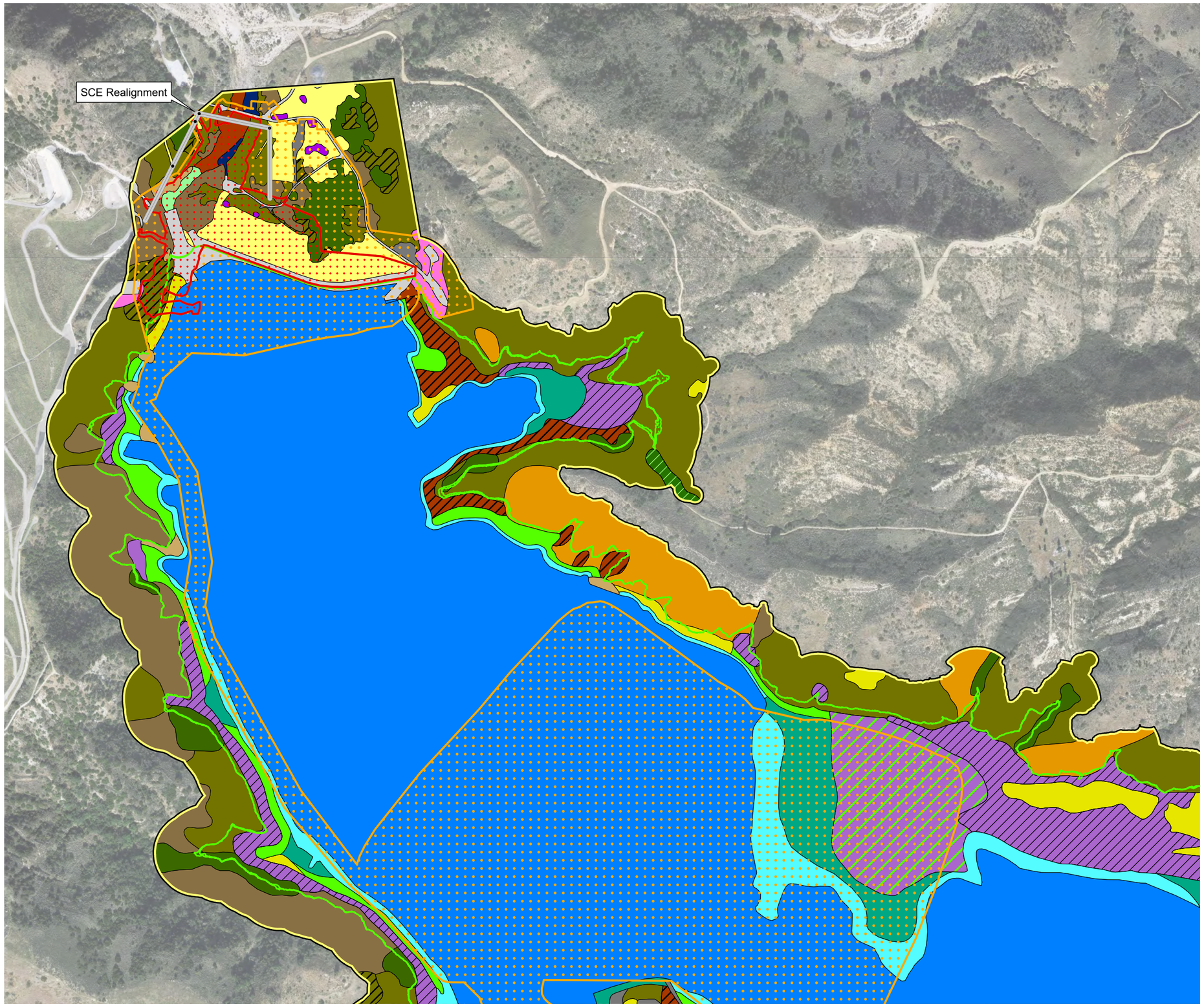
Threshold 4.3-4 Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

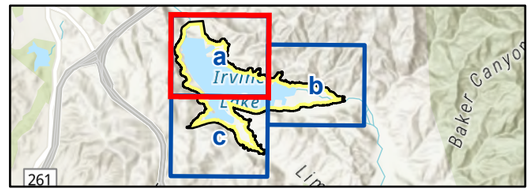
Threshold 4.3-5 Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Threshold 4.3-6 Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

4.3.5 IMPACT ANALYSIS

The actual and potential occurrence of biological resources in the BSA vicinity was correlated with the significance criteria described above to determine whether impacts from the Project on these resources would be significant. Vegetation types and other areas that would be impacted by the Project, SCE Realignment, and Additional Inundation Area are shown in Table 4.3-5 and Exhibit 4.3-8. It should be noted that within the SCE Realignment (outside the Project's permanent and temporary impact area), only trees and branches would be removed; other vegetation would not be temporarily removed but may be disturbed by access and movement of construction materials through the area. Special status species locations in relation to impact areas are shown in Exhibit 4.3-9.





Biological Study Area

Project Impacts

Permanent Impacts

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

Vegetation Types and Other Areas

Sagebrush Scrub (2.3.6)

Disturbed Sagebrush Scrub (2.3.6)

Southern Cactus Scrub (2.4)

Disturbed Floodplain Sage Scrub (2.6)

Toyon - Sumac Chaparral (3.12)

Annual Grassland (4.1)

Ruderal (4.6)

Riparian Herb (7.1)

Southern Willow Scrub (7.2)

Mulefat Scrub (7.3)

Disturbed Mulefat Scrub (7.3)

Southern Sycamore Riparian Woodland/Southern Coast Live Oak Riparian Forest (7.4/7.5)

Southern Black Willow Forest (7.7)

Disturbed Southern Black Willow Forest (7.7)

Southern Black Willow Forest/Riparian Herb (7.7/7.1)

Coast Live Oak Woodland (8.1)

Western Sycamore (8.x)

Cliff (10)

Open Water (12.1)

Fluctuating Shoreline (12.2)

Vegetated Fluctuating Shoreline (12.2)

Ornamental (15.5)

Developed (15.6)

Disturbed (16.1)

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*
***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

N W E S

0 300 600 Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts Vegetation Types

Exhibit 4.3-8a

Santiago Creek Dam Improvement Project

PSOMAS

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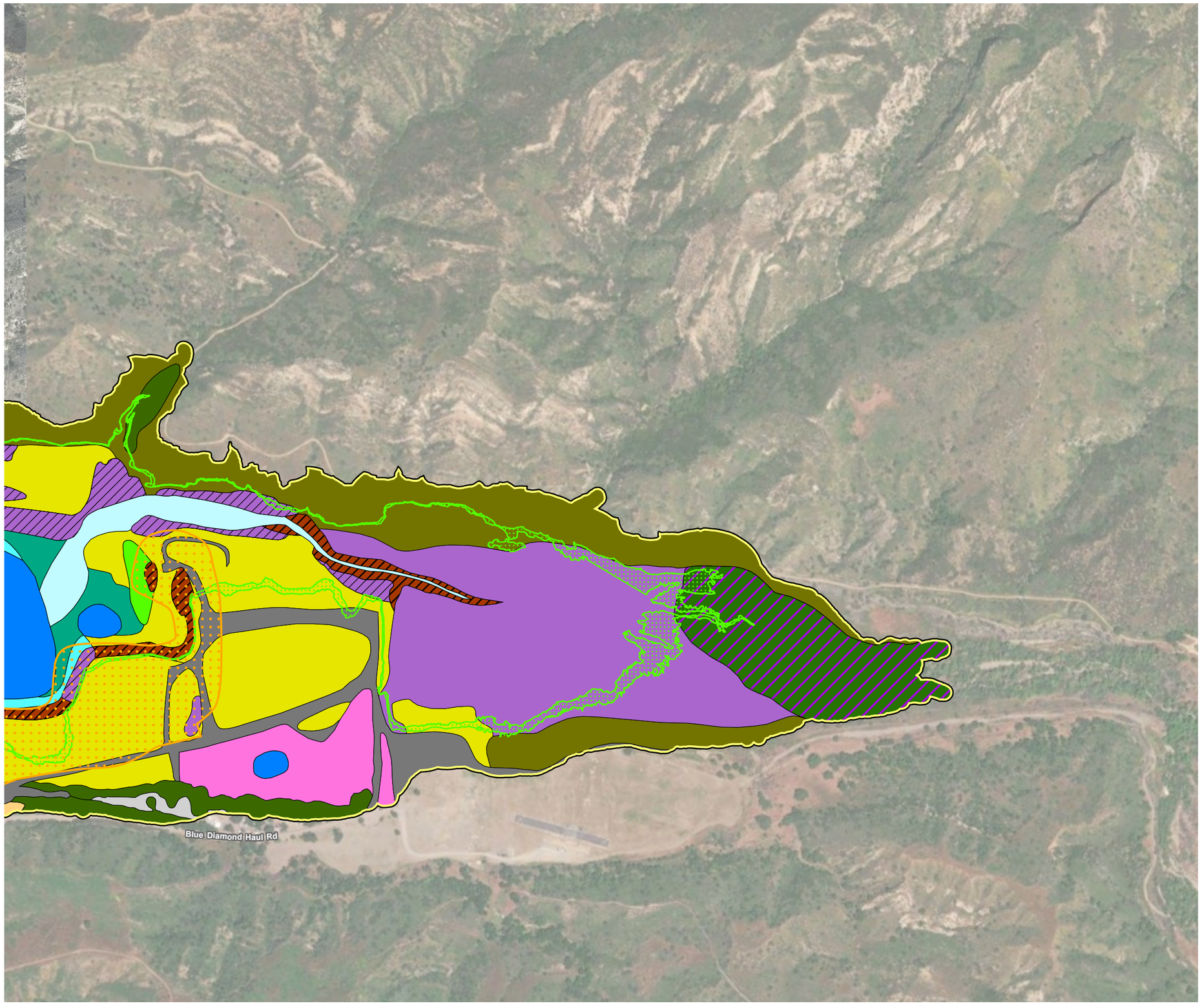

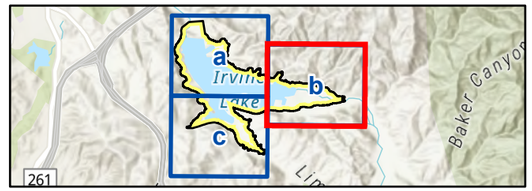

Biological Study Area

Project Impacts

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

Vegetation Types and Other Areas

Sagebrush Scrub (2.3.6)

Sagebrush - Coyote Brush Scrub (2.3.12)

Ruderal (4.6)

Riparian Herb (7.1)

Disturbed Mulefat Scrub (7.3)

Southern Sycamore Riparian Woodland (7.4)

Southern Black Willow Forest (7.7)

Disturbed Southern Black Willow Forest (7.7)

Coast Live Oak Woodland (8.1)

Open Water (12.1)

Fluctuating Shoreline (12.2)

Vegetated Fluctuating Shoreline (12.2)

Perennial Stream (13.1)

Ornamental (15.5)

Developed (15.6)

Disturbed (16.1)

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*
***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

N W E S

0 300 600 Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
Vegetation Types

Exhibit 4.3-8b

Santiago Creek Dam Improvement Project

PSOMAS

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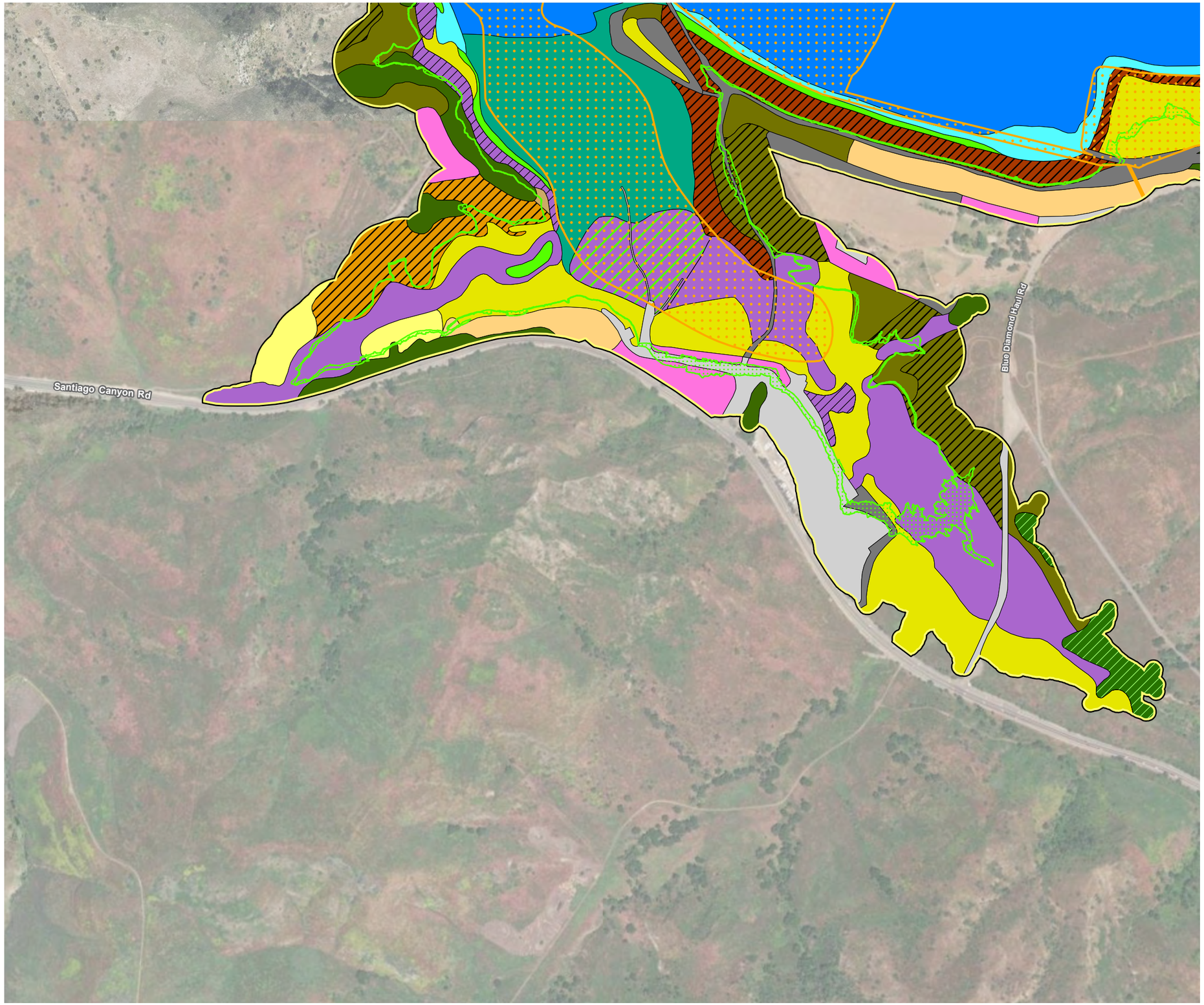

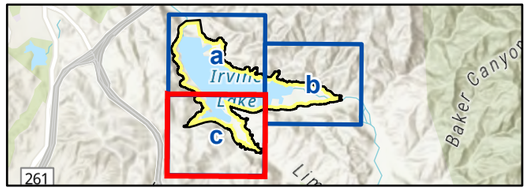

- Biological Study Area

Project Impacts

- Temporary Impacts*
- Additional Inundation Area

SCE Realignment

- Permanent Impacts
- Temporary Impacts**

Vegetation Types and Other Areas

- Sagebrush Scrub (2.3.6)
- Disturbed Sagebrush Scrub (2.3.6)
- Sagebrush - Coyote Brush Scrub (2.3.12)
- Disturbed Southern Cactus Scrub (2.4)
- Annual Grassland (4.1)
- Ruderal (4.6)
- Riparian Herb (7.1)
- Disturbed Mulefat Scrub (7.3)
- Southern Sycamore Riparian Woodland/Southern Coast Live Oak Riparian Forest (7.4/7.5)
- Southern Black Willow Forest (7.7)
- Disturbed Southern Black Willow Forest (7.7)
- Southern Black Willow Forest/Riparian Herb (7.7/7.1)
- Coast Live Oak Woodland (8.1)
- Cliff (10)
- Open Water (12.1)
- Fluctuating Shoreline (12.2)
- Vegetated Fluctuating Shoreline (12.2)
- Ornamental (15.5)
- Developed (15.6)
- Disturbed (16.1)

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*
***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

N W E S

0 300 600 Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts Vegetation Types

Exhibit 4.3-8c

Santiago Creek Dam Improvement Project

PSOMAS

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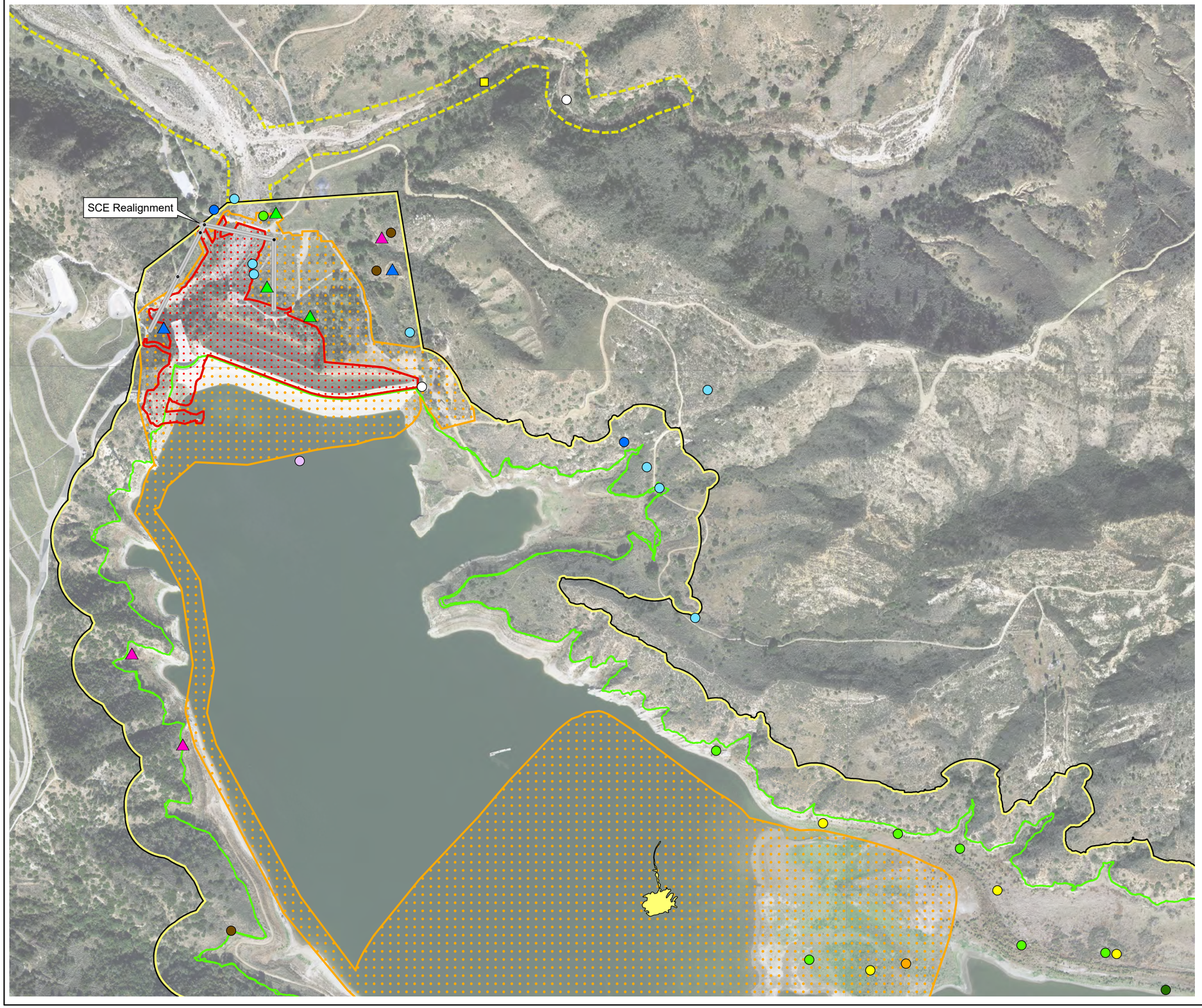

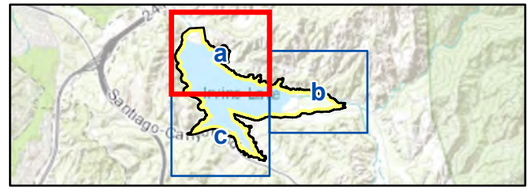

Biological Study Area
Arroyo Toad Survey Area

Project Impacts
Permanent Impacts
Temporary Impacts*
Additional Inundation Area

SCE Realignment
Permanent Impacts
Temporary Impacts**

Special Status Plants
Coulter's Matilija Poppy Population
Intermediate Mariposa Lily Population
Many-Stemmed Dudleya Population
Mud Nama Population (mapped polygon)

Special Status Species
American Peregrine Falcon
American White Pelican
Coastal Cactus Wren
Coastal California Gnatcatcher
Grasshopper Sparrow
Least Bell's Vireo
Southern California Rufous-Crowned Sparrow
White-Tailed Kite
Yellow-Breasted Chat
Two-Striped Gartersnake

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*
***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

N
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Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
Special Status Species **Exhibit 4.3-9a**

Santiago Creek Dam Improvement Project

PSOMAS

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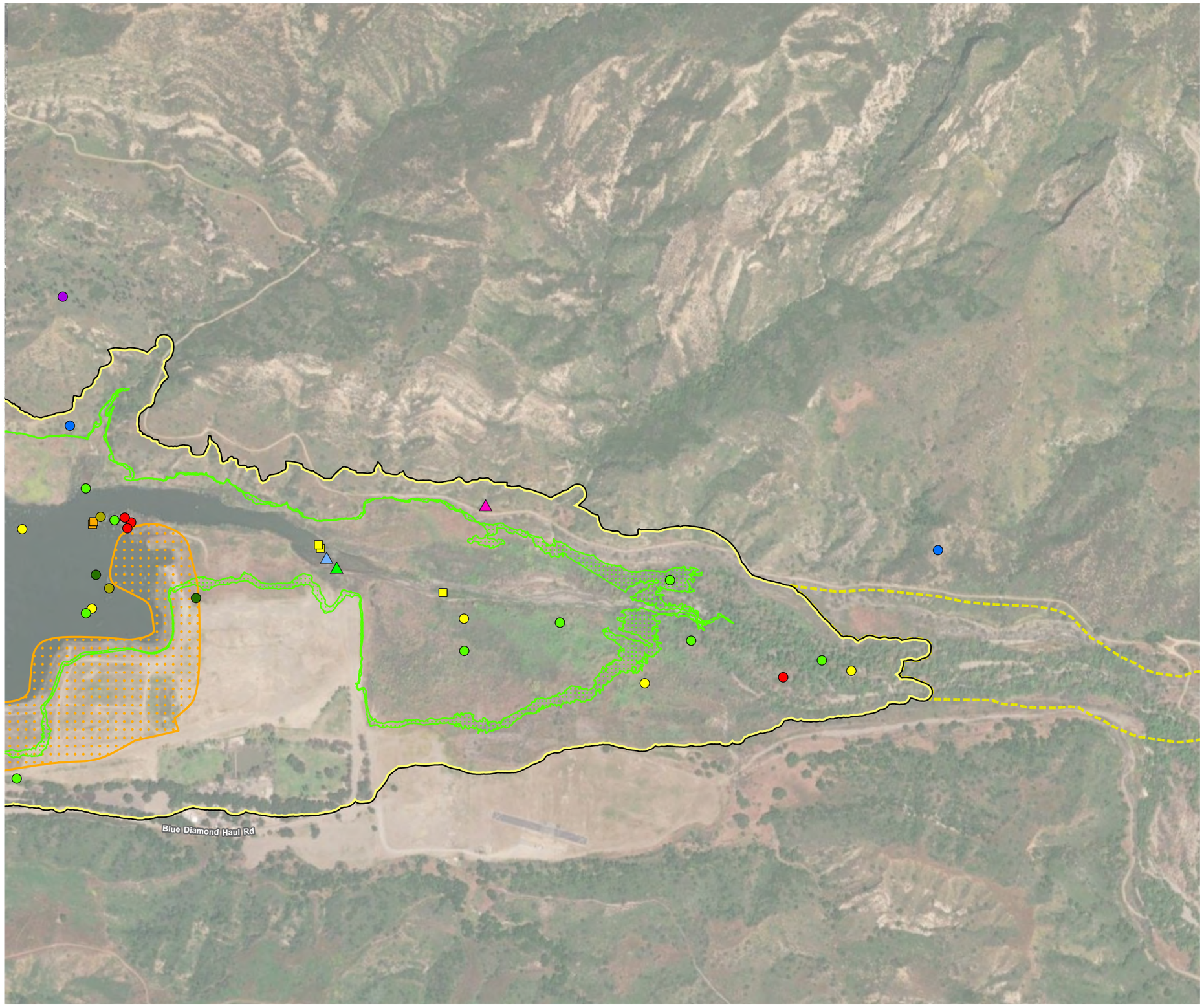

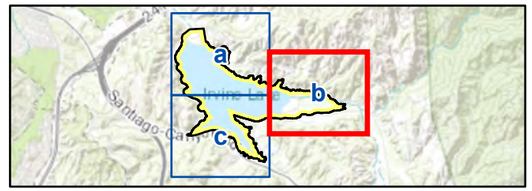

Biological Study Area
Arroyo Toad Survey Area

Project Impacts
Temporary Impacts*
Additional Inundation Area

SCE Realignment
Permanent Impacts
Temporary Impacts**

Special Status Plants
Coulter's Matilija Poppy Population
Intermediate Mariposa Lily Population
Braunton's Milkvetch Population

Special Status Species
Bald Eagle (Nest)
Coastal Cactus Wren
Grasshopper Sparrow
Least Bell's Vireo
Willow Flycatcher (migrant)
Yellow Warbler
Yellow-Breasted Chat
Belding's Orange-Throated Whiptail
Two-Striped Gartersnake

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*
***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

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0 300 600 Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
Special Status Species **Exhibit 4.3-9b**

Santiago Creek Dam Improvement Project

PSOMAS

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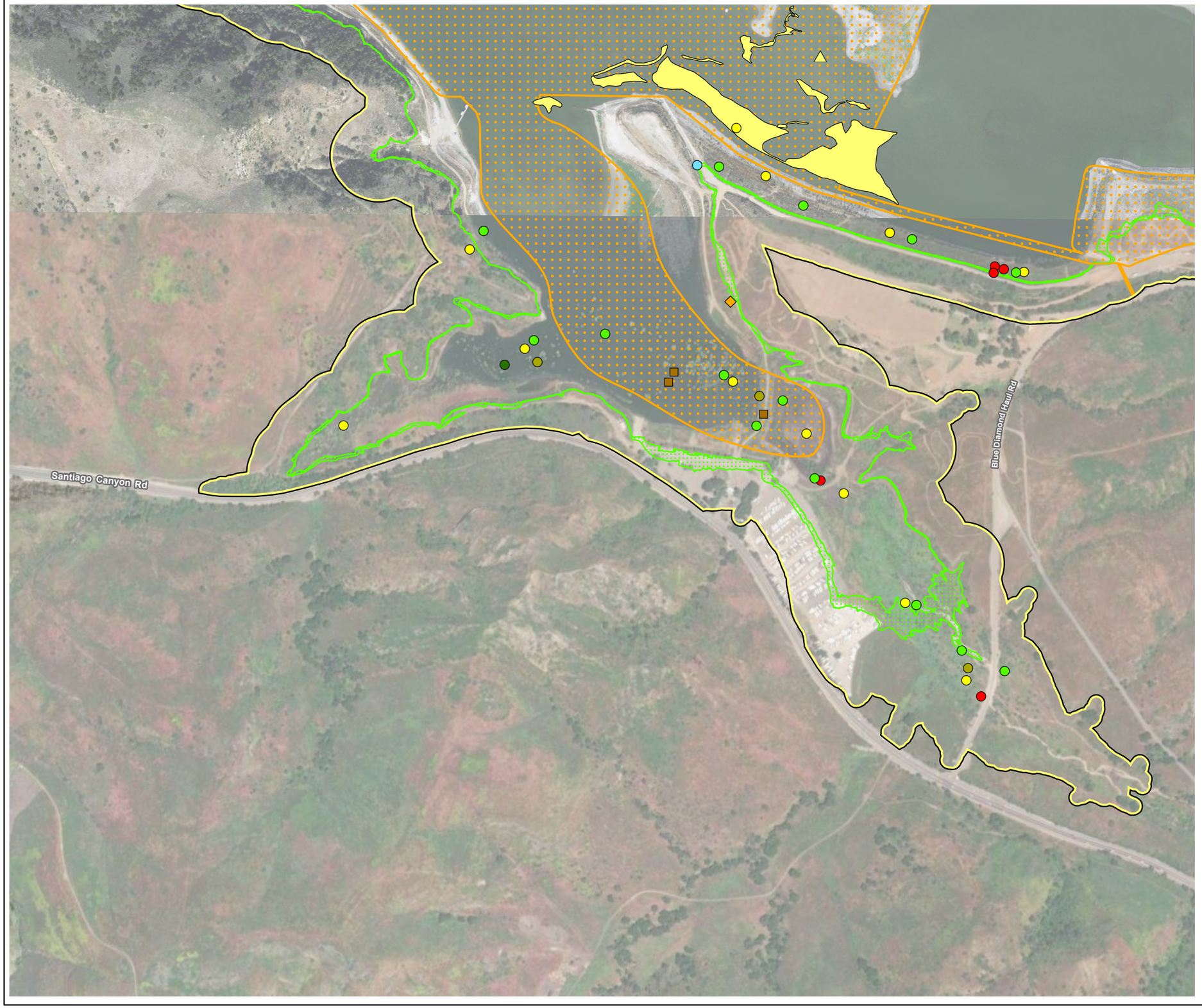

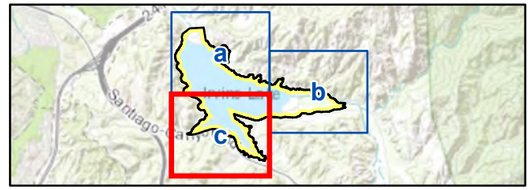

Biological Study Area

Project Impacts

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

Special Status Plants

Mud Nama Population (point location)

Mud Nama Population (mapped polygon)

Special Status Species

Crotch's Bumble Bee

Coastal California Gnatcatcher

Grasshopper Sparrow

Least Bell's Vireo

Willow Flycatcher (migrant)

Yellow Warbler

Yellow-Breasted Chat

Coastal Whiptail

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*
***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

N
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0 300 600
Feet

Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
Special Status Species

Exhibit 4.3-9c

Santiago Creek Dam Improvement Project

PSOMAS

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TABLE 4.3-5
VEGETATION ACREAGE IMPACTS OF THE PROJECT[a]

Vegetation Types and Other Areas	Gray and Bramlet Vegetation Code	Existing (acres)	Permanent Impact (acres)	Temporary Impact (acres)	SCE Realignment Temporary Impact[b] (acres)	Total Permanent/ Temporary Impact (acres)	Additional Inundation Area (acres)
Coastal Sage Scrub							
Sagebrush Scrub	2.3.6	115.81	2.39	3.43	0.07	5.89	2.24
Disturbed Sagebrush Scrub	2.3.6	19.39	1.36	0.83	0.00	2.19	0.58
Sagebrush – Coyote Brush Scrub	2.3.12	10.59	0.00	0.03	0.00	0.03	0.06
Southern Cactus Scrub	2.4	17.48	0.00	0.00	0.00	0.00	0.19
Disturbed Southern Cactus Scrub	2.4	10.62	0.00	0.00	0.00	0.00	0.29
Disturbed Floodplain Sage Scrub	2.6	0.48	0.20	0.10	0.00	0.30	0.00
Subtotal Coastal Sage Scrub		*174.37*	*3.95*	*4.39*	*0.07*	*8.41*	*3.36*
Chaparral							
Toyon – Sumac Chaparral	3.12	29.91	2.52	2.18	0.00	4.70	0.18
Subtotal Chaparral		*29.91*	*2.52*	*2.18*	*0.00*	*4.70*	*0.18*
Grassland							
Annual Grassland	4.1	15.59	5.67	3.09	0.01	8.77	0.16
Ruderal	4.6	92.38	1.25	25.72	0.00	25.97	3.07
Subtotal Grassland		*107.97*	*5.92*	*28.81*	*0.01*	*34.74*	*3.23*
Riparian							
Riparian Herb	7.1	13.15	0.00	1.09	0.00	1.09	0.00
Southern Willow Scrub	7.2	0.43	0.43	0.00	0.00	0.43	0.00
Mulefat Scrub	7.3	1.50	1.02	0.33	0.00	1.35	0.00
Disturbed Mulefat Scrub	7.3	26.67	0.00	4.40	0.00	4.40	0.60
Southern Sycamore Riparian Woodland	7.4	20.48	0.00	0.00	0.00	0.00	0.96
Southern Sycamore Riparian Woodland/Coast Live Oak Riparian Forest	7.4/7.5	5.46	0.00	0.00	0.00	0.00	0.00
Southern Black Willow Forest	7.7	83.61	0.00	6.57	0.00	6.57	7.82
Disturbed Southern Black Willow Forest	7.7	35.34	0.00	0.73	0.00	0.73	0.28
Southern Black Willow Forest/Riparian Herb	7.7/7.1	26.01	0.00	22.16	0.00	22.16	0.00
Subtotal Riparian		*212.65*	*1.45*	*35.28*	*0.00*	*36.73*	*9.66*

TABLE 4.3-5
VEGETATION ACREAGE IMPACTS OF THE PROJECT[a]

Vegetation Types and Other Areas	Gray and Bramlet Vegetation Code	Existing (acres)	Permanent Impact (acres)	Temporary Impact (acres)	SCE Realignment Temporary Impact[b] (acres)	Total Permanent/ Temporary Impact (acres)	Additional Inundation Area (acres)
Woodland							
Coast Live Oak Woodland	8.1	31.09	0.48	2.78	0.05	3.31	0.50
Western Sycamore	8.x	0.36	0.05	0.21	0.00	0.26	0.00
Subtotal Woodland		*31.45*	*0.53*	*2.99*	*0.05*	*3.57*	*0.50*
Cliff and Rock							
Cliff	10.0	1.62	0.30	0.21	0.01	0.52	0.01
Subtotal Cliff and Rock		*1.62*	*0.30*	*0.21*	*0.01*	*0.52*	*0.01*
Lakes, Reservoirs, and Basins							
Open Water	12.1	313.28	0.33	139.08	0.00	139.41	0.00
Fluctuating Shoreline	12.2	26.31	0.00	13.04	0.00	13.04	0.00
Vegetated Fluctuating Shoreline	12.2	45.13	0.00	31.08	0.00	31.08	0.00
Subtotal Lakes, Reservoirs, and Basins		*384.72*	*0.33*	*183.20*	*0.00*	*183.53*	*0.00*
Watercourses							
Perennial Stream	13.1	6.97	0.00	0.00	0.00	0.00	0.00
Subtotal Watercourses		*6.97*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
Developed Areas							
Ornamental	15.5	20.77	0.03	1.21	0.00	1.24	0.47
Developed	15.6	20.98	2.44	2.59	0.00	5.03	1.80
Subtotal Developed Areas		*41.75*	*2.47*	*3.80*	*0.00*	*6.27*	*2.27*
Disturbed Areas							
Disturbed	16.1	25.42	0.03	3.95	0.00	3.98	0.83
Subtotal Disturbed Areas		*25.42*	*0.03*	*3.95*	*0.00*	*3.98*	*0.83*
Total		**1,016.83**	**17.50**	**264.81**	**0.14**	**282.45**	**20.04**

[a] The impact by landowner (i.e., IRWD or County of Orange) is included in the Biological Technical Report (Appendix C).

[b] Within the SCE Realignment (outside of the Project's permanent and temporary impact area), only trees and branches would be removed; other vegetation would not be temporarily removed but may be disturbed by access and movement of construction materials through the area.

The following analysis addresses "direct" and "indirect" impacts. Direct impacts are those that involve the initial loss of habitat or individuals due to vegetation clearing and construction-related activities. Indirect impacts would be those related to impacts on the adjacent habitat due to construction activities (e.g., fugitive dust, noise) or operation of a project (e.g., human activity).

IRWD has prepared the *Project Manual for the Santiago Creek Dam Improvements Project No. 01813, Code 7975* (Project Manual) describing specifications related to construction of the Project (IRWD 2024). The Project Manual identifies standard Best Management Practices (BMPs) that would be implemented during construction of the Project; these BMPs are considered Project Design Features (PDF). Project impacts were evaluated assuming the following PDFs would be implemented:

PDF BIO-1 **Worker Environmental Awareness Program (WEAP) Training.** Prior to the initiation of construction activities, IRWD will retain a qualified Biologist (i.e., Biological Monitor) to provide a WEAP training for construction personnel to review the mitigation measures and permit requirements applicable to the construction phase. The Biological Monitor will require trained personnel to sign the WEAP Log to document that they have been trained and understand the mitigation measures and permit conditions. The Biological Monitor will repeat the WEAP training as-needed for new construction personnel.

PDF BIO-2 **Project Limits.** Prior to construction, the Project limits will be clearly staked by IRWD or IRWD's Contractor and verified by the Biological Monitor.

PDF BIO-3 **NCCP/HCP Construction Minimization Measures.** As required by the NCCP/HCP, IRWD will follow standard construction-related minimization measures. These include removal of coastal sage scrub outside the California gnatcatcher breeding season (i.e., February 15 to July 15); pre-construction surveys for coastal California gnatcatchers; identification of coastal sage scrub habitat areas for protection as Environmentally Sensitive Areas (ESAs); and biological monitoring during all clearing of coastal sage scrub.

PDF BIO-4 **Tree Protection.** To protect western sycamore and coast live oak trees adjacent to Project impact areas, protective fencing will be placed around all western sycamore and coast live oak trees located within 50 feet of the impact areas. The tree protection area will be 1.5 times the dripline of the tree. No stockpiling of materials will occur within the tree protection areas. Limbs of western sycamore and coast live oak trees can be pruned to allow construction equipment access. If large branches need to be removed or if more than 10 percent of the total canopy would be affected, pruning will be supervised by a Certified Arborist retained by IRWD.

PDF BIO-5 **Nesting Bird Protection.** To the extent practicable, vegetation clearing will be conducted during the non-breeding season (i.e., September 16 to January 31). If vegetation clearing will be initiated during the breeding season for nesting birds/raptors (i.e., February 1–September 15), the construction activity will be conducted in compliance with the conditions set forth in the Migratory Bird Treaty Act. IRWD will retain a qualified Biologist to conduct a pre-construction survey for nesting birds and/or raptors within three days prior to clearing of any vegetation or work near existing structures. The nesting bird survey area will include a buffer of 100 feet around the work area for nesting birds and a buffer of 500 feet around the work area for nesting raptors. If an active nest is found, the Biologist will determine the appropriate protective buffer depending on the sensitivity of the species and

the nature of the construction activity. The protective buffer will be 25–100 feet for nesting birds; 300–500 feet for special status bird species or nesting raptors; and 0.5 mile for golden eagle or prairie falcon. No work will be conducted in the protective buffer until a qualified Biologist determines that the nest is no longer active. The Biologist will map any nests found during survey efforts and their protective buffers and will provide the map to IRWD and the Contractor.

PDF BIO-6 **Speed Limit During Construction.** The speed limit on construction access roads will be no more than 20 miles per hour. Signage will be posted throughout the construction areas and at multiple locations along the access road between the dam and the staging area at the upstream end of the lake. “Wildlife crossing” signage will also be posted along the access road between the dam and the staging area at the upstream end of the lake. Signage will be verified by the Biological Monitor.

PDF BIO-7 **Night Lighting.** Night lighting will be directed away from adjacent habitat areas to the extent practicable. Shielding of night lighting during construction will be incorporated to ensure that ambient lighting is directed away from sensitive habitat areas. Appropriate shielding of night lighting will be verified by the Biological Monitor.

PDF BIO-8 **Prevent Spread of Invasive Species.** Weed seeds entering the construction area via vehicles will be minimized by requiring construction vehicles to be washed prior to delivery to the Project site. Track-clean or other methods of vehicle cleaning will be used by the construction contractor to prevent weed seeds from entering/exiting the Project site on vehicles. Wattles used for erosion control will be biodegradable and certified as weed-free. Seed mixes and/or hydroseed applied to temporarily disturbed areas will consist of native species local to the Project vicinity. IRWD will retain a qualified Biologist to review and approve the seed mix. Use of measures to prevent the spread of invasive species will be verified by the Biological Monitor.

PDF BIO-9 **Treatment of Invasive Species.** During active construction, IRWD will retain a qualified Biologist to conduct surveys for non-native invasive plant species on the OC Parks target list on a monthly basis. If a target species is observed within 100 feet of the active construction area, IRWD will retain a qualified Contractor to remove and/or treat the non-native invasive plant species and to appropriately dispose of it. The target species will be removed/treated before they set seed.

For a period of two years following completion of construction, IRWD will retain a qualified Biologist to conduct surveys for non-native invasive plant species on the OC Parks target list on a quarterly basis. If a target species is observed within 100 feet of the previously disturbed areas, IRWD will retain a qualified Contractor to remove and/or treat the non-native invasive plant species and to appropriately dispose of it. The target species will be removed/treated before they set seed.

Threshold 4.3-1

Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Special Status Plant Species

One individual Braunton's milkvetch (federally Endangered, CRPR 1B.1) was observed in the sandy channel of Santiago Creek, upstream of the lake. This location is outside of the impact footprint for the Project (Exhibit 4.3-9). Therefore, there would be no impact on this species and no mitigation would be required.

One individual intermediate mariposa lily (CRPR 1B.2) was observed downstream of the dam; this individual would be impacted by the Project (Exhibit 4.3-9). Five individual intermediate mariposa lilies were observed in three locations upstream of the dam. All of the intermediate mariposa lily locations observed upstream of the dam are located outside of the impact footprint of the Project (Exhibit 4.3-9). Intermediate mariposa lily is a Covered Species under the NCCP/HCP; impacts up to 20 individuals are covered. Therefore, no mitigation would be required. To further minimize the impact, intermediate mariposa lily has been included with **MM BIO-1A** and **BIO-1C**.

Approximately 810 many-stemmed dudleya (CRPR 1B.2) individuals were observed in 2 locations downstream of the dam. Approximately 800 individuals were observed in the eastern portion of the plant survey area and 10 individuals were observed on a steep, east-facing cliff in the western portion of the plant survey area. The larger population of dudleya (800 individuals) is located outside of the impact footprint of the Project, but the smaller population (10 individuals) is located within the impact area (Exhibit 4.3-9). Although not formally listed under the federal or State Endangered Species Acts, many-stemmed dudleya is considered rare, threatened, or endangered within its range, and is fairly threatened in California (20–80 percent of its populations are threatened). However, the loss of 10 individuals of the 810 observed downstream of the dam represents 1.2 percent of the individuals observed; therefore, the loss of 10 individuals of many-stemmed dudleya downstream of the dam would be considered adverse but less than significant. To further minimize the impact, many-stemmed dudleya has been included with **MM BIO-1A** and **BIO-1C**.

Multiple populations of mud nama (CRPR 2B.2) were observed in the southern portion of Irvine Lake (Exhibit 4.3-9). This area experiences periodic inundation and was mapped as open water during vegetation mapping in 2020. At the time of the special status plant survey, the substrate was exposed and consisted of riparian herb vegetation; the species was growing in more open areas, including along disturbed roads/trails. Because the individuals covered a large area and the species is small in stature, the population size was estimated based on density and square footage of each mapped polygon. The total population was estimated to be between 3.5 and 5.5 million. Current Project design shows that the borrow areas would impact 7.08 acres (308,405 square feet) of the mapped mud nama, which is estimated to be 86 to 89 percent of the mud nama present in the BSA (3,063,453 to 4,589,250 individuals). This impact would be significant under CEQA Guidelines Section 15380. Once IRWD receives the results of the 2025 geotechnical investigations, Project Engineers would further refine the impact boundary to avoid and minimize impacts on mud nama to the extent feasible; IRWD is committed to avoiding at least 50 percent of the mud nama population (as mapped in 2022). Implementation of Mitigation Measures (MM) BIO-1A and BIO-1B would require pre-construction surveys by a qualified Botanist to flag the boundary of the population and to make recommendations for avoiding impacts to the extent

feasible. With implementation of **MM BIO-1A** through **BIO-1C**, which requires the avoidance of at least 50 percent of the mud nama populations (as mapped in 2022) and compensatory mitigation, impacts on mud nama would be considered less than significant.

Approximately 46 Coulter's matilija poppy (CRPR 4.2) clones were observed in 3 populations downstream of the dam, and one individual was observed along Santiago Creek upstream of the lake. These populations are all located within the temporary impact footprint of the Project (Exhibit 4.3-9). Coulter's matilija poppy is a Covered Species in the NCCP/HCP; therefore, no mitigation would be required. To further minimize the impact, Counter's matilija poppy has been included with **MM BIO-1A** and **BIO-1C**.

Additional Inundation

The additional inundation that would occur infrequently as a result of raising the spillway would be temporary and would occur near the existing waterline (i.e., within two feet). The additional inundation may temporarily affect two of the intermediate mariposa lily locations on the northwestern side of Irvine Lake and the mud nama located within the lakebed (Exhibit 4.3-9). The intermediate mariposa lily populations are already located at the outer edge of the existing inundation footprint of the lake. The additional inundation would be expected to be similar in duration to the current inundation of the lake edges; therefore, the effect of the additional inundation would be expected to be less than significant for the few intermediate mariposa lily locations affected. Suitable habitat for mud nama consists of areas that are intermittently inundated; the mud nama locations are in areas that are regularly inundated. Additional inundation would either have no effect or would be considered a beneficial impact for this species. Overall, impacts on special status plant species as a result of the additional inundation would be considered less than significant and no mitigation would be required.

Special Status Wildlife Species

Invertebrates

Focused surveys for Crotch's bumble bee were conducted throughout the BSA in summer 2024; one Crotch's bumble bee individual was observed (Psomas 2024a). Suitable habitat for this species is present throughout the BSA. A total of 52.66 acres (12.95 acres permanent; 39.58 acres temporary; 0.13 acre within the SCE realignment) of suitable habitat (i.e., coastal sage scrub, chaparral, grassland, woodland, and ornamental) for the Crotch's bumble bee would be removed to construct the Project (Table 4.3-5). This species is a Candidate for State listing; therefore, impacts on this species would be considered significant. **MM BIO-2** would require pre-construction surveys for Crotch's bumble bee, avoidance of active nest burrows during construction, and consultation with CDFW to obtain an Incidental Take Permit.

Monarch butterfly, a federally proposed Threatened species, was recorded as an incidental observation during the spring 2022 Quino checkerspot butterfly surveys and its hostplant, milkweed, was noted during spring botanical surveys. Monarch butterfly is not expected to overwinter in the BSA because the BSA is too far inland; therefore, the Project is not expected to impact an overwintering site and no mitigation would be required.

Additional Inundation

The additional inundation that would occur infrequently as a result of raising the spillway would be temporary and would occur near the existing waterline (i.e., within two feet). The additional inundation area would temporarily impact 7.74 acres of suitable habitat for Crotch's bumble bee (i.e., coastal sage scrub, chaparral, grassland, woodland, and ornamental) (Table 4.3-5). If the

area where Crotch's bumble bees forage was inundated, it is assumed that they would forage on higher ground, and once the water subsided, foraging habitat would again be available to them. Because the inundation would only affect a strip of habitat up to two feet in elevation, and there is a substantial amount of habitat available adjacent to the additional inundation area, the inundation would be considered a less than significant impact on foraging and no mitigation would be required.

Fish

White sturgeon is stocked in Irvine Lake by OC Parks. The Project would dewater the lake prior to construction for a period of up to four years. Dewatering the lake would result in the loss of all non-native fish, including the white sturgeon. White sturgeon stocked in the lake are sterile individuals and isolated from naturally occurring populations; therefore, the loss of these individuals would not affect the viability of the species since these individuals are not reproducing and were intended to be taken by angling. Therefore, the impact on white sturgeon would be considered less than significant and no mitigation would be required.

Santa Ana speckled dace does not currently occur in Santiago Creek and/or Irvine Lake. Therefore, there would be no impact on this species and no mitigation would be required.

If CDFW implements a translocation of Santa Ana speckled dace to an area along Santiago Creek upstream of Irvine Lake, the translocated individuals may or may not be successful (i.e., survive and reproduce). Following the translocation, CDFW would monitor the translocated individuals to determine whether they become an established self-sustaining population. If the translocated individuals are successful in maintaining their population, they could move downstream along Santiago Creek to the upstream (eastern) end of the BSA prior to the initiation of the Project. Santa Ana speckled dace would not be expected to enter Irvine Lake as their preferred habitat is streams; they do not occur in lakes (except at the confluence with the stream). However, while the lake is dewatered, a portion of the flow could act as a stream, which the dace could then occupy temporarily until the lake is refilled. Project intake pipelines for dewatering and bypass pipelines around the work area would all include fish screens. The potential that the Project would impact translocated Santa Ana speckled dace is considered low because: (1) the translocated dace may not survive until the Project begins; (2) the translocated dace may not move downstream into the lake area where the Project construction would be occurring; (3) the Project bypass pipelines and dewatering pipelines would include fish screens; and (4) the area where active construction would be occurring would be dry. Therefore, the potential impact on translocated Santa Ana speckled dace is considered less than significant, and no mitigation would be required.

Additional Inundation

The additional inundation that would occur infrequently as a result of raising the spillway would be temporary and would occur near the existing waterline (i.e., within two feet). The additional inundation area would increase the amount of habitat available for fish species. Therefore, the additional inundation would be considered a beneficial effect, and no mitigation would be required.

Amphibians

Focused surveys for the arroyo toad were conducted downstream of the dam in spring 2020 and upstream of Irvine Lake in 2022; no arroyo toads were observed (Psomas 2020a, 2022c). Therefore, there would be no impact on this species and no mitigation would be required.

Focused surveys for the western spadefoot toad were conducted throughout the BSA in spring 2025; no western spadefoot toads were observed (Psomas 2025 [in preparation]). Therefore, there would be no impact on this species and no mitigation would be required.

Coast Range newt has potential to occur in the BSA. The Project would not impact breeding habitat for this species (i.e., stream habitat with sufficient water). However, this species use the upland habitats for foraging and aestivation. A total of 88.67 acres (14.67 acres permanent; 73.86 acres temporary; 0.14 acre within the SCE realignment) of suitable habitat for these species (i.e., coastal sage scrub, chaparral, grassland, riparian, woodland, and cliff) would be removed to construct the Project (Table 4.3-5). Although not formally covered, Coast Range newt also benefits from habitats conserved in the Reserve System. Due to the limited amount of habitat loss relative to the availability of habitat for Coast Range newt in the region, and because there would be no impact on breeding locations, impacts on this species would be considered adverse but less than significant; no mitigation would be required.

Additional Inundation

The additional inundation that would occur infrequently as a result of raising the spillway would be temporary and would occur near the existing waterline (i.e., within two feet). The additional inundation area would temporarily impact 16.94 acres of suitable habitat for special status amphibian species (i.e., coastal sage scrub, chaparral, grassland, riparian, woodland, and cliff) (Table 4.3-5). Amphibians can occur in aquatic or upland habitat; therefore, the additional inundation is not expected to affect them. Therefore, the additional inundation would be considered less than significant, and no mitigation would be required.

Reptiles

Focused surveys for southwestern pond turtle were conducted throughout the BSA in summer 2024; no southwestern pond turtles were observed (Psomas 2024b). Therefore, there would be no impact on this species and no mitigation would be required.

Two-striped garter snake is known to occur in riparian and open water habitats along Santiago Creek both upstream and downstream of the dam (Psomas 2020a, 2022c). A total of 220.26 acres (1.78 acres permanent; 218.48 acres temporary) of suitable riparian, fluctuating shoreline, vegetated fluctuating shoreline, and open water habitat for this species would be removed to construct the Project (Table 4.3-5). Although not formally covered by the NCCP/HCP, two-striped garter snake benefits from habitats conserved in the Reserve System. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on this species would be considered adverse but less than significant, and no mitigation would be required.

Orange-throated whiptail and coastal whiptail were incidentally observed along Santiago Creek during focused surveys (Psomas 2022c). Additionally, coast horned lizard, southern California legless lizard, California glossy snake, coast patch-nosed snake, and red diamond rattlesnake have potential to occur in habitats throughout the BSA. A total of 88.67 acres (14.67 acres permanent; 73.86 acres temporary; 0.14 acre within the SCE realignment) of suitable habitat for these species (i.e., coastal sage scrub, chaparral, grassland, riparian, woodland, and cliff) would be removed to construct the Project (Table 4.3-5). Of these species, coast horned lizard, orange-throated whiptail, coastal whiptail, and red diamond rattlesnake are Covered Species in the NCCP/HCP; upland habitats have been conserved in the Reserve System. Although not formally covered, southern California legless lizard, California glossy snake, and coast patch-nosed snake also benefit from habitats conserved in the Reserve System. Due to the limited amount of habitat

loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than significant, and no mitigation would be required.

Additional Inundation

The additional inundation that would occur infrequently as a result of raising the spillway would be temporary and would occur near the existing waterline (i.e., within two feet). The additional inundation would temporarily impact up to 16.94 acres of habitat for special status reptile species (i.e., coastal sage scrub, chaparral, grassland, riparian, woodland, and cliff) in the additional inundation area (Table 4.3-5). If the area were inundated, there would be no effect on two-striped garter snake, which could use the open water habitat. It is assumed that the other special status reptiles would move to higher ground, and once the water subsided, the habitat would again be available to them. Because the inundation would only affect a strip of habitat up to two feet in elevation, and there is a substantial amount of habitat available adjacent to the additional inundation area, the inundation would be considered a less than significant impact on special status reptiles and no mitigation would be required.

Birds

The federally Threatened coastal California gnatcatcher is known to occur throughout the coastal sage scrub habitats in the BSA. One pair of gnatcatchers successfully nested downstream of Santiago Creek Dam and multiple coastal California gnatcatchers were observed in habitat around Irvine Lake, upstream of the dam (Exhibit 4.3-9; Psomas 2020b, 2022d, 2024a). Therefore, coastal California gnatcatcher presence should be assumed throughout coastal sage scrub habitats in the BSA. A total of 8.41 acres (3.95 acres permanent; 4.39 acres temporary; 0.13 acre within the SCE realignment) of suitable habitat for this species (i.e., coastal sage scrub) would be removed to construct the Project (Table 4.3-5). Additionally, during construction, this species would be disturbed by construction noise for up to 20 hours per day (including night work) periodically the breeding season for approximately four years. During construction, jackhammering and concrete crushing would occur during demolition of the existing spillway and drilling into bedrock would occur to construct the new spillway. In the absence of noise minimization measures, all coastal sage scrub within 500 feet of construction activities would be indirectly affected by construction noise[8], with the most noise-intensive effects on coastal sage scrub occurring downstream of the dam. Any impact on coastal California gnatcatcher would be considered significant. This species is a Covered Species under the NCCP/HCP; therefore, take of coastal sage scrub is fully covered by participation in the NCCP/HCP for IRWD. Additionally, the NCCP/HCP requires standard construction minimization measures during removal of coastal sage scrub habitat to protect NCCP/HCP Covered Species (**PDF BIO-3**). Implementation of **MM BIO-3** would ensure that IRWD's take is accounted for according to the NCCP/HCP.

The federally and state Endangered least Bell's vireo is known to occur in riparian habitats along Santiago Creek and the upstream edges of Irvine Lake (Exhibit 4.3-9; Psomas 2022e). Least Bell's vireo was absent downstream of the dam during the 2020 focused surveys (Psomas 2020c); but was incidentally observed downstream of the dam during the 2024 focused surveys for Crotch's bumble bee (Psomas 2024a); riparian habitat downstream of the dam is not as well-developed. Therefore, least Bell's vireo presence should be assumed throughout riparian habitats at the upper end of Irvine Lake and along Santiago Creek upstream of the lake; least Bell's vireo has potential to occur in riparian habitats downstream of the dam. A total of 36.73 acres (1.45 acres permanent, 35.28 acres temporary) of suitable riparian habitat for the least Bell's vireo would be removed to construct the Project (Table 4.3-5). Additionally, during construction, this

[8] A detailed analysis of noise impacts on these sensitive habitat areas will be included in the Noise section of the Environmental Impact Report.

species would be disturbed by construction noise for up to 20 hours per day (including night work) periodically during the breeding season for approximately four years. During construction, concrete crushing would occur in the staging area at the upstream end of Irvine Lake. If least Bell's vireo occurred downstream of the dam, they would also be subject to jackhammering, concrete crushing, and drilling into bedrock to demolish/construct the new spillway, as described above for coastal California gnatcatcher. In the absence of noise minimization measures, all riparian habitat within 500 feet of construction would be indirectly affected by construction noise[9]. Any impact on least Bell's vireo would be considered significant. The least Bell's vireo is a Conditionally Covered Species under the NCCP/HCP. **MM BIO-4** would ensure that riparian habitat impacted by the Project would be replaced at no less than a 1:1 ratio. **MM BIO-5** would require removal of riparian habitat outside the nesting season, implementation of appropriate noise minimization measures, and consultation with USFWS and CDFW.

The coastal cactus wren and Southern California rufous-crowned sparrow were observed in coastal sage scrub habitats and grasshopper sparrow was observed in grassland habitats in the BSA (Exhibit 4.3-9; Psomas 2020b, 2022d, 2022e). Additionally, loggerhead shrike and California horned lark have potential to occur in upland habitats throughout the BSA. A total of 47.85 acres (12.39 acres permanent; 35.38 acres temporary; 0.08 acre within the SCE realignment) of suitable habitat for these species (i.e., coastal sage scrub, chaparral, and grassland) would be removed to construct the Project (Table 4.3-5). Of these species, coastal cactus wren and Southern California rufous-crowned sparrow are Covered Species in the NCCP/HCP; upland habitats have been conserved in the Reserve System. Although not formally covered, loggerhead shrike, California horned lark, and grasshopper sparrow also benefit from habitats conserved in the Reserve System. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than significant, and no mitigation would be required.

The yellow-breasted chat and yellow warbler were observed in riparian habitats in the BSA (Exhibit 4.3-9; Psomas 2022d, 2022e). A total of 36.73 acres (1.45 acres permanent; 35.28 acre temporary) of suitable habitat for these species (i.e., riparian) would be removed to construct the Project (Table 4.3-5). Although not formally covered by the NCCP/HCP, these species also benefit from habitats conserved in the Reserve System. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than significant, and no mitigation would be required.

A pair of bald eagles, State Endangered and Fully Protected, was incidentally observed nesting in a canyon adjacent to the BSA during focused surveys conducted around Irvine Lake in 2022 (Exhibit 4.3-9, Psomas 2022d, 2022e). CDFW included the location on a map of breeding territories (1990 to 2016); therefore, this location has been known since at least 2016. The 2022 nesting location was over 1,200 feet (0.22 mile) from the borrow site/staging area, which is the closest Project activity[10] and approximately 1.25 miles from Santiago Creek Dam, where construction would be concentrated. Therefore, the nest would not be expected to be directly or indirectly impacted by the construction activities or noise. However, the entire lake would be temporarily dewatered (312.11 acres of open water) and construction would affect a total of 183.53 acres within the lake (0.33 acre permanent; 183.20 acres temporary) that provide suitable foraging habitat for this species (i.e., open water, fluctuating shoreline, and vegetated fluctuating shoreline) to construct the Project (Table 4.3-5). During construction, the lake would be dewatered and fish would no longer be an available food source for this breeding pair. Waterfowl may also

[9] A detailed analysis of noise impacts on these sensitive habitat areas will be included in the Noise section of the Environmental Impact Report.

[10] The Federal Bald Eagle Act states that a permit to impact the nest would be needed if construction would be within 660 feet of an active nest.

be reduced in numbers once the lake is drained, although they may still be present upstream and downstream of the impact area. Throughout the winter storm season, when the lake is functioning for flood control, open water may be available for a limited time following storms but would be kept in a dewatered condition throughout the construction period and fish would not be stocked. When the lake holds limited water following storms, it could be used by waterfowl. The temporary loss of the lake habitat over four years of construction may cause the bald eagles to leave Irvine Lake for the duration of construction. However, they (or a new pair) would be expected to reoccupy the lake following completion of the Project once the lake is restocked with fish. This impact would be considered significant. **MM BIO-6** would require consultation with USFWS and CDFW to determine the appropriate monitoring strategy during construction.

White-tailed kite and American peregrine falcon were observed in the BSA during surveys. In addition, Cooper's hawk, ferruginous hawk (during winter and migration), golden eagle, prairie falcon, long-eared owl, and burrowing owl have potential to occur in the BSA for foraging. A total of 137.98 acres (14.73 acres permanent; 123.11 acres temporary; 0.14 acre within the SCE realignment) of suitable foraging habitat for these species (i.e., coastal sage scrub, chaparral, grassland, riparian, woodland, cliff, fluctuating shoreline, vegetated fluctuating shoreline, ornamental, and disturbed) would be removed to construct the Project (Table 4.3-5). However, during construction, the lake would be dewatered and an additional 128.58 acres of lake bottom (areas currently mapped as open water outside of the impact areas) would be temporarily available as foraging habitat for these species, though these areas may provide limited prey since there would not be any vegetation cover. The permanent loss of 14.73 acres of foraging habitat for these raptors would cumulatively contribute to the ongoing regional loss of foraging habitat for these species. Of these species, American peregrine falcon is a Covered Species, while golden eagle and prairie falcon are Conditionally Covered, by the NCCP/HCP; upland habitats have been conserved in the Reserve System. Although not formally covered, Cooper's hawk, ferruginous hawk, white-tailed kite, long-eared owl, and burrowing owl also benefit from habitats conserved in the Reserve System. Therefore, this impact would be considered adverse but less than significant because a substantial amount of foraging habitat for these species is available immediately adjacent to the Project in the Reserve System.

The Cooper's hawk, white-tailed kite, golden eagle, prairie falcon, American peregrine falcon, long-eared owl, and burrowing owl also have potential to nest within or adjacent to the BSA. Impacts on any active raptor nest (common or special status species) would be considered a violation of the MBTA and Sections 3503, 3503.5, and 3513 of the *California Fish and Game Code*. Additionally, these species could be disturbed by noise adjacent to construction areas. Standard pre-construction surveys and nesting bird protection would be implemented to ensure consistency with the MBTA and *California Fish and Game Code* (**PDF BIO-5**). Therefore, impacts on nesting raptors would be less than significant assuming compliance with regulatory requirements.

Additional Inundation

The additional inundation that would occur infrequently as a result of raising the spillway would be temporary and would occur near the existing waterline (i.e., within two feet). The additional inundation would temporarily impact up to 17.41 acres of foraging and nesting habitat for special status bird species (i.e., coastal sage scrub, chaparral, grassland, woodland, cliff, and ornamental) in the additional inundation area (Table 4.3-5). If the area were inundated, it is assumed that special status birds would move to higher ground, and once the water subsided, the habitat would again be available to them. Because the inundation would only affect a strip of habitat up to two feet in elevation, and there is a substantial amount of habitat available adjacent to the additional inundation area, the inundation would be considered a less than significant impact on special status birds and no mitigation would be required.

The additional inundation areas would be expected to be inundated during the storm season, which is generally outside the peak bird breeding season (although there is some overlap in early spring). The inundation would be associated with natural storm events, which could lead to a natural loss of nests early in the spring. The potential inundation of nests is expected to be extremely limited because (1) it would only affect species nesting within two feet in elevation above the current maximum water line; (2) it would only affect species nesting in February and March; and (3) it would only occur approximately once every several years. Therefore, the effect on nesting birds would be expected to be less than significant and no mitigation would be required.

Mammals

Mountain lions are known to occur throughout the vicinity of the BSA and mountain lion sign (i.e., tracks) were observed downstream of Santiago Creek Dam during focused surveys. A total of 88.71 acres (14.67 acres permanent; 73.86 acres temporary; 0.14 acre within the SCE realignment) of suitable habitat for this species (i.e., coastal sage scrub, chaparral, grassland, riparian, woodland, and cliff) would be removed to construct the Project (Table 4.3-5). The mountain lion is proposed for State listing due to fragmentation of habitat that isolates populations. Although the Project would permanently impact 14.67 acres of habitat downstream of the dam along Santiago Creek, it would be in the same location as the existing dam structure; it would not create a new barrier to movement. Additionally, there is extensive habitat in the Reserve System immediately surrounding the Project site that would be available for use by mountain lion. Although mountain lion may avoid the dam area and borrow site/staging area during construction that occurs at night, it would be expected to move along the edge of the Project, using habitat not impacted by the Project, during construction. Therefore, the Project would not be expected to interfere with movement by mountain lions. It is possible that mountain lions may choose to move along the roads despite the construction, which would increase the potential for wildlife strikes along the roadways at night. Speed limits and wildlife crossing signage would be posted along access roads (**PDF BIO-6**). Therefore, the impact on mountain lions would be less than significant.

Northwestern San Diego pocket mouse and San Diego desert woodrat may occur in the BSA. A total of 51.94 acres (13.22 acres permanent; 38.58 acres temporary; 0.14 acre within the SCE realignment) of suitable habitat for these species (i.e., coastal sage scrub, chaparral, grassland, woodland, and cliff) would be removed to construct the Project (Table 4.3-5). Additionally, vibration from construction could cause the collapse of pocket mouse burrows in the adjacent habitat as well as cause woodrats to flee their middens. Individuals could also potentially move through the construction area and be hit by construction vehicles. San Diego desert woodrat is a Covered Species in the NCCP/HCP; upland habitats have been conserved in the Reserve System. Although not formally covered, northwestern San Diego pocket mouse also benefits from habitats conserved in the Reserve System. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than signific/ant, and no mitigation would be required.

Six special status bat species have potential to forage in the BSA: pallid bat, pocketed free-tailed bat, big free-tailed bat, western red bat, western yellow bat, and western mastiff bat. A total of 137.98 acres (14.73 acres permanent; 123.11 acres temporary; 0.14 acres within the SCE realignment) of suitable foraging habitat for these species would be removed to construct the Project (Table 4.3-5). Many bat species prefer to forage over water. During construction, Irvine Lake (312.11 acres) would be dewatered and the creek would be routed around the construction area. Although this could create lower quality foraging habitat during construction, it is expected that open water (i.e., preferred foraging habitat) would be available upstream and/or downstream of the work areas during construction. These impacts would be considered adverse but less than significant because a substantial amount of foraging habitat for these species would continue to

be available immediately adjacent to the Project in the Reserve System throughout the Project. Following completion of the Project, open water would again be available within Irvine Lake. Therefore, no mitigation would be required for the loss of bat foraging habitat.

Pallid bat, pocketed free-tailed bat, big free-tailed bat, western red bat, western yellow bat, and western mastiff bat also have potential to roost in the BSA. Bats may roost in the rocky outcroppings along Santiago Creek, in crevices of structures (e.g., dam structure, spillway and outlet tower, and dam keeper's house), or in large oak or sycamore trees in the BSA. A total of 3.57 acre (0.53 acre permanent; 2.99 acres temporary; 0.05 acre within the SCE realignment) of suitable tree roosting habitat would be removed to construct the Project (Table 4.3-5). This impact would be considered adverse but less than significant because a substantial amount of tree roosting habitat would continue to be available immediately adjacent to the Project in the Reserve System during the Project. A total of 0.52 acre (0.30 permanent; 0.21 acre temporary; 0.01 acre within the SCE realignment) of suitable cliff roosting habitat would be removed to construct the Project (Table 4.3-5). Additionally, during the project, a portion of the dam, spillway, outlet tower structure, and dam keeper's house that may be used by bats that roost in crevices would not be available for roosting. Construction activities could directly impact roosting individuals. Impacts on a maternal roost (i.e., where breeding occurs) or a communal roost would be considered to meet the requirements of CEQA Guidelines Section 15380. **MM BIO-7** would require pre-construction surveys and bat exclusion.

Additional Inundation

The additional inundation that would occur infrequently as a result of raising the spillway would be temporary and would occur near the existing waterline (i.e., within two feet). The additional inundation would also temporarily impact up to 16.94 acres of habitat for special status mammals (i.e., coastal sage scrub, chaparral, grassland, riparian, woodland, and cliff) in the additional inundation area (Table 4.3-5). This may increase the amount of preferred foraging habitat (i.e., open water) for bat species. If the area were inundated, it is assumed that terrestrial mammals would move to higher ground, and once the water subsided, the habitat would again be available to them. Because the inundation would only affect a strip of habitat up to two feet in elevation, and there is a substantial amount of habitat available adjacent to the additional inundation area, the inundation would be considered a less than significant impact on special status mammals and no mitigation would be required.

Indirect Impacts

Noise

The BSA includes some periodic noise events, including consistent low helicopter flights and landings and periodic special events in the adjacent park (e.g., concerts). Noise levels in the BSA would increase substantially over present levels during construction of the Project due to construction vehicles, demolition of the existing spillway, concrete crushing, and drilling into bedrock to secure the new spillway and dam embankment. A detailed noise analysis has been prepared for the Project. During construction, temporary noise impacts have the potential to disrupt foraging, nesting, roosting, and denning activities for a variety of wildlife species. These impacts are considered adverse, but not significant for most wildlife species, because the Project would not impact a substantial population of these species. Noise from construction activities may cause birds adjacent to the work area to abandon their territory or may discourage individuals from selecting habitat adjacent to the work area due to construction noise and human activity. Construction activities could increase noise in the immediate vicinity and could interfere with communication between a pair that could affect their nest success. Noise impacts would be considered significant for the coastal California gnatcatcher, least Bell's vireo, and other nesting

raptors. With the implementation of **PDF BIO-3** and **MM BIO-5**, indirect noise impacts on the coastal California gnatcatcher and least Bell's vireo would be considered less than significant. With implementation of standard pre-construction surveys and nesting bird protection to ensure consistency with the MBTA and *California Fish and Game Code* (**PDF BIO-5**), indirect impacts on nesting birds and raptors would be reduced to less than significant.

Night Lighting

Night lighting may impact the behavioral patterns of nocturnal and crepuscular (i.e., active at dawn and dusk) wildlife adjacent to night lighting. Of greatest concern is the effect on small, ground-dwelling animals that use the darkness to hide from predators and bats, owls, and mountain lion, which are specialized night foragers. Following the Project, the spillway and outlet tower would not include night lighting; therefore, there would be no impact due to night lighting during operation of the Project. However, construction activities would include regular night work; therefore, night lighting during construction could negatively impact nocturnal and crepuscular wildlife species within the BSA as well as in the surrounding adjacent open space. The Project Manual includes specifications to minimize night lighting on sensitive habitat areas (**PDF BIO-7**).

Human Activity

During construction, there would be an increase in human activity (i.e., vehicle and foot traffic), which would increase the disturbance of natural open space adjacent to construction areas. Human disturbance could disrupt normal foraging and breeding behavior of wildlife adjacent to construction areas, diminishing the value of the habitat. With implementation of standard construction minimization measures (**PDF BIO-3**), **MM BIO-5**, standard pre-construction surveys and nesting bird protections (**PDF BIO-5**), and specifications to ensure night lighting is minimized near sensitive habitat (**PDF BIO-7**), indirect impacts due to human activity would be reduced to less than significant. Additionally, a WEAP training would be implemented to ensure that construction personnel are trained on the environmental sensitivity of the area (**PDF BIO-1**).

The Project is not expected to increase human activity during operation. Therefore, there would be no long-term impact and no mitigation would be required.

Increased Wildfire Risk

Fires are a natural part of the landscape in California; however, with the changing weather patterns brought by climate change, the fire season is coming earlier and ending later than in the past (USFS 2018). In the last five years (October 2019 - October 2023), there have been 6,884 wildfires that have burned 1,570,571 acres in California (CalFire 2023). Drought or extended periods of low rainfall can dry out fuel, increasing its risk of burning. Periods of high rainfall decrease fire risk because there is more moisture in the vegetation; however, years of high rainfall increase the fuel load with growth of vegetation and weeds. In the Project region, Santa Ana wind conditions also increase the risk of fire with dry, gusty winds (CalFire 2023). According to the National Park Service, approximately 85 percent of wildfires are caused by humas. Human-caused wildfires are due to campfires left unattended, the burning of debris, equipment use and malfunctions, negligently discarded cigarettes, and intentional acts of arson (NPS 2022). The location of the Project is an important factor in understanding the extent of wildfire risk and how much potential for damage there is if a fire starts. Risk is higher when there are hot temperatures, low humidity, and high winds (i.e., "red flag warning" weather conditions). Risk is also higher near dry, ignitable vegetation (e.g., coastal sage scrub, chaparral, grassland, and ruderal), and hills or mountainous topography (Lordson 2020). Public Resources Code Sections 4427, 4428, 4431, and 4442 prohibit the use of combustion engines near forest, brush, or grass at any time of year

when ground litter or vegetation would sustain the spread of fire. A detailed wildfire analysis has been prepared for the Project and is included in Section 4.17, Wildfire.

During construction, construction equipment or personal vehicles have potential to accidentally ignite vegetation, starting a wildfire. If not contained quickly, the fire could spread through adjacent habitat areas, damaging the NCCP/HCP Reserve. The loss of habitat may affect listed species (e.g., coastal California gnatcatcher). All construction personnel would be trained on the environmental sensitivity of the area prior to construction (**PDF BIO-1**) and the Biological Monitor would be present during vegetation clearing (**PDF BIO-3**). Therefore, the increased fire risk would be considered less than significant.

Impact Conclusion: *The Project has potential to impact special status plant and wildlife species. Significant or potentially significant impacts were identified for mud nama, Crotch's bumble bee, coastal California gnatcatcher, least Bell's vireo, bald eagle, and roosting bats. Additionally, wildlife using habitat adjacent to the Project could be indirectly impacted by construction noise, night lighting during construction, dust, and invasive plant species. Assuming implementation of **PDF BIO-1** through **PDF BIO-9** and with implementation of **MM BIO-1** through **MM BIO-7** these impacts would be reduced to less than significant and the potential impacts on special status species would be less than significant, pursuant to Threshold 4.3-1.*

Threshold 4.3-2

Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?

Coastal Sage Scrub

A total of 8.41 acres (3.95 acres permanent; 4.39 acres temporary; 0.07 acre within the SCE realignment) of coastal sage scrub vegetation would be removed to construct the Project (Table 4.3-5, Exhibit 4.3-8). Coastal sage scrub vegetation types that would be impacted include sagebrush scrub, disturbed sagebrush scrub, sagebrush-coyote brush scrub, and disturbed floodplain sage scrub. The NCCP/HCP protects coastal sage scrub in the Central–Coastal Subregion because it provides habitat for Covered Species. Additionally, disturbed floodplain sage scrub is considered a sensitive natural community by CDFW.

The Project would also temporarily impact up to 3.36 acres of sage scrub vegetation types in the additional inundation area (Exhibit 4.3-8); inundation effects are discussed further below. Coastal sage scrub in the additional inundation area includes sagebrush scrub, disturbed sagebrush scrub, sagebrush-coyote brush scrub, southern cactus scrub, and disturbed southern cactus scrub. The NCCP/HCP protects coastal sage scrub in the Central–Coastal Subregion because it provides habitat for Covered Species. Additionally, southern cactus scrub and disturbed southern cactus scrub are considered sensitive natural communities by CDFW.

Per Section 5.11 of the NCCP/HCP, infrastructure is an existing use that is allowed within the Reserve. Take of coastal sage scrub is fully covered by participation in the NCCP/HCP for IRWD. Additionally, the NCCP/HCP requires avoidance and minimization measures during removal of coastal sage scrub habitat to protect NCCP/HCP Covered Species. Implementation of **MM BIO-3** would ensure that IRWD's take is accounted for according to the NCCP/HCP.

Riparian

A total of 36.73 acres (1.45 acre permanent; 35.28 acres temporary) of riparian vegetation would be removed to construct the Project (Table 4.3-5, Exhibit 4.3-8). Riparian vegetation types that would be impacted include riparian herb, southern willow scrub, mulefat scrub, disturbed mulefat scrub, southern black willow forest, disturbed southern black willow forest, and southern black willow forest/riparian herb. Impacts on riparian vegetation types are considered significant because federal and State resource agencies (i.e., USACE, CDFW, and RWQCB) have given these vegetation types special status due to their high biological value; jurisdictional areas are discussed below under Threshold 4.3-3. Riparian vegetation types also provide potential habitat for federal and State-listed species. Additionally, southern willow scrub, southern black willow forest, disturbed southern black willow riparian forest, and southern black willow riparian forest/riparian herb are also considered sensitive natural communities by CDFW.

The Project would also temporarily impact up to 9.66 acres of riparian vegetation types in the additional inundation area (Exhibit 4.3-8); inundation effects are discussed further below. Riparian vegetation types in the additional inundation area include disturbed mulefat scrub, southern sycamore riparian woodland, southern black willow forest, and disturbed southern black willow forest. As described above, these vegetation types have been given special status due to their high biological value and potential to support federal and State-listed species. Additionally, southern sycamore riparian woodland, southern black willow forest, and disturbed southern black willow forest are considered sensitive natural communities by CDFW.

Implementation of **MM BIO-4** would ensure that compensatory mitigation such as establishment of on-site or off-site riparian habitat, payment of in-lieu mitigation fees, and/or preservation of off-site riparian habitat at IRWD lands is implemented to mitigate for the loss of riparian vegetation types.

Woodland

A total of 3.57 acre (0.53 acre permanent; 2.99 acres temporary; 0.05 acre within the SCE realignment) of woodland vegetation would be removed to construct the Project (Table 4.3-5, Exhibit 4.3-8). This may include trimming of trees along access roads. Woodland vegetation types that would be impacted include coast live oak woodland and western sycamore. Western sycamore is considered a sensitive vegetation community by CDFW.

The Project would also temporarily impact up to 0.50 acre of woodland vegetation types in the additional inundation area (Exhibit 4.3-8); inundation effects are discussed further below. Woodland vegetation in the additional inundation area is coast live oak woodland. Coast live oak woodland is not considered a sensitive natural community by CDFW. Impacts on coast live oak woodland would be considered less than significant; therefore, no mitigation would be required for the vegetation community. However, portions of the woodland are within jurisdictional areas (see Threshold 4.3-3 below).

Implementation of **MM BIO-4** would ensure that compensatory mitigation such as establishment of on-site or off-site riparian habitat, payment of in-lieu mitigation fees, and/or preservation of off-site riparian habitat at IRWD lands is implemented to mitigate for the loss of woodland vegetation types. Implementation of **MM BIO-8** would ensure that any western sycamore removed would be replaced. Standard tree protection measures to fence coast live oak and western sycamores within or near the work area would also be implemented (**PDF BIO-4**).

Indirect Impacts

Increased Inundation

Lake level depends on rainfall of the season, intensity of storm events, and rate of releases. Following the Project, dam operations would not substantially change; the way that water would be held in the reservoir throughout the year would be expected to be the same as the existing conditions. The Project would raise the spillway height by six feet, which is two feet above the current maximum water storage elevation with flashboards installed. Thus, the area between the 795.9-foot elevation contour and the 797.9-foot elevation around the perimeter of Irvine Lake (referred to as "additional inundation area") would be infrequently inundated for a period of up to approximately 45 days (Exhibit 4.3-8). In the last 20 years, Irvine Lake has been at the maximum capacity of 795.9 four times. Approximately the same frequency would be expected following implementation of the Project, but it would depend on frequency and intensity of storms and operations of the lake.

When the lake is at the maximum elevation, a narrow strip of riparian vegetation would be inundated infrequently (9.66 acres of riparian; Exhibit 4.3-8; Table 4.3-5). These areas are dominated by mule fat and willows, which have a high to very high tolerance to inundation, assuming shoots (i.e., trunks, stems, leaves) are not fully submerged (Glentz et al. 2006, Tallent-Halsell and Walker 2002, Francis et al. 2005, Good et al. 1992). Glentz et al. (2006) found that willows can withstand a flooding duration for as much as 40% of the growing season (spring/summer); the BSA receives most rainfall outside the growing season in the winter and early spring when willows are dormant. Therefore, the infrequent additional inundation is not expected to affect the riparian vegetation that currently exists around the lake. While the OHWM may change after raising the spillway, creating some additional jurisdiction, riparian vegetation and hydric soils are not expected to be created where they do not currently occur based on the infrequency of the additional inundation. Jurisdictional areas within Irvine Lake, Santiago Creek, and Drainages 4, 5, 6, 7, 9, 12, and 15 fall within the additional inundation area (see Threshold 4.3-3 below).

When the lake is at the maximum elevation, a narrow strip of upland vegetation would be inundated infrequently (3.36 acres coastal sage scrub, 0.18 acre chaparral, and 0.50 acre of coast live oak woodland; Exhibit 4.3-8, Table 4.3-5). Species in these habitat types are not adapted to wet conditions and could be affected by extended inundation (i.e., longer than one week). Normally, shrub and tree roots get air from pore spaces in the soil, but when soils are inundated, air spaces are filled with water and roots experience anaerobic conditions. This can result in a delay in leafing out, branch dieback, smaller than normal leaves, or wilted leaves. Once the inundation has subsided, shrubs and trees should resume normal growth and their growth may catch up by spring or summer. However, if a flooded shrub/tree does not resume normal growth, the roots may have been damaged by the inundation (Cregg 2013). The infrequent additional inundation affects two feet in elevation, which may be several feet wide in flat areas, but less than a foot on steeper slopes. The upland habitat types within the additional inundation areas are mostly located on slopes, which means a narrower area of upland vegetation would be affected around most of the lake (Exhibit 4.3-8). Therefore, if a shrub/tree is affected, it would be expected to only affect a few shrubs or a small portion of the roots and associated canopy of trees. Potential effects on chaparral due to infrequent additional inundation would be considered adverse but less than significant in relation to the total amount of chaparral vegetation available in the Project region. Coastal sage scrub and oak woodlands are Covered Habitats under the NCCP/HCP; upland habitats have been conserved in the Reserve System. Take of coastal sage scrub is fully covered by participation in the NCCP/HCP for IRWD. Implementation of **MM BIO-3** would ensure that IRWD's take is accounted for according to the NCCP/HCP.

When the lake is at the maximum elevation, a narrow strip of nonnative vegetation would be inundated infrequently (3.23 acres grassland [annual grassland, ruderal] and 0.47 acres of ornamental; Exhibit 4.3-8, Table 4.3-5). Like the upland vegetation, these vegetation types may be adversely affected by the infrequent additional inundation, however, these vegetation types are considered of low biological value. Therefore, inundation effects on this vegetation would be considered less than significant and no mitigation would be required.

Although infrequent additional inundation would not directly remove vegetation from the BSA, habitat within the inundation area would be unavailable to most wildlife during the infrequent inundation. If infrequent additional inundation occurred during the breeding season, it could flood burrows and nests causing them to fail. However, it is anticipated that most inundation events would occur during the storm season (i.e., October 1 to April 15), which is outside the peak breeding season for most wildlife. Following each inundation event, the habitat would again be available for use with areas along the periphery becoming available most quickly. Although infrequent additional inundation effects would be considered adverse, they would affect a limited amount of habitat (17.41 acres) compared to the amount of habitat available in the Project region. Therefore, inundation effects would be considered adverse but less than significant.

Dewatering of the Lake

During the Project, the lake would be dewatered for a period of up to four years. When a lake is dewatered, water is not available to seep through the ground to recharge the underground aquifer and the water table under and around the edge of the lake may drop. If this occurs, it could affect the riparian vegetation around the edge of the lake. However, during the winter storm season, precipitation is expected to recharge or partially recharge the underground aquifer/water table. The water table can also recharge through the areas surrounding the lake that are outside the dewatered area, including through several drainages flowing into the lake and sheet flow from the southeastern and eastern sides of the lake. The majority of riparian scrub/woodland vegetation occurs at the upstream end of the lake, upstream of the work area, where recharge would still be occurring naturally (since it is upstream of the area that would be dewatered). Considering both precipitation and recharge from surrounding areas, lowering of the water table is not expected to substantially affect riparian scrub/woodland vegetation around the edges of the lake. Therefore, this impact is considered adverse but less than significant, and no mitigation would be required.

Increased Dust

Grading activities would disturb soils and result in the accumulation of dust on the surface of the leaves of trees, shrubs, and herbs. The respiratory function of the plants in the area would be impaired when dust accumulation is excessive. This indirect effect of construction of the Project on the native vegetation in the immediate vicinity of the construction area is considered adverse but less than significant because it would not substantially reduce plant populations in the region. Additionally, it is assumed that a water truck would be used to reduce dust during construction as required for air quality requirements. Therefore, no mitigation would be required.

No increased dust would be expected during operation of the Project. Therefore, there would be no long-term impact and no mitigation would be required.

Invasive Exotic Plant Species

No landscaping is anticipated as part of the Project. Therefore, there would be no effect on adjacent habitats due to the planting of non-native, invasive plant species.

Construction activities create disturbance, which in turn provides a place for non-native weedy species to spread. Additionally, construction equipment can introduce non-native weed seeds to the area if equipment is not properly cleaned. Weeds from the construction may then spread to adjacent habitat areas (including adjacent Reserve areas), which would degrade habitat quality for native species. In addition to the negative effects on habitat quality, non-native weeds can also increase the potential for large fires to spread. The Project Manual includes specifications for the use of BMPs to prevent the spread of weed seeds and requires the use of a native seed mix for hydroseeding areas disturbed by construction activities (**PDF BIO-8**). Invasive species observed during construction would be treated during and following construction (**PDF BIO-9**). Therefore, impacts as a results of invasive exotic plant species would be considered less than significant.

Impact Conclusion: *The Project would impact coastal sage scrub, riparian, and woodland habitats. The additional inundation during implementation of the Project would also affect a limited amount of these habitats. With implementation of **MM BIO-3**, **MM BIO-4**, and **MM BIO-8** these impacts would be less than significant. Therefore, the potential impact on riparian habitats and sensitive natural communities would be less than significant, pursuant to Threshold 4.3-2.*

Threshold 4.3-3

Would the Project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

USACE

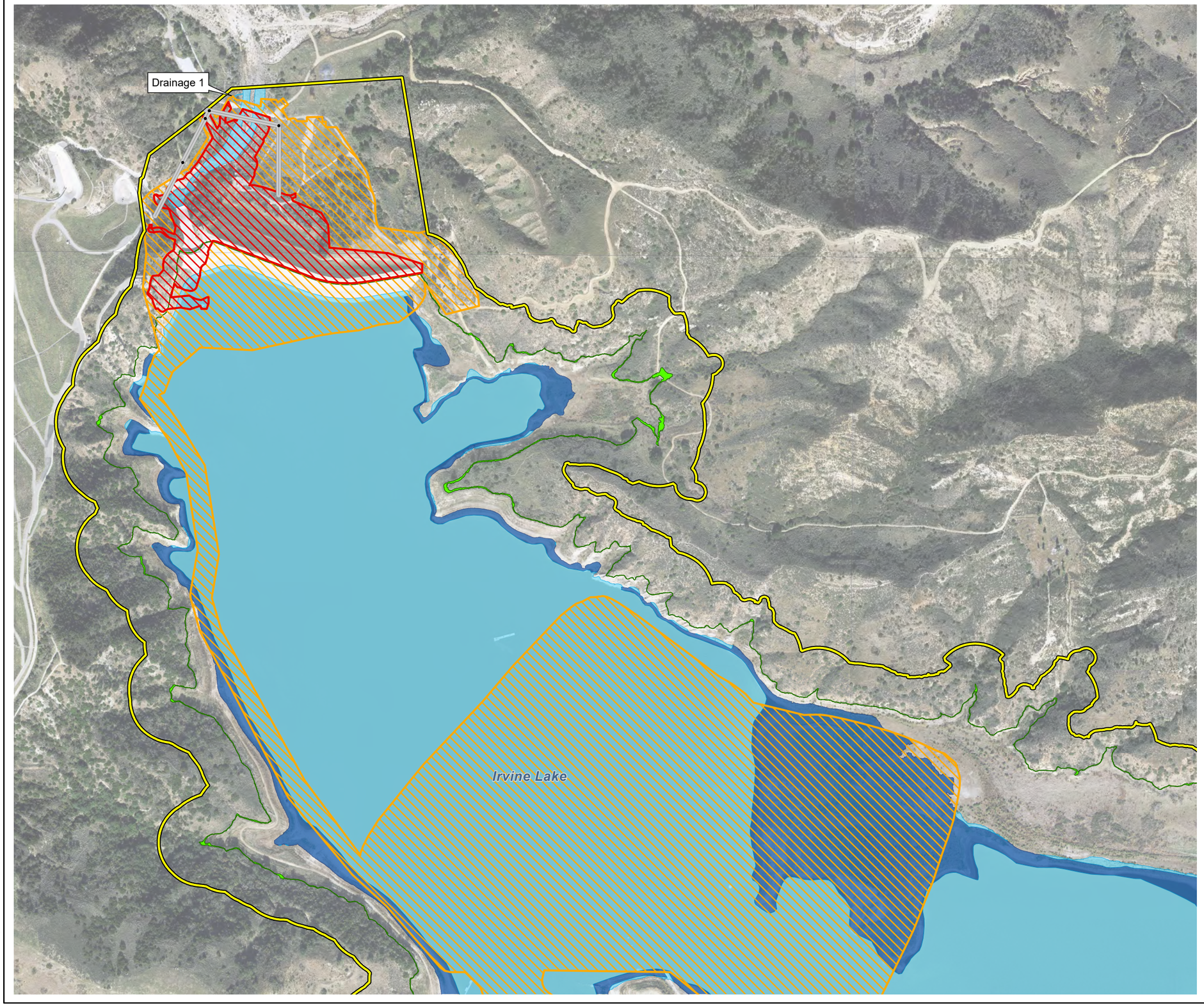
A total of 203.570 acres of WOTUS under the regulatory authority of the USACE would be impacted to construct the Project (wetland: 0.000 acre permanent, 63.915 acres temporary; non-wetland: 1.798 acres permanent, 137.857 acres temporary) (Table 4.3-6; Exhibit 4.3-10). This represents impacts to WOTUS in Irvine Lake, Santiago Creek, and Drainage 1. There would be no impact on USACE jurisdiction for the SCE Realignment. Implementation of **MM BIO-4** would ensure that compensatory mitigation such as establishment of on-site or off-site riparian habitat, payment of in-lieu mitigation fees, and/or preservation of off-site riparian habitat at IRWD lands is implemented to mitigate for the loss of WOTUS under the jurisdiction of USACE.

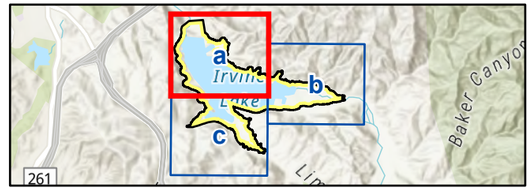
Additional Inundation

The Project would impact an additional 0.673 acre of WOTUS (0.673 acre wetland) with the additional inundation area (Table 4.3-6; Exhibit 4.3-10). The inundation of these areas would be infrequent and limited in duration. Additionally, these areas are already within the OHWM; additional inundation of areas under the jurisdiction of USACE would be considered less than significant.

RWQCB

A total of 203.641 acres of waters of the State under the regulatory authority of the RWQCB would be impacted to construct the Project (wetland: 0.000 acres permanent, 63.915 acres temporary; non-wetland: 1.861 acres permanent, 137.865 acres temporary) (Table 4.3-6; Exhibit 4.3-11). This represents impacts to waters of the State in Irvine Lake, Santiago Creek, Drainage 1, Drainage 2, and Drainage 3. There would be no impact on RWQCB jurisdiction for the SCE Realignment. Implementation of **MM BIO-4** would ensure that compensatory mitigation such as establishment of on-site or off-site riparian habitat, payment of in-lieu mitigation fees, and/or





Survey Area

Project Impacts

Permanent Impacts

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

Waters of the United States

Wetland

Non-Wetland

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*

***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
USACE Waters of the United States Exhibit 4.3-10a

Santiago Creek Dam Improvement Project

PSOMAS

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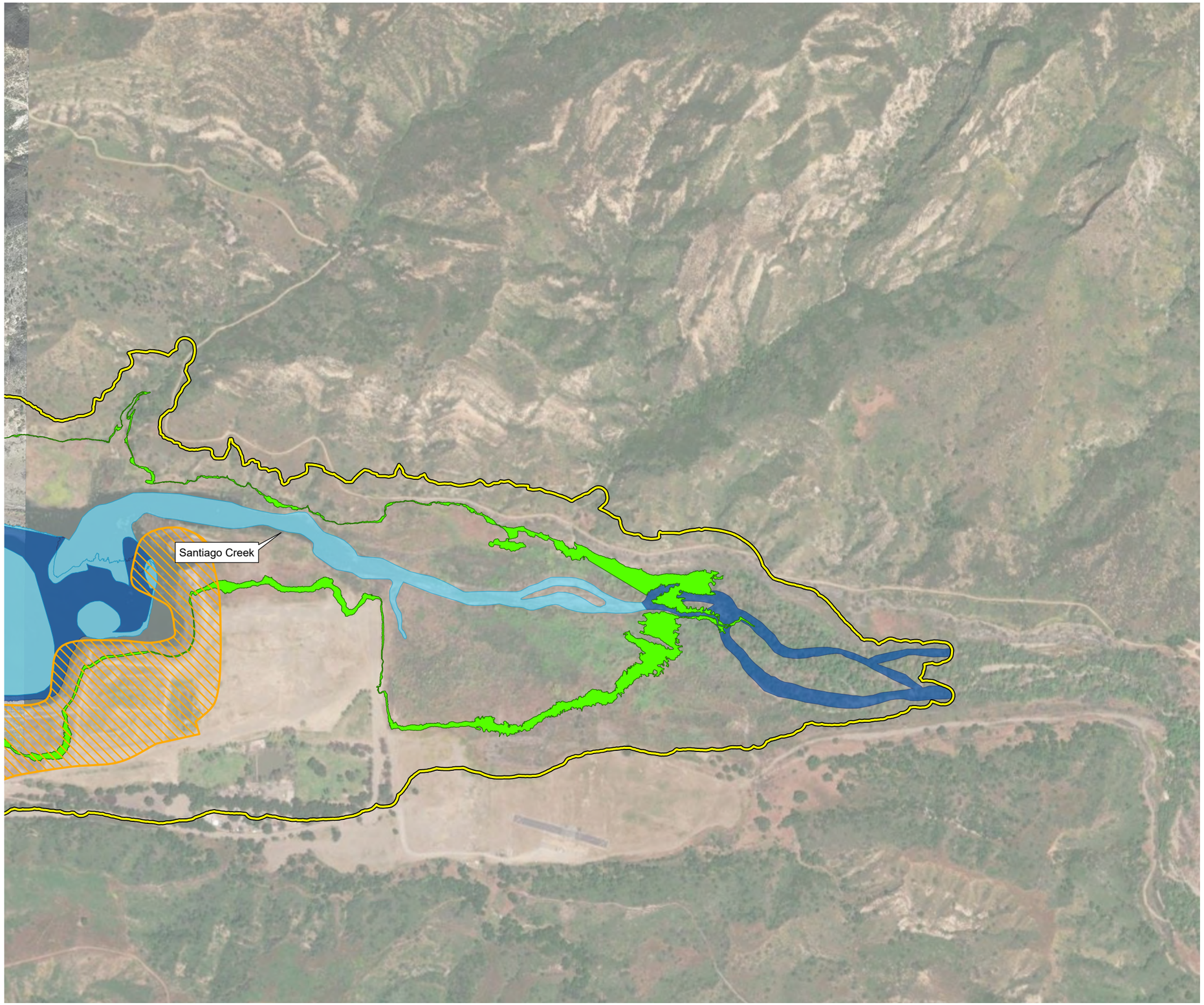

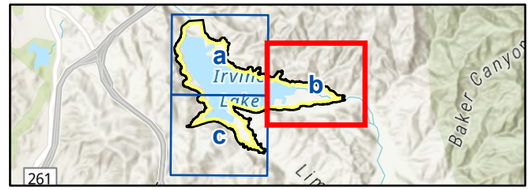

Survey Area

Project Impacts

Permanent Impacts

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

Waters of the United States

Wetland

Non-Wetland

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*

***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
USACE Waters of the United States Exhibit 4.3–10b

Santiago Creek Dam Improvement Project

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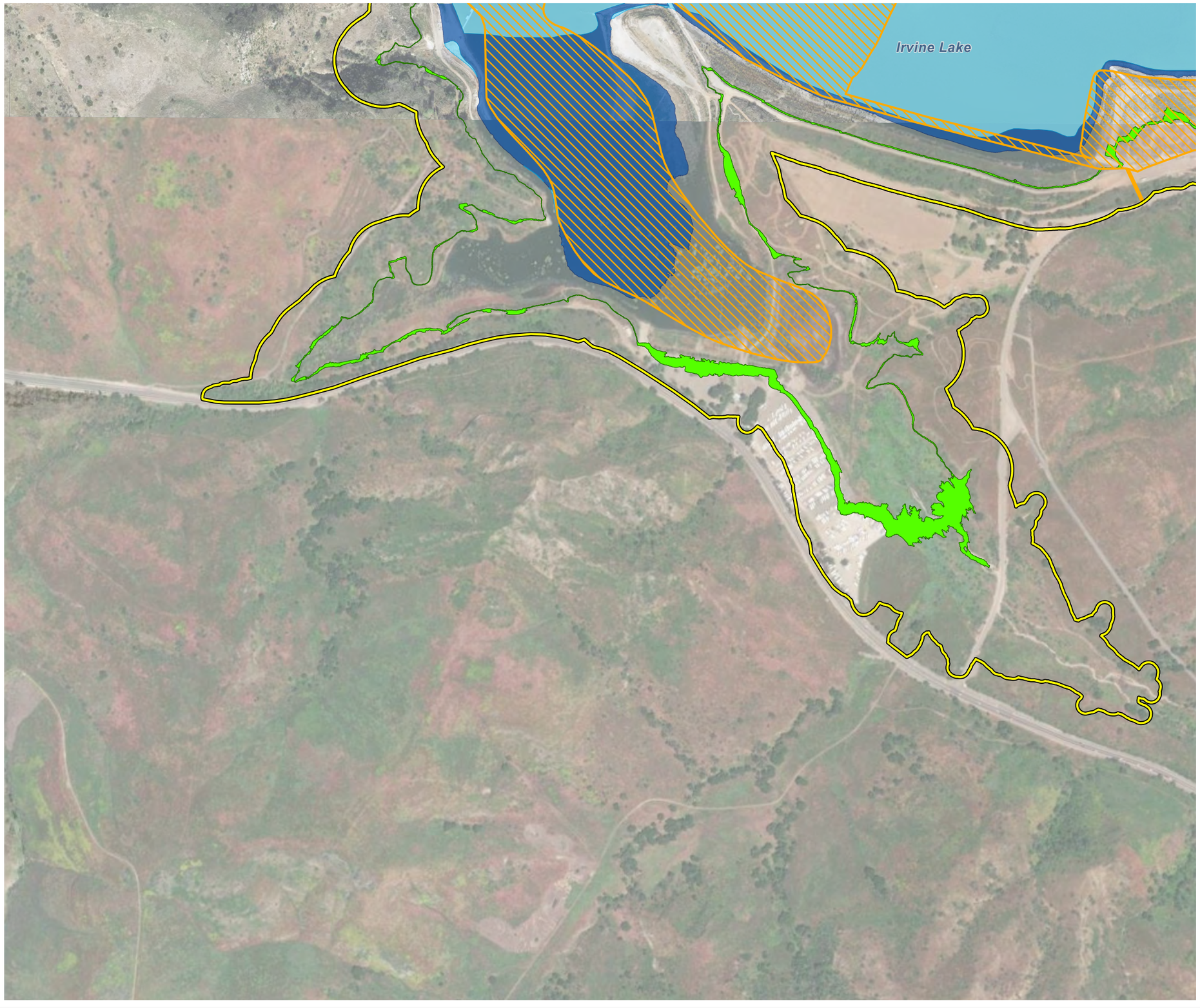

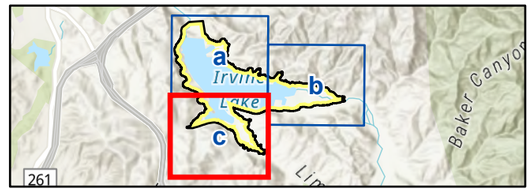

Survey Area

Project Impacts

Permanent Impacts

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

Waters of the United States

Wetland

Non-Wetland

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*

***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
USACE Waters of the United States Exhibit 4.3–10c

Santiago Creek Dam Improvement Project

PSOMAS

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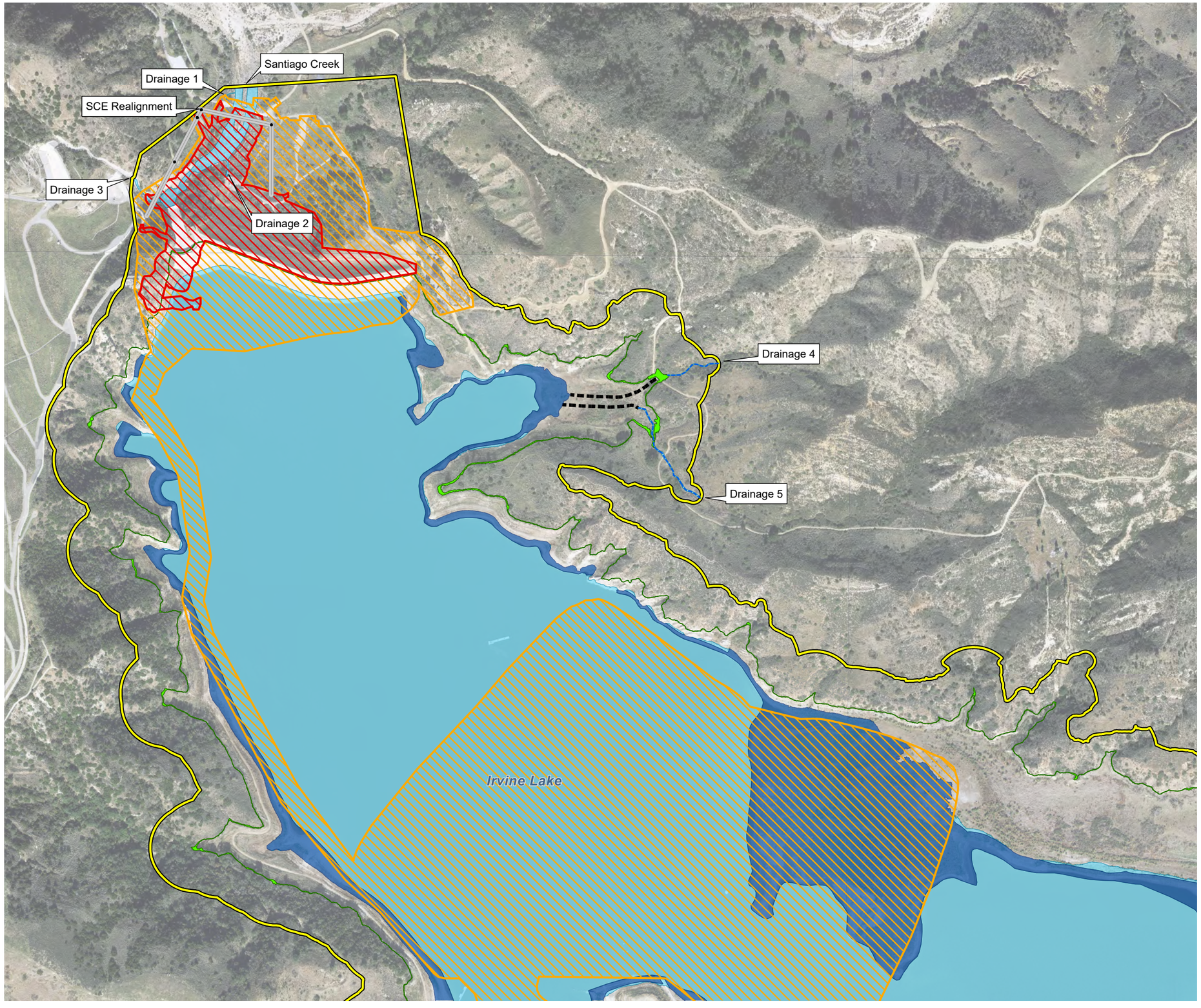

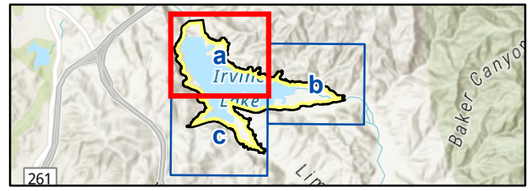

Survey Area

Sheet Flow (non-jurisdictional)

Impact Type

Permanent Impacts

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

Waters of the State

Wetland

Non-Wetland

Non-Wetland Drainage Centerline

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*

***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
RWQCB Waters of the State

Exhibit 4.3-11a

Santiago Creek Dam Improvement Project

PSOMAS

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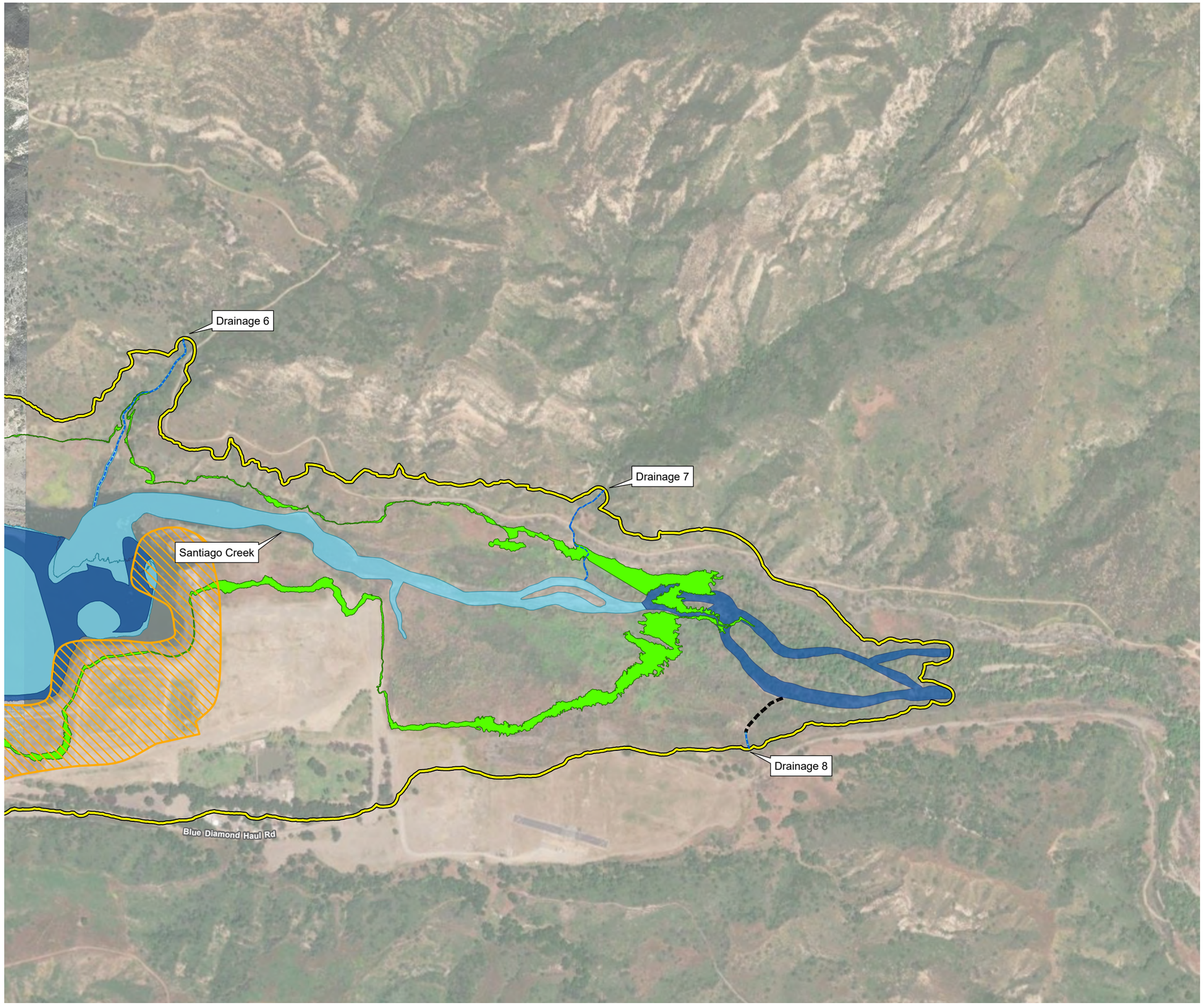

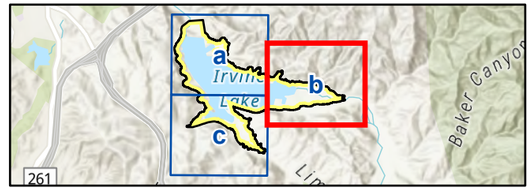

Survey Area

Sheet Flow (non-jurisdictional)

Impact Type

Permanent Impacts

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

Waters of the State

Wetland

Non-Wetland

Non-Wetland Drainage Centerline

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*

***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
RWQCB Waters of the State

Exhibit 4.3-11b

Santiago Creek Dam Improvement Project

PSOMAS

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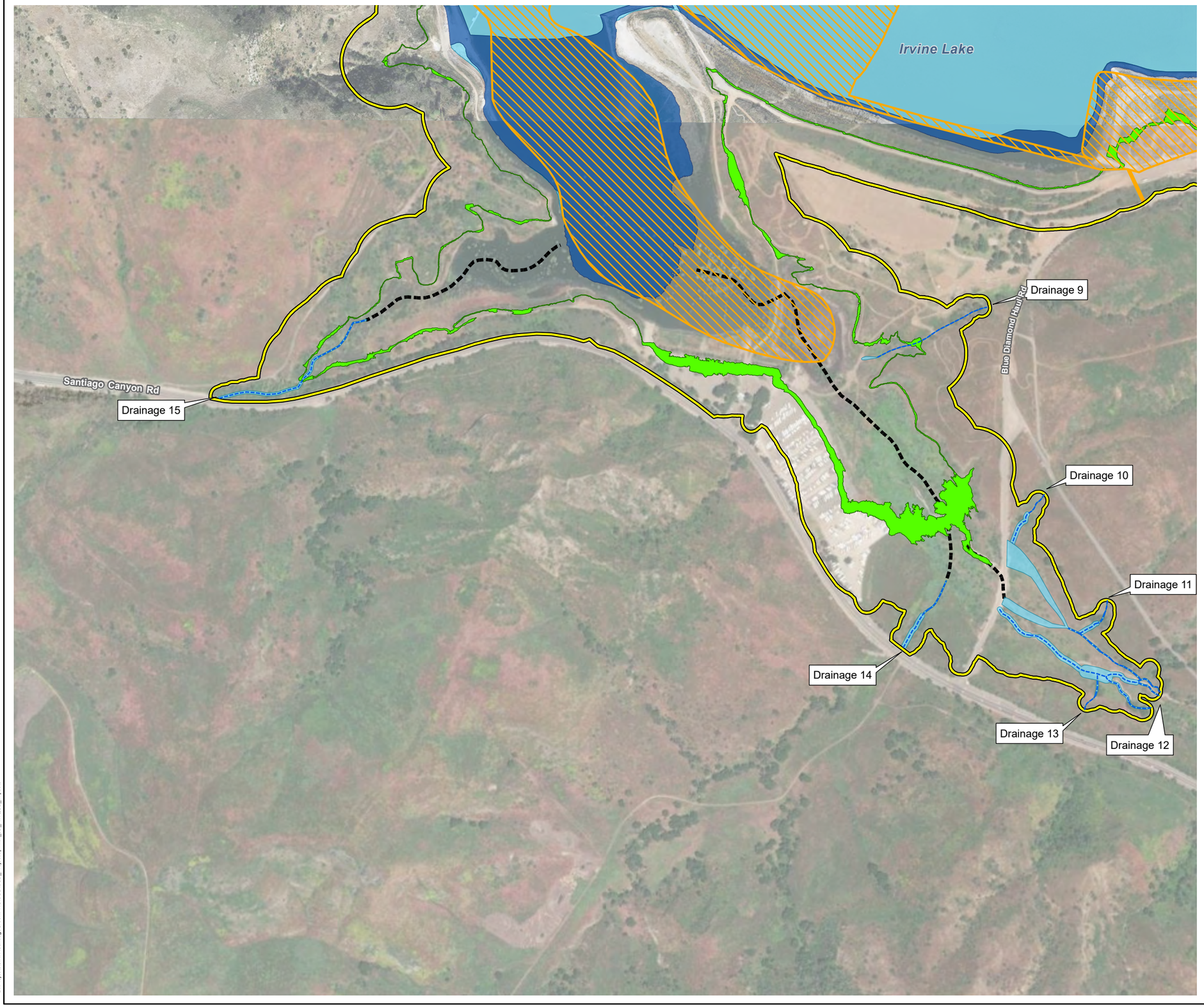

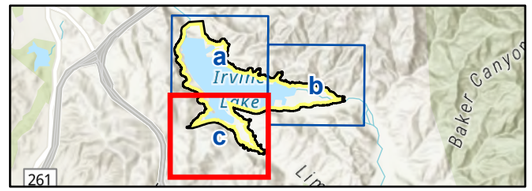

Survey Area

Sheet Flow (non-jurisdictional)

Impact Type

Permanent Impacts

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

Waters of the State

Wetland

Non-Wetland

Non-Wetland Drainage Centerline

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*

***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
RWQCB Waters of the State

Exhibit 4.3–11c

Santiago Creek Dam Improvement Project

PSOMAS

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preservation of off-site riparian habitat at IRWD lands is implemented to mitigate for the loss of waters of the State under the jurisdiction of RWQCB.

Additional Inundation

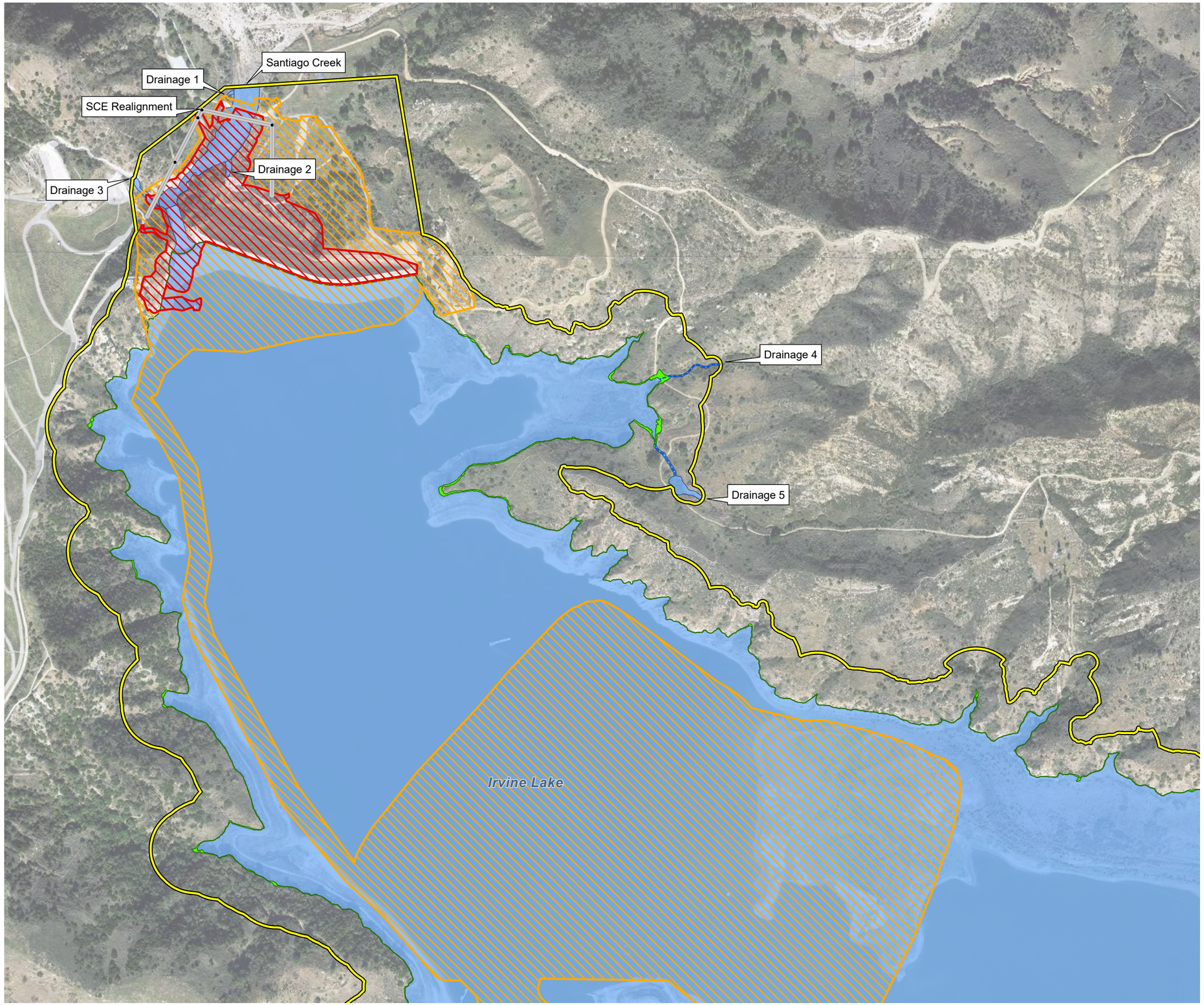
The Project would impact an additional 0.711 acre of waters of the State (0.673 acre wetland, 0.038 acre non-wetland) with the additional inundation area (Table 4.3-6; Exhibit 4.3-11). The inundation of these areas would be infrequent and limited in duration. Additionally, these areas are already within the OHWM, subject to existing water flow, and/or are riparian in nature; additional inundation of areas under the jurisdiction of RWQCB would be considered less than significant.

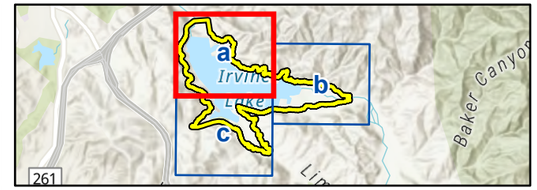
CDFW

A total of 233.744 acres of waters under the regulatory authority of CDFW would be impacted to construct the Project (3.924 acres permanent; 229.850 acres temporary) (Table 4.3-6; Exhibit 4.3-12). This represents impacts to waters under the authority of CDFW in Irvine Lake, Santiago Creek, Drainage 1, Drainage 2, and Drainage 3. Implementation of **MM BIO-4** would ensure that compensatory mitigation such as establishment of on-site or off-site riparian habitat, payment of in-lieu mitigation fees, and/or preservation of off-site riparian habitat at IRWD lands is implemented to mitigate for the loss of waters of the State under the jurisdiction of CDFW.

Additional Inundation

The Project would impact an additional 8.980 acres of waters under the authority of CDFW with the additional inundation area (Table 4.3-6; Exhibit 4.3-12). The inundation of these areas would be infrequent and limited in duration. Additionally, these areas are already within the existing bed and bank, subject to existing water flow, and/or are riparian in nature; additional inundation of areas under the jurisdiction of CDFW would be considered less than significant.





Biological Study Area

Impact Type

Permanent Impacts

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

CDFW Jurisdictional Waters

CDFW

Drainage Centerline

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*

***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
CDFW Jurisdictional Waters

Exhibit 4.3-12a

Santiago Creek Dam Improvement Project

PSOMAS

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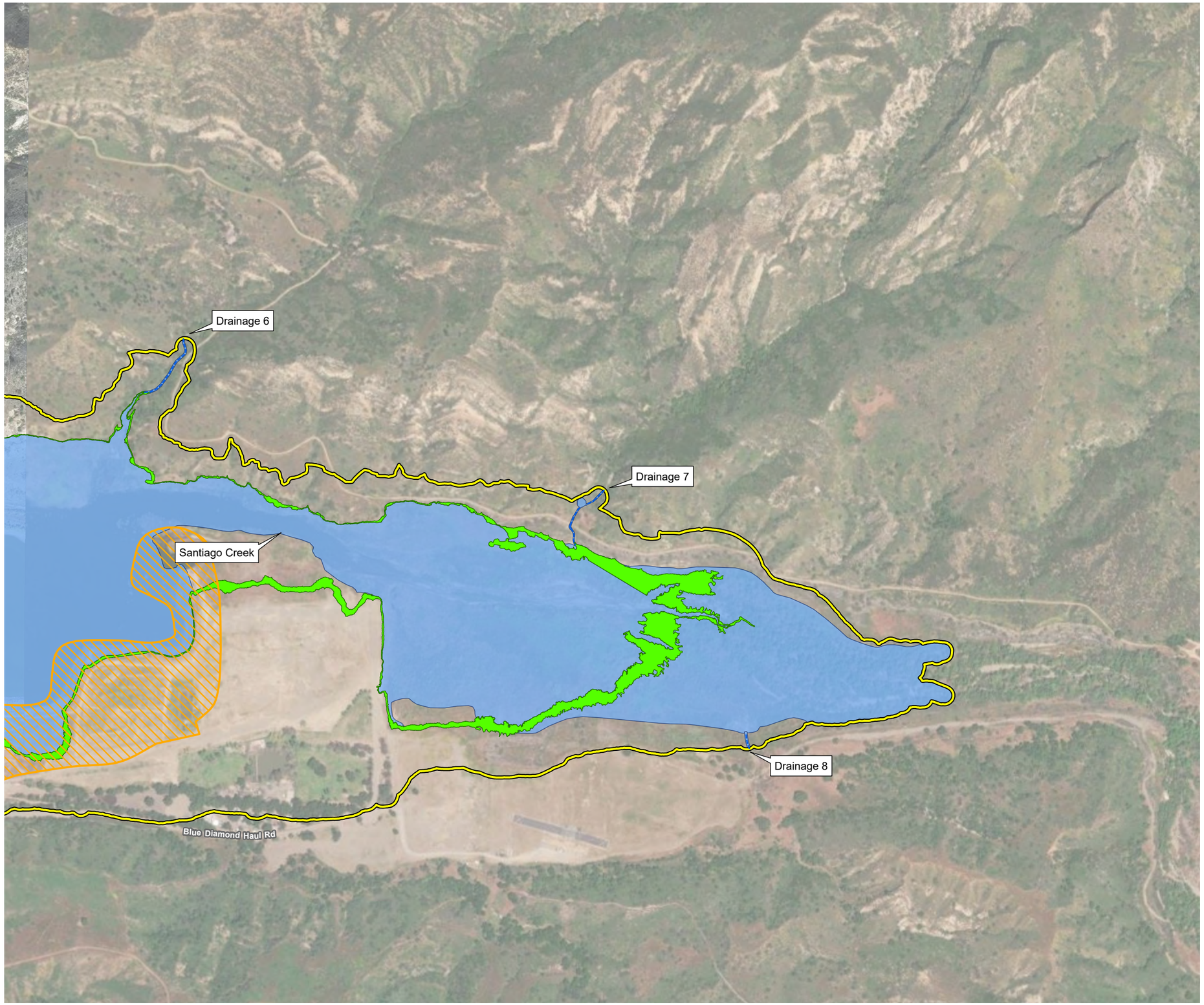

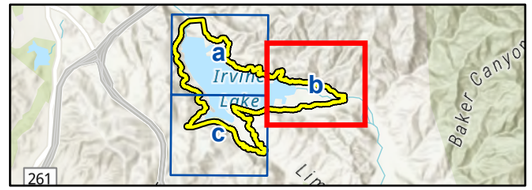

Biological Study Area

Impact Type

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

CDFW Jurisdictional Waters

CDFW

Drainage Centerline

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*

***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
CDFW Jurisdictional Waters

Exhibit 4.3-12b

Santiago Creek Dam Improvement Project

PSOMAS

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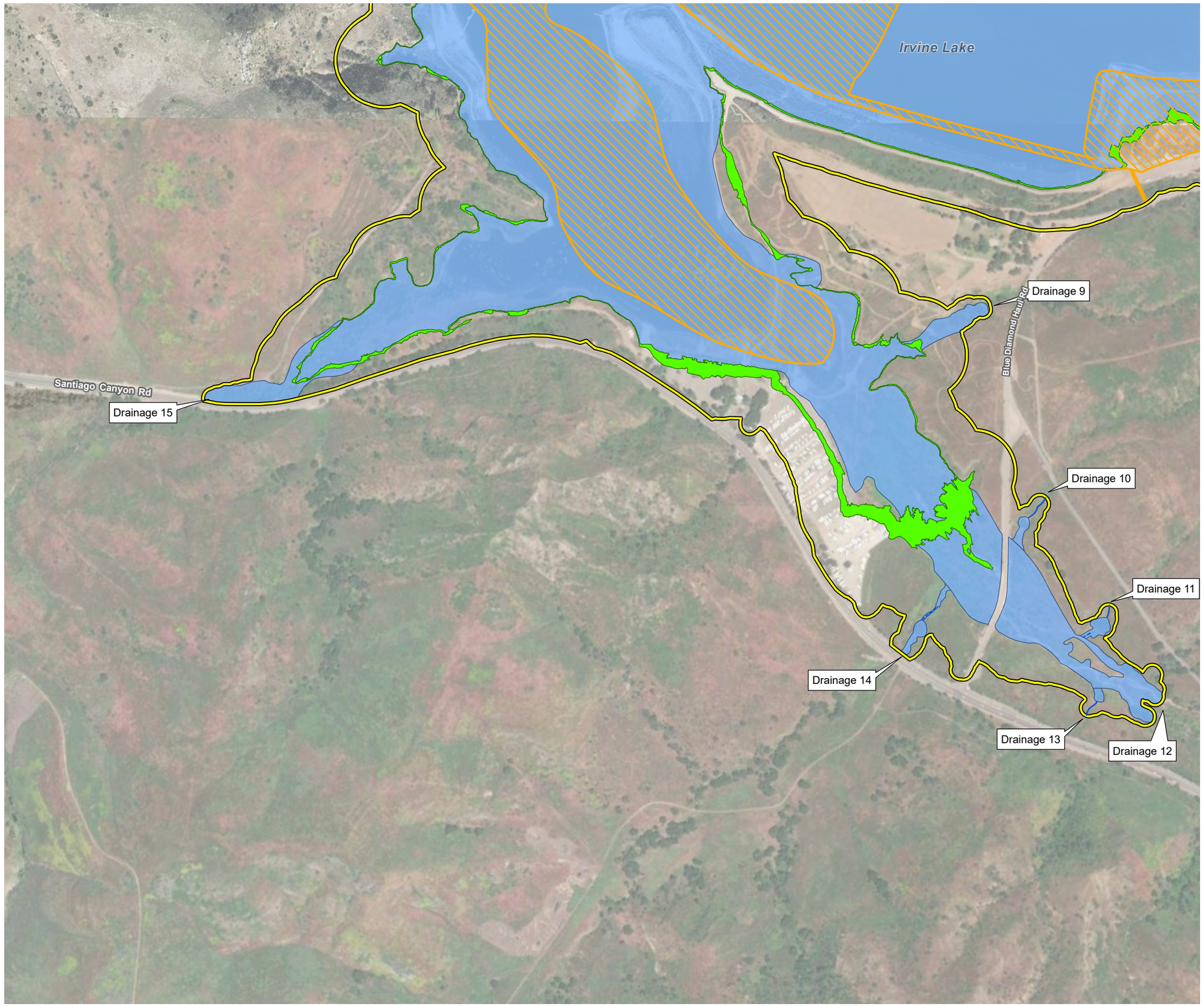

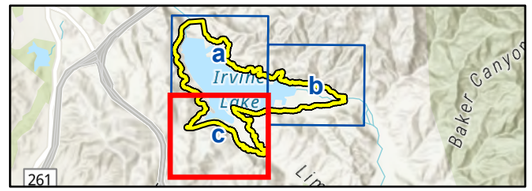

Biological Study Area

Impact Type

Temporary Impacts*

Additional Inundation Area

SCE Realignment

Permanent Impacts

Temporary Impacts**

CDFW Jurisdictional Waters

CDFW

Drainage Centerline

**Irvine Lake would be partially or fully dewatered prior to construction of the access road across the dry lake bottom.*

***Outside of the Project's permanent and temporary impact boundary, only trees/branches under the powerlines would be removed; other vegetation would not be removed but may be temporarily disturbed by access and movement of construction materials through the area.*

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Aerial Source: Hexagon Geosystems 2017; Esri, Maxar 2023

Project Impacts
CDFW Jurisdictional Waters

Exhibit 4.3-12c

Santiago Creek Dam Improvement Project

PSOMAS

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TABLE 4.3-6
SUMMARY OF PROJECT IMPACTS ON JURISDICTIONAL RESOURCES

Jurisdiction	Amount of Jurisdictional Water Resource (acres)				
	Existing	**Permanent**	**Temporary**	**Total Permanent/ Temporary Impact**	**Additional Inundation Area[a]**
USACE WOTUS	Wetland: 101.706	Wetland: 0.000	Wetland: 63.915	Wetland: 63.915	Wetland: 0.673
	Non-wetland: 326.770	Non-wetland: 1.798	Non-wetland: 137.857	Non-wetland: 139.655	Non-wetland: 0.000
	Total: 428.476	Total: 1.798	Total: 201.772	Total: 203.570	Total: 0.673
RWCQB Waters of the State	Wetland: 101.706	Wetland: 0.000	Wetland: 63.915	Wetland: 63.915	Wetland: 0.673
	Non-wetland: 333.499	Non-wetland: 1.861	Non-wetland: 137.865	Non-wetland: 139.726	Non-wetland: 0.038
	Total: 435.20	Total: 1.861	Total: 201.780	Total: 203.641	Total: 0.711
CDFW Jurisdictional Resources	669.630	3.924	229.850	233.774	8.980

USACE: U.S. Army Corps of Engineers; WOTUS: waters of the United States; RWQCB: Regional Water Quality Control Board; CDFW: California Department of Fish and Wildlife

[a] Portions of the Permanent and Temporary impact boundaries overlap the "Additional Inundation Area". This overlap is not being excluded because the Additional Inundation Area represents a long-term, periodic change in maximum lake level as opposed to a permanent structural impact or temporary construction impact.

Indirect Impacts

Water Quality

During construction, excess silt, petroleum, or chemicals on the soil surface within the construction could be washed into drainages (including Santiago Creek) and Irvine Lake during storms and may affect areas downstream of the Project. Adverse effects on water quality could indirectly impact species that use riparian areas within the watershed by affecting the food web interactions (e.g., abundance of insects or other prey) or through biomagnification (i.e., the buildup of chemicals in body tissues to toxic levels in higher trophic levels). To be compliant with regulatory requirements, the Project will obtain a State Water Resources Control Board's General Permit for Storm Water Discharge Associated with Construction Activity (Construction Activities General NPDES Permit), which will include development of a Storm Water Pollution Prevention Plan and provisions for the implementation of Best Management Practices and erosion control measures to prevent the runoff of toxins, chemicals, petroleum products, or other elements that might degrade water quality. Assuming compliance with standard regulatory requirements, impacts on water quality would be less than significant and no mitigation would be required.

No urban pollutants would be expected during operation of the Project. Therefore, there would be no long-term impact and no mitigation would be required.

Impact Conclusion: *The Project has potential to impact areas within the jurisdiction of the USACE, RWQCB, and CDFW and water quality. With implementation of* ***MM BIO-4*** *and standard best management practices these impacts would be less than significant. Therefore, the potential impact on state and*

federally protected wetlands and other jurisdictional resources would be less than significant, pursuant to Threshold 4.3-3.

Threshold 4.3-4

Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Santiago Creek Dam presents an existing barrier to wildlife movement for fish and amphibians along the Creek. As such, existing wildlife movement in the BSA is expected to be restricted to movement along the creek upstream of Irvine Lake and movement along the creek downstream of the dam. Although wildlife may avoid the dry lakebed during construction, the Project would not be expected to interfere with movement upstream or downstream of construction area. Wildlife species (e.g., mountain lion) would be expected to move through upland areas or along the edge of the Project through habitat not impacted by the Project. The Project would include night construction, which could temporarily decrease wildlife movement in the vicinity of construction at the dam embankment, spillway, near the staging area, and along access roads that are used by medium to large-sized mammals for movement at night. However, medium to large-sized mammals and other wildlife would still able to use ridgelines that would not be affected by the Project. It is possible that wildlife may choose to move along the roads despite the construction, which would increase the potential for wildlife strikes along the roadways at night. Speed limits and wildlife crossing signage would be posted along access roads (**PDF BIO-6**). Therefore, the impact on wildlife movement would be less than significant.

The Project would permanently impact 14.73 acres of habitat downstream of the dam along Santiago Creek that wildlife currently moves through (Table 4.3-5); however, it would be in the same location as the existing dam structure; it would not create a new barrier to movement.

Additional Inundation

The additional inundation that would occur infrequently as a result of raising the spillway would be temporary and would occur near the existing waterline (i.e., within two feet); it would not create any new barriers to wildlife movement. Therefore, the effect of the additional inundation on wildlife movement would be less than significant and no mitigation would be required.

Noise

See discussion under Threshold 4.3-1.

Night Lighting

See discussion under Threshold 4.3-1.

Human Activity

See discussion under Threshold 4.3-1.

Impact Conclusion: *Santiago Creek Dam represents an existing barrier to wildlife movement; therefore the Project would not impact wildlife movement along a regional wildlife corridor. However, the Project is located within a NCCP/HCP Reserve and wildlife movement in adjacent areas could be affected by noise, night lighting, and human activity during construction. With*

*implementation of **PDF BIO-1**, **PDF BIO-6**, and **PDF BIO-7**, impacts would be less than significant, pursuant to Threshold 4.3-4.*

Threshold 4.3-5

Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Several common bird species have the potential to nest in the vegetation, on the ground, or in structures in the BSA. The loss of an active migratory bird nest, including nests of common species, would be considered a violation of the MBTA and Sections 3503, 3503.5, and 3513 of *California Fish and Game Code*. Standard pre-construction surveys and nesting bird protections would ensure that construction would not violate the provisions of the MBTA or *California Fish and Game Code* (**PDF BIO-5**).

Additional Inundation

The additional inundation areas would be expected to be inundated during the storm season, which is generally outside the peak bird breeding season. The inundation would be associated with natural storm events, which could lead to a natural loss of nests early in the spring. The potential inundation of nests is expected to be extremely limited because (1) it would only affect species nesting within two feet in elevation above the current maximum water line; (2) it would only affect species nesting in February and March; and (3) it would only occur approximately once every several years. Therefore, the effect on nesting birds would be expected to be less than significant and no mitigation would be required.

Impact Conclusion: *The Project has potential to affect nesting birds/raptors, which are protected by the MBTA and California Fish and Game Code. With implementation of standard pre-construction surveys and nesting bird protections (**PDF BIO-5**), the impact would be less than significant, and no conflict with applicable requirements would occur, pursuant to Threshold 4.3-5.*

Threshold 4.3-6

Would the Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The Project is located within the Central-Coastal NCCP/HCP area and is within a NCCP/HCP Non-Reserve Open Space Area (Exhibit 4.3-3).

Consistency With Non-Reserve Open Space Policies

The NCCP/HCP Implementation Agreement allows development of infrastructure within the Reserve System in accordance with the provisions of Chapter 5.3, 5.9, and 5.11 of the NCCP/HCP and 5.3.3 of the Implementation Agreement. Santiago Creek Dam is a permitted existing use under the NCCP/HCP. No amendments to the NCCP/HCP would be required for constructing infrastructure facilities so long as amended infrastructure plans do not result in incidental take beyond that described and permitted by the NCCP/HCP. Implementation of **MM BIO-3** would ensure that IRWD's take is accounted for according to the NCCP/HCP.

Consistency With Coastal Sage Scrub Take Authorization

Under the NCCP/HCP, IRWD is allotted up to 87 acres of take (60 within the Reserve System and 27 outside the Reserve System); this Project may use credits from within the Reserve System. IRWD merged with the Santiago County Water District, which was allotted 9 acres within the Reserve System, bringing the total allotted for IRWD to 96 acres (69 acres within the Reserve System and 27 acres outside the Reserve System). As of March 2025, IRWD has approximately 44 acres within the Reserve remaining in their allocation.

Per Section 5.11 of the NCCP/HCP, infrastructure is an existing use that is allowed within the Reserve. The Project would remove 8.41 acres of coastal sage scrub habitat (3.95 acres permanent; 4.39 acres temporary; 0.07 acre within the SCE realignment) (Table 4.3-5, Exhibit 4.3-8). Coastal sage scrub vegetation types that would be impacted include sagebrush scrub, disturbed sagebrush scrub, sagebrush-coyote brush scrub, and disturbed floodplain sage scrub. Raising the spillway would also temporarily impact 3.36 acres within the additional inundation area (Table 4.3-5, Exhibit 4.3-8). Coastal sage scrub in the additional inundation area include sagebrush scrub, disturbed sagebrush scrub, sagebrush-coyote brush scrub, southern cactus scrub, and disturbed southern cactus scrub. Implementation of **MM BIO-3** would ensure that IRWD's take is accounted for according to the NCCP/HCP.

Conditionally Covered Species

Intermediate Mariposa Lily

Potential habitat for the Intermediate mariposa lily is present in the BSA. Focused surveys for this species were conducted downstream of Santiago Creek Dam in 2020, and one individual mariposa lily was observed. Focused surveys for this species were conducted upstream of Santiago Creek Dam in 2022, and five individual intermediate mariposa lilies were observed in three locations. The intermediate mariposa lily location downstream of the dam is within the temporary impact area and would be impacted if it cannot be avoided during construction. The remaining intermediate mariposa lily locations observed are outside the permanent and temporary impact areas for the Project. Two of the intermediate mariposa lily locations (consisting of four individuals) are located within the additional inundation area (Exhibit 4.3-9); however, they are already located at the edge of the existing inundation area and would not be expected to be significantly impacted. Additionally, the NCCP/HCP covers the loss of up to 20 intermediate mariposa lily individuals; therefore, the loss of one individual within the temporary impact area plus the potential loss of four individuals within the additional inundation area would be covered by the NCCP/HCP.

Least Bell's Vireo

Potential habitat for the least Bell's vireo is present in the BSA. Focused surveys for this species were conducted downstream of Santiago Creek Dam in 2020; no vireo were observed. Focused surveys for this species were conducted upstream of Santiago Creek Dam in 2022; least Bell's vireo were observed throughout riparian scrub/woodland habitat at the upper end of Irvine Lake, along Santiago Creek, and in the southern portion of Irvine Lake (Exhibit 4.3-9). Least Bell's vireo was incidentally observed in the riparian habitat downstream of the dam during focused surveys conducted in summer 2024. Implementation of **MM BIO-4** and **MM BIO-5** would ensure that impacts on least Bell's vireo are reduced to less than significant.

Impact Conclusion: *The Project is consistent with the NCCP/HCP. With implementation of* ***MM BIO-3*** *and* ***MM BIO-5****, the impact would be reduced to less than significant, and no conflict with the NCCP/HCP would occur, pursuant to Threshold 4.3-6.*

4.3.6 CUMULATIVE IMPACTS

To ensure that the cumulative impact analysis is as comprehensive as possible, pending projects in surrounding cities have been analyzed (see Table 4-1, Exhibit 4-1).

The Santiago Canyon Road Safety Improvement Project is currently under construction. It includes measures to improve roadway safety along the existing road such as adding passing lanes, retaining walls, guard rails, drainage improvements, stormwater treatment, and relocating utilities; however, this project is not expected to have substantial impacts on biological resources as the majority of improvements would occur within the existing right-of-way as shown on project maps. There may be limited impacts to biological resources along the edge of the roadway; any impact on coastal sage scrub would be covered by the County's participation in the NCCP/HCP and accounted accordingly. Any impact on riparian resources would be mitigated as required through the project's permitting.

The other two cumulative projects under consideration are updates to the City of Orange and County of Orange Housing Elements. The updates to these documents provide policy guidance for housing for the City/County to address housing opportunities and needs for present and future residents. The updates to these housing elements would not have impacts on biological resources.

Impact Conclusion: *When considered with the cumulative list of projects, the Project would not have a disproportionate contribution to cumulative impacts. Each project would be mitigated at the project-level and cumulative impacts would be less than significant.*

4.3.7 MITIGATION PROGRAM

Mitigation Measures

This section focuses on the development of mitigation measures for those impacts of the Project found to be significant or potentially significant. Strategies to mitigate each impact to a less than significant level are identified and described in the following section.

MM BIO-1A **Special Status Plants/Pre-construction Surveys:** During the peak blooming season prior to the initiation of construction (within the same year or the spring/summer prior), IRWD will retain a qualified Botanist to conduct a focused survey for mud nama. Although not required, the pre-construction survey will also include intermediate mariposa lily, many-stemmed dudleya, and Coulter's matilija poppy to minimize impacts on these species. The pre-construction survey will focus on these species in the general locations where they were previously observed within the impact area, including a 100-foot survey buffer. The Botanist will record special status plant locations within the impact area and within 100 feet of the impact area using GPS and will clearly mark locations with pin flags or lathe and flagging. The Botanist will meet in the field with IRWD to discuss whether avoidance of these locations would be feasible (e.g., whether they could be protected within the temporary impact areas).

No compensatory mitigation will be required if the locations of intermediate mariposa lily,[11] many-stemmed dudleya, and Coulter's matilija poppy cannot be avoided. However, IRWD will notify the Natural Communities Coalition (NCC) and allow the NCC to collect seed and/or salvage special status plants that will be impacted by the Project. Seed collection/salvage will be coordinated so that it does not delay the construction schedule.

Compensatory mitigation will be required if more than 10 percent of the mud nama locations mapped in 2022 will be impacted, as described below under MM BIO-1B.

Following the pre-construction survey and field meeting with IRWD, the Botanist will prepare a Pre-construction Special Status Plant Survey Report to document the results of the pre-construction surveys and will document the special status plant locations that will be avoided during construction. The Botanist will calculate the percent of the mud nama population that will be impacted by comparing the amount of mud nama within the construction impact area to the mud nama locations mapped in 2022. The report will also document that the final engineering plans, coupled with construction avoidance areas, will impact less than 50 percent of the mud nama population mapped in 2022.

After the field meeting with IRWD, the Botanist will work with IRWD/Contractor to clearly mark the locations that will be avoided during construction with lathe and flagging, orange snow fencing, stakes and rope, or other suitable fencing until the initiation of construction. During construction, the Biological Monitor will ensure that these areas are protected as described below under MM BIO-1C.

MM BIO-1B **Mud Nama/Compensatory Mitigation:** As described under MM BIO-1A, if compensatory mitigation is required for mud nama (i.e., more than 10 percent of the mud nama locations mapped in 2022 will be impacted by the Project), IRWD will retain a qualified Restoration Biologist to prepare a detailed Mud Nama Mitigation Plan. The Plan will describe collection of seed, salvage of individuals, salvage of soils (i.e., seed bank), and establishment of a new on-site location that will replace the area of mud nama impacted at a 1:1 ratio (i.e., 1 acre impacted to 1 acre replaced). The on-site mitigation areas will provide similar microhabitat, including similar soils and elevation, to provide similar inundation frequency to current conditions. The Mud Nama Mitigation Plan will include the following topics: (1) responsibilities and qualifications of the personnel to implement and supervise the plan; (2) mitigation site selection criteria; (3) site preparation and planting implementation, including pilot studies (if needed); (4) implementation schedule; (5) maintenance plan/guidelines; (6) monitoring plan; (7) performance criteria and contingency planning; and (8) long-term preservation. IRWD will implement the Plan.

IRWD will retain a qualified Restoration Biologist/Seed Collector to collect seed, salvage individuals, and salvage soils (i.e., seed bank) from the mud nama during the spring/summer prior to impacts on this plant. IRWD will ensure that the seed/salvaged individuals/soil are stored by a qualified Seed Collector in

[11] The NCCP/HCP covers impacts on this species up to 20 individuals; if more than 20 individuals would be impacted, additional consultation with the resource agencies would be required. However, this is not anticipated to be necessary because only six individuals have been observed in the BSA during focused surveys, and only one individual is located in the impact area.

appropriate conditions to maintain the viability of the seed to be used in the implementation of the Mud Nama Mitigation Plan.

MM BIO-1C **Special Status Plants/Biological Monitoring:** Before the start of construction, IRWD will retain a qualified Biological Monitor to confirm that the special status plant locations to be avoided are clearly marked with lathe and flagging, orange snow fencing, stakes and rope, or other suitable fencing. The Biological Monitor will post signs to indicate each location as an "Environmentally Sensitive Area" that no work activities may occur within the fencing. The Biological Monitor will conduct a WEAP training regarding the importance of Environmentally Sensitive Areas. Once Project activities begin, the Biological Monitor will check the fencing/signage weekly to ensure that it stays in place throughout construction activities and will notify IRWD and the construction contractor immediately if the fencing/signage needs to be repaired.

MM BIO-2 **Crotch's Bumble Bee:** If the California Department of Fish and Wildlife (CDFW) determines that listing of the Crotch's bumble bee as threatened or endangered under the California Endangered Species Act is not warranted prior to or during implementation of the Project, this measure will not be required.

Until CDFW makes a determination, or if CDFW determines that listing of the Crotch's bumble bee as threatened or endangered under the California Endangered Species Act is warranted, the following measures will be required.

MM BIO-2A **Incidental Take Permit:** IRWD will obtain an Incidental Take Permit (2081) prior to removal of suitable habitat for Crotch's bumble bee. IRWD will consult with CDFW to determine the appropriate mitigation to compensate for loss of floral resources associated with the species at a minimum 1:1 ratio of suitable habitat impacted (i.e., 1 acre impacted to 1 acre compensated). Potential compensatory mitigation options include on-site revegetation of temporarily disturbed areas using a seed mix of species preferred by Crotch's bumble bee at a minimum 1:1 ratio of temporarily impacted areas; payment of an in-lieu mitigation fee to an approved mitigation bank at a minimum 1:1 ratio of permanently impacted areas; long-term preservation of on-site or off-site habitat at a minimum 1:1 ratio of permanently impacted areas; or another strategy as approved by CDFW. Mitigation provided for under MM BIO-3 (Coastal Sage Scrub) may be used towards mitigation for Crotch's bumble bee.

MM BIO-2B **Pre-construction Survey.** Prior to vegetation clearing or other ground-disturbance during each year of Project construction, IRWD will retain a qualified Biologist to conduct pre-construction focused surveys for active nests of Crotch's bumble bee following the most current CDFW guidelines[12] within 100 feet of Project impact areas with suitable habitat for Crotch's bumble bee. According to current guidelines (CDFW 2023), the Biologist will conduct three visual surveys during the species' active period (i.e., April to August). The timing between each visual survey may be reduced to accommodate the construction schedule, as long as the first and last survey are conducted at least one week apart during the active period.

[12] The current guidelines for this species are CDFW 2023; guidelines may be updated as more is learned about this species' biology.

If no active nests of Crotch's bumble bee are observed, vegetation clearing, grading, and ground disturbance may proceed.

If a ground nest is observed, it will be protected in place until it is no longer active, as determined by the qualified Biologist retained by IRWD. IRWD will implement applicable protective measures from the Incidental Take Permit for the species (see MM BIO-2A). Potential protective measures may include protective buffers coupled with biological monitoring to avoid take of an active ground nest. The protective buffer will be determined by the Biologist conducting the pre-construction survey, or as designated in conditions in the Incidental Take Permit.

IRWD will ensure that a Letter Report is prepared to document the results of the pre-construction survey and will provide the letter to CDFW within 30 days of the completion of the survey.

MM BIO-2C **Biological Monitoring.** Biological monitoring for Crotch's bumble bee will follow the most current CDFW guidelines[13] at the time of construction. According to current guidelines (CDFW 2023), IRWD will retain a Biological Monitor to be present onsite during vegetation clearing and/or ground-disturbing activities that take place during the Crotch's bumble bee queen flight period (i.e., February to March), colony active period (i.e., April to August), or gyne flight period (i.e., September to October). No biological monitoring will be required for vegetation clearing or ground-disturbance that occurs from November to January.

If a ground nest of Crotch's bumble bee is observed during the monitoring, it will be protected in place until it is no longer active, as determined by the qualified Biologist retained by IRWD. IRWD will also implement applicable protective measures from the Incidental Take Permit for the species (see MM BIO-2A). If establishment of a protective buffer and/or avoidance of the nest is not feasible, IRWD and its qualified Biologist will consult with CDFW regarding potential encroachment into the protective buffer that may result in take of Crotch's bumble bee pursuant to MM BIO-2A.

MM BIO-3 **Coastal Sage Scrub and Coastal California Gnatcatcher:** Potential direct and indirect impacts on coastal sage scrub and coastal California gnatcatcher are fully mitigated through IRWD's participation and contribution in the Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) Mitigation Program. This participation not only provides mitigation for coastal sage scrub and the coastal California gnatcatcher, but also other Covered Species and Covered Habitats. IRWD will mitigate for impacts on coastal sage scrub and coastal California gnatcatcher through a combination of the following, as approved by USFWS and CDFW: (1) use of IRWD's NCCP/HCP take allocation at a 1:1 ratio for impacted coastal sage scrub; (2) restoration of coastal sage scrub habitat at a minimum 1:1 ratio in areas temporarily disturbed by construction including weeding and three years of restoration monitoring; and/or (3) restoration of coastal sage scrub habitat at an on-site or off-site location at a minimum 1:1 ratio, as described in a Habitat Mitigation and Monitoring Plan (HMMP) in order to preserve IRWD's remaining NCCP/HCP take allocation (if desired by IRWD).

[13] The current guidelines for this species are CDFW 2023; guidelines may be updated as more is learned about this species' biology.

If a coastal sage scrub habitat establishment program is selected to mitigate for all or a portion of the impacts, IRWD will prepare a Coastal Sage Scrub HMMP and submit it to the resource agencies for review and approval prior to the initiation of construction activities. The Coastal Sage Scrub HMMP will include the following items: (1) responsibilities and qualifications; (2) performance criteria and contingency planning; (3) site selection; (4) seed materials procurement; (5) wildlife surveys and protection; (6) site preparation and plant materials installation; (7) schedule; (8) maintenance program; (9) monitoring program; and (10) long-term preservation. IRWD will retain a qualified Restoration Ecologist to prepare the Coastal Sage Scrub HMMP and will retain a qualified Restoration Contractor to implement the HMMP. IRWD will be responsible for implementing the Coastal Sage Scrub HMMP and ensuring that the mitigation program achieves the approved performance criteria.

MM BIO-4 **Riparian Vegetation and Jurisdictional Permitting:** Before the start of construction, IRWD will obtain all necessary permits for impacts to U.S. Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW), and/or Regional Water Quality Control Board (RWQCB) jurisdictional areas and will determine the compensatory mitigation needed for the loss of jurisdictional waters and wetlands. Potential compensatory mitigation options will include one or a combination of the following, as determined through consultation with the above-listed resource agencies: (1) establishment of riparian habitat (on site or off site) at a minimum 1:1 ratio for impacted jurisdictional areas; (2) payment to a resource agency-approved mitigation bank or regional riparian enhancement program (e.g., invasive species removal) at a minimum 1:1 ratio for impacted jurisdictional areas; and/or (3) preservation of off-site riparian habitat on IRWD lands at a minimum 1:1 ratio for impacted jurisdictional areas.

If in-lieu mitigation fees are required, IRWD will pay the in-lieu mitigation fee before the start of construction to a mitigation bank/enhancement program for the replacement of impacted jurisdictional resources.

If a riparian habitat establishment program is selected to mitigate for all or a portion of the impacts, IRWD will retain a qualified Restoration Ecologist to prepare a Riparian Habitat Mitigation and Monitoring Plan (HMMP) and will submit it to the resource agencies for review and approval prior to the initiation of construction activities. The Riparian HMMP will include the following items: (1) responsibilities and qualifications; (2) performance criteria and contingency planning; (3) site selection; (4) seed materials procurement; (5) wildlife surveys and protection; (6) site preparation and plant materials installation; (7) schedule; (8) maintenance program; (9) monitoring program; and (10) long-term preservation. IRWD will retain a qualified Restoration Contractor to implement the HMMP. IRWD will be responsible for implementing the Riparian HMMP and ensuring that the mitigation program achieves the approved performance criteria.

MM BIO-5 **Least Bell's Vireo:** IRWD will consult with USFWS and CDFW under Section 7 of the Federal Endangered Species Act and Section 2080.1 of the California Fish and Game Code to approve the mitigation approach and whether NCCP/HCP Conditional Coverage will be extended to least Bell's vireo based on the measures below.

A. IRWD will obtain concurrence from USFWS and CDFW that the riparian mitigation described in MM BIO-4 will provide appropriate compensatory mitigation for the loss of riparian habitat.

B. To the extent feasible, removal of riparian habitat will be conducted during the non-breeding season (i.e., September 16 to March 14) in order to minimize direct impacts on nests of least Bell's vireo. IRWD will retain a qualified Biologist to monitor vegetation clearing of riparian habitat.

C. Before starting construction each spring, IRWD will retain a qualified Biologist to survey all habitat within 500 feet of the construction limits for the presence of least Bell's vireo. The Biologist will map any active nests/territories as Environmentally Sensitive Areas on an aerial photograph. IRWD will also ensure that the Biologist prepares a Letter Report and that it is submitted to USFWS and CDFW to document the results of the pre-construction survey within 30 days of completion of the survey.

D. IRWD will retain a qualified Biologist to conduct weekly focused surveys during construction to update the location of active least Bell's vireo territories. The Biologist will map new territories as Environmentally Sensitive Areas and will remove inactive Environmentally Sensitive Areas from the map. Once construction is in progress, IRWD will provide Weekly Reports to USFWS and CDFW.

E. IRWD will retain a qualified Biologist to establish a 500-foot protective buffer around each least Bell's vireo territory identified during pre-construction or weekly surveys. The Biologist will verify that occupied riparian habitat is protected with lathe and rope, orange snow fencing, or other suitable fencing to provide an adequate buffer from construction work. The Biologist will post signs to indicate that the area is an "Environmentally Sensitive Area" and that no work activities may occur within the fencing. The Biologist will conduct training to educate workers on the importance of Environmentally Sensitive Areas.

F. If construction activities need to occur within 500 feet of an active least Bell's vireo territory, IRWD will consult with USFWS and CDFW to determine an appropriate noise reduction strategy. Appropriate noise reduction measures may include, but are not limited to, specifications for equipment type, siting of equipment, and temporary noise barriers. IRWD will retain a qualified Biologist to monitor the installation of any noise reduction measures.

G. IRWD will retain a qualified Biologist to conduct daily monitoring when construction activities are conducted within 500 feet of an active least Bell's vireo territory or until the Biologist determines that the individuals are not being impacted by the noise (i.e., the noise measures are established and birds are acclimated to the activities).

MM BIO-6 **Bald Eagle:** IRWD will consult with USFWS and CDFW with regard to bald eagle to determine whether any regulatory approval is necessary to comply with the California Endangered Species Act and the federal Bald Eagle Act. Because there would be no direct take of a nest, an informal consultation may be sufficient, but this approach will be confirmed by USFWS and CDFW.

USFWS and CDFW will review and approve the monitoring strategy to be used during construction. IRWD will retain a qualified Biologist to visit the bald eagle nest multiple times over the course of the breeding season to determine whether the nest is active and/or to determine the stage of nesting. The Biologist will conduct the first visit in early March to determine whether the nest is active. The Biologist will conduct the second visit in late March or early April to confirm the nesting stage (i.e., presence of eggs/young), or to confirm that the nest is still inactive. If the nest is not active during the first two visits, no additional surveys will be needed. However, if the nest is active, the Biologist will conduct weekly surveys from five weeks post-hatching continuing until the young fledge or May 15, whichever comes last. The Biologist will complete the California Bald Eagle Nesting Territory Survey Form to document the survey results each year. IRWD will ensure that the form is submitted to USFWS and CDFW by September 1 of each year.

MM BIO-7 **Pre-Construction Bat Surveys:** IRWD will retain a qualified Biologist to conduct a pre-construction roosting bat survey (including both day and evening efforts) before construction begins. The day survey will involve inspection of the structures within the impact area to look for signs of bat roosting. The evening survey will involve monitoring each potential roost site for evening emergence, conducting exit counts, and acoustic monitoring (from a half an hour before sunset to no greater than three hours after sunset) near potential roosts within the impact area. If the Biologist determines that bats are actively roosting onsite, IRWD will retain a qualified Biologist to prepare a Project-specific Bat Roost Minimization Plan (BRMP) and will implement the plan. The BRMP will include relevant avoidance and minimization measures based on the survey results. If tree roosting bat species are found to be both foraging and potentially roosting onsite, IRWD will conduct tree removal only during the non-maternity season (September 1 through March 31). When potentially-occupied roost trees are removed, IRWD will implement a phased tree removal method (i.e., leaving the felled tree on the ground for 24-48 hours after the felling to allow any tree-roosting bats to leave). IRWD will avoid all Project-structures proposed for demolition that support an active day-roost until either the roost is no longer active, as determined by a qualified Biologist, or the occupants can be humanely evicted as described in the BRMP. IRWD will retain a qualified Biologist to conduct bat eviction during the fall months outside of the bat maternity season (i.e., September 1 through November 30).

MM BIO-8 **Tree Survey/Replacement:** Before the start of construction, IRWD will retain a qualified Biologist or Certified Arborist to conduct a tree survey to identify the location and health of western sycamore trees within 100 feet of the Project impact area. To the extent practicable, temporary impact areas will be revised to avoid and minimize effects on western sycamore trees. Standard tree protection measures to fence western sycamores will be recommended for trees within or near the work area (PDF BIO-4).

Any western sycamores that are greater than four inches diameter at breast height (dbh) removed by construction will be replaced at no less than a 1:1 ratio. Trees with a dbh of 4 inches to 8 inches will replaced at a 1:1 ratio with a minimum container size of 15 gallons. Trees with a dbh of greater than 8 inches to 16 inches will be replaced at a 1:1 ratio with a minimum container size of 25 gallons (i.e., 24-inch box). Trees with a dbh of greater than 16 inches to 24 inches will be replaced at a 3:1 ratio with a minimum container size of 25 gallons (i.e., 24-inch box). Trees with a dbh of greater than 24 inches to 36 inches will be replaced at a 5:1 ratio with a minimum container size of 25 gallons (i.e., 24-inch box). Trees with a dbh of greater than 36 inches will be replaced at a 10:1 ratio with a minimum container size of 25 gallons (i.e., 24-inch box). The replacement trees will be replaced either on-site or off-site in a location with appropriate microclimate conditions. The replacement trees will be incorporated into the Coastal Sage Scrub HMMP or Riparian HMMP (described above).

4.3.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Assuming impacts to mud nama can be reduced to less than 50 percent of the population mapped in 2022 through refinement of Project design, the impact will be reduced to less than significant with the incorporation of recommended mitigation. For all other impacts, implementation of the recommended mitigation measures will mitigate biological impacts to a level that is considered less than significant.

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4.4 CULTURAL RESOURCES

This section evaluates the Project's potential to result in adverse effects on cultural resources, including historical and archaeological resources. Information in this section is based on the *Historic Property Identification Report (Archaeological Resources) and Paleontological Resources Study Santiago Creek Dam Outlet and Spillway Project, Irvine, Orange County, California* (Report), prepared by Psomas (2024) included as Appendix D of this EIR, and the *Historical Resources Assessment, Santiago Creek Dam Outlet Tower and Spillway Improvements Project, Orange County, California*, prepared by South Environmental (2023) and included as an attachment to the Report.

4.4.1 REGULATORY SETTING

Cultural resource laws, regulations, and guidelines set up the processes for defining what is or is not a significant cultural resource and include various agency procedures for managing these archaeological and historical resources and assessing the information from the cultural remains to determine their significance. Most important is whether these resources are eligible for inclusion in a national or State register (i.e., National Register of Historic Places [NRHP] and California Register of Historical Resources [CRHR]). The laws and regulations serve to do the following:

- Set forth the criteria for assessing the relative importance of cultural remains;
- Outline the procedures for reviewing assessments;
- Delineate the responsible parties involved in making such assessments;
- Identify and then define the extent of jurisdiction and responsibility of each party in the evaluation process;
- Set forth the criteria for making a determination of significance, as well as indicating which party can or cannot make such determinations;
- Set forth the criteria for the archaeological and historic preservation work performed; and
- Set forth the criteria regarding who can perform the archaeological and historic preservation work.

A summary of both federal and State laws, regulations, and standards that govern cultural resource management within the Project site is provided below.

Federal

The National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code 470f) requires federal agencies to account for the effects of their undertakings on historic properties, and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. Historic properties are defined as buildings, structures, districts, sites, or objects which are included in or eligible for inclusion in the NRHP. Section 106 is implemented through 36 Code of Federal Regulations (CFR) Part 800, which outlines the process for historic preservation review, including participants, identification efforts, and the assessment and resolution of adverse effects. Per 36 CFR 800.16(y), a federal undertaking is defined as any project requiring or receiving a federal permit, license, approval, or funding. Federal agencies must take steps to determine if the undertaking would result in an adverse effect to historic properties and take measures to avoid or resolve those effects as feasible.

National Historic Preservation Act

The NRHP is the United States' official list of districts, sites, buildings, structures, and objects worthy of preservation. Overseen by the National Park Service, under the U.S. Department of the Interior, the NRHP was authorized under the NHPA, as amended. Its listings encompass all National Historic Landmarks and historic areas administered by the National Park Service.

NRHP guidelines for the evaluation of historic significance were developed to be flexible and to recognize the accomplishments of all who have made significant contributions to the nation's history and heritage. Its criteria are designed to guide federal agencies, State and local governments, and others in evaluating potential entries in the NRHP. For a property to be listed in or determined eligible for listing, it must be demonstrated to possess integrity[1] and to meet at least one of the following criteria:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
B. That are associated with the lives of persons significant in our past; or
C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. That have yielded, or may be likely to yield, information important in prehistory or history.

Native American Graves and Repatriation Act

The Native American Graves and Repatriation Act (NAGPRA) established a means for Native Americans, including Indian Tribes, to request the return of human remains and other sensitive cultural items held by federal agencies or federally assisted museums or institutions. NAGPRA also contains provisions regarding the intentional excavation and removal of, inadvertent discovery of, and illegal trafficking in Native American human remains and sensitive cultural items.

State

California Register of Historical Resources

The California Environmental Quality Act (CEQA) requires a lead agency to determine whether a project would have a significant effect on one or more historical resources. According to Section 15064.5(a) of the CEQA Guidelines, a "historical resource" is defined as a resource listed in or determined to be eligible for listing in the CRHR (*California Public Resources Code* [PRC] Section 21084.1); a resource included in a local register of historical resources (*California Code of Regulations* [CCR], Title 14, Section 15064.5[a][2]); or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (14 CCR 15064.5[a][3]).

[1] Within the concept of integrity, the National Register criteria recognize seven aspects or qualities that, in various combinations, define integrity. These are location, design, setting, materials, workmanship, feeling, and association (NPS 1990).

Section 5024.1 of the PRC, Section 15064.5 of the CEQA Guidelines (CCR, Title 14, Chapter 3, Sections 15000–15387), and Sections 21083.2 and 21084.1 of the CEQA (PRC, Sections 21000–21189) were used as the basic guidelines for the cultural resources study. PRC Section 5024.1 requires an evaluation of historical resources to determine their eligibility for listing in the CRHR. The purpose of the CRHR is to maintain listings of the State's historical resources and to indicate which properties are to be protected from substantial adverse change. The criteria for listing resources in the CRHR, which were expressly developed to be in accordance with previously established criteria developed for listing in the NRHP (per the criteria listed at 36 CFR 60.4), are stated below.

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and that:

(1) Are associated with events that have made a significant contribution to the broad patterns of our history; or

(2) Are associated with the lives of persons significant in our past; or

(3) Embody the distinctive characteristics of a type, period, or method of installation, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(4) Have yielded, or may be likely to yield, information important in prehistory or history.

According to Section 15064.5(a)(3) (A–D) of the CEQA Guidelines, a resource is considered historically significant if it meets the criteria for listing in the NRHP, as stated above, in addition to the CRHR. Impacts that affect those characteristics of the resource, that qualify it for the NRHP or that would adversely alter the significance of a resource listed in or eligible for listing in the CRHR, are considered to have a significant effect on the environment. Proposed Project impacts to cultural resources are considered significant if the Project: (1) physically destroys or damages all or part of a resource; (2) changes the character of the use of the resource or physical feature within the setting of the resource that contributes to its significance; or (3) introduces visual, atmospheric, or audible elements that diminish the integrity of significant features of the resource.

The purpose of a cultural resources' investigation is to evaluate whether any cultural resources remain exposed on the surface of a project site or can reasonably be expected to exist in the subsurface. If resources are discovered, management recommendations would be required for evaluation of the resources for CRHR eligibility.

California Environmental Quality Act

As described further below, the following CEQA statutes and CEQA Guidelines are of relevance to the analysis of archaeological, historic, and tribal cultural resources:

- California PRC Section 21083.2(g) defines "unique archaeological resource."
- California PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a) define "historical resources." In addition, CEQA Guidelines Section 15064.5(b) defines the phrase "substantial adverse change in the significance of an historical resource." It also defines the circumstances when a project would materially impair the significance of a historical resource.
- California PRC Section 21074(a) defines "tribal cultural resources."

- California PRC Section 5097.98 and CEQA Guidelines Section 15064.5(e) set forth standards and steps to be employed following the accidental discovery of human remains in any location other than a dedicated ceremony.
- California PRC Sections 21083.2(b)-(c) and CEQA Guidelines Section 15126.4 provide information regarding the mitigation framework for archaeological and historic resources, including examples of preservation-in-place mitigation measures; preservation-in-place is the preferred manner of mitigating impacts to significant archaeological sites because it maintains the relationship between artifacts and the archaeological context and may also help avoid conflict with religious or cultural values of groups associated with the archaeological site(s).

More specifically, under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (California PRC Section 21084.1; CEQA Guidelines Section 15064.5(b).) If a site is either listed or eligible for listing in the CRHR, or if it is included in a local register of historic resources or identified as significant in a historical resources survey (meeting the requirements of California PRC Section 5024.1(q)), it is a "historical resource" and is presumed to be historically or culturally significant for purposes of CEQA (California PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)). The lead agency is not precluded from determining that a resource is a historical resource even if it does not fall within this presumption (California PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)).

A "substantial adverse change in the significance of an historical resource" reflecting a significant effect under CEQA means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines Section 15064.5(b)(1); California PRC Section 5020.1(q)). In turn, CEQA Guidelines Section 15064.5(b)(2) states the significance of a historical resource is materially impaired when a project:

1. Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources; or
2. Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the PRC or its identification in an historical resources survey meeting the requirements of Section 5024.1(g) of the PRC, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
3. Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

Pursuant to these sections, the CEQA inquiry begins with evaluating whether a project site contains any "historical resources," then evaluates whether that project will cause a substantial adverse change in the significance of a historical resource such that the resource's historical significance is materially impaired.

Assembly Bill 52

Assembly Bill (AB) 52 (Chapter 532, Statutes of 2014), which became effective on July 1, 2015, requires lead agencies to provide notice to tribes that are traditionally and culturally affiliated with the geographic area of a proposed project, if they have requested such notice in writing. Once Native American tribes receive a project notification, they have 30 days to respond as to whether they wish to initiate consultation regarding the project, including subjects such as mitigation for any potential project impacts to tribal cultural resources (TCR). A TCR is defined as either a site, feature, place, or cultural landscape that is geographically defined in terms of size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is eligible for the CRHR or a local historic register. If a tribe requests consultation and the lead agency and the tribe ultimately agree on mitigation to address any potentially significant impacts to TCRs, the mitigation measures agreed upon during consultation must be recommended for inclusion in the environmental document.

Senate Bill 18

Senate Bill (SB) 18 (*California Government Code,* Section 65352.3) incorporates the protection of California's traditional tribal cultural places into land use planning for cities, counties, and agencies by establishing responsibilities for local governments to contact, refer plans to, and consult with California Native American tribes prior to the adoption or amendment of any general plan or specific plan proposed on or after March 1, 2005. SB 18 requires that public notice to be sent to tribes listed on the NAHC's SB 18 Tribal Consultation List within the geographical areas affected by the proposed general plan or specific plan (or general plan or specific plan amendment). Tribes must respond to a local government notice within 90 days (unless a shorter time frame has been agreed upon by the tribe), indicating whether or not they want to consult with the local government. Consultations are for the purpose of preserving or mitigating impacts to places, features, and objects described in Sections 5097.9 and 5097.993 of the *Public Resources Code* (PRC) that may be affected by the proposed adoption or amendment to a general plan or specific plan.

Human Remains

Section 7050.5 of the *California Health and Safety Code* provides for the disposition of accidentally discovered human remains. Section 7050.5 states that, if human remains are found, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains would occur until the County Coroner has determined the appropriate treatment and disposition of the human remains.

Section 5097.98 of the PRC states that, if remains are determined by the Coroner to be of Native American origin, the Coroner must notify the Native American Heritage Commission (NAHC) within 24 hours. The NAHC, in turn, must identify the person or persons it believes to be the most likely descendant of the deceased Native American. The descendant shall complete their inspection within 48 hours of being granted access to the site. The designated Native American representative would then determine, in consultation with the property owner, the disposition of the human remains.

Local

County of Orange General Plan

Resources Element

Cultural historic resources are defined as buildings, structures, objects, sites, and districts of significance in history, archaeology, architectural history, and culture. The County maintains a list of certified archaeological professionals who are qualified to work on projects within the County's jurisdiction (i.e., unincorporated areas).

The following goals, policies, and objectives of the Resources Element pertaining to archaeological and historical resources are applicable to the proposed Project.

Cultural-Historic Resources

Goal 1: To raise the awareness and appreciation of Orange County's cultural and historic heritage.

Goal 2: To encourage through a resource management effort the preservation of the county's cultural and historic heritage.

Objective 2.1: Promote the preservation and use of buildings, sites, structures, objects, and districts of importance in Orange County through the administration of planning, environmental, and resource management programs.

Objective 2.2: Take all reasonable and proper steps to achieve the preservation of archaeological and paleontological remains, or their recovery and analysis to preserve cultural, scientific, and educational values.

Objective 2.3: Take all reasonable and proper steps to achieve the preservation and use of significant historic resources including properties of historic, historic architectural, historic archaeological, and/or historic preservation value.

Policy 1: Identification of resources shall be completed at the earliest stage of project planning and review such as general plan amendment or zone change.

Policy 2: Evaluation of resources shall be completed at intermediate stages of project planning and review such as site plan review, subdivision map approval, or at an earlier stage of project review.

Policy 3: Final preservation actions shall be completed at final stages of project planning and review such as grading, demolition, or at an earlier stage of project review.

Policy 4: To identify historic resources through literature and records research and/or onsite surveys.

1. To evaluate historic resources through comparative analysis or through subsurface or materials testing.

2. To preserve significant historic resources by one or a combination of the following alternatives, as agreed upon by RDMD and the project sponsor:
    a. Adaptive reuse of historic resource.
    b. Maintaining the historic resource in an undisturbed condition.
    c. Moving the historic resource and arranging for its treatment.
    d. Salvage and conservation of significant elements of the historic resources.
    e. Documentation (i.e., research narrative, graphics, photography) of the historic resource prior to destruction.

Policy 5: To identify archaeological resources through literature and records research and surface surveys.

1. To evaluate archaeological resources through subsurface testing to determine significance and extent.
2. To observe and collect archaeological resources during the grading of a project.
3. To preserve archaeological resources by:
    a. Maintaining them in an undisturbed condition, or
    b. Excavating and salvaging materials and information in a scientific manner.

Goal 3: To preserve and enhance buildings structures, objects, sites, and districts of cultural and historic significance.

Objective 3.1: Undertake actions to identify, preserve, and develop unique and significant cultural and historic resources.

Objective 3.3: To appraise, collect, organize, describe, preserve, and make available County of Orange records of permanent, historical value.

Orange County Municipal Code

Sec. 7-9-42.2. – Definitions

Historic structure. Any structure that is:

1. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
2. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
3. Individually listed on a State inventory of historic places in states with historic preservation programs which have been approved by the Secretary of Interior; or
4. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either by an approved State program as determined by the Secretary of the Interior or directly by the Secretary of the Interior in states without approved programs.

4.4.2 METHODOLOGY

CEQA requires a lead agency to determine whether a project would have a significant effect that would cause a substantial adverse change in the significance of a historical resource or a unique archaeological resource. The cultural resource analysis in this section provides that documentation and is based on the record searches and a consideration of the issues described below.

Built Environment Survey

A survey of all built environment within the Project site was completed by Psomas on July 17, 2023. The survey included documenting all built environment with notes and photographs, as well as the immediate setting.

Background Research

Previous Evaluations of the Santiago Dam (30-176757)

The Santiago Dam is listed in the Office of Historic Preservation's Built Environment Resources Directory with a status code of 2S2, indicating it was determined eligible for the NRHP by consensus through the Section 106 process and is listed in the CRHR.

The Santiago Dam was first recorded and evaluated for historical significance in 2003, who found the dam eligible under NRHP Criterion A for its important historical associations:

> The water provided by the creation of Santiago Dam and Reservoir contributed significantly to the early and mid-20th century development of the citrus industry in Orange County, which was a leading supplier of oranges, lemons, and grapefruit to the entire nation at that time. Therefore, given its strong association with the history of water resources development in Orange County, as well as with the citrus agriculture industry on not only a regional but on a State and national level, the dam is recommended eligible for listing on the NRHP under Criterion A. Because the dam has undergone little modifications since its construction, it retains good integrity of location, design, materials, workmanship, and association.

In 2021, a Continuation Sheet was prepared to update the 2003 evaluation stating they "found no evidence to indicate that the historic integrity of the Santiago Dam has been compromised subsequent to its initial recordation in 2003. The Continuation Sheet concurs with the 2003 recommendation that the Santiago Dam is eligible for listing on the NRHP under Criterion A at the local, State, and national level and retains sufficient integrity to convey that historical significance".

Neither of these studies addressed the eligibility of other aspects of the Dam, such as the Dam Keeper's Residence, Dam Keeper's Garage, Second Garage, Storage Shed, Orange County Waste and Recycling (OCWR) Landfill Flare Facility, or Control Building and Valve Vault.

Project Evaluation

A Historical Resources Assessment (HRA) was prepared for the Project by South Environmental to assess the Project-related effects on historic properties and historical resources on the site and within the vicinity. The HRA includes a pedestrian survey of all built environmental resources over 45 years old within the Project's Area of Potential Effect (APE) and reviewed all background materials regarding the dam, including previously conducted built environment studies, historic

photographs, and current architectural and engineering plans. South Environmental reviewed all available historical newspapers covering the Project site in an effort to understand the development of the Project site and surrounding areas and to review relevant articles pertaining to Santiago Dam development and other structures within the Project site. South Environmental reviewed Sanborn Fire Insurance Company maps, available on the Los Angeles Public Library website, to understand the development of properties in and around the Project site. No Sanborn maps were available for the location of the Project site.

South Environmental reviewed all available historic topographic maps and aerial imagery to understand the development history of the Project site. Historic topographic maps of the Project site were available from U.S. Geological System (USGS) topoView and historic aerial photographs were available from Nationwide Environmental Title Research LLC (NETR) and University of California, Santa Barbara, FrameFinder Maps for various years for the Black Star Canyon.

Cultural Resource Records Search and Literature Review

An archaeological resources records search was conducted at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton on September 21, 2021. The SCCIC is the designated branch of the California Historical Resources Information System for the Project area and houses records concerning archaeological and historic resources in Los Angeles, Ventura, San Bernardino, and Orange Counties. The review consisted of an examination of the USGS Black Star Canyon 7.5-minute quadrangle to evaluate the Project area for any sites recorded or cultural resources studies conducted on the parcel and within a one-mile radius. Data sources consulted at the SCCIC include the Historic Property Data File maintained by the California Office of Historic Preservation, archaeological records, Archaeological Determinations of Eligibility, Historical Landmarks, and historic maps. The records were reviewed to accomplish the following:

- Identify cultural resources (e.g., archaeological sites) in the Project site and surrounding areas;
- Identify and determine the adequacy of previous cultural resources studies in the Project site;
- Develop management recommendations for cultural resources within or adjacent to the Project site; and
- Assess what additional cultural resources studies would need to be undertaken for the proposed Project.

Native American Sacred Lands File Review

An inquiry was made of the NAHC on September 11, 2020, to request a review of the Sacred Lands File (SLF) database regarding the possibility of Native American cultural resources and/or sacred places in the Project vicinity that are not documented on other databases.

Archaeological Field Survey

Psomas surveyed the Project site on October 20, 2020. The entire Project site was surveyed by walking evenly spaced transects spaced no more than 10 meters (32 feet) apart. The archaeologist examined all areas considered highly sensitive for cultural resources and the ground surface for the presence of the following:

- Prehistoric artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools);

- Historic artifacts (e.g., metal, glass, ceramics);
- Sediment discoloration that might indicate the presence of a cultural midden;
- Depressions and other features indicative of the former presence of structures or buildings (e.g., post holes, foundations); and
- Fossil Localities.

Psomas maintained transect accuracy in the Project site using a Garmin global positioning system (GPS) receiver and Project field maps. A field notebook and a digital camera were used to record the survey conditions and findings.

4.4.3 EXISTING CONDITIONS

Precontact Setting

Southern California has a long history of human occupation, with dates of the earliest evidence of human occupation during the late Pleistocene, circa (ca.) 11,000 years B.C. (Glassow et al. 2007: 191). Prehistoric material culture in the State's southern region has been categorized according to periods or patterns that define technological, economic, social, and ideological elements. Within these periods, archaeologists have defined cultural patterns or complexes specific to prehistory within the State's southern region, including the Project site.

The following text and table (Table 4.4-1) illustrates the chronological framework developed for Southern California. This framework is divided into four major periods: Paleoindian period (ca. 11,000–7000 B.C.), Milling Stone period (7000 B.C.–3000 B.C.), Intermediate period (3000 B.C.–A.D. 500), and Late Prehistoric period (A.D. 500–Historic Contact). Within these broad temporal periods are variations in the timing and nomenclature of cultural complexes for the region. The timescales referenced in the following discussion are presented as calendar dates (years B.C.–A.D.).

TABLE 4.4-1
CULTURAL CHRONOLOGY FOR SOUTHERN CALIFORNIA

Period	Cultural Traits	Years (B.C.–A.D.)
Paleoindian	Clovis and Folsom Fluted Projectile Points	11,000 B.C.–7000 B.C.
Milling Stone	Ground Stone Implements; Large Leaf-Shaped Projectile Points	7000 B.C.–3000 B.C.
Intermediate	Large Side-Notched, Stemmed, and Leaf-Shaped Projectile Points; Mortar and Pestle	3000 B.C.–A.D. 500
Late Prehistoric	Smaller Projectile Points with Convex or Concave Bases, Bow and Arrow; Increased Population Size	A.D. 500–1769
Source: Psomas 2024.		

Paleoindian Period (11,000–7000 B.C.)

Recent data from coastal and inland sites during this period indicate that the economy was a diverse mixture of hunting and gathering, with a major emphasis on aquatic resources in many coastal areas and on Pleistocene lakeshores (Moratto 1984:90–92). Although few Clovis-like or Folsom-like fluted points have been found in Southern California, it is widely thought that there was a greater emphasis on hunting at near-coastal and inland sites during the Paleoindian Period than in later periods (e.g., Dillon 2002; Erlandson et al. 1987). Subsistence patterns shifted around 6000 B.C., concurrent with the gradual desiccation associated with the onset of the Altithermal, a

warm and dry period that lasted for about 3,000 years. As the climate changed, a greater emphasis was placed on plant foods and small animals.

Milling Stone Period (7000–3000 B.C.)

The Milling Stone Period (Wallace 1955, 1978) is the earliest well-established period of occupation in Southern California (Glassow et al. 2007: 192). This period is characterized by an ecological adaptation to collecting, accompanied by a dependence on ground stone implements associated with the horizontal motion of grinding small seeds: milling stones (metates, slabs) and hand stones (manos, mullers). Milling stones are found in large numbers for the first time and become more numerous toward the end of this period. As evidenced by their tool kits and shell middens in coastal sites, people during this period practiced a mixed food-procurement strategy. Subsistence patterns became more specialized as groups became better adapted to their regional or local environments. Projectile points from the period are relatively rare, but are large and generally leaf-shaped, and were probably employed with darts or spears thrown with atlatls. Bone tools, such as awls, and items made from shell, including beads, pendants, and abalone dishes, are also quite uncommon. Evidence of weaving or basketry is present at a few sites. The mortar and pestle, associated with the vertical motion of pounding foods such as acorns, were introduced during the Milling Stone Period but did not become common until the Intermediate Period.

Intermediate Period (3000 B.C.–A.D. 500)

The Intermediate Period is characterized by a shift toward a hunting and maritime subsistence strategy, along with a wider use of plant foods. During this period, a pronounced trend toward greater adaptation to regional or local resources can be observed. For example, the remains of fish, land mammals, and marine mammals are increasingly abundant and diverse in sites along the Southern California coast. Chipped stone tools suitable for hunting are more common and both stylistically and technologically varied. Projectile points include large side-notched, stemmed, and lanceolate or leaf-shaped forms. Larger knives, a variety of stone flake scrapers, and drill-like implements are also common during this period. Shell fishhooks become an integral part of the tool kit. Bone tools, including awls, are more numerous than in the preceding period; and the use of asphaltum adhesive becomes more common.

Late Prehistoric Period (A.D. 500–1769)

During the Late Prehistoric Period, use of plant food resources increased in conjunction with land and marine mammal hunting. The variety and complexity of material culture also increased during this period, demonstrated by more diverse classes of artifacts. The recovery of many small, finely chipped projectile points, usually stemless with convex or concave bases, suggests an increased utilization of the bow and arrow for hunting rather than the atlatl and dart.

During this period, an increase in population size is accompanied by the advent of larger, more permanent villages with greater numbers of inhabitants (Wallace 1955:223). Some coastal and near-coastal settlements were occupied by as many as 1,500 people. Many of these larger settlements were permanent villages where at least some people resided year-round. The populations of these villages may have also increased seasonally.

Post Contact History

Prior to European exploration and colonization efforts in the 18th century, Orange County and the Santiago Canyon was home to Juaneño and Gabrielino Native American communities. The earliest European colonizers traveled through Orange County as part of Don Gaspar de Portolá's overland expedition into Alta California. The Portola expedition camped in what is now Santiago

Canyon in July of 1769 and again in January of 1770 when missionary Juan Crespi noted the location of the Santiago Creek and that the missionaries had named it Santiago after the patron Saint of Spain. In 1797, Father Junipero Serra founded Mission San Gabriel in present day Los Angeles and Mission San Juan Capistrano in 1776. Between these two missions, the majority of Orange County was under mission control and used primarily as grazing lands. In 1821, Mexico gained independence from Spain and in 1833 the Mexican government moved to secularize former mission lands and granted them to Mexican citizens. Teodocio Yorba, the youngest son of Jose Antonio Yorba who was one of the largest landowners in orange County, received the Rancho Lomas de Santiago land grant in 1846. Teodocio established his ranch headquarters at the present site of Irvine Lake.

With the signing of the Treaty of Guadalupe Hidalgo in 1848, Alta California was ceded to the United States and California became a U.S. Territory. The Congressional Act of 1851 forced landholders to reapply to the Board of Land Commissioners to get valid title to their ranchos. Yorba was able to retain his claim to Rancho Lomas de Santiago and sold the rancho to William Wolfskill in 1860. After suffering financial misfortune as a result of the drought of 1863–1864, Wolfskill sold the rancho to Llewellyn Bixby, Thomas and Benjamin Flint, and James Irvine in 1866. Bixby, the Flints, and Irvine had also purchased other large sections of rancho land, but the acquisition of Rancho Lomas de Santiago was important to securing water rights in the region. In 1877, James Irvine acquired his partner's shares in the various ranchos they had purchased together, becoming sole owner of over 110,000 acres of land that stretched 23 miles from the Pacific Ocean to the Santa Ana River.

Santiago Dam

For most of the late 19th and early 20th centuries, the land around the present site of Santiago Dam was used for cattle and sheep grazing, as well as recreation. The Serrano Irrigation District (known today as the SWD) provided water for the earliest citrus groves in the Orange and Villa Park areas, beginning in 1876. By the late 1920's, the demand for irrigation water had increased to the point that a large storage reservoir was needed. In response to this demand, the Serrano Irrigation District and the John T. Carpenter Water Company of Villa Park undertook a joint project in 1930. Santiago Dam was constructed, creating Santiago Reservoir (now called Irvine Lake), during 1931. Although the dam was designed by Kempkey, the on-site supervising engineer was Wess Albert, and the construction contractor was R.G. Tourneau. The dam was completed in 1933, and the reservoir was first completely filled, with water running over the spillway at its west end, in 1937. In 1934, a dam keeper's residence was constructed on a hillside overlooking the east end of the dam. The water provided by the creation of the dam and reservoir contributed significantly to the early and mid-20th century development of the citrus industry in Orange County, one of the leading citrus-producing regions of the U.S. at that time. The facility was originally intended only for irrigation water storage but was opened for recreational use in 1941. Today, IRWD still distributes untreated water from the reservoir for irrigation and can treat water from Irvine Lake to potable standards at its Baker Water Treatment and at the Howiler Treatment Plant. The County of Orange currently operates Irvine Lake's recreational concessions.

Report Findings

South Central Coastal Information Center

The SCCIC record search identified 28 prior technical cultural resources studies and academic overviews within ½-mile of the Project site. Of the 28 previous investigations, 14 of these studies occurred or overlapped within the Project site (Table 4.4-2). The studies crossed the current Project site as early as 1979 and as recently as 2007. The types of studies include academic overviews, cultural resource surveys and assessments, mitigation monitoring, and testing and

evaluations. The academic overview studies are a testament to the archaeological sensitivity of region, including the Project site. The records search results summary letter from SCCIC are included in Appendix D.

TABLE 4.4-2
CULTURAL RESOURCE STUDIES WITHIN THE PROJECT SITE

Report	Author	Year	Study	Type of Study
OR-00305	Schroth, Adella	1979	The History of Archaeological Research on Irvine Ranch Property: The Evolution of a Company Tradition	Cultural Resources Research
OR-00648	Breece, Bill and Beth Padon	1982	Cultural Resource Survey: Archaeological Resources. Foothill Transportation Corridor, Phase II	Cultural Resources Research
OR-00752	Mason, Roger D.	1984	Eastern Corridor Alignment Study, Orange County, California. Volume II: Prehistory and History	Cultural Resources Research
OR-00983	Bissell, Ronald M.	1989	Cultural Resources Reconnaissance of East Orange Planning Area 1: 1,800 Acres in Eastern Orange County, California	Cultural Resources Research
OR-01005	Breece, William H.	1989	Archaeological Survey of Proposed Landfill Gas Recovery and Disposal System at the Santiago Canyon and Prima Deshecha Landfills	Cultural Resources Research
OR-01026	Mason, Roger D.	1990	Cultural Resources Survey Report Santiago Canyon Road Alignment Study Orange County, California	Cultural Resources Research
OR-01039	Sturm, Bradley L.	Unknown	An Archaeological Assessment of the Irvine Lake Desilting Project	Cultural Resources Research
OR-01080	Palmer, Robert	1991	Archaeological Monitoring at Santiago Canyon Landfill Flare Station	Cultural Resources Research
OR-02225	Strozier, Hardy	1978	The Irvine Company Planning Process and California Archaeology: A Review and Critique	Cultural Resources Research
OR-02534	Anonymous	1976	Annual Report to the Irvine Company from Archaeological Research, Inc.	Cultural Resources Research
OR-02858	Chace, Paul G.	1971	The Black Star Canyon Project: A Landmarks Survey	Cultural Resources Research
OR-02882	Dice, Michael and Christeen Taniguchi	2004	Final Phase II Archaeological Testing Evaluation of Irvine Ranch Cultural Resources. Santiago Hills Planned Community – Tract Maps Nos 16199 and 16201 and East Orange Planned Community Area – Tract Map No 16514 and the East Orange Planned Community	Cultural Resources Research
OR-02918	Cotterman, Cary D., Evelyn N. Chandler, and Roger D. Mason	2003	Cultural Resources Survey Report for a Verizon Telecommunications Facility: Santiago Dam Located at Irvine Lake (Santiago Reservoir), Orange County, California	Cultural Resources Research

TABLE 4.4-2
CULTURAL RESOURCE STUDIES WITHIN THE PROJECT SITE

Report	Author	Year	Study	Type of Study
OR-03600	Garcia, Kyle H. and Marcy Rockman	2007	Results of Archaeological Survey and Monitoring for Southern California Edison's Pole Replacements After Santiago Fire Along Santiago Canyon Road, Modjeska Canyon Road, and Hicks Canyon Road; Orange County, California	Cultural Resources Research
Source: Psomas 2024.				

The SCCIC records searches identified 18 previously recorded cultural resources within ½-mile of the Project site (Table 4.4-3). The previously recorded resources include two precontact isolates (ground stone), 12 precontact sites, three historic sites/built environments, and one multicomponent site. The precontact sites consist of rock shelters, lithic scatters (stone debris left over from making stone tools), hearths (roasting pits/remnants of campfires), cairns (rock features), bedrock milling features (ground stone technology), habitation debris (midden), and burials. The historic sites consist of roads/trails, single family residences, standing structures, wells/cisterns, water conveyance systems and a standing engineering structure (dam). Of the 18 cultural resources, two (P-30-001012 and P-30176757) were identified within the Project site. Cultural resource P-30-001012 is described as a precontact lithic scatter and cultural resource P-30-17657 is the Santiago Dam.

TABLE 4.4-3
PRIOR CULTURAL RESOURCES WITHIN THE 1/2-MILE RADIUS OF THE PROJECT SITE

Primary Number	Site Number	Site Type	Attribute Type	Year(s) Recorded	Proximity to Project Site
P-30-000237	CA-ORA-237	Prehistoric: lithic scatter; cairns/rock features; burials; hearth/pits; other	AP02; AP08; AP09; AP11; AP16	1969	Outside
P-30-000238	CA-ORA-238	Prehistoric: burials; hearths/pits	AP09; AP11	1969	Outside
P-30-000239	CA-ORA-239	Prehistoric: lithic scatter	AP02	1969	Outside
P-30-000240	CA-ORA-240	Prehistoric: habitation debris	AP15	1968	Outside
P-30-000304	CA-ORA-304	Prehistoric: lithic scatter; bedrock milling feature	AP02; AP04	1971	Outside
P-30-000319	CA-ORA-319	Prehistoric: lithic scatter	AP02	1982	Outside
P-30-000320	CA-ORA-320	Prehistoric: lithic scatter; hearth/pits; rock shelter/cave	AP02; AP11; AP14	1995	Outside
P-30-001012	CA-ORA-1012	Prehistoric: lithic scatter	AP02	1971	Within
P-30-001272	CA-ORA-1272	Prehistoric: lithic scatter	AP02	1990	Outside
P-30-001277	CA-ORA-1277	Prehistoric: lithic scatter; rock shelter/cave	AP02; AP14	1971	Outside
P-30-001294	CA-ORA-1294	Prehistoric: lithic scatter; hearth/pits	AP02; AP11	1990	Outside
P-30-001460	CA-ORA-460/H	Multicomponent: lithic scatter; monument/mural/gravestone	AP02; HP26	1982	Outside
P-30-001474	CA-ORA-1474H	Historic: foundations/structures pads; landscaping/orchard; water conveyance system; standing structures; single family property; farm/ranch	AH02; AH03; AH06; AH15; HP02; HP33	2004	Outside
P-30-001535	CA-ORA-1535	Prehistoric: lithic scatter; cairns/rock features	AP02; AP08	1991	Outside
P-30-001771	CA-ORA-1771H	Historic: foundations/structure pads; landscaping/orchard; roads/trails/railroad grades	AH02; AH03; AH07	1990	Outside
P-30-100304	–	Prehistoric: isolated lithic scatter	AP02 (Isolate)	1991	Outside
P-30-100460	–	Prehistoric: isolated lithic scatter	AP02 (Isolate)	2004	Outside
P-30-176757	–	Historic: engineering structure; dam	HP11; HP21	2018	Within

Source: Psomas 2024.

CA-ORA-1012 (P-30-001012)

This archaeological site was originally recorded by W. H. Bryce in 1982 as a precontact lithic scatter measuring 70 x 95 meters and consisting of debitage (debris from manufacturing stone tools) and groundstone (stone that has been pecked or ground into a specific shape). The debitage includes 16 pieces of secondary debitage comprising of 12 white chert secondary flakes and four chalcedony flakes, all described as small to medium in size. The groundstone assembly includes one piece (fragment) of a basin metate and one piece (fragment) of a shallow bowl. The metate fragment measured 19 x 19 x 7 centimeters (cm) and the stone bowl fragment measured 21 cm x 14 cm x 26 cm.

In 2004, the archaeological site was relocated. None of the cultural resources (artifacts discussed above) previously identified in 1982 were visible on the ground surface. However, it should be noted disturbance from agricultural activities may have displaced these resources after 1982. No cultural resources (i.e., groundstone, projectile points) were recovered from the excavations and no stratigraphic evidence for cultural middens (habitation debris) were observed. In accordance with CEQA, and using criteria outlined for the CRHR eligibility, it was determined that the site does not qualify for the CRHR and is not a unique archaeological resource for the purposes of CEQA. However, should modifications take place within the site boundary beyond the area tested, it was concluded that additional subsurface investigations should be considered.

Santiago Dam (P-30-176757)

As a cultural resource, Santiago Dam was first documented in 2003, when a DPR 523 Series Form was prepared documenting the dam was built in 1933 as an earthen and concrete structure containing 1,100,000 cubic yards of clay, porous soil, and rock. The dam was noted as 1,425 feet (0.27 mile) long as the crest, which rose 136 feet above the surrounding ground at its highest point. At this time, the dam was recommended as eligible for listing on the NRHP under Criterion A.

Native American Sacred Lands File Review Results

On September 11, 2020, Psomas requested that the NAHC conduct a search of its SLF to determine if cultural resources important to Native Americans have been recorded in the Project site or in the immediate vicinity. The results of the NAHC SLF search were received on October 9, 2020, and were positive for sacred lands in the vicinity of the Project site. The NAHC recommended contacting the Juaneño Band of Mission Indians Acjachemen Nation – Belardes for more information.

The results letter also included a list of tribes affiliated with the Project area (see Table 4.4-4). Consultation pursuit to AB 52 was conducted by IRWD. The results of the AB 52 consultation between IRWD and local Native American representatives have been documented as part of the CEQA review prepared for the Project. The SLF search results summary letter from the NAHC are included in Appendix D. For additional information regarding the consultation process, please see Chapter 4.15, Tribal Cultural Resources, of this EIR.

TABLE 4.4-4
NAHC TRIBAL REPRESENTATIVES CONTACT LIST

Tribal Organization	Indigenous Affiliation	Contact(s)
Campo Band of Diegueno Mission Indians	Diegueno	Ralph Goff
Ewiiaapaayp Band of Kumeyaay Indians	Diegueno	Robert Pinto; Michael Garcia
Cabazon Band of Mission Indians	Cahuilla	Daniel Salgada
Gabrieleno Band of Mission Indians – Kizh Nation	Gabrieleno	Andrew Salas
Gabrieleno/Tongva San Gabriel Band of Mission Indians	Gabrieleno	Anthony Morales
Gabrielino/Tongva Nation	Gabrielino	Sandonne Goad
Gabrielino Tongva Indians of California Tribal Council	Gabrielino	Robert Dorame
Gabrielino-Tongva Tribe	Gabrielino	Charles Alvarez
Juaneño Band of Mission Indians Acjachemen – Belardes	Juaneño	Matias Belardes
La Posta Band of Diegueno Mission Indians	Diegueno	Gwendolyn Parada; Javaugh Miller
Pala Band of Mission Indians	Cupeno; Luiseno	Shasta Gaughen
Manzanita Band of Kumeyaay Nation	Diegueno	Angela Elliott
Mesa Grande Band of Diegueno Mission Indians	Diegueno	Michael Linton
Pala Band of Mission Indians	Cupeno; Luiseno	Shasta Gaughen
Santa Rosa Band of Cahuilla Indians	Cahuilla	Lovina Redner
Soboba Band of Luiseno Indians	Cahuilla; Luiseno	Isaiah Vivanco

Archeological Field Survey Results

As indicated above, a Psomas cross-trained archaeologist/paleontologist surveyed the Project site on October 20, 2020. The Santiago Dam was noted as being within the Project site. No new archaeological resources were identified within the Project area; however, it should be noted the ground visibility was obscured by several species of native and non-native vegetation. Additionally, Psomas relocated archaeological site P-30-001012. None of the cultural resources previously recorded were observed on the surface; however, as noted in 2004 the artifact assemblage and site boundary were not observed due to the site being stripped for agricultural practices along with scattered debris piled and placed along a nearby small drainage.

Significance Evaluation

Santiago Dam (P-30-176757)

NRHP, CRHR, and County Designation Criteria

The Santiago Dam appears to remain eligible for the NRHP, CRHR, and local landmark designation based on the following application of designation criteria and integrity requirements.

NRHP Criterion A. That are associated with events that have made a significant contribution to the broad patterns of our history.

CRHR Criterion 1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

Santiago Dam is directly associated with events that made significant contributions to the development of the citrus industry in Orange County in the late 19th and early 20th century with a period of significance of 1933, when the dam was built. The subject property was constructed by the Serrano Irrigation District, John T. Carpenter Water Company, and the Irvine Company. Prior to construction on the dam, farmers dug wells, built reservoirs, and laid pipelines to irrigate their crops. Water quality and water scarcity prompted a change in water distribution and the installation of wells. Water runoff and irrigation rights were a constant struggle between the Irvine, Carpenter, and Serrano Irrigation Districts. The dispute between the three districts was resolved when they came together to construct the Santiago Dam. The Dam provided water for domestic and agricultural uses and is directly related to the development of the citrus industry in Orange County during the late 19th and early 20th century.

The Santiago Dam, including the dam, outlet tower, spillway, and reservoir, is directly associated with the historical and current function of the Dam. Although the Dam Keeper's Residence and Garage appear to have been constructed around the same time as the Dam, their significantly altered appearance makes them unrecognizable from the period of significance of the Dam. The remaining features within the Dam such as the Storage Shed, Second Garage, Control Building and Valve Vault, and OCWR Landfill Flare Facility are non-contributing features constructed outside the period of significance of the Dam.

Therefore, the Santiago Dam is eligible under NRHP Criterion A and CRHR Criterion 1 for its important contributions to local water and agricultural history.

NRHP Criterion B. That are associated with the lives of persons significant in our past.

CRHR Criterion 2. Is associated with the lives of persons important in our past.

The subject property is a dam constructed by the John T. Carpenter Water Company, Serrano Irrigation District, and the Irvine Company. Review of local publications and newspaper articles failed to indicate that the subject property has any important associations with significant persons in regional history. Therefore, the subject property is not eligible under NRHP Criterion B or CRHR Criterion 2.

NRHP Criterion C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

CRHR Criterion 3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

The Santiago Dam is an earthen and concrete structure constructed in 1933. Although Augustus Kempkey appears to have consulted on numerous water projects throughout California, he does not appear to have been a master engineer when considered among others in his field. Further, the Santiago Dam is an earthen embankment dam, the most common type of dam in the United States; they can be built from locally available materials that require minimal processing, saving money on the construction process. The Dam does not possess high artistic value or innovative engineering features. Therefore, the Santiago Dam is not eligible under NRHP Criterion C or CRHR Criterion 3.

NRHP Criterion D. That have yielded, or may be likely to yield, information important in prehistory or history.

CRHR Criterion 4. Has yielded, or may be likely to yield, information important in prehistory or history.

The subject property is not significant as a source, or likely source, of important historical information nor does it appear likely to yield important information about historic construction methods, materials, or technologies. Therefore, the subject property is not eligible under NRHP Criterion D or CRHR Criterion 4.

Integrity

Location: The subject property retains integrity of location as it remains in its current location.

Design: The subject property has integrity of design. Although there have been a few alterations, the design of the Dam remains relatively unchanged.

Setting: The subject property has integrity of setting. The Dam is still located in an undeveloped rural setting.

Materials: The subject property retains integrity of materials as the dam and spillway retain original materials.

Workmanship: The subject property retains integrity of workmanship as evidence of the original craftsmanship is present.

Feeling: The subject property retains integrity of feeling as the area remains undeveloped and rural.

Association: The subject property continues to be associated with the distribution of water for agricultural and domestic use.

The Santiago Dam is eligible for listing under NRHP and CRHR under Criterion A/1.

Taiwan 12kV Overhead Distribution Line

The Taiwan 12kV Overhead Distribution Line is not eligible for the NRHP, CRHR, and local landmark designation based on the following application of designation criteria and integrity requirements.

NRHP Criterion A. That are associated with events that have made a significant contribution to the broad patterns of our history.

CRHR Criterion 1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

Guidance provided in Tinsley Becker et al. 2015 states that sub transmission lines and their associated infrastructure should be evaluated under two important themes, which are most appropriately examined below under Criteria A/1/2:

1. An association with and representation of SCE's organizational history as evidence of key expansion periods that contributed to or served as the genesis of settlement or marked growth in community services by SCE.

   The Taiwan 12kV Overhead Distribution line was energized c. 1952. Information regarding the construction of the line is limited. The design for distribution lines was borrowed from

telegraph transmission technology and uses infrastructure that is found State-wide. The principles of the design of distribution systems are rudimentary with minor changes since their inception and are unable to reflect significance from the period from which they were constructed.

2. An association with SCE's original construction and implementation campaigns or the established period of significance for the company's 66kV, 220kV, and 500kV systems.

   The Taiwan 12kV Overhead Distribution line is not associated with SCE's early construction and implementation campaigns, nor does it fall within the period of significance for either SCE's 66kV, 220kV, or 500kV systems.

For the reasons demonstrated above, the subject property is not eligible under NRHP Criterion A or CRHR Criterion 1.

NRHP Criterion B. That are associated with the lives of persons significant in our past.

CRHR Criterion 2. Is associated with the lives of persons important in our past.

The subject property is a transmission line that is owned by SCE. Review of local publications and newspaper articles failed to indicate that the subject property has any important associations with significant persons in regional or SCE history. Therefore, the subject property is not eligible under NRHP Criterion B, CRHR Criterion 2, or County Criterion 3.

NRHP Criterion C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

CRHR Criterion 3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

The Taiwan 12kV Overhead Distribution Line does not serve as an important example of electrical infrastructure on SCE's system. Under this criterion, wood poles are considered ubiquitous and indistinctive utilitarian structures that are purely functional and do not exhibit any important construction methods or technologies. Further, the line is not an early example of electrical voltage or transmission technology and does not represent an innovation in engineering design or for construction material technology. Therefore, the subject line is not eligible under NRHP Criterion C or CRHR Criterion 3.

NRHP Criterion D. That have yielded, or may be likely to yield, information important in prehistory or history.

CRHR Criterion 4. Has yielded, or may be likely to yield, information important in prehistory or history.

The subject property is not significant as a source, or likely source, of important historical information nor does it appear likely to yield important information about historic construction methods, materials, or technologies. Therefore, the property is not eligible under NRHP Criterion D or CRHR Criterion 4.

Integrity

Location: The subject property retains integrity of location as it remains in its current location.

Design: The subject property has integrity of design. Although there have been a few alterations, the design of the dam and spillway remain unchanged.

Setting: The subject property has integrity of setting. The line continues to be located in an undeveloped rural setting.

Materials: The subject property appears to retain integrity of materials as they do not appear to have been replaced.

Workmanship: The subject property retains integrity of workmanship as evidence of the original craftsmanship is present.

Feeling: The subject property retains integrity of feeling as the presence of wood poles help it retain a circa 1952 feeling.

Association: The subject property has no important associations with any patterns of regional development or SCE organization history and falls outside the period of significance for 66kV electrical transmission.

The Taiwan 12kV Overhead Distribution line is not eligible for listing under NRHP and CRHR under any designation criteria.

4.4.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant cultural resources impact if it would:

Threshold 4.4-1 Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.

Threshold 4.4-2 Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.

Threshold 4.4-3 Disturb any human remains, including those interred outside formal cemeteries.

4.4.5 IMPACT ANALYSIS

Regulatory Requirement

RR CR-1 If human remains are found during ground-disturbing activities, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains will occur, in accordance with Section 7050.5 of the California Health and Safety Code. The County Coroner will be notified of the discovery immediately. If the County Coroner determines that the remains are or believed to be Native American, s/he will notify the NAHC within 24 hours of the discovery. In accordance with Section 5097.98 of the California Public Resources Code, the NAHC must immediately notify those persons it believes to be the most likely descended from the deceased Native American (i.e., the most likely

descendant). The descendants will complete their inspection within 48 hours of being granted access to the site by IRWD. IRWD will discuss and confer with the most likely descendants regarding all reasonable options regarding the descendants' preferences for treatment of the human remains prior to disturbing the site by further construction activity.

Threshold 4.4-1

Would the Project cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?

Less Than Significant Impact. One historic property/historical resource was identified within the Project site: the Santiago Dam (P-30-176757), which currently has a status code of 2S2, indicating it has been determined eligible for the NRHP and is listed in the CRHR. The updated evaluation completed as part of the current study found that the Dam remains eligible for the NRHP/CRHR under Criterion A/1. The Dam is eligible for its important historical associations with water resources development in Orange County, as well as with the citrus agriculture industry.

Although specific aspects of the Dam would be modified, it would remain recognizable as an earthen embankment dam and would continue to perform the historic function for which it is eligible. The character-defining features of the Dam necessary for it to continue to convey its historical significance under Criterion A/1 include its ongoing function as an earthen embankment dam on Santiago Creek, maintaining the same general massing and scale. Therefore, the proposed Project would result in no adverse effects to historic properties under Section 106 of the NHPA, and no significant impacts to historical resources under CEQA.

Impact Conclusion: *The Santiago Dam (P-30-176757) was determined eligible for the CRHR and listed in the CRHR. Although specific aspects of the Dam would be modified, it would remain recognizable as an earthen embankment dam and would continue to perform the historic function for which it is eligible. Thus, the Project would not cause a substantial adverse change in the significance of an historical resource, and no mitigation is required.*

Threshold 4.4-2

Would the Project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section15064.5?

Less Than Significant with Mitigation. A significant impact could occur if grading or excavation activities associated with the Project were to disturb archaeological resources that presently exist within the Project site. As stated previously, the results of the 2021 SCCIC cultural resources records searches identified 18 previously recorded cultural resources within ½-mile of the Project site. The previously recorded resources include two precontact isolates (ground stone), 12 precontact sites, three historic sites/built environments, and one multicomponent site. The precontact sites consist of rock shelters, lithic scatters (stone debris left over from making stone tools), hearths (roasting pits/remnants of campfires), cairns (rock features), bedrock milling features (ground stone technology), habitation debris (midden), and burials. The historic sites consist of roads/trails, single family residences, standing structures, wells/cisterns, water conveyance systems and a standing engineering structure (dam). Of the 18 cultural resources, one archaeological resource (P-30-001012) was identified within the Project area. Cultural resource P-30-001012 is described as a precontact lithic scatter. Furthermore, the NAHC SLF search was positive for sacred sites.

Fieldwork relocated P-30-001012; however, no new archaeological resources and/or cultural resources were identified within the Project site. Both the Project site and the surrounding area are considered highly sensitive for archaeological resources dating to both the precontact period and the historic era. Moreover, the Santiago Dam, a documented resource eligible for listing on the NRHP/CRHR under Criterion A/1, is located within the Project site, and while the resource is not an archaeological resource, historic refuse left behind from the construction of the dam may be present below the ground surface. As such, there is the possibility that undiscovered intact archaeological resources (precontact or historic era) may be present in previously undisturbed soils. Therefore, the Project would implement **MM CR-1**, which requires archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and **MM CR-2**, which provides details for treatment of unanticipated discoveries.

Impact Conclusion: *The Project has potential to cause a substantial adverse change in the significance of an archaeological resource. However, potential effects would be mitigated to a less than significant level with the implementation of **MM CR-1**, which requires archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and **MM CR-2**, which identifies treatment of unanticipated discoveries.*

Threshold 4.4-3

Would the Project disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant Impact. A Project-related significant adverse effect could occur if grading or excavation activities associated with the Project were to disturb previously interred human remains. No known burial sites are located on or adjacent to the Project site. In the unlikely event of an unanticipated encounter with human remains in Project site, the *California Health and Safety Code* and the *California Public Resources Code* require that any activity in the area of potential finding be halted, and the Orange County Coroner be notified, as described in **RR CUL-1**. Implementation of **RR CUL-1** would reduce this impact to a less than significant level.

Impact Conclusion: *Pursuant to Threshold 4.4-3, Project activities are not expected to disturb human remains. However, if human remains are encountered during grading activities, **RR CR-1** requires that any activity in the area of a potential find be halted, and the Orange County Coroner be notified. Implementation of **RR CR-1** would reduce this impact to a less than significant level.*

4.4.6 CUMULATIVE IMPACTS

Archaeological and historic resources impacts are site-specific with regard to any given resource. Impacts that may be considered cumulative relate to the general loss of cultural resources over time throughout the region. The Project would not cause an adverse change to the significance of a historical resource pursuant to Section 15064.5. The Project, in conjunction with cumulative development, could lead to the accelerated degradation of previously unknown archaeological resources. However, the Project would comply with **MM CR-1** and **MM CR-2**, which require archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and identify treatment of unanticipated discoveries. Thus, the Project would result in less significant impacts to archaeological resources.

The Discovery of human remains are also site-specific. Although unlikely to occur, potential impacts associated with human remains would be reduced to a less than significant level with adherence to existing State law (**RR CR-1**).

Therefore, implementation of the Project would have no significant cumulative impacts associated with historic resources, archaeological resources, and human remains.

4.4.7 MITIGATION PROGRAM

Mitigation Measures

MM CR-1 IRWD will retain a certified archaeologist, defined as an archaeologist meeting the Secretary of the Interior's Standards for professional archaeology, to observe ground-disturbing activities (including but not limited to geotechnical excavations, vegetation removal, grubbing, grading, and excavation) within previously undisturbed soils below fill soils and to salvage and catalogue archaeological resources as necessary. Monitoring will not be required for secondary movement of soils, such as backfilling. The archaeologist will be present at the pre-construction meeting, will establish procedures for archaeological resource surveillance within previously undisturbed soils in coordination with IRWD throughout construction of the proposed Project, and will establish, in cooperation with IRWD, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of the artifacts as appropriate. The archaeological monitor will have the authority to temporarily halt or divert work away from any discoveries of archaeological resources in order to evaluate the resources pursuant to **MM CR-2**. The archaeologist may determine, in consultation with IRWD, to reduce monitoring to spot-checking or eliminate monitoring depending on site conditions observed, such as the presence of fill material, soil stratigraphy, encountering bedrock, or other factors.

The archaeological monitor will keep daily logs detailing the types of activities and soils observed, and any discoveries. After monitoring has been completed, the certified archaeologist will prepare a monitoring report that details the results of monitoring. The report will be submitted to IRWD and any Native American groups who request a copy. The certified archaeologist will submit a copy of the final report to the California Historic Resources Information System South Central Coastal Information Center.

MM CR-2 If archaeological resources are inadvertently unearthed during excavation activities (within disturbed or undisturbed soils), the contractor will immediately cease all earth-disturbing activities within a 50-foot radius of the area of discovery, and the certified archaeologist and IRWD will be notified immediately. If the certified archaeologist determine the archaeological resources are potentially significant pursuant to CEQA Guidelines Section 15064.5 or California PRC Section 21083.2(g), the archaeologist, in consultation with IRWD and representatives from the tribal governments consulting under AB 52, will determine appropriate treatment, which may include avoidance of the area of the find, data recovery, documentation, testing, reburial, archival review, and/or transfer to the appropriate museum or educational institution, or other appropriate actions. After the find has been appropriately avoided or mitigated, work in the area may resume.

4.4.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Project-specific and cumulative impacts to historic resources, archaeological resources, and human remains associated with the Project would be less than significant. Potential impacts to archeological resources would be mitigated to a less than significant level with the implementation of **MM CR-1**, which requires archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and **MM CR-2**, which provides details for treatment of unanticipated discoveries. Additionally, the Project would comply with the State requirements pertaining to the protection of human remains by implementing **RR CR-1**.

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4.5 ENERGY

This section of the Environmental Impact Report (EIR) describes the existing energy conditions of the Project area and identifies associated potential energy impacts related to development of the proposed Project. Energy consumption calculations associated with this Project are included as Appendices B and E to this EIR.

4.5.1 BACKGROUND

Existing Conditions

Electric Power

Southern California Edison (SCE) maintains electrical facilities and infrastructure within the County and surrounding areas that provide service to the Project area under the applicable rules and tariffs approved by the California Public Utilities Commission (CPUC). SCE delivers power to approximately 15 million people in California, including the Project site (SCE 2019).

Natural Gas

SoCalGas (SCGC) is the nation's largest natural gas distribution utility, delivering increasingly clean, safe and reliable energy to 21.1 million consumers through 5.9 million meters in more than 500 communities (SCGC 2023). SoCalGas' service territory encompasses approximately 24,000 square miles throughout Central and Southern California, from Visalia to the Mexican border. The service would be provided in accordance with SCGC's policies and extension rules on file with the CPUC.

4.5.2 REGULATORY SETTING

Federal

Energy Independence and Security Act of 2007

The Energy Independence and Security Act (EISA) of 2007 (Public Law 110–140) seeks to provide the nation with greater energy independence and security by increasing the production of clean renewable fuels; improving vehicle fuel economy; and increasing the efficiency of products, buildings, and vehicles. It also seeks to improve the energy performance of the federal government. The EISA sets increased Corporate Average Fuel Economy Standards; the Renewable Fuel Standard; appliance energy efficiency standards; building energy efficiency standards; and accelerated research and development tasks on renewable energy sources (e.g., solar energy, geothermal energy, and marine and hydrokinetic renewable energy technologies), carbon capture, and sequestration.

State

CEQA

California Public Resources Code Section 21100(b)(3) and Appendix F to the CEQA Guidelines require a discussion of potential energy impacts of proposed projects.

Appendix F states:

> The goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include:
>
> (1) Decreasing overall per capita energy consumption,
>
> (2) Decreasing reliance on fossil fuels such as coal, natural gas, and oil, and
>
> (3) Increasing reliance on renewable energy sources.

Appendix F of the CEQA Guidelines also requires that "EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy".

California Public Utilities Commission

The CPUC regulates utility companies and ensures the provision of safe, reliable utility service and infrastructure related to electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. CPUC General Order 112E, which is based on the Federal Department of Transportation Guidelines contained in Part 192 of the Code of Federal Regulations, specifies a variety of design, construction, inspection, and notification requirements. The CPUC conducts annual audits of pipeline operations to ensure compliance with these safety standards. In addition, SCGC has a safety program which has reduced the risk of gas distribution fires by improving welds on the larger diameter (24- to 30-inch) pipelines and by replacing old distribution pipes with flexible plastic pipes.

California Energy Commission

In 1974, the California Energy Commission (CEC) was created to be the State's principal energy planning organization and to meet the energy challenges facing the State in response to the 1973 oil embargo. The CEC is charged with seven basic responsibilities when designing State energy policy:

- Advancing State Energy Policy;
- Achieving Energy Efficiency;
- Certifying Thermal Power Plants;
- Investing in Energy Innovation;
- Transforming Transportation;
- Developing Renewable Energy; and
- Preparing for Energy Emergencies.

Local

Orange County

General Plan

The Orange County General Plan provides the vision of the future and framework for development in the County. The General Plan is comprised of various elements or topical sections that cover different aspects of the County. The two Elements that are most relevant to the Project are the Public Services and Facilities Element and Resources Element.

Public Services and Facilities Element

The Public Services and Facilities Element focuses on those publicly managed services and facilities which have a direct influence on the distribution and intensity of development that can be accommodated through the utilization of existing technologies and assumptions that are used to determine adequate service levels. These services include flood control, waste management, water and wastewater, transportation, and community services (i.e., fire protection, library, sheriff patrol, local special services districts, and public-school facilities).

The following goals, objectives, and policies from the Public Services and Facilities Element of the Orange County General Plan are relevant to the proposed Project.

Water System

Goal 1: Encourage the planning and development of a water conveyance and distribution system to meet the County's future demand.

Objective 1.1: To achieve desired water system service levels through the coordination of land use and water system planning.

Objective 1.2: To implement State, regional, and local facility plans for water delivery to Orange County.

Objective 1.3: To increase storage and delivery capacity for water supplies in Orange County.

Policy 1: *System Capacity and Phasing* – To ensure the adequacy of water system capacity and phasing, in consultation with the service providing agency(ies), in order to serve existing and future development as defined by the General Plan.

Policy 2: *Water Delivery System* – To support water facility planning and development efforts for Orange County water supplies conducted by local and regional water agencies.

Resources Element

The Resources Element, one of nine elements of the Orange County General Plan, contains official County policies on the conservation and management of resources. The Resources Element establishes a strategy for the development, management, preservation, and conservation of resources that are necessary to meet Orange County's existing and future demands. Aspects of this Element that relate to the Project are local water availability and water quality. The Water Resources Component of the Element describes the need to manage local water resources to meet the County's needs.

The following goals, objectives, and policies from the Resources Element of the Orange County General Plan are relevant to the proposed Project.

Water Resources Component

The use, supply, and conservation of water are critical issues in Orange County. Since almost every urban activity is dependent on water to some extent, it is in the best interest of the general public that the County's water resources are properly planned and managed.

Goal 1: Ensure an adequate dependable supply of water of acceptable quality for all reasonable uses.

Objective 1.1: To maintain the adequacy and dependability of imported water supplies.

Objective 1.3: To reduce dependence on imported water supplies through both conservation and local water resource development.

Policies

Policy 1: *Water Supply* – To ensure the adequacy of water supply necessary to serve existing and future development as defined by the General Plan.

Policy 2: Conservation – To reduce per capita and total water consumption through conservation and reclamation programs and the support of new technologies.

Policy 4: *Shortage Planning* – To ensure that Orange County will not be severely impaired by any potential future water shortages.

Policy 5: *Water Quality* – Protect and improve water quality through continued management, enforcement, and reporting requirements. Encourage an integrated water resources approach for stormwater management that considers water supply, water quality, flood control, open space, and native habitats. Promote coordination between the County, cities, and other stakeholders in the identification and implementation of watershed protection and Low Impact Development (LID) principles. Consider implementation of LID principles to conserve natural features (e.g., trees, wetlands, streams, etc.), hydrology, drainage patterns, topography, and soils. Encourage the creation, restoration, and preservation of riparian corridors, wetlands, and buffer zones. Continue to educate the public about protecting water resources. Additional water quality policies are also provided in the Land Use Element.

4.5.3 METHODOLOGY

Construction

Fuel use for diesel and gasoline are provided for the construction phase for off-road equipment, worker commutes, haul trips, and vendor trips. Fuel consumption was estimated based on anticipated construction durations, as well as equipment quantities and types. Construction energy consumption was estimated using a combination of the California Emissions Estimator Model (CalEEMod), the Off-Road Diesel Analysis (OffRoad) inventory tool, and the Emission Factors (EMFAC) database. Construction equipment assumptions were based on data provided by Irvine Ranch Water District (IRWD) and CalEEMod for construction equipment activities, which are included in Appendix B, while fuel consumption was derived from OffRoad for off-road vehicles and EMFAC for on-road vehicles, which is included in Appendix E.

Operations

The operations phase would result in energy consumption from vehicle trips associated with the Project as well as electrical consumption. Due to the lack of change in energy consumption between existing operations and Project conditions, the assessment of energy impacts is addressed qualitatively.

4.5.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, the Project would result in a significant energy impact if it would:

Threshold 4.5-1 Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Threshold 4.5-2 Conflict with or obstruct a State or local plan for renewable energy or energy efficiency?

4.5.5 IMPACT ANALYSIS

Threshold 4.5-1

Would the Project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less Than Significant Impact. Project construction would require the use of construction equipment for development of Project components, hauling, and demolition activities. Construction would also include the vehicles of construction workers and vendors traveling to and from the Project site and on-road haul trucks for the export of materials from site clearing and the export of sediment from excavation.

Off-road construction equipment use was calculated from the equipment data (i.e., vehicle types, hours per day, horsepower, load factor) provided in the CalEEMod construction output files included in Appendix B of this EIR. The total horsepower hours for construction equipment used for the Project was then multiplied by fuel usage rates to obtain the total fuel usage for off-road equipment.

Fuel consumption from construction worker, vendor, and delivery/haul trucks was calculated using the trip rates and distances provided in the CalEEMod construction output files. Total vehicle miles traveled (VMT) was then calculated for each type of construction-related trip and divided by the fuel consumption factor from California Air Resources Board's EMFAC 2021 model. EMFAC provides the total annual VMT and fuel consumed for each vehicle type. Construction vendor and delivery/haul trucks were assumed to be heavy-duty diesel trucks. As shown in Table 4.5-1, Energy Use During Construction, the Project would consume a total of 75,906 gallons of gasoline and 474,188 gallons of diesel fuel during construction.

TABLE 4.5-1
ENERGY USE DURING CONSTRUCTION

Source	Gasoline Fuel (gallons)	Diesel Fuel (gallons)
Off-road Construction Equipment	30,569	362,201
Worker commute	38,413	95
Vendors	6,815	70
On-road haul	110	111,822
Total	**75,906**	**474,188**
Sources: Based on data from CalEEMod (Appendix B), Offroad, and EMFAC2021 (Appendix E).		

Fuel energy consumed during construction would be temporary in nature and would not represent a significant demand on energy resources. Furthermore, there are no unusual Project characteristics that would necessitate the use of construction equipment that would be less energy-efficient than comparable equipment at construction sites in other parts of the State. Though energy consumption related to the Project's infrastructure improvements, they are necessary to meet the Project's objectives of meeting the seismic, safety, and design requirements; fulfill operational requirements; extend the useful life of the dam; and improve water supply reliability. Therefore, the proposed construction activities would not result in inefficient, wasteful, or unnecessary fuel consumption. This impact would be less than significant, and no mitigation is required.

Impact Conclusion: *Based on the analysis presented, the Project would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. The Project's impact would be less than significant, and no mitigation is required.*

Threshold 4.5-2

Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Less Than Significant Impact. The Project does not involve the development of renewable energy, nor is energy efficiency an issue related to the dam improvements as discussed above under Threshold 4.5-1. As such, the Project would not conflict or obstruct the State of California or local plans for renewable energy or energy efficiency. The proposed Project however would be consistent with the goals, objectives, and policies established within the Public Services and Facilities Element and Resource Element of the Orange County General Plan. The Project would maintain local water supply reliability, fulfill IRWD's operational requirements, and reduce the potential for seismic issues that may result in dam failure and inundation of developed areas (refer to Section 4.6, Geology and Soils). If inundation of developed areas occurs due seismic or other issues that would be addressed by the Project, a tremendous amount of energy would need to be expended to restore these areas to preflood conditions. As such, implementation of the Project and subsequent fulfillment of Project objectives would be preventative and would be more energy efficient than reacting to restoration efforts related to inundation. As such, the Project would not conflict with State or local plans related energy and water. Impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *Implementation of the Project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Impacts would be less than significant, and no mitigation is required.*

4.5.6 CUMULATIVE IMPACTS

The Project would require energy during the construction and operations phases of the Project. As previously discussed, the dam improvements associated with the Project are necessary to meet today's seismic and safety standards, water supply reliability, and current Division of Safety of Dams regulatory requirements; and to satisfy IRWD's operational requirements and extend the useful life of the facilities. Energy used to update and upgrade the current infrastructure is a preventative measure to avoid flooding and water loss related to failure of the dam infrastructure and potentially use more energy for restorative actions. Cumulative energy consumption with other projects would occur within the region but is considered necessary and no cumulative impacts would occur.

4.5.7 MITIGATION PROGRAM

Mitigation Measures

The proposed Project would not result in significant impacts to energy; therefore, no mitigation measures are required.

4.5.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed Project would not result in significant impacts related to energy and impacts would be less than significant, and no mitigation is required.

4.5.9 REFERENCES

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4.6 GEOLOGY AND SOILS

This section of the Environmental Impact Report (EIR) describes existing geologic and soil conditions and known or anticipated paleontological resources in the Project area, identifies associated potential geotechnical impacts related to development of the proposed Project, and sets forth measures designed to mitigate identified significant adverse impacts. Information in this section is based upon the *Santiago Creek Dam Outlet Tower and Spillway Improvements Project, PR 01813, Preliminary Design Report* (PDR) prepared by AECOM and GEI Consultants (July 2022) and the *Historic Property Identification Report (Archaeological Resources) and Paleontological Resources Study, Santiago Creek Dam Outlet and Spillway Project, Irvine, Orange County, California* dated February 2024 and prepared by Psomas (Appendix D; Psomas 2024).

4.6.1 REGULATORY SETTING

Federal

Public Resources Code Sections 5097.5 and 30244

California Public Resources Code (PRC) Sections 5097.5 and 30244 specify State requirements for paleontological resource management. These statutes prohibit the removal of any paleontological site or feature from public lands without permission of the jurisdictional agency, defining their removal as a misdemeanor. PRC Sections 5097.5 and 30244 require reasonable mitigation of adverse impacts on paleontological resources from developments on public (i.e., State, county, city, district) lands.

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) was adopted by the State of California in 1972 in order to mitigate surface fault rupture hazards along known active faults (Section 2621 et. seq. of the PRC). The purpose of the Alquist-Priolo Act is to reduce the threat to life and property—specifically from surface fault rupture—by preventing the construction of buildings used for human occupancy on the surface trace of active faults. Under the Alquist-Priolo Act, the California Geological Survey (CGS) has defined an “active” fault as one that has had surface displacement during the past 11,000 years (Holocene time). This law directs the State Geologist to establish Earthquake Fault Zones (known as “Special Studies Zones” prior to January 1, 1994) to regulate development in designated hazard areas. In accordance with the Alquist-Priolo Act, the State has delineated “Earthquake Fault Zones” along identified active faults throughout California. City and County jurisdictions must require a geologic investigation to demonstrate that a proposed development project, which includes structures for human occupancy, is adequately set back (generally at least 50 feet) from an active fault prior to permitting.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act (SHMA) was passed in 1990 and directs the CGS (formerly the California Division of Mines and Geology) to identify and map areas subject to earthquake hazards such as liquefaction, earthquake-induced landslides, and amplified ground shaking (Sections 2690–2699.6 of the PRC). Passed by the State legislature after the 1989 Loma Prieta Earthquake, the SHMA is aimed at reducing the threat to public safety and minimizing potential loss of life and property in the event of a damaging earthquake event. Seismic Hazard Zone Maps

are a product of the resultant Seismic Hazards Mapping Program and are produced to identify Zones of Required Investigation; most developments designed for human occupancy in these zones must conduct site-specific geotechnical investigations to identify the hazard and to develop appropriate mitigation measures prior to permitting by local jurisdictions.

The SHMA establishes a Statewide public safety standard for the mitigation of earthquake hazards. The CGS' Special Publication 117, *Guidelines for Evaluating and Mitigating Seismic Hazards in California*, provides guidance for the evaluation and mitigation of earthquake-related hazards for projects in designated zones of required investigations.

Division of Safety of Dams

In the State of California, dam safety is regulated by the Division of Safety of Dams (DSOD) under the authority granted by the California Water Code (Parts 1 and 2 of Division 3, Dam and Reservoirs). The DSOD provides oversight to the design, construction, and maintenance of over 1,200 jurisdictional sized dams in California, including the Santiago Creek Dam. Jurisdictional dams are dams that are more than 6 feet high and impound 50 acre-feet or more of water, or 25 feet or higher and impound more than 15 acre-feet of water. The jurisdictional height of a dam is from the toe of the dam to its maximum storage elevation, which is typically the spillway crest. The DSOD ensures dam safety by:

- Reviewing and approving dam enlargements, repairs, alterations, and removals to ensure that the dam appurtenant structures are designed to meet minimum requirements.
- Performing independent analyses to understand dam and appurtenant structures performance. These analyses can include structural, hydrologic, hydraulic, and geotechnical evaluations.
- Overseeing construction to ensure work is being done in accordance with the approved plans and specifications.
- Inspecting each dam on an annual basis to ensure it is safe, performing as intended, and is not developing issues. Roughly 1/3 of these inspections include in-depth instrumentation reviews of the dam surveillance network data.
- Periodically reviewing the stability of dams and their major appurtenances in light of improved design approaches and requirements, as well as new findings regarding earthquake hazards and hydrologic estimates in California.

The structural elements of the proposed Project would undergo appropriate and final design-level geotechnical evaluations prior to final design and construction. Implementing the regulatory requirements in the DSOD regulations and ensuring that all structures constructed in compliance with the law is the responsibility of the project engineers and building officials. In addition to the DSOD regulations, IRWD goes above and beyond to ensure a heightened level of dam safety by implementing Risk Informed Decision Making (RIDM). The design engineer, as a registered professional with the State of California, is required to comply with the DSOD and local codes while applying standard engineering practice and the appropriate standard of care for the particular region in California, which, in the case of the proposed Project, is Orange County.[1] The California Professional Engineers Act (Building and Professions Code Sections 6700-6799), and the Codes of Professional Conduct, as administered by the California Board of Professional Engineers and Land Surveyors, provides the basis for regulating and enforcing engineering

[1] A geotechnical engineer (GE) specializes in structural behavior of soil and rocks. GEs conduct soil investigations, determine soil and rock characteristics, provide input to structural engineers, and provide recommendations to address problematic soils.

practice in California. For a dam project, the DSOD is responsible for review and approval of the proposed design, and inspections during construction and annually during operations.

Paleontological Resources

Paleontological resources are afforded protection by environmental legislation set forth under CEQA. Appendix G of the CEQA Guidelines provides guidance relative to significant impacts on paleontological resources, indicating that a project will have a significant impact on paleontological resources if it disturbs or destroys a unique paleontological resource or site or unique geological feature.

Under Guidelines for the Implementation of CEQA, as amended on March 29, 1999 (Title 14, Division 6, Chapter 3, California Code of Regulations: 15000 et seq.), procedures define types of activities, persons, and public agencies required to comply with CEQA and include as one of the questions to be answered in the Environmental Checklist: "Will the proposed project disturb paleontological resources?" (Appendix G, Section VII, Part f)

The California Public Resources Code Section 5097.5 states:

a) "No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

b) As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof."

Local

County of Orange General Plan

Safety Element

The Safety Element, one of nine elements of the General Plan, contains the County of Orange's (County) policies on identified and potential hazards and safety considerations, their mitigation (i.e., reduction in damage and loss to real and personal property and minimization of adverse social and economic impacts) and implications for development.

The following goals and policies from the Safety Element of the Orange County General Plan are relevant to the proposed Project.

Goal 1: Provide for a safe living and working environment consistent with available resources.

Objective 1.1: To identify natural hazards and determine the relative threat to people and property in Orange County.

Goal 2: Minimize the effects of natural safety hazards through implementation of appropriate regulations and standards, which maximize protection of life and property.

Objective 2.1: To create and maintain plans and programs which mitigate the effects of natural hazards.

Objective 2.2: To support the development and utilization of technologies, which minimize the effects of natural hazards.

Resources Element

The following goals and policies from the Resources Element of the Orange County General Plan are relevant to the proposed Project.

Cultural-Historic Resources

Goal 2: To encourage through a resource management effort the preservation of the county's cultural and historic heritage.

Objective 2.2: Take all reasonable and proper steps to achieve the preservation of archaeological and paleontological remains, or their recovery and analysis to preserve cultural, scientific, and educational values.

Paleontological Resources Policies:

1. To identify paleontological resources through literature and records research and surface surveys.
2. To monitor and salvage paleontological resources during the grading of a project.
3. To preserve paleontological resources by maintaining them in an undisturbed condition.

4.6.2 METHODOLOGY

Information in this section is derived from the "Geotechnical Investigation and Design Criteria" and "Structural Design Criteria" chapters of the *Santiago Creek Dam Outlet Works and Spillway Improvements Preliminary Design Report – Volume I* (Geotechnical Investigation) prepared by AECOM and GEI Consultants (GEI) and dated July 15, 2022 (AECOM and GEI 2022a); the *Seismic Hazard Analysis Report: Santiago Creek Dam Outlet Tower and Spillway Improvements Project* (Seismic Hazards Analysis) prepared by AECOM and dated July 30, 2020 (AECOM 2020); the *Construction Hydrologic and Geotechnical Risk Evaluation* (Technical Memorandum) prepared by GEI Consultants and dated February 6, 2023 (GEI 2023); the *Historic Property Identification Report (Archaeological Resources) and Paleontological Resources Study, Santiago Creek Dam Outlet and Spillway Project, Irvine, Orange County, California* prepared by Psomas and dated February 2024 (Psomas 2024; Appendix D); and publicly available information published by the California Geological Survey (CGS). It is noted that the Geotechnical Investigation incorporates the relevant data from the Seismic Hazards Analysis.

Paleontological Records Search

On October 15, 2020, Psomas requested that the Natural History Museum (NHM) of Los Angeles County conduct a search of its paleontology collection records for the locality and specimen data for the Project site and surrounding area.

Paleontological Field Survey

Psomas surveyed the Project site on October 20, 2020. The entire Project site was surveyed by walking evenly spaced transects spaced no more than 10 meters (32 feet) apart. The paleontologist examined the ground surface for the presence of the following:

- Unique Geological Formations and
- Fossil Localities.

Psomas maintained transect accuracy in the Project site using a Garmin global positioning system (GPS) receiver and Project field maps. A field notebook and a digital camera were used to record the survey conditions and findings.

4.6.3 EXISTING CONDITIONS

The geotechnical investigation for the PDR consisted of a review of relevant literature and field investigations that included geologic mapping, test pits, auger borings, and rotary-wash borings. The following sections summarize the key findings of the literature review and the field investigations.

Literature Review

Principal sources of existing information include geologic maps and reports on the regional geology published by the U.S. Geological Survey and unpublished reports, drawings, and photographs related to site-specific studies and construction of Santiago Creek Dam. Review of these geologic publications and unpublished project reports provided a framework of the subsurface geologic conditions at the Project site, which served as the basis for preparation of the geotechnical investigation work plan and subsurface exploration program (Kempkey 1930; Marliave 1939; WCC 1979; Schoellhamer et al. 1981; Morton and Miller 1981; Morton and Miller 2006).

Santiago Creek Dam is on Santiago Creek, which is a major north-flowing drainage in the Northern Santa Ana Mountains. Geologic mapping shows the Project area to be underlain by Cretaceous to Eocene sedimentary rock, which is locally overlain by Pleistocene to Holocene age alluvium. Bedrock in the vicinity of the outlet tower and spillway consists of marine sediments of the Williams Formation. The Williams Formation is subdivided into the Schulz Ranch Sandstone Member and the Pleasants Sandstone Member. The Schulz Ranch Member, which is the stratigraphically lower member of the Williams Formation, is typically a brownish yellow to gray, massive coarse-grained sandstone and conglomerate. It is also reported that portions of the Schulz Ranch Member consist of interbedded conglomeratic sandstone with siltstone beds that are about 12 to 30 feet thick. The Pleasants Sandstone Member is described as a light brown to gray, fine-grained sandstone. The contact between the two members is mapped in the vicinity of the spillway (WCC 1979; Schoellhamer et al. 1981; Morton and Miller 1981; Morton and Miller 2006).

Although the published literature describes the Williams Formation as predominantly consisting of sandstone, much of the Williams Formation mapped in the left abutment and spillway area as shale. Much of the spillway excavation and the entire length of the trench for the outlet pipe mapping indicates a predominance of shale. Shale also was encountered in a diamond drill hole (Drill Hole No. 9) about 50 feet south of the outlet tower that was done as part of the original dam explorations. The log of the borehole suggests that the top of the brown shale bedrock was at an elevation of approximately 672 feet. Based on the mapping and outlet trench log, the orientation of the bedrock in the vicinity of the spillway and outlet tower typically strikes northwest and dips

approximately 50 to 75 degrees toward the southwest (Schoellhamer 1954 and 1981; Marliave 1939; Kempkey 1930; and WCC 1979).

Geotechnical Field Investigations

Geologic Mapping

Geologic mapping of the Project area was performed in July 2021. The field mapping was supplemented by existing map data and included foundation contours beneath the embankment in the vicinity of the dam crest and embankment, spillway, and outlet works. The field mapping generally corroborated the published mapping described above and depicts various bedrock units of the Williams Formation and local surficial deposits consisting of artificial fill, colluvium, and alluvium (Marliave 1939).

Subsurface Investigations for the Outlet Works

Three vertical borings (O-1 through O-3) were explored as part of the Outlet Works investigations in October of 2020. Two borings (O-1 and O-2) were drilled from a barge on the alignment of the sloping intake structure and one boring was drilled (O-3) near the downstream control structure. The borings at the sloping intake (O-1 and O-2) were drilled to depths of 90 and 90.5 feet, respectively. These borings encountered colluvium and lake deposits ranging from about 8 to 14 feet thick. Comparison of the current reservoir bottom from the bathymetric survey to the as-built topographic contours suggests that these lake deposits thicken towards the outlet tower and outlet pipe to approximately 25 feet thick. Beneath the lake deposits, borings O-1 and O-2 encountered embankment fills ranging from about 5 to 37 feet thick, overlying shale bedrock. The boring drilled near the downstream control structure encountered 13.5 feet of artificial fill, overlying 17 feet of older alluvium, overlying sandstone bedrock.

A geotechnical laboratory testing program was performed on soil and rock core samples obtained from the outlet works borings. This data and other information related to the outlet works borings are summarized in the project Geotechnical Data Report (GDR) previously prepared by AECOM and GEI (AECOM and GEI 2021).

Subsurface Investigations for the Spillway

Fourteen borings (S-1 through S-14) were drilled as part of the spillway investigations between October and December 2020. The borings included vertical and inclined borings that ranged in length from about 20 feet to 160 feet. Note that several of the borings, including S-8, S-10, and S-12, are labeled as “a” and “b”. In these cases, the original borings (labeled “a”) were abandoned due to drilling difficulties, and a second boring (labeled “b”) was drilled and completed nearby.

Borings S-1 through S-4 and S-12a through S-14 were drilled in the existing spillway approach area. These borings were vertical and drilled to depths ranging from about 20 feet to 53 feet. These borings encountered embankment fills ranging from about 13 to 35 feet thick overlying bedrock.

Borings S-5 through S-10b were drilled in the spillway chute. Two of the borings (S-7 and S-10b) were inclined; the remaining borings were vertical. The inclined borings were drilled to a maximum length of about 160 feet; the vertical borings were drilled to depths ranging from about 21 feet to 51 feet. These borings encountered bedrock beneath the spillway slab.

Boring S-11 was drilled above the existing spillway "waste channel," on the hillside directly opposite the downstream end of the chute. The boring was inclined and drilled to a total length of about 160 feet. This boring encountered bedrock along its entire length.

A geotechnical laboratory testing program was performed on soil and rock core samples obtained from the spillway borings. These data and other information related to the spillway borings are summarized in the GDR (AECOM and GEI 2021).

Geotechnical Properties

The following subsections summarize information contained in the *Santiago Creek Dam Outlet Works and Spillway Improvements Geotechnical Interpretive Report (GIR)* (AECOM and GEI 2022b). The GIR describes the geologic and geotechnical site conditions for the Project. The descriptions and geologic interpretations provided herein are based on the geotechnical field and laboratory exploration programs recently completed by AECOM and GEI, along with other published and unpublished data and information. The recent field and laboratory test data obtained by AECOM and GEI are included in the GDR (AECOM and GEI 2021).

Soils

The strength parameters used to evaluate the soils at the Project site are based on current and historical information, which includes laboratory test data (e.g., Unified Soil Classification System classification, strength testing) and blow counts from boring logs, as well as the team's professional judgement. These soil parameters would be used as a basis for stability analyses, retaining walls, and foundation recommendations.

Bedrock

The strength parameters used to evaluate the stability of the cuts in the rock mass are based on the available laboratory test data (e.g., unconfirmed compressive strength [UCS] results), field observations of existing outcrops, and professional judgement. The rock parameters were developed for sandstones and shales, each considering two weathering classes: intensely to moderately weathered rock; and slightly weathered to fresh rock. GSI determines the rock joint parameters and friction angles which ensure future stability of the bedrock cuts.

Seismic Considerations

The U.S. Army Corps of Engineers (USACE) requires that civil works structures are to be designated as either "critical" or "normal." EM 1110-2-2100 (USACE 2005) states that "structures designated as critical are those structures on high hazard projects whose failure will result in loss of life. Loss of life can result directly, due to flooding, or indirectly from secondary effects. Loss of life potential should consider the population at risk, the downstream flood wave depth and velocity, and the probability of fatality of individuals within the affected population." Should the outlet works or spillway be damaged, IRWD could lose the ability to perform an emergency release to protect the dam, and lead to an uncontrolled release of the reservoir. Therefore, the structural classifications for the Project are all "critical."

USACE requires that for critical structures, the maximum design earthquake (MDE) used for seismic evaluation should be set equal to the Maximum Considered Earthquake (MCE). DSOD requires dams be designed to withstand loads from the MCE. Based on USACE and DSOD requirements, the MCE will be used to design the outlet works and spillway structures. Although the USACE has no official authority with respect to Santiago Creek Dam or the design of the Project facilities, USACE engineering publications are typically very specific and technically

detailed, and the design standards are recognized as being consistent with sound engineering practice. As such, the geotechnical design of the Project is based on current DSOD requirements and informed by USACE design standards.

Seismic Hazard Analysis

The design earthquake ground motions for Santiago Creek Dam were developed using a Deterministic Seismic Hazard Analysis, in accordance with the requirements of DSOD. The seismic source faults that can generate significant earthquake ground motions at the dam site (local faults are shown in Exhibit 4.6-1, Fault Map for Santiago Creek Dam) were identified, and the acceleration time histories were developed, which adequately represent the intensity of ground motions corresponding to the controlling maximum earthquakes.

Basin Physiology and Geology

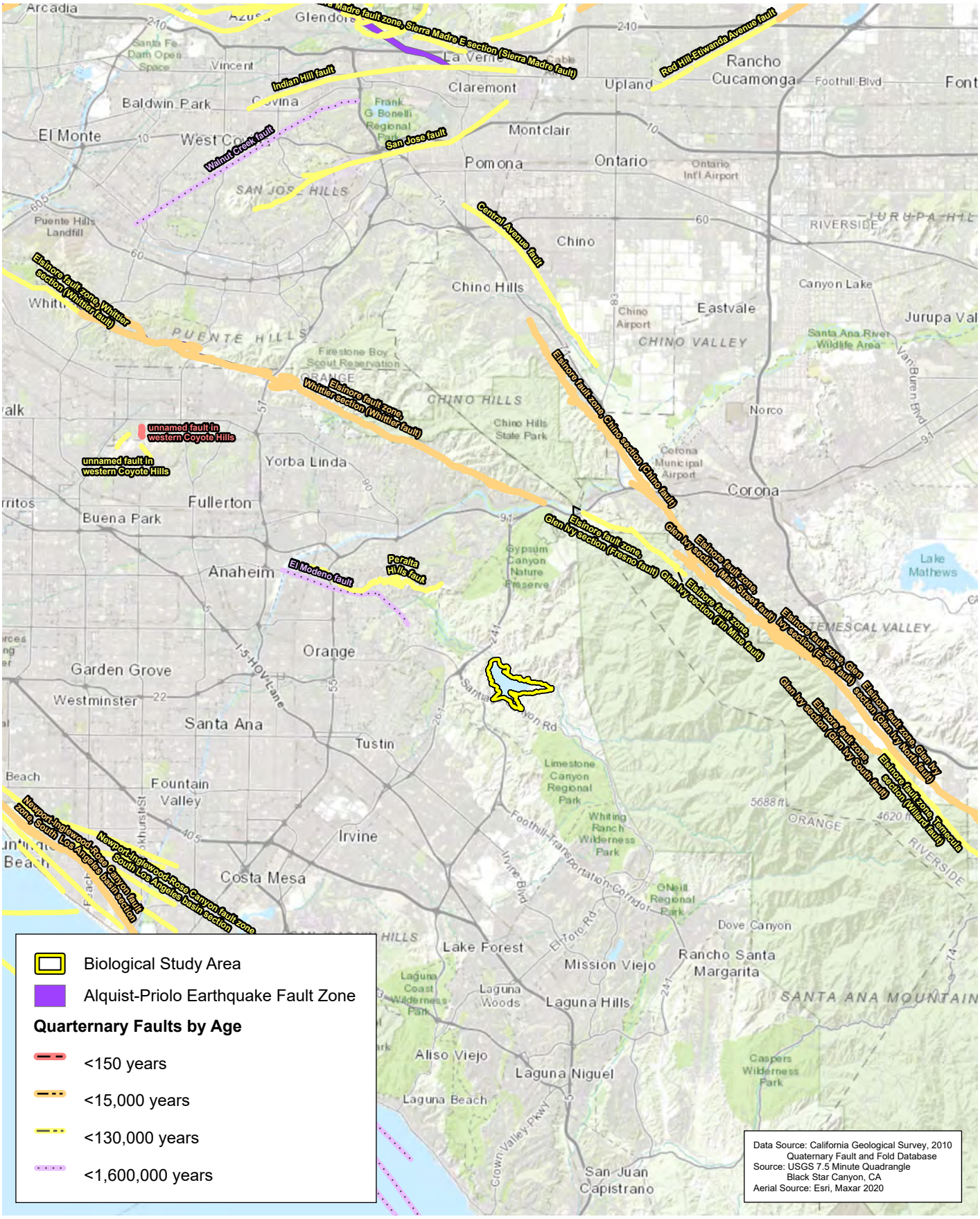
Santiago Creek is located on the western slope of the Santa Ana Mountains in southern California. The creek flows in a northwesterly direction for about 32 miles from its headwaters near Santiago Peak to its confluence with the Santa Ana River about 14.5 miles downstream of Santiago Creek Dam. Santiago Creek Dam drains about 63 square miles of the Santiago Creek watershed. The drainage basin upstream of the dam generally consists of steep and mountainous terrain, ranging in elevation from approximately 780 feet at the dam to 5,680 feet in the headwaters near Santiago Peak. Urban development and agricultural use within the watershed are limited, with much of the drainage basin located in the Cleveland National Forest. Vegetation within the basin generally consists of scrub/rangeland with areas of dense shrubs and trees. Most of the basin soils fall into Natural Resource Conservation Service (NRCS) hydrologic group D, indicating a poor infiltration rate and high runoff potential when thoroughly wet, though there are pockets of more well-drained soils.

Paleontological Records Search Results

The paleontological records search was completed on October 16, 2020. The record search included a thorough search of the NHM paleontology collection records for the locality and specimen data for the Project site and surrounding area. The records search identified fossil localities that lie directly within the proposed Project site as well as numerous fossil localities nearby from the same sedimentary deposits that occur in the proposed Project area, either at the surface or at depth. One locality, LACM IP 26171, is located along the northwest shore of Santiago Reservoir, where unspecified invertebrates were collected from the Williams Formation during excavations for the spillway in 1969 (depth of fossils is not known). Additionally, eight localities were located nearby the same sedimentary deposits that occur in the Project site, either at the surface or at depth. The Project site is generally underlain by Pleistocene age alluvium, which could contain previously undiscovered fossils of extinct mega-fauna (i.e., saber-toothed cats, mammoths, dire wolves).

Paleontological Field Survey Results

A Psomas cross-trained archaeologist/paleontologist surveyed the Project site on October 20, 2020. The Psomas archaeologist did not identify new archaeological and/or paleontological resources within the Project site; however, it should be noted the ground visibility was obscured by several species of native and non-native vegetation. Additionally, Psomas identified archaeological site P-30-001012, which was preserved in place. None of the cultural resources previously recorded were observed on the surface; however, the artifact assemblage and site boundary were not observed due to the site being stripped for agricultural practices along with scattered debris piled and placed along a nearby small drainage.



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Fault Map for Santiago Creek Dam

Exhibit 4.6-1

Santiago Creek Dam Improvement Project

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Geotechnical Investigations

As stated in Section 3.0, Project Description, although IRWD previously completed comprehensive geotechnical investigations of the site to support the Project design and the development of detailed construction documents, it was determined that additional geotechnical investigations would be necessary to support the final design. A supplemental geotechnical investigation was conducted in January 2025 and included additional borings. Other supplemental field investigations may include additional borings, test pits, and geophysical surveys needed to support the ongoing Project design. The additional geotechnical investigations would remain within the proposed limits of disturbance defined by the Project and would be mitigated as part of the overall Project.

4.6.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant geology and soils impact if it would:

Threshold 4.6-1 Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

(i) Strong seismic ground shaking

(ii) Seismic-related ground failure, including liquefaction

(iii) Landslides

Threshold 4.6-2 Result in substantial soil erosion or the loss of topsoil.

Threshold 4.6-3 Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

Threshold 4.6-4 Be located on expansive soils, as defined in Table 18-1-B of the California Building Code (1994), creating substantial direct or indirect risks to life or property.

Threshold 4.6-5 Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

4.6.5 IMPACT ANALYSIS

Threshold 4.6-1

Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

(i) Strong seismic ground shaking?

Less Than Significant Impact. The Project site, as with the entire Southern California region, may be subject to strong ground shaking resulting from a major earthquake on one or more faults in the area. Exhibit 4.6-1, Fault Map for Santiago Creek Dam, illustrates the locations and names of active regional faults. The nearest active fault is the Elsinore-Whittier fault zone (i.e., all segments), located approximately six miles to the north-northeast of the site.

The Irvine Lake dam and reservoir are under the regulatory jurisdiction of the DSOD. The USACE has no official authority with respect to Santiago Creek Dam or the design of the Project facilities. However, USACE engineering publications are typically very specific and technically detailed, and the design standards are recognized as being consistent with sound engineering practice. As such, the geotechnical design of the Project is based on current DSOD requirements and informed by USACE design standards, among other applicable codes and standards.

USACE requires that civil works structures are to be designated as either "critical" or "normal", and states that "structures designated as critical are those structures on high-hazard projects whose failure will result in loss of life. Loss of life can result directly, due to flooding, or indirectly from secondary effects." Should the outlet works or spillway be damaged, IRWD could lose the ability to perform an emergency release to protect the dam and lead to an uncontrolled release of the reservoir. Therefore, the structural classifications for the Project are all designated "critical." USACE requires that for critical structures, the MDE used for seismic evaluation should be set equal to the MCE. Based on USACE and DSOD requirements, the MCE—a multi-segment rupture on the Elsinore-Whittier faults with M 7.75—will be used to design the outlet works and spillway structures.

The Project's structural and geotechnical design has been prepared consistent with DSOD and USACE requirements and standards, respectively, based on site-specific seismic and geologic conditions, and applicable seismic safety requirements of the 2022 California Building Code (CBC), among other requirements. The potential for strong ground shaking is an existing seismic hazard that affects the site, and the Project would not exacerbate this condition. As discussed in Section 3.0, Project Description, of this EIR, the rehabilitation and replacement of the Santiago Creek Dam outlet works and spillway facilities and improvements to the dam crest and embankment are necessary in part to address seismic safety concerns and identified dam safety deficiencies and to meet current DSOD regulatory requirements. As such, implementation of the Project would reduce the existing potential for substantial adverse effects to the Santiago Creek Dam involving strong seismic ground shaking. There would be less than significant impacts related to strong seismic ground shaking with implementation of engineering design requirements applicable to the Project, and no mitigation is required.

Impact Conclusion: *The Project site is in a seismically active area that would likely experience strong ground shaking during the life of any project developed thereon. However, compliance with existing regulations (2022 CBC) would reduce potentially significant impacts associated with strong seismic ground shaking to a less than significant level.*

Threshold 4.6-1

Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

(ii) Seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Liquefaction refers to loose, saturated sand or silt deposits that behave as a liquid and lose their load-supporting capability when strongly shaken. Loose granular soils and silts that are saturated by relatively shallow groundwater are susceptible to liquefaction. Based on review of the *Earthquake Zones of Required Investigation for the Black Star Canyon Quadrangle* dated 2001 and prepared by CGS, the northernmost portion of the footprint of proposed new permanent facilities is identified as potentially susceptible to liquefaction (see Exhibit 4.6-2, Zones of Required Investigation for Landslides and Liquefaction). Lateral spreading

is a liquefaction-related phenomenon that involves primarily lateral movement of earth materials over underlying materials which are liquefied due to ground shaking.

During Project geotechnical investigation activities, a liquefaction event could have potential adverse effects to construction workers onsite while operating heavy equipment or working in trenches. IRWD and its contractors would be required to adhere to all Division of Occupational Safety and Health, better known as Cal/Division of Occupational Safety and Health (OSHA) requirements for working within an active construction site, including specific provisions for working within trenches, to ensure worker safety is given the known site conditions. Therefore, relative to existing conditions, the proposed Project would not expose people or structures to new potential substantial adverse effects related to liquefaction. Impacts would be less than significant.

As noted above, the Project's design has been prepared consistent with DSOD and USACE requirements and standards, and applicable seismic safety requirements of the 2022 CBC, among other requirements. This would include engineering design measures to appropriately manage risks of seismic-related ground failure affecting the Project. Also as noted above, the Project is necessary in part to address seismic safety concerns and meet current DSOD regulatory requirements. As such, implementation of the Project would reduce the existing potential for substantial adverse effects to the Santiago Creek Dam involving seismic-related ground failure. There would be a less than significant impact related to seismic-related ground failure, including liquefaction and lateral spreading, with implementation of engineering design requirements applicable to the Project, and no mitigation would be required.

Impact Conclusion: *Implementation of the Project would reduce the existing potential for substantial adverse effects to the Santiago Creek Dam involving seismic--related ground failure. There would be a less than significant impacts related to seismic-related ground failure, including liquefaction and lateral spreading, with implementation of engineering design requirements applicable to the Project and no mitigation would be required.*

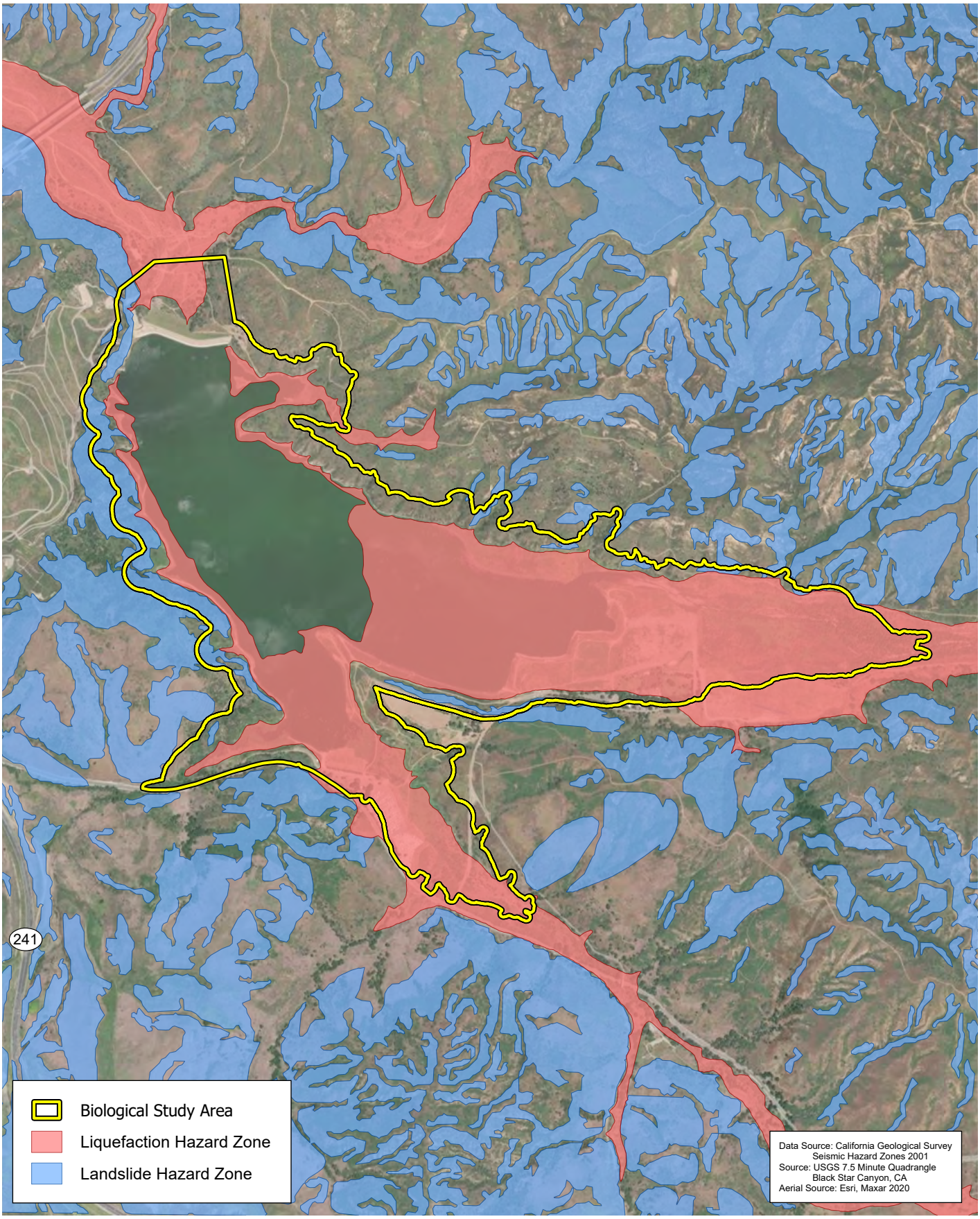
Threshold 4.6-1

Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

(iii) Landslides?

Less Than Significant Impact. Seismically induced landslides and other slope failures are common occurrences during or soon after earthquakes. According to the CGS seismic hazard mapping of the Black Star Canyon Quadrangle (see Exhibit 4.6-2), the eastern portion of the footprint of proposed new permanent facilities is identified as potentially susceptible to landslides.

As noted above, during Project geotechnical investigation activities, IRWD and their contractors would be required to adhere to all Cal/OSHA requirements for working within active construction sites, including specific provisions for working within trenches, to ensure worker safety given the known site conditions. Additionally, the Project's design has been prepared consistent with DSOD and USACE requirements and standards, and applicable seismic safety requirements of the 2022 CBC, among other requirements. This would include engineering design measures to appropriately manage risks of landslides affecting the Project. Also, the Project is necessary in part to address seismic safety concerns and meet current DSOD regulatory requirements. As such, implementation of the Project would reduce the existing potential for substantial adverse effects to the Santiago Creek Dam involving landslides. There would be a less than significant



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Zones of Required Investigation for Landslides and Liquefaction

Exhibit 4.6-2

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impact related to landslides, including liquefaction and lateral spreading, with implementation of engineering design requirements applicable to the Project, and no mitigation would be required.

Impact Conclusion: *Implementation of the Project would reduce the existing potential for substantial adverse effects to the Santiago Creek Dam involving landslides. There would be a less than significant impact related to landslides, including liquefaction and lateral spreading, with implementation of engineering design requirements applicable to the Project, and no mitigation would be required.*

Threshold 4.6-2

Would the Project result in substantial soil erosion or the loss of topsoil?

Less Than Significant Impact. The largest source of erosion and topsoil loss is uncontrolled drainage during construction. As discussed in more detail in Section 4.9, Hydrology and Water Quality, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into "waters of the U.S." Construction activities shall be conducted in compliance with the statewide NPDES General Permit for Storm Water Discharges Associated with the Construction and Land Disturbance Activities (Order No 2012-0006-DWQ, NPDES No. CAS000002), adopted by the SWRCB on July 17, 2012. In compliance with the NPDES permit, erosion potential during construction of the proposed Project would be managed with BMPs implemented on the Project site as part of an SWPPP during construction activities in accordance with NPDES requirements. Implementation of the BMPs would ensure that construction-related erosion impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *Grading activities would increase the potential for soil erosion and loss of topsoil. With the incorporation of construction BMPs as described in Section 4.9, Hydrology and Water Quality, of this EIR and compliance with applicable laws and regulations (e.g., NPDES Construction General Permit), Project impacts on soil erosion and loss of topsoil would be less than significant. Long-term operation of the Project would also result in less than significant impacts. No mitigation measures are required.*

Threshold 4.6-3

Would the Project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

Less Than Significant Impact. Potential impacts related to liquefaction and lateral spreading would be less than significant at the Project site as discussed above in the Response to Question 4.6-1(iii). As noted above, IRWD and their contractors would be required to adhere to all Cal/OSHA requirements for working within active construction sites, including specific provisions for working within trenches, that would ensure the safety of all construction workers onsite. Additionally, the Project's design has been prepared consistent with DSOD and USACE requirements and standards, and applicable seismic safety requirements of the 2022 CBC, among other requirements. This would include engineering design measures to appropriately manage soil engineering issues such as subsidence or collapse affecting the Project. Also as noted above, the Project is necessary in part to address seismic safety concerns and meet current DSOD regulatory requirements.

According to the Technical Memorandum prepared for the Project, the thickness of the lake sediment at the bottom of the reservoir is unknown but based on recent bathymetric surveys may be up to 35-feet thick. Lake sediment is typically very weak fine-grained soil susceptible to shear failure and significant volumetric consolidation. Borings conducted on the Project site identified approximately 8 feet of lake sediment intermixed with colluvium, and it was described as organic lean soil, gravelly clay, and clayey sand. Therefore, the berm will be constructed according to the thickness and properties of the lake sediment to avoid uncontrolled slope failure or bearing failure (GEI 2023). As such, implementation of the Project would reduce the existing potential for substantial adverse effects to the Santiago Creek Dam involving unstable geologic units, if present. There would be less than significant impacts related to the presence of unstable geologic units with implementation of engineering design requirements applicable to the Project, and no mitigation would be required.

Impact Conclusion: *There would be less than significant impacts related to the presence of unstable geologic units with implementation of engineering design requirements applicable to the Project, and no mitigation would be required.*

Threshold 4.6-4

Would the Project be located on expansive soils, as defined in Table 18-1-B of the California Building Code (1994), creating substantial direct or indirect risks to life or property?

Less Than Significant Impact. Expansive soils are soils that swell when they absorb water and shrink as they dry, such as pure clay soils and claystone. The hazard associated with expansive soils is that they can overstress and cause damage to the foundation of buildings set on top of them. According to the Geotechnical Investigation, the Project site is underlain by artificial fill, embankment fill, older alluvium, and colluvium and lake deposits. These types of surficial sediments typically have a low clay content, being comprised of primarily sand, silt, and gravel. In particular, engineered fill previously placed on the Project site would be expected to have a very low or non-existent expansion potential. While expansive soils are not anticipated on the Project site, as noted above, the Project's design has been prepared consistent with DSOD and USACE requirements and standards, and applicable seismic safety requirements of the 2022 CBC, among other requirements. There would be less than significant impacts related to expansive soils with implementation of engineering design requirements applicable to the Project, and no mitigation would be required.

Impact Conclusion: *The on-site soils were determined to have very low or non-existent expansion potential. There would be less than significant impacts related to expansive soils with implementation of engineering design requirements applicable to the Project, and no mitigation would be required.*

Threshold 4.6-5

Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than Significant With Mitigation.

This analysis is based on the results of a literature review and records search conducted through the NHM of Los Angeles County and a review of geologic maps and aerial imagery of the Project site. The paleontological records search was completed on October 16, 2020. The record search

included a thorough search of the NHM paleontology collection records for locality and specimen data for the Project site and surrounding area. The records search identified fossil localities that lie directly within the proposed Project site as well as numerous fossil localities nearby from sedimentary deposits that occur in the proposed Project site, either at the surface or at depth. One locality, LACM IP 26171, is located along the northwest shore of Santiago Reservoir, where unspecified invertebrates were collected from the Williams Formation during excavations for the spillway in 1969 (depth of fossils is not known) (Psomas 2024). Additionally, eight localities were located nearby from the same sedimentary deposits that occur in the Project site, either at the surface or at depth. As indicated above, the Project site is generally underlain by Pleistocene age alluvium, which could contain previously undiscovered fossils consisting of extinct mega-fauna that were not previously documented and that may qualify as unique paleontological resources under CEQA. In addition to the Pleistocene age alluvium, several scientifically unique geological formations – Ladd Formation, Williams Formation, Topanga Formation, Vaqueros Formation, Puente Formation – dating between 83 million years ago to 6 million years ago were identified within the Project site. These formations may contain scientifically significant index, land, marine, or dinosaur fossils from geological periods similar to those of the fossil locality located along the northwest shore of Santiago Reservoir, belonging to the Williams Formation.

However, as noted in the geotechnical analysis, earthmoving activities (i.e., grading and excavation) would take place in previously disturbed soils, which consist of artificial fill, embankment fill, older alluvium, and colluvium and lake deposits (AECOM and GEI 2022b). Therefore, it is unlikely the Project will impact scientifically important fossil localities; however, in the event that ground disturbance activities occur within undisturbed soils, the Project would implement **MM GEO-1**, which requires paleontological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and **MM GEO-2**, which provides details for treatment of unanticipated discoveries.

Impact Conclusion: *The Project has a potential to disturb unique paleontological resources during construction. However, potential effects may be mitigated to a less than significant level with the implementation of **MM GEO-1**, which requires retention of a qualified Paleontologist to observe ground-disturbing activities, including geotechnical investigations, within undisturbed soils and **MM GEO-2**, which identifies treatment of unanticipated discoveries.*

4.6.6 CUMULATIVE IMPACTS

Geology and soils impacts are generally site-specific and there is typically little, if any, cumulative relationship between the development of a project and development within a larger cumulative area (e.g., county-wide development). For example, development at the Project site would not alter geologic events or soil features/characteristics (such as ground shaking, seismic intensity, or settlement) at other locations; therefore, the proposed Project would not directly affect the level of intensity at which a seismic event or geologic hazard on an adjacent site is experienced. However, while development of the proposed Project and future development in Orange County may expose more persons to seismic hazards, compliance with all requirements and standards for seismic activity would reduce the potential impacts.

Development projects would be required to comply with the applicable State and local agency grading manuals and ordinances. As with the Project, future development would also be required to have site-specific geotechnical investigations to identify the geologic and seismic characteristics on a site and provide recommendations for engineering design and construction to ensure the structural integrity of proposed development. These recommendations would be incorporated into project design. Compliance of individual projects with the recommendations of the applicable geotechnical investigation would prevent cumulatively significant hazards

associated with seismic conditions, unstable soils, lateral spreading, liquefaction, soil collapse, expansive soil, soil erosion, and other geologic issues. Additionally, potential impacts related to paleontological resources may be mitigated to a less than significant level with the implementation of **MM GEO-1**, which requires retention of a qualified Paleontologist to observe grading activities within undisturbed soils, including geotechnical investigations, and **MM GEO-2**, which provides details for treatment of unanticipated discoveries. Therefore, the Project's contribution to cumulative geology and soils impacts would be less than significant with implementation of **MM GEO-1** and **MM GEO-2,** and compliance with applicable seismic design criteria in the CBC and the County's grading regulations.

4.6.7 MITIGATION PROGRAM

Mitigation Measures

MM GEO-1 Before beginning initial ground-disturbing activities (including but not limited to geotechnical excavations, vegetation removal, grubbing, grading, and excavation), IRWD will retain a paleontologist that meets the 2010 Society of Vertebrate Paleontology standards for paleontology. The paleontologist will observe ground-disturbing activities within previously disturbed or undisturbed soils with high paleontological sensitivity in geological formations, such as the Williams Formation or Pleistocene age alluvium, at the Project site. In the event of discovery, paleontological findings will be salvaged and catalogued by the paleontologist. Monitoring will not be required for secondary movement of soils, such as backfilling. The paleontologist will regularly meet with the contractor to ensure adequate involvement with ground-disturbing activities and will establish procedures for paleontological resource surveillance within previously undisturbed soils in coordination with IRWD throughout construction of the proposed Project. The qualified paleontologist will also establish, in coordination with IRWD, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of the fossils/unique geological units as appropriate. The paleontological monitor will have the authority to temporarily halt or divert work away from exposed fossils in order to recover the fossil specimens pursuant to **MM GEO-2**. The paleontologist may determine, in consultation with IRWD, to reduce monitoring to spot-checking or eliminate monitoring depending on site conditions observed, such as the presence of geologic units with low paleontological sensitivity or other factors. The paleontological monitor will prepare daily logs detailing the types of activities and soils observed and any discoveries. Upon the completion of initial ground-disturbing activities, the paleontologist will prepare a final monitoring and mitigation report to document the results of the monitoring effort.

MM GEO-2 If paleontological resources are inadvertently unearthed during excavation activities, the contractor will immediately cease all earth-disturbing activities within a 50-foot radius of the area of discovery and will contact the paleontologist and IRWD immediately. If the paleontologist determines the paleontological resources are potentially significant under CEQA, the paleontologist, in consultation with IRWD, will determine appropriate actions for treatment. Any significant fossils collected during project-related excavations will be salvaged and prepared to the point of identification following the standards of the Society of Vertebrate Paleontology (2010). Any salvaged fossils will be offered for donation to an accredited repository with a scientific interest in the materials. If no accredited repository accepts the donation, then the fossils may be donated to a local museum, historical society, school, or other institution for educational purposes.

After the resource has been appropriately avoided or mitigated, work in the area may resume.

4.6.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Direct and cumulative impacts to geology and soils associated with the Project would be less than significant with implementation of **MM GEO-1** and **MM GEO-2**. No significant unavoidable impacts would occur.

4.6.9 REFERENCES

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4.7 GREENHOUSE GAS EMISSIONS

This section addresses greenhouse gas (GHG) emissions anticipated from construction and operation of the proposed Project and its potential global climate change impacts. The Project's estimated construction and operational GHG emissions were calculated by using the California Emissions Estimator Model (CalEEMod, Version 2022.1.1.20); the inputs and data for the Project are included in Appendix B.

4.7.1 BACKGROUND

General Environmental Effects of Global Climate Change

Executive Order (EO) S-3-05 mandates the preparation of biennial science assessment reports on climate change impacts and adaptation options for California. EO S-13-08 directs the California Natural Resources Agency (CNRA) to develop a State Climate Adaptation Strategy and to provide State land use planning guidance related to sea level rise and other climate change impacts. Current reports resulting from these directed actions are the *Climate Action Team Report to the Governor and Legislature* and the *California Climate Adaptation Strategy* (CalEPA 2010; CNRA 2023). These studies report that global warming in California is anticipated to impact resources, including, but not limited to, those discussed below.

- **Public Health.** Many Californians currently experience the worst air quality in the nation, and climate change is expected to make matters worse. Higher temperatures would increase the frequency, duration, and intensity of conditions conducive to air pollution formation. If global background ozone (O_3) levels increase as predicted under some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by more frequent wildfires, which emit fine particulate matter that can travel long distances. Rising temperatures and more frequent heat waves would increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress. Climate change may also increase asthma rates and the spread of infectious diseases and their vectors, as well as challenge food and water supplies. Children, the elderly, people with chronic heart or lung disease, outdoor workers, people who exercise outdoors, and the economically disadvantaged would be particularly vulnerable to these changes. In addition, more frequent extreme weather events could also result in increased injuries and deaths from these phenomena.
- **Energy.** Increasing mean temperature and more frequent heat waves will drive up demand for cooling in summer; this new energy demand will only be partially offset by decreased demand for heating in winter. Hydropower, which currently provides 15 percent of in-state generation, would be threatened by declining snowpack, which serves as a natural reservoir for hydropower generation in the spring and summer. Winter storms, earlier snowmelt, and greater runoff may combine to cause flooding, which could, in turn, damage transmission lines and cause power outages.
- **Water Resources.** Rising temperatures, less precipitation, and more precipitation falling as rain instead of snow could severely diminish the snowpack. Because the Sierra Nevada snowpack provides most of California's available water, this potential loss would increase the risk of summer water shortages and would hamper water distribution and hydropower generation. The diminished snowpack would also nearly eliminate all skiing and other snow-related recreation. Rising sea levels would push salt water into California's estuaries, wetlands, and groundwater aquifers, threatening the water quality and reliability in the Sacramento/San Joaquin River Delta—a major California fresh water supply. Extreme precipitation and flooding could also damage water quality by creating sudden increases in runoff. Moreover, warming would increase evapotranspiration rates from

plants, soil, and open water surfaces, which would result in greater demand for irrigation. Overall, climate change would reduce California's water supplies even as its growing population requires additional resources.

- **Sea Level and Flooding.** The sea level at California's coasts is expected to rise by 11 to 18 inches above 2000 levels by 2050 and by 23 to 55 inches by 2100. If realized, these increases would create more frequent and higher storm surges; would erode some coastal areas; and would increase pressure on existing levees. These increases would create a greater risk of flooding in previously untouched inland areas. Consequently, continued development in vulnerable coastal areas would put more people and infrastructure at risk.
- **Agriculture.** Although higher carbon dioxide (CO_2) levels can stimulate plant production and increase plant water-use efficiency, in the long-term, climate change would reduce the quantity and quality of agricultural products Statewide. As temperatures rise, farmers will face greater water demand for crops and a less reliable water supply, as well as increased competition from urban water users. Sea level rise may cause saltwater intrusion in the Delta region, making it difficult to raise certain crops. Rising temperatures will likely aggravate O_3 pollution, interfering with plant growth and making plants more susceptible to disease and pests. In addition, warming would reduce the number of colder hours needed for fruit and nut production; would shift pest and weed ranges; would alter crop-pollinator timing; and would increase the frequency of droughts, heat waves, and floods. Higher average temperatures would also increase mortality and decrease productivity in livestock.
- **Forestry.** California timber production has declined over the past few decades due, in part, to warming and increased wildfires. While further warming may increase production for some species in some locations, climate change is expected to reduce overall forest growth. Increasing average temperatures and drought frequency would result in more wildfires and greater burned areas, while less frequent and more intense rainfall would increase soil erosion and landslides. Higher temperatures and less water would force many tree species to shift their ranges; those that run out of livable habitat may die out. Pests, diseases, and invasive species may also colonize new areas, further challenging forest health and biodiversity.
- **Ecosystems.** Rising average temperatures would subject plants and animals to greater thermal stress, causing some species to adapt or shift their ranges, while others may face extinction. Invasive species may also shift their ranges, threatening native species. Changing temperatures would alter the timing of plant flowering and insect emergence, damaging species' abilities to reproduce. Changing precipitation patterns would impact aquatic and riparian ecosystems by reducing snowpack, stream flow, and groundwater, while increasing the frequency of droughts, floods, and wildfires. As sea levels rise, some coastal habitats may be permanently flooded or eroded, and saltwater intrusion into freshwater resources may threaten terrestrial species. Changes in ocean circulation and temperature, ocean acidification, and increased runoff and sedimentation would threaten pelagic species. In sum, continued global warming would alter natural ecosystems and threaten California's biological diversity.

4.7.2 REGULATORY SETTING

Regulatory Background

Significant changes in global climate patterns have been associated with global warming, which is an average increase in the temperature of the atmosphere near the Earth's surface; this is attributed to an accumulation of GHG emissions in the atmosphere. GHGs trap heat in the atmosphere which, in turn, increases the Earth's surface temperature. Some GHGs occur naturally and are emitted into the atmosphere through natural processes, while others are created and emitted solely through human activities.

On June 1, 2005, Governor Arnold Schwarzenegger signed EO S-3-05, which calls for a reduction in GHG emissions to the year 2000 level by 2010, to year 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

The principal overall State plan and policy adopted for the purpose of reducing GHG emissions is Assembly Bill (AB) 32 (California Global Warming Solutions Act of 2006). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on Statewide GHG emissions. AB 32 recognizes that California is the source of substantial amounts of GHG emissions. The statute states the following:

> Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the State from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

In order to avert these consequences, AB 32 establishes a State goal of reducing GHG emissions to 1990 levels by the year 2020, codifying the EO S-3-05 goal.

The California Air Resources Board (CARB) approved a *Climate Change Scoping Plan* as required by AB 32 in 2008; this plan is required to be updated every five years. The *Climate Change Scoping Plan* proposes a "comprehensive set of actions designed to reduce overall carbon GHG emissions in California, improve our environment, reduce our dependence on oil, diversify our energy sources, save energy, create new jobs, and enhance public health" (CARB 2008). The *Climate Change Scoping Plan* has a range of GHG-reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 implementation regulation to fund the program. On February 10, 2014, CARB released the Draft Proposed First Update to the *Climate Change Scoping Plan* (CARB 2014). The board approved the final *First Update to the Climate Change Scoping Plan* on May 22, 2014. The first update describes California's progress towards AB 32 goals, stating that "California is on track to meet the near-term 2020 greenhouse gas limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32" (CARB 2014). The latest update occurred in January 2017 and incorporates the 40 percent reduction to 1990 emissions levels by 2030.

California EO B-30-15 (April 29, 2015) set an "interim" Statewide emission target to reduce GHG emissions to 40 percent below 1990 levels by 2030 and directed State agencies with jurisdiction over GHG emissions to implement measures pursuant to statutory authority to achieve this 2030 target and the 2050 target of 80 percent below 1990 levels.

On September 8, 2016, the Governor signed Senate Bill (SB) 32 to codify the GHG reduction goals of EO B-30-15, requiring the State to reduce GHG emissions by 40 percent below 1990 levels by 2030 (Health and Safety Code Section 38566). This goal is expected to keep the State on track to meet the goal set by EO S-3-05 of reducing GHG emissions by 80 percent below 1990 levels by 2050 (California Legislative Information 2017a). SB 32's findings state that CARB will "achieve the state's more stringent greenhouse gas emission reductions in a manner that benefits the state's most disadvantaged communities and is transparent and accountable to the public and the Legislature."

AB 197 was signed at the same time and will make sure that the SB 32 goals are met by requiring CARB to provide annual reports of GHGs, criteria pollutants, and toxic air contaminants (TACs) by facility, City and subcounty level, and sector for stationary sources and at the County level for mobile sources. It also requires the CARB to prioritize specified emission reduction rules and regulations and to identify specified information for emission reduction measures (e.g., alternative compliance mechanism, market-based compliance mechanism, and potential monetary and nonmonetary incentive) when updating the Scoping Plan (California Legislative Information 2017b).

On April 29, 2015, Governor Brown signed EO B-30-15, which orders "A new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030 is established in order to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050" (COOG 2015). Five key goals for reducing GHG emissions through 2030 include (1) increasing renewable electricity to 50 percent; (2) doubling the energy efficiency savings achieved in existing buildings and making heating fuels cleaner; (3) reducing petroleum use in cars and trucks by up to 50 percent; (4) reducing emissions of short-lived climate pollutants; and (5) managing farms, rangelands, forests, and wetlands to increasingly store carbon. EO B-30-15 also directs CARB to update the *Climate Change Scoping Plan* to express the 2030 target in terms of million metric tons of carbon dioxide equivalent.

SB 350, signed October 7, 2015, is the Clean Energy and Pollution Reduction Act of 2015. SB 350 is the implementation of some of the goals of EO B-30-15. The objectives of SB 350 are as follows (California Legislative Information 2015):

1. To increase from 33 percent to 50 percent, the procurement of our electricity from renewable sources.
2. To double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.

The text of SB 350 sets a December 31, 2030, target for 50 percent of electricity to be generated from renewable sources.

The Sustainable Communities and Climate Protection Act of 2008, SB 375, established a process to coordinate land use planning, regional transportation plans, and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 required Southern California Association of Governments (SCAG) to incorporate a "sustainable communities strategy" (SCS) into its regional transportation plans (RTPs) that will achieve GHG emission reduction targets though several measures, including land use decisions. SCAG's SCS is included in the SCAG 2024–2050 RTP/SCS (SCAG 2024). The goals and policies of the RTP/SCS that reduce vehicle miles traveled focus on transportation and land use planning that include building infill projects; locating residents closer to where they work and play; and designing communities so there is access to high quality transit service.

County of Orange

The County of Orange General Plan does not specifically reference GHGs; however, the following sections of the General Plan are relevant to the effects of climate change as it relates to the proposed Project.

General Plan

The County of Orange's General Plan provides the vision of the future and framework for development in the County. The General Plan is comprised of various elements or topical sections that cover different aspects of the County. The two Element that are most relevant to the Project are the Public Services & Facilities Element and Resources Element.

Public Services & Facilities Element

The Public Services and Facilities Element focuses on those publicly managed services and facilities which have a direct influence on the distribution and intensity of development that can be accommodated through the utilization of existing technologies and assumptions that are used to determine adequate service levels. These services include flood control, waste management, water and wastewater, transportation, and community services (i.e., fire protection, library, sheriff patrol, local special services districts, and public-school facilities).

Goals, Objectives, and Policies

Water System

Goal 1 Encourage the planning and development of a water conveyance and distribution system to meet the County's future demand.

Objective 1.1 To achieve desired water system service levels through the coordination of land use and water system planning.

Objective 1.2 To implement State, regional, and local facility plans for water delivery to Orange County.

Objective 1.3 To increase storage and delivery capacity for water supplies in Orange County.

Policy 1 System Capacity and Phasing – To ensure the adequacy of water system capacity and phasing, in consultation with the service providing agency(ies), in order to serve existing and future development as defined by the General Plan.

Policy 2 Water Delivery System – To support water facility planning and development efforts for Orange County water supplies conducted by local and regional water agencies.

Policy 3 Intergovernmental Coordination – To actively encourage opportunities for increased coordination between the County and the water agencies through cooperative water facility planning and implementation efforts.

Water Delivery System

Goal 1 To support water facility planning and development efforts for Orange County water supplies conducted by local and regional water agencies.

Policy 1 Intergovernmental Coordination – To actively encourage opportunities for increased coordination between the County and the water agencies through cooperative water facility planning and implementation efforts.

Resources Element

The Resources Element, one of nine elements of the General Plan, contains official County policies on the conservation and management of resources. The Resources Element establishes a strategy for the development, management, preservation, and conservation of resources that are necessary to meet Orange County's existing and future demands. Aspects of this Element that relate to the Project are local water availability and water quality. The Water Resources Component of the Element describes the need to manage local water resources to meet the County's needs. The following have been established in the Water Resources Component.

Goals, Objectives and Policies

Water Resources Component

The use, supply, and conservation of water are critical issues in Orange County. Since almost every urban activity is dependent on water to some extent, it is in the best interests of the general public that the County's water resources are properly planned and managed.

Goal 1 Ensure an adequate dependable supply of water of acceptable quality for all reasonable uses.

Objective 1.1 To maintain the adequacy and dependability of imported water supplies.

Objective 1.2 To achieve a reduction in per capita water consumption by the year 2020.

Objective 1.3 To reduce dependence on imported water supplies through both conservation and local water resource development.

Policy 1 Water Supply – To ensure the adequacy of water supply necessary to serve existing and future development as defined by the General Plan.

Policy 2 Conservation – To reduce per capita and total water consumption through conservation and reclamation programs and the support of new technologies.

Policy 3 Groundwater Sources – To support groundwater management efforts that are conducted by County water agencies.

Policy 4 Shortage Planning – To ensure that Orange County will not be severely impaired by any potential future water shortages.

Policy 5 Water Quality – Protect and improve water quality through continued management, enforcement, and reporting requirements. Encourage an integrated water resources approach for stormwater management that considers water supply, water quality, flood control, open space, and native habitats.

Promote coordination between the County, cities, and other stakeholders in the identification and implementation of watershed protection and Low Impact Development (LID) principles.

Consider implementation of LID principles to conserve natural features (e.g., trees, wetlands, streams, etc.), hydrology, drainage patterns, topography, and soils.

Encourage the creation, restoration, and preservation of riparian corridors, wetlands, and buffer zones. Continue to educate the public about protecting water resources.

Additional water quality policies are also provided in the Land Use Element.

Policy 6 Intergovernmental Coordination – To encourage and support a cooperative effort among all agencies towards the resolution of problems and the utilization of opportunities in the planning management and protection of water resources, including water quality.

4.7.3 METHODOLOGY

Project related GHG emissions were calculated by using CalEEMod. For this analysis, the results are expressed in metric tons of CO_2 equivalent per year ($MTCO_2e/yr$). Please refer to the methodology in Section 4.2, Air Quality, of this EIR, for a discussion of the CalEEMod inputs, adjustments, outputs, and other characteristics for construction-related and operational emissions.

4.7.4 EXISTING CONDITIONS

GHGs are global pollutants and are therefore unlike criteria air pollutants such as O_3, particulate matter (PM_{10} and $PM_{2.5}$), and TACs, which are pollutants of regional and local concern. While pollutants with localized air quality effects have relatively short atmospheric lifetimes (generally on the order of a few days), GHGs have relatively long atmospheric lifetimes, ranging from one year to several thousand years. Long atmospheric lifetimes allow for GHGs to disperse around the globe. Therefore, GHG effects are global, as opposed to the local and/or regional air quality effects of criteria air pollutant and TAC emissions.

4.7.5 THRESHOLDS OF SIGNIFICANCE

On December 5, 2008, the South Coast Air Quality Management District (SCAQMD) Governing Board adopted its staff proposal for an interim CEQA GHG significance threshold of 10,000 $MTCO_2e$/year for industrial projects where the SCAQMD is the lead agency. In September 2010, the Working Group proposed extending the 10,000 $MTCO_2e$/year screening threshold currently applicable to industrial projects where the SCAQMD is the lead agency, described above, to other lead agency industrial projects. Because the Project's land use is closest to the application of industrial uses as compared to residential and commercial uses, the significance threshold developed for industrial uses will be used for the evaluation of potential GHG impacts.

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant GHG emissions impact if it would:

Threshold 4.7-1 Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

Threshold 4.7-2 Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

4.7.6 IMPACT ANALYSIS

Relevant elements of the proposed Project related to the analysis of potential GHG emissions impacts include construction and operations phase activities which emit GHG emissions. Construction activities which emit GHGs are related to fuel combustion from offroad construction equipment as well as worker and truck trips. The operations phase of the Project would involve GHG emissions from energy usage and vehicular trips. California has adopted several initiatives to reduce the State's contribution to global climate change. This information is incorporated by reference into this report, and information that is relevant to the analysis of GHG emissions resulting from the proposed Project is summarized in this section.

Threshold 4.7-1

Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less than Significant Impact. Based on the proposed construction activities described above, the principal source of construction GHG emissions would be internal combustion engines of construction equipment, on-road construction vehicles, and workers' commuting vehicles. GHG emissions from construction activities were obtained from the CalEEMod model, described above. The estimated construction GHG emissions for the proposed Project would be 15,766 $MTCO_2e$, as shown in Table 4.7-1, Estimated Greenhouse Gas Emissions from Construction.

TABLE 4.7-1
ESTIMATED GREENHOUSE GAS
EMISSIONS FROM CONSTRUCTION

Year	Emissions ($MTCO_2e$)
2024	1,554
2025	7,754
2026	6,298
2027	160
Total	15,766
Amortized	**526**

$MTCO_2e$: metric tons of carbon dioxide equivalent.

Notes:
- Totals may not add due to rounding variances.
- Detailed calculations in Appendix B.

Operational phase activities would not change substantively from existing conditions because of the lack of additional energy consumption, stationary sources, and mobile vehicle trips. As such, the Project would not result in a substantial change in GHG emissions. The Project involves improvements to existing dam infrastructure and would not result in substantial increases in air pollutant sources such as vehicular or energy consumption. Existing operations related to dam inspection and maintenance activities would be comparable to those which would occur under the proposed Project. As such, GHG emissions would likewise be essentially the same.

Because impacts from construction activities occur over a relatively short period of time, they contribute a relatively small portion of the overall lifetime Project GHG emissions. In addition, GHG emission reduction measures for construction equipment are relatively limited. The SCAQMD recommends that construction emissions be amortized over a 30-year Project lifetime so that GHG reduction measures address construction GHG emissions as part of the operational GHG reduction strategies (SCAQMD 2008). Therefore, construction and operational emissions are combined by amortizing the construction and operations over an assumed 30-year Project lifetime. This combination is shown in Table 4.7-2, Estimated Total Project Annual Greenhouse Gas Emissions, using the proposed Project's amortized construction and operational emissions.

TABLE 4.7-2
ESTIMATED TOTAL PROJECT ANNUAL
GREENHOUSE GAS EMISSIONS

Source	Emissions ($MTCO_2e/yr^a$)
Construction (Amortized)	526[a]
Operations	--
Total[b]	**526**
SCAQMD-Recommended Threshold	**10,000**
Exceeds Threshold?	**No**

$MTCO_2e/yr$: metric tons of carbon dioxide equivalent per year; SCAQMD: South Coast Air Quality Management District.

[a] Total derived by dividing construction emissions (see Table 8) by 30.
[b] Total annual emissions are the sum of amortized construction emissions and operational emissions.

It is noted that there are no established applicable quantitative federal, State, regional, or local CEQA significance criteria for GHG emissions for non-industrial projects in the South Coast Air Basin. The SCAQMD has adopted an interim threshold of 10,000 $MTCO_2e$ per year for industrial land use projects. As shown, the estimated GHG emissions from the proposed Project would be less than this suggested threshold. The impact would be less than significant, and no mitigation is required.

Impact Conclusion: *Pursuant to Threshold 4.7-1, the Project would not generate GHG emissions, either directly or indirectly, resulting in a significant impact on the environment. Impacts would be less than significant, and no mitigation is required.*

Threshold 4.7-2

Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less than Significant Impact. The County of Orange has not adopted a Climate Action Plan, and the SCAQMD has not adopted standards for the purpose of reducing GHG emissions. There are a number of GHG reduction plans that have been adopted on the State and regional level. SCAG adopted this 2024–2050 RTP/SCS for the six-county region including Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties.

2022 CARB Scoping Plan

The Project would not impede the State's progress towards carbon neutrality by 2045 under the 2022 Scoping Plan. The Project would be required to comply with applicable current and future regulatory requirements promulgated through the 2022 Scoping Plan. Moreover, and as indicated above, the Project's level of GHG emissions would not exceed the SCAQMD recommended threshold of 10,000 MTCO2e/yr. Moreover, the Project would be consistent with the CAP as demonstrated above; therefore, the Project would be consistent with the GHG reduction mandates established by SB 32 and the 2022 Scoping Plan. A less than significant impact would occur. Vehicle trips associated with operations of the infrastructure are expected to be the same or comparable to existing operating conditions. The minimal amount of vehicle trips would have a negligible effect on GHG emissions. However, the Project's improvements to existing water

infrastructure would meet the Project's objectives of meeting the seismic, safety and design requirements; fulfilling operational requirements; extending the useful life of the dam; and improving water supply reliability. This is especially important to the challenges posed by climate change which includes increased flooding, heat events, and droughts as discussed in the California Scoping Plan. The California Scoping Plan discusses the need to enact climate change adaptation measures for water resources which include modernization, conservation, maintaining water quality, groundwater recharge, and minimizing flood risk. Maintaining and improving water infrastructure is part of the adaptation to climate change that is necessary to prevent flooding, and to assist in the provision of adequate water supplies to the region which are goals established within the County's Resource Element of the General Plan and the California Scoping Plan.

SCAG's 2024-2050 RTP/SCS

As discussed above, the principal State plan and policy adopted for the purpose of reducing GHG emissions is AB 32. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. SB 375, signed in September 2008 (Chapter 728, Statutes of 2008), aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocations. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or alternative planning strategy (APS) that will address land use allocation in that Metropolitan Planning Organization's Regional Transportation Plan (RTP). The principles of SB 375 are incorporated in SCAG's adopted 2024-2050 RTP/SCS. The proposed Project is neither a housing development project nor a transportation project that would increase population within the State or increase vehicle miles travelled (VMT). As discussed previously, the Project would also not result in substantial amounts of GHG emissions from either the construction phase or from the operations phase. As shown above, the Project would result in emissions which are below the SCAQMD's draft interim significance threshold for GHGs. As such, GHG emissions generated by the Project are not considered to be substantial. Moreover, the Project would not conflict with the goals outlined in the plan, which are to build and maintain an integrated multimodal transportation network; develop, connect and sustain communities that are livable and thriving; create a healthy region for the people of today and tomorrow; and support a sustainable, efficient and productive regional economic environment that provides opportunities for all residents. A less than significant impact would occur.

Therefore, the Project would have less than significant impacts regarding conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions, and no mitigation measures are required.

Impact Conclusion: *Pursuant to Threshold 4.7-2, the Project would be consistent with and would not conflict with regulations and policies adopted for the purpose of reducing GHG emissions. Impacts would be less than significant, and no mitigation is required.*

4.7.7 CUMULATIVE IMPACTS

As discussed at the beginning of Section 4.7.5, it is accepted as very unlikely that any individual development project would have GHG emissions of a magnitude to directly impact global climate change. Therefore, the analysis presented in Section 4.7.6 represents the cumulative impact analysis for the Project related to GHG emissions. As concluded in Section 4.7.6, the Project would not generate GHG emissions, either directly or indirectly, resulting in a significant impact on the environment and the Project would be consistent with and would not conflict with regulations and policies adopted for the purpose of reducing GHG emissions.

4.7.8 MITIGATION PROGRAM

Mitigation Measures

The proposed Project would not result in significant impacts to GHG Emissions; therefore, no mitigation measures are required.

4.7.9 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The analysis of Project GHG emissions shows that the Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment nor would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Therefore, the Project's GHG emissions impacts would be less than significant, and no mitigation is required.

4.7.10 REFERENCES

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4.8 HAZARDS AND HAZARDOUS MATERIALS

This section of the Environmental Impact Report (EIR) describes the existing hazards and hazardous materials conditions in the Project area, identifies associated potential hazards and hazardous materials impacts related to development of the proposed Project, and sets forth measures designed to mitigate significant adverse impacts. Information in this section is based upon The EDR Radius Map™ Report with GeoCheck®, Santiago Creek Dam Improvement, Silverado, Anaheim, California 92808 (Inquiry Number 6196088.2s) (2020). This report is included as Appendix F to this EIR.

4.8.1 REGULATORY SETTING

Federal

Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act administered by the U.S. Department of Transportation governs the transport of hazardous materials, such as contaminated soil, asbestos, or lead-containing materials. The California Department of Transportation (Caltrans) implements the federal regulations published as Title 49 of the *Code of Federal Regulations* (CFR), which is known as the Hazardous Materials Transportation Act. The main purpose of the Hazardous Materials Transportation Act is to provide adequate protection against risks to life and property inherent in the transport of hazardous materials by improving the regulatory and enforcement authority of the Secretary of Transportation.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) was authorized by Congress in 1976. This law creates the framework for the proper management of hazardous and non-hazardous solid waste. The RCRA amended the Solid Waste Disposal Act of 1965 and has the following goals: (1) to protect human health and the environment from the potential hazards of waste disposal; (2) to conserve energy and natural resources; (3) to reduce the amount of waste generated; and (4) to ensure that wastes are managed in an environmentally sound manner.

Occupational Safety and Health Administration (OSHA)

The Occupational Safety and Health Act of 1970 (OSH Act) was passed to ensure that employers are responsible for providing a safe and healthful workplace. The Occupational Safety and Health Administration's (OSHA's) mission is to assure safe and healthful workplaces by setting and enforcing standards and by providing training, outreach, education, and assistance. Employers must comply with all applicable OSHA standards. Employers must also comply with the General Duty Clause of the OSH Act, which requires employers to keep their workplace free of serious recognized hazards. OSHA standards are listed in Title 29 CFR Part 1910.

State

California Hazardous Waste Control Act

The California Hazardous Waste Control Act (HWCA), as found in the *California Health and Safety Code* (see Division 20, Chapter 6.5, Article 2, Section 25100, et seq.) authorizes the California State Department of Toxic Substances Control (DTSC) and local Certified Unified

Program Agencies (CUPA) to regulate facilities that generate or treat hazardous waste. The HWCA authorizes CUPAs to perform the following actions:

- Conduct inspections of any factory, plant, construction site, waste disposal site, transfer station, establishment, or any other place or environment where hazardous wastes are stored, handled, processed, disposed of, or being treated to recover resources.
- Maintain records of compliance with the Hazardous Waste Control Act.
- Require hazardous waste generators to pay inspection and administration fees to cover the costs of administering the provisions in the HWCA. Fees may include but shall not be limited to the costs of inspection, document development and processing, recordkeeping, enforcement activities, and informational materials development and distribution.
- Issue authorization for on-site treatment of hazardous waste to persons eligible to operate pursuant to permit-by-rule, conditional authorization, or conditional exemption.
- Enforce against violations of the HWCA.

Certified Unified Program Agency

In 1993, Senate Bill 1082 created the CUPA program to foster effective partnerships between local, State, and federal agencies. The Environmental Health Division was designated as the CUPA for the County of Orange by the State Secretary for Environmental Protection on January 1, 1997. The CUPA is the local administrative agency that coordinates the regulation of hazardous materials and hazardous wastes in Orange County through the following six programs:

- Hazardous Materials Disclosure (HMD)
- Business Emergency Plan (BEP)
- Hazardous Waste (HW)
- Underground Storage Tank (UST)
- Aboveground Petroleum Storage Tank (APST)
- California Accidental Release Prevention Program (CalARP)

County and City Fire Agencies within Orange County have joined in partnership with the CUPA as Participating Agencies (PAs). In most Orange County cities, the Environmental Health Division administers all programs; however, the City of Newport Beach Fire Department is responsible for its Hazardous Materials and Business Emergency Plan Programs.

California Accidental Release Prevention Program

CalARP, managed by the CUPA as noted above, is a merging of the Federal Accidental Release Prevention Program and State programs for the prevention of accidental release of regulated toxic and flammable substances. It replaced the California Risk Management and Prevention Program and was created to eliminate the need for two separate and distinct risk management programs. Stationary sources exceeding a threshold quantity of regulated substances are evaluated under this program to determine the potential for and impacts of accidental releases from the source. Depending on the potential hazards, the owner or occupant of a stationary source may be required to develop and submit a risk management plan.

California Occupational Safety and Health Administration

The Division of Occupational Safety and Health, better known as Cal/OSHA, protects and improves the health and safety of working men and women in California through setting and enforcing standards; providing outreach, education, and assistance; and issuing permits, licenses, certifications, registrations, and approvals. Employers are required to monitor worker exposure to listed hazardous substances and notify workers of exposure (8 *California Code of Regulations* Sections 337-340). Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the Code of Federal Regulations. Cal/OSHA standards are generally more stringent than federal regulations. Cal/OSHA regulations specify employer requirements including employee training, provision of safety equipment, accident-prevention programs, and hazardous substance exposure warnings.

Asbestos Abatement

Asbestos is a known human carcinogen, and the U.S. Environmental Protection Agency (USEPA) and California Environmental Protection Agency (CalEPA) have identified asbestos as a hazardous air pollutant pursuant to Section 12 of the Federal Clean Air Act. Further, the California Air Resources Board has identified asbestos as a Toxic Air Contaminant, pursuant to the *California Health and Safety Code* (Section 39650 et seq.). Asbestos is also regulated as a potential worker safety hazard under the authority of the Cal/OSHA, discussed above. These rules and regulations prohibit emissions of asbestos from asbestos-related demolition or construction activities; require medical examinations and monitoring of employees engaged in activities that could disturb asbestos; specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; and require notice to federal and local government agencies prior to beginning renovation or demolition that could disturb asbestos.

In California, asbestos abatement must be performed and monitored by contractors with appropriate certifications from the California Department of Health Services (DHS). In addition, Cal/OSHA has regulations to protect worker safety during potential exposure to asbestos under Title 8 of the *California Code of Regulations* (Section 1529 Asbestos). All demolition that could result in the release of asbestos must be conducted according to Cal/OSHA standards. These standards were developed to protect the general population and construction workers from respiratory and other hazards associated with exposure to these materials.

The South Coast Air Quality Management District's (SCAQMD's) Rule 1403 provides guidelines for the proper removal and disposal of asbestos-containing materials. In accordance with Rule 1403, structures that may contain asbestos are required to be subject to an asbestos survey by a Certified Asbestos Consultant (certified by Cal/OSHA) to identify building materials that contain asbestos. Under this rule, removal of asbestos must include prior SCAQMD notification; compliance with removal procedures and time schedules; asbestos-handling and clean-up procedures; and storage, disposal, and landfilling requirements.

Lead Abatement

Because of its toxic properties, lead is regulated as a hazardous material. Inorganic lead is also regulated as a toxic air contaminant. In California, lead abatement must be performed and monitored by contractors with appropriate certifications from the California DHS. In addition, Cal/OSHA has adopted regulations to protect worker safety during potential exposure to lead under Title 8 of the *California Code of Regulations* (Section 1532.1 Lead). All demolition that could result in the release of lead must be conducted according to these standards, which were

developed to protect the general population and construction workers from respiratory and other hazards associated with lead exposure.

Local

County of Orange General Plan

Safety Element

The Safety Element, one of nine elements of the General Plan, contains County policies on identified and potential hazards and safety considerations, their mitigation (i.e., reduction in damage and loss to real and personal property and minimization of adverse social and economic impacts) and implications for development.

The following goal and objectives of the General Plan Safety Element pertaining to hazards and hazardous materials are applicable to the Project:

Goal 2: Minimize the effects of natural safety hazards through implementation of appropriate regulations and standards, which maximize protection of life and property.

Objective 2.1: To create and maintain plans and programs which mitigate the effects of natural hazards.

Objective 2.2: To support the development and utilization of technologies, which minimize the effects of natural hazards.

4.8.2 METHODOLOGY

An EDR Radius Map™ with Geocheck® Report was prepared for the Project by Environmental Data Resources, Inc. (EDR 2020). Search parameters were based on a one-mile radius of the Project site and consisted of a search of federal, State, local, tribal, and other databases. The complete list of databases and additional information can be found in Appendix F.

4.8.3 EXISTING CONDITIONS

Current Uses of the Project Site

The Santiago Creek Dam impounds water for Irvine Lake on Santiago Creek – a tributary to the Santa Ana River. Existing structures on the Project site include the dam, outlet tower in Irvine Lake, spillway channel, flashboard storage shed, control house/outlet works, energy dissipater structure, dam keeper's house, a portion of Irvine Lake pipeline, and dam access road.

Previous Uses of the Project Site

Santiago Creek Dam was constructed in 1933 to store water for the benefit of the surrounding communities.

The former Irvine Park-Army Camp was used from 1942 to 1946 for training combat troops in field exercises and command post exercises. The property comprised two neighboring encampments, Camp Irvine and Camp Rathke. An area of the former Irvine Park-Army Camp, known as the Multi-Range Training Complex, has been identified through historical research and site visits as having potential explosive hazards. The munitions known or suspected to have been used at the

property include rockets, practice rockets, grenades, practice grenades, small to medium caliber munitions, and small arms ammunition.

The former Irvine Park-Army Camp is located in the cities of Anaheim and Orange, California, in Orange County. The land is owned by multiple public and private landowners and includes Irvine Regional Park and an Outdoor Education Center.

Surrounding Land Uses

Surrounding land uses primarily consist of undeveloped open space. Irvine Regional Park is located northwest of State Route (SR) 241; Limestone Canyon Regional Park is located south of Santiago Canyon Road; and Oak Canyon Park and the Recreational Lease Area are located at the southeast end of Irvine Lake. The closed Santiago Canyon Landfill is located adjacent to the west of Irvine Lake. Residential development is located west of SR-241.

4.8.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant hazards and hazardous materials impact if it would:

Threshold 4.8-1 Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Threshold 4.8-2 Expose people or structure, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

4.8.5 IMPACT ANALYSIS

Threshold 4.8-1

Would the Project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Less Than Significant With Mitigation. An EDR Radius Map™ with Geocheck® Report was prepared for the Project by Environmental Data Resources, Inc. (EDR 2020). Search parameters were based on a one-mile radius of the Project site and consisted of a search of federal, State, local, tribal, and other databases. The complete list of databases and additional information regarding the identified sites can be found in Appendix F. According to the EDR Radius Map, no mapped sites were found within ¼-mile of the proposed Project.

However, Irvine Ranch Water District (IRWD) received a letter from the U.S. Army Corps of Engineers (USACE) dated February 11, 2021 regarding the Project site and their former training areas designated for cleanup. IRWD denied access for the time being. USACE's understanding was that Project-specific biological and field investigations research was currently ongoing for the proposed Project. IRWD and USACE are in mutual understanding that USACE will conduct all necessary investigations on the site noted related to munitions-related exposure at a future date.

USACE prepared a Final Munitions Response Quality Assurance Project Plan, Military Munitions Response Program Remedial Investigation/Feasibility Study, Irvine Park – Army Camp Range Complex Munitions Response Site, Formerly Used Defense Site, Orange County, California (Plan) in July 2022 (USACE 2022). The Plan identifies a Munitions Response Site and Hazardous Fragment Distance Boundary covering a large area of Santiago Creek upstream of the dam crest and spillway, but also overlaps on the dam crest and spillway themselves, which are also on IRWD property as shown in Exhibit 4.8-1, Explosive Safety Quantity-Distance Arcs, prepared as part of the Final Munitions Response Quality Assurance Project Plan and Military Munitions Response Program Remedial Investigation/Feasibility Study. Although exact areas of munitions and explosives of concern are not known, the areas noted on this exhibit include the actual Munitions Response Site (MRS), or the area known to require a munitions response action due to the potential for munitions or explosives of concern, as well as the Hazardous Fragment Distance Safety Arc and the Maximum Fragment Distance Horizontal Safety Arc. Therefore, based on this exhibit, the northernmost portion of the Project site has the potential to be impacted by potential for munitions or explosives of concern. However, the areas identified for potential impact have been subject to historical disturbance associated with construction and maintenance of the dam, access road, and associated structures, as well as installation of SCE power lines and power poles at the downstream toe of the dam.

In July 2023, IRWD subsequently met with USACE and DTSC. USACE has an on-going Formerly Used Defense Sites (FUDS) investigation at the Irvine Park – Army Camp location, which includes the Project site and the MRS discussed above and depicted in Exhibit 4.8-1. USACE's Remedial Investigation/Action will be completed in the next few years. USACE's FUDS is independent of DTSC's general decisions regarding Cortese List designations.

IRWD and DTSC will consult regarding inclusion of their owned parcel, which is within the Project site, in the Cortese List. According to USACE, IRWD's owned parcel likely only had "small arms" activity such as rifle range firing. However, according to USACE, undocumented activities including use of explosives could have been conducted on this property. As such, a discussion of the possibility of removing the parcel from the Cortese List following USACE's Remedial Investigation/Action completion will take place in the future.

The Project is scheduled to commence prior to completion of the USACE's FUDS. Given the timing of Project, IRWD will follow and implement the 3Rs of Explosives Safety – Recognize, Retreat, and Report as detailed in **MM HAZ-1** during construction.

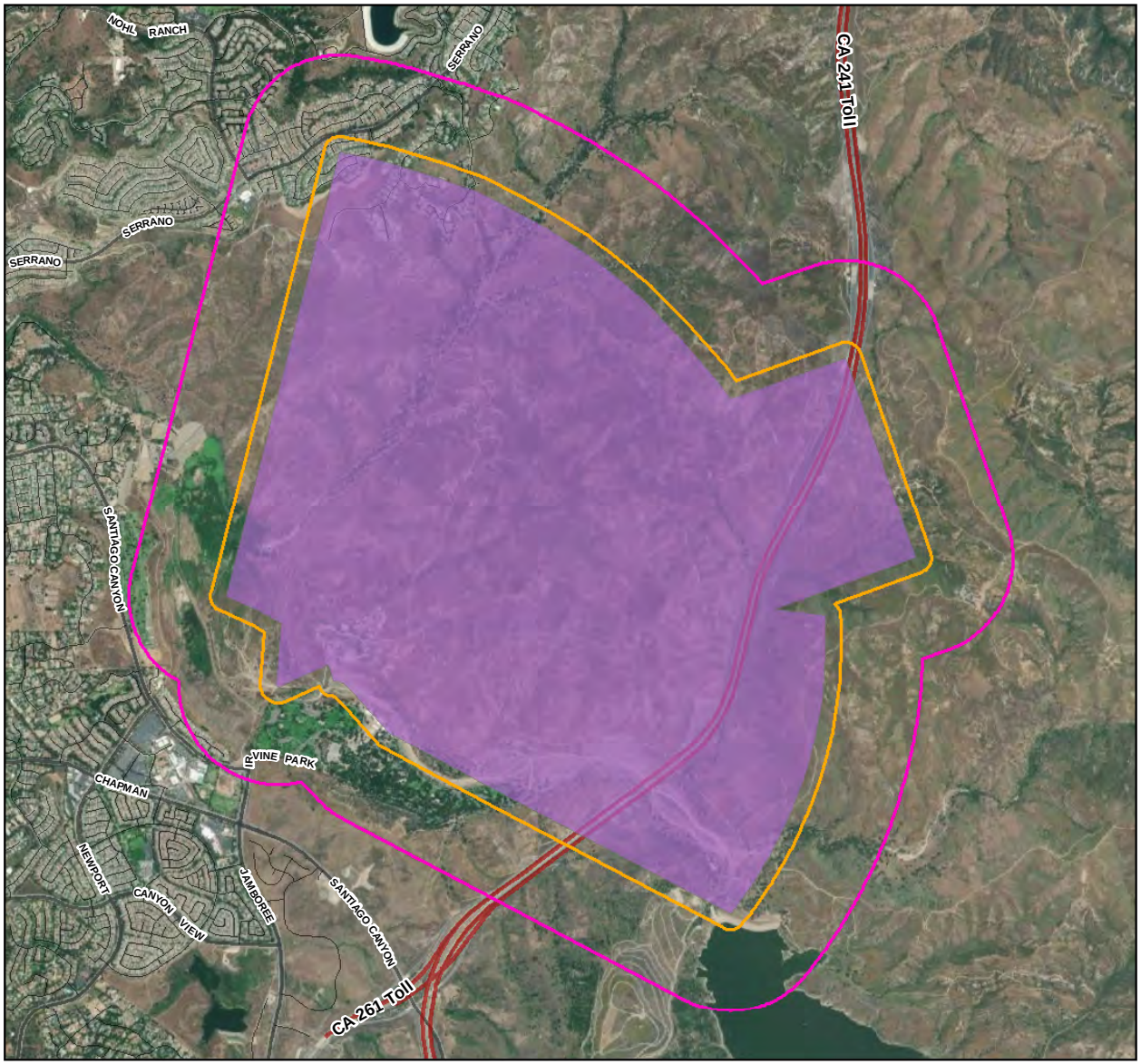
With implementation of **MM HAZ-1**, impacts related to known hazardous materials sites would be less than significant.

Impact Conclusion: *A portion of the Project site is located on the former Irvine Park-Army Camp and is currently designated on the Cortese List. With the implementation of **MM HAZ-1**, which requires IRWD to follow and implement the 3Rs of Explosives Safety – Recognize, Retreat, and Report, impacts would be less than significant.*

Threshold 4.8-2

Would the Project expose people or structure, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

Less Than Significant Impact. As defined by the Public Resources Code (PRC) 4126, State Responsibility Areas (SRAs) are State- and privately-owned forest, watershed, and rangeland for which the primary financial responsibility of preventing and suppressing wildland fires rests with



Legend

- Minor Road
- Highway
- Major Road
- MRS Boundary *3,351.7 acres*

Exclusion Zones

Unintentional Detonations

- Hazardous Fragment Distance [HFD] Safety Arc (335 ft.[1])

Intentional Detonations

- Maximum Fragment Distance-Horizontal [MFD-H] Safety Arc (2,111 ft.[2])

Source: USACE 2022

Explosive Safety Quantity-Distance Arcs

Exhibit 4.8-1

Santiago Creek Dam Improvement Project

N W E S

Map not to scale

PSOMAS

(02/27/2025 JVR) R:\Projects\IRW_IRWD\3IRW001101\Graphics\EIR\ex_4.8-1.pdf

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the State. State Responsibility Areas, by definition, do not include any lands within city limits. Within SRAs, CAL FIRE maps fire hazard severity zones based on factors such as fuel, slope, and fire weather to identify the degree of fire hazard throughout California (e.g., moderate, high, or very high). CAL FIRE also provides recommendations for fire hazard severity zones within Local Responsibility Areas (LRAs), but the responsibility for mapping Local Responsibility Areas lies within the local jurisdiction responsible for fire management and control within the Local Responsibility Area. While fire hazard severity zones do not predict when or where a wildfire will occur, they do identify areas where wildfire hazards could be more severe and therefore are of greater concern.

According to the California Fire Hazard Severity Zone Viewer, the Project site is located within a Very High Fire Hazard Severity Zones (FHSZ) in a SRA. The areas surrounding the Project site, which are primarily open space areas, are also located within a Very High FHSZ, with the exception of a portion of Irvine Lake, which is located within a High FHSZ within an SRA (CAL FIRE 2023). Development of the proposed Project would include construction and operation of a new outlet tower, spillway improvements and access road improvements, and improvements to the dam crest and embankment. The proposed access road improvements are proposed for Southern California Edison (SCE) utility line relocation, that would occur after completion of the Project and would go through a separate review process. The Project, similar to other such projects, has the potential to increase the risk associated with wildfires due to the presence of heavy construction equipment, including the use of flammable liquids and the presence of internal combustion engines, which could generate sparks or cause leaks that create fire risks, as discussed in further detail above. All infrastructure installed as part of the Project during operation and maintenance will adhere to California Code of Regulation (CCR) Title 24, the California Building Code (CBC), and County of Orange Safety Element. Therefore, with regulatory compliance measures incorporated, the proposed Project would not exacerbate wildfire risk and would not cause environmental impacts other than those analyzed throughout Section 4.0, Impact Analysis, of this EIR. Impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *The Project site is located within a Very High FHSZ in a SRA. The areas surrounding the Project site are also located within a Very High FHSZ, with the exception of a portion of Irvine Lake, which is located within a High FHSZ within an SRA. With regulatory compliance measures incorporated, the proposed Project would not exacerbate wildfire risk and impacts would be less than significant. No mitigation is required.*

4.8.6 CUMULATIVE IMPACTS

The cumulative study area associated with hazardous materials is typically site-specific except where past, present, and/or proposed land uses would impact off-site land uses and persons or where past, present, or foreseeable future development in the surrounding area would cumulatively expose a greater number of persons to hazards (e.g., hazardous materials and/or waste contamination).

As discussed under Threshold 4.8-1, because explosive hazards associated with military munitions from past military training may remain on the former Multi-Range Training Complex, the USACE recommends that landowners and visitors follow the 3Rs of Explosives Safety – Recognize, Retreat, and Report (**MM HAZ-1**). With implementation of mitigation, impacts related to known hazardous materials sites would be less than significant. The proposed Project would not contribute to any potential significant cumulative impacts related to hazardous materials sites.

As discussed under Threshold 4.8-2, the Project site is located within a very high FHSZ in an SRA, and the areas surrounding the Project site are also located within a very high FHSZ. With regulatory compliance measures incorporated, implementation of the proposed Project would not exacerbate wildfire risk and would not cause environmental impacts. Therefore, the proposed Project would not contribute to any potentially significant cumulative impacts related to wildland fires.

4.8.7 MITIGATION PROGRAM

MM HAZ-1 IRWD will require that all construction contractor(s) and their personnel receive, review, and adhere to the guidance published in *3Rs Safety Guide, Former Irvine Park-Army Camp, California, Orange County*. IRWD will require its construction contractor to provide training to all construction personnel on the implementation and application of the Safety Guide, which includes 1) Recognize that munitions are dangerous; 2) Retreat – do not approach, touch, move or disturb it, but carefully leave the area; and 3) Report immediately what you saw and where you saw it to local law enforcement.

4.8.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

With the implementation of **MM HAZ-1**, impacts related to hazards and hazardous materials would be less than significant.

4.8.9 REFERENCES

California Department of Forestry and Fire Protection (CAL FIRE). 2023 (November 15, access date). Fire Hazard Severity Zone Viewer. Sacramento, CA: CAL FIRE. https://experience.arcgis.com/experience/03beab8511814e79a0e4eabf0d3e7247/.

Environmental Data Resources, Inc. (EDR). 2020 (September 17). The EDR Radius Map™ Report with GeoCheck®: Santiago Creek Dam Improvement, Silverado, Anaheim, CA 92808 (Inquiry Number 6196088.2s). Shelton, CT: EDR. Appendix F.

U.S. Army Corps of Engineers (USACE). 2022 (July). Final Munitions Response Quality Assurance Project Plan, Military Munitions Response Program Remedial Investigation/Feasibility Study, Irvine Park – Army Camp, Range Complex Munitions Response Site, Formerly Used Defense Site, Orange County, California. Washington D.C.: USACE.

———.2016. 3Rs Safety Guide, Former Irvine Park-Army Camp, California, Orange County. Washington D.C.: USACE.

U.S. Department of Defense. 2021 (February 11). Irvine Park Army Camp Range Complex Munitions Response Site #: J09CA712901, Irvine Park – Army Camp is located at the Irvine Regional Park in the City of Orange, CA. Los Angeles, CA: Department of the Army.

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4.9 HYDROLOGY AND WATER QUALITY

This section of the Environmental Impact Report (EIR) discusses Project-related impacts to hydrology/drainage and water quality at the Project site.

4.9.1 REGULATORY SETTING

Federal, state, and regional laws, regulations, plans, and guidelines that are potentially applicable to the proposed Project are summarized below. They are established to achieve regional water quality objectives and to protect the beneficial uses of the region's surface and groundwater.

Federal

Clean Water Act

The federal Clean Water Act (CWA) and subsequent amendments, under the enforcement authority of the U.S. Environmental Protection Agency (USEPA), was enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The purpose of the CWA is to protect and maintain the quality and integrity of the nation's waters by requiring States to develop and implement State water plans and policies. The CWA gave the USEPA the authority to implement pollution control programs such as setting wastewater standards for industry. In California, implementation and enforcement of the National Pollutant Discharge Elimination System (NPDES) program is conducted through the California State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs). The CWA also sets water quality standards for surface waters and established the NPDES program to protect water quality through various sections of the CWA, including Sections 401 through 404 and 303(d) that are implemented and regulated by the SWRCB and the nine RWQCBs. NPDES and Section 402 of the CWA would apply to the proposed Project because the Project would be required to control discharges of pollutants from point sources, as discussed below.

National Pollutant Discharge Elimination System (NPDES) Permit and Section 402

The NPDES permit system was established under the CWA to regulate municipal and industrial point discharges to surface waters of the U.S. Each NPDES permit for point discharges contains limits on allowable concentrations of pollutants contained in discharges. Section 402 of the CWA contains general requirements regarding NPDES permits.

The CWA was amended in 1987 to require NPDES permits for non-point source (i.e., stormwater) pollutants in discharges. Stormwater sources are diffuse and originate over a wide area rather than from a definable point. The goal of NPDES stormwater regulations is to improve the quality of stormwater discharged to receiving waters to the "maximum extent practicable" through the use of structural and non-structural Best Management Practices (BMPs). BMPs can include the development and implementation of various practices including educational measures (workshops informing the public of what impacts result when household chemicals are dumped into storm drains), regulatory measures (local authority over drainage facility design), public policy measures, and structural measures (i.e., filter strips, grass swales, and detention ponds). In California, the stormwater portion of Section 402 is addressed through the state Construction General Permit, as described below.

National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) determines flood elevations and floodplain boundaries based on U.S. Army Corps of Engineers' studies. FEMA also distributes the Flood Insurance Rate Maps (FIRM) used in the National Flood Insurance Program. FIRMs identify the locations of special flood hazard areas, including 100-year floodplains. The proposed Project site is located in an identified FIRM flood hazard area. More specifically, the site is located within the FEMA 100-year flood zone (AECOM and GEI 2022).

Federal Guidelines for Dam Safety and Emergency Action Planning

The Water Resources Development Act of 1996 (Public Law 104-303) directed FEMA to establish a National Dam Safety Program and formally established the National Dam Safety Review Board and the Interagency Committee on Dam Safety as its authorized permanent advisory body. Through this Act, FEMA developed guidelines for dam owners to improve conditions for preparedness for foreseeable emergencies. These guidelines are intended to encourage development of comprehensive and consistent emergency action planning to protect lives and reduce property damage and involve participation of emergency management authorities and dam owners in emergency action planning (FEMA 2013). Emergency action plans (developed for a given dam location) outline actions to be taken to alleviate dam problems, outline responsibilities and procedures for warning/notification, and notably, provide for the development of inundation maps to identify critical infrastructure and at-risk population sites that may require protective measures, warning, and evacuation planning.

State

California Department of Water Resources, Division of Safety of Dams

The California Department of Water Resources (DWR), Division of Safety of Dams (DSOD), through Division 3 of the California Water Code, is entrusted with regulatory authority and oversight for dam safety. DSOD provides oversight of the design, construction, and maintenance of over 1,200 jurisdictional-sized dams in California. Jurisdictional dams are dams that are more than 6 feet high and impound 50 acre-feet or more of water, or 25 feet or higher and impound more than 15 acre-feet of water. The jurisdictional height of a dam, as determined by DSOD, is the vertical distance measured from the lowest point at the downstream toe of the dam to its maximum storage elevation, which is typically the spillway crest. The Santiago Creek Dam is a jurisdictional dam. DSOD ensures dam safety by:

- Reviewing and approving dam enlargements, repairs, alterations, and removals to ensure that the dam-appurtenant structures are designed to meet minimum requirements.
- Performing independent analyses to determine the performance of the dam and appurtenant structures. These analyses can include structural, hydrologic, hydraulic, and geotechnical evaluations.
- Overseeing construction to ensure that work is being done in accordance with the approved plans and specifications.
- Inspecting each dam on an annual basis to ensure it is safe, performing as intended, and is not developing issues. Roughly 1/3 of these inspections include in-depth instrumentation reviews of dam surveillance network data.
- Periodically reviewing the stability of dams and their major appurtenances in light of improved design approaches and requirements as well as new findings regarding earthquake hazards and hydrologic estimates in California.

The California Office of Emergency Services Dam Safety Program was enhanced though passage of Senate Bill 92 (2017) and detailed in the California Water Code Sections 6160 and 6161 and Government Code Section 8589.5. The bill required preparation of Emergency Action Plans (EAPs) (except for dams designated as low hazard) and brings inundation mapping under the jurisdiction of the California DWR. This legislation set forth additional requirements for EAPs including compliance requirements, implementation of the plan, and coordination with local public safety agencies.

EAPs are written documents that identify potential emergency conditions at a dam and specify actions to help minimize property damage and loss of life if these conditions occur. EAPs contain procedures and information that instruct dam owners to issue early warning and notification messages to downstream emergency management authorities. EAPs also provide assistance and guidance to local jurisdictions for their emergency planning for a dam failure event to ensure effective dam incident emergency response procedures and planning. Senate Bill 92 also requires EAPs be updated (at minimum) every 10 years or when there are significant changes to the dam, its critical appurtenant structures, or downstream hazard classification (DWR DSOD 2018).

Consistent with Federal Guidelines for Dam Safety, IRWD prepared an EAP for the Santiago Creek Dam, approved November 28, 2022 (Stetson Engineers 2022). The EAP was prepared to identify potential emergency conditions at Santiago Creek Dam, facilitate notification of affected parties, assign roles and responsibilities to involved agencies, and take mitigating actions in time to minimize loss of human life or injury and property damage. Emergency management authorities will use the information in this EAP to facilitate their performance of their responsibilities. Local, county, and state authorities have coordinating plans in place to address local emergency operations and/or warnings and evacuations.

According to the EAP, DSOD has rated the Santiago Creek Dam as having an “Extremely High” downstream hazard classification. Because of its hazard classification, IRWD developed its EAP in accordance with California Water Code Sections 6160 and 6161, Government Code Section 8589.5, and the FEMA Federal Guidelines for Dam Safety: “Emergency Action Planning for Dams.” Prior to approval, the Santiago Creek Dam EAP was circulated for review and comment to affected parties and all to emergency planning, law, and fire public safety agencies for all affected jurisdictions.

The EAP establishes IRWD as the “Dam Owner” and makes IRWD responsible for detecting and evaluating dam safety incidents, classifying the incident, notifying emergency management authorities, taking appropriate response actions, terminating the EAP, and performing follow-up tasks related to dam incidents. A safety incident at Santiago Creek Dam could impact 13 jurisdictions served by 18 public safety agencies.

A dam safety incident is reported through 911 or a direct phone call to Orange County Sheriff’s Department (OCSD). The emergency response through the public safety agencies would be coordinated by OCSD “Control One,” which is the central point of contact for interoperable communications between all law enforcement, fire, and public works agencies responding to a dam safety emergency at the Santiago Creek Dam. Upon notification of an incident, Control One would broadcast an emergency message to all dispatch centers at once via radio and would send messages via teletype over communications terminals. Once the incident is reported, a Unified Command is expected to be established. The Unified Command would include OCSD, Orange County Fire Authority, and representatives from IRWD (dam owners), plus representatives from all agencies of downstream jurisdictions, as necessary. The Unified Command will facilitate coordination among agencies and disciplines. An Incident Command Post (ICP) would be established in an area near the dam outside of the inundation zone. A possible ICP location for Santiago Creek Dam is at the parking lot for the Irvine Lake recreation area, located at 4621 E.

Santiago Canyon Road, Silverado, CA 92676. The County and Operational Area Emergency Operations Center is expected to be activated during emergencies at Santiago Creek Dam. The Emergency Operations Center would be established at the County Emergency Management office at 2644 E Santiago Canyon Rd, Silverado, California. The Unified Command will facilitate coordination among agencies and disciplines. Responsibilities consist of establishing the ICP, protecting life and property, controlling personnel and equipment resources, maintaining accountability for responder and public safety, and establishing and maintaining an effective liaison with outside agencies and organizations. The Unified Command is responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources.

NPDES Construction General Permit

Construction associated with the proposed Project would disturb more than one acre of land surface that has the potential to affect the quality of stormwater discharges into waters of the U.S. The proposed Project would, therefore, be subject to the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Order WQ 2022-0057-DWQ, NPDES No. CAS000002). The Construction General Permit regulates discharges of pollutants into stormwater associated with construction activity to waters of the U.S. from construction sites that disturb one acre or more of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface. The permit regulates stormwater discharges associated with construction or demolition activities, such as clearing and excavation; the construction of buildings; and linear underground projects, including installation of water pipelines and other utility lines.

The Construction General Permit requires that construction sites be assigned a Risk Level of 1 (low), 2 (medium), or 3 (high), based both on the sediment transport risk at the site and the receiving waters' risk during periods of soil exposure (e.g., grading and site stabilization). The sediment risk level reflects the relative amount of sediment that could potentially be discharged to receiving water bodies and is based on the nature of the construction activities and the location of the site relative to the receiving water bodies. The receiving waters risk level reflects the risk to the receiving waters from the sediment discharge. Depending on the risk level, the construction projects could be subject to the following requirements:

- Effluent standards;
- Good site management "housekeeping;"
- Non-stormwater management;
- Erosion and sediment controls;
- Run-on and runoff controls;
- Inspection, maintenance, and repair; and
- Monitoring and reporting requirements.

The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific BMPs designed to prevent sediment and pollutants from contacting stormwater moving off site into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management, and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Routine inspection of all BMPs is required under the provisions of the Construction General Permit.

The SWPPP must be prepared before construction begins. The SWPPP must contain a site map(s) that delineates the construction work area, existing and proposed buildings, parcel boundaries, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the project area. The SWPPP must list BMPs and the placement of those BMPs that the applicant would use to protect stormwater runoff. Examples of typical construction BMPs include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing, and fueling. The Construction General Permit also sets post-construction standards (i.e., implementation of BMPs to reduce pollutants in stormwater discharges from the site following construction).

In the proposed Project area, the Construction General Permit is implemented and enforced by the Santa Ana RWQCB, which administers the stormwater permitting program. Dischargers must electronically submit a notice of intent and permit registration documents to obtain coverage under this Construction General Permit. Dischargers are to notify the Santa Ana RWQCB of violations or incidents of noncompliance and submit annual reports identifying deficiencies in the BMPs and explaining how the deficiencies were corrected. The risk assessment and SWPPP must be prepared by a State Qualified SWPPP Developer, and implementation of the SWPPP must be overseen by a State Qualified SWPPP Practitioner. A legally responsible person, who is legally authorized to sign and certify permit registration documents, is responsible for obtaining coverage under the permit.

NPDES Municipal Separate Storm Sewer System Permit (MS4)

In 1987, amendments to the Clean Water Act expanded the NPDES permit program to regulate discharges from storm drains owned and operated by municipalities, such as the County of Orange. In November 1990, USEPA published regulations that established application requirements for stormwater permits for municipal stormwater discharges. In California, the NPDES stormwater permit program is administered and enforced by the SWRCB through the nine RWQCBs by issuing Waste Discharge Requirements and NPDES permits. These permits are reissued approximately every five years and include applicable provisions of the State Porter-Cologne Water Quality Control Act, which is the principal legislation for controlling stormwater pollutants in California. The permit establishes regulations covering discharge prohibitions, receiving water limitations, municipal operations, new development, construction site controls (construction site runoff), and other regulations for surface water quality.

The discharge prohibitions prohibit the discharge of non-stormwater (materials other than stormwater) into storm drain systems and watercourses. The municipal operations regulations include a number of requirements to control and reduce non-stormwater discharges and polluted stormwater to storm drains and watercourses during operation, inspection, and routine repair and maintenance activities of municipal facilities and infrastructure, such as the proposed Project. The requirements include source control, site design, and stormwater treatment requirements, such as minimizing disturbance of natural infiltration areas and the addition of impervious surfaces, controlling and directing runoff, and the use of infiltration and bioretention, among other measures. The MS4 Permit for the proposed Project area is discussed below in the section regarding local regulations.

Groundwater Dewatering for the Santa Ana Region

Discharges of groundwater are covered by the General Discharge Permit for Discharges to Surface Waters of Groundwater resulting from Groundwater Dewatering Operations and/or Groundwater Cleanup Activities at Sites within the San Diego Creek/Newport Bay Watershed Polluted by Petroleum Hydrocarbons, Solvents, Metals, and/or Salts (Dewatering Permit for Santa Ana Region). As detailed in Section 3.0, Project Description, a subgrade dewatering system such as a dewatering well is proposed as part of the overall dewatering process. Encountered groundwater would be dewatered and conveyed to Santiago Creek. Before discharging to the creek in compliance with discharge permits, the water may be treated for total dissolved solids (TDS) if there are elevated levels of turbidity. If required, the subgrade dewatering system may discharge into the existing storm drain, if necessary, pursuant to the conditions and requirements in Order Number: R8-2020-0006; NPDES Number: CAG998001 (RWQCB 2020).

Local

Santa Ana Regional Water Quality Control Board

The proposed Project site is located within the region under the jurisdiction of the Santa Ana RWQCB, which establishes regulatory standards and objectives for water quality in the region in the *Water Quality Control Plan, Santa Ana River Basin*, commonly referred to as the Basin Plan. The Basin Plan identifies existing and potential beneficial uses for surface water and groundwater and provides numerical and narrative water quality objectives designed to protect those uses. Irvine Lake (Santiago Reservoir) has the following surface water beneficial uses:

MUN – Municipal and Domestic Supply waters are used for community, military, municipal or individual water supply systems. These uses may include, but are not limited to, drinking water supply.

AGR – Agricultural Supply waters are used for farming, horticulture or ranching. These uses may include, but are not limited to, irrigation, stock watering, and support of vegetation for range grazing.

REC1 – Water Contact Recreation (Primary Contact Recreation) waters are used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses may include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing and use of natural hot springs. Although the Irvine Lake (Santiago Reservoir) is listed with a REC1 beneficial use, IRWD does not permit primary contact recreation because the reservoir waters are used for water supply.

REC2 – Non-contact Water Recreation (Secondary Contact Recreation) waters are used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water would be reasonably possible. These uses may include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing and aesthetic enjoyment in conjunction with the above activities.

WARM – Warm Freshwater Habitat waters support warmwater ecosystems that may include, but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

COLD – Cold Freshwater Habitat waters support cold water ecosystems that may include, but are not limited to, preservation and enhancement of aquatic habitats, vegetation, fish and wildlife, including invertebrates.

WILD – Wildlife Habitat waters support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.

RARE - Rare, Threatened or Endangered Species waters support the habitats necessary for the survival and successful maintenance of plant or animal species designated under state or federal law as rare, threatened or endangered.

Orange County Municipal Storm Water Permit (MS4)

The Orange County Municipal Storm Water Permit (MS4) applies to the proposed Project (Municipal NPDES Permit No. CAS 618030, Order No. R8-2009-0030 - NPDES Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the Incorporated Cities of Orange County within the Santa Ana Region, Areawide Urban Storm Water Runoff, Orange County ("Co-Permittees")). The NPDES municipal general permits issued by the RWQCB establish regulations covering discharge prohibitions, receiving water limitations, municipal operations (such as the proposed project), new development, construction site controls (construction site runoff), and other regulations to regulate surface water quality (RWQCB 2015). The discharge prohibitions prohibit the discharge of non-stormwater (materials other than stormwater) into storm drain systems and watercourses and includes a tiered categorization of non-stormwater discharges based on potential for pollutant content that may be discharged upon adequate assurance that the discharge contains no pollutants of concern at concentrations that will impact beneficial uses or cause exceedances of water quality standards. The receiving water limitations provide narrative and numeric water quality standards. The municipal operations regulations include a number of requirements to control and reduce non-stormwater discharges and polluted stormwater to storm drains and watercourses during operation, inspection, and routine repair and maintenance activities of municipal facilities and infrastructure. The requirements include source control, site design, and stormwater treatment requirements, such as minimizing disturbance of natural infiltration areas and the addition of impervious surfaces, controlling and directing runoff, and the use of infiltration and bioretention measures, among other measures. To more efficiently address the requirements, the permittees within the County of Orange developed the Drainage Area Management Plan (DAMP), described below.

Drainage Area Management Plan (DAMP)

To implement the requirements of the Orange County MS4 Permit, the Co-Permittees developed the 2003 DAMP (Orange County Public Works [OCPW] 2003) to serve as the foundation of the model programs, local implementation plan, and watershed implementation plans. The DAMP provides a framework and a process for following the Orange County MS4 Permit requirements and incorporates watershed protection/storm water quality management principles into the Co-Permittees' General Plan process, the environmental review process, and the development permit approval process. Among others, the DAMP discusses the activities, practices, and programs being implemented by the various municipalities for reducing pollutant discharges into the MS4s. It includes a public education program to encourage the prevention of storm water pollution at the source. The DAMP also defines requirements for construction sites and for project-specific planning, selection, and design of BMPs in new development or significant redevelopment projects. Additionally, it includes the water quality monitoring programs being implemented in the County.

The 2007 DAMP (OCPW 2007) was developed in response to the updated Orange County MS4 Permit. This DAMP addresses the same storm water quality programs related to municipal activities; public education; requirements for new development and significant redevelopment projects (including the Model Water Quality Management Plan), construction sites, and existing development; discharge prohibitions; and the water quality monitoring program.

County of Orange

General Plan, Resources and Land Use Elements

The following goals and policies from the Resources Element of the Orange County General Plan are relevant to the proposed project's consideration of water resources (Orange County, 2012).

Goal 1 Ensure an adequate dependable supply of water of acceptable quality for all reasonable uses.

Policy 1 Water Supply – To ensure the adequacy of water supply necessary to serve existing and future development as defined by the General Plan.

Policy 2 Conservation – To reduce per capita and total water consumption through conservation and reclamation programs and the support of new technologies.

Policy 3 Groundwater Sources – To support groundwater management efforts that are conducted by County water agencies.

Policy 4 Shortage Planning – To ensure that Orange County will not be severely impaired by any potential future water shortages.

Policy 5 Water Quality – Protect and improve water quality through continued management, enforcement, and reporting requirements. Encourage an integrated water resources approach for stormwater management that considers water supply, water quality, flood control, open space, and native habitats.

Promote coordination between the County, cities, and other stakeholders in the identification and implementation of watershed protection and Low Impact Development (LID) principles.

Consider implementation of LID principles to conserve natural features (e.g., trees, wetlands, streams, etc.), hydrology, drainage patterns, topography, and soils.

Encourage the creation, restoration, and preservation of riparian corridors, wetlands, and buffer zones. Continue to educate the public about protecting water resources.

The following policies from the Land Use Element of the Orange County General Plan (as updated in 2024) establish a framework for managing urban and stormwater runoff (Orange County 2024).

Encourage, support and require all new development and redevelopment projects to identify opportunities for implementation of Low Impact Development (LID) principles in the early stages of the development planning process.

Promote, support, and require innovative site planning and development techniques that allow for implementation of LID principles while taking into consideration specific hydrology and geology conditions.

Encourage, support and require the use of LID as art of an overall strategy to mitigate stormwater impacts from new development and redevelopment projects consistent with current NPDES permit requirements.

Encourage and support, where applicable, the use of buffer zones to protect natural water bodies, including but not limited to, wetlands and riparian corridors. Where infeasible, require other measures to protect natural water bodies.

Identify and evaluate potential changes to land use development regulations to support and promote stormwater management techniques and ensure regulations do not inhibit compliance with current NPDES permit requirements.

4.9.2 METHODOLOGY

The environmental analysis of potential impacts to hydrology and water quality is based on a review of regional literature and water resources data and the site-specific geotechnical investigation, including dam safety and inundation analysis, the feasibility study, design reports and constructability analysis prepared for the proposed Project.

The analysis assumes that the proposed Project would comply with the various laws and regulations pertaining to water quality, dam safety, and others described in Section 4.9.1, Regulatory Setting. For example, as the Project would disturb more than one acre, compliance with the Construction General Permit would be required along with implementation of BMPs and conditions of a SWPPP to limit impacts during construction.

Following consideration of the proposed Project, as described in the Project Description, and the Project's implementation of and compliance with regulatory requirements, this impact analysis evaluates whether a significant environmental impact would occur based on the CEQA Appendix G thresholds of significance outlined herein. For any potential impacts considered to be significant, mitigation is proposed to reduce the severity of such impacts to less than significant levels.

4.9.3 EXISTING CONDITIONS

Santiago Creek Dam was constructed in 1933 and the existing spillway is located along the western end of the dam. The spillway is approximately 180 feet wide and empties into a concrete-lined chute, which is approximately 80 feet wide at the end of the chute. The spillway is rated for 30,000 cubic feet per second (cfs) and has a total length of 310 feet. Stoplogs may be inserted at the spillway annually from April to September to raise the effective crest elevation by four feet, from 790 feet above mean sea level up to 794 feet (Stetson 2022).

Villa Park Dam, a jurisdictional dam owned by OCPW, is located approximately 3.5 river miles downstream of Santiago Creek Dam. A sudden and total failure of the Santiago Creek Dam may lead to a sequential failure at the downstream Villa Park Dam.

Santiago Creek Hydrology

Santiago Creek is on the western slope of the Santa Ana Mountains in southern California and is a tributary to the Santa Ana River (United States Geological Survey Hydrologic Unit Code 18070203). The Santiago Creek watershed has a total drainage area of about 90 square miles and is located in southern California in a mild, Mediterranean climate zone. The creek flows in a northwesterly direction for about 32 miles from its headwaters near Santiago Peak to its confluence with the Santa Ana River about 14.5 miles downstream of Santiago Creek Dam. Santiago Creek Dam drains about 63 square miles of the Santiago Creek watershed. The drainage basin upstream of the dam generally consists of steep and mountainous terrain, ranging in elevation from approximately 780 feet above mean sea level at the dam to 5,680 feet above mean sea level in the headwaters near Santiago Peak (AECOM and GEI 2022). The average

annual temperature is about 64 degrees Fahrenheit. Summers are warm and dry; winters are cool and mild. The majority of annual precipitation occurs during the months of November through April. Average annual precipitation is about 14 inches but varies greatly (Stetson 2022). Most of the basin soils are in the Natural Resources Conservation Service hydrologic group D, indicating a poor infiltration rate and high runoff potential when thoroughly wet, though there are pockets of more well-drained soils (AECOM and GEI 2022).

Drainage and Topography

The Santiago Creek watershed can be divided into three sub-watersheds based on the areas draining to the Santiago Creek and Villa Park Dams. The drainage area upstream of Santiago Creek Dam is 63.1 square miles and consists of steep canyons. These mountainous headwaters are mostly undeveloped, with elevations up to about 5,500 feet above mean sea level. Downstream of Santiago Creek Dam, Santiago Creek flows northwest for roughly 3.5 river miles, where it is impounded by Villa Park Dam. The drainage area between Santiago Creek and Villa Park Dams is 20 square miles, also mostly undeveloped. Downstream of Villa Park Dam, Santiago Creek flows through the Santiago Creek Recharge Basins and then continues for another 5.5 river miles before joining the Santa Ana River. At its point of discharge into the Santa Ana River, Santiago Creek drains a total area of 99 square miles. The Santa Ana River drains a total of 2,650 square miles and flows into the Pacific Ocean in Huntington Beach (Stetson 2022).

Surface Water

Santiago Creek Dam is a compacted earthfill embankment that impounds water for Irvine Lake from the Santiago Creek, local storm water runoff, and imported raw water from the Metropolitan Water District of Southern California (MWDSC) and serves as a domestic and irrigation water supply for various cities in Orange County. Santiago Creek is a tributary to the Santa Ana River.

Santiago Creek Historical Flood Events

Santiago Creek experienced a large flood event in February 1969, where a storm arrived in February after Irvine Lake was already full from a storm event that occurred in January. Severe flooding occurred on Santiago Creek and in the lower Santa Ana River watershed from February 22-25, 1969. The event is estimated to have been a 100-year flood. The United States Geological Survey gauge downstream of Villa Park Dam recorded a peak discharge of 6,600 cfs on February 25, 1969. This was the observed peak downstream of the two regulating reservoirs. During this event, both Santiago Creek Dam and Villa Park Dam discharged water over their respective spillways. A DSOD inspection report stated that during this event, outflow at the Santiago Creek Dam spillway peaked at about 7 feet, or 9,700 cfs, though it is uncertain whether the gage was accurate (Stetson 2022).

Groundwater

The Project site is located outside of the Orange County Groundwater Basin (County of Orange 2012).

4.9.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant hydrology and water quality impact if it would:

Threshold 4.9-1 Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.

Threshold 4.9-2 Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

Threshold 4.9-3 Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

- **(i)** result in substantial erosion or siltation on- or-off site;
- **(ii)** result in flooding on- or off-site;
- **(iii)** create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- **(iv)** impede or redirect flood flows.

Threshold 4.9-4 In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.

Threshold 4.9-5 Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

4.9.5 IMPACT ANALYSIS

Thresholds 4.9-1

Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Short-Term Construction-Related Water Quality Impacts

Less Than Significant Impact. Potential impacts of construction activities on water quality focus on sediments, turbidity, and pollutants associated with sediments. Construction-related activities that are primarily responsible for sediment releases are related to exposing soils to potential mobilization by rainfall, runoff, and wind. These activities include grading and other earth-disturbance activities. Non-sediment-related pollutants that are also of concern during construction include waste construction materials and chemicals, liquid products, and petroleum products used in building construction or the maintenance of heavy equipment. Construction impacts from implementation of the proposed Project would be minimized through compliance with the Construction General Permit. This permit requires the development and implementation of a SWPPP for the proposed Project site, which must include erosion- and sediment-control BMPs that meet or exceed measures required by the NPDES Construction General Permit, as well as BMPs that control the other potential construction-related pollutants. A SWPPP would be developed, as required by and in compliance with, the NPDES Construction General Permit. Erosion-control BMPs are designed to prevent erosion, whereas sediment controls are designed to trap sediment once it has been mobilized. The NPDES Construction General Permit requires the SWPPP to include BMPs to be selected and implemented based on the phase of construction and weather conditions.

The SWPPP would be designed and implemented to address site-specific conditions related to Project construction. The SWPPP would identify and describe the sources of sediment and other pollutants that may affect the quality of storm water discharges; it would also ensure the implementation and maintenance of BMPs to reduce or eliminate sediment, pollutants adhering to sediment, and other non-sediment pollutants in storm water and non-storm water discharges.

Compliance with the NPDES Construction General Permit and the preparation of a SWPPP would ensure that any impacts to downstream waters resulting from construction activities on the Project site would be less than significant. Erosion-control and treatment-control BMPs would be implemented per NPDES requirements.

Furthermore, the Project would comply with the General Waste Discharge Requirements issued by the Santa Ana Regional Water Quality Control Board (R8-2015-0004, NPDES No. CAG998001, General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant [De Minimis] Threat to Water Quality) (RWQCB 2015), including provisions requiring notification, testing, and reporting of dewatering and testing-related discharges, which would mitigate any impacts of such discharges. As such, the project would comply with applicable local, State, and federal regulations. Therefore, impacts related to construction-phase water quality impacts would not represent a significant impact.

Long-Term Water Quality Impacts

Less Than Significant Impact. Existing structures include the dam crest, intake tower in Irvine Lake, spillway channel, flashboard storage shed, control house/outlet works, energy dissipater structure, Irvine Lake pipeline and dam crest access road. The remaining portion of the site is covered with open water, fluctuating shoreline, vegetated fluctuating shoreline, perennial stream, ornamental, developed, and disturbed areas. Implementation of the proposed Project involves abandonment of the existing Santiago Creek Dam outlet tower, construction of a new inclined outlet structure located on the left abutment of the existing dam, structural improvements to the dam spillway, and improvements to the dam embankment. The Project would not introduce new uses to the site; as such, development of the Project would not introduce substantial amounts of urban pollutants to the storm water runoff beyond existing conditions. Therefore, impacts related to long-term operational water quality impacts would not be significant.

Impact Conclusion: *The proposed Project would not violate any water quality standards and waste discharge requirements, nor would it otherwise substantially degrade water quality, pursuant to Threshold 4.9-1. Water quality-related impacts would be less than significant. No mitigation is required.*

Threshold 4.9-2

Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

No Impact. The Project is not located above or within a groundwater recharge basin and the Project would not increase water demand. Implementation of the proposed Project would not substantially change the nature of the existing facilities. Therefore, no impacts would occur, and no mitigation is required.

Impact Conclusion: *The Project would not deplete groundwater supplies or interfere substantially with groundwater recharge. No impacts would occur, pursuant to Threshold 4.9-2. No mitigation is required.*

Threshold 4.9-3

Would the Project substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i) result in substantial erosion or siltation on- or off-site;

ii) substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

iv) impede or redirect flood flows.

Less Than Significant Impact. Over the Project's approximate four-year construction schedule, Irvine Lake would be dewatered to accommodate demolition and construction activities which would temporarily modify the site's drainage patterns. Prior to the beginning of construction, IRWD would drawdown the reservoir water levels before the beginning of the dry season. As discussed in Section 3.0, Project Description, the dewatering process includes a combination of several efforts including opening the critical valve to Santiago Creek to allow water from Irvine Lake to naturally flow downstream, modifying the existing outlet tower to allow the water level in Irvine Lake to be lowered further, implementing a temporary pumping system once the temporary diversion berm is constructed, and installing a subgrade dewatering system, which may consist of dewatering wells. The subgrade dewatering wells would operate during the dry season to maintain a dry work environment but may operate during the wet season if the work requires the subgrade dewatering system to operate. Storm water flows would be controlled through construction of a temporary flood control berm and a temporary outlet conduit, bypass pumping, and piping for stream diversion. Due to these control measures, storm flows would be directed through the temporary piping systems and would not result in on- or off-site flooding. The temporary diversion and piping would also keep storm flows away from areas of exposed soil, thus reducing the potential for erosion or siltation. Additionally, the Project would comply with the State General Construction Permit which requires preparation of a SWPPP. The SWPPP would identify appropriate BMPs to control runoff, minimize erosion and siltation; thus, storm flows would not encounter areas of additional pollutant sources. The diversion and piping systems would not impede flood flows, and the temporary redirection of flows would be planned to avoid impacts related to flooding, erosion, and siltation, as discussed above.

Following construction, all temporary bypass measures would be removed, and the dam, spillway, and outlet tower would operate similar to existing conditions. Proposed improvements would include abandonment of the existing Santiago Creek Dam outlet tower, construction of a new inclined outlet structure located on the left abutment of the existing dam, structural improvements to the dam spillway, and improvements to the dam embankment. These improvements would accommodate peak reservoir inflow of 68,000 cfs and a peak outflow of 65,000 cfs and raise the maximum operational water level in Irvine Lake by 2 feet. Normal operation at Irvine Lake calls for the lake level to be kept lower in winter months to capture local runoff.

Implementation of the proposed Project would rehabilitate and replace the Santiago Creek Dam outlet works and spillway facilities, which would accommodate peak flows. However, rare hydrologic conditions may occur, such as sequential storm events, when the watershed is

saturated and runoff is increased. Under these conditions, known as the probable maximum flood (PMF), the reservoir may be full and storm runoff would be released over the spillway. Historically, this occurred in February 1969 as a result of a high-magnitude, low-probability storm event. Under an analysis of floods ranging from the two-year event to the PMF, for the two-year event Santiago Creek would be confined to the main channel. However, for larger events such as five-, ten-, 25-, 50-, and 100-year events, park facilities at Irvine Regional Park could be inundated. Under the PMF scenario, which is highly unlikely, the entire park area would be inundated (Stetson 2022). As stated above, the Project would raise the proposed spillway by two feet to a crest elevation of 796 feet, which is six feet higher than the current spillway without flashboard and specifically designed to pass the PMF per DSOD standards.

Although flooding is a possibility under these storm events with the proposed Project, the potential for on- or off-site flooding resulting from storm events would not be increased compared to existing conditions and the same areas would be subject to potential inundation. Furthermore, the Project would maintain the existing drainage pattern of the area and would increase overall capacity to accommodate updated peak flows. Therefore, Project implementation would not alter the existing drainage pattern by impeding or redirecting flood flows, substantially increasing the rate or amount of surface runoff, or altering the course of a stream or river.

As discussed under Threshold 4.9-1, implementation of the proposed Project would not introduce new uses to the site; as such, development of the Project would not introduce substantial additional amounts of polluted stormwater beyond existing conditions.

Impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *The proposed Project would not alter the existing drainage pattern of the site or area, would not result in substantial erosion or siltation on or off-site, substantially increase the rate or amount of surface runoff in a manner in which would result in flooding on- or off-site, create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff, or impede or redirect flood flows. Impacts would be less than significant, and no mitigation is required.*

Threshold 4.9-4

Would the Project, in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Less than Significant Impact. Santiago Creek Dam is located at the north end of Irvine Lake within a FEMA 100-year flood zone or High-Risk Area (1 percent annual chance of flooding) (FEMA 2009). The Project site is not located within a coastal zone and is not located near the ocean; therefore, it would not be subject to a tsunami. It is possible that a seiche, or standing wave, resulting from failure of the dam could impact the Project site. However, the likelihood of the seiche effects reaching the Project site is low. The proposed Project would not introduce any uses that would expose people or structures to hazards associated with a tsunami or seiche.

As discussed under Threshold 4.9-3, implementation of the proposed Project would rehabilitate and replace the Santiago Creek Dam outlet works, spillway facilities, and improvements to the dam embankment which would accommodate peak flows. Santiago Creek Dam is a jurisdictional dam subject to the regulatory authority of the California DSOD. Design of the Project would conform to applicable DWR statutes pertaining to dam appurtenant structures. As part of the design process, a review was performed of the DSOD guidance documents to determine

mandatory criteria for the project design. This review was supplemented by additional detailed design criteria derived from U.S. Army Corps of Engineers and U.S. Bureau of Reclamation publications. Specifically, the Project complies with all design criteria related to general structural considerations, seismic considerations, material properties, concrete hydraulic structures, and hydraulic steel structures. Additionally, the Project includes mechanical design features that would be integrated into the Project's supervisory control and data acquisition (SCADA) system. Operations staff would have the ability to remotely monitor various mechanical and physical elements and be able to respond in an emergency event.

As previously discussed, DSOD has rated the Santiago Creek Dam as "Extremely High" hazard classification for dam failure due to the downstream hazard classification. Because of its hazard classification, IRWD developed the EAP which identifies responsibilities of affected parties, notification flowcharts for each emergency level that could be activated, the EAP Response Process, General Responsibilities, Preparedness, and Plan Maintenance.

The EAP is a plan for early identification of potential dam safety incidents and specifies planned actions to help minimize risks to public safety should these conditions occur. The EAP contains procedures and exercises for dam operators to issue early warning and notifications to emergency management authorities. In accordance with the EAP, in the event there is any determination of a dam safety issue or incident at Santiago Creek Dam, the EAP notification, communication, and response responsibilities would be activated. As discussed previously, once the incident is reported, a Unified Command would be established, including OCSD, Orange County Fire Authority, representatives from IRWD, and representatives from all agencies of downstream jurisdictions. The Unified Command would facilitate coordination among agencies and disciplines. Responsibilities consist of establishing the Incident Command Post, protecting life and property, controlling personnel and equipment resources, maintaining accountability for responder and public safety, and establishing and maintaining an effective liaison with outside agencies and organizations. The Project's replacement outlet tower and spillway would meet or exceed the current safety, design and construction requirements established by the DSOD and would ensure the risks to public safety are minimized. The proposed Inlet/Outlet Works for the Santiago Creek Dam would consist of several interconnected facilities composed of the inclined inlet/outlet structure, emergency outlet pipe, Irvine Lake pipeline, bifurcation valve vault, emergency outlet valve vault, and dam control building. The vault will include valves to bifurcate the flow to either the Irvine Lake pipeline or the emergency outlet pipeline, thus reducing risk of downstream flooding.

The proposed Project would not introduce any new uses that would expose people or structures to hazards associated with the failure of this dam. With compliance with existing regulations for the design and operation of the dam, and adherence to the procedures in the EAP, the impacts relative to the release of pollutants during seiches and flooding due to breaches of the dam would be less than significant and would not require mitigation.

Impact Conclusion: *The proposed Project would not introduce any uses that would expose people or structures to the release of pollutants during seiches and flooding due to breaches of the dam. Impacts would be less than significant, and no mitigation is required.*

Threshold 4.9-5

Would the Project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less Than Significant Impact. As discussed under Threshold 4.9-1 above, through conformance with applicable regulatory standards and implementation of applicable BMPs, the Project would not substantially degrade water quality; therefore, the Project would not conflict with or obstruct implementation of the applicable water quality control plan. In terms of sustainable groundwater management plans, as noted above under Threshold 4.9-2, the Project would not have the potential to adversely affect groundwater supplies or the management of groundwater basins in the area. As such, the Project would not result in any conflicts with or affect implementation of such plans. There would be less than significant impacts, and no mitigation is required.

Impact Conclusion: *The proposed Project would not conflict with or obstruct implementation of the applicable water quality control plan or sustainable groundwater management plan. Impacts would be less than significant, and no mitigation is required.*

4.9.6 CUMULATIVE IMPACTS

With the implementation of construction and operational BMPs by the proposed Project (e.g., SWPPP, structural- and non-structural BMPs), the anticipated quality of runoff would not contribute concentrations of pollutants of concern that would result in a violation of water quality standards and waste discharge requirements or the degradation of water quality in the Project's receiving waters. Any future development within the watershed must also comply with the NPDES Construction General Permit and Orange County MS4 Permit. Additionally, future developments in the County would conform with County regulations related to hydrology and water quality. Therefore, cumulative impacts on surface water quality would be less than significant.

Although the Project would involve improvements to existing uses, other future developments anticipated in the area may result in changes to some existing land uses, which would result in increased impervious surfaces and increases in the amount and velocity of surface runoff, along with decreases in the amount of natural groundwater recharge. However, all cumulative projects in the County and the watershed, including the proposed Project, would be subject to Orange County requirements related to hydrology, drainage, and water quality. Future development projects would also be required to prepare Water Quality Management Plans and implement structural and non-structural BMPs to control storm water flows, runoff volumes and rates, and drainage system improvements. As previously discussed, the Project's drainage pattern would be temporarily modified during construction and no off-site storm drainage improvements would be required. Furthermore, because the Project would not modify drainage patterns or overall hydrology, impacts related to on- and off-site flooding would be less than significant. Additionally, individual project impacts related to potential erosion and siltation, and flooding on and off site would be less than significant given the requirements to implement BMPs. Compliance with these regulations would also avoid cumulative impacts related to changes in drainage patterns, on-site and off-site flooding, capacity of storm-drain systems, and the need for improvements to storm drainage infrastructure.

The Project is not located above or within a groundwater recharge basin and the Project would not increase water demand. Thus, cumulative impacts on groundwater supplies and recharge would be less than significant.

Overall, cumulative impacts on hydrology and water quality would be less than significant, and no mitigation is required.

4.9.7 MITIGATION PROGRAM

Mitigation Measures

The proposed Project would not result in significant impacts to Hydrology and Water Quality; therefore, no mitigation measures are required.

4.9.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than Significant.

4.9.9 REFERENCES

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4.10 LAND USE AND PLANNING

This section of the Environmental Impact Report (EIR) describes the existing land use conditions in the Project area and identifies associated potential land use impacts related to development of the proposed Project. Additionally, this section identifies the plans and policies of applicable planning documents and the Project's consistency with them.

4.10.1 REGULATORY SETTING

One aspect of land use planning considered under the California Environmental Quality Act (CEQA) is the consistency of the proposed Project with relevant planning documents, which include Southern California Association of Governments' (SCAG) 2024–2050 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (SCAG 2024) and the Regional Comprehensive Plan (RCP; SCAG 2008). The Project is also subject to the County of Orange's (County's) land use authority and is analyzed for consistency with the County's General Plan and Code of Ordinances.

Local

County of Orange General Plan

The first land use plan for Orange County, the Master Plan of Land Use, was adopted in 1946 and refined through the adoption of Area Plans for individual planning areas throughout the unincorporated area. In 1999, an administrative update to the General Plan was prepared to create a more current and readable document. This update incorporated new County programs, socioeconomic data, and revised charts, graphics, and maps. The most recent update to the County's General Plan occurred in June 2024, with the adoption of a new Land Use element.

A general plan functions as a guide for the type of community that is desired for the future and provides the means to achieve it. The *County of Orange General Plan* consists of an introductory chapter, a demographics chapter, and nine elements: Land Use, Transportation, Public Services and Facilities, Resources, Recreation, Noise, Safety, Housing, and Growth Management. A discussion of the Project's land use consistency with applicable goals and policies in the County's General Plan is provided later in this section.

Land Use Element

The *County of Orange General Plan* Land Use Element is one of nine elements of the General Plan and contains official policies on the location and character of land uses necessary for orderly growth and development within the County. The Land Use Element describes objectives, policies, and land use patterns for all unincorporated areas within Orange County. The Land Use Element also identifies policies and programs in other County General Plan elements that affect land use and provides guidance for future land use planning studies for the unincorporated areas of the County.

Transportation Element

The Transportation Element sets forth a comprehensive strategy for planning, developing, and maintaining a surface transportation system to serve existing and planned land uses in the unincorporated areas of Orange County. The primary goal of the Transportation Element, consistent with the State mandate, was originally adopted by the Orange County Board of Supervisors on May 10, 1972. On June 9, 1982, this goal was reaffirmed as follows: To develop an integrated transportation system consisting of a blend of transportation modes capable of

meeting the need to move people and goods by private and public means with maximum efficiency, convenience, economy, safety, and comfort and a system that is consistent with other goals and values of the County and the region. The Transportation Element provides a basis for transportation-related decisions and complements the other General Plan elements. Specifically, it clarifies and addresses transportation issues raised in the other General Plan elements and offers guidance toward solutions.

Public Services and Facilities Element

The Public Services and Facilities Element sets forth a comprehensive strategy for the planning, management, and implementation of public facilities that are necessary to meet Orange County's existing and future demands. The Public Services and Facilities Element focuses on publicly managed services and facilities which have a direct influence on the distribution and intensity of development that can be accommodated through the utilization of existing technologies and assumptions that are used to determine adequate service levels. These services include flood control, waste management, water and wastewater, transportation, and community services (fire protection, library, sheriff patrol, local special services districts, and public school facilities). The policies and programs of the Public Services and Facilities Element form an effective implementation plan to meet the established goals. Consequently, the Public Services and Facilities Element serves to guide and direct local government decision making in public facility-related matters and also fosters coordination with regional, State, and federal policies and programs.

Resources Element

The Resources Element sets forth a comprehensive strategy for the development, management, preservation, and conservation of resources that are necessary to meet Orange County's existing and future demands. This Element contains official County policies on the conservation and management of resources, including Natural Resources, Energy Resources, Water Resources, Air Resources, Open Space, and Cultural-Historical Resources. For each resource component, specific goals, objectives, and policies are identified. Additionally, the Element outlines implementation programs to address identified constraints associated with each component.

Recreation Element

The Recreation Element is mandated by Government Code Section 65303(a). The Recreation Element sets forth a comprehensive strategy for the acquisition, development, operation, maintenance, management, and financing of County recreation facilities which are necessary to meet Orange County's existing and future recreation needs. This strategy is expressed as an integrated framework of recreation goals, objectives, policies, and programs. The policies and programs of the Recreation Element form an effective implementation plan to meet the established goals. The Recreation Element serves to guide and direct local government decision-making regarding recreation issues and facilitates the coordination of local, regional, State, and federal efforts.

Noise Element

The Noise Element contains information that relates to the noise environment in the unincorporated sections of Orange County. Specifically, the General Plan's Noise Element responds to the requirements of Section 65302(f) of the California Government Code and adheres to the guidance provided by the State in "Guidelines for the Preparation and content of Noise Elements of the General Plan." The purpose of the Noise Element is to provide a statement of public policy and a decision framework for the maintenance of a quiet environment. The Noise

Element identifies the sources of noise, analyzes the extent of the noise intrusion, and estimates its potential impact upon the County.

Safety Element

A basic purpose of the County's Safety Element is to comprehensively inventory hazards which primarily impact persons and property in the unincorporated areas of Orange County. The scope of the Element also allows for a countywide perspective for other safety-related matters. This Element contains County policies on identified and potential hazards and safety considerations, their mitigation, and implications for development, including Crime, Fire, Hazardous Materials, Aircraft Environment, and Flood and Seismic/Geologic Hazards. The Safety Element identifies the type and location of hazards throughout the County, as well as policies and programs to minimize impacts.

Housing Element

The County of Orange is currently updating the Housing Element of the General Plan covering the planning period from 2021–2029. The Housing Element serves as a policy guide to address the comprehensive housing needs of the unincorporated areas within Orange County. The primary focus of the Housing Element is to ensure decent, safe, and sanitary housing for current and future residents of the unincorporated areas.

In the Housing Element, the County of Orange must identify land that is zoned to permit residential uses in order to meet the County of Orange's Regional Housing Needs Assessment (RHNA) allocation of 10,406 units within unincorporated areas of Orange County by October 2029. Additionally, the County of Orange must establish goals, policies, objectives, and implementation programs to meet the existing and projected housing needs of the unincorporated County of Orange.

Growth Management

The County's Growth Management Element contains policies on the planning and provision of traffic improvements and public facilities that are necessary for orderly growth and development. The Element presents policies and programs for traffic improvement phasing, facility and development phasing plans, and provides guidance for future facility implementation plans for the County.

County of Orange Code of Ordinances

The County of Orange Code of Ordinances is a compilation of the rules, regulations, or codes that were enacted into law by the County of Orange. The Code of Ordinances is divided into separate sections, of which Title 7, Land Use and Building Regulations is most applicable to this Project. Title 7 of the County Code of Ordinances contains building regulations which would apply to the Project. Also, Title 7, Division 9 contains planning-related rules and regulations, including the County of Orange Comprehensive Zoning Code. The Comprehensive Zoning Code includes regulations and site development standards for each zoning district, as well as general site development regulations applicable across zoning districts (County of Orange 2024).

Regional

Southern California Association of Governments

The Southern California Association of Governments (SCAG) is the Metropolitan Planning Organization (MPO) for six counties: Orange, Los Angeles, San Bernardino, Riverside, Ventura, and Imperial. The SCAG region includes 191 cities in an area that encompasses more than 38,000 square miles. As the designated MPO, SCAG prepares plans for transportation, growth management, hazardous waste management, and air quality. Additionally, SCAG reviews environmental documents of projects of regional significance for consistency with regional plans. SCAG's responsibilities include the following:

- Maintaining a continuous, comprehensive, and coordinated planning process (the "3 Cs") resulting in a Regional Transportation Plan (RTP) and a Federal Transportation Improvement Program (FTIP);
- Developing a Sustainable Communities Strategy (SCS) to address greenhouse gas emissions as an element of the RTP;
- Developing demographic projections;
- Developing integrated land use, housing, employment, and transportation programs and strategies for the South Coast Air Quality Management Plan;
- Serving as co-lead agency for air quality planning in the Central Coast and Southeast Desert air basin districts;
- Developing and ensuring that the RTP and the FTIP conform to the purposes of the State Implementation Plans for specific transportation-related criteria pollutants, per the Clean Air Act;
- Serving as the authorized regional agency for intergovernmental review of proposed programs for federal financial assistance and direct development activities;
- Reviewing environmental impact reports for projects having regional significance to ensure they are consistent with approved regional plans;
- Developing an area-wide waste treatment management plan;
- Preparing the RHNA; and
- Along with the San Diego Association of Governments and the Santa Barbara County/Cities Area Planning Council, preparing the Southern California Hazardous Waste Management Plan.

SCAG has developed a number of plans in compliance with its responsibilities. Those that are relevant to the Project are discussed below.

Regional Comprehensive Plan

SCAG's Regional Comprehensive Plan (RCP) provides a policy framework for regional planning in Southern California. The RCP calls for city and county involvement and coordination in addressing regional issues related to growth management and development. However, the RCP serves only as a voluntary "toolbox" to assist local jurisdictions in making their General and Specific Plans and individual projects more sustainable. As identified in Resolution No. 08-502-1 (Resolution of the Southern California Association of Governments Accepting the 2008 Regional

Comprehensive Plan for the SCAG Region), given its advisory nature, the 2008 RCP is not used in SCAG's Inter-Governmental Review process (SCAG 2008).

SCAG Regional Transportation Plan/Sustainable Communities Strategy (Connect SoCal)

Every four years, SCAG updates Connect SoCal, the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) as required by federal and state regulations. The most recent RTP/SCS was approved by SCAG's Regional Council in April 2024.

Connect SoCal 2024 includes guidance for local agencies and direction for SCAG to implement a vision of "a healthy, prosperous, accessible and connected region for a more resilient and equitable future" across 22 strategies, including complete streets, housing the region, climate resilience and workforce development. Connect SoCal 2024 represents a newer version of the plan, building upon the policies established in 2020 while incorporating updated priorities like increased focus on equity, climate resilience, and economic development, reflecting on the changing needs to the region over time (SCAG 2024).

4.10.2 METHODOLOGY

Information presented in this section is based on field reconnaissance, review of aerial photographs, and review of the relevant planning documents identified in this section. Project consistency with existing and planned land uses in the vicinity is evaluated through review of the land use goals and policies contained in plans and programs including the *County of Orange General Plan* and planning programs prepared by SCAG (e.g., RTP/SCS Goals).

The threshold from the CEQA Guidelines' Appendix G Checklist is focused on planning and policy consistency. As part of the land use analysis, the CEQA Guidelines require an EIR to evaluate whether the Project would cause a significant environmental impact due to a conflict with a land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

A consistency analysis with the County's land use policies is presented in the Impact Analysis section. Although SCAG does not have direct approval authority over the Project, local agencies, including the County of Orange, strive to achieve consistency with regional planning programs. Therefore, these plans and policies including the RTP/SCS have been used as the basis of making a determination of whether or not there is a significant impact.

4.10.3 EXISTING CONDITIONS

Existing Land Uses Within the Project Site

The Project is located at Santiago Creek Dam at the northwest end of Irvine Lake in unincorporated Orange County, California. Santiago Creek Dam impounds Irvine Lake. The Project is located south of State Route (SR) 261 and east of SR-241 and Santiago Canyon Road. Existing structures include the dam, outlet tower in Irvine Lake, spillway channel, flashboard storage shed, control house/outlet works, energy dissipater structure, a portion of the Irvine Lake pipeline, dam keeper's house and dam access road.

The Project site is located on the U.S. Geological Survey's Black Star Canyon 7.5-minute quadrangle. It is within the Santa Ana Watershed. The drainage area for the Project encompasses approximately 63.4 square miles. Irvine Lake (also called the Santiago Creek Reservoir) was originally constructed in 1933 to store water for the benefit of the surrounding communities.

The Project is within the Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) area. Santiago Creek Dam and its associated structures are located within designated "Non-Reserve Open Space," while Habitat Reserve and Conservation Easements surround the lake; a Special Linkage[1] is located southeast of the lake. The purpose of this plan is to provide regional protection and recovery of multiple species and habitat while allowing compatible land use and appropriate development. IRWD[2] is a participating jurisdiction and, as such, will comply with the terms of the NCCP/HCP Implementation Agreement (IA). Santiago Dam predated the NCCP/HCP and is now a permitted existing use under the NCCP/HCP. No amendments to the NCCP/HCP are required for constructing infrastructure facilities so long as amended infrastructure plans do not result in incidental take beyond that described and permitted by the NCCP/HCP.

General Plan Designation and Zoning for the Project Site

The General Plan land use designation of the Project site is Open Space (OS) and the zoning designation is General Agricultural (A1). The OS General Plan designation provides for limited land uses that do not require a commitment of significant urban infrastructure. The Project site is also within an Open Space Reserve (OSR) overlay. The OSR designation is intended to reflect the Resources and Recreation Elements of the General Plan. It identifies major parks, beaches, forests, harbors and other territory that is to remain open space. It may also include recreational trails and similar facilities for alternative transportation.

Land Uses Surrounding the Project Site

Surrounding land uses primarily consist of undeveloped open space. Irvine Regional Park is located northwest of SR-241; Limestone Canyon Regional Park is located south of Santiago Canyon Road; and Oak Canyon Park is located at the southeast end of Irvine Lake. The closed Santiago Canyon Landfill is located adjacent to the west of Irvine Lake. Residential development is located west of SR-241.

4.10.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant land use impact if it would:

Threshold 4.10-1 Physically divide an established community.

Threshold 4.10-2 Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

As stated in Section XI, Land Use and Planning, of the Initial Study, the Project would not divide an established community. As such, Threshold 4.10-1 will not be further evaluated in this Draft EIR.

[1] Special Linkage is located southeast of the lake.
[2] The Santiago County Water District (SCWD) was also a participating jurisdiction in the NCCP/HCP. The SCWD consolidated with IRWD in 2006.

4.10.5 IMPACT ANALYSIS

Threshold 4.10-2

Would the Project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

Less Than Significant Impact. The analysis of this threshold is broken down into two subtopics: (1) Project consistency with planning documents (e.g., plans, policies, programs, regulations, ordinances) and (2) Project compatibility with existing and planned land uses.

Project Compatibility with Planning Documents

As discussed above in Section 4.10.1, there are several applicable State, regional and local planning programs such as the County of Orange General Plan, County of Orange Code of Ordinances, and SCAG RTP/SCS. The Project's consistency with the plans is evaluated in this section.

County of Orange General Plan

The County of Orange General Plan was amended in 2012 and is organized into nine elements, as described above. Each element contains the County's goal(s), objectives, and policies related to that element. The Land Use Element in the County of Orange General Plan identifies the allowable land uses throughout the County. The current land use designation for the Project site is Open Space (OS); the Project is an allowed use under this designation.

The State's general rule for a General Plan consistency determination is that "an action, program, or project is consistent with the General Plan if, considering all its aspects, it will further the objectives and policies of the General Plan and not obstruct their attainment." Table 4.10-1 provides a policy consistency analysis related to the Project and to the objectives and policies of the County's General Plan that are considered applicable to the Project.

TABLE 4.10-1
PROJECT POLICY CONSISTENCY WITH APPLICABLE COUNTY OF ORANGE GENERAL PLAN ELEMENTS

Applicable Goals and Policies	Project Consistency
Land Use Element	
Policy 9: Enhancement of Environment: To guide development so that the quality of the physical environment is enhanced.	**Consistent**. The Project purpose is to ensure new facilities associated with the existing lake and dam meet or exceed the current seismic safety and design requirements, improve water supply reliability, and minimize impacts to local environmental resources. As such, the Project is designed with protection of the physical environment in mind.
Policy 13: Recycling/ Materials Recovery. To encourage and facilitate establishment of recycling/materials recovery facilities to address the State mandate given through the California Integrated Waste Management Act of 1989 (AB 939).	**Consistent.** The Project would comply with all applicable recycling/materials recovery regulations. Although the site does not involve establishment of a recycling facility itself, the Project would comply with all regulations related to recycling during construction and operations. Further analysis related to solid waste (recycling) is provided in Section 4.16, Utilities and Service Systems.
Policy 14: Urban and Storm Runoff Regulations. To guide physical development within the County while protecting water quality through required compliance with urban and stormwater runoff regulations.	**Consistent.** The Project would comply with all applicable water quality and stormwater runoff regulations. During construction, the Project would comply with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit and the preparation of a Storm Water Pollution Prevention Plan (SWPPP), which would ensure that any impacts to downstream waters resulting from construction activities on the Project site would be less than significant. During operations, the Project would not introduce new uses to the site, including substantial amounts of urban pollutants to the storm water runoff beyond existing conditions. Further analysis related to water quality and stormwater is provided in Section 4.9, Hydrology and Water Quality.
Transportation Element	
Scenic Highway Plan	
Goal 1. Preserve and enhance unique or special aesthetic and visual resources through sensitive highway design and the regulation of development within the scenic corridor.	**Consistent.** Proposed visual changes associated with Project improvements would be consistent with the existing character of the Project site as no new or visually unique uses are proposed. Therefore, the Project would not conflict with long term aesthetics within the site vicinity. Further analysis related to aesthetics is provided in Section 4.1, Aesthetics.
Objective 1.1: Protect and enhance the County's beauty, amenities, and quality of life within the unincorporated areas.	
Circulation Plan	
Goal 5. Manage peak hour traffic congestion to achieve an acceptable level of service (LOS) on existing and future circulation plan facilities in the unincorporated areas of the County.	**Consistent.** During construction, a small number of vehicle trips are associated with routine inspection and maintenance at the existing dam. It is anticipated that routine inspection and maintenance trips would continue, and no new operational trips would occur with implementation of the proposed Project. Therefore, because there would be no increase in daily trips associated with daily operation of the Project components, no Project related traffic impacts are anticipated. Therefore, the Project would achieve an acceptable LOS and would not cause an impact related to vehicle miles travelled (VMT). Further analysis related
Objective 5.3. Reduce Vehicle Miles Traveled. In an effort to reduce greenhouse gas (GHG), pursuant to SB 743. See "Guidelines for Evaluating Vehicle Miles Traveled Under CEQA" and "2020 Updated Transportation Implementation Manual".	

TABLE 4.10-1
PROJECT POLICY CONSISTENCY WITH APPLICABLE COUNTY OF ORANGE GENERAL PLAN ELEMENTS

Applicable Goals and Policies	Project Consistency
	to transportation is provided in Section 4.14, Transportation.
Public Services and Facilities Element	
Water System	
Goal 1: Encourage the planning and development of a water conveyance and distribution system to meet the County's future demand.	**Consistent.** The Project would construct water infrastructure associated with the existing Santiago Creek Dam, as described further in Section 3.0, Project Description. The Project's primary purpose is to improve water supply reliability and provide additional water capacity to serve IRWD customers' water needs. Further analysis related to water is provided in Section 4.16, Utilities and Service Systems.
Objective 1.1. To achieve desired water system service levels through the coordination of land use and water system planning.	
Objective 1.2. To implement State, regional, and local facility plans for water delivery to Orange County.	
Objective 1.3. To increase storage and delivery capacity for water supplies in Orange County.	
Policy 1. System Capacity and Phasing. To ensure the adequacy of water system capacity and phasing, in consultation with the service providing agency(ies), in order to serve existing and future development as defined by the General Plan.	
Policy 2. Water Delivery System. To support water facility planning and development efforts for Orange County water supplies conducted by local and regional water agencies.	
Policy 3. Intergovernmental Coordination – To actively encourage opportunities for increased coordination between the County and the water agencies through cooperative water facility planning and implementation efforts.	
Wastewater System	
Goal 1. Support the planning and development of a wastewater system to meet both the County's demand and attain water quality goals.	**Consistent.** The Project does not include construction or expansion of any wastewater facilities, as it would not result in an additional population with a demand for wastewater. As such, the Project would not impact wastewater systems within the County. Further analysis related to wastewater is provided in Section 4.16, Utilities and Service Systems.
Objective 1.1. To maintain wastewater system service levels through the coordination of land use and wastewater system planning.	
Objective 1.2. To implement wastewater agency facility and water quality plans for Orange County.	
Policy 1. Water Quality – To protect quality in both delivery systems and groundwater basins through effective wastewater system management.	
Policy 2. Intergovernmental Coordination – To actively encourage opportunities for increased coordination between the County and wastewater agencies through cooperative wastewater studies, planning, and facility implementation efforts.	
Policy 3. System Capacity and Phasing – To ensure the adequacy of wastewater system capacity and phasing in consultation with the service providing agency(ies) in order to serve existing and future development as defined by the General Plan.	

TABLE 4.10-1
PROJECT POLICY CONSISTENCY WITH APPLICABLE COUNTY OF ORANGE GENERAL PLAN ELEMENTS

Applicable Goals and Policies	Project Consistency
Orange County Fire Authority	
Goal 1. Provide a safe living environment ensuring adequate fire protection facilities and resources to prevent and minimize the loss of life and property from structural and wildland fire damages.	**Consistent.** The Orange County Fire Authority (OCFA) would provide fire protection services to the Project site and would be required to comply with all applicable codes, ordinances and regulations regarding fire prevention and suppression measures, fire hydrants and sprinkler systems, emergency access, and other similar requirements, which would minimize demand for fire protection services. In addition, the Project site plans would be subject to review and approval by the OCFA prior to Project approval which would ensure that adequate emergency access, fire hydrant availability, and sufficient capacity for fire flows would be provided in compliance with all applicable codes and standards. Although the remote location and restricted use of roads to the Project site may have an impact on the ability to respond within the OCFD service standards, the Project site is already within the existing OCFD service area, and would continue to operate as a dam, which is the same under existing conditions. Further analysis related to fire protection services are provided in Section 4.12, Public Services.
Objective 1. To achieve desired level of fire protection and paramedic service through coordinated land use and facility planning.	
Policy 1. Facility Siting. Fire/paramedic facilities shall be sited in locations so as to assure efficient fire rescue and paramedic response for the service area. General criteria for site selection shall include: a) Call response time: for 80 percent of the service area, first fire engine to reach the emergency scene within 5 minutes and paramedic to reach the scene within 8 minutes. b) Land use compatibility: stations shall be located in commercial or industrial, or open space zones in order to avoid the disturbance to residential areas wherever possible. c) Street access: stations shall be located adjacent to arterial highways with controlled traffic signalization.	
Policy 3 Site Design Criteria – Require all land use proposals to implement adequate site design so as to maximize fire protection and prevention in order to minimize potential damages. The site design criteria shall be established to reflect the levels of protection needed for projects in various fire hazard areas. Such criteria shall include consideration as to: structure type and density, emergency fire flow and fire hydrant distribution, street pattern and emergency fire access, fuel modification programs, automatic fire sprinkler systems, and other requirements as determined by the Fire Chief. In accordance with the Insurance Services Office (ISO) suggested standards, ultimate fire protection rating shall be maintained by General Plan land use categories as follows: (1) ISO 3 for all urban developments including Residential (1C and 1B), Commercial (2A and 2B), Employment (3.0), and Public Facilities (4.0), which are within 5 miles from a fire station and less than 1000 feet from a hydrant; and (2) ISO 4 for Rural Residential (1A) which are within 5 miles from a fire station and less than 100 feet from a hydrant. For areas greater than 5 miles or 1000 feet, the ISO suggested standard is 9.	
Orange County Sheriff-Coroner	
Goal 1. Assure that adequate Sheriff patrol service is provided to ensure a safe living and working environment.	**Consistent.** The Orange County Sheriff-Coroner Department (OCSD) provides police protection services to the Project site. The Project would result in temporary construction activities and periodic maintenance for inspections and material delivery and would not contribute to a residential population or permanent additional employment. Although the Project could potentially increase the demand on the OCSD personnel and resources during temporary construction activities
Objective 1.1. To maintain adequate levels of Sheriff patrol services through coordinated land use and facility planning efforts.	
Policy 1. Land Use Review — To continue to coordinate land use proposal reviews with the County Sheriff-Coroner	

TABLE 4.10-1
PROJECT POLICY CONSISTENCY WITH APPLICABLE COUNTY OF ORANGE GENERAL PLAN ELEMENTS

Applicable Goals and Policies	Project Consistency
Department to assure that Sheriff patrol service shall be adequately addressed.	and periodic operational maintenance, overall, the Project would replace and update existing uses and the demand is not sufficient that it would require the construction of new or alteration of existing police protection facilities (i.e., police stations) to maintain an adequate level of police protection service in the area. Further analysis related to police protection services are provided in Section 4.12, Public Services.
Resources Element	
Natural Resources Component	
Policy 5. Landforms. To protect the unique variety of significant landforms in Orange County through environmental review procedures and community and corridor planning activities.	**Consistent.** Proposed visual changes associated with Project improvements would be consistent with the existing character of the Project site as no new or visually unique uses are proposed. Therefore, the Project would not conflict with long term aesthetics within the site vicinity, including unique landforms. Further analysis related to aesthetics is provided in Section 4.1, Aesthetics.
Open Space Component	
Goal 1: Retain the character and natural beauty of the environment through the preservation, conservation, and maintenance of open space.	**Consistent.** Following construction, the Project area would be restored as a reservoir and OC Parks may choose to reopen the facility for fishing and other recreational purposes. Similar to current conditions, the recreational aspect of the facility is managed by OC Parks separate from the Project and IRWD's control. During operations, the Project would accommodate recreational use similar to current uses. The Project would not impact County open space areas, as Project uses would not change. Further analysis related to open space is provided in Section 4.13, Recreation.
Objective 1.1. To designate open space areas that preserve, conserve, maintain, and enhance the significant natural resources and physical features of unincorporated Orange County.	
Policy 1.1: To guide and regulate development of the unincorporated areas of the County to ensure that the character and natural beauty of Orange County is retained.	
Cultural Historic Resources Component	
Goal 1: To raise the awareness and appreciation of Orange County's cultural and historic heritage.	**Consistent.** One historic property/historical resource was identified within the Project site: the Santiago Dam Complex which currently has a status code of 2S2, indicating it has been determined eligible for the National Register of Historic Places (NRHP) and is listed in the California Register of Historical Resources (CRHR). The Dam is eligible for its important historical associations with water resources development in Orange County, as well as with the citrus agriculture industry. Although specific aspects of the Dam would be modified, it would remain recognizable as an earthen embankment dam and would continue to perform the historic function for which it is eligible. Additionally, the record search for the South Central Coastal Information Center (SCCIC) qualifies the Project site and surrounding area as considered sensitive for archaeological resources, and MM CR-1, which requires archaeological monitoring during grading within previously undisturbed soils, and MM CR-2, which provides details for treatment of unanticipated discoveries, would be incorporated to ensure less than significant impacts to archaeological resources. Further
Goal 2: To encourage through a resource management effort the preservation of the county's cultural and historic heritage.	
Objective 2.1: Promote the preservation and use of buildings, sites, structures, objects, and districts of importance in Orange County through the administration of planning, environmental, and resource management programs.	

TABLE 4.10-1
PROJECT POLICY CONSISTENCY WITH APPLICABLE COUNTY OF ORANGE GENERAL PLAN ELEMENTS

Applicable Goals and Policies	Project Consistency
	analysis related to open space is provided in Section 4.4, Cultural Resources.
Objective 2.2: Take all reasonable and proper steps to achieve the preservation of archaeological and paleontological remains, or their recovery and analysis to preserve cultural, scientific, and educational values. Paleontological Resources Policies: 1. To identify paleontological resources through literature and records research and surface surveys. 2. To monitor and salvage paleontological resources during the grading of a project. 3. To preserve paleontological resources by maintaining them in an undisturbed condition.	**Consistent.** The paleontological records search requested from the Natural History Museum (NHM) identified fossil localities that lie directly within the proposed Project site as well as numerous fossil localities nearby from sedimentary deposits that occur in the proposed Project area, either at the surface or at depth. The site history and geotechnical analysis indicates that earthmoving activities (i.e., grading and excavation) would take place in previously disturbed soils, which consist of artificial fill, embankment fill, older alluvium, and colluvium and lake deposits. As such, the Project would incorporate MM GEO-1, which requires retention of a qualified Paleontologist to observe grading activities within undisturbed soils, including geotechnical investigations, to ensure preservation of paleontological resources and MM GEO-2, which provides details for treatment of unanticipated discoveries. Further analysis related to paleontological resources is provided in Section 4.6. Geology and Soils.
Policy 1: Identification of resources shall be completed at the earliest stage of project planning and review such as general plan amendment or zone change.	**Consistent.** The record search for the SCCIC qualifies the Project site and surrounding area as considered sensitive for archaeological resources, and MM CR-1, which requires archaeological monitoring during grading within previously undisturbed soils, and MM CR-2, which provides details for treatment of unanticipated discoveries, would be incorporated to ensure less than significant impacts to archaeological resources. Further analysis related to open space is provided in Section 4.4, Cultural Resources.
Policy 2: Evaluation of resources shall be completed at intermediate stages of project planning and review such as site plan review, subdivision map approval, or at an earlier stage of project review.	
Policy 3: Final preservation actions shall be completed at final stages of project planning and review such as grading, demolition, or at an earlier stage of project review.	
Policy 4: To identify historic resources through literature and records research and/or onsite surveys. 1. To evaluate historic resources through comparative analysis or through subsurface or materials testing. 2. To preserve significant historic resources by one or a combination of the following alternatives, as agreed upon by RDMD and the project sponsor: a. Adaptive reuse of historic resource. b. Maintaining the historic resource in an undisturbed condition. c. Moving the historic resource and arranging for its treatment. d. Salvage and conservation of significant elements of the historic resources. e. Documentation (i.e., research narrative, graphics, photography) of the historic resource prior to destruction.	

TABLE 4.10-1
PROJECT POLICY CONSISTENCY WITH APPLICABLE COUNTY OF ORANGE GENERAL PLAN ELEMENTS

Applicable Goals and Policies	Project Consistency
Policy 5: To identify archaeological resources through literature and records research and surface surveys. 1. To evaluate archaeological resources through subsurface testing to determine significance and extent. 2. To observe and collect archaeological resources during the grading of a project. 3. To preserve archaeological resources by: a. Maintaining them in an undisturbed condition, or b. Excavating and salvaging materials and information in a scientific manner.	
Goal 3: To preserve and enhance buildings structures, objects, sites, and districts of cultural and historic significance.	**Consistent.** As stated above, the Santiago Creek Dam is considered a historic property eligible for the NRHP and is listed in the CRHR. Although specific aspects of the Dam would be modified, it would remain recognizable as an earthen embankment dam and would continue to perform the historic function for which it is eligible. Therefore, the Project would continue to preserve the historic Dam as a whole and would not cause a significant impact related to historic resources. Additionally, the record search for the SCCIC qualifies the Project site and surrounding area as considered sensitive for archaeological resources, and MM CR-1, which requires archaeological monitoring during grading within previously undisturbed soils, and MM CR-2, which provides details for treatment of unanticipated discoveries, would be incorporated to ensure less than significant impacts to archaeological resources. Further analysis related to open space is provided in Section 4.4, Cultural Resources.
Objective 3.1: Undertake actions to identify, preserve, and develop unique and significant cultural and historic resources.	
Objective 3.3: To appraise, collect, organize, describe, preserve, and make available County of Orange records of permanent, historical value.	
Energy Resources Component	
Goal 1. Maximize the conservation and wise use of energy resources in all residences, businesses, public institutions, and industries in Orange County.	**Consistent.** Project construction would require the use of construction equipment for development of Project components, hauling, and demolition activities. Overall, **f**uel energy consumed during construction would be temporary in nature and would not represent a significant demand on energy resources. Energy consumption related to the Project's infrastructure improvements are necessary to meet the Project's objectives of meeting the seismic, safety, and design requirements; fulfill operational requirements; extend the useful life of the dam; and improve water supply reliability. In addition, the Project does not involve the development of renewable energy, nor is energy efficiency an issue related to the dam improvements. The Project would not create a significant impact related to energy resources or consumption. Further analysis related to energy is provided in Section 4.5, Energy.
Objective 1.1. Achieve a reduction in projected per capita energy demand and consumption by the year 2005.	
Goal 2. Encourage the utilization of existing energy resources to their highest potential and the development of alternative energy sources consistent with sound energy conservation practices and techniques to meet the County's future energy demand.	
Objective 2.1. Encourage the efficient development of local energy resources to supply a portion of the County's energy demand through the year 2005 in a manner which protects the environment.	
Policy 2. Energy Resource Development – To encourage and actively support the efficient use and optimum development of energy resources in the County consistent with sound resource management practices.	
Policy 3. Energy Conservation – To encourage and actively support the utilization of energy conservation measures in all new and existing structures in the County.	

TABLE 4.10-1
PROJECT POLICY CONSISTENCY WITH APPLICABLE COUNTY OF ORANGE GENERAL PLAN ELEMENTS

Applicable Goals and Policies	Project Consistency
Water Resources Component	
Goal 1: Ensure an adequate dependable supply of water of acceptable quality for all reasonable uses.	**Consistent.** The Project would construct local Orange County water infrastructure to improve water supply reliability, extend the useful life of water infrastructure facilities, and provide additional water capacity to serve future demand. In addition, IRWD, which owns and operates the Irvine Lake and Santiago Dam, conducted a water supply reliability analysis, which concluded IRWD's water supply is reliable throughout all conditions including normal, single dry year and multiple dry year and extended drought. As the Project would provide additional capacity and improve water supply reliability within IRWD, the Project would assist in ensuring adequate supply of water within the County. Further analysis related to water is provided in Section 4.16, Utilities and Service Systems.
Objective 1.1. To maintain the adequacy and dependability of imported water supplies.	
Objective 1.2. To achieve a reduction in per capita water consumption by the year 2020.	
Objective 1.3. To reduce dependence on imported water supplies through both conservation and local water resource development.	
Policy 1 – Water Supply. To ensure the adequacy of water supply necessary to serve existing and future development as defined by the General Plan.	
Policy 2 – Conservation. To reduce per capita and total water consumption through conservation and reclamation programs and the support of new technologies.	
Policy 3 – Groundwater Sources. To support groundwater management efforts that are conducted by County water agencies.	
Policy 4 – Shortage Planning. To ensure that Orange County will not be severely impaired by any potential future water shortages.	
Policy 5 – Water Quality. Protect and improve water quality through continued management, enforcement, and reporting requirements. Encourage an integrated water resources approach for stormwater management that considers water supply, water quality, flood control, open space, and native habitats. Promote coordination between the County, cities, and other stakeholders in the identification and implementation of watershed protection and Low Impact Development (LID) principles. Consider implementation of LID principles to conserve natural features (trees, wetlands, streams, etc.), hydrology, drainage patterns, topography, and soils. Encourage the creation, restoration, and preservation of riparian corridors, wetlands, and buffer zones. Continue to educate the public about protecting water resources.	**Consistent.** The Project would comply with all applicable water quality and stormwater runoff regulations. During construction, the Project would comply with the NPDES Construction General Permit and the preparation of a SWPPP, which would ensure that any impacts to downstream waters resulting from construction activities on the Project site would be less than significant. During operations, the Project would not introduce new uses to the site, including substantial amounts of urban pollutants to the storm water runoff beyond existing conditions. IRWD would coordinate with the RWQCB, County, and any other related agencies in preparation of the SWPPP and NPDES compliance. Further analysis related to water quality and stormwater is provided in Section 4.9, Hydrology and Water Quality.
Policy 6 – Intergovernmental Coordination. To encourage and support a cooperative effort among all agencies towards the resolution of problems and the utilization of opportunities in the planning management and protection of water resources, including water quality.	
Recreation Element	
Regional Riding and Hiking Trails Component	
Goal 1. Provide a useful, enjoyable, safe, and efficient public regional riding and hiking trail system to meet the needs and desires of the citizens of the entire County.	**Consistent.** Although the Project would temporarily impact existing recreational uses related to hiking and fishing, the impacts would be short-term during certain phases of construction and full use of the area for recreational purposes would be restored following construction. Further analysis related to recreational facilities is provided in Section 4.13, Recreation.
Goal 2. Create trail linkages between open space and recreation facilities, between community, municipal, State, and federal trail systems, and between the trail systems of surrounding counties.	

TABLE 4.10-1
PROJECT POLICY CONSISTENCY WITH APPLICABLE COUNTY OF ORANGE GENERAL PLAN ELEMENTS

Applicable Goals and Policies	Project Consistency
Regional Recreational Facilities Component	
Goal 1. To provide a regional recreation network to meet the regional recreation needs of existing and future residents of the entire County.	**Consistent** The Project site itself is considered a regional recreational facility with shoreline fishing opportunities at Irvine Lake. Although the Project would temporarily impact existing recreational uses related to hiking and fishing, the impacts would be short-term during certain phases of construction and full use of the area for recreational purposes would be restored following construction. During operations, the proposed dam improvements and spillway would not impact the existing recreational facilities at Irvine Lake. Further analysis related to recreational facilities is provided in Section 4.13, Recreation.
Goal 2. To develop regional recreation facility park sites with recreation facilities designed to respond to the diverse regional recreation interests of the citizens of the County.	
Goal 3. To operate and maintain regional recreation facilities providing operation programs designed for the most effective use of each site at a minimum cost.	
Noise Element	
Policy 4 – Noise Monitoring and Abatement. To monitor noise levels, and adopt and enforce noise abatement programs.	**Consistent** Project construction activities would comply with the County Code of Ordinances, assuming that IRWD obtains a variance prior to construction. Additionally, the noise levels at the nearest sensitive residential use would not exceed the daytime or nighttime noise thresholds established by the Federal Transportation Administration (FTA). Operational noise impacts would be consistent with existing conditions, and no significant noise impacts would occur. Further analysis related to noise is provided in Section 4.11, Noise.
Objective 4.1. To enforce the County's Noise Ordinance to prohibit or mitigate harmful and unnecessary noise within the County.	
Objective 4.3. To develop and enforce standards in addition to those presently included in the Noise Ordinance to regulate noise from construction and maintenance activities and commercial public and industrial land uses.	
Objective 4.5. To require that noise from motors, appliances, air conditioners, and other consumer products does not disturb the occupants of surrounding properties.	
Policy 5 – Noise/Land Use Planning Integration. To fully integrate noise considerations in land use planning to prevent new noise/land use conflicts.	**Consistent** All construction equipment is anticipated to be fitted with the original equipment manufacturer's or manufacturer-approved equivalent mufflers or intake silencers to maintain, at a minimum, published noise emission levels used in the calculation of offsite noise exposure from construction activities. Project construction activities would comply with the County Code of Ordinances, assuming that IRWD would obtain a variance prior to construction. Additionally, noise levels at the nearest sensitive residential use would not exceed the daytime or nighttime noise thresholds established by the FTA. For the residential sensitive receptors located approximately two miles to the west, noise levels generated during Project construction would be attenuated by the substantial distances between the Project site and the aforementioned uses. Furthermore, Irvine Lake is surrounded by ridgelines, which would also attenuate noise levels, and nearby uses are not anticipated to be exposed to a substantial level of noise. Project construction would not exceed the 80 dBA Leq daytime and 70 dba Leq nighttime noise criteria and consequently would not expose Oak Canyon Park and Lakeview Park Camping Area to excessive levels of noise. No camping is allowed at Irvine Lake so there would be no nighttime noise exposure. No significant Project-related traffic noise impacts are
Objective 5.1 To utilize the criteria of acceptable noise levels for various types of land uses as depicted on Tables VIII-2 and VIII-3 in the review of development proposals.	
Objective 5.4 To stress the importance of building and design techniques in future site planning for noise reduction.	

TABLE 4.10-1
PROJECT POLICY CONSISTENCY WITH APPLICABLE COUNTY OF ORANGE GENERAL PLAN ELEMENTS

Applicable Goals and Policies	Project Consistency
	anticipated. Impacts related to stationary sources of noise would be less than significant. Operational noise impacts would be consistent with existing conditions, and no significant noise impacts would occur. Further analysis related to noise is provided in Section 4.11, Noise.
Policy 6 – Noise Sensitive Land Uses. To identify and employ mitigation measures in order to reduce the impact of noise levels and attain the standards established by the Noise Element, for both interior areas and outdoor living areas for noise sensitive land uses.	**Consistent** As stated above, the noise levels at the nearest sensitive residential use would not exceed the daytime or nighttime noise thresholds established by the FTA. For nearby public parks, the Project would result in less than significant noise impacts and would not require mitigation. Further analysis related to noise is provided in Section 4.11, Noise.
Objective 6.7. To apply noise standards as defined in the Noise Element for noise-sensitive land uses.	
Safety Element	
Public Safety Component	
Goal 1. Provide for a safe living and working environment consistent with available resources.	**Consistent.** One of the Project's primary purposes is to ensure that the dam's infrastructure meets current seismic safety standards as set by the Division of Safety of Dams (DSOD). As requested by the DSOD, IRWD performed a seismic analysis and found that the existing tower and spillway are reaching the end of their useful life and do not meet current seismic safety and design standards. The Project would rehabilitate and replace the outlet tower and spillway to ensure that all safety concerns are met as well as modify the embankment to permit operation of the facilities for a long-term water resource benefit. In addition, because the Project site is located on the former Irvine Park-Army Camp, which is currently designated on the Cortese List, the Project would comply with MM HAZ-1, which requires IRWD to follow and implement the 3Rs of Explosives Safety – Recognize, Retreat, and Report. Therefore, impacts related to hazards would be less than significant. With the incorporation of MM HAZ-1, Project impacts related to hazardous materials would be less than significant. Further analysis related to hazardous materials is provided in Section 4.8, Hazards and Hazardous Materials. With regard to natural hazards, the Project site is located within a Very High Fire Hazard Severity Zone (FHSZ) and would be required to comply with all applicable regulatory requirements including California Code of Regulations (CCR) Title 24, the California Building Code (CBC), and the County of Orange Safety Element. Further analysis related to wildfire hazards is provided in Section 4.17, Wildfire.
Objective 1.1. To identify natural hazards and determine the relative threat to people and property in Orange County.	
Goal 2. Minimize the effects of public safety hazards through implementation of appropriate regulations and standards which maximize protection of life and property.	
Objective 2.1: To create and maintain plans and programs which mitigate the effects of natural hazards.	
Objective 2.2: To support the development and utilization of technologies, which minimize the effects of natural hazards.	
Goal 3. Raise the awareness of Orange County residences, workers, and visitors to the potential threat of public safety hazards.	
Flood Hazard Component	
Goal 2. Provide effective and efficient flood protection throughout Orange County.	**Consistent.** The Project itself is the Santiago Creek Dam, which provides flood control within the County. The Project would provide site improvements and updates to ensure the dam will continue to adequately operate in compliance with all applicable regulations.

TABLE 4.10-1
PROJECT POLICY CONSISTENCY WITH APPLICABLE COUNTY OF ORANGE GENERAL PLAN ELEMENTS

Applicable Goals and Policies	Project Consistency
Natural Hazards	
Goal 2. Minimize the effects of natural safety hazards through implementation of appropriate regulations and standards which maximize protection of life and property.	**Consistent.** The Project would comply with all applicable regulations as set forth by the DSOD relating to seismic safety and IRWD's operational requirements. The Project would rehabilitate and replace the outlet tower and spillway to ensure all safety concerns are met and to minimize natural hazard impacts as well as to modify the embankment to permit operation of the facilities for a long-term water resource benefit.
County of Orange 2012.	

Project Compatibility with Existing and Planned Land Uses

The Project has also been analyzed for compatibility with existing adjacent land uses, including whether impacts would result from siting different and/or incompatible land uses near each other. The proposed Project site has a General Plan designation of Open Space and has a consistent zoning designation of OS FP-2 (Open Space), both of which are consistent with the existing uses on the Project site. Since the proposed Project does not include changes in the existing land use or zoning designations, and would not change the character or existing uses of the Project site, the proposed Project is consistent with both the Land Use Element of the County's General Plan and the County's Zoning Ordinance. No long-term direct or indirect impacts to surrounding uses would occur with the proposed Project. Potential short-term, construction-related compatibility issues related to aesthetics, air quality, and noise are discussed in Sections 4.1, Aesthetics, 4.2, Air Quality, and 4.11, Noise, respectively, of this EIR. Further, the proposed Project would not conflict with any other applicable land use plan, policy, or regulation. Therefore, the proposed Project would not result in significant impacts related to conflicts with any such plan, policy, or regulation that has been adopted for the purpose of avoiding or mitigating an environmental effect.

County of Orange Code of Ordinances

The County of Orange Code of Ordinances is a compilation of the rules, regulations, and codes that were enacted into law by the County of Orange, including Land Use and Building Regulations and the County of Orange Comprehensive Zoning Code. The Project would be designed to comply with the Code of Ordinances. In addition, as stated above, the Project would not conflict with the Zoning Code, as the Project would comply with the zoning designation of General Agricultural (A1). The Project would not provide any new uses; rather, it would improve the existing dam/water infrastructure and spillway to meet all current seismic and design standards. Therefore, the proposed Project would not result in significant impacts related to conflicts with any land use plan, policy, or regulation that has been adopted for the purpose of avoiding or mitigating an environmental effect.

SCAG RTP/SCS (Connect SoCal)

Recognizing the importance of resilience, SCAG's Regional Council adopted a Climate Change Action Resolution (Resolution No. 21-628-1) in January 2021 and resolved to develop a Regional Resilience Framework to "help the region plan and prepare for a changing climate, as well as potential near- and long-term disruptions to Southern California."

SCAG formally affirmed the drought and water-shortage emergency in Southern California (based on Executive Order N-5-23 issued by Governor Newsom in 2021) and called on local and regional partners to join together to adopt an "all of the above" approach to addressing the region's water challenges and catalyzing opportunities across a six-county region that's home to nearly 19 million people. Clean, safe, affordable and reliable water supply is central to Southern California's people, economy and natural systems—and necessary to support the region's projected growth. In an effort to support partners in tackling the region's deepening water crisis, SCAG's Regional Council unanimously adopted a Water Action Resolution (Resolution No. 22-647-3) in October 2022 to reduce water use; improve water conservation, reuse and efficiency; enhance water systems' health and resilience; pursue and potentially implement new water supply and storage opportunities; and support investments in water infrastructure and conservation practices that support the region's economic and population growth and foster planning for the region's housing needs. This resolution also called on SCAG to "identify, recommend and integrate into Connect SoCal 2024 policies and strategies to align investments in water infrastructure with housing needs and the adopted growth forecast and development pattern."

Building on SCAG's ongoing resilience efforts, its staff used a lens of resilience in the development of Connect SoCal to consider and address the shocks and stressors facing the region, including those currently present and those expected up to 2050 and beyond. (SCAG 2024).

The primary objective of the proposed Project is the rehabilitation and replacement of the Santiago Creek Dam outlet tower and spillway facilities as well as to modify the embankment to permit operation of the facilities for a long-term water resource benefit. In implementing the proposed Project, IRWD would improve water supply availability and minimize impacts to local environmental resources. As such, the Project would be consistent with the assumptions utilized to develop Connect SoCal.

Impact Conclusion: *The Project would not conflict with any local applicable land use plan, policy, or regulation. Impacts would be less than significant.*

4.10.6 CUMULATIVE IMPACTS

Projects considered in the cumulative impact analysis consist of four projects within a one-mile buffer of the Project: three of which are located in the unincorporated County of Orange with the last one located in the City of Orange. These related projects are described in more detail in Table 4-1, Cumulative Projects List, which is provided in Section 4.0, Impact Analysis.

The Project is located at the existing Santiago Creek Dam at Irvine Lake, which is already developed. Surrounding land uses primarily consist of undeveloped open space, and residential development is located west of SR-241. Other cumulative projects in proximity of the site would be restricted to infill redevelopment type projects in the areas designated for development, outside the open space areas. As discussed previously, the Project would not involve any new development and, instead, would focus on improvements to the existing Santiago Creek Dam infrastructure. Additionally, the Project would improve infrastructure to fulfill the damand Irvine Lake's original purpose of water impoundment for IRWD's use for their existing and planned service populations; the Project itself would not result in an expansion of development in the area, either directly or indirectly. Therefore, the Project would not contribute to a cumulative impact relating to land use incompatibility through future development.

Additionally, future development of cumulative projects would be evaluated for compatibility with the surrounding uses and for consistency with the local and regional jurisdictions' land use plans, policies, and regulations, including the County General Plan and Zoning Code. Each proposed

development project would be subject to the development review and permit process, which would include determination of project conformity to applicable land use plans and policies. Thus, these projects would be approved in accordance with adopted land use plans and policies and would not lead to land use incompatibilities and conflict or inconsistency with the goals and policies. In light of the above, cumulative land use impacts and the Project's contribution to cumulative impacts would be less than significant.

4.10.7 MITIGATION PROGRAM

Mitigation Measures

The proposed Project would not result in significant impacts to land use and planning.

4.10.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Project impacts related to land use and planning would be less than significant and mitigation is not required.

4.10.9 REFERENCES

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4.11 NOISE

This section discusses Project-related impacts to the human noise environment in the vicinity of the Project site. Information in this section is based upon the *Noise and Vibration Analysis Technical Memorandum for the Santiago Creek Dam Outlet Tower and Spillway Improvements Project* prepared by Psomas (2024). The letter report is included in Appendix G of this EIR.

4.11.1 BACKGROUND

Noise and Vibration Basics and Terminology

Noise

"Sound" is a vibratory disturbance created by a moving or vibrating source that is capable of being detected. "Noise" is defined as a sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. Effects of noise on people can include general annoyance; interference with speech communication; sleep disturbance; and, in the extreme, hearing impairment (Caltrans 2013).

Sound pressure levels are described in units called the decibel (dB). Decibels are measured on a logarithmic scale. A doubling of the energy of a noise source (such as doubling of traffic volume) would increase the noise level by 3 dB. The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this phenomenon, the A-scale was devised. The A-weighted decibel scale (dBA) approximates the frequency response of the average healthy ear when listening to most ordinary everyday sounds and is used in this analysis.

Human perception of noise has no simple correlation with acoustical energy. Due to subjective thresholds of tolerance, the annoyance of a given noise source is perceived very differently from person to person. The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at 3 feet is approximately 60 dBA, while loud jet engine noises at 1,000 feet equate to 100 dBA, which can cause serious discomfort. Table 4.11-1 shows the relationship of various noise levels in dBA to commonly-experienced noise events.

TABLE 4.11-1
NOISE LEVELS FOR COMMON EVENTS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet fly-over at 300 m (1,000 ft)	100	
Gas lawn mower at 1 m (3 ft)	90	
Diesel truck at 15 m (50 ft) at 80 km/hr (50 mph)	80	Food blender at 1 m (3 ft); garbage disposal at 1 m (3 ft)
Noisy urban area, daytime gas lawn mower at 30 m (100 ft)	70	Vacuum cleaner at 3 m (10 ft)
Commercial area, heavy traffic at 90 m (300 ft)	60	Normal speech at 1 m (3 ft)
Quiet urban daytime	50	Large business office, dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime	30	Library
Quiet rural nighttime	20	Bedroom at night, concert hall (background)
	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

dBA: A-weighted decibels; m: meter; ft: feet; km/hr: kilometers per hour; mph: miles per hour
Source: Caltrans 2013.

Two equal noise sources, when heard together, do not “sound twice as loud” as one of the sources. As stated above, a doubling of noise sources results in a noise level increase of 3 dBA. It is widely accepted that (1) the average healthy ear can barely perceive changes of a 3 dBA increase or decrease, (2) a change of 5 dBA is readily perceptible, and (3) an increase (decrease) of 10 dBA sounds twice (half) as loud (Caltrans 2013).

From the source to the receiver, noise changes both in the level and frequency spectrum. The most obvious change is the decrease in noise level as the distance from the source increases. Sound from a small, localized source (approximating a “point” source) radiates uniformly outward as it travels away from the source in a spherical pattern. For point sources, such as heating, ventilation, and air conditioning (HVAC) units or construction equipment, the sound level attenuates (or drops off) at a rate of 6 dBA for each doubling of distance (i.e., if the noise level is 70 dBA at 25 feet, it is 64 dBA at 50 feet). Vehicle movements on a road make the sources of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. The sound level attenuates or drops off at a rate of 3 dBA per doubling of distance for line sources.

A large object in the path between a noise source and a receiver can significantly attenuate noise levels at that receiver’s location. The amount of attenuation provided by this “shielding” depends on the size of the object and the frequencies of the noise levels. Natural terrain or landform features as well as man-made features (e.g., buildings and walls) can significantly alter noise exposure levels. For a noise barrier to work, it must be high enough and long enough to block the view from the receiver to a road or to the noise source. Effective noise barriers can reduce outdoor noise levels at the receptor by up to 15 dBA.

Several rating scales (or noise “metrics”) exist to analyze effects of noise on a community. These scales include the equivalent noise level (L_{eq}), including L_{max} and L_{min}, which are respectively the highest and lowest A-weighted sound levels that occur during a noise event, and the Community Noise Equivalent Level (CNEL). Average noise levels over a period of minutes or hours are usually expressed as dBA L_{eq}, which is the equivalent noise level for that period of time. The

period of time averaging may be specified; for example, $L_{eq(3)}$ would be a three-hour average. Noise of short duration (i.e., substantially less than the averaging period) is averaged into ambient noise during the period of interest. Thus, a loud noise lasting many seconds may have minimal effect on the measured sound level averaged over a one-hour period.

To evaluate community noise impacts, CNEL was developed to account for human sensitivity to nighttime noise. CNEL represents the 24-hour average sound level with a penalty for noise occurring at night. The CNEL computation divides a 24-hour day into three periods: daytime (7:00 AM to 7:00 PM), evening (7:00 PM to 10:00 PM), and nighttime (10:00 PM to 7:00 AM). The evening sound levels are assigned an approximately 5-dBA penalty, and the nighttime sound levels are assigned a 10-dBA penalty prior to averaging with daytime hourly sound levels.

4.11.2 VIBRATION

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration is normally associated with activities such as railroads or vibration-intensive stationary sources but can also be associated with construction equipment such as jackhammers, pile drivers, and hydraulic hammers. Vibration displacement is the distance that a point on a surface moves away from its original static position. The instantaneous speed that a point on a surface moves is described as the velocity, and the rate of change of the speed is described as the acceleration. Each of these descriptors can be used to correlate vibration to human response, building damage, and acceptable equipment vibration levels. During the construction of a project, the operation of construction equipment can cause groundborne vibration. During the operational phase of a project, receptors may be subject to levels of vibration that can cause annoyance due to noise generated from vibration of a structure or items within a structure. Analysis of this type of vibration is best measured in velocity and acceleration.

The three main wave types of concern in the propagation of groundborne vibrations are surface or Rayleigh waves, compression or P-waves, and shear or S-waves.

- Surface or Rayleigh waves travel along the ground surface. They carry most of their energy along an expanding cylindrical wave front, similar to the ripples produced by throwing a rock into a lake. The particle motion is more or less perpendicular to the direction of propagation (known as retrograde elliptical).
- Compression or P-waves are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal, in a push-pull motion. P-waves are analogous to airborne sound waves.
- Shear or S-waves are also body waves, carrying their energy along an expanding spherical wave front. Unlike P-waves, however, the particle motion is transverse, or perpendicular to the direction of propagation.

The peak particle velocity (ppv) or the root mean square (rms) velocity is usually used to describe vibration amplitudes. The ppv is defined as the maximum instantaneous peak of the vibration signal and the rms is defined as the square root of the average of the squared amplitude of the signal. The ppv is more appropriate for evaluating potential building damage and also used for evaluating human response.

The units for ppv velocity are normally inches per second (in/sec). Often, vibration is presented and discussed in dB units in order to compress the range of numbers required to describe the vibration. In this study, all ppv velocity levels are in in/sec and all vibration levels are in dB relative to one microinch per second. The threshold of perception is approximately 0.3 ppv. Typically,

groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Even the more persistent Rayleigh waves decrease relatively quickly as they move away from the source of the vibration. Manmade vibration problems are, therefore, usually confined to short distances (500 feet or less) from the source.

Construction generally includes a wide range of activities that can generate groundborne vibration. In general, blasting and demolition of structures generate the highest vibrations. Heavy trucks can also generate groundborne vibrations, which vary depending on vehicle type, weight, and pavement conditions. Potholes, pavement joints, discontinuities, differential settlement of pavement, and other anomalies all increase the vibration levels from vehicles passing over a road surface. Construction vibration is normally of greater concern than vibration of normal traffic on streets and freeways with smooth pavement conditions. Trains generate substantial quantities of vibration due to their engines, steel wheels, and heavy loads.

4.11.3 REGULATORY SETTING

Public agencies have established noise and vibration guidelines and standards to protect citizens from potential hearing damage and various other adverse physiological, structural, and social effects associated with noise and vibration. The Project is located within the County of Orange. For the evaluation of potential noise and vibration impacts, this analysis assumes compliance with the noise policies and regulations established by the County of Orange.

Federal Transit Administration

The Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment Manual (FTA 2018) has developed construction impact guidelines shown in Table 4.11-2.

TABLE 4.11-2
CONSTRUCTION NOISE CRITERIA

1-Hour Criteria (L_{eq})		
Land Use	**Day**	**Night**
Residential	90	80
Commercial	100	100
Industrial	100	100
8-Hour Criteria (L_{eq})		
Land Use	**Day**	**Night**
Residential	80	70
Commercial	85	85
Industrial	90	90

There are no construction noise criteria for parks. Residential uses are considered to be the most noise sensitive land use.

County of Orange

Because the Project site is not owned or leased by the County, the County local noise requirements are applicable to this Project. In addition, the County noise standards are applicable to offsite noise-sensitive land uses that would potentially be impacted by noise from the Project construction and operations.

General Plan

The Noise Element, one of nine elements of the *County of Orange General Plan*, contains official County policies on the conservation and management of resources (County of Orange 2015). The Noise Element defines a Noise Referral Zone as "that area with a total noise environment of 60 decibels Community Noise Equivalent Level (CNEL) or more. The intent of the Noise Referral Zone is to act as a triggering mechanism or flag for development proposals in areas potentially adversely affected by high noise levels. [U]nless it can be shown with certainty that the project is outside the area that has a CNEL of 60 or more decibels, an acoustical analysis report will be required".

The Noise Element states, "A key objective of this Noise Element is to ensure that each County resident's quality of life is not affected adversely by high noise levels". The information from Tables VIII-2 and VIII-3 of the Noise Element, shown as Table 4.11-3, defines the County's land use/noise compatibility standards. The Noise Element states that these standards apply to "situations where a new use is being proposed that is impacted by an existing noise source" and also "when an existing use is impacted by a new or expanded source of noise". For the latter case, "the project proponent is obliged to mitigate the impacts of the new source of noise".

TABLE 4.11-3
ORANGE COUNTY COMPATIBILITY MATRIX FOR LAND USE AND COMMUNITY NOISE EQUIVALENT LEVELS

Type of Use	65+ dB CNEL	60 to 65 dB CNEL
Residential	3a, b, e	2a, e
Commercial	2c	2c
Employment	2c	2c
Open Space		
Local	2c	2c
Community	2c	2c
Regional	2c	2c
Educational Facilities		
Schools (K through 12)	2c, d, e	2c, d, e
Preschool, college, other	2c, d, e	2c, d, e
Places of Worship	2c, d, e	2c, d, e
Hospitals		
General	2a, c, d, e	2a, c, d, e
Convalescent	2a, c, d, e	2a, c, d, e
Group Quarters	1a, b, c, e	2a, c, e
Hotel/Motels	2a, c	2a, c
Accessory Uses		
Executive Apartments	1a, b, e	2a, e
Caretakers	1a, b, c, e	2a, c, e

TABLE 4.11-3
ORANGE COUNTY COMPATIBILITY MATRIX FOR LAND USE AND COMMUNITY NOISE EQUIVALENT LEVELS

Type of Use	65+ dB CNEL	60 to 65 dB CNEL
dB: decibel; CNEL: Community Noise Equivalent Level		
EXPLANATION AND DEFINITIONS		
Action Required to Ensure Compatibility Between Land Use and Noise from External Sources		
1 = Allowed if interior and exterior community noise levels can be mitigated.		
2 = Allowed if interior levels can be mitigated.		
3 = New residential uses are prohibited in areas within the 65-dB CNEL contour from any airport or air station; allowed in other areas if interior and exterior community noise levels can be mitigated. The prohibition against new residential development excludes limited "infill" development within an established neighborhood.		
Standards Required for Compatibility of Land Use and Noise		
a = Interior Standard: CNEL of less than 45 dB (habitable rooms only).		
b = Exterior Standard: CNEL of less than 65 dB in outdoor living areas.		
c = Interior Standard: $L_{eq(h)}$ = 45 to 65 dB interior noise level, depending on interior use.		
d = Exterior Standard: $L_{eq(h)}$ of less than 65 dB in outdoor living areas.		
e = Interior Standard: As approved by the Board of Supervisors for sound events of short duration such as aircraft flyovers or individual passing railroad trains.		
Key Definitions		
Habitable Room – Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms and similar spaces.		
Interior – Spaces that are covered and largely enclosed by walls.		
$L_{eq(h)}$ – The A-weighted equivalent sound level averaged over a period of "h" hours. An example would be $L_{eq(12)}$ where the equivalent sound level is the average over a specified 12-hour period (such as 7:00 AM to 7:00 PM). Typically, time period "h" is defined to match the hours of operation of a given type of use.		
Outdoor Living Area – Outdoor living area is a term used by the County of Orange to define spaces that are associated with residential land uses typically used for passive private recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, and other outdoor areas associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are front yard areas, driveways, greenbelts, maintenance areas, and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).		
Source: County of Orange 2005 (see Tables VIII-2 and VIII-3 of the Noise Element).		

Noise Ordinance

The County Noise Ordinance is in Title 4, Division 6 of the Codified Ordinances of the County of Orange. The Noise Ordinance designates the entire County, including incorporated and unincorporated areas, as Noise Zone 1. The Noise Ordinance establishes exterior and interior standards for Noise Zone 1 as shown in Tables 4.11-4 and 4.11-5.

TABLE 4.11-4
ORANGE COUNTY EXTERIOR NOISE STANDARDS

Noise Zone	Noise Level	Time Period
1	55 dBA	7:00 AM–10:00 PM
	50 dBA	10:00 PM–7:00 AM
dBA: A-weighted decibels Source: County of Orange 2015		

TABLE 4.11-5
ORANGE COUNTY INTERIOR NOISE STANDARDS

Noise Zone	Noise Level	Time Period
1	55 dBA	7:00 AM–10:00 PM
	45 dBA	10:00 PM–7:00 AM
dBA: A-weighted decibels Source: County of Orange 2015		

With respect to exterior noise levels, the Noise Ordinance states the following:

(a) In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

(b) It shall be unlawful for any person at any location within the unincorporated area of the County to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, either incorporated or unincorporated, to exceed:

(1) The noise standard for a cumulative period of more than thirty (30) minutes in any hour; or

(2) The noise standard plus five (5) dB(A) for a cumulative period of more than fifteen (15) minutes in any hour; or

(3) The noise standard plus ten (10) dB(A) for a cumulative period of more than five (5) minutes in any hour; or

(4) The noise standard plus fifteen (15) dB(A) for a cumulative period of more than one (1) minute in any hour; or

(5) The noise standard plus twenty (20) dB(A) for any period of time.

(c) In the event the ambient noise level exceeds any of the first four (4) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

With respect to interior standards, the Noise Ordinance states the following:

(a) In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

(b) It shall be unlawful for any person at any location within the unincorporated area of the County to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured within any other dwelling unit on any residential property, either incorporated or unincorporated, to exceed:

  (1) The interior noise standard for a cumulative period of more than five (5) minutes in any hour; or

  (2) The interior noise standard plus five (5) db(A) for a cumulative period of more than one (1) minute in any hour; or

  (3) The interior noise standard plus ten (10) db(A) for any period of time.

(c) In the event the ambient noise level exceeds either of the first two (2) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Section 4-6-7 of the Noise Ordinance exempts the following activities:

(a) Activities conducted on the grounds of any public or private nursery, elementary, intermediate, or secondary school or college.

(b) Outdoor gatherings, public dances and shows, provided such events are conducted pursuant to a license issued by the County of Orange pursuant to Title 5 of the Codified Ordinances of the County of Orange.

(c) Activities conducted on any park or playground, provided such park or playground is owned and operated by a public entity.

(d) Any mechanical device, apparatus or equipment used, related to, or connected with emergency machinery, vehicle, or work.

(e) Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

(i) Noise sources associated with the maintenance of real property, provided said activities take place between 7:00 a.m. and 8:00 p.m. on any day except Sunday or a federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a federal holiday.

(j) Any activity to the extent regulation thereof has been preempted by State or federal law.

4.11.4 METHODOLOGY

Psomas prepared a *Noise and Vibration Analysis Technical Memorandum for the Santiago Creek Dam Outlet Tower and Spillway Improvements Project* in December 2024 (Psomas 2024). This letter report presents the results of the noise and vibration analysis for the proposed Project. The analysis also addresses the potential noise and vibration impacts associated with the Project in accordance with the California Environmental Quality Act (CEQA) (*California Public Resources Code* §21000 et seq.) and the CEQA Guidelines (*California Code of Regulations*, Title 14, §15000 et seq.).

4.11.5 EXISTING CONDITIONS

Due to the undeveloped nature of the area proximate to the Project site, the existing noise environment at the Project Site is primarily influenced by traffic noise on nearby roads as well as activities occurring at the site. The nearest roadways that affect ambient noise levels at the Project site are the Eastern Transportation Corridor Toll Road (State Route 241), State Route 261 (SR-261), and Santiago Canyon Road. At its closest point, the nearest road (SR-241) is more than half a mile from Irvine Lake. As such, ambient noise levels are low and characteristic of rural areas.

Orange County Fire Authority (OCFA) currently uses portions of the proposed Project staging area for helicopter takeoffs and landings associated with training and operational activities. During the construction of the proposed Project, HeloPods would be installed and operational near the lake, resulting in a similar anticipated noise level. In addition, Oak Canyon Park hosts a number of events, including graduation nights, picnics, concerts, athletic events, and shows that may include crowds, music, and amplified sound. Noise from these existing activities would intermittently contribute to the ambient noise levels within the area.

Sensitive Noise Receptors

The State of California defines noise-sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions (State of California 2015). Noise-sensitive land uses typically include residences, hospitals, religious facilities, schools, and libraries, which could all be adversely affected by an increase in noise levels. Noise-sensitive receptors in the vicinity of the proposed Project Site include residential land uses located approximately 9,500 feet to the west. There are nearby parks which include Oak Canyon Park, Irvine Regional Park, and Irvine Lake.

4.11.6 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant noise impact if it would:

Threshold 4.11-1 Result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance, or applicable standards of other agencies.

Threshold 4.11-2 Result in generation of excessive groundborne vibration or groundborne noise levels.

Threshold 4.11-3 For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of

a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

4.11.7 IMPACT ANALYSIS

Threshold 4.11-1

Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?

Less Than Significant Impact.

Construction Noise

Construction is anticipated to start in 2027, and the Project is expected to be completed within four years. During construction, concrete crushing would occur in one of the staging areas, which may include the primary staging area. Concrete crushing would be expected to occur intermittently 20 hours per day for approximately three weeks during the existing spillway demolition phase of the Project.

The Project requires that some of the existing site improvements be demolished, or removed and relocated, prior to construction. The following existing features would be demolished or removed:

- Vertical outlet tower and portions of 60-inch outlet conduit
- Significant portions (or possibly all) of the spillway chute and walls
- Spillway bridge and piers
- Portions of the upstream dam embankment concrete facing
- Storage building on dam crest
- Outlet works control building and valve vault
- Outlet works energy dissipator vault
- Portions of the Irvine Lake pipeline
- Catwalk and stair assembly across Santiago Creek
- Piezometers Monitoring wells
- Other ancillary equipment, utilities, and facilities

The Project involves construction of multiple components that include:

- Inlet/Outlet Works
    - Inclined Inlet/Outlet Structure
    - Intake Risers and Platforms
- Downstream Outlet Works
    - Bifurcation Valve Vault
    - Emergency Outlet Valve Vault
- Spillway

- Pipelines
    - Irvine Lake pipeline Relocation
    - Ancillary site improvements
- Inclined Inlet/Outlet Structure Access Roadway and Bridge
- Dam Control Building
- Existing Dam Crest Raise and Widening
- Emergency Access Walkway and Stairs
- Vehicle Bridge
- Utility Relocation
- Embankment Enhancements

Primary construction access would be from Santiago Canyon Road and Blue Diamond Haul Road. The primary contractor staging and equipment storage area, as well as the required conventional concrete batch plant and construction trailers, would be located in the large, flat plateau area at the upstream end of the reservoir. The primary onsite construction access/haul road (Blue Diamond) would connect the staging area to the toe of the existing dam within the lakebed after the lake is dewatered. An earthen ramp would be constructed up the right abutment of the existing dam to provide access for construction vehicles to the downstream area to construct the outlet works and spillway stilling basin facilities. To facilitate the construction of the downstream features, a secondary staging area would be located on the downstream toe of the dam near the existing outlet structure building.

Construction of the Project would occur 10 hours per day during the wet season (October-April) and 20 hours per day during the dry season (April to November). The County's Code of Ordinances states that noise sources associated with construction, repair, remodeling, or grading of real property may take place so long as "said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a Federal holiday." Because construction activities would occur outside of the hours allowed within the County's Code of Ordinances, IRWD would need to obtain a variance for this work prior to the start of the construction activities.

Construction noise levels for individual construction equipment reported in the Federal Highway Administration's Roadway Construction Noise Model (RCNM) were used to estimate future construction noise levels for the Project (FHWA 2008). Noise levels of construction activities from each component of the Project were assessed based on types, quantity, timeframe, and distance relative to noise receptor locations. All construction equipment is anticipated to be fitted with the original equipment manufacturer's or manufacturer-approved equivalent mufflers or intake silencers to maintain, at minimum, published noise emission levels. These levels were used to calculate offsite noise exposure from construction activities.

Typically, estimated construction noise levels are primarily influenced by the equipment that produces the highest noise levels, and those activities located closest to the receptor of interest. The Project consists of numerous structures that would be distributed over a large Project site. The distance between construction activities and any natural or manmade barriers provides noise attenuation for noise-sensitive receptors. Noise levels during construction of each distinct Project component would vary due to the different numbers and types of construction activities occurring and the equipment used. Table 4.11-6, Estimated Construction Noise Levels at Receptors, shows noise exposure levels for each of the four main activity areas associated with the Project. These

include the dam area to the northwest of the Project site where the proposed upgrades to the infrastructure would occur, the primary staging area located to the southeast, the Blue Diamond haul route which runs along the southern and western perimeters of the Project's construction area, and the lakebed haul route that extends through the western portion of the lake. Each of these areas was assessed for noise exposure levels at offsite residential areas, nearby parks, and habitats that may contain protected nesting areas. The range in noise exposure levels is due to the varying construction phases and associated distances of these activities that would occur between the Project and each respective noise sensitive receptor.

TABLE 4.11-6
ESTIMATED CONSTRUCTION NOISE LEVELS AT RECEPTORS

Construction Phase	Distance from Construction Activities (feet)	Noise Exposure Level (dBA L_{eq})
Construction of Main Dam Structures		
Irvine Regional Park	5,070	31-46
Residences Along Jamboree Road	9,785	25-41
Oak Canyon Park	9,035	41-57
Lakeview Park Camping Area	7,640	42-58
Sensitive Habitat to the South of Dam	140-1300	49-86
Sensitive Habitat to the North of the Dam	150-1370	63-84
Sensitive Habitat Near Primary Staging Area	8,300	42-57
Primary Staging Area		
Irvine Regional Park	12,700	32
Residences Along Jamboree Road	16,130	30
Oak Canyon Park	1,000	69
Lakeview Park Camping Area	1,000	69
Nearest Sensitive Habitat to the Staging Area[a]	239	79
Blue Diamond Haul Route		
Nearest Sensitive Habitat	100	61
Lakebed Haul Route		
Nearest Sensitive Habitat	41	68

dBA: A-weighted decibels; L_{eq}: Equivalent Noise Level; ft: feet

[a] Sensitive habitat includes habitat for noise-sensitive special status species such as coastal California gnatcatcher and least Bell's vireo. See Section 4.3, Biological Resources, for additional information.

Source: Noise calculations in Attachment B.

Noise Exposure at Residential Uses

Estimated noise levels at the nearest noise-sensitive uses attributable to the Project are shown in Table 4.11-5. As shown in this table, Project-related construction activities would occur at distances of approximately two miles from existing residential uses located to the west of the Project site. In addition to the substantial distances between the Project site and the nearest developed noise-sensitive land uses, Irvine Lake is surrounded by ridgelines which attenuate noise levels. Irvine Lake is located at an elevation of approximately 780 feet above sea level (asl), while many of the downstream components of the Project are located at elevations of 660 feet asl. Intervening ridgelines to the east of the dam site rise to elevations of greater than 1,000 feet asl. Noise generated by Project construction would be attenuated by these ridgelines. As shown in Table 4.11-5, noise levels are expected to range from 25-41 dBA L_{eq} at the building façades of the nearest noise sensitive residential uses. Noise level exposure from Project construction activities would occur during both daytime and nighttime activities. Noise generated during Project

construction would be below the FTA's daytime and nighttime Leq criteria and the County's interior and exterior daytime and nighttime Leq thresholds for residential land uses. Interior noise exposure levels at these residences would be further reduced by approximately 20 dBA under a windows-closed condition and 12 dBA under a windows-open condition, resulting in interior noise levels less than 45 dBA CNEL. In addition, construction noise from the Project site may not be discernible with traffic noise occurring along the SR-261 and SR-241. As such, noise impacts from Project-related daytime and nighttime construction activities would result in less than significant noise impacts.

Noise Exposure at Nearby Park Uses

The nearest parks located proximate to the Project's construction activities include Oak Canyon Park, Irvine Lake, and Irvine Regional Park. Irvine Regional Park is located approximately one mile northwest of the northernmost Project construction activities. Irvine Regional Park is also located such that intervening ridgelines with elevations greater than 1,000 feet provide substantial noise attenuation from the Project's construction activities. As shown in Table 4.11-5, construction noise exposure levels are anticipated to range from 31 to 46 dBA L_{eq} at Irvine Regional Park and are not anticipated to result in a substantial level of noise exposure due to attenuation facilitated by spreading loss and obstruction of the line-of-sight between the Project site and the aforementioned receptors.

A portion of the recreational area surrounding Irvine Lake would remain open, with select areas proximate to the Project construction closed for safety reasons. Irvine Lake would also be affected by noise occurring at the Project's construction areas. Noise exposure levels throughout the large park would be affected by proximity to construction activities. The degree of noise exposure is highly dependent on the proximity of park users relative to the Project's construction activities.

Oak Canyon Park is located approximately 1.7 miles from the Project's dam activities. As shown in Table 4.11-5, construction noise levels from activities occurring at the dam would be substantially attenuated due to the distance between the dam and the park with noise exposure levels of 43 to 60 dBA L_{eq}. However, Oak Canyon Park (shown on Exhibit 3-1 in Section 3.0, Project Description) is located adjacent to the proposed primary staging area. The primary staging area is anticipated to be used for staging construction management trailers, materials, equipment, conventional concrete batch plant, and the concrete crushing operation. The concrete crushing operation involves the delivery of aggregates that would be crushed for use in the concrete batch plant. The concrete batch plant would be supported by haul trucks transporting cement and aggregates as well as concrete trucks transporting concrete for use in the dam improvements. Concrete crushing would be expected to occur intermittently up to 20 hours per day for approximately three weeks (sometime between the months of April and November), during the existing spillway demolition phase of the Project. The park would mostly be exposed to noise associated with activities occurring at the staging area, where equipment and materials will be stored, and concrete batching and rock crushing activities would occur. Equipment staging is expected to occur during the beginning and end of each work shift when equipment would be either taken out of or returned to the staging area. Material staging would involve the temporary storage of building materials, excavated aggregates, and soil. The delivery and removal of materials in the staging area would occur throughout the day and would involve haul trucks transporting these materials. With the exception of rock crushing activities, construction-related activities associated with the staging area would occur intermittently. Rock crushing activities could occur for up to 20 hours a day and would be based on the need to reduce the size of excavated aggregates. Rock crushing activity would be the loudest Project construction activity, generating noise levels of 95 dBA L_{eq} at a distance of 50 feet (DEC 2001) before sound barriers are installed. Assuming that the rock crusher is located at least 1,000 feet away (this distance has been confirmed by IRWD), noise exposure levels at Oak Canyon Park are estimated to be 69

dBA L_{eq}. The County has established noise compatibility standards for open space of between 60-65 dBA CNEL and 65+ dBA CNEL and allows noise levels within these ranges if interior noise levels can be mitigated. Considering that there are no interior areas for park uses, the FTA 8-hour construction L_{eq} noise limits of 80 dBA during daytime hours and 70 dBA during nighttime hours have been applied as significance thresholds for Project construction. Noise levels of 69 dBA L_{eq} from the staging area would not exceed the 80 dBA L_{eq} daytime and 70 dBA L_{eq} nighttime noise criteria and consequently would not expose Oak Canyon Park to significant levels of noise.

The Lakeview Park Camping Area (shown on Exhibit 3-1 in Section 3.0, Project Description) would be exposed to similar levels of noise as those at Oak Canyon Park due to the large distance from the dam site and its proximity to the primary staging area. Noise levels from construction activities at the dam site range from 44 to 61 dBA L_{eq}. This park is proximate to construction activities occurring at the primary staging area and would likewise be exposed to daytime noise from these activities. Noise levels are estimated to be 69 dBA L_{eq} from the primary staging area. Daytime noise exposure to this level would not exceed the daytime noise criterion of 80 dBA L_{eq} established by the FTA. No camping is allowed at Irvine Lake (OC Parks 2023) so there would be no nighttime noise exposure. Noise from project-related construction noise would result in less than significant noise impacts at the Oak Canyon Park and Lakeview Park Camping Area.

Operational Noise

During the operations phase of the Project, dam operations would continue consistent with the types of operations performed before the infrastructure improvements. Under existing conditions, a small number of vehicle trips are associated with routine inspection and maintenance of the existing dam. It is anticipated that routine inspection and maintenance trips would continue, and no new operational trips would occur with implementation of the proposed Project. Therefore, because there would be no increase in daily trips associated with the daily operation of the Project components, no Project-related traffic noise impacts are anticipated. New stationary sources of noise would be created by small pumps used for aeration within the reservoir. Due to the very large distances between these pumps and offsite noise-sensitive land uses, noise related to these pumps would be inaudible at the offsite noise-sensitive land uses Impacts would be less than significant, and no mitigation is necessary.

Impact Conclusion: *Noise generated during Project construction would not exceed the daytime or nighttime noise thresholds established by the FTA. For the residential sensitive receptors located approximately two miles to the west, noise levels generated during Project construction would be attenuated by the substantial distances between the Project site and the aforementioned uses. Furthermore, Irvine Lake is surrounded by ridgelines which would attenuate noise levels. As shown in Table 4.11-5, noise exposure levels are anticipated to range from 31 to 46 dBA L_{eq} at Irvine Regional Park and are not anticipated to result in a substantial level of noise exposure. Additionally, Project construction would not exceed the 80 dBA L_{eq} daytime and 70 dba L_{eq} nighttime noise criteria and consequently would not expose Oak Canyon Park and Lakeview Park Camping Area to excessive levels of noise. No camping is allowed at Irvine Lake (OC Parks 2023) so there would be no nighttime noise exposure. No Project-related traffic noise impacts are anticipated. Impacts related to stationary sources of noise would be less than significant, and no mitigation is necessary pursuant to Threshold 4.11-1.*

Threshold 4.11-2

Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

Less than Significant Impact. As is typical of most cities and counties in California, there are no applicable County standards for vibration-induced annoyance or structural damage from vibration. The California Department of Transportation (Caltrans) has adopted vibration damage thresholds, which are shown in Table 4.11-7, to assess the potential for structural damage from vibration. The structural damage threshold for "older residential structures" of 0.3 peak particle velocity (ppv) inch per second (in/sec) for continuous/frequent (i.e., intermittent) sources is most applicable to this analysis.

TABLE 4.11-7
VIBRATION DAMAGE THRESHOLD CRITERIA

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

PPV: peak particle velocity; in/sec: inch(es) per second

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: Caltrans 2013.

The Caltrans vibration annoyance thresholds are shown in Table 4.11-8. These thresholds are used to assess the potential for a significant vibration impact for human annoyance; and annoyance is evaluated within occupied buildings.

TABLE 4.11-8
VIBRATION ANNOYANCE THRESHOLDS

Average Human Response	ppv
Severe	2.0
Strongly perceptible	0.9
Distinctly perceptible	0.24
Barely perceptible	0.035

ppv: peak particle velocity; in/sec: inch(es) per second
Source: Caltrans 2013.

Demolition activities, excavation, infrastructure development, and repaving would occur at the Project site around Irvine Lake. Vibration annoyance and building damage from typical construction activities have the potential to be excessive at nearfield distances of 100 feet or less. Because of the very substantial distances between the Project site and the nearest buildings, vibration-induced annoyance and building damage would not occur. The operations phase of the Project would not involve machinery or activities that generate perceptible levels of vibration. There would be a less than significant impact, and no mitigation is required.

Impact Conclusion: *Vibration annoyance and building damage from typical construction activities have the potential to be excessive at nearfield distances of 100 feet or less. Because of the very substantial distances between the Project site and the nearest buildings, vibration-induced annoyance and building damage would not occur. The operations phase of the Project would not involve machinery or activities that generate perceptible levels of vibration. There would be a less than significant impact, and no mitigation is required pursuant to Threshold 4.11-2.*

Threshold 4.11-3

For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the project area to excessive noise levels?

No Impact. The Project Site is not located within two miles of a public or private airport. The Project site is located approximately 10 miles northeast of John Wayne Airport. Helicopter operations have historically been conducted at Irvine Lake. Noise associated with these activities are intermittent and generally a substantial distance from workers at the dam. As such, the Project would not result in exposure of people residing or working in the Project area to excessive noise levels. Therefore, there would be no significant impact related to excessive aircraft noise exposure.

Impact Conclusion: *The Project would not result in exposure of people residing or working in the Project area to excessive aircraft noise levels. Pursuant to Threshold 4.11-3, there would be no impact related to excessive aircraft noise exposure.*

4.11.8 CUMULATIVE IMPACTS

Cumulative Short-term (Construction) Noise and Vibration Impact

Adverse noise and vibration impacts during construction of the proposed Project would be localized and would occur intermittently for varying periods throughout the construction phase. Short-term cumulative impacts related to ambient noise and vibration levels could occur if construction associated with the proposed Project as well as surrounding current and future development were to occur simultaneously. Noise or vibration associated with construction of the proposed Project in combination with another project within approximately 500 feet of the Project site boundaries could adversely impact sensitive receptors in the vicinity of the site with a cumulative noise level greater than the noise generated solely at the Project site. Due to the remote nature of the Project site, it is unlikely that construction activities from other projects within 500 feet of the Project site would occur concurrently with those of the Project. As such, cumulative noise impacts related to construction activities would result in less than significant noise impacts.

Cumulative Long-Term (Operation) Noise Impact

Cumulative traffic noise impacts would not occur due to the minimal vehicle trips required for maintenance of Project facilities and equipment. Stationary sources of machinery noise are minimal and would not result in a substantial increase in ambient noise levels in the local area. Additionally, noise produced during long-term operations would be regulated under the County's Code of Ordinances. Lastly, the Project's operations are located at such distances that there would not be a substantial increase in noise due to cumulative contributions from other sources. As such, impacts associated with cumulative long-term noise would be less than significant, and no mitigation is required.

4.11.9 MITIGATION PROGRAM

Mitigation Measures

No significant impacts would occur for noise or vibration from either the construction or operations phases of the Project. As such, no mitigation measures are necessary or recommended. Regarding impacts to sensitive biological resources, mitigation has been included in Section 4.3, Biological Resources, that would reduce potential impacts to nearby species and habitat.

4.11.10 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Project-specific and cumulative noise impacts would be less than significant. No significant unavoidable impacts would occur.

4.11.11 REFERENCES

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4.12 PUBLIC SERVICES

This section of the Environmental Impact Report (EIR) describes existing public services in the Project area and identifies associated potential fire and police protection impacts related to development of the proposed Project.

Existing parks and potential Project impacts on parks are addressed in Section 4.13, Recreation, of this EIR. Schools and Libraries will not be addressed in this Draft EIR as discussed in Section 2.0, Introduction, Project History, and Setting, as the Project would not contribute to an increase in the residential population, and no impacts would occur.

4.12.1 REGULATORY SETTING

Fire Protection

California Fire Code

The 2022 California Fire Code, California Code of Regulations, Title 24, Part 9, effective January 1, 2020, is based on the 2021 International Fire Code. Typical fire safety requirements of the California Fire Code include requirements for the installation of fire sprinklers; appropriate building materials and particular types of construction; and the clearance of debris and vegetation within a prescribed distance from occupied structures within wildfire hazard areas. In addition, the California Fire Code addresses fire flow requirements, fire hydrant spacing, and access road specifications.

Cal/Occupational Safety and Health Administration (OSHA) Regulations (CCR Title 8)

The California Division of Occupational Safety and Health Administration (Cal/OSHA) has primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally-approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the Code of Federal Regulations. Cal/OSHA standards are generally more stringent than federal regulations. The use of hazardous materials in the workplace requires employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.

California Public Resources Code

The California Public Resources Code (PRC) regulates natural resources and the conservation, utilization, and supervision of these resources; as well as mines and mining, oil and gas, and forestry. The following sections of the PRC are relevant to the proposed Project:

PRC 4427: During any time of the year when burning permits are required in an area pursuant to this article, construction personnel are prohibited from using or operating any motor, engine, boiler, stationary equipment, welding equipment, cutting torches, tarpots, or grinding devices from which a spark, fire, or flame may originate, which is located on or near any forest-covered land, brush--covered land, or grass-covered land, without first clearing all flammable materials within 10 feet of the operation and maintaining a water-type fire extinguisher equipped and ready for use.

PRC 4428: No person, except any member of an emergency crew or except the driver or owner of any service vehicle owned or operated by or for, or operated under contract with, a publicly or privately owned utility, which is used in the construction, operation, removal, or repair of the

property or facilities of such utility when engaged in emergency operations, shall use or operate any vehicle, machine, tool or equipment powered by an internal combustion engine operated on hydrocarbon fuels, in any industrial operation located on or near any forest, brush, or grass--covered land between April 1 and December 1 of any year, or at any other time when ground litter and vegetation will sustain combustion permitting the spread of fire, without providing and maintaining, for firefighting purposes only, suitable and serviceable tools in the amounts, manner and location prescribed in this section.

PRC 4431: During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate or cause to be operated in the area any portable saw, auger, drill, tamper, or other portable tool powered by a gasoline-fueled internal combustion engine on or near any forest-covered land, brush-covered land, or grass-covered land, within 25 feet of any flammable material, without providing and maintaining at the immediate locations of use or operation of the saw or tool, for firefighting purposes one serviceable round point shovel, with an overall length of not less than 46 inches, or one serviceable fire extinguisher. The Director of Forestry and Fire Protection shall by administrative regulation specify the type and size of fire extinguisher necessary to provide at least minimum assurance of controlling fire caused by use of portable power tools under various climatic and fuel conditions.

The required fire tools shall at no time be farther from the point of operation of the power saw or tool than 25 feet with unrestricted access for the operator from the point of operation.

PRC 4442:

a. Except as otherwise provided in this section, no person shall use, operate, or allow to be used or operated, any internal combustion engine which uses hydrocarbon fuels on any forest-covered land, brush-covered land, or grass-covered land unless the engine is equipped with a spark arrester, as defined in subdivision (c), maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire pursuant to Section 4443.

b. Spark arresters affixed to the exhaust system of engines or vehicles subject to this section shall not be placed or mounted in such a manner as to allow flames or heat from the exhaust system to ignite any flammable material.

c. A spark arrester is a device constructed of nonflammable materials specifically for the purpose of removing and retaining carbon and other flammable particles over 0.0232 of an inch in size from the exhaust flow of an internal combustion engine that uses hydrocarbon fuels or which is qualified and rated by the United States Forest Service.

d. Engines used to provide motive power for trucks, truck tractors, buses, and passenger vehicles, except motorcycles, are not subject to this section if the exhaust system is equipped with a muffler as defined in the Vehicle Code.

e. Turbocharged engines are not subject to this section if all exhausted gases pass through the rotating turbine wheel, there is no exhaust bypass to the atmosphere, and the turbocharger is in effective mechanical condition.

f. Motor vehicles when being operated in an organized racing or competitive event upon a closed course are not subject to this section if the event is conducted under the auspices of a recognized sanctioning body and by permit issued by the fire protection authority having jurisdiction.

County of Orange General Plan

Public Services & Facilities Element

The Public Services and Facilities Element, one of nine elements of the General Plan, sets forth a comprehensive strategy for the planning, management, and implementation of public facilities that are necessary to meet Orange County's existing and future demands. The Public Services and Facilities Element focuses on those publicly-managed services and facilities which have a direct influence on the distribution and intensity of development that can be accommodated through the utilization of existing technologies and assumptions that are used to determine adequate service levels. These services include community services, such as fire protection.

The Community Facilities section of the Public Services & Facilities Element specifically discusses the Orange County Fire Authority (OCFA), fire protection services, and fire station locations.

The following goals and objectives of the Public Services & Facilities Element pertaining to fire services are applicable to the Project:

Goal 1: Provide a safe living environment ensuring adequate fire protection facilities and resources to prevent and minimize the loss of life and property from structural and wildland fire damages.

Objective 1: To achieve desired level of fire protection and paramedic service through coordinated land use and facility planning.

Policy 3: Site Design Criteria – Require all land use proposals to implement adequate site design so as to maximize fire protection and prevention in order to minimize potential damages. The site design criteria shall be established to reflect the levels of protection needed for projects in various fire hazard areas. Such criteria shall include consideration as to: structure type and density, emergency fire flow and fire hydrant distribution, street pattern and emergency fire access, fuel modification programs, automatic fire sprinkler systems, and other requirements as determined by the Fire Chief.

In accordance with the Insurance Services Office (ISO) suggested standards, ultimate fire protection rating shall be maintained by General Plan land use categories as follows: (1) ISO 3 for all urban developments including Residential (1C and 1B), Commercial (2A and 2B), Employment (3.0), and Public Facilities (4.0), which are within five miles from a fire station and less than 1000 feet from a hydrant; and (2) ISO 4 for Rural Residential (1A) which are within 5 miles from a fire station and less than 100 feet from a hydrant. For areas greater than 5 miles or 1000 feet, the ISO suggested standard is 9.

Safety Element

The Safety Element, one of nine elements of the General Plan, contains County policies on identified and potential hazards and safety considerations, their mitigation (i.e., reduction in damage and loss to real and personal property and minimization of adverse social and economic impacts) and implications for development.

The Fire section of the Safety Element examines the threat of fire to urban areas, wildlands, and the urban/wildlands interface. Fire is a constant threat in all parts of the County. It is the responsibility of the OCFA to meet the fire threat challenge for present and future development and residents (County of Orange 2012).

The following goal of the County of Orange General Plan Safety Element pertaining to public safety and wildfire is applicable to the Project:

Public Safety Component

Goal 2: Minimize the effects of public safety hazards through implementation of appropriate regulations and standards which maximize protection of life and property.

Police Protection

County of Orange General Plan

Public Services & Facilities Element

As indicated above, the Public Services and Facilities Element focuses on those publicly-managed services and facilities, which include community services, such as sheriff patrol. The Community Facilities section of the Public Services & Facilities Element specifically discusses the Orange County Sheriff Department and sheriff protection services. Additionally, the sheriff patrol service is funded by sales tax revenue generated by the Local Public Safety Protection and Improvement Act of 1993 (Proposition 172) and City contracts.

The following goals and objectives of the Public Services & Facilities Element pertaining to sheriff patrol services are applicable to the Project:

Goal 1: Assure that adequate Sheriff patrol service is provided to ensure a safe living and working environment.

Objective 1.1: To maintain adequate levels of Sheriff patrol services through coordinated land use and facility planning efforts.

Policy 1: Land Use Review —To continue to coordinate land use proposal reviews with the County Sheriff-Coroner Department to assure that Sheriff patrol service shall be adequately addressed.

4.12.2 METHODOLOGY

Fire Protection

The OCFA was contacted to determine if the Project would significantly impact OCFA's ability to provide fire protection services. The analysis is based on information reviewed and provided by OCFA.

Police Protection

The Orange County Sheriff-Coroner Department (OCSD) was contacted to determine if the proposed Project would significantly impact its ability to provide services. The analysis is based on information and input reviewed by the OCSD.

4.12.3 EXISTING CONDITIONS

Fire Protection

The OCFA provides regional fire protection, emergency medical services, and rescue services to the unincorporated areas of Orange County plus 22 cities, including the Project site. Resources are deployed based upon a regional service delivery system that assigns personnel and equipment to emergency incidents without regard to jurisdictional boundaries. The equipment used by the department has the versatility to respond to both urban and wildland emergency conditions.

In addition to these fire suppression and emergency services, the OCFA provides fire prevention services. These duties are the responsibility of the Fire Prevention Department and include regular inspections of public assemblies and hazardous materials and operations pursuant to the Uniform Fire Code. Fire prevention and public education programs include fire prevention education for all fifth-grade students. The OCFA receives property tax revenue, known as the Structural Fire Fund, as its primary source of funding. Additionally, the Department of Forestry maintains a contract with the County Fire Authority for wildland firefighting protection in State responsibility areas (County of Orange 2012). Impacts related to wildfires are addressed in Section 4.17, Wildfire, of this Draft EIR.

The OCFA Operations Department is comprised of seven divisions and eleven battalions that include 77 fire stations. The Project site is located within Division 4, Battalion 3 (OCFA 2024a). Most divisions are divided into two battalions under the command of field Battalion Chiefs. Within these battalions are 77 fire stations (5–10 stations per battalion) that provide regional emergency response to all fires, medical aid, rescues, hazardous materials incidents, wildland fire, aircraft fire and rescue services to John Wayne Airport, and other miscellaneous emergencies.

In addition, the OCFA Operations section includes the emergency medical services section, which manages the delivery of medical services by OCFA medical technicians and paramedics; operations training and safety section, which supports the safety and training of all operations personnel; California Urban Search and Rescue Task Force 5, which is a State task force that responds as a Federal Emergency Management Agency (FEMA) or California Governor's Office of Emergency Services resource during national or regional emergencies such as earthquakes, hurricanes, or other natural and manmade disasters; Emergency Planning and Coordination section, which provides emergency management planning, agreement coordination, and homeland security grand coordination; and investigations section, which conducts fire investigation and evaluation and initiates early intervention strategies (OCFA 2024b).

The nearest OCFA Station is Station No. 8, which is located at 10631 Skyline Drive, Santa Ana, approximately 5.7 miles west of the Project site (OCFA 2024c). In addition, the nearest fire station outside of the OCFA jurisdiction is the Orange City Fire Department Station 7, located at 8501 E. Fort Road, Orange, approximately 3 miles west of the Project site, which would be able to respond, if necessary, in the event of an emergency. Table 4.12-1, Fire Stations Serving the Project Site, below describes the types and locations of existing fire department facilities serving the Project area. In addition, the table describes staffing and equipment at each existing station.

TABLE 4.12-1
FIRE STATIONS SERVING THE PROJECT SITE

Fire Station	Address	Apparatus	Station Staffing	Daily Staffing	Distance from the Project Site
OCFA 8	10631 Skyline Drive Santa Ana, California 92705	Paramedic Engine	3 Fire Captains, 3 Engineers, 6 Firefighters	1 Fire Captain, 1 Engineer, 2 Firefighters	5.7
OCFA 43	11490 Pioneer Way Tustin, California 92782	Paramedic Engine	3 Fire Captains, 3 Engineers, 6 Firefighters	1 Fire Captain, 1 Engineer, 2 Firefighters	6.5
OCFA 55	4955 Portola Parkway Irvine, California 92620	Paramedic Engine	3 Fire Captains, 3 Engineers, 6 Firefighters	1 Fire Captain, 1 Engineer, 2 Firefighters	8.8
OCFA 23	5020 Santiago Canyon Road Orange, California 92869	Paramedic Engine	3 Fire Captains, 3 Engineers, 6 Firefighters	1 Fire Captain, 1 Engineer, 2 Firefighters	6.4
Source: Rivers 2023.					

Current OCFA Standards are:

- A 5:00-minute first-due travel time standard and an 8:00-minute First Alarm travel standard.
- A total response time that includes 1:30 minutes for call processing and 2:00 minutes for turnout.
- A total response time as follows:
    - First due at 8:30 minutes.
    - Effective Response Force (First Alarm) at 11:30 minutes, with an initial response of three engines, one ladder truck, and one Battalion Chief (Rivers 2023).

Police Protection

The OCSD provides police patrol and investigative services to the unincorporated areas of Orange County, including the Project site. The OCSD consists of nearly 4,000 sworn and professional staff through six organizational Commands comprised of 23 Divisions. Together, these Commands and Divisions provide services including land, air and sea-based patrol, custody operations, investigative services, emergency management, coroner services, forensics and specialty operations, among an extensive list of other public safety services (County of Orange 2012).

The OCSD's patrol functions are both organized geographically and by service type into five divisions: North, South, and West Operations Divisions are geographically based, while the Airport and Harbor Patrol divisions are geared towards service type for the contracting entity receiving the services (County of Orange 2012).

The North Operations Division, which serves the Project site, is stationed in the Sheriff's permanent headquarters in the City of Santa Ana, located at 550 North Flower Street. The service territory of this division covers the unincorporated North County islands, Bolsa Chica, areas north of Brea and Yorba Linda, foothill areas east of Orange and north of Tustin, Irvine Coastal area north of Laguna Beach, the City of Villa Park, the communities of Midway City, Rossmoor, and

Sunset Beach, and Orange County Transit Authority (OCTA) police services (County of Orange 2012).

The North Division headquarters is located approximately 12.2 miles by road from the Project site, and primary response to the Project site would be by patrol vehicles that are assigned geographically throughout the County. Response time to calls for service may vary depending upon their location at the time of dispatch; however, the response goal for priority or emergency calls is to respond as immediately as possible. Non-priority calls are triaged based on importance. Non-priority calls will be responded to; however, they may not require an immediate dispatch based on the level of importance relative to other calls within the same time frame (Patella 2023).

Orange County Sheriff's Department's Emergency Management Division is another entity performing emergency planning and response in the County, and aims to promote, facilitate, and support the County of Orange and the Operational Area efforts to prepare for, respond to and recover from disasters. The Emergency Management Division provides emergency management and preparedness services to the unincorporated areas of Orange County and supports the efforts of the Orange County Operational Area. There are currently over 100 jurisdictions in the Operational Area encompassing all County departments and agencies, public and private organizations, and the general population within the boundaries of Orange County.

Additionally, the sheriff patrol service is funded by sales tax revenue generated by the Local Public Safety Protection and Improvement Act of 1993 (Proposition 172) and City contracts.

4.12.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant public services impact if it would:

Threshold 4.12-1 Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

(i) Fire protection

(ii) Police protection

(iii) Schools

(iv) Parks

(v) Other public facilities

This Draft EIR Section only addresses fire protection and police protection, as no residential or permanent employee population would be generated as a result of the Project. Impacts related to parks and recreation are discussed further in Section 4.13, Recreation, of this Draft EIR.

4.12.5 IMPACT ANALYSIS

Threshold 4.12-1(i)

Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

(i) Fire protection?

The proposed Project would involve improvements to the Santiago Creek Dam outlet works and spillway facility improvements in order to address specific seismic safety concerns as well as modify the embankment to permit operation of the facilities for a long-term water resource benefit and meet all applicable requirements as an existing public facility. The proposed Project would replace and update existing uses, which may currently generate demand for fire protection services during routine operation-related activities. The Project's structural and geotechnical design has been prepared consistent with the Division of Safety of Dams (DSOD) and U.S. Army Corps of Engineers (USACE) requirements and standards, respectively, based on site-specific geologic conditions and applicable safety requirements of the 2022 California Building Code (CBC).

During construction, equipment and on-site diesel fuel could generate an additional demand for fire protection services in the area with possible ignition sources such as internal combustion engines, gasoline-powered tools, and equipment that could produce a spark, fire, or flame. The use of spark-producing construction machinery within or adjacent to fire risk areas such as the surrounding open space areas, could expose temporary project workers and contractors to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire, resulting in a potentially significant impact. However, all personnel on the Project site would have to comply with PRC Sections 4427, 4428, 4431, and 4442, which include provisions relating to the handling of combustible fuels and equipment that can exacerbate fire risks. During construction, strict adherence to these PRC sections would ensure that contractors are responsible for all monitoring and safety measures ensuring that any risk to exacerbate wildfire would be reduced. Additionally, all construction must comply with fire protection and prevention requirements specified by the California Code of Regulations (CCR) and Cal/OSHA. This includes various measures such as easy accessibility of firefighting equipment, proper storage of combustible liquids, no smoking in service and refueling areas, and worker training for firefighter extinguisher use.

Operation-related activities would involve a limited number of maintenance trucks for inspections and material delivery. These trucks would be limited to established access roads and would have a low potential of producing sparks, fire, or flame, that could result in uncontrolled spread of wildfire. Nevertheless, due to the site's topography and wildfire risk, operators of the proposed Project site would comply with PRC Sections 4427, 4428, 4431, and 4442, which include provisions relating to the handling of combustible fuels and equipment that can exacerbate fire risks.

As stated above, the OCFA established the following response time goals: first response due at 8:30 minutes and effective response force at 11:30 minutes with an initial response of three engines, one ladder truck and one Battalion Chief. The Project is located approximately 5.7 miles northeast of Station No. 8, the nearest OCFA station, which is also about 18 driving miles away using access from Irvine Park Lane. The remote location and restricted use of roads to the Project site may have an impact on OCFD's ability to respond within its service standards (Rivers 2023). However, the Project site is already within the existing OCFD service area and would continue to

operate as a dam, which is the same as under existing conditions. As such, the Project would not create an increased impact to response time goals over existing conditions.

Although the Project could potentially increase the demand on the OCFA personnel and resources during temporary construction activities and periodic operational maintenance, the Project would replace and update existing uses and the demand is not sufficient that it would require the construction of new or alteration of existing fire protection facilities (i.e., fire stations) to maintain an adequate level of fire protection service in the area. In addition, the OCFA does not anticipate the Project would require a need to construct or expand OCFA facilities (Rivers 2023).

Additionally, the proposed Project would be required to comply with all applicable codes, ordinances, and regulations regarding fire prevention and suppression measures, fire hydrants and sprinkler systems, emergency access, and other similar requirements. This would also minimize demand for fire protection services. The Project site plans would be subject to review and approval by the OCFA prior to project approval, which would ensure that adequate emergency access, fire hydrant availability, and sufficient capacity for fire flows would be provided in compliance with all applicable codes and standards. Thus, no physical impacts associated with the provision of fire protection services would occur as result of the Project, and no mitigation is required. Therefore, impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *The Project's temporary construction activities and periodic maintenance activities would only cause an incremental increase in demand on County fire services. No new or physically-altered fire facilities that would result in substantial adverse physical impacts would be required as a result of the Project. Therefore, the impact is less than significant, and no mitigation is required.*

Threshold 4.12-1(ii)

Would the Project result in substantial adverse physical impacts associated with the provision of new or physically-altered governmental facilities, need for new or physically-altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

(ii) Police protection?

The proposed Project would involve improvements to the Santiago Creek Dam outlet/inlet works and spillway facility in order to address specific seismic safety concerns as well as modify the embankment to permit operation of the facilities for a long-term water resource benefit and meet all applicable requirements as an existing public facility. The proposed Project would replace and update existing uses, which may generate demand for police protection services during routine operation-related activities.

The Project would result in temporary construction activities and periodic maintenance for inspections and material delivery and would not contribute to a residential population or permanent additional employment. Although the Project could potentially increase the demand on OCSD personnel and resources during temporary construction activities and periodic operational maintenance, the Project would replace and update existing uses and the demand is not sufficient that it would require the construction of new or alteration of existing police protection facilities (i.e., police stations) to maintain an adequate level of police protection service in the area.

During temporary construction activities, the Project may increase number of calls to the area due to theft or vandalism of construction equipment on-site. The Project would include security measures such as cameras, directional lighting, etc., to prevent theft and vandalism, and therefore reduce the number of service provider calls during construction activities.

The Project would comply with the County's discretionary review process and standard conditions of approval, which would ensure that Project implementation would result in a less than significant impact to police protection services.

The current police facilities are adequate to handle the existing personnel and equipment that are employed and utilized by the Department. As the OCSD does not foresee significant police service issues due to the Project's size, location, and type of development (Patella 2023), the Project would not create a demand for additional officers or resources to provide adequate service to the Project. Therefore, impacts related to police protection would be less than significant, and no mitigation measures are either required or recommended.

Impact Conclusion: *The Project would not result in an increased demand for police protection services or result in a significant impact to police response. The Project would replace an existing use that is generating demand for police protection services. The Project would not result in the need for construction of new or physically-altered police facilities to maintain adequate levels of service. Therefore, the impact is considered less than significant, and no mitigation is required.*

4.12.6 CUMULATIVE IMPACTS

Projects considered in the cumulative impact analysis consist of four projects within a one-mile buffer of the Project, three of which are located in the unincorporated County of Orange with one located in the City of Orange. These related projects are described in more detail in Table 4-1, Cumulative Projects List, which is provided in Section 4.0, Impact Analysis.

Fire Protection

The geographic area for the cumulative analysis of fire protection services is the service territory for OCFA. Future development in the County is expected to increase demand for fire protection services and would contribute to the need for additional equipment and personnel to meet the demand. All new development in the County, including the proposed Project, would be required to comply with all applicable codes, ordinances, and regulations (including the Orange County Municipal Code, which adopts by reference the California Fire Code and the 2021 International Fire Code) regarding fire prevention and suppression measures, fire hydrants and sprinkler systems, emergency access, and similar requirements. Such compliance would minimize demand for fire protection services. The Project as well as other future development in the County would require the payment of taxes and appropriate fees that would be used for future facility improvements necessary to ensure adequate levels of service from these public service providers. Therefore, impacts related to the provision of new or physically- altered fire facilities would not result in a significant cumulative impact, and no mitigation measures are either required or recommended.

Police Protection

The geographic area for the cumulative analysis of police protection services is the service territory for the OCSD. As with fire protection services, future projects in the County, including the proposed Project, are expected to increase demand for police protection services and would

contribute to the need to expand facilities and operate such services. Police staffing levels are in constant need of evaluation as the County's population grows. Individual projects may not result in the need to increase staffing levels; however, combined developments may result in a cumulative increase in police protection service requirements. Project development would not require construction of new or physically-altered police protection facilities to maintain an adequate level of service to the Project site and surroundings. Additionally, the Project would comply with the County's discretionary review process and standard conditions of approval, which would ensure that Project's implementation would result in a less than significant impact to police protection services. Therefore, the Project's demand for police protection services would not result in a significant cumulative impact.

4.12.7 MITIGATION PROGRAM

Mitigation Measures

No significant impacts pertaining to public services were identified; therefore, no mitigation measures are required.

4.12.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Project impacts on fire and police protection services would be less than significant and mitigation is not required.

4.12.9 REFERENCES

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4.13 RECREATION

This section discusses the existing recreational uses in the Project's surrounding area and assesses the proposed Project's potential impacts to recreational amenities and facilities. The analysis in this section is based on existing regulatory documents and a literature search.

4.13.1 REGULATORY SETTING

Federal

No federal regulations related to recreation are applicable to the proposed Project.

State

No State regulations related to recreation are applicable to the proposed Project.

Local

County of Orange General Plan

Land Use Element

The Land Use Element included in the County of Orange General Plan contains official County policies on the location and character of land uses necessary for orderly growth and development. The Land Use Element has a 2025 horizon year and describes objectives, policies, and land use patterns for all unincorporated territory in the County of Orange. The Land Use Plan further establishes development criteria and standards including population density and building intensity. The Land Use Element complements the Recreation Element by incorporating its land use recommendations in policies and programs; however, the Land Use Element does not supersede the Recreation Element (County of Orange 2024).

The General Plan land use designation of the Project site is Open Space (OS), and the zoning designation is General Agricultural (A1). The OS General Plan designation provides for limited land uses that do not require a commitment of significant urban infrastructure. The Project site is also within an Open Space Reserve (OSR) overlay. The OSR designation is intended to reflect the Resources and Recreation Elements of the General Plan. It identifies major parks, beaches, forests, harbors, and other territory that is to remain open space. It may also include recreational trails and similar facilities for alternative transportation.

Recreation Element

The Recreation Element outlines a comprehensive strategy for meeting Orange County's existing and future recreation needs, set forth in an integrated framework of recreation goals, objectives, policies and programs, as well as a "master plan" for each of three components: The Local Parks Component, the Regional Riding and Hiking Trails Component, and the Regional Recreation Facilities Component (County of Orange 2012). Goals and objectives that are applicable to existing and planned recreation facilities that are in the proposed Project area are as follows:

Regional Riding and Hiking Trails Component

Goal 1: Provide a useful, enjoyable, safe, and efficient public regional riding and hiking trail system to meet the needs and desires of the citizens of the entire County.

Goal 2: Create trail linkages between open space and recreation facilities, between community, municipal, state, and federal trail systems, and between the trail systems of surrounding counties.

Regional Recreation Facilities Component

Goal 1: To provide a regional recreation network to meet the regional recreation needs of existing and future residents of the entire County.

Goal 2: To develop regional recreation facility park sites with recreation facilities designed to respond to the diverse regional recreation interests of the citizens of the County.

Goal 3: To operate and maintain regional recreation facilities providing operation programs designed for the most effective use of each site at a minimum cost.

OC Parks Strategic Plan

The 2018 OC Parks Strategic Plan was approved by the Orange County Board of Supervisors on December 4, 2018. The plan compiles research, outreach, and discussions with the public, stakeholders, the County Board of Supervisors, and OC Community Resources/OC Parks employees. The resulting document highlights OC Parks' core identity and values: Community, Commitment to Excellence, Service, Stewardship; provides a clear set of objectives to guide planning and decision-making processes; and better positions OC Parks to take on the challenges and opportunities of the present and future. OC Parks' Goals in the 2018 Strategic Plan include the following:

- Understanding the park visitors' needs, promote OC Parks;
- Protecting the parks in perpetuity, together;
- Serving as stewards of OC Parks' assets;
- Practicing sustainable financial management;
- Ensuring responsible park development and expansion;
- Implement thriving resilient ecosystems for emergency management; and
- Cultivating an effective dynamic workforce (OC Parks 2018).

4.13.2 METHODOLOGY

Recreation information for the proposed Project area was derived from various sources and compiled in this chapter to develop a comprehensive understanding of existing park and recreational opportunities as well as constraints that could occur as a result of the proposed Project. Information sources include the County of Orange General Plan.

4.13.3 EXISTING CONDITIONS

The proposed Project site is located in unincorporated County of Orange. The County recreational facilities below characterize the environmental setting of the proposed Project area.

Local Park Facilities

Unincorporated Orange County has 63 developed local parks and 20 additional parks that have been offered to and accepted by the County but are not yet developed (as of 2012). Almost 25 percent of the local parks that have been accepted by the County remain undeveloped.

Similarly, approximately 25 percent of the net local park acreage is undeveloped (116.56 net acres). Approximately 63 percent of the total gross acres accepted by the County are "usable" as defined by the Local Park Code.

Local parks are generally improved with sports fields, open play areas, play equipment, landscaped areas, trails, etc., to enhance and intensify outdoor recreational opportunities. They fulfill the specialized role of meeting neighborhood and community recreation needs and, in doing so, contribute to the County's comprehensive recreation planning efforts. Also, local parks preserve sites of archaeological/paleontological, historical, cultural, or natural resource significance, and provide views. The local park types recognized in the General Plan are as follows:

- **Community Park.** A community park is typically a 20- to 50-acre local park generally designed to meet the active recreational needs of several neighborhoods. These parks are intended to serve drive-to clientele within a radius of up to three miles. They contain facilities which require more space than neighborhood parks and which may include but not be limited to: extensive landscaping; nature areas; multipurpose playfields for softball, baseball, soccer, and football; court sport facilities for basketball, racquetball/handball, and tennis; swimming pools; and community centers with adequate off-street parking. Community parks provide the greatest economy of scale in terms of active and passive recreation potential and cost of maintenance and operation, and are generally included within large, planned communities.
- **Mini Park.** Mini parks are small, passive local parks, generally of 2,500 square feet to one acre in size. While some are preplanned as structured urban open spaces in the fabric of new developments, others are developed on vacant lots in older neighborhoods that have been combined and converted to recreation use. Size and location are usually determined by the availability of vacant land. Mini parks are essentially substitutes for backyards and are normally provided in higher-density areas. They are expensive to maintain and difficult to administer but serve an important function, especially in highly urbanized areas. These parks may serve any age group, depending on the characteristics of the neighborhood. They usually feature play apparatus and a paved area for wheeled toys, benches, and landscape treatment. They may also feature children's play areas, quiet game areas, and some sports activities such as multi-purpose courts, if space allows. Some mini parks are natural areas with minimal improvements (e.g., benches) which safeguard identified archaeological/paleontological sites, other natural resources, or serve as viewpoints.
- **Neighborhood Park.** A neighborhood park is any general use local park developed to serve the active recreation needs of a particular neighborhood within a community. The size of the park depends on the population within its service area and the extent of desired amenities but usually ranges from two to 20 acres. Typically, neighborhood parks have a maximum service radius of one-half mile and are within walking or bicycling distance of park patrons. They may feature such amenities as landscaping, children's play area, active ball fields, multipurpose playfields, game courts, open turf areas, and lighting for night use. In some cases, a neighborhood park may provide off-street parking and restrooms.
- **View/Lookout Park.** View/lookout parks are generally small (under two acres) passive sites, either natural or landscaped, provided to take advantage of a specific site opportunity from which unique views can be enjoyed.

Regional Riding and Hiking Trails

Orange County's network of regional riding and hiking trails link the harbors, beaches, parks, and other open space and recreation lands together. The Countywide regional trail network has 348 miles of existing and proposed trails. Many trails or trail segments are located in areas regulated by governmental entities other than the County of Orange, i.e., cities, State agencies, and federal agencies (County of Orange 2012).

Many regional parks are connected to each other by a network of regional riding and hiking trails and Class I (paved off-road) bikeways. Riding and hiking trails have a soft surface, typically composed of native soil or decomposed granite (DG). Trails are used by equestrians, pedestrians, and mountain bicyclists. Class I bikeways are paved with asphalt or concrete and are used by bicyclists and pedestrians (OC Parks 2024a).

According to the Orange County Regional Trails Master Layout, there are both proposed riding and hiking trails and off-road paved bikeways along Santiago Creek in the vicinity of the Project site (OC Parks 2021).

Regional Recreation Facilities

Orange County's regional recreation facilities encompass parks, nature preserves, beaches, historic parks, and harbors totaling over 60,000 existing acres. Almost all of the facilities are managed by Orange County Parks (OC Parks), the successor department to Harbors, Beaches, and Parks.

Orange County's regional recreation facilities are varied and offer a wide spectrum of activities. Regional parks offer recreational or scenic attractions that are of countywide significance and not generally available in local and municipal parks. They provide a spaciousness which the typical neighborhood or municipal park does not provide.

Regional parks offer extensive trail systems and facilities for family and group picnicking, camping, nature study, and limited active recreation areas for all age groups. They may accommodate active recreation facilities such as swimming pools, athletic fields, bowling greens, water-oriented facilities, and golf courses (where size permits), when special funding mechanisms, such as concessionaire or municipal financing, are available for construction and ongoing maintenance of the facilities (County of Orange 2012).

OC Park Facilities

Table 4.13-1, OC Parks Facilities, lists OC Parks facilities, distance from the Project site, and amenities offered at the facility.

TABLE 4.13-1
OC PARKS FACILITIES

Name	Location	Distance from Site Boundary (driving miles)	Amenities
Aliso and Wood Canyons Wilderness Park	28373 Alicia Parkway Laguna Niguel, California	23 miles	Bike Trails, Bird Watching, Equestrian Trails, Hiking Trails, Interpretive Programs, Picnic Areas, Restrooms, Scenic Overlook
Carbon Canyon Regional Park	4442 Carbon Canyon Road Brea, California	16 miles	Ball Fields, Barbeques, Bike Trails Bird Watching, Dogs Permitted on Leashes, Equestrian Trails, Fishing, Hiking Trails, Historic Dam, Nature Center, Picnic Areas, Picnic Areas (Tables, Restrooms), Picnic Shelters for Reservation, Playgrounds Shelters, Tennis Courts, Volleyball Courts
Ronald W. Caspers Wilderness Park	33401 Ortega Highway San Juan Capistrano, California	36 miles	Amphitheater, Barbeques Bike Trails, Bird Watching, Camping, Corral, Dump Station Equestrian Camping, Equestrian Trails Fire Rings, Gazebo, Hiking Trails, Historic Windmill, Horseshoe Pits, Interpretive Programs Center, Nature Center, Picnic Areas (Tables, Restrooms), Restrooms, RV Camping, Scenic Overlook, Shelters
Ralph B. Clark Regional Park	8800 Rosecrans Avenue Buena Park, California	23 miles	Amphitheater, Ball Fields, Barbeques, Dogs Permitted on Leashes, Fishing, Hiking Trails Horseshoe Pits, Interpretive Programs Center, Model Boats, Picnic Areas (Tables, Restrooms), Picnic Shelters for Reservation Playgrounds, Tennis Courts, Volleyball Courts, Weddings Special Events
Ted Craig Regional Park	3300 State College Boulevard Fullerton, California	19 miles	Ball Fields, Barbeques, Basketball Courts, Bike Trails, Bird Watching, Dogs Permitted on Leashes, Fishing, Hiking Trails, Interpretive Programs Center, Model Boats Picnic Areas (Tables, Restrooms), Picnic Shelters for Reservation, Playgrounds, Racquetball Courts, Weddings Special Events
Featherly Regional Park	24001 Santa Ana Canyon Road Anaheim, California	14 miles	RV Camping, Wilderness Area
Irvine Lake	4621 E Santiago Canyon Road Silverado, California	0 miles Project site	Shoreline Fishing
Irvine Ranch Open Space	13333 Black Star Canyon Road Silverado, California	6 miles	Biking, Equestrian Activities, Hiking, Wilderness Area (Includes Fremont Canyon Nature Preserve, Limestone Canyon, and Black Star Canyon Wilderness)
Irvine Regional Park	1 Irvine Park Road California Orange, California	3 miles	Ball Fields, Barbeques, Bike Rentals Bike Trails, Boarding Stables Dogs Permitted on Leashes, Equestrian Trails Fishing, Food Concessions, Hiking Trails, Interpretive Programs Center, Paddle Boat Rentals, Picnic Areas, Picnic Shelters for Reservation, Playgrounds, Pony Rides, Train Rides

TABLE 4.13-1
OC PARKS FACILITIES

Name	Location	Distance from Site Boundary (driving miles)	Amenities
Laguna Coast Wilderness Park	18751 Laguna Canyon Road Laguna Beach, California	20 miles	Bike Trails, Bird Watching, Equestrian Trails, Hiking Trails, Interpretive Programs, Nature Center, Picnic Areas (Tables, Restrooms), Restrooms, Scenic Overlook
Laguna Niguel Regional Park	28241 La Paz Road Laguna Niguel, California	24 miles	Amphitheater, Barbeques, Bike Trails Dogs Permitted on Leashes, Fishing Gazebo, Hiking Trails, Horseshoe Pits, Model Glider Area, Pickleball, Picnic Areas (Tables, Restrooms), Picnic Shelters for Reservation, Playgrounds, Scenic Overlook, Tennis Courts, Volleyball Courts, Weddings Special Events
William R. Mason Regional Park	18712 University Drive Irvine, California	15 miles	Amphitheater, Ball Fields, Bike Trails Bird Watching, Dogs Permitted on Leashes, Equestrian Trails, Fitness Par Course Gazebo, Hiking Trails, Horseshoe Pits Interpretive Programs, Model Boats, Picnic Areas, Picnic Areas (Tables, Restrooms), Picnic Shelters for Reservation, Playground Tot Lot, Playgrounds, Restrooms, Shelters, Volleyball Courts
Mile Square Regional Park	16801 Euclid Street Fountain Valley, California	18 miles	Archery, Ball Fields, Barbeques, Bike Rentals, Bike Trails, Camping, Dogs Permitted on Leashes, Fishing, Fitness Par Course, Interpretive Programs, Paddle Boat Rentals, Picnic Areas, Picnic Areas (Tables, Restrooms), Picnic Shelters for Reservation, Playgrounds, Restrooms, Shelters, Soccer Field, Volleyball Courts, Weddings Special Events
O'Neill Regional Park	30892 Trabuco Canyon Road Trabuco Canyon, California	19 miles	Amphitheater, Bike Trails, Camping Conference Rooms, Dump Station, Equestrian Trails, Hiking Trails, Horseshoe Pits, Interpretive Programs Center, Picnic Areas (Tables, Restrooms), Playgrounds, RV Camping, Scenic Overlook, Showers
Thomas F. Riley Wilderness Park	30952 Oso Parkway Coto de Caza, California	25 miles	Amphitheater, Bike Trails Corral, Equestrian Trails, Hiking Trails, Interpretive Programs Center, Restrooms, Scenic Overlook
Peters Canyon Regional Park	8548 E. Canyon View Avenue Orange, California	7 miles	Dogs Permitted on Leashes, Equestrian Trails, Hiking Trails, Interpretive Programs Center, Picnic Areas (Tables, Restrooms), Scenic Overlook
Santiago Oaks Regional Park	2145 North Windes Drive Orange, California	6 miles	Barbeques, Bird Watching, Dogs Permitted on Leashes, Equestrian Trails, Hiking Trails, Historic Dam, Interpretive Programs Center, Picnic Areas (Tables, Restrooms), Playgrounds, Scenic Overlook, Weddings Special Events
Talbert Regional Park	1298 Victoria Avenue Costa Mesa, California	20 miles	Bike Trails, Dogs Permitted on Leashes, Hiking Trails, Picnic Areas (Tables, Restrooms), Restrooms, Scenic Overlook

TABLE 4.13-1
OC PARKS FACILITIES

Name	Location	Distance from Site Boundary (driving miles)	Amenities
Whiting Ranch Wilderness Park	26701 Portola Parkway Foothill Ranch, California	16 miles	Bike Trails, Equestrian Center, Equestrian Trails, Hiking Trails, Restrooms
Tri-City Regional Park	2301 Kraemer Boulevard Placentia, California	15 miles	Barbeques, Dogs Permitted on Leashes Fishing, Picnic Shelters for Reservation, Restrooms
Upper Newport Bay Nature Preserve	2301 University Drive Newport Beach, California	18 miles	Amphitheater, Bike Trails, Classroom Conference Center, Dogs Permitted on Leashes, Equestrian Trails, Gift Shop, Hiking Trails, Interpretive Programs Center, Restrooms, Scenic Overlook
Harriett M. Wieder Regional Park	19251 Seapoint Avenue Huntington Beach, California	26 miles	Dogs Permitted on Leashes, Equestrian Trails, Hiking Trails, Picnic Areas (Tables, Restrooms), Playgrounds
Yorba Regional Park	7600 East La Palma Avenue Anaheim, California 92807	15 miles	Ball Fields, Barbeques, Bike Rentals, Bike Trails, Dogs Permitted on Leashes, Equestrian Trails, Fishing, Fitness Par Course, Hiking Trails, Horseshoe Pits, Kite Flying Area, Model Boats, Paddle Boat Rentals, Picnic Areas (Tables, Restrooms), Picnic Shelters for Reservation, Playgrounds, Volleyball Courts
Source: OC Parks 2024b.			

Other Park Facilities

The Project would also be located adjacent to other park facilities run by separate jurisdictions from OC Parks, as shown in Table 4.13-2, Other Park Facilities within the Project Vicinity.

TABLE 4.13-2
OTHER PARK FACILITIES WITHIN THE PROJECT VICINITY

Name	Location	Distance from the Nearest Site Boundary	Amenities
Oak Canyon Park	5305 Santiago Canyon Road, Silverado, California	0.4 miles	Privately leased park by James Event Productions
Saddleback Motocross Park	Santiago Canyon Road, Orange, California	1.1 miles	Motor playground/motocross
OCMA (Orange County Modelers Association) Bob Swenson Flying Site	Blue Diamond Haul Road, Silverado, California	0.8 miles	Model aircraft flying

Other nearby Park facilities include smaller neighborhood and community parks within the adjacent City of Irvine, located to the southwest of the Project site.

4.13.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant recreation impact if it would:

Threshold 4.13-1 Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Threshold 4.13-2 Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

4.13.5 IMPACT ANALYSIS

Threshold 4.13-1

Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Less Than Significant Impact. The Project would improve the existing Santiago Creek Dam and spillway to ensure structural elements are adequate during seismic events and meet current standards as well as modify the embankment to permit operation of the facilities for a long-term water resource benefit. Construction activities would include demolition of the current silt line and replacement of a new outlet structure, a raised spillway to allow for additional reservoir capacity, construction of a new bifurcation valve vault and emergency outlet downstream of the existing dam, an upsized and relocated Irvine Lake pipeline, creation of a crest control structure and embankment enhancements, addition of a stilling basin, ancillary site improvements, and access road improvements for Southern California Edison (SCE) utility line relocation. The Project would also modify the existing dam embankment by removing the dam face, constructing a filter drain system, and encapsulating the filter drain system with embankment shell material. The dam crest would also be widened to approximately 35 to 45 feet wide to accommodate a wider access road, and protective railings would be installed on both sides of the access road. See Section 3.0, Project Description, for a full description of the proposed construction and demolition activities.

Temporary Construction Impacts

During construction activities, portions of Irvine Lake will be temporarily closed and drained in order to complete the dam and spillway improvements on-site. As Irvine Lake experiences high community use, especially for shoreline fishing purposes, the Project would have a temporary adverse impact during construction, which is anticipated to occur over approximately three years.

As such, other nearby parks within the County would serve community residents' recreational needs while Irvine Lake is temporarily under construction, as shown in Table 4.13-1, above. The nearest public recreational facilities to the proposed Project include Oak Canyon Park, Saddleback Motocross Park, Irvine Regional Park, OCMA flying site, Fremont Canyon Nature Preserve, Black Star Canyon Wilderness Park, Limestone Canyon Regional Park, and Peters Canyon Regional Park. The nearby facilities within the Project area would be able to support an increase in hikers, bikers, and RVs temporarily during the construction duration, as there is a wide array of recreational facilities with varied amenities that would be able to serve the population during construction. In addition, construction access for the Project would occur via Blue Diamond Haul Road and would not interfere with the OCMA site's access.

In addition, the Project would result in temporary impacts related to shoreline fishing during construction. Other OC Parks facilities include fishing amenities, such as Carbon Canyon Regional Park, Ralph B. Clark Regional Park, Ted Craig Regional Park, Mile Square Regional Park, Tri-City Regional Park, and Yorba Regional Park. Community residents would be able to temporarily utilize other OC Parks facilities within the site vicinity during construction. The Project would ultimately result in a temporary loss of fishing capabilities at the site, but other facilities within the site vicinity would be available to meet the community residents' recreational needs. In addition, the temporary loss of fishing on-site is within a coordinated agreement with the County of Orange, which is the entity responsible for maintaining and restocking fish within Irvine Lake. Although the Project would increase the use of nearby recreational facilities within the Project vicinity, the construction activities would be temporary in nature and would not create a significant long-term impact.

Operational Impacts

The proposed Project does not include any increase in residential units that would increase the permanent residential base of the County. Since demand for parks is typically based on the permanent residential population, and because no population increase would occur as part of the proposed Project, the proposed project would not result in an increase in demand/use on existing parks that could result in substantial physical deterioration during operations.

Following construction, the area would be restored as a reservoir and OC Parks may choose to reopen the facility for fishing and other recreational purposes. Similar to current conditions, the recreational aspect of the facility is managed by OC Parks separate from the Project and IRWD's control. Therefore, future use as a recreational facility is not an element of this Project; however, the Project would accommodate future use as a recreational facility, similar to current conditions. Additionally, under current conditions, OC Parks has the ability to close Irvine Lake to recreational activities at any time, but other recreational facilities throughout the County would continue to serve the public without necessary physical expansion of or improvements to facilities. As a result, impacts related to physical deterioration of nearby recreational facilities would be less than significant.

Impact Conclusion: *The proposed Project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. Less than significant impacts would occur.*

Threshold 4.13-2

Would the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact. The proposed Project involves abandonment of the existing Santiago Creek Dam outlet tower, construction of a new inclined outlet structure located on the left abutment of the existing dam, structural improvements to the dam spillway, and modifications and enhancements to the dam embankment to permit operation of the facilities for a long-term water resource benefit. As discussed previously, the Project is not anticipated to induce population growth; therefore, it would not directly or indirectly impact any local recreational facilities through increase of use. In addition, the Project would not result in the construction or expansion of recreational facilities beyond the proposed Project, which would create improvements to Irvine Lake. No impacts related to demand or use of recreational facilities would occur, and no mitigation is required.

Impact Conclusion: *The proposed Project would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. No impact would occur.*

4.13.6 CUMULATIVE IMPACTS

The proposed Project does not have a residential component that would generate population and significantly increase demand for recreational facilities. While other projects in the area with residential elements would result in increased demand on existing parks and recreation related facilities and services, the proposed Project would not contribute to the cumulative impact on existing facilities or require construction of facilities that would impact the environment. The proposed Project would result in temporary construction activities that may have a short-term increase in the surrounding parks; however, this would not create long-term impacts or significantly contribute to cumulative impacts.

All cumulative projects that would likely result in increased population would therefore also result in the increased use of local and regional recreational amenities. However, these cumulative projects would either include recreational facilities and amenities for use by future residents of the proposed communities or would meet their fair share requirement by paying in- lieu fees, which would minimize both the potential for substantial physical deterioration of recreational facilities by improving existing County parks and the need to provide local and regional recreation facilities that would serve the increased population. As cumulative projects provide for the construction or expansion of recreational facilities, the potential impacts associated with development of the facilities would be addressed and mitigation measures proposed, which would serve to minimize impacts on the environment. Therefore, the Project's contribution to the cumulative physical impact on local and regional recreational facilities would be less than significant.

4.13.7 MITIGATION PROGRAM

Mitigation Measures

No mitigation is required.

4.13.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Less than significant impact.

4.13.9 REFERENCES

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4.14 TRANSPORTATION

This section of the Environmental Impact Report (EIR) describes the existing transportation conditions in the Project area, identifies associated potential transportation impacts related to development of the proposed Project, and sets forth measures designed to mitigate identified significant adverse impacts.

4.14.1 REGULATORY SETTING

Federal

There are no federal regulations applicable to the proposed Project.

State

California Department of Transportation (Caltrans)

The California Department of Transportation (Caltrans) manages interregional transportation, including management and construction of the California highway system. In addition, Caltrans is responsible for permitting and regulation of the use of State roadways. The Project area includes four highways that fall under Caltrans' jurisdiction: State Route (SR) 261 and SR-241.

Caltrans' construction practices require temporary traffic control planning "when the normal function of a roadway, or private road open to public travel, is suspended" (FHWA 2012). In addition, Caltrans requires that permits be obtained for transportation of oversized loads and licenses be obtained for transportation of certain materials.

Senate Bill No. 743

Approved in 2013, Senate Bill (SB) 743 amended the California Environmental Quality Act (CEQA) Guidelines to provide an alternative to level of service (LOS) for evaluating transportation impacts. In accordance with Senate Bill (SB) 743, the new CEQA Guidelines Section 15064.3, subdivision (b) was adopted in December 2018 by the California Natural Resources Agency. These revisions to the CEQA Guidelines' criteria for determining the significance of transportation impacts are primarily focused on projects within transit priority areas and shift the focus from automobile delay to reduction of greenhouse gas emissions, creation of multimodal networks, and promotion of a mix of land uses. Automobile delay, as measured by LOS and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. The intent of this legislation was to balance the need for traffic LOS standards with the need to build infill housing and mixed-use commercial developments within walking distance of mass transit facilities, downtowns, and town centers. In doing so, this legislation aims to provide greater flexibility to local governments to balance these sometimes-competing needs. However, a jurisdiction may still adopt LOS as a performance standard for analyzing traffic conditions and maintaining throughput on its highway system. The Governor's Office of Planning and Research (OPR) has adopted changes to the CEQA Guidelines that identify vehicle miles traveled (VMT) as the most appropriate metric to evaluate a project's transportation impacts. VMT is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person. OPR determined that lead agencies must, by July 1, 2020, implement the new VMT requirements. With the adoption of SB 743, the State of California changed the method of traffic analysis required by CEQA for projects. The law changed the way local jurisdictions analyze transportation impacts from development projects and identify mitigation measures to reduce those impacts. SB 743 became effective on July 1, 2020. The previous practice of evaluating traffic transportation impacts used vehicular LOS on the local roadway system. SB 743 requires

that the amount of driving and length of trips — as measured by VMT — be used to assess transportation impacts under CEQA. These impacts would be reduced or "mitigated" by options such as increasing transit, providing for active transportation such as walking and biking, and participating in mitigation banks. All jurisdictions have the option to tailor requirements to their unique communities.

Regional

Southern California Association of Governments (SCAG)

Under federal law, Southern California Association of Governments (SCAG) is designated as a Metropolitan Planning Organization and under State law as a Regional Transportation Planning Agency and a Council of Governments for Orange County and the Project site. The SCAG region encompasses six counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) and 191 cities in an area covering more than 38,000 square miles. The agency develops long-range regional transportation plans, including sustainable communities' strategies and growth forecast components, regional transportation improvement programs, regional housing needs allocations, and a portion of the South Coast Air Quality management plans (SCAG 2024b).

Connect SoCal

On April 4, 2024, SCAG's Regional Council unanimously voted to approve and fully adopt Connect SoCal (2024–2050 Regional Transportation Plan/Sustainable Communities Strategy; [RTP/SCS]) (SCAG 2024a). Connect SoCal is a long-range plan that builds upon and expands land use and transportation strategies established over several planning cycles to increase mobility options and achieve a more sustainable growth pattern. It charts a path toward a more mobile, sustainable, and prosperous region by making connections between transportation networks, between planning strategies, and between the people whose collaboration can improve the quality of life for Southern Californians. Connect SoCal outlines more than $751 billion in transportation system investments through 2050. It was prepared through a collaborative, continuous, and comprehensive process with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses, and local stakeholders within the region's counties (SCAG 2024c).

Master Plan of Arterial Highways

The Master Plan of Arterial Highways (MPAH) was initially established by the County of Orange in 1956 to ensure that a regional arterial highway network would be planned, developed, and preserved, in order to supplement the County's developing freeway system. This vision has withstood the test of time and is consistent with the U.S. Department of Transportation's view today "that multiagency collaboration is a critical element in developing 21st century solutions for 21st century transportation challenges, such as reducing traffic congestion". Arterial highways are shown on the MPAH map as either: (1) established alignments depicted by solid lines on the map, including existing highways where the centerline is the precise centerline; and (2) future highways where the Board of Supervisors, a City Council, or the subdivision process has established a precise alignment; and conceptually proposed alignments, defined by intermittent lines indicating future facilities whose precise alignment has not yet been determined (OCTA 2017).

Local

Orange County Congestion Management Program

The Orange County (County) Congestion Management Program (CMP) was originally adopted in 1991 and updated in November 2023. The goals of the Orange County CMP are to support regional mobility and air quality objectives by reducing traffic congestion, to provide a mechanism for coordinating land use and development decisions that support the regional economy, and to determine gas tax fund eligibility. To meet these goals, the CMP contains a number of policies designed to monitor and address system performance issues. The Orange County Transportation Authority (OCTA) was designated as the Congestion Management Agency (CMA) for the County. As a result, the OCTA is responsible for developing, monitoring, and updating (biennially) Orange County's CMP (OCTA 2023).

A key element of the CMP's current Land Use Analysis Program is the preparation by local jurisdictions of a traffic impact analysis. The traffic impact analysis reports are designed to provide an improved basis for assessing the impacts of land use decisions on the regional transportation system, both within and outside the permitting jurisdiction, by providing a consistent format to identify impacts and mitigation and by evaluating mitigation costs. A CMP traffic impact analysis includes additional requirements and evaluations as compared to a typical traffic study. A traffic impact analysis report helps to determine appropriate mitigation measures and financial responsibilities for resolving CMP system impacts and for developing appropriate mitigation for future development projects.

Orange County Bikeways Strategic Plan

OCTA adopted the 2009 Commuter Bikeways Strategic Plan (CBSP) on May 22, 2009 to encourage the enhancement of Orange County's regional bikeways network in order to make bicycle commuting a more viable and attractive travel option. The CBSP is intended to create a comprehensive blueprint of the existing bikeways in the county as well as to propose new facilities to complete a network of bikeways. The projects described in the CBSP are a compilation of projects planned by Orange County cities and the County of Orange. The CBSP is a long-range, financially unconstrained planning document (OCTA 2012).

Southern California Association of Governments

In September 2020, SCAG's Regional Council adopted Connect SoCal (2020–2045 RTP/SCS), and the addendum to the Connect SoCal Program EIR.

Connect SoCal is a long-range visioning plan that builds upon and expands land use and transportation strategies established over several planning cycles to increase mobility options and achieve a more sustainable growth pattern. It charts a path toward a more mobile, sustainable, and prosperous region by making connections between transportation networks, between planning strategies, and between the people whose collaboration can improve the quality of life for Southern Californians.

Connect SoCal outlines more than $638 billion in transportation system investments through 2045. It was prepared through a collaborative, continuous, and comprehensive process with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses, and local stakeholders within the region's counties (SCAG 2020).

County of Orange General Plan

Recreation Element

The Recreation Element outlines a comprehensive strategy for meeting Orange County's existing and future recreation needs, set forth in an integrated framework of recreation goals, objectives, policies and programs, as well as a "master plan" for each of three components: The Local Parks Component, the Regional Riding and Hiking Trails Component, and the Regional Recreation Facilities Component (County of Orange 2012). Goals and objectives that are applicable to the proposed Project are as follows:

Regional Riding and Hiking Trails Component

Goal 1: Provide a useful, enjoyable, safe, and efficient public regional riding and hiking trail system to meet the needs and desires of the citizens of the entire County.

Goal 2: Create trail linkages between open space and recreation facilities, between community, municipal, state, and federal trail systems, and between the trail systems of surrounding counties.

Transportation Element

The Transportation Element, sets forth the County's strategy for planning, developing, and maintaining a surface transportation system to serve unincorporated areas of the County. Goals and objectives that are applicable to the proposed Project are as follows:

Goal 5: Manage peak hour traffic congestion to achieve an acceptable level of service (LOS) on existing and future circulation plan facilities in the unincorporated areas of the County.

Objective 5.3: Reduce Vehicle Miles Traveled in an effort to reduce greenhouse gas (GHG), pursuant to SB 743. See "Guidelines for Evaluating Vehicle Miles Traveled Under CEQA" and "2020 Updated Transportation Implementation Manual".

4.14.2 METHODOLOGY

Transportation information for the proposed Project area was derived from various sources and compiled in this chapter to develop a comprehensive understanding of existing transportation and circulation conditions as well as constraints that could occur as a result of construction and operation of the proposed Project. Information sources include Caltrans and OCTA.

4.14.3 EXISTING CONDITIONS

Regional Setting

The Project is located at Santiago Creek Dam at the northwest end of Irvine Lake in unincorporated Orange County, California. The Project is located south of SR-261 and east of SR-241 and Santiago Canyon Road. The regional transportation system is comprised of an interconnected network of roadways, local transit systems, and pedestrian and bicycle facilities. Freeways and toll roads in the general vicinity of the proposed Project site include the Eastern Transportation Corridor (SR-261) to the southwest and the Foothill Transportation Corridor (SR-241) to the north, west, and southwest. Santiago Canyon Road is a primary arterial highway located to the west of the Project site (OCTA 2024a).

SR-261 is a 6-mile-long north–south State highway that provides regional access to the Project area, running between Anaheim Hills and Irvine in the vicinity of the proposed Project. SR-261 has an on- and off-ramp at Santiago Canyon Road/Chapman Avenue approximately 1.3 miles west of the proposed Project site.

SR-241 is a 24-mile-long north–south State highway that provides regional access to the Project area, running between Ladera Ranch and Irvine in the vicinity of the proposed Project. SR-241 has an on- and off-ramp at Santiago Canyon Road/Chapman Avenue approximately 1.3 miles southwest of the proposed Project site.

Local Roadways

The proposed Project site is located on the eastern side of Santiago Canyon Road. The following roadway provides both local access to the proposed Project site and connects to the regional arterials and highways described above:

Santiago Canyon Road is a two-lane roadway classified as a primary arterial highway with rural characteristics. The roadway is curved with several steep grade changes. Numerous trees and utility poles are located along the sides of the road. The road has multiple intersections and driveways serving residences, local businesses, and recreational destinations. Santiago Canyon Road changes its name to Chapman Avenue in Orange Hills and to El Toro in Mission Viejo. The travel lanes are generally 12 feet in width with bike lanes adjacent to the travel lanes.

Existing Transit Service

The County of Orange is served by Metrolink train service and the OCTA bus service. Metrolink is a commuter rail service operated by the Southern California Regional Rail Authority. Multiple stops during the morning and evening commuting period are provided at stations located in Irvine, Laguna Niguel, Tustin, and San Juan Capistrano. The nearest train station to the proposed Project site is the Tustin Metrolink, approximately 7 miles southwest of the proposed Project site (Metrolink 2024). There are currently no bus routes in the vicinity of the Project site (OCTA 2024b).

Existing Bicycle and Pedestrian Facilities

Many regional parks are connected to each other by a network of regional riding and hiking trails and Class I (paved off-road) bikeways. Riding and hiking trails have a soft surface, typically composed of native soil or decomposed granite (DG). Trails are used by equestrians, pedestrians, and mountain bicyclists. Class I bikeways are paved with asphalt or concrete and are used by bicyclists and pedestrians.

According to the Orange County Regional Trails Master Layout, there are both proposed riding and hiking trails and off-road paved bikeways along Santiago Creek in the vicinity of the Project site (OC Parks 2021).

4.14.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, a project would result in a significant transportation impact if it would:

Threshold 4.14-1 Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

Threshold 4.14-2 Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).

Threshold 4.14-3 Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

Threshold 4.14-4 Result in inadequate emergency access.

4.14.5 IMPACT ANALYSIS

Threshold 4.14-1

Would the Project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Less Than Significant Impact. Implementation of the proposed Project is expected to generate short-term traffic impacts generated during the construction period. Vehicle trips would be generated by trucks hauling soil from the borrow sites along the access road to the work area and to the dam as well as potential import and export of material periodically over the four-year construction period, and workers commuting to and from the Project site. It is anticipated that these trips would be concentrated internally to the Project site, and external trips related to employee commutes and potential import and export of soil would be nominal would not be concentrated during traffic peak hours.

To facilitate the movement of construction traffic including worker commutes and to minimize potential disruptions, a Traffic Control Plan would be prepared in accordance with County requirements and followed during construction. The Traffic Control Plan would include measures such as requiring an encroachment permit for work in the public right-of-way, limiting heavy truck activity during peak hours, using flaggers to manage short-term traffic control, requiring a formal traffic control plan for lane closures, limiting time and duration of closures, and/or requiring a minimum number of lanes to be open for travel during peak hours. Compliance with the Traffic Control Plan and County requirements would prevent any conflict between the Project and applicable plans, ordinances, or policies; and the Project's impact would be less than significant.

Under existing conditions, a small number of vehicle trips are associated with routine inspection and maintenance of the existing dam. It is anticipated that routine inspection and maintenance trips would continue and that no new operational trips would occur with implementation of the proposed Project. Therefore, because there would be no increase in daily trips associated with daily operation of the Project components, no Project related traffic impacts are anticipated.

The proposed Project would not result in any long-term trip generation or associated traffic impacts because the proposed Project involves abandonment of the existing Santiago Creek Dam outlet tower and construction of a new inclined outlet structure located on the left abutment of the existing dam in addition to structural improvements to the dam spillway and enhancements to the dam embankment. Additionally, the proposed Project does not involve any activities that would conflict with non-vehicular modes of transportation. Impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *Project construction and operation would not result in a significant impact. Based on the above evaluation, with compliance with the Traffic Control Plan and County requirements, Project construction impacts would be less than significant. Additionally, it is anticipated that routine inspection and*

maintenance trips would continue, and no new operational trips would occur with implementation of the proposed Project. Therefore, the potential operation impacts would be less than significant, and no mitigation is required.

Threshold 4.14-2

Would the Project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?

No Impact. The nearest intersection to the proposed Project that has been designated by OCTA as a Congestion Management Program intersection is Irvine Boulevard and Jamboree Drive. This intersection is approximately 5 miles southwest of the Project site (OCTA 2017). Due to the nominal amount of traffic generated by the proposed Project and its distance from the designated intersection, no impact would occur at the intersection, and no mitigation is required.

Impact Conclusion: *The Project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b), pursuant to Threshold 4.14-2. No impact would occur, and no mitigation is required.*

Threshold 4.14-3

Would the Project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Impact. The proposed Project would involve improvements to the Santiago Creek Dam outlet works and spillway facility improvements in order to address specific seismic safety concerns and meet all applicable requirements as an existing public facility as well as modify the embankment to permit operation of the facilities for a long-term water resource benefit. The Project does not propose any modifications to the existing circulation system in the Project's vicinity. The Project would not implement any sharp curves or dangerous intersections and would not create incompatible uses as the Project would continue operation as an existing dam and spillway. Although construction would occur over an extended duration (approximately four years), the construction traffic would still be temporary. In addition, because the Project would not alter the existing roadways, no impact would occur, and no mitigation is required.

Impact Conclusion: *No impact would occur related to hazards due to a design feature or incompatible uses, pursuant to Threshold 4.14-3. No mitigation is required.*

Thresholds 4.14-4

Would the Project result in inadequate emergency access?

Less Than Significant Impact. The proposed Project would involve improvements to the Santiago Creek Dam outlet works and spillway facility improvements in order to address specific seismic safety concerns and meet all applicable requirements as an existing public facility as well as modify the embankment to permit operation of the facilities for a long-term water resource benefit. During construction, existing access routes would be maintained at the Project site. Furthermore, emergency access routes are already in place at the Project site, and proposed Project actions would not alter access. Therefore, no impact to local or regional emergency access routes would occur, and no mitigation is required.

Impact Conclusion: *No impact to local or regional emergency access routes would occur, pursuant to Threshold 4.14-4. No mitigation is required.*

4.14.6 CUMULATIVE IMPACTS

As discussed above, the proposed Project would not result in any impacts to transportation and circulation in the area. Given the small number of vehicle trips that are associated with routine inspection and maintenance at the existing dam, it is anticipated that routine inspection and maintenance trips would continue, and no new operational trips would occur with implementation of the proposed Project. Therefore, because there would be no increase in daily trips associated with daily operation of the Project components, no Project-related traffic impacts are anticipated. Similarly, given no increase in daily trips, the Project would not contribute to cumulative impacts to local and regional transportation facilities or circulation in the area. No cumulative impacts would result, and no mitigation is required.

Additionally, the Project does not propose relocation of the access or entry to the site such that it would create a design hazard. The Project would not result in any deviation from the County of Orange standards. Therefore, no contribution to a cumulative physical impact pertaining to a hazard due to a design feature or inadequate emergency access would occur, and no mitigation is required.

4.14.7 MITIGATION PROGRAM

Mitigation Measures

The proposed Project would not result in significant transportation impacts; therefore, no mitigation measures are required.

4.14.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed Project would result in any project-specific and cumulative impacts to transportation or circulation in the area. No impacts would occur, and no mitigation is required.

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4.15 TRIBAL CULTURAL RESOURCES

This section of the Environmental Impact Report (EIR) describes the existing tribal cultural resources setting in the Project area, identifies associated potential tribal cultural resources impacts related to development of the proposed Project, and sets forth measures designed to mitigate identified significant adverse impacts. Information in this section is based on the *Historic Property Identification Report (Archaeological Resources) and Paleontological Resources Study Santiago Creek Dam Outlet and Spillway Project, Irvine, Orange County, California* (Report) completed by Psomas in February 2024 (Appendix D), the *Historical Resources Assessment, Santiago Creek Dam Outlet Tower and Spillway Improvements Project, Orange County, California*, prepared by South Environmental in November 2023 and included as an attachment to the Report, and the results of consultation with California Native American Tribes conducted by Irvine Ranch Water District (IRWD) for the Project, as required by the California Environmental Quality Act (CEQA) per the recent amendment by Assembly Bill (AB) 52.

4.15.1 REGULATORY SETTING

Federal

National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966, as amended, promotes the preservation, enhancement, and productive use of historic resources. The NHPA established the Advisory Council on Historic Preservation (ACHP) and provided procedures for the ACHP and federal agencies in promoting historic preservation.

Section 106 of the NHPA, which is included in 36 Code of Federal Regulations (CFR) Part 800, requires that federal actions and uses of federal funds be accompanied by analysis of their potential effects on historic properties or those listed in or eligible for listing in the National Register of Historic Places (NRHP, National Register).

National Register of Historic Places

The National Historic Preservation Act of 1966 established the National Register as “an authoritative guide to be used by federal, State, and local governments, private groups and citizens to identify the Nation’s historic resources and to indicate what properties should be considered for protection from destruction or impairment.” The National Register recognizes a broad range of historical and cultural resources that are significant at the national, State, and local levels and can include districts, buildings, structures, objects, prehistoric archaeological sites, historic-period archaeological sites, traditional cultural properties, and cultural landscapes. Within the National Register, approximately 2,500 (3 percent) of the more than 90,000 districts, buildings, structures, objects, and sites are recognized as National Historic Landmarks or National Historic Landmark Districts as possessing exceptional national significance in American history and culture.

While individual historic properties derive their significance from one or more of the criteria discussed in the next section, a historic district derives its importance from being a unified entity, even though it is often composed of a variety of resources. With a historic district, the historic resource is the district itself. The identity of a district results from the interrelationship of its resources, which can be an arrangement of historically or functionally-related properties. A district is defined as a geographic area of land containing a significant concentration of buildings, sites, structures, or objects united by historic events, architecture, aesthetic, character, and/or physical development. A district’s significance and historic integrity determine its boundaries.

A resource that is listed in or eligible for listing in the National Register is considered an "historic property" under Section 106 of the NHPA.

Criteria

To be eligible for listing in the National Register, a resource must be at least 50 years of age, unless it is of exceptional importance as defined in Title 36 CFR, Part 60, Section 60.4(g). In addition, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Four criteria for evaluation have been established to determine the significance of a resource:

A. Are associated with events that have made a significant contribution to the broad patterns of our history;
B. Are associated with the lives of persons significant in our past;
C. Embodies the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. Have yielded, or may be likely to yield, information important in prehistory or history.

Historic Districts

The National Park Service defines a historic district as "a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development." A district must be "a definable geographic area that can be distinguished from surrounding properties by changes such as density, scale, type, age, style of sites, buildings, structures, and objects, or by documented differences in patterns of historic development or associations." Boundaries must be based upon a shared relationship among the properties constituting the district.

Within a historic district, a building, structure, or feature is considered a contributor if it was constructed during the period of significance, contributes to the property's historic significance and character, and retains sufficient integrity to convey that significance. Non-contributors are those buildings that were constructed outside of the period of significance, do not contribute to the property's historic significance and character, and/or do not retain sufficient integrity.

Period of Significance

According to the National Park Service, in addition to the above criteria, significance is defined by the area of history in which the property made important contributions and by the period of time when these contributions were made. This is referred to as the period of significance. The period of significance is the length of time when a property was associated with important events, activities or persons, or attained the characteristics which qualify it for listing. The period of significance usually begins with the date when significant activities or events began giving the property its historic significance; this is often a date of construction. The period of significance can be as brief as a single year; many, however, span many years and consist of beginning and closing dates. Identification and definition of the period of significance is based on "specific events directly related to the significance of the property," for example, the date of construction, years of ownership, or length of operation as a particular entity.

Integrity

In addition to meeting one or more of the criteria of significance, a property must have integrity, which is defined as "the ability of a property to convey its significance." The National Register recognizes seven qualities that, in various combinations, define integrity. The seven factors that define integrity are location, design, setting, materials, workmanship, feeling, and association. To retain historic integrity, a property must possess several, and usually most, of these seven aspects. Thus, the retention of the specific aspects of integrity is paramount for a property to convey its significance. In general, the National Register has a higher integrity threshold than State or local registers.

The National Register recognizes seven aspects or qualities that comprise integrity: location, design, setting, materials, workmanship, feeling, and association. These qualities are defined as follows:

- *Location* is the place where the historic property was constructed or the place where the historic event took place.
- *Design* is the combination of elements that create the form, plan, space, structure, and style of a property.
- *Setting* is the physical environment of a historic property.
- *Materials* are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
- *Workmanship* is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
- *Feeling* is a property's expression of the aesthetic or historic sense of a particular period of time.
- *Association* is the direct link between an important historic event or person and a historic property.

State

California Register of Historical Resources

The California Register of Historical Resources (CRHR) program encourages public recognition and protection of resources of architectural, historical, archaeological, tribal cultural resources, and cultural significance; identifies historical resources for State and local planning purposes; determines eligibility for State historic preservation grant funding; and affords certain protections under CEQA. The criteria established for eligibility for the CRHR are directly comparable to the national criteria established for the National Register (as discussed in Section 4.4, Cultural Resources).

In order to be eligible for listing in the CRHR, a building, object, or structure must satisfy at least one of the following four criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States;
2. It is associated with the lives of persons important to local, California, or national history;
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or

4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Archaeologists and Tribal Representatives assess sites based on all four of the above criteria but usually focus on the fourth criterion provided above. Historical resources eligible for listing in the CRHR must also retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. For the purposes of eligibility for the CRHR, integrity is defined as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance". This general definition is generally strengthened by the more specific definition offered by the NRHP—the criteria and guidelines on which the CRHR criteria and guidelines are based upon.

California Environmental Quality Act

Archaeological and Historical Resources

CEQA requires a lead agency to determine whether a project would have a significant effect on the environment, including historical resources. CEQA Guidelines Section 15064.5, Determining the Significance of Impacts to Archeological and Historical Resources, requires that all private and public activities not specifically exempted should be evaluated against the potential for environmental damage, including effects to historical resources. Historical resources are recognized as part of the environment under CEQA. According to Section 5020.1 of the Public Resources Code, historical resources are defined as "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California". An archeological site may be considered an historical resource if it is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California (Public Resource Code § 5020.1(j)) or if it meets the criteria for listing on the California Register (14 California Code of Regulations § 4850).

Lead agencies must evaluate historical resources against the CRHR criteria before making a finding as to a proposed project's impacts to historical resources. Mitigation of adverse impacts is required if the proposed project would cause substantial adverse change to a historical resource. Substantial adverse change includes demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired. While demolition and destruction are fairly obvious significant impacts, it is more difficult to assess when change, alteration, or relocation crosses the threshold of substantial adverse change. The CEQA Guidelines provide that a project that demolishes or alters those physical characteristics of a historical resource that convey its historical significance (i.e., its character-defining features) can be considered to materially impair the resource's significance. The CRHR is used in the consideration of historical resources relative to significance for purposes of CEQA. The CRHR includes resources listed in, or formally determined eligible for listing in, the NRHP, as well as some California State Landmarks and Points of Historical Interest. Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be significant resources for purposes of CEQA unless a preponderance of evidence indicates otherwise.

Generally, a resource shall be considered by the lead agency to be a "historical resource" if it:

1. Is listed in or determined to be eligible by the State Historical Resources Commission for listing in the California Register of Historical Resources (California Public Resources Code Section 5024.1, Title 14 California Code of Regulations, Section 4850, *et seq.*).
2. Is included in a local register of historical resources or is identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code.
3. Is a building or structure determined to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.

Tribal Cultural Resources/Assembly Bill 52

In September 2014, Governor Brown signed AB 52 (Chapter 532, Statutes of 2014), which creates a new category of environmental resources that must be considered under CEQA: "tribal cultural resources." The legislation imposes new requirements for offering to consult with California Native American tribes regarding projects that may affect a tribal cultural resource, emphasizes a broad definition of what may be considered to be a tribal cultural resource, and includes a list of recommended mitigation measures (MMs).

Recognizing that tribes may have expertise regarding their tribal history and practices, AB 52 requires lead agencies to provide notice to tribes that are traditionally and culturally affiliated with the geographic area of a proposed project if they have requested notice of projects proposed within that area. MMs agreed upon during consultation will be considered for inclusion in the environmental document.

AB 52, which became effective on July 1, 2015, and codified in Public Resources Code section 21080.3 et seq., requires lead agencies to provide notice to tribes that are traditionally and culturally affiliated with the geographic area of a proposed project, if they have requested such notice in writing. Once Native American tribes receive a project notification, they have 30 days to respond and identify if they wish to initiate consultation regarding the project on subjects such as mitigation for any potential project impacts to tribal cultural resources. A tribal cultural resource is defined as either a site, feature, place, or cultural landscape that is geographically defined in terms of size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is eligible for the CRHR or a local historic register. If a tribe requests consultation and the lead agency and the tribe ultimately agree on mitigation to address any potentially significant impacts to tribal cultural resources, the mitigation measures agreed upon during consultation must be recommended for inclusion in the environmental document.

Native American Historic Resource Protection Act

Established in 2002, the Native American Historic Resource Protection Act, establishes a misdemeanor for unlawfully and maliciously excavating upon, removing, destroying, injuring, or defacing a Native American historic, cultural, or sacred site that is listed or may be eligible for listing in the CRHR. The focus of this legislation was to provide additional legal protection for Native American historical and cultural sites, art, and other cultural artifacts found at those sites. The Act also encourages collaborative relationships for the protection of Native American cultural resources between Native Americans and landowners. Funding and other State assistance should be encouraged for support of voluntary agreements to conserve, maintain, and provide physical access for Native Americans to these cultural resources.

California Health and Safety Code (Sections 7050.5, 7051, and 7054)

These sections of the California Health and Safety Code collectively address the illegality of interference with human burial remains (except as allowed under applicable sections of the California Public Resources Code). These sections also address the disposition of Native American burials found in archaeological sites and protect such remains from disturbance, vandalism, or inadvertent destruction. Procedures to be implemented are established for (1) the discovery of Native American skeletal remains during construction of a project; (2) the treatment of the remains prior to, during, and after evaluation; and (3) reburial.

Section 7050.5 of the *California Health and Safety Code* specifically provides for the disposition of accidentally discovered human remains. Section 7050.5 states that if human remains are found, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined whether the human remains are likely of Native American origin, and, if so, the most likely descendant is given the opportunity to suggest appropriate treatment and disposition of the human remains pursuant to California Public Resources Code Section 5097.98, discussed below.

California Public Resources Code (Section 5097.98)

Section 5097.98 of the Public Resources Code states that, if remains are determined by the Coroner to be of Native American origin, the Coroner must notify the Native American Heritage Commission (NAHC) within 24 hours. When the NAHC receives this notification from a County Coroner, it shall immediately notify those persons it believes to be most likely descended from the deceased Native American. The descendants may, with the permission of the owner of the land or his or her authorized representative, inspect the site of the remains and may recommend to the owner or the person responsible for the excavation work means for treatment or disposition, with appropriate dignity, of the human remains and any associated grave goods. The descendants shall complete their inspection and make recommendations or preferences for treatment within 48 hours of being granted access to the site. This regulation also requires that, upon the discovery of Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred with the most likely descendants regarding their recommendations and all reasonable options regarding their preferences for treatment. This section of the Public Resources Code has been incorporated into Section 15064.5(e) of the CEQA Guidelines.

4.15.2 METHODOLOGY

Native American Consultation

On September 11, 2020, Psomas requested that the NAHC conduct a search of its Sacred Lands File (SLF) to determine if cultural resources important to Native Americans have been recorded in the Project site or in the immediate vicinity. For the purposes of AB 52, a tribal cultural resource is considered a site, feature, place, cultural landscape, sacred place, or object which is of cultural value to a California Native American Tribe and is either eligible for the CRHR or a local register.

The results of the NAHC SLF search were received on October 9, 2020, and were positive for sacred lands in the vicinity of the Project site. The NAHC recommended contacting the Juaneño Band of Mission Indians Acjachemen Nation – Belardes for more information. As a result, Joyce Perry, Tribal Representative, Cultural Resources Director, of the Juaneño Band of Mission Indians was copied on all correspondence from the NAHC.

The results letter also included a list of tribes affiliated with the Project site (see Table 4.15-1). Consultation pursuit to AB 52 was conducted by IRWD.

TABLE 4.15-1
NAHC TRIBAL REPRESENTATIVES CONTACT LIST

Tribal Organization	Indigenous Affiliation	Contact(s)
Campo Band of Diegueno Mission Indians	Diegueno	Ralph Goff
Ewiiaapaayp Band of Kumeyaay Indians	Diegueno	Robert Pinto; Michael Garcia
Gabrieleno Band of Mission Indians – Kizh Nation	Gabrieleno	Andrew Salas
Gabrieleno/Tongva San Gabriel Band of Mission Indians	Gabrieleno	Anthony Morales
Gabrielino/Tongva Nation	Gabrielino	Sandonne Goad
Gabrielino Tongva Indians of California Tribal Council	Gabrielino	Robert Dorame
Gabrielino-Tongva Tribe	Gabrielino	Charles Alvarez
Juaneño Band of Mission Indians Acjachemen – Belardes	Juaneño	Matias Belardes
La Posta Band of Diegueno Mission Indians	Diegueno	Gwendolyn Parada; Javaughn Miller
Manzanita Band of Kumeyaay Nation	Diegueno	Angela Elliott
Mesa Grande Band of Diegueno Mission Indians	Diegueno	Michael Linton
Pala Band of Mission Indians	Cupeno; Luiseno	Shasta Gaughen
Santa Rosa Band of Cahuilla Indians	Cahuilla	Lovina Redner
Soboba Band of Luiseno Indians	Cahuilla; Luiseno	Scott Cozart
Sycuan Band of the Kumeyaay Nation	Kumeyaay	Cody Martinez

On April 22, 2022, Andrew Salas (Gabrieleno Band of Mission Indians – Kizh Nation) sent a letter to Kellie Welch (IRWD) responding to IRWD's AB 52 notification letter. Mr. Salas stated that the Project is located within their ancestral tribal territory, and their tribal government requested consultation with IRWD. The SCCIC records search files were sent to Kizh Nation on August 17, 2022. Brandy Salas, Admin Specialist with the Kizh Nation confirmed receipt of files for consultation on August 17, 2022. Consultation between the Gabrieleno Band of Mission Indians – Kizh Nation and IRWD was conducted on October 19, 2022. As a follow-up to consultation, Brandy Salas sent supplemental materials and proposed mitigation measures to Andy Uk (IRWD) via email on June 27, 2023. On August 29, 2023, Andy Uk sent an email to Brandy Salas with mitigation measures prepared by IRWD. Brandy Salas responded in an email on September 6, 2023, stating that the tribe respectfully disagreed with the proposed mitigation measures and provided alternative mitigation measures. IRWD closed consultation with the Kizh Nation on November 5, 2024 via email. IRWD also sent a follow-up email to the Kizh Nation on November 19, 2024, to reiterate that IRWD made a good faith effort to consult and reach mutually agreed-upon mitigation measure(s) and that the AB 52 consultation process was closed.

On May 18, 2022, Joyce Perry (Juaneño Band of Mission Indians, Acjachemen Nation) sent an email to Marina Lindsay and Kellie Welch (IRWD) responding to IRWD's AB 52 notification letter. Ms. Perry stated that the Project is located within their territory, and a sensitive area to their tribe. The tribe requested to consult on this Project and to review the Tribal Cultural Resources section of the EIR. Consultation between the Juaneño Band of Mission Indians, Acjachemen Nation and IRWD was conducted on August 23, 2022. Additionally, the tribe reconfirmed their recommendation made to IRWD on September 22, 2022, for native monitoring by representatives of the Juaneño Band of Mission Indians during ground disturbance in the vicinity of

Santiago Canyon Road and Haul Road with nearby resources P-30-001012, P-30-100460, and P-30-001294.

On October 15, 2024, Andy Uk sent Joyce Perry a courtesy outreach email to inform her and the Juaneño Band of Mission Indians, Acjachemen Nation of minor modifications to the proposed project. The minor changes to the proposed project include:

- Embankment improvements based on Risk Informed Decision Making and feedback from DSOD;
- The identification of borrow areas at Irvine Lake that would excavate earthen material to use throughout the project, which would avoid previously recorded cultural resources within the project site footprint;
- Off-site hauling of material to accommodate improvements to the dam with temporary staging of material at a location downstream of the dam.

IRWD provided this update to Joyce Perry and the Juaneño Band of Mission Indians, Acjachemen Nation, because although there would be minor changes which involve ground disturbances and earthwork, there would be no differences or adjustments to the level of impacts to the cultural resources previously identified and/or discussed with the Juaneño Band of Mission Indians, Acjachemen Nation. The email provided a reminder that IRWD and Juaneño Band of Mission Indians, Acjachemen Nation previously had engaged in AB 52 consultation and that it was closed with mutually agreed-upon mitigation measures, and the email did not serve to re-initiate the AB 52 tribal consultation process.

SLF search results summary letter from the NAHC are included in Appendix D.

4.15.3 EXISTING CONDITIONS

Section 4.4, Cultural Resources, of this Draft EIR provides an evaluation of cultural resources, including archaeological and historic resources. As noted in that section, a cultural resource record search and literature review was conducted at the California Historical Resources Information System (CHRIS), which maintains records and literature regarding cultural resources within California. The South Central Coastal Information Center (SCCIC) is a designated branch of the CHRIS and houses records recorded in San Bernardino, Los Angeles, Orange, and Ventura Counties. The CHRIS office for Orange County is located at the SCCIC at California State University, Fullerton. The records search/literature review conducted for the Project revealed that 28 cultural resource studies have been conducted within 1-mile of the Project site; 14 occurred or overlapped within the Project site. Additionally, the records search/literature review conducted for the Project revealed that 18 cultural resources sites have been previously recorded within 1-mile of the Project site. The previously recorded resources include two precontact isolates (ground stone), 12 precontact sites, three historic sites/built environments, and one multicomponent site. The precontact sites consist of rock shelters, lithic scatters (stone debris left over from making stone tools), hearths roasting pits/remnants of campfires), cairns (rock features), bedrock milling features (ground stone technology), habitation debris (midden), and burials. The historic sites consist of roads/trails, single family residences, standing structures, wells/cisterns, water conveyance systems and a standing engineering structure (dam). Of the 18 cultural resources, two cultural resources (P-30-001012 and P-30176757) were identified within the Project site. Cultural resource P-30-001012 is described as a precontact lithic scatter and cultural resource P-30-17657 is the Santiago Dam.

Regional Ethnographies

Ethnography is a cultural anthropologic research method that strives to answer anthropological questions about different cultures. The following section describes the ethnographic background of the Project site.

Gabrielino/Tongva

At the time of European contact, this part of Los Angeles County was the home of the Gabrielino. The Gabrielino and their descendants are those people who became associated with Mission San Gabriel Arcángel, which was established in south-central Los Angeles County on September 8, 1771, in what has ever since been called the San Gabriel Valley. Today, these people are sometimes referred to as the Tongva, although the term originally (i.e., before the arrival of Euro-Americans) referred to the inhabitants of the San Gabriel Valley only. Today, Gabrielino ancestry also refers to the occupants of the San Fernando Valley (Fernandeño). The Eastern Gabrielino refers to those who lived south of the San Gabriel Mountains, mainly in the San Gabriel Valley, while the Western Gabrielino refers to those who lived along the western coast of Los Angeles County, from Malibu to Palos Verdes, and includes the people living in the San Fernando Valley.

The ancestral Gabrielino arrived in the Los Angeles Basin probably 500 years Before the Common Era. Large, permanent villages were established in the fertile lowlands along rivers and streams and in sheltered areas along the coast. Eventually, Gabrielino territory encompassed the watersheds of the Los Angeles, San Gabriel, Rio Hondo, and Santa Ana Rivers (which includes the greater Los Angeles Basin) to perhaps as far south as Aliso Creek, as well as portions of the San Fernando, San Gabriel, and San Bernardino Valleys. Gabrielino territory also included the islands of San Clemente, San Nicholas, and Santa Catalina. Recent studies suggest the population may have numbered as many as 10,000 individuals at their peak in the Pre-contact Period.

The subsistence economy of the Gabrielino was one of hunting and gathering. The surrounding environment was rich and varied, and the natives were able to exploit mountains, foothills, valleys, deserts, and coasts. As was the case for most native Californians, acorns were the staple food (by the Intermediate Horizon), supplemented by the roots, leaves, seeds, and fruit of a wide variety of flora (i.e., cactus, yucca, sage, and agave). Fresh and saltwater fish, shellfish, birds, insects, and large and small mammals were exploited.

A wide variety of tools and implements were employed by the Gabrielino to gather, collect, and process food resources. The most important hunting tool was the bow and arrow. Traps, nets, blinds, throwing sticks, and slings were also employed. Fish were an important resource and nets, traps, spears, harpoons, hooks, and poisons were utilized to catch them. Ocean-going plank canoes and tule balsa canoes were used for fishing and for travel by those groups residing near the Pacific Ocean.

The processing of food resources was accomplished in a variety of ways: nuts were cracked with hammer stone and anvil; acorns were ground with mortar and pestle; and seeds and berries were ground with mano and metate. Yucca, a valuable resource in many areas, was eaten by the natives and exploited for its fibers. Strainers, leaching baskets and bowls, knives, bone saws, and wooden drying racks were also employed. Food was consumed from a variety of vessels. Catalina Island steatite was used to make ollas and cooking vessels.

Gabrielino houses were circular domed structures of willow poles thatched with tule. They were actually quite large and could, in some cases, hold 50 individuals. Other structures served as sweathouses, menstrual huts, and ceremonial enclosures.

Juaneño/Acjachemen

During the Late Prehistoric and Contact Periods, the Project area was located also within the Juaneño territory. As with the Gabrielino, whose name signifies their mission association, the name Juaneño designates those peoples that fell under the control of the Mission at San Juan Capistrano. Specifically, it denotes the indigenous Native Americans living in and near the San Juan and San Mateo Creek Drainages, who called themselves the Acjachemen.

During the Pre-Contact Period, the Acjachemen population is thought to have numbered upwards of 3,500. It is known that 1,138 local Native Americans, consisting primarily of Acjachemen but including Gabrielino, coastal and interior Luiseño, Serrano, and Cahuilla, resided at Mission San Juan Capistrano in the year 1810. The Mission's death register shows as many as 1,665 native burials in its cemetery by this time, a number, in addition to those who died unrecorded at the remaining villages from natural causes and introduced infectious diseases.

Overall, the Acjachemen territory consisted of the eastern Santa Ana Mountains to the coast and southward to San Juan Capistrano. The majority of the known ethnographic village sites are located primarily in this region. To this day, the San Juan Capistrano area has seen continuous habitation by the Juaneño people.

The Juaneño lived in structured villages, populated variously by between 35 and 300 people, consisting of a single lineage to multiple clans in larger settings. While each village unit maintained economic and social ties to neighboring villages, they also maintained a well-defined resource area.

The Juaneño exploited a wide variety of resources for their dietary needs. These consisted primarily of plant foods, including seeds, nuts, fruits, tubers, and greens. Marine resources constituted the largest sources of meat and consisted mostly of shellfish and fish. Marine resources were collected from open water, bay, and estuary habitats. Birds and mammals made up most of the remainder of the diet. Many common bird species and most small rodents were exploited where available. Seasonal rounds of exploitation formed the basis for the successful procurement of various food types as evident by the settlement patterns still identifiable today from the remains of simple campsites to complex village sites.

4.15.4 THRESHOLDS OF SIGNIFICANCE

In accordance with the Appendix G of the CEQA Guidelines, a project would result in a significant tribal cultural resources impact if it would:

Threshold 4.15-1 Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1 (k), or

ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resource Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

4.15.5 IMPACT ANALYSIS

Regulatory Requirement

RR CR-1 If human remains are found during ground-disturbing activities, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains will occur, in accordance with Section 7050.5 of the California Health and Safety Code. The County Coroner will be notified of the discovery immediately. If the County Coroner determines that the remains are or believed to be Native American, s/he will notify the NAHC within 24 hours of the discovery. In accordance with Section 5097.98 of the California Public Resources Code, the NAHC must immediately notify those persons it believes to be the most likely descended from the deceased Native American (i.e., the most likely descendant). The descendants will complete their inspection within 48 hours of being granted access to the site by IRWD. IRWD will discuss and confer with the most likely descendants regarding all reasonable options regarding the descendants' preferences for treatment of the human remains prior to disturbing the site by further construction activity.

Threshold 4.15-1

Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k).

Less Than Significant Impact with Mitigation. For purposes of this impact analysis, a tribal cultural resource is considered a site, feature, place, cultural landscape, sacred place, or object which is of cultural value to a California Native American Tribe and is either eligible for the CRHR or a local register.

As discussed in Section 4.4, Cultural Resources, of this EIR, impacts to historical resources, archaeological resources, and human remains would be less than significant. Potential impacts to archeological resources would be mitigated to a less than significant level with the implementation of **MM CR-1**, which requires archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and **MM CR-2**, which provides details for treatment of unanticipated discoveries. Additionally, the Project would comply with the State requirements pertaining to the protection of human remains by implementing **RR CR-1**.

One historic property/historical resource was identified within the Project site: the Santiago Dam Complex (P-30-176757), which currently has a status code of 2S2, indicating it has been determined eligible for the NRHP and is listed in the CRHR. The updated evaluation completed as part of the current study found that the Dam remains eligible for the NRHP/CRHR under Criterion A/1. The Dam is eligible for its important historical associations with water resources development in Orange County, as well as with the citrus agriculture industry. This cultural resource is a historical-era resource and is not considered a tribal cultural resource.

Although specific aspects of the Dam would be modified, it would remain recognizable as an earthen embankment dam and would continue to perform the historic function for which it is eligible. The character-defining features of the Dam necessary for it to continue to convey its historical significance under Criterion A/1 include its ongoing function as an earthen embankment dam on Santiago Creek, maintaining the same general massing and scale. Therefore, the proposed Project would result in no adverse effects to historic properties under Section 106 of the NHPA, and no significant impacts to historical resources under CEQA. Additionally, the Project would not have an impact on a tribal cultural resource that is listed or eligible for listing on the CRHR or a local register.

The Project would result in a less than significant impact with implementation of **MM CR-1** and **MM CR-2 and** would comply with **RR CR-1**.

Impact Conclusion: *Potential impacts to archeological resources would be mitigated to a less than significant level with the implementation of **MM CR-1**, which requires archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and **MM CR-2**, which identifies treatment of unanticipated discoveries. Additionally, the Project would comply with the State requirements pertaining to the protection of human remains by implementing **RR CR-1**.*

The Santiago Creek Dam Complex (P-30-176757) was determined eligible for the CRHR and listed in the CRHR. However, it would remain recognizable as an earthen embankment dam and would continue to perform the historic function for which it is eligible. Thus, pursuant to Threshold 4.15-1, the Project would not have an impact on a tribal cultural resource that is listed or eligible for listing on the CRHR or a local register.

Threshold 4.15-1

Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resource Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Less Than Significant Impact with Mitigation. The second component of this analysis is if the proposed Project would impact a tribal cultural resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a Native American tribe. Subdivision (c) states:

> A resource may be listed as an historical resource in the California Register if it meets any of the following CRHR criteria:
>
> (1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
>
> (2) Is associated with the lives of persons important in our past.
>
> (3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
>
> (4) Has yielded, or may be likely to yield, information important in prehistory or history.

Based on information available through the record searches at the SCCIC and the NAHC, and the long-term past use of the Project area, there is no information available that indicates there are significant tribal resources within the Project area that would be significant pursuant to criteria set forth in subdivision (c) of Public Resource Code Section 5024.1. However, as noted in Section 5.15.2 above, IRWD requested consultation with tribes that notified IRWD of a desire to be consulted with regarding the Project.

IRWD received two responses. Andrew Salas (Gabrieliño Band of Mission Indians – Kizh Nation) responded on April 22, 2022. Consultation between the Gabrieliño Band of Mission Indians – Kizh Nation and IRWD was conducted on October 19, 2023. Additionally, Joyce Perry (Juaneño Band of Mission Indians) responded on May 18, 2022. Consultation between the Juaneño Band of Mission Indians and IRWD was conducted on August 23, 2022. Based on consultation between IRWD and the tribal representatives, no tribal cultural resources were identified on the Project site; however, earthwork activities (i.e., grading, excavation, and trenching) at the Project site may disturb native sediments and, therefore, could have the potential to impact unidentified archaeological resources of Native American origin.

In order to reduce the potential for impacts to unidentified tribal cultural resources, IRWD would voluntarily implement **MM TCR-1, MM TCR-2,** and **MM TCR-3** in response to concerns expressed by local Tribes.

Impact Conclusion: *Potential impacts to tribal cultural resources would be mitigated to a less than significant level with the implementation of **MM TCR-1**, **MM TCR-2**, and **TCR-3**, which detail procedures related to tribal monitoring and protocols for unanticipated discoveries.*

4.15.6 CUMULATIVE IMPACTS

Although Tribal Cultural Resources impacts are site-specific with regard to any given resource (e.g., resources of important cultural value to Native Americans), impacts may be considered cumulative due to the loss of cultural resources in general over time throughout the region. There are no tribal cultural resources listed or determined eligible for listing, on the national, State, or local register of historical resources on the Project site. However, should buried resources be identified, ground disturbance within native sediment could lead to the accelerated degradation of previously unknown tribal cultural resources. Mitigation can reduce potential impacts to a less

than significant level. As with the Project, testing and data recovery is standard practice in the County and is routinely required of projects prior to and during grading activities. Despite the site-specific nature of cultural resources, the mitigation identified for tribal cultural resources monitoring, standard mitigation measures and adherence to State requirements would reduce the potential for cumulative impacts. As a result, with implementation of **MM TCR-1, MM TCR-2,** and **MM TCR-3**, the Project would not have a cumulatively considerable contribution to a significant cumulative impact related to tribal cultural resources.

4.15.7 MITIGATION PROGRAM

Mitigation Measures

MM CR-1 IRWD will retain a certified archaeologist, defined as an archaeologist meeting the Secretary of the Interior's Standards for professional archaeology, to observe ground-disturbing activities (including but not limited to geotechnical excavations, vegetational removal, grubbing, grading, and excavation) within previously undisturbed soils below the fill soils and to salvage and catalogue archaeological resources as necessary. Monitoring will not be necessary for secondary movement of soils, such as backfilling. The archaeologist will be present at the pre-construction meeting, will establish procedures for archaeological resource surveillance within previously undisturbed soils in coordination with IRWD throughout construction of the proposed Project, and will establish, in cooperation with IRWD, procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of the artifacts as appropriate. The archaeological monitor will have the authority to temporarily halt or divert work away from any discoveries of archaeological resources in order to evaluate the resources pursuant to **MM CR-2.** The archaeologist may determine, in consultation with IRWD, to reduce monitoring to spot-checking or eliminate monitoring depending on site conditions observed, such as the presence of fill material, soil stratigraphy, encountering bedrock, or other factors.

The archaeological monitor will keep daily logs detailing the types of activities and soils observed, and any discoveries. After monitoring has been completed, the certified archaeologist will prepare a monitoring report that details the results of monitoring. The report will be submitted to IRWD and any Native American groups who request a copy. The certified archaeologist will submit a copy of the final report to the California Historic Resources Information System South Central Coastal Information Center.

MM CR-2 If archaeological resources are inadvertently unearthed during excavation activities (within disturbed or undisturbed soils), the contractor will immediately cease all earth-disturbing activities within a 50-foot radius of the area of discovery, and the certified archaeologist and IRWD will be notified immediately. If the certified archaeologist determine the archaeological resources are potentially significant pursuant to CEQA Guidelines Section 15064.5 or California Public Resources Code (PRC) Section 21083.2(g), the archaeologist, in consultation with IRWD and representatives from the tribal governments consulting under AB 52, will determine appropriate treatment, which may include avoidance of the area of the find, data recovery, documentation, testing, reburial, archival review, and/or transfer to the appropriate museum or educational institution, or other appropriate actions. After the find has been appropriately avoided or mitigated, work in the area may resume.

MM TCR-1 ***Juaneño Band of Mission Indians, Acjachemen Nation – Belardes Tribal Monitoring.***

At least one month prior to beginning earthwork activities (i.e. grading, excavation and trenching) related to the existing water line tie-in activities of the proposed project, located at the intersection of Santiago Canyon Road and Haul Road, IRWD will notify the representatives of the Juaneño Band of Mission Indians, Acjachemen Nation - Belardes ("Acjachemen Nation - Belardes") identifying the date of starting earthwork activities. The notification will invite the representative to be present at the project site, and IRWD will further coordinate with the Acjachemen Nation – Belardes for construction monitoring. Acjachemen Nation – Belardes will be provided reasonable access to the project site, at its own expense and in a manner that will not conflict construction activities or cause construction delays to the contractor, to observe these earthwork activities. If Native American artifacts and ancestral human remains related to Acjachemen Nation – Belardes are uncovered during earthwork activities, MM TCR-3 Protocols for Unanticipated Discoveries will be implemented.

The Acjachemen Nation – Belardes will document and provide logs to IRWD detailing the time/date of the visit, the outcome of the site visit and detail proposed activities it intends to conduct at the next site visit. The logs will also specifically describe the relevant ground-disturbing activities, the type of construction activities performed, locations of ground-disturbing activities, soil types, cultural-related materials, and any other facts, conditions, materials, or discoveries of significance to the Acjachemen Nation - Belardes. The monitor logs will identify and describe any discovered tribal cultural resources, including but not limited to, Native American cultural and historical artifacts, remains, places of significance, etc., as well as any discovered Native American (ancestral) human remains and burial goods.

MM TCR-2 ***Gabrieleno Band of Mission Indians - Kizh Nation Tribal Monitoring.***

During the AB 52 consultation process, the Gabrieleno Band of Mission Indians - Kizh Nation (Kizh Nation) informed IRWD's staff that the Gabrieleno tribe has a strong tribal cultural presence in the region from the past, including the project site area. Therefore, there could be Kizh Nation tribal cultural resources present at the project site area and Kizh Nation has requested Native American monitoring of ground disturbing activities. The project site area spans over a vast area and the proposed project would have multiple construction phases with varied activities and schedules. At least one month prior to beginning earthwork activities, IRWD will notify in writing the Native American representatives from the Kizh Nation (tribal representative) of the date of the start of earthwork activities. The tribal representative, at their own expense, and in a manner that does not interfere with earthwork activities, will be allowed to observe subsurface ground disturbing construction activities. Monitoring may include either direct observation of the earthwork activities or the examination of excavated soils prior to disposal for evidence of cultural resources. If Native American artifacts and ancestral human remains are uncovered during earthwork activities, then MM TCR-3 Protocols for Unanticipated Discoveries will be implemented.

The Kizh Nation tribal representative will complete daily monitoring logs and provide logs to IRWD detailing the time/date of the visit and the outcome of the site visit and detail proposed activities for their next site visit. The logs will also

specifically describe the relevant ground-disturbing activities, the type of construction activities performed, locations of ground-disturbing activities, soil types, cultural-related materials, and any other facts, conditions, materials, or discoveries of significance to the Kizh Nation. The monitor logs will identify and describe any discovered tribal cultural resources, including but not limited to, Native American cultural and historical artifacts, remains, places of significance, etc., as well as any discovered Native American (ancestral) human remains and burial goods.

MM TCR-3 ***Protocols for Unanticipated Discoveries.***

If a cultural resource is found, all construction activities in the immediate vicinity of the discovery (i.e., not less than the surrounding 50 feet) will cease and will not resume until the discovered cultural resource(s) is assessed by IRWD's consulting Qualified Archaeologist. If the Qualified Archaeologist determines that the resources may be significant under CEQA, then the Qualified Archaeologist, in consultation with IRWD, will develop an appropriate treatment plan for the resource(s). IRWD will also consult with the Native American tribes or other appropriate Native American representatives in determining appropriate treatment for unearthed cultural resources if the resources are prehistoric or Native American in nature. Under CEQA, preservation in place is the preferred manner of mitigating impacts to archaeological sites. However, if avoidance is infeasible, other appropriate measures will be instituted, which could include, among other options, detailed documentation, or data recovery excavation. Work may proceed on other parts of the project area while mitigation for cultural resources is being carried out.

4.15.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Project-specific and cumulative impacts to archaeological resources would be mitigated to a less than significant level with the implementation of **MM CR-**1, which requires archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and **MM CR-2**, which provides details for treatment of unanticipated discoveries. Additionally, the Project would comply with the State requirements pertaining to the protection of human remains by implementing **RR CR-1**. In order to reduce the potential for impacts to unidentified tribal cultural resources, the Project would implement **MM TCR-1**, **MM TCR-2**, and **MM TCR-3,** which would reduce potential impacts to tribal cultural resources to less than significant levels.

4.15.9 REFERENCES

Psomas. 2024 (February). *Historic Property Identification Report (Archaeological Resources) and Paleontological Resources Study Santiago Creek Dam Outlet and Spillway Project, Irvine, Orange County, California.* Pasadena, CA: Psomas. Appendix D.

South Environmental. 2023 (November). *Historical Resources Assessment, Santiago Creek Dam Outlet Tower and Spillway Improvements Project, Orange County, California*. Pasadena, CA: South Environmental.

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4.16 UTILITIES AND SERVICE SYSTEMS

This section of the Environmental Impact Report (EIR) describes the existing utilities and service systems (wet and dry utilities) for the proposed Project and identifies associated potential impacts related to water, sewer, solid waste, electricity, natural gas, and communication systems for the proposed Project.

4.16.1 REGULATORY SETTING

Federal

Water

Federal Safe Drinking Water Act of 1974

The Safe Drinking Water Act authorizes the U.S. Environmental Protection Agency (EPA) to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. EPA, States, and water systems then work together to make sure that these standards are met. Originally, the Safe Drinking Water Act focused primarily on treatment as the means of providing safe drinking water at the tap. The 1996 amendments to the Act enhanced existing law by recognizing source water protection, operator training, funding for water system improvements, and public information as important components of safe drinking water. This approach ensures the quality of drinking water by protecting it from source to tap. The Act applies to every public water system in the United States.

Wastewater

Federal Clean Water Act (33 USC Sections 1251, et seq.)

The Clean Water Act's (CWA) primary goals are to restore and maintain the chemical, physical, and biological integrity of the nation's waters and to make all surface waters fishable and swimmable. The CWA forms the basic national framework for the management of water quality and the control of pollution discharges; it provides the legal framework for several water quality regulations, including the National Pollutant Discharge Elimination System (NPDES), effluent limitations, water quality standards, pretreatment standards, antidegradation policy, nonpoint source discharge programs, and wetlands protection. The EPA has delegated the responsibility for administration of portions of the CWA to State and regional agencies. In California, the State Water Resources Control Board (SWRCB) administers the NPDES permitting program and is responsible for developing NPDES-permitting requirements. The SWRCB works in coordination with the Regional Water Quality Control Boards to preserve, protect, enhance, and restore water quality.

State

Water

State of California Water Recycling Act

Enacted in 1991, the Water Recycling Act established water recycling as a State priority. The Water Recycling Act encourages municipal wastewater treatment districts to implement recycling programs to reduce local water demands.

California Code of Regulations, Title 22, Division 4, Chapter 3 Water Recycling Criteria

California regulates the wastewater treatment process and use of recycled water pursuant to California Code of Regulations (CCR) Title 22, Division 4, Chapter 3, "Water Recycling Criteria." According to these regulations, recycled water to be used for irrigating public areas must be filtered and disinfected to tertiary standards.

Urban Water Management Act

The Urban Water Management Plan Act (UWMP Act) was passed in 1983 (California Water Code Sections 10610 through 10657) and has been amended several times. The Act requires "every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000-acre feet of water annually, to prepare and adopt, in accordance with prescribed requirements, an urban water management plan." Urban water suppliers must file these plans with the California Department of Water Resources every five years. The plans must describe and evaluate reasonable, practical, and efficient water uses, as well as reclamation, and conservation activities. As required by the Memorandum of Understanding Regarding Urban Water Conservation in California and Assembly Bill 11, the 2005 UWMP Act incorporated water conservation initiatives and a Water Shortage Contingency Plan.

Making Conservation a California Way of Life

In 2018, the California State Legislature passed AB 1668 and SB 606, which directed the State Water Board to adopt water efficiency standards and also performance measures for commercial, industrial, and institutional water use. Making Conservation a California Way of Life is a new regulation adopted by the State Water Board in July 2024 that establishes individualized water efficiency goals for each Urban Retail Water Supplier. These goals are based on the unique characteristics of the supplier's service area and give suppliers the flexibility to implement locally-appropriate solutions. Once implemented, these goals are expected to reduce urban water use by more than 400,000 acre feet by 2030, thereby helping California adapt to the water supply impacts resulting from climate change. The proposed regulations are intended to help realize the water savings outlined in California's Water Supply Strategy, released in 2022.

Senate Bill 610

In regard to water supply, portions of the Water Code (commonly referred to as Senate Bill (SB) 610, according to the enacting legislation) require the preparation of a Water Supply Assessment (WSA) for certain projects. SB 610 requires that a WSA be prepared for any "project" which would consist of one or more of the following:

- A proposed residential development of more than 500 dwelling units;
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- A mixed-use project that includes one or more of the projects specified above; or
- A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

Assembly Bill 3030

Assembly Bill (AB) 3030, the Groundwater Management Act, is codified in Section 10750 et seq. of the California Water Code. AB 3030 provides local water agencies with procedures for developing a groundwater management plan to permit those agencies to manage their groundwater resources efficiently and safely while protecting the quality of their supplies. Under AB 3030, a local water agency may voluntarily develop a groundwater management plan. Once an agency adopts a plan, the rules and regulations within the plans must be adopted to implement the program outlined in the plan.

Efficiency Standards

CCR Title 24 contains the California Building Code (CBC), including the California Plumbing Code (Part 5), which promotes water conservation. CCR Title 20 addresses Public Utilities and Energy and includes appliance efficiency standards that promote water conservation. In addition, a number of California enactments require water-efficient plumbing fixtures in structures:

- CCR Title 20 Section 1604(g) establishes efficiency standards that provide a maximum flow rate for all new showerheads, lavatory faucets, sink faucets, and tub spout diverters.
- CCR Title 20 Section 1606 prohibits the sale of fixtures that do not comply with established efficiency regulations.
- CCR Title 24 Sections 25352(i) and (j) address pipe insulation requirements, which can reduce water used before hot water reaches equipment or fixtures. Insulation of water heating systems is also required.
- Health and Safety Code Section 17921.3 requires low-flush toilets and urinals in virtually all buildings.

Solid Waste

California Integrated Waste Management Act of 1989 (AB 939)

The California Integrated Waste Management Act of 1989 (AB 939) requires all California cities and counties to achieve a 50 percent diversion rate by 2000. Additional solid waste statutes are included in California's Public Resources Code, Government Code, and Health and Safety Code, among others. The California Solid Waste Reuse and Recycling Access Act of 1991, as amended, requires each development project to provide an adequate storage area for collection and removal of recyclable materials.

California Department of Resources Recycling and Recovery (CalRecycle) Organics Regulations (SB 1383)

This bill requires the State Air Resources Board, no later than January 1, 2018, to approve and begin implementing that comprehensive strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030, as specified. The bill also establishes specified targets for reducing organic waste in landfills.

Regional

Water

IRWD 2020 Urban Water Management Plan

The Urban Water Management Planning Act (UWMP Act) requires all urban water suppliers to prepare, adopt, and file an Urban Water Management Plan (UWMP) with the Department of Water Resources (DWR) every five years. IRWD's 2020 UWMP is an update to the 2015 UWMP and was prepared in conformance with Water Code Sections 10610 through 10656 of the UWMP Act. Included in the plan is detailed information about IRWD's water demand, supply, and reliability for the next 25 years (IRWD 2021).

Local

County of Orange General Plan

Land Use Element

The following policies of the County of Orange General Plan Land Use Element (County of Orange 2024) pertaining to utilities and service systems are applicable to the Project:

Policy 13: Recycling/Materials Recovery – To encourage and facilitate the establishment of recycling/materials recovery facilities to address the State mandate given through the California Integrated Waste Management Act of 1989 (AB 939).

Policy 14: Urban and Storm Runoff Regulations – To guide physical development within the County while protecting water quality through required compliance with urban and stormwater runoff regulations.

Public Services & Facilities Element

The following policies of the County of Orange General Plan Public Services & Facilities Element (County of Orange 2012a) pertaining to utilities and service systems are applicable to the Project:

Water System

Goal 1: Encourage the planning and development of a water conveyance and distribution system to meet the County's future demand.

Objective 1.1: To achieve desired water system service levels through the coordination of land use and water system planning.

Objective 1.2: To implement State, regional, and local facility plans for water delivery to Orange County.

Objective 1.3: To increase storage and delivery capacity for water supplies in Orange County.

Policy 1: System Capacity and Phasing – To ensure the adequacy of water system capacity and phasing, in consultation with the service providing agency(ies), in order to serve existing and future development as defined by the General Plan.

Policy 2: Water Delivery System – To support water facility planning and development efforts for Orange County water supplies conducted by local and regional water agencies.

Policy 2: Intergovernmental Coordination – To actively encourage opportunities for increased coordination between the County and the water agencies through cooperative water facility planning and implementation efforts.

Wastewater System

Goal 1: Support the planning and development of a wastewater system to meet both the County's demand and attain water quality goals.

Objective 1.1: To maintain wastewater system service levels through the coordination of land use and wastewater system planning.

Objective 1.2: To implement wastewater agency facility and water quality plans for Orange County.

Policy 1: Water Quality – To protect quality in both delivery systems and groundwater basins through effective wastewater system management.

Policy 2: Intergovernmental Coordination – To actively encourage opportunities for increased coordination between the County and wastewater agencies through cooperative wastewater studies, planning, and facility implementation efforts.

Policy 3: System Capacity and Phasing – To ensure the adequacy of wastewater system capacity and phasing in consultation with the service providing agency(ies) in order to serve existing and future development as defined by the General Plan.

General Plan, Resources Element

The following policies of the County of Orange General Plan Resources Element (County of Orange 2012b) pertaining to utilities and service systems are applicable to the Project:

Energy Resources Component

Goal 1: Maximize the conservation and wise use of energy resources in all residences, businesses, public institutions, and industries in Orange County.

Objective 1.1: Achieve a reduction in projected per capita energy demand and consumption by the year 2005.

Goal 2: Encourage the utilization of existing energy resources to their highest potential and the development of alternative energy sources consistent with sound energy conservation practices and techniques to meet the County's future energy demand.

Objective 2.1: Encourage the efficient development of local energy resources to supply a portion of the County's energy demand through the year 2005 in a manner which protects the environment.

Policy 2: Energy Resource Development – To encourage and actively support the efficient use and optimum development of energy resources in the County consistent with sound resource management practices.

Policy 3: Energy Conservation – To encourage and actively support the utilization of energy conservation measures in all new and existing structures in the County

Water Resources Component

Goal 1: Ensure an adequate dependable supply of water of acceptable quality for all reasonable uses.

Objective 1.1: To maintain the adequacy and dependability of imported water supplies.

Objective 1.2: To achieve a reduction in per capita water consumption by the year 2020.

Objective 1.3: To reduce dependence on imported water supplies through both conservation and local water resource development.

Policy 1: Water Supply – To ensure the adequacy of water supply necessary to serve existing and future development as defined by the General Plan.

Policy 2: Conservation – To reduce per capita and total water consumption through conservation and reclamation programs and the support of new technologies.

Policy 3: Groundwater Resources – To support groundwater management efforts that are conducted by County water agencies.

Policy 4: Shortage Planning – To ensure that Orange County will not be severely impaired by any potential future water shortages.

Policy 5: Water Quality – Protect and improve water quality through continued management, enforcement, and reporting requirements. Encourage an integrated water resources approach for stormwater management that considers water supply, water quality, flood control, open space, and native habitats. Promote coordination between the County, cities, and other stakeholders in the identification and implementation of watershed protection and Low Impact Development (LID) principles. Consider implementation of LID principles to conserve natural features (trees, wetlands, streams, etc.), hydrology, drainage patterns, topography, and soils. Encourage the creation, restoration, and preservation of riparian corridors, wetlands, and buffer zones. Continue to educate the public about protecting water resources.

4.16.2 METHODOLOGY

Information presented in this section is obtained through research relating to utility providers and facilities, existing capacities, and planned improvements. Impact analysis discusses the proposed Project's demand in light of existing capacities. For CEQA purposes, the potential effects associated with implementation of the proposed Project are related to the provision of adequate service levels and the need to upgrade and/or provide additional facilities to serve the proposed Project.

4.16.3 EXISTING CONDITIONS

Water

The Project site is within the service area of IRWD for potable water service.

Irvine Ranch Water District

IRWD is a retail water supplier that serves an approximately 181 square mile area that encompasses the Cities of Irvine, Newport Beach, Tustin, Orange, Lake Forest, Costa Mesa, plus unincorporated areas of Orange County.

IRWD's drinking water comes from two primary sources: local groundwater and imported water. Approximately 52 percent of IRWD's overall supply comes from local groundwater wells in the Orange County Groundwater Basin and the Irvine and Lake Forest sub-basins. For many years, IRWD received almost all of its water from imported sources. To alleviate this dependency on costly imported water, IRWD began to develop a series of local wells in 1979. The Dyer Road Wellfield Project extracts low-cost, high-quality water from deep within the Orange County Groundwater Basin. IRWD now operates 27 groundwater wells.

IRWD buys approximately 18 percent of its water through the Municipal Water District of Orange County (MWDOC), which buys water from the Metropolitan Water District of Southern California (MWD), a regional water wholesaler that delivers imported water from Northern California and the Colorado River (IRWD 2024a).

IRWD's 2020 Urban Water Management Plan (2020 UWMP) was prepared in accordance with the California Urban Water Management Planning Act (Act) and other applicable laws. The Act requires IRWD, as an urban water supplier, to prepare and adopt a UWMP, which analyzes and projects IRWD's water supply reliability during normal, single dry, and multiple dry years over the next 20 years. IRWD uses demographic growth projections developed by the Center for Demographic Research at California State University, Fullerton to estimate future water demands. Per the 2020 UWMP, IRWD's forecast total water demand for 2040 is 178,727 acre-feet per year (AFY) (IRWD 2021).

Existing Water Infrastructure

IRWD owns and operates Irvine Lake and the Santiago Creek Dam that serve as a critical water supply source for IRWD's service area. IRWD uses water from Irvine Lake as a source of water for non-drinking purposes, such as irrigation uses, and as a source of water for the Baker Water Treatment Plant, which produces drinking water for an estimated 85,000 homes in Orange County. IRWD also treats water from Irvine Lake at the Howiler Treatment Plant that is used to backstop and augment Serrano Water District's use of groundwater. Eventually, IRWD will construct a pipeline from the Howiler Plant to IRWD's service area. The construction and operation of this pipeline will be subject to additional environmental review.

Santiago Creek Dam impounds water for Irvine Lake on Santiago Creek, a tributary to the Santa Ana River. The reservoir provides flood control, water supply, fisheries enhancement, and recreational opportunities for the surrounding area. The outlet works for the dam consist of a tower, an outlet conduit, and downstream control house. A concrete-encased welded steel pipe outlet conduit is located at the base of the outlet tower and runs beneath the dam to the toe of the dam where a bifurcation splits the flow into a main pipe and diverter pipe. The main pipe supplies water to IRWD. If an emergency drawdown is necessary, the diverter valve (normally kept closed) can be opened and water can be released through the diverter pipe to discharge into the streambed immediately downstream of the Control House.

Wastewater

The Project area is within the jurisdiction of IRWD for wastewater infrastructure. IRWD's wastewater system is comprised of two Recycled Water Treatment Plants (Los Alisos and Michelson) and 1,153 miles of sewer connection pipelines (IRWD 2024b).

Electricity

Southern California Edison (SCE) maintains electrical facilities and infrastructure within the County and surrounding areas that provide service to the project area under the applicable rules and tariffs approved by the California Public Utilities Commission. SCE delivers power to approximately 15 million people in California, including to the Project site (SCE 2024).

Natural Gas

SoCalGas (SCGC) is the nation's largest natural gas distribution utility, delivering natural gas to 21.1 million consumers through 5.9 million meters in more than 500 communities (SCGC 2024). SoCalGas' service territory encompasses approximately 24,000 square miles throughout Central and Southern California, from Visalia to the Mexican border. The service is provided in accordance with SCGC's policies and extension rules on file with the CPUC.

Solid Waste

Waste Management provides solid waste collection and disposal services to the Project area. Collected waste is disposed of at Frank R. Bowerman (FRB) Landfill, located at 11002 Bee Canyon Access Road in Irvine. FRB Landfill has a maximum daily permitted capacity of 11,500 tons per day (tpd), and an annual daily annual average disposal amount of 6,214 tpd. This landfill has a remaining capacity of 161.88 million cubic yards and an estimated closure date of 2053. Other landfills that serve the County include Prima Deshecha and Olinda Alpha Landfills, with closure dates of 2102 and 2036, respectively (Halligan 2023). The FRB Landfill is approximately 725 acres with 530 acres allocated for waste disposal (OC Waste & Recycling 2024).

4.16.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, the Project would result in a significant utilities and service systems impact based upon the following thresholds:

Threshold 4.16-1 Would the Project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which cause significant environmental effects?

Threshold 4.16-2 Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

Threshold 4.16-3 Result in a determination by the wastewater treatment provider that serves or may service the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Threshold 4.16-4 Generate solid waste in excess of State or local standards or in excess of the capacity of Local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Threshold 4.16-5 Comply with federal, State, and Local Management and reduction statues and regulations related to solid wastes including the CIWMP (County Integrated Waste Management Plan)?

4.16.5 IMPACT ANALYSIS

Threshold 4.16-1

Would the Project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which cause significant environmental effects?

Water

Less than Significant Impact. The Project involves abandonment of the existing Santiago Creek Dam outlet tower, construction of a new inclined outlet structure located on the left abutment of the existing dam, structural improvements to the dam spillway, and improvements to the dam embankment. The Project would include creation of a new inclined outlet structure, which would accommodate water from the lake and convey the water through an existing conduit under the dam. At the downstream toe of the dam, a new fitting would be installed to bifurcate the flow to the indirect low pressure system, or the emergency outlet pipeline. Water that enters the indirect low pressure system would reach IRWD's distribution systems. Water that enters the emergency outlet pipeline would be released at the end of the new spillway. Additional proposed water infrastructure would include the inclined inlet/outlet structure, which would consist of multiple approximately 30-inch riser pipes spaced incrementally to allow water to be drawn from the reservoir at different depths depending on the water quality in the reservoir. During construction, water would be rerouted to an alternate pipeline that would feed directly into the indirect low pressure system and continue service to IRWD customers. The Project would also modify the existing dam embankment by removing the dam face, constructing a filter drain system, and encapsulating the filter drain system with embankment shell material. The dam crest would also be widened to approximately 35 to 45 feet wide and elevated by up to approximately one foot to accommodate a wider access road, and protective railings would be installed on both sides of the access road. All water infrastructure is included as a part of the proposed Project, and impacts related to the construction and operation of the dam improvements are analyzed and mitigated within this EIR. The Project would not require additional public water infrastructure to meet Project demands. Therefore, impacts related to water facilities are less than significant, and no mitigation is required.

Wastewater

No Impact. The Project does not include construction or expansion of any wastewater facilities. In addition, the Project would not result in additional population, and the Project would not require additional public wastewater infrastructure to meet Project demands. Therefore, no impact related to wastewater would occur, and no mitigation is required.

Stormwater

No Impact. The Project does not include construction or expansion of any stormwater facilities. The Project has been designed to accommodate anticipated storm flows and involves raising the existing spillway 6 feet to 797.9 feet, which is 2 feet higher than the existing maximum water storage elevation with the flashboards installed. Raising the spillway would allow the lake to impound water up to the 797.9-foot elevation contour year-round, which would allow storage of

approximately 1,600 acre-feet of additional water. IRWD estimates that the upper two feet of the reservoir (i.e., 795.9 to 797.9 elevation contours) could be inundated for an approximate maximum of 30 to 45 days per year but typically would be inundated for less time. The Project also includes an emergency outlet facility which would control flow and dissipate energy as water is released into the existing Santiago Creek. Erosion control measures would be implemented to minimize the potential for erosion in the creek as discussed in Section 4.9, Hydrology and Water Quality. Therefore, the Project is designed to accommodate storm flows and no impact related to stormwater facilities would occur; no mitigation is required.

Electricity

Less Than Significant Impact. Construction of the Project would require relocation of the existing SCE overhead power lines and power poles at the downstream toe of the dam within the Project vicinity. The existing power lines would be moved and placed outside of the construction limits. SCE would relocate the existing overhead electrical lines as shown on Exhibit 3-16, Conceptual SCE Site Plan. The Project would not require any further relocation or construction of new or expanded facilities beyond what is currently proposed and analyzed as part of this EIR. Impacts would be less than significant, and no mitigation is required.

Natural Gas

No Impact. The Project does not include construction or expansion of any natural gas facilities. In addition, the Project would not result in an additional population, and the Project would not require additional public natural gas infrastructure to meet Project demands. Therefore, no impact related to natural gas would occur, and no mitigation is required.

Telecommunications

No Impact. The Project does not include construction or expansion of any telecommunications facilities. In addition, the Project would not result in an additional population, and the Project would not require additional public telecommunications infrastructure to meet Project demands. Therefore, no impact related to telecommunications would occur, and no mitigation is required.

Impact Conclusion: *The Project would not require or result in the relocation or construction of new or expanded wastewater treatment, storm drainage, natural gas, or telecommunications facilities. The Project would not result in additional demand for water supply. Construction of the Project would require relocation of the existing overhead power lines and power poles in the Project vicinity. This relocation would be completed by SCE prior to construction. The new poles would be placed outside of the construction limits for the Project and are not included as part of this Project. As such, impacts would be less than significant, and no mitigation is required.*

Threshold 4.16-2

Would the Project have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years?

Less Than Significant Impact. Water would be needed for various construction activities. The available water source in the Project vicinity is a 12-inch potable water line running along East Santiago Canyon Road south of Irvine Lake. IRWD would install a temporary highline from Santiago Canyon Road, along the Blue Diamond Haul Road to the staging area. The temporary construction water line would be routed above-ground through the Irvine Lake parking area and

along the primary contractor access/haul road to the proposed working areas. However, the amount of water required would not be substantial and the Project is consistent with the General Plan, which anticipates water use and plans for future water supplies.

In addition, IRWD's 2020 UWMP water reliability analysis indicated that IRWD is reliable throughout all conditions including normal, single dry year, multiple dry year and extended drought (IRWD 2021).

IRWD imports water from MWD (via Lake Mathews, which is primarily Colorado River Water). MWD has determined and stated in its 2020 UWMP that it is able to meet the current and projected full service demands of its member agencies under all three hydrologic conditions through 2045 by developing and implementing water resources programs and activities through its preferred resource mix. As such, IRWD maintains water supplies that are sufficient to serve reasonably- foreseeable future development including the Project site, during normal, dry, and multiple dry years.

In addition, a primary purpose of the Project is to improve water supply reliability, because IRWD uses water from Irvine Lake as a source of water for the Baker Water Treatment Plant, which produces drinking water for an estimated 85,000 homes in the County The Project would include an inclined outlet structure that would be placed near the left abutment of the existing dam, and replacement of the existing spillway with a side-channel spillway on the left abutment. The spillway crest would be raised by six feet to regain operational storage capacity that was lost over the years due to sedimentation. The Project would also modify the existing dam embankment by removing the dam face, constructing a filter drain system, and encapsulating the filter drain system with embankment shell material. The dam crest would also be widened to approximately 35 to 45 feet wide to accommodate a wider access road, and protective railings would be installed on both sides of the access road. Therefore, the Project would provide additional capacity and improve water supply reliability for IRWD and its service area. The Project would have sufficient water supplies available. Therefore, any impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *The Project would not result in a significant additional demand for water. Less-than-significant water-related impacts would occur, and no mitigation is required.*

Threshold 4.16-3

Would the Project result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?

No Impact. As noted previously, the Project would not include construction or expansion of any wastewater facilities. The Project would involve removal of the dam keeper's house and associated septic system, which would result in a minor reduction of wastewater generation. In addition, the Project would not result in an additional population, and the Project would not require additional public wastewater infrastructure to meet Project demands. Therefore, the Project would not require wastewater capacity. No impact related to wastewater would occur, and no mitigation is required.

Impact Conclusion: *The Project would result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the*

provider's existing commitments. No impacts would occur, and no mitigation is required.

Threshold 4.16-4

Would the Project generate solid waste in excess of State or local standards or in excess of the capacity of Local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Less Than Significant Impact. As stated in Section 3.0, Project Description, the closed Santiago Canyon Landfill is located adjacent to the west of Irvine Lake. A new access road and ramp would be constructed to provide vehicle access to the new inlet/outlet structure. A new retaining wall would be needed to cut the roadway into the existing slope without affecting the existing closed Santiago Canyon Landfill facility. Additionally, a new emergency access walkway (approximately five feet wide) and stair system would be constructed along the left wall of the new spillway channel to reach the inlet/outlet structure and dam crest from the adjacent landfill during a spillway event. The walkway would connect to the new access. The Project would also modify the existing dam embankment by removing the dam face, constructing a filter drain system, and encapsulating the filter drain system with embankment shell material. The dam crest would also be widened to approximately 35 to 45 feet wide to accommodate a wider access road, and protective railings would be installed on both sides of the access road. During construction activities, the Project would implement all Best Management Practices (as further described in Section 4.9, Hydrology and Water Quality) and appropriate geotechnical measures (as further described in Section 4.6, Geology and Soils) to ensure the Project would not impact the adjacent closed landfill. In addition, access to the site would not inhibit access to the existing FRB Landfill, located south of the site, as discussed further in Section 4.14, Transportation.

Solid waste generated from the Project site would likely be disposed of at the FRB Landfill, which is part of the Orange County landfill system operated by OC Waste & Recycling. As stated above, the landfill is permitted to receive a maximum of 11,500 tpd with a 6,214 tpd daily annual average. Solid waste would be generated during construction related to demolition and construction activities and would be periodically generated during operations from temporary maintenance activities. As confirmed by OC Waste & Recycling, the increase in solid waste disposal resulting from implementation of the Project could be accommodated within the permitted capacity of the County's overall landfill system, which includes the Frank R. Bowerman Landfill. The County of Orange maintains 15 years of countywide solid waste landfill capacity as required by AB 939 (Halligan 2023). A less than significant impact related to landfill capacity would occur from implementation of the proposed Project, and no mitigation is required.

Impact Conclusion: *The Project would not generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure or otherwise impair the attainment of solid waste reduction goals. Impacts would be less than significant, and no mitigation is required.*

Threshold 4.16-5

Would the Project comply with federal, State, and Local Management and reduction statues and regulations related to solid wastes including the CIWMP (County Integrated Waste Management Plan)?

No Impact. Solid waste practices in California are governed by multiple federal, State, and local agencies that enforce legislation and regulations to ensure landfill operations minimize impacts to public health and safety and the environment. OC Waste & Recycling is obligated to obtain a

Solid Waste Facilities Permit, a Storm Water Discharge Permit, and a permit to construct and operate gas management systems and to meet Waste Discharge Requirements. The Local Enforcement Agency and the SWRCB enforce landfill regulations related to health, air quality, and water quality, respectively.

During construction activities, the Project would comply with OC Waste & Recycling's Construction & Demolition Program and with the 65% diversion requirement associated with applicable construction and demolition projects. Applicants can achieve diversion through reuse, recycling, and/or composting of construction and demolition materials at County-approved facilities or use of a County Franchised Waste Hauler. Additionally, the Project would comply with OC Waste & Recycling's specific criteria for the acceptance of clean soil in order to protect the environment and ensure regulatory compliance (Halligan 2023). Therefore, the proposed Project would not inhibit OC Waste & Recycling's compliance with regulatory requirements and would comply with all applicable federal, State, and local regulations. No impact would occur, and no mitigation is required.

Impact Conclusion: *The Project would comply with federal, State, and Local Management and reduction statues and regulations related to solid waste. No impact would occur, and no mitigation is required.*

4.16.6 CUMULATIVE IMPACTS

The proposed Project does not have a residential component that would generate population or significantly increase demand for utilities and service systems. While other projects in the area with residential elements would result in increased demand on existing utility-related facilities and services, the proposed Project would not contribute to any cumulative impact on existing facilities or require construction of such facilities that would impact the environment.

More specifically in terms of water, because the Project is consistent with the County General Plan land use designation for the site, which takes into account water requirements, the Project would not result in the unplanned-for or excessive use of water. The Project itself aims to increase water supply reliability within the service districts of IRWD, and no cumulatively considerable impact to water resources would occur.

All cumulative projects would be required to upgrade and install infrastructure, as needed, to accommodate each project, in coordination with utility service providers and the County. These on and off-site improvements would be analyzed as part of each project's environmental review and would be mitigated to the extent feasible. Therefore, cumulative impacts related to the relocation or upgrade of utilities are not anticipated. Each cumulative project would also be required to evaluate and confirm the availability of water and wastewater treatment services as part of their environmental and discretionary review process. Therefore, cumulative impacts related to the reliability of water and wastewater services would also be less than significant. Finally, solid waste that would be generated by the cumulative projects as well as the proposed Project would not be cumulatively considerable given that these projects would collectively generate a very small percentage of the daily capacity for the landfills that would receive these projects' waste. Also, the County of Orange's solid waste landfill system would have the capacity to provide the proposed Project with long-term solid waste disposal services, both on a project-specific and cumulative basis given that the County of Orange maintains 15 years of countywide solid waste landfill capacity, as required by AB 939. Therefore, the Project would not result in any contribution to the cumulative physical impact on existing utility capacities, facilities, and services.

4.16.7 MITIGATION PROGRAM

Mitigation Measures

The proposed Project would not result in significant utilities and service systems impacts; therefore, no mitigation measures are required.

4.16.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The Project would not result in Project-specific and cumulative impacts associated with demand on existing utility capacities, facilities, and services. No construction of new or expansion of existing utility facilities would be required resulting in physical effect on the environment. The potential impacts would be less than significant.

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4.17 WILDFIRE

This section of the Environmental Impact Report (EIR) describes the existing wildfire hazards in the Project area and identifies associated potential wildfire risks related to development of the proposed Project.

4.17.1 REGULATORY SETTING

The following State and local regulations require actions reducing death, injuries, and property damage that can result from wildfire.

State Requirements

California Building Code

New construction in any Fire Hazard Severity Zone (FHSZ) must comply with California Building Code (CBC) Chapter 7A, *Materials and Construction Methods for Exterior Wildfire Exposure.* CBC Chapter 7A sets forth requirements pertaining to roofing; vents (covered with metal wire mesh or other materials with openings no larger than 0.125 inch); exterior coverings; floor projections; underfloor protection; exterior windows, skylights, and doors; decking; accessory structures; and use of ignition-resistant materials.

California Fire Code

The 2022 California Fire Code (CFC), California Code of Regulations, Title 24, Part 9, effective January 1, 2020, is based on the 2021 International Fire Code. Typical fire safety requirements of the CFC include requirements for the installation of fire sprinklers; building materials, and particular types of construction; and the clearance of debris and vegetation within a prescribed distance from occupied structures within wildfire hazard areas. In addition, the CFC addresses fire flow requirements, fire hydrant spacing, and access road specifications.

California Department of Forestry and Fire Prevention Fire Prevention Program

The California Department of Forestry and Fire Prevention's (CAL FIRE's) Fire Prevention Program consists of various activities including wildland pre-fire engineering, vegetation management, fire planning, education, and law enforcement. Common projects include fire break construction and other fire fuel reduction activities that lessen the risk of wildfire to communities. These activities include brush clearance around communities, along roadways, and evacuation routes. Other important activities include defensible space inspections, emergency evacuation planning, fire prevention education, fire hazard severity mapping, implementation of the State Fire Plan, fire-related law enforcement activities such as investigations to determine fire cause and origin as well as arson cases, and support for local government fire safe planning in the State Responsibility Area (SRA).

CAL FIRE prepares FHSZ maps for SRA and Local Responsibility Areas (LRA) considering many factors such as fire history, existing and potential fuel (natural vegetation), flame length, blowing embers, terrain, and typical weather for the area (CAL FIRE 2024). Wildland fire protection in California is the responsibility of either the State, local government, or the federal government.

Cal/Occupational Safety and Health Administration (OSHA) Regulations (CCR Title 8)

The California Division of Occupational Safety and Health Administration (Cal/OSHA) has the primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally-approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the Code of Federal Regulations (CFR). Cal/OSHA standards are generally more stringent than federal regulations. The use of hazardous materials in the workplace requires employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.

California Public Resources Code

The California Public Resources Code (PRC) was established in 1939 by the California Code Commission. The PRC contains law relating to natural resources, the conservation, utilization, and supervision thereof, along with mines and mining, oil and gas, and forestry. The following sections of the PRC are relevant to the proposed Project:

PRC 4427: During any time of the year when burning permits are required in an area pursuant to this article, construction personnel are prohibited from use or operating any motor, engine, boiler, stationary equipment, welding equipment, cutting torches, tarpots, or grinding devices from which a spark, fire, or flame may originate, which is located on or near any forest-covered land, brush--covered land, or grass-covered land, without first clearing all flammable materials within 10 feet of the operation and maintaining a water-type fire extinguisher equipped and ready for use.

PRC 4428: No person, except any member of an emergency crew or except the driver or owner of any service vehicle owned or operated by or for, or operated under contract with, a publicly- or privately--owned utility, which is used in the construction, operation, removal, or repair of the property or facilities of such utility when engaged in emergency operations, may use or operate any vehicle, machine, tool or equipment powered by an internal combustion engine operated on hydrocarbon fuels, in any industrial operation located on or near any forest, brush, or grass--covered land between April 1 and December 1 of any year, or at any other time when ground litter and vegetation will sustain combustion permitting the spread of fire, without providing and maintaining, for firefighting purposes only, suitable and serviceable tools in the amounts, manner, and location prescribed in this section.

PRC 4431: During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate or cause to be operated in the area any portable saw, auger, drill, tamper, or other portable tool powered by a gasoline-fueled internal combustion engine on or near any forest-covered land, brush-covered land, or grass-covered land, within 25 feet of any flammable material, without providing and maintaining at the immediate locations of use or operation of the saw or tool, for firefighting purposes one serviceable round point shovel, with an overall length of not less than 46 inches, or one serviceable fire extinguisher. The Director of Forestry and Fire Protection shall by administrative regulation specify the type and size of fire extinguisher necessary to provide at least minimum assurance of controlling fire caused by use of portable power tools under various climatic and fuel conditions.

The required fire tools shall at no time be farther from the point of operation of the power saw or tool than 25 feet with unrestricted access for the operator from the point of operation.

PRC 4442:

(a) Except as otherwise provided in this section, no person shall use, operate, or allow to be used or operated, any internal combustion engine which uses hydrocarbon fuels on any forest-covered land, brush-covered land, or grass-covered land unless the engine is equipped with a spark arrester, as defined in subdivision (c), maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire pursuant to Section 4443.

(b) Spark arresters affixed to the exhaust system of engines or vehicles subject to this section shall not be placed or mounted in such a manner as to allow flames or heat from the exhaust system to ignite any flammable material.

(c) A spark arrester is a device constructed of nonflammable materials specifically for the purpose of removing and retaining carbon and other flammable particles over 0.0232 of an inch in size from the exhaust flow of an internal combustion engine that uses hydrocarbon fuels or which is qualified and rated by the United States Forest Service.

(d) Engines used to provide motive power for trucks, truck tractors, buses, and passenger vehicles, except motorcycles, are not subject to this section if the exhaust system is equipped with a muffler as defined in the Vehicle Code.

(e) Turbocharged engines are not subject to this section if all exhausted gases pass through the rotating turbine wheel, there is no exhaust bypass to the atmosphere, and the turbocharger is in effective mechanical condition.

(f) Motor vehicles when being operated in an organized racing or competitive event upon a closed course are not subject to this section if the event is conducted under the auspices of a recognized sanctioning body and by permit issued by the fire protection authority having jurisdiction.

PRC 4291:

Sets forth requirements for defensible space, including clearing most flammable vegetation within 30 feet of buildings, and reducing flammable vegetation 30 feet to 100 feet from buildings.

Local Requirements

Orange County Municipal Code

The CFC is adopted as Section 3-3-1 et seq. of the Orange County Municipal Code. Section 3-3-31, Chapter 49 Requirements for Wildland-Urban Interface Fire Areas to ensure Fuel Modification plans shall be reviewed and approved by the Orange County Fire Authority for all new buildings to be built or installed in wildfire risk area.

ReadyOC

ReadyOC is a public outreach effort aimed at educating and empowering Orange County residents, businesses, and the community to better prepare for emergency situations. The primary goal is to ensure local residents are well prepared for a variety of emergency situations that could impact the County and to offer opportunities for concerned citizens to get involved in local readiness efforts.

Funded through the U.S. Department of Homeland Security, ReadyOC is administered by the Santa Ana and Anaheim police departments as part of the Urban Area Security Initiative in conjunction with the Orange County Sheriff's Department. The campaign is guided by the

ReadyOC Steering Committee composed of emergency management personnel representing several local government agencies and advised by a Corporate Advisory Council that includes many of Orange County's leading businesses and organizations (ReadyOC 2023).

Orange County

General Plan, Public Services & Facilities Element

The Public Services and Facilities Element, one of nine elements of the General Plan, sets forth a comprehensive strategy for the planning, management, and implementation of public facilities that are necessary to meet Orange County's existing and future demands. The Public Services and Facilities Element focuses on those publicly-managed services and facilities which have a direct influence on the distribution and intensity of development that can be accommodated through the utilization of existing technologies and assumptions that are used to determine adequate service levels. These services include community services, such as fire protection (County of Orange 2012a).

The Community Facilities section of the Public Services & Facilities Element specifically discusses the Orange County Fire Authority (OCFA), fire protection services, and fire station locations.

The following goals and objectives of the Public Services & Facilities Element pertaining to fire services are applicable to the Project:

Goal 1: Provide a safe living environment ensuring adequate fire protection facilities and resources to prevent and minimize the loss of life and property from structural and wildland fire damages.

Objective 1: To achieve desired level of fire protection and paramedic service through coordinated land use and facility planning.

Policy 1: Facility Siting: Fire/paramedic facilities shall be sited in locations so as to assure efficient fire rescue and paramedic response for the service area. General criteria for site selection shall include:

a) Call response time: for 80 percent of the service area, first fire engine to reach the emergency scene within 5 minutes and paramedic to reach the scene within 8 minutes.
b) Land use compatibility: stations shall be located in commercial or industrial, or open space zones in order to avoid the disturbance to residential areas wherever possible.
c) Street access: stations shall be located adjacent to arterial highways with controlled traffic signalization.

Policy 3: Site Design Criteria – Require all land use proposals to implement adequate site design so as to maximize fire protection and prevention in order to minimize potential damages. The site design criteria shall be established to reflect the levels of protection needed for projects in various fire hazard areas. Such criteria shall include consideration as to: structure type and density, emergency fire flow and fire hydrant distribution, street pattern and emergency fire access, fuel modification programs, automatic fire sprinkler systems, and other requirements as determined by the Fire Chief.

In accordance with the Insurance Services Office (ISO) suggested standards, ultimate fire protection ratings shall be maintained by General Plan land use categories as follows: (1) ISO 3

for all urban developments including Residential (1C and 1B), Commercial (2A and 2B), Employment (3.0), and Public Facilities (4.0) which are within five miles from a fire station and less than 1000 feet from a hydrant; and (2) ISO 4 for Rural Residential (1A) which are within five miles from a fire station and less than 100 feet from a hydrant. For areas greater than five miles or 1000 feet, the ISO suggested standard is 9.

General Plan, Safety Element

The Safety Element, one of nine elements of the General Plan, contains County policies on identified and potential hazards and safety considerations, their mitigation (i.e., reduction in damage and loss to real and personal property and minimization of adverse social and economic impacts), and implications for development.

The Fire section of the Safety Element examines the threat of fire to urban areas, wildlands, and the Wildland-Urban Interface (WUI). Fire is a constant threat in all parts of the County. It is the responsibility of the Orange County Fire Authority to meet the fire threat challenge for present and future development and residents (County of Orange 2012b).

The following goal of the County of Orange General Plan Safety Element pertaining to wildfire is applicable to the Project:

Goal 1: Provide a safe living environment, ensuring adequate fire protection facilities and resources to prevent and minimize the loss of life and property fire.

Unified County of Orange and Orange County Operational Area Emergency Operations Plan

The Unified County of Orange (County) and Orange County Operational Area (OA) Emergency Operations Plan (EOP) provides guidance and procedures for the County and the County as the OA to prepare for and respond to significant or catastrophic natural, technological, or conflict-related incidents that produce situations requiring a coordinated response. It further provides guidance regarding management concepts, identifies organizational structures and relationships, and describes responsibilities and functions of the emergency organization to protect life and property. The plan incorporates and complies with the principles and requirements found in State and federal laws, regulations, and guidelines. The EOP outlines procedures for coordination between City, County of Orange, State, and federal authorities in emergency responses, and for City requests for mutual aid from such authorities (County of Orange 2016).

County of Orange & Orange County Fire Authority Local Hazard Mitigation Plan

The Local Hazard Mitigation Plan (LHMP) is a multi-jurisdiction plan developed jointly between the County of Orange, local governments, and the Orange County Fire Authority, a Joint Powers Authority (County of Orange and Orange County Fire Authority 2015). This collaborative plan was developed to ensure that each participating agency has met the requirements of 44 CFR §201.6. The current approved Local Hazard Mitigation Plan is adopted as an element of the County of Orange General Plan under Chapter IX – Safety Element as required under California Government Code §8685.9 and §65302.6. As a multi-jurisdiction plan, the document focuses on mitigating all natural hazards impacting unincorporated areas of the County as well as County and Orange County Fire Authority-owned facilities. The Orange County Fire Authority provides fire suppression and prevention services to the County's unincorporated areas as well as a variety of other jurisdictions and contracts under their Joint Powers Authority. As a result, fire mitigation strategies in this plan are inclusive of all areas served by the Fire Authority.

The Orange County Fire Authority Local Hazard Mitigation Plan (OCLHMP) discusses factors that exacerbate fire risk such as vegetation, weather, topography, and fuel hazards. The OCLHMP provides requirements for developments at the WUI, where the Project resides. These include requiring the construction of fuel modification zones (firebreak, fuel break, or green belt) in unincorporated County areas.

The proposed Project is located within unincorporated Orange County and would therefore be subject to compliance with the OCLHMP. The OCLHMP identifies hazard-mitigation measures to limit the impact of wildland fires in Orange County. The OCFA is the responsible agency for these mitigation measures, which include the list below.

- Implementation of a real-time remote sensing and fire detection platform to increase the ability to detect, respond to, and monitor wildland areas in Orange County.
- Increase communication, coordination, and collaboration between WUI property owners, local and county planners, and fire prevention crews and officials to address risk, existing mitigation measures, and federal assistance programs.
- Reduce the amount of combustible fuels within identified at-risk communities.
- Encourage implementation of wildfire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability.
- Evaluate and implement roadway-hardening measures on identified high risk roadways in wildland areas in Orange County.
- Enhance outreach and education programs aimed at mitigating WUI hazards thereby reducing the exposure of stakeholders (public and private) to these hazards.
- Establish a countywide wildland fire prevention education task force.
- Enhance the efficiency of WUI/Intermix response and recovery activities.
- Development and dissemination of maps relating to the fire hazard to help educate and assist builders and homeowners in being engaged in wildland/urban mitigation activities and to help guide emergency services during response.
- Inventory alternative firefighting water sources and encourage the development of additional sources.

4.17.2 METHODOLOGY

Several maps of designated wildfire hazard zones (FHSZ, CAL FIRE; and WUI area, (US Forest Service) were reviewed to determine whether the Project site or surrounding open space areas are mapped in any of those zones or areas.

4.17.3 EXISTING CONDITIONS

The Santiago Creek Dam is a compacted earthfill embankment comprised of an outlet tower and spillway. Existing structures include the dam, outlet tower in Irvine Lake, spillway channel, flashboard storage shed, control house/outlet works, energy dissipater structure, Irvine Lake pipeline, and dam access road.

Surrounding land uses primarily consist of undeveloped open space. Irvine Regional Park is located northwest of State Route (SR) 241, Limestone Canyon Regional Park is located south of Santiago Canyon Road, and Oak Canyon Park is located at the southeast end of Irvine Lake. The

closed Santiago Canyon Landfill is located adjacent to the west of Irvine Lake. Residential development is located west of SR-241.

The Project site is located in the Central/Coastal Subregion of the Natural Communities Conservation Plan/Habitat Conservation Plan. Santiago Dam and its associated structures are located within designated "Non-Reserve Open Space", while Habitat Reserve and Conservation Easements surround the lake; a Special Linkage is located southeast of the lake. Vegetated slops surround the Santiago Dam, including vegetation types such as: sagebrush scrub, disturbed sagebrush scrub, sagebrush-coyote bush scrub, southern cactus scrub, disturbed southern cactus scrub, disturbed floodplain sage scrub, toyon-sumac chaparral, annual grassland, ruderal, riparian herb, southern willow scrub, mulefat scrub, disturbed mulefat scrub, southern sycamore riparian woodland, southern sycamore-coast live oak riparian woodland, southern black willow forest, disturbed southern black willow forest, southern black willow forest/riparian herb, coast live oak woodland, and western sycamore, and vegetated fluctuating shoreline.

Wildfire Context

Fires are a natural part of the landscape in California; however, with the changing weather patterns brought by climate change, the fire season is coming earlier and ending later than in the past (USFS 2024a). In the last five years (2019 - 2023), there have been 7,521 wildfires that have burned 1,563,049 acres in California (CAL FIRE 2023b). Drought or extended periods of low rainfall can dry out fuel, increasing its risk of burning. Periods of high rainfall decrease fire risk because there is more moisture in the vegetation; however, years of high rainfall increase the fuel load with growth of vegetation and weeds. In the Project region, Santa Ana wind conditions also increase the risk of fire with dry, gusty winds (CAL FIRE 2023b). According to the National Park Service, approximately 85 percent of wildfires are caused by humans. Human-caused wildfires are due to campfires left unattended, the burning of debris, equipment use and malfunctions, negligently discarded cigarettes, and intentional acts of arson (NPS 2022).

The climate of Southern California, including the Project site, has been characterized by fire climatologists as the worst fire climate in the United States with high winds (Santa Ana) occurring during autumn after a six-month drought period each year (Keeley 2004).

Contributing Wildfire Factors

Fire environments are dynamic systems and include many types of environmental factors and site characteristics. Fires can occur in any environment where conditions are conducive to ignition and fire movement. Assessment of existing wildfire risk in an area involves five major factors: fuel, topography, weather, resources exposed to wildfire; and effects of wildfire on those resources (LACCEO 2014; NPS 2017; IBHS 2023). The state of each of these components and their interactions with each other determines the potential characteristics and behavior of a fire at any given moment.

1. **Fuel.** Many types of vegetation are fuel for wildfires, including forest, woodland, scrub (including chaparral and sage scrub), and grassland (LACCEO 2014)
2. **Topography.** The rate of wildfire spreading upslope will likely double with a doubling of grade (PVE and RHE 2013). Heat rising in front of fire heats and dries upslope fuels, speeding combustion. Gulches and canyons funnel air, like a chimney, which intensifies fire and speeds fire spread (PVE and RHE 2013).
3. **Weather.** Extreme fire weather is hot and dry, with strong winds. Hot, dry northeasterly winds, such as the Santa Ana winds common in the Los Angeles region in autumn, contribute to spreading wildfire (LACCEO 2014).

4. **Resources.** Resources exposed to wildfire include people, structures, other cultural resources, wildlife, and vegetation.
5. **Effects of wildfire.** In addition to their many adverse effects, wildfires have several favorable effects, including removing underbrush and debris, thus providing space and sunlight for new plants and aiding regeneration of fire-dependent plant species (BLM 2024). The discussion of effects in this section focuses on adverse effects of wildfires.

Wildland fire may transition to urban fire if structures are receptive to ignition. Understanding the existing wildland vegetation and fuel conditions on and around the project site is necessary to understand the fire environment.

State and Local Responsibility Areas

As defined by PRC Section 4126, SRAs are State- and privately-owned forest, watershed, and rangeland for which the primary financial responsibility of preventing and suppressing wildland fires rests with the State. State Responsibility Areas, by definition, do not include any lands within city limits. Within SRAs, CAL FIRE maps fire hazard severity zones based on factors such as fuel, slope, and fire weather to identify the degree of fire hazard throughout California (e.g., moderate, high, or very high). CAL FIRE also provides recommendations for fire hazard severity zones within LRAs, but the responsibility for mapping LRAs lies within the local jurisdiction responsible for fire management and control within the LRA. While fire hazard severity zones do not predict when or where a wildfire will occur, they do identify areas where wildfire hazards could be more severe and therefore are of greater concern.

According to the California Fire Hazard Severity Zone Viewer, the Project site is located within a very high FHSZ in an SRA. The areas surrounding the Project site, which are primarily open space areas, are also located within a very high FHSZ, with the exception of a portion of Irvine Lake, which is located within a high FHSZ within an SRA (CAL FIRE 2023a). The OCFA also provides a daily Fire Rating for coastal, inland and mountain areas (OCFA 2024d). This website can provide updates and local rates on the present status of fire danger within the OCFA service area. Additionally, the Project site and surrounding areas are not in a WUI area (that is, an area where structures and other human developments meet or intermingle with wildland vegetative fuels) mapped by the US Forest Service. (USFS 2024b).

Firefighting Resources in the Project Region

The OCFA provides regional fire protection, emergency medical services, and rescue services to the unincorporated areas of Orange County, including the Project site, plus 22 cities. Resources are deployed based upon a regional service delivery system that assigns personnel and equipment to emergency incidents without regard to jurisdictional boundaries. The equipment used by the department has the versatility to respond to both urban and wildland emergency conditions (County of Orange 2012). The nearest OCFA Station is Station No. 8, located at 10631 Skyline Drive, Santa Ana, approximately 5.8 miles west of the Project site (OCFA 2024a). In addition, the nearest fire station outside of the OCFA jurisdiction is Orange City Fire Department Station 7, located at 8501 E. Fort Road, Orange, approximately three miles west of the Project site, which would be able to respond, if necessary, in the event of an emergency.

The OCFA Operations section also includes the California Urban Search and Rescue Task Force 5, which is a State task force that responds as a FEMA or California OES resource during national or regional emergencies such as earthquakes, hurricanes, or other natural and manmade disasters; the Emergency Planning and Coordination section, which provides emergency management planning, agreement coordination, and homeland security grand coordination; and

investigations section, which conducts fire investigation and evaluation and initiates early intervention strategies (OCFA 2024b).

Additionally, OCFA has an air operations team with multiple helicopters for firefighting and emergency rescue purposes. The helicopter operation is located at Fullerton Airport, located at 4011 West Commonwealth Avenue, Fullerton, approximately 20 miles northeast of the Project site (OCFA 2024c).

4.17.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, the Project would result in a significant wildfire impact where:

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

Threshold 4.17-1 Substantially impair an adopted emergency response plan or emergency evacuation plan?

Threshold 4.17-2 Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Threshold 4.17-3 Require installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Threshold 4.17-4 Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage change?

4.17.5 IMPACT ANALYSIS

Project Design Features

PDF WILDF-1 The Project will comply with the general provisions of the Orange County Fire Authority fire prevention requirements, including prohibiting operation of any stationary equipment, welding equipment, cutting torches, tarpots, or grinding devices from which a spark, fire or flame may originate on or near any forest-covered land, brush covered land, or grass covered land, without:

1. Having an IRWD approved Hot Work Permit;
2. Prior to starting construction activities, soaking around the work area for a distance of 30 feet to reduce fire spread into wildlands, which shall remain soaked for the duration of the work;
3. Maintaining, at a minimum, one serviceable round point shovel with an overall length of not less than forty-six (46) inches and one backpack pump water-type fire extinguisher fully equipped and ready for use at the immediate area during the operation;

4. Stopping work when winds are 8 MPH during periods when relative humidity is less than 25%, or a Red Flag condition has been declared or public announcement is made, or when an official sign was caused to be posted by the Orange County Fire Authority or IRWD; or
5. Keeping a cell phone nearby and calling 911 immediately in case of a fire.

PDF WILDF-2 The Project will comply with the general provisions of the Orange County Fire Authority, including prohibiting operation of either mechanized or non-mechanized equipment during Red Flag Warnings as declared by the Orange County Fire Authority or other jurisdictional agency or IRWD determines hazardous conditions exist and informs the Project Contractor of such.

PDF WILDF-3 The Project will comply with the general provisions of the Orange County Fire Authority, including training all construction personnel in the requirements of the Fire Prevention and Response Plan prior to construction. The Plan will outline the responsibilities for prevention, pre-suppression and suppression activities associated with fire hazards for the Project. Additionally, fire safety information shall be disseminated to construction personnel during regular safety meetings and fire management techniques shall be applied during construction.

Regulatory Requirements

RR WILDF-1 The Project will comply with the general provisions of the California Fire Code relating to fire safety, emergency access, and emergency egress routes.

RR WILDF-2 The Project will comply with PRC Sections 4427, 4428, 4431, and 4442, related to the handling of combustible fuels and equipment that can exacerbate fire risks, in addition to fire protection and prevention requirements specified by the California Code of Requirements and California Division of Occupational Safety and Health Administration . This includes various measures such as easy accessibility of firefighting equipment, proper storage of combustible liquids, no smoking in service and refueling areas, and worker training for firefighter extinguisher use.

Threshold 4.17-1

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project substantially impair an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. As previously stated, the Project site is located within a very high FHSZ in an SRA, and the areas surrounding the Project site, which are primarily open space areas, are also located within a very high FHSZ (CAL FIRE 2023a).

The County does not have formally-designated evacuation routes, however, the major transportation routes in Orange County include the freeway system and surface streets. The Project site is located approximately 4.5 driving miles northeast of SR-261 and approximately four driving miles east of SR-241, which are the major freeways located in the site vicinity. The Project is located approximately four driving miles north of Santiago Canyon Road, which is the

major roadway available. These major freeways and roadways in the area would be utilized as the main evacuation routes in case of an emergency. In addition, the Orange County Sheriff's Department, in conjunction with the Santa Ana and Anaheim police departments, would implement ReadyOC to provide emergency preparedness in an emergency.

Construction of the proposed Project would not physically interfere with the outlying arterial roadway system as all construction activities and staging areas would be within the boundaries of the existing Santiago Creek Dam and would not impede the use of the surrounding freeways or streets. Existing access routes would be maintained at the Project site during construction activities and the proposed Project would not alter access. Implementation of the proposed Project would not alter traffic conditions or modify the local or regional circulation system, as discussed further in Section 4.14, Transportation, of this EIR. Further, IRWD's Project Manual includes specific fire hazard-reduction measures, such as **PDF WILDF-1** through **PDF WILDF-3**, that would be implemented during construction activities to reduce potential for wildfire impacts on site.

Additionally, the Project proposes ancillary site improvements, including a new access road and ramp to provide vehicle access to the new inclined/outlet structure and raising of the dam crest with a concrete parapet wall, providing a new emergency access walkway and stair system to reach the inclined inlet/outlet structure and dam crest from the adjacent landfill facility during a reservoir spill event, and a new prefabricated truss-type bridge structure across the proposed spillway. The Project would also modify the existing dam embankment by removing the dam face, constructing a filter drain system, and encapsulating the filter drain system with embankment shell material. The dam crest would also be widened to approximately 35 to 45 feet wide and elevated by up to approximately one foot to accommodate a wider access road, and protective railings would be installed on both sides of the access road. These site improvements would provide improved emergency access and allow expanded emergency access to the site. The Project would implement **RR WILDF-1**, which requires compliance with the general provisions of the CFC relating to fire safety, emergency access, and emergency egress routes, which would provide emergency safety measures.

The Project would also comply with the Orange County EOP, which provides guidance and procedures for the County and the County as the OA to prepare for and respond to significant or catastrophic natural, technological, or conflict-related incidents that produce situations requiring a coordinated response. Much of the EOP is procedural, including setting forth roles and responsibilities of City agencies and officials in emergency responses; coordination between City, County, State, and federal authorities; and procedures for requesting mutual aid and for continuity of County government. Project development would not substantially impair implementation of the EOP. Therefore, the Project would not substantially impair an adopted emergency response plan or emergency evacuation plan, impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *The proposed Project would not substantially impair an adopted emergency response plan or emergency evacuation plan, as it would not prevent access to the local or regional circulation system and would improve an emergency access walkway in the case of a reservoir spill event with RR WILDF-1 and PDFs WILDF-1 through WILDF-3 incorporated. Therefore, the potential impacts associated with emergency access would be less than significant.*

Threshold 4.17-2

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Less Than Significant Impact. As indicated above, the Project site is located within a very high FHSZ in an SRA, and the areas surrounding the Project site, which are primarily open space areas, are also located within a very high FHSZ. These areas include slopes surrounding the Project site that may be susceptible to prevailing winds, as brush and grassland habitats are highly flammable. Vegetation on-site that may contribute to wildfire risk includes: sagebrush scrub, disturbed sagebrush scrub, sagebrush-coyote bush scrub, southern cactus scrub, disturbed southern cactus scrub, disturbed floodplain sage scrub, toyon-sumac chaparral, annual grassland, riparian herb, southern willow scrub, mulefat scrub, disturbed mulefat scrub, southern sycamore-coast live oak riparian woodland, southern black willow forest, disturbed southern black willow forest, southern black willow forest/riparian herb, coast live oak woodland, and western sycamore.

During construction, equipment and on-site diesel fuel could create a risk of wildfire with possible ignition sources such as internal combustion engines, gasoline-powered tools, and equipment that could produce a spark, fire, or flame. The use of spark-producing construction machinery within or adjacent to fire risk areas such as the surrounding open space areas, could expose temporary project workers and contractors to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire, resulting in a potentially significant impact. However, all personnel on the Project site would be required to comply with **RR WILDF-2**, which includes compliance with the PRC Sections 4427, 4428, 4431, and 4442, relating to the handling of combustible fuels and equipment that can exacerbate fire risks. During construction, strict adherence to these PRC sections would ensure that contractors are responsible for all monitoring and safety measures ensuring that any risk to exacerbate wildfire would be reduced. Additionally, all construction must comply with fire protection and prevention requirements specified by the California Code of Regulations (CCR) and Cal/OSHA. This includes various measures such as the easy accessibility of firefighting equipment, proper storage of combustible liquids, no smoking in service and refueling areas, and worker training for firefighter extinguisher use. Additionally, the Project would include installation of HeloPods[1] near the Flats area at the eastern edge of the lake at the upstream end of the reservoir for use in the absence of stored water in Irvine Lake.

Operation-related activities would involve a limited number of maintenance trucks for inspections and material delivery. These trucks would be limited to established access roads and would have a low potential of producing sparks, fire, or flame, that could result in uncontrolled spread of wildfire. Nevertheless, due to the site topography and wildfire risk, operators of the proposed Project site would comply with PRC Sections 4427, 4428, 4431, and 4442, which include regulations relating to the handling of combustible fuels and equipment that can exacerbate fire risks. Therefore, operational impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *The proposed Project would be surrounded by open space areas, however, it would not exacerbate wildfire risks within the area, as it would incorporate RR WILDF-2, and comply with all applicable regulations including PRC Sections 4427, 4428, 4431, and 4442 and Cal/OSHA. Therefore, the*

[1] Portable, tactical helicopter dip sources, which provide a water source to fire crews to refill the helicopters' water tanks closer to the location of a wildfire.

potential impacts associated with slope, prevailing winds, and other factors would be less than significant.

Threshold 4.17-3

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project require installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Less Than Significant Impact. As indicated above, the Project site is located within a very high FHSZ in an SRA, and the areas surrounding the Project site, which are primarily open space areas, are also located within a very high FHSZ.

Development of the proposed Project would include construction and operation of a new outlet tower, spillway improvements and access road improvements. The Project would also modify the existing dam embankment by removing the dam face, constructing a filter drain system, and encapsulating the filter drain system with embankment shell material. The dam crest would also be widened to approximately 35 to 45 feet wide to accommodate a wider access road, and protective railings would be installed on both sides of the access road. The proposed access road improvements are proposed for SCE utility line relocation. The Project, similar to other such projects, has the potential to increase the risk associated with wildfires due to the presence of heavy construction equipment, including the use of flammable liquids and the presence of internal combustion engines, which could generate sparks or cause leaks that create fire risks, as discussed in further detail above. All infrastructure installed as part of the Project during operation and maintenance will adhere to CCR Title 24, the CBC, and County of Orange Safety Element. Therefore, with regulatory compliance measures incorporated, installation or maintenance activities would not exacerbate wildfire risk and would not cause environmental impacts other than those analyzed throughout Section 4.0, Impact Analysis, of this EIR. Impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *The proposed Project would not exacerbate wildfire risks within the area as a result of installation or maintenance of associated infrastructure, as it would comply with all applicable regulations such as the California Code of Regulations Title 24, the California Building Code, and the County of Orange Safety Element. Therefore, the potential impacts associated with installation or maintenance of associated infrastructure would be less than significant.*

Threshold 4.17-4

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage change?

Less Than Significant Impact. As indicated above, the Project site is located within a very high FHSZ in an SRA, and the areas surrounding the Project site, which are primarily open space areas, are also located within a very high FHSZ.

During construction activities, site alteration through movement of substantial quantities of soil and earth materials has the potential to result in landslides as a result of runoff or drainage

changes during construction. As discussed in Section 4.9, Hydrology and Water Quality, given that the size of the proposed Project exceeds one acre, the Project would be required to comply with the National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ) (Construction General Permit) and local stormwater ordinances. These State and local requirements were developed to ensure that erosion is controlled on construction sites. The Construction General Permit requires preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which requires applications of Best Management Practices (BMPs) to control runoff from construction work sites. The BMPs would include, but would not be limited to, physical barriers to prevent erosion and sedimentation, construction of sedimentation basins, limitations on work periods during storm events, use of infiltration swales, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion from occurring during construction. In the event that a wildland fire is followed by a rain event, and results in downstream flooding or landslides as a result of post-fire runoff, the BMP measures required to be implemented under the SWPPP would reduce the risk of runoff, post-fire slope instability, and drainage changes. Additionally, the Project's design is required to be consistent with Division of Safety of Dams and US Army Corps of Engineers requirements and standards, and applicable seismic safety requirements of the CBC, among other requirements. This would include engineering design measures to appropriately manage risks of landslides affecting the Project.

During operations, the proposed Project would be designed to withstand a variety of site conditions to allow IRWD to impound water within Irvine Lake, a critical water supply reservoir for IRWD, and to maintain the reservoir, which provides flood control, water supply, fisheries enhancement, and recreational opportunities for the surrounding area. Operation of the proposed project would not involve onsite personnel that could be put at risk should landslides or flooding occur as a result of wildland fires. Operation of the proposed project would be managed in a manner that would not result in runoff, post-fire slope instability, or drainage changes as a result of potential wildland fire. As a result, impacts would be less than significant, and no mitigation is required.

Impact Conclusion: *The proposed Project would not expose people or structure to risks subsequent to wildfire, such as flooding or landslides, as it would comply with all applicable regulations during construction and operations. Therefore, the potential impacts associated with wildfire risks such as flooding, and landslides would be less than significant.*

4.17.6 CUMULATIVE IMPACTS

Projects considered in the cumulative impact analysis consist of four projects within a one-mile buffer of the Project, three of which are located in the unincorporated County of Orange and the fourth is located in the City of Orange. These related projects are described in more detail in Table 4-1, Cumulative Projects List, which is provided in Section 4.0, Impact Analysis.

All four of the cumulative projects including No. 1 (Loma Ridge Jeep Trail), No.2 (Below Irvine Lake), No. 3 (Haul Road and SR-241) and No. 4 (Blue Diamond Haul Road) are located within the very high FHSZ in an SRA, as designated by CalFire. As the cumulative projects would be located in a very high FHSZ within an SRA, these projects could potentially exacerbate wildfire risks, including risks subsequent to wildfire such as flooding and landslides.

However, similar to the proposed Project, other related projects would be required to comply with existing State, County and City laws, regulations, and guidelines addressing wildfire hazards,

including relevant CBC and CFC provisions; California Public Resources Code; the Orange County Municipal Code. Section 3-3-31, (which adopted the CFC as Section 3-3-1 et seq) and Chapter 49, Requirements for Wildland-Urban Interface Fire Areas, to ensure Fuel Modification plans shall be reviewed and approved by the OCFA for all new buildings to be built or installed in wildfire risk areas. As such, cumulative impacts would be less than significant after regulatory compliance, and Project's impacts would not be cumulatively considerable.

4.17.7 MITIGATION PROGRAM

Mitigation Measures

No mitigation measures have been identified for wildfire.

4.17.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Project-specific and cumulative wildfire impacts of the proposed Project would be less than significant with compliance with pertinent regulatory requirements listed above. No significant unavoidable wildfire impacts would occur.

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SECTION 5.0 ALTERNATIVES

5.1 INTRODUCTION

Sections 15126.6(a)–15126.6(b) of the State California Environmental Quality Act (CEQA) Guidelines (14 *California Code of Regulations* [CCR]) provides guidance on the range of alternatives to a proposed project that must be evaluated. The CEQA Guidelines state the following:

(a) Alternatives to the Proposed Project. An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The Lead Agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.

(b) Purpose. Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.

Pursuant to the CEQA Guidelines, a range of alternatives to the proposed Project is considered and evaluated in this Environmental Impact Report (EIR). These alternatives were developed in the course of Project planning and environmental review. The discussion in this section provides:

1. A description of alternatives considered;
2. An analysis of whether the alternatives meet most of the objectives of the Project (as presented in Sections 1.4 and 3.5 of this EIR and restated below); and
3. An analysis comparing the alternatives under consideration and the proposed Project. The focus of this analysis is to determine if the alternatives are capable of eliminating or reducing the significant environmental effects of the Project to a less than significant level.

5.2 CRITERIA FOR SELECTING ALTERNATIVES

Several criteria were used to select alternatives to the proposed Project. These criteria include the alternative's ability to achieve the Project Objectives, feasibility, and ability to eliminate or reduce significant impacts. Each of these are described below.

5.2.1 ABILITY TO ACHIEVE PROJECT OBJECTIVES

The ability of an alternative to meet most of a project's objectives is an important component when evaluating alternatives. When an alternative is selected, not only are the environmental impacts considered but so is the alternative's ability to meet a project's intended objectives. Section 15126.6(f) of the CEQA Guidelines (14 CCR) states the following:

> The range of alternatives required in an EIR is governed by a 'rule of reason' that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project.

The primary objective of the proposed Project is the rehabilitation and replacement of the Santiago Creek Dam outlet tower and spillway facilities as well as to modify the embankment to permit operation of the facilities for a long-term water resource benefit. In implementing the proposed Project, Irvine Ranch Water District (IRWD) would:

1. Create new facilities and dam embankment modifications that will meet or exceed the current seismic, safety and design requirements established by the California DWR DSOD, which is the governing state agency associated with this Project;
2. Satisfy IRWD's operational requirements in the present and the future;
3. Extend the useful life of the facilities;
4. Improve water supply reliability; and
5. Minimize impacts to local environmental resources and surrounding property owners.

5.2.2 FEASIBILITY

When developing alternatives for evaluation in an EIR, the feasibility of implementing the alternative must be considered. If a range of alternatives is developed but, due to regulatory restrictions, cannot be implemented, the analysis would not meet the CEQA intent to provide a reasonable range of feasible alternatives. Section 15126.6(f)(1) of the CEQA Guidelines (14 CCR) states the following:

> Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives (*Citizens of Goleta Valley v. Board of Supervisors* [1990] 52 Cal.3d 553; see *Save Our Residential Environment v. City of West Hollywood* [1992] 9 Cal.App.4th 1745, 1753, fn. 1).

It has been recognized that, for purposes of CEQA, "feasibility" encompasses "desirability" to the extent that the latter is based on a reasonable balancing of the relevant economic, environmental, social, and technological factors (*California Native Plant Society v. City of Santa Cruz* [2009] 177 Cal.App.4th 957, 1001). This balancing is harmonized with CEQA's fundamental recognition that policy considerations may render alternatives impractical or undesirable (Ibid.; see also *California Public Resources Code,* Section 21081; 14 CCR 15126.6[c] and 15364).

5.2.3 ELIMINATION/REDUCTION OF SIGNIFICANT IMPACTS

Section 15126.6(b) of the CEQA Guidelines states that "[b]ecause an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly".

The proposed Project, evaluated in Sections 4.1 through 4.17 of this EIR, results in a range of impacts. Therefore, the Alternatives evaluated in this section have been developed in an effort to reduce and/or eliminate one or more potentially significant impacts associated with the proposed Project. Although the level of impact may be the same for each alternative when compared to the CEQA Thresholds of Significance, the degree or severity of impact may be slightly different under each scenario.

A significant and unavoidable impact related to air quality was identified for the proposed Project and is briefly summarized below.

Air Quality

Based on the analysis presented, pollutant emissions from the proposed Project would exceed the SCAQMD thresholds and would result in a significant impact even with the implementation of mitigation measure MM AQ-1 and SCAQMD regulatory requirements. Additionally, the Project's construction activities would conflict with the 2022 AQMP's goal of reducing criteria pollutant emissions. Subsequently, the Project would in a temporary significant and unavoidable impact related to consistency with the AQMP.

The potentially significant adverse environmental impacts of the proposed Project, which require mitigation, are briefly summarized below.

Biological Resources

The Project has potential to impact special status plant and wildlife species. Potentially significant impacts were identified for mud nama, Crotch's bumble bee, western pond turtle, coastal California gnatcatcher, least Bell's vireo, bald eagle, and roosting bats. Additionally, wildlife using habitat adjacent to the Project could be indirectly impacted by construction noise, night lighting during construction, dust, and invasive plant species. Assuming implementation of PDF BIO-1 through PDF BIO-9 and with implementation of MM BIO-1 through MM BIO-8 these impacts would be reduced to less than significant. Therefore, the potential impact on special status species would be less than significant.

The Project would impact coastal sage scrub, riparian, and woodland habitats. The additional inundation during implementation of the Project would also affect a limited amount of these habitats. With implementation of MM BIO-3, MM BIO-4, and MM BIO-8 these impacts would be less than significant. Therefore, the potential impact on riparian habitats and sensitive natural communities would be less than significant.

The Project has potential to impact areas within the jurisdiction of the USACE, RWQCB, and CDFW. The Project also has potential to significantly impact water quality during construction. With implementation of MM BIO-5 these impacts would be less than significant. Therefore, the potential impact on state and federally protected wetlands and other jurisdictional resources would be less than significant.

Santiago Dam represents an existing barrier to wildlife movement; therefore, the Project would not impact wildlife movement along a regional wildlife corridor. However, the Project is located within a NCCP/HCP Reserve and wildlife movement in adjacent areas could be affected by noise, night lighting, and human activity during construction. With implementation of PDF BIO-1, PDF BIO-6, and PDF BIO-7, impacts would be less than significant.

The Project has potential to affect nesting birds/raptors, which are protected by the MBTA and California Fish and Game Code. With implementation of standard pre-construction surveys and nesting bird protections (PDF BIO-5), the impact would be less than significant, and no conflict with applicable requirements would occur.

The Project is consistent with the NCCP/HCP. With implementation of MM BIO-4 and MM BIO-6, the impact would be reduced to less than significant, and no conflict with the NCCP/HCP would occur.

Cultural Resources

The Project has potential to cause a substantial adverse change in the significance of an archaeological resource. However, potential effects would be mitigated to a less than significant level with the implementation of MM CR-1, which requires archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and MM CR-2 which provides details for treatment of unanticipated discoveries.

Geology and Soils

The Project has a potential to disturb paleontological resources. However, potential effects may be mitigated to a less than significant level with the implementation of MM GEO-1, which requires retention of a qualified Paleontologist to observe grading activities within undisturbed soils, including geotechnical investigations, and MM GEO-2 which provides details for treatment of unanticipated discoveries.

Hazards and Hazardous Materials

A portion of the Project site is located on the former Irvine Park-Army Camp and is currently designated on the Cortese List. With the implementation of MM HAZ-1, which requires USACE to make explosives safety education material available to landowners and the community, and coordinate with landowners as it plans required response activities, impacts would be less than significant.

Tribal Cultural Resources

Potential impacts to archeological resources would be mitigated to a less than significant level with the implementation of MM CR-1, which requires archaeological monitoring during grading activities within previously undisturbed soils, including geotechnical investigations, and MM CR-2 which provides details for treatment of unanticipated discoveries. Additionally, the Project would comply with the State requirements pertaining to the protection of human remains by implementing RR CR-1. Potential impacts to tribal cultural resources would be mitigated to a less than significant level with the implementation of MM TCR-1, MM TCR-2, and MM TCR-3, which detail procedures related to tribal monitoring and protocols for unanticipated discoveries.

The proposed Project would not result in potentially significant adverse impacts related to other environmental issues, including Aesthetics, Energy, Greenhouse Gas Emissions, Hydrology and

Water Quality, Land Use and Planning, Noise, Public Services, Recreation, Transportation, Utilities and Service Systems, and Wildfire.

5.2.4 ALTERNATIVE CONSIDERED BUT NOT CARRIED FORWARD

The CEQA Guidelines require that an EIR identify alternatives that were considered by the lead agency but rejected as infeasible along with a brief explanation of the reasons underlying this determination. Among the factors that may be used to eliminate alternatives from detailed consideration in the EIR are:

1. Failure to meet most of the basic project objectives,
2. Infeasibility, or
3. Inability to avoid significant environmental impacts (CEQA Guidelines Section 15126.6(c)).

In accordance with 15126.6(c) of the CEQA Guidelines, alternatives were considered by IRWD but rejected from further analysis due to one or more of the above reasons. A description of each alternative and the rationale for it being rejected from further consideration is provided below.

Repair of Existing Spillway

IRWD examined several retrofit alternatives. Repair of the existing spillway was determined infeasible from an engineering standpoint. Any design variation would result in the same impacts and modifying the existing spillway would involve essentially replacing the existing structure. Therefore, this alternative was omitted from further consideration.

Extended Construction Schedule

IRWD considered elongating the construction schedule by one year, which would reduce the intensity of daily construction activities and thereby reduce maximum daily air pollutant emissions to a certain degree. However, extending the overall duration of Project construction by another year would significantly increase the Project cost; would extend the amount of time the unimproved dam, outlet tower, and spillway would present safety risks to IRWD and the community; and would unduly prolong the length of time this critical water storage reservoir is out of service. Therefore, this alternative was omitted from further consideration.

Shorter Construction Workdays

IRWD considered implementing shorter construction workdays during the dry season instead of the 20-hour workdays included in the proposed Project. Shorter construction workdays would reduce the duration of daily construction activities and thereby reduce maximum daily air pollutant emissions to a certain degree. However, construction of the proposed Project necessitates 20-hour workdays during the dry season to accomplish construction within a reasonable timeframe due to seasonal restrictions associated with work during the wet season. As indicated above, extending the overall duration of Project construction would significantly increase the Project cost; would extend the amount of time the unimproved dam, outlet tower, and spillway would present safety risks to IRWD and the community; and would unduly prolong the length of time this critical water storage reservoir is out of service. Therefore, this alternative was omitted from further consideration.

5.2.5 ALTERNATIVE SITE

Section 15126.6(f)(2) of the CEQA Guidelines sets forth the following criteria for determining whether to identify an alternative site because "An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative" (14 CCR 15126.6[f][3]). Section 15126.6(f)(2) of the CEQA Guidelines (14 CCR) states the following:

(A) Key question. The key question and first step in analysis is whether any of the significant effects of the project would be avoided or substantially lessened by putting the project in another location. Only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR.

(B) None feasible. If the lead agency concludes that no feasible alternative locations exist, it must disclose the reasons for this conclusion, and should include the reasons in the EIR. For example, in some cases there may be no feasible alternative locations for a geothermal plant or mining project which must be in proximity to natural resources at a given location.

(C) Limited new analysis required. Where a previous document has sufficiently analyzed a range of reasonable alternative locations and environmental impacts for projects with the same basic purpose, the lead agency should review the previous document. The EIR may rely on the previous document to help it assess the feasibility of potential project alternatives to the extent the circumstances remain substantially the same as they relate to the alternative (*Citizens of Goleta Valley v. Board of Supervisors* [1990] 52 Cal.3d 553, 573).

Development of the Project on an alternative site was not carried forward for detailed consideration, as the Project consists of improvements to the existing Santiago Creek Dam outlet tower, spillway, and dam embankment and crest. It would not be feasible to carry out the Project in a different location.

5.3 ALTERNATIVES FOR ANALYSIS

In accordance with Section 15126.6(a) of the CEQA Guidelines, the discussion in this section of the EIR focuses on a reasonable range of alternatives. The analysis provides a comparison of the alternatives' varying environmental effects and their merits and/or disadvantages in relation to the proposed Project and to each other; their feasibility and ability to achieve Project Objectives are also discussed.

The following alternatives are analyzed in this EIR:

- **Alternative 1 – No Project Alternative.** This alternative assumes the site would continue to remain in its current state and would not meet current standards. The alternative would also reduce the useful life of the facilities, and reduce water supply reliability. The existing uses on the site would continue with restricted operations. The existing site improvements would remain unchanged, and no structures would be demolished.
- **Alternative 2 - Purchasing Water Alternative.** This alternative assumes IRWD need to purchase, on average, 5,070 acre feet (AF) of expensive imported supplies each year to meet demands currently met with the Irvine Lake native water supplies.

In accordance with Section 15126.6(a) of the CEQA Guidelines, this EIR provides a comparison of the environmental effects and their merits and/or disadvantages of each alternative in relation

to the proposed Project, as well as each alternative's ability to achieve the Project Objectives. To facilitate the readers' understanding, Table 5-1 provides a matrix that compares each alternative's ability to meet the Project Objectives. The level of environmental impact and ability to meet Project Objectives is considered in identifying the environmentally superior alternative, which is discussed in Section 5.4, Environmentally Superior Alternative.

The site's existing environmental setting would be the same for the proposed Project and all alternatives. Additionally, unless specifically identified, it is assumed that the Mitigation Program identified for the Project would also be applicable for the alternatives, unless otherwise noted.

TABLE 5-1
COMPATIBILITY COMPARISON OF ALTERNATIVES
WITH PROJECT OBJECTIVES

Project Objective	Proposed Project	Alternatives	
		Alternative 1: No Project	Alternative 2: Purchasing Metropolitan Water
1. Construct new facilities and dam embankment modifications that will meet or exceed the current seismic, safety and design requirements established by the California DWR DSOD, which is the governing state agency associated with this Project	●	○	○
2. Satisfy IRWD's operational requirements	●	○	○
3. Extend the useful life of the facilities	●	○	○
4. Improve water supply reliability	●	○	●
5. Minimize impacts to local environmental resources and surrounding property owners	●	○	○

Proposed Project: Replacement of the Santiago Creek Dam outlet works and spillway facility, dam embankment and crest improvements.

Alternative 1 – No Project Alternative: No new development; operation of the existing dam facilities will continue.

2Purchasing Water Alternative: Includes purchasing imported water supplies each year.

Legend:

● = Fully Implements

◒ = Partially Implements

○ = Does Not Implement

5.3.1 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

Section 15126.6(e) of the CEQA Guidelines requires that an EIR evaluate a "No Project" alternative to allow decision makers to compare the impacts of approving a proposed project with the impacts of not approving that project. Section 15126.6(e)(3) of the CEQA Guidelines describes the two general types of no project alternative: (1) when the project is the revision of an existing land use, regulatory policy, or ongoing operation, the no project alternative would be the continuation of that plan and (2) when the project is other than a land use/regulatory plan (e.g., a specific development on an identifiable property), the no project alternative is the circumstance under which that project is not processed (i.e., no development).

Under the No Project Alternative, existing site conditions and the environmental setting would remain unchanged. This Alternative assumes the site would continue to remain in its existing state

without demolition of existing structures and site improvements, and the continued use and operation of the existing Santiago Creek Dam facilities. This alternative would not meet current standards and would reduce the useful life of the facilities, which would result in a reduction in water supply reliability.

Impact Evaluation

Aesthetics

The No Project Alternative would not result in any construction activities or new development on the site. In the absence of demolition and construction activities, no changes in the visual quality of the site would occur. Additionally, there would be no new land use, buildings, and site improvements on the site. No changes in the sources of light and glare would occur that could potentially impact the surrounding uses. Thus, in the absence of the proposed Project, the site would remain in its existing condition, with the existing Santiago Creek Dam facilities in operation. This alternative would have fewer aesthetic impacts than those of the proposed Project. However, Project impacts on aesthetics would also be less than significant.

Air Quality

The No Project Alternative would not involve any demolition and construction activities (including grading and excavation) or new development on the site. In the absence of construction activities and new traffic generation, this alternative would not result in any significant air quality impacts. SCAQMD thresholds for construction-related and long-term operational emissions would not be exceeded. Therefore, this alternative would avoid short-term direct emissions, and short-term contribution to cumulative air quality impacts that may occur with implementation of the proposed Project. As this Alternative generates more vehicle trips and the associated pollutant emissions than the proposed Project, NOx and PM_{10} emissions of this alternative would be slightly greater than those of the proposed Project, while CO emissions would be slightly less than the proposed Project and VOC and $PM_{2.5}$ emissions would be approximately the same as the proposed Project.

Biological Resources

The No Project Alternative would not result in any construction activities or new development on the site. In the absence construction activities, no impacts to biological resources would occur. Additionally, there would be no new land use, buildings, and site improvements on the site. Therefore, potential biological resources impacts identified for the proposed Project would not occur under the No Project Alternative. However, Project impacts would be less than significant with mitigation measures.

Cultural Resources

The existing Santiago Creek Dam is eligible for its important historical association with water resources development in Orange County, as well as with the citrus agriculture industry. Under the No Project Alternative, the Dam would not be demolished and no impacts to historical resources would result. In the absence of any construction and demolition activities on the site, this Alternative would not result in the potential for impacts to unknown buried archaeological or paleontological resources and human remains that may be encountered during grading and excavation activities. As such, the potential for impacts to cultural resources for the No Project Alternative would be less compared to the proposed Project. However, Project impacts on cultural resources would be less than significant with implementation of mitigation measures.

Energy

The No Project Alternative would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. Additionally, the No Project Alternative would not conflict with or obstruct a State or local plan for renewable energy. Thus, the No Project Alternative would result in lower energy related impacts than the proposed Project.

Geology and Soils

The No Project Alternative would not involve any construction and/or demolition activities (including grading and excavation) or redevelopment of the site. Therefore, potential geology and soils impacts identified for the proposed Project would not occur under the No Project Alternative. However, Project impacts would be less than significant with mitigation measures.

Greenhouse Gas Emissions

The No Project Alternative would not involve any demolition or construction activities (including grading and excavation) or redevelopment of the site. In the absence of construction activities and operation of new land uses (including new traffic generation), this alternative would not generate GHG emissions from new sources but will continue generating GHG emissions at the rate that it is currently producing. However, the Project's GHG emissions would also be less than significant and would be less than the GHG emissions of the existing restaurant due to the Project's reduced vehicular trips. Thus, the No Project Alternative would not result in lower overall GHG emissions than the proposed Project.

Hazards and Hazardous Materials

The No Project Alternative would not involve the use, transport, disposal, or emission of hazardous materials associated with construction of the proposed Project. Additionally, with the continued operation of the existing Dam facilities, hazardous material uses would be limited. The hazards and hazardous materials impacts associated with this alternative are considered to be less than those of the proposed Project.

Hydrology and Water Quality

Under No Project Alternative, the existing hydrology patterns and hydrologic characteristics of the site would remain. Compared to the proposed Project, there would be no increase in the amount and velocity of surface runoff. The No Project Alternative would not change the amount of existing pervious surfaces on the site and would not increase the amount of pollutants in storm water runoff. The hydrology and water quality impacts under the No Project Alternative would be less than the proposed Project.

Land Use and Planning

Under the No Project Alternative, there would be no change in the existing or planned land uses on the site. The site would remain in its current condition. No residential uses currently occur on the Project site that would be impacted or divided by development of the proposed Project. The Project would not conflict with any applicable land use plans, policies, and regulations. Additionally, the Project would be compatible with the surrounding uses and would comply with County design standards. Overall, the land use impacts under the No Project Alternative would be less than the proposed Project.

Noise

The No Project Alternative would continue the existing Dam operations and would not involve any demolition, grading, or construction activities. Therefore, noise associated with the construction activities of the proposed Project would not occur under this alternative. All temporary noise impacts associated with implementation of the proposed Project can be mitigated to a level considered less than significant; however, no temporary noise impacts associated with this alternative would result, as no construction would occur under this alternative. Operationally, it is anticipated that routine inspection and maintenance trips would continue, and no new operational trips would occur with implementation of the No Project Alternative. Therefore, because there would be no increase in daily trips associated with daily operation of the Project components, no Project related traffic noise impacts are anticipated.

Public Services

Under the No Project Alternative, there would be no increase in demand for public services (fire and police protection services) as the Project site would remain in its currently condition. Because there would be no change in land use, increased demands on public services would not occur and the impact of the No Project Alternative relative to public services and facilities would be less than the proposed Project. However, the proposed Project's impacts on public services would also be less than significant.

Recreation

Under the No Project Alternative, there would be no increase in population. As such, no residential units are proposed, and no demand for recreational facilities would result. Additionally, no impacts on existing facilities would occur. No impacts pertaining to construction or expansion of a trail system would occur, and no mitigation is not required.

Transportation

The No Project Alternative would not involve any construction activities on the site. Additionally, the No Project Alternative would not generate operational trips. As such, the No Project Alternative would have no impacts related to short-term construction since no construction would occur. The No Project Alternative would have reduced traffic impacts (or impacts would be avoided) than the proposed Project.

Tribal Cultural Resources

The No Project Alternative would not involve any construction activities on the site. Thus, this alternative would not result in the potential for impacts to unknown and buried tribal cultural resources. The potential for impacts to tribal cultural resources for the No Project Alternative would be less than the proposed Project. However, Project impacts on tribal cultural resources would be less than significant based on a lack of evidence for existence of such resources.

Utilities and Service Systems

The No Project Alternative would not result in a change in demand for utilities and service systems (water, wastewater treatment, and solid waste generation), as the operation of the existing Santiago Creek Dam facilities would continue under this alternative. Therefore, the demand for utilities and service systems would remain at the existing levels. The impact of the No Project Alternative relative to utilities and service systems would be less than the proposed Project.

However, the Project impacts to utilities and service systems would be less than significant and no mitigation is required.

Wildfire

The Project site is located within a Very High Fire Hazard Severity Zone (FHSZ) in a State responsibility Area (SRA). The areas surrounding the Project site are also located within a Very High FHSZ, with the exception of a portion of Irvine Lake, which is located within a High FHSZ within an SRA. With regulatory compliance measures incorporated, the No Project Alternative would not exacerbate wildfire risk and impacts would be less than significant.

Conclusions

Would Alternative 1 Avoid or Substantially Lessen the Significant Impacts, Compared to the Project?

The proposed Project would result in a significant and unavoidable impact related to air quality. However, it would result in potentially significant impacts associated with Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, and Tribal Cultural Resources that can be mitigated. The No Project Alternative would maintain the site in its current condition with the existing Dam facilities. Thus, this alternative would avoid the above-mentioned mitigable impacts.

Because demolition of the existing structures and construction of the new Dam facilities would not occur under the No Project Alternative, there would also be reduced impacts for the following environmental topics: Aesthetics, Energy, Greenhouse Gas Emissions, Hydrology and Water Quality, Land Use and Planning, Public Services, Nosie Recreation, Transportation, Utilities and Service Systems, and Wildfire. The Project's impacts for these topics are also less than significant.

Would Alternative 1 Result in Attainment of Project Objectives, Compared to the Project?

By not developing the site with the proposed Dam facilities, the No Project Alternative would not attain any of the 5 Project Objectives identified above in Section 5.2.1, Ability to Meet Project Objectives.

5.3.2 ALTERNATIVE 2 – PURCHASING WATER ALTERNATIVE

IRWD owns and operates the Santiago Creek Dam and the Santiago Reservoir (or Irvine Lake) impoundment to store water supplies for the benefit of the surrounding communities. Irvine Lake is the largest surface water reservoir in Orange County and is a critical facility for water supply management. IRWD utilizes Irvine Lake to capture and store native runoff in wet years and store supplemental water for enhanced supply reliability. IRWD utilizes water from Irvine Lake for two purposes: 1) as a source of water for non-drinking purposes, such as irrigation for avocado orchards, and 2) as a source of water for the Baker Water Treatment Plant which creates drinking water for an estimated 85,000 homes in Orange County.

Each year, Irvine Lake captures and impounds native runoff from the upper Santiago Creek Watershed. IRWD has appropriative rights to the flows of Santiago Creek including a right to diversion by storage in Irvine Lake for municipal, domestic, and agricultural uses. Based on these existing water rights, the Irvine Lake can capture and store up to 28,000 AF per year of natural inflow or native water collected to storage each year. Over the past 25 years, approximately 5,070 AF per year of native Santiago Creek flows have been diverted into storage. Capturing and storing

this fresh water in Irvine Lake helps IRWD to increase water supply reliability and to reduce the cost of water for their customers. If this low-cost water supply was not available, IRWD would need to purchase, on average, 5,070 AF of expensive imported supplies each year to meet demands currently met with the Irvine Lake native water supplies.

Storage of Supplemental Water

IRWD also utilizes Irvine Lake to store supplemental imported water supplies from MWD to provide operational flexibility and create redundancy within the water conveyance systems. The imported water delivered to Irvine Lake is used for both consumptive purposes and water storage and it can be held for short or long periods of time to be later delivered when needed to meet demands. In the event of an emergency or extended facility shutdown on Metropolitan's delivery system, storage of supplemental water supplies helps IRWD to provide supply reliability, redundancy, and diversification. Without having water in storage, during periods of catastrophic supply interruption or critical drought conditions, IRWD would be more vulnerable to water supply disruptions and less reliable. During such water supply disruptions, IRWD may need to impose water restrictions under its Water Shortage Contingency Plans, which includes mandatory demand reduction measures.

Impact Evaluation

Aesthetics

Alternative 2 would not result in any construction activities or new development on the site. In the absence of demolition and construction activities, no changes in the visual quality of the site would occur. Additionally, there would be no new land use, buildings, and site improvements on the site. No changes in the sources of light and glare would occur that could potentially impact the surrounding uses. Thus, in the absence of the proposed Project, the site would remain in its existing condition, with the existing Santiago Creek Dam facilities in operation. This alternative would have fewer aesthetic impacts than those of the proposed Project. However, Project impacts on aesthetics would also be less than significant.

Air Quality

Alternative 2 would not involve any demolition and construction activities (including grading and excavation) or new development on the site. In the absence of construction activities and new traffic generation, this alternative would not result in any significant air quality impacts. SCAQMD thresholds for construction-related and long-term operational emissions would not be exceeded. Therefore, this alternative would avoid short-term direct emissions, and short-term contribution to cumulative air quality impacts that may occur with implementation of the proposed Project. As this Alternative generates less vehicle trips and the associated pollutant emissions than the proposed Project, NOx and PM_{10} emissions of this alternative would be less than those of the proposed Project. Additionally, CO, VOC, and $PM_{2.5}$ emissions would be less than those of the proposed Project.

Biological Resources

Alternative 2 would not result in any construction activities or new development on the site. In the absence construction activities, no impacts to biological resources would occur. Additionally, there would be no new land use, buildings, and site improvements on the site. Therefore, potential biological resources impacts identified for the proposed Project would not occur under the No Project Alternative. However, Project impacts would be less than significant with mitigation measures.

Cultural Resources

The existing Santiago Creek Dam is eligible for its important historical association with water resources development in Orange County, as well as with the citrus agriculture industry. Under Alternative 2, the Dam would not be demolished and no impacts to historical resources would result. In the absence of any construction and demolition activities on the site, this Alternative would not result in the potential for impacts to unknown buried archaeological or paleontological resources and human remains that may be encountered during grading and excavation activities. As such, the potential for impacts to cultural resources for Alternative 2 would be less compared to the proposed Project. However, Project impacts on cultural resources would be less than significant with implementation of mitigation measures.

Energy

Alternative 2 would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. Additionally, Alternative 2 would not conflict with or obstruct a State or local plan for renewable energy. Thus, Alternative 2 would result in lower energy related impacts than the proposed Project.

Geology and Soils

Alternative 2 would not involve any construction and/or demolition activities (including grading and excavation) or redevelopment of the site. Therefore, potential geology and soils impacts identified for the proposed Project would not occur under this alternative. However, Project impacts would be less than significant with mitigation measures.

Greenhouse Gas Emissions

Alternative 2 would not involve any demolition or construction activities (including grading and excavation) or redevelopment of the site. In the absence of construction activities and operation of new land uses (including new traffic generation), this alternative would not generate GHG emissions from new sources but will continue generating GHG emissions at the rate that it is currently producing. However, the Project's GHG emissions would also be less than significant and would be less than the GHG emissions of the existing restaurant due to the Project's reduced vehicular trips. Thus, Alternative 2 would result in lower overall GHG emissions than the proposed Project.

Hazards and Hazardous Materials

Alternative 2 would not involve the use, transport, disposal, or emission of hazardous materials associated with construction of the proposed Project. Additionally, with the continued operation of the existing Dam facilities, hazardous material uses would be limited. The hazards and hazardous materials impacts associated with this alternative are considered to be less than those of the proposed Project.

Hydrology and Water Quality

Under Alternative 2, the existing hydrology patterns and hydrologic characteristics of the site would remain. Compared to the proposed Project, there would be no increase in the amount and velocity of surface runoff. Alternative 2 would not change the amount of existing pervious surfaces on the site and would not increase the amount of pollutants in storm water runoff. The hydrology and water quality impacts under Alternative 2 would be less than the proposed Project.

Land Use and Planning

Under Alternative 2, there would be no change in the existing or planned land uses on the site. The site would remain in its current condition. No residential uses currently occur on the Project site that would be impacted or divided by development of the proposed Project. The Project would not conflict with any applicable land use plans, policies, and regulations. Additionally, the Project would be compatible with the surrounding uses and would comply with County design standards. Overall, the land use impacts under Alternative 2 would be less than the proposed Project.

Noise

Alternative 2 would continue the existing Dam operations and would not involve any demolition, grading, or construction activities. Therefore, noise associated with the construction activities of the proposed Project would not occur under this alternative. All temporary noise impacts associated with implementation of the proposed Project can be mitigated to a level considered less than significant; however, no temporary noise impacts associated with this alternative would result, as no construction would occur under this alternative. Operationally, it is anticipated that routine inspection and maintenance trips would continue, and no new operational trips would occur with implementation of Alternative 2. Therefore, because there would be no increase in daily trips associated with daily operation of the Project components, no Project related traffic noise impacts are anticipated.

Public Services

Under Alternative 2, there would be no increase in demand for public services (fire and police protection services) as the Project site would remain in its currently condition. Because there would be no change in land use, increased demands on public services would not occur and the impact of Alternative 2 relative to public services and facilities would be less than the proposed Project. However, the proposed Project's impacts on public services would also be less than significant.

Recreation

Under Alternative 2, there would be no increase in population. As such, no residential units are proposed, and no demand for recreational facilities would result. Additionally, no impacts on existing facilities would occur. No impacts pertaining to construction or expansion of a trail system would occur, and no mitigation is not required.

Transportation

Alternative 2 would not involve any construction activities on the site. Additionally, no operational trips would be generated under this alternative. As such, Alternative 2 would have no impacts related to short-term construction since no construction would occur. Alternative 2 would have reduced traffic impacts (or impacts would be avoided) than the proposed Project.

Tribal Cultural Resources

Alternative 2 would not involve any construction activities on the site. Thus, this alternative would not result in the potential for impacts to unknown and buried tribal cultural resources. The potential for impacts to tribal cultural resources for Alternative 2 would be less than the proposed Project. However, Project impacts on tribal cultural resources would be less than significant based on a lack of evidence for existence of such resources.

Utilities and Service Systems

Alternative 2 would not result in a change in demand for utilities and service systems (water, wastewater treatment, and solid waste generation), as the operation of the existing Santiago Creek Dam facilities would continue under this alternative. Therefore, the demand for utilities and service systems would remain at the existing levels. The impact of Alternative 2 relative to utilities and service systems would be less than the proposed Project. However, the Project impacts to utilities and service systems would be less than significant and no mitigation is required.

Wildfire

The Project site is located within a Very High Fire Hazard Severity Zone (FHSZ) in a State responsibility Area (SRA). The areas surrounding the Project site are also located within a Very High FHSZ, with the exception of a portion of Irvine Lake, which is located within a High FHSZ within an SRA. With regulatory compliance measures incorporated, Alternative 2 would not exacerbate wildfire risk and impacts would be less than significant.

Conclusions

Would Alternative 2 – Purchasing Water Alternative Avoid or Substantially Lessen the Potentially Significant Impacts, as Compared to the Project?

The Purchasing Water Alternative assumes IRWD would need to purchase, on average, 5,070 AF of expensive imported supplies each year to meet demands currently met with the Irvine Lake native water supplies. The proposed Project would result in a significant and unavoidable impact related to air quality. However, it would result in potentially significant impacts associated with Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, and Tribal Cultural Resources that can be mitigated. Alternative 2 would maintain the site in its current condition with the existing Dam facilities. Thus, this alternative would avoid the above-mentioned mitigable impacts.

Because demolition of the existing structures and construction of the new Dam facilities would not occur under Alternative 2, there would also be reduced impacts for the following environmental topics: Aesthetics, Energy, Greenhouse Gas Emissions, Hydrology and Water Quality, Land Use and Planning, Public Services, Nosie Recreation, Transportation, Utilities and Service Systems, and Wildfire. The Project's impacts for these topics are also less than significant.

Would Alternative 2 – Purchasing Metropolitan Water Alternative Result in Attainment of Project Objectives, as Compared to the Project?

With the purchasing of water, this alternative would meet 1 of the 5 Project Objectives identified above in Section 5.2.1, Ability to Meet Project Objectives. Specifically, Alternative 2 would not meet the objectives related to constructing new facilities and dam embankment modifications that will meet or exceed the current seismic, safety, and design requirements established by the California Department of Water Resources, Division of Safety of Dams; satisfying IRWD's operational requirements; extending the useful life of the facilities; and minimizing impacts to local environmental resources and surrounding property owners.

5.4 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires the identification of an environmentally superior alternative. Section 15126.6(e)(2) of the CEQA Guidelines states that, if the No Project Alternative is the environmentally superior alternative, then the EIR shall also identify an environmentally superior alternative among the other alternatives.

As shown, Alternative 1 - No Project Alternative would retain existing site conditions and thus, would not result in any environmental impacts. Additionally, the No Project Alternative would not meet any of the 5 project objectives.

Alternative 2 - Purchasing Water Alternative would generally have the same impacts as the No Project. In addition, this Alternative would only meet 1 of the 5 Project objectives.

Based on the detailed analyses in Sections 5.3.1 (Alternative 1 – No Project Alternative), and 5.3.2 (Alternative 2 – Purchasing Metropolitan Water) and the summaries above and in Table 5-2, the proposed Project is the next environmentally superior alternative to the No Project Alternative.

For ease of review of Table 5-2, below, please note these clarifications: **LTS:** Less than Significant Impact; **LTSM:** Less than Significant Impact with Mitigation; **G:** Greater Impact than the Proposed Project; (**=):** Same Impact as the Proposed Project; **L:** Less Impact than the Proposed Project.

TABLE 5-2
COMPARISON OF PROJECT ALTERNATIVES IMPACTS TO PROPOSED PROJECT IMPACTS

Impact Category	Proposed Project Impact	Alternatives	
		Alternative 1: No Project	Alternative 2: Purchasing Water
Aesthetics			
Threshold 4.1-1 Substantially degrade the existing visual character or quality of public views of the site and its surroundings (Public views are those that are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.	LTS	L	L
Threshold 4.1-2 Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	LTS	L	L
Air Quality			
Threshold 4.2-1 Conflict with or obstruct implementation of the applicable air quality plan.	SI	L	L
Threshold 4.2-2 Violate any air quality standard or contribute substantially to an existing or projected air quality violation.	LTS	L	L
Threshold 4.2-3 Expose sensitive receptors to substantial pollutant concentrations.	LTS	L	L
Biological Resources			
Threshold 4.3-1 Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.	LTSM	L	L
Threshold 4.3-2 Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service.	LTSM	L	L

TABLE 5-2
COMPARISON OF PROJECT ALTERNATIVES IMPACTS TO PROPOSED PROJECT IMPACTS

Impact Category	Proposed Project Impact	Alternatives	
		Alternative 1: No Project	Alternative 2: Purchasing Water
Threshold 4.3-3 Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	LTSM	L	L
Threshold 4.3-4 Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	LTSM	L	L
Threshold 4.3-5 Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	LTSM	L	L
Threshold 4.3-6 Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan.	LTSM	L	L
Cultural Resources			
Threshold 4.4-1 Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.	LTS	L	L
Threshold 4.4-2 Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	LTSM	L	L
Threshold 4.4-3 Disturb any human remains, including those interred outside of formal cemeteries.	LTSM	L	L
Energy			
Threshold 4.5-1 Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	LTS	L	= L
Threshold 4.5-2 Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LTS	L	= L

TABLE 5-2
COMPARISON OF PROJECT ALTERNATIVES IMPACTS TO PROPOSED PROJECT IMPACTS

Impact Category	Proposed Project Impact	Alternatives	
		Alternative 1: No Project	Alternative 2: Purchasing Water
Geology and Soils			
Threshold 4.6-1 Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42. ii) Strong seismic ground shaking. iii) Seismic-related ground failure, including liquefaction. iv) Landslides.	LTS	L	L
Threshold 4.6-2 Result in substantial soil erosion or the loss of topsoil.	LTS	L	L
Threshold 4.6-3 Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.	LTS	L	L
Threshold 4.6-4 Be located on expansive soils, as defined in Table 18-1-B of the California Building Code (1994), creating substantial risks to life or property.	LTS	L	L
Threshold 4.6-5 Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	LTSM	L	L
Greenhouse Gas Emissions			
Threshold 4.7-1 Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	LTS	L	L
Threshold 4.7-2 Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	LTS	L	L

TABLE 5-2
COMPARISON OF PROJECT ALTERNATIVES IMPACTS TO PROPOSED PROJECT IMPACTS

Impact Category	Proposed Project Impact	Alternatives	
		Alternative 1: No Project	**Alternative 2: Purchasing Water**
Hazards and Hazardous Materials			
Threshold 4.8-1 Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.	LTSM	L	L
Threshold 4.8-2 Expose people or structure, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.	LTS	L	L
Hydrology and Water Quality			
Threshold 4.9-1 Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.	LTS	L	L
Threshold 4.9-2 Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.	NI	=	=
Threshold 4.9-3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would: i) result in substantial erosion or siltation on- or off-site; ii) substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner in which would result in flooding on- or off-site; iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or iv) impede or redirect flood flows.	LTS	L	L

TABLE 5-2
COMPARISON OF PROJECT ALTERNATIVES IMPACTS TO PROPOSED PROJECT IMPACTS

Impact Category	Proposed Project Impact	Alternatives	
		Alternative 1: No Project	Alternative 2: Purchasing Water
Threshold 4.9-4 In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.	LTS	L	L
Threshold 4.9-5 Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	LTS	L	L
Land Use and Planning			
Threshold 4.10-1 Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.	LTS	L	L
Noise			
Threshold 4.11-1 Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	LTS	L	L
Threshold 4.11-2 Generation of excessive groundborne vibration or groundborne noise levels.	LTS	L	L
Threshold 4.11-3 For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.	NI	=	=

TABLE 5-2
COMPARISON OF PROJECT ALTERNATIVES IMPACTS TO PROPOSED PROJECT IMPACTS

Impact Category	Proposed Project Impact	Alternatives	
		Alternative 1: No Project	Alternative 2: Purchasing Water
Public Services			
Threshold 4.12-1 Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: i) Fire protection ii) Police protection iii) Schools iv) Parks	LTS	L	L
Recreation			
Threshold 4.13-1 Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LTS	L	L
Threshold 4.13-2 Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	NI	=	=
Transportation			
Threshold 4.14-1 Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	LTS	L	L
Threshold 4.14-2 Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).	LTS	L	L

TABLE 5-2
COMPARISON OF PROJECT ALTERNATIVES IMPACTS TO PROPOSED PROJECT IMPACTS

Impact Category	Proposed Project Impact	Alternatives	
		Alternative 1: No Project	**Alternative 2: Purchasing Water**
Threshold 4.14-3 Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	LTS	L	L
Threshold 4.14-4 Result in inadequate emergency access.	LTS	L	L
Tribal Cultural Resources			
Threshold 4.15-1 Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1 (k), or ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	LTSM	L	L
Utilities and Service Systems			
Threshold 4.16-1 Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which cause significant environmental effects.	LTS	L	L
Threshold 4.16-2 Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.	LTS	L	L

TABLE 5-2
COMPARISON OF PROJECT ALTERNATIVES IMPACTS TO PROPOSED PROJECT IMPACTS

Impact Category	Proposed Project Impact	Alternatives	
		Alternative 1: No Project	**Alternative 2: Purchasing Water**
Threshold 4.16-3 Result in a determination by the wastewater treatment provider that serves or may service the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	LTS	L	L
Threshold 4.16-5 Generate solid waste in excess of State or local standards or in excess of the capacity of Local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	LTS	L	L
Threshold 4.16-6 Comply with federal, State, and Local Management and reduction statues and regulations related to solid wastes including the CIWMP (County Integrated Waste Management Plan).	NI	=	=
Wildfire			
Threshold 4.17-1 Substantially impair an adopted emergency response plan or emergency evacuation plan.	LTS	L	L
Threshold 4.17-2 Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.	LTS	L	L
Threshold 4.17-3 Require installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.	LTS	L	L

TABLE 5-2
COMPARISON OF PROJECT ALTERNATIVES IMPACTS TO PROPOSED PROJECT IMPACTS

Impact Category	Proposed Project Impact	Alternatives	
		Alternative 1: No Project	**Alternative 2: Purchasing Water**
Threshold 4.17-4 Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage change.	LTS	L	L

Proposed Project: Replacement of the Santiago Creek Dam outlet works and spillway facility, dam embankment and crest improvements.

Alternative 1 – No Project Alternative: No new development; operation of the existing dam facilities will continue.

Alternative 2 - Purchasing Metropolitan Water: Includes purchasing imported water supplies each year

Proposed Project Impact: **LTS** - Less than significant impact; **LTSM** - Less than significant impact with Mitigation

Comparison of Project Impacts: **G** – greater impacts than the proposed Project; **=** the same impacts as the proposed Project; **L** – less impacts than the proposed Project

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SECTION 6.0 LONG-TERM IMPLICATIONS OF THE PROJECT

6.1 SIGNIFICANT ENVIRONMENTAL EFFECTS THAT CANNOT BE MITIGATED

The environmental effects of the proposed Project and alternatives are addressed in Sections 4.1 through 4.17 and Section 5.0 of this EIR. Implementation of the Project would result in potential impacts for the following topical issues: Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, and Tribal Cultural Resources as discussed in Sections 4.1 through 4.17 and summarized in Table 1-1 in Section 1.0, Executive Summary.

6.2 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES THAT WOULD BE CAUSED BY THE PROJECT

Section 15126(c) of the CEQA Guidelines requires that an EIR describe any significant irreversible environmental changes which would occur as a result of the proposed action should it be implemented. The environmental effects related to the implementation of the proposed Project are analyzed in Sections 4.1 through 4.17 of this EIR. The proposed Project would replace the Santiago Creek Dam outlet works, make spillway facility improvements and embankment enhancements in order to address specific seismic safety concerns and meet all applicable requirements as an existing public facility. The proposed use is an improvement of the site because the site is already developed with existing structures including the dam, outlet tower in Irvine Lake, spillway channel, flashboard storage shed, control house/outlet works, energy dissipater structure, dam keeper's house, Irvine Lake pipeline, and dam access road. The Project would also modify the existing dam embankment by removing the dam face, constructing a filter drain system, and encapsulating the filter drain system with embankment shell material. The dam crest would also be widened to approximately 35 to 45 feet wide to accommodate a wider access road, and protective railings would be installed on both sides of the access road. Therefore, the proposed Project is not considered a new long-term commitment of land resources to the proposed use. Nevertheless, construction and reduction of nonrenewable and/or slowly renewable resources, including petroleum fuels, and natural gas (for vehicle emissions, construction, and lighting); and lumber, sand/gravel, steel, copper, lead, and other metals (for use in construction, piping, and roadway infrastructure) would occur. Other resources that are slow to renew and/or recover from environmental stresses would also be impacted by Project implementation, such as air quality through the combustion of fossil fuels and production of greenhouse gases. Project development is an irreversible commitment of land and energy resources.

6.3 GROWTH-INDUCING IMPACTS OF THE PROPOSED ACTION

Pursuant to Sections 15126(d) and 15126.2(d) of the CEQA Guidelines, this section examines: (1) ways in which the Project could foster economic or population growth and (2) the construction of additional development, either directly or indirectly, in the surrounding environment. Per Section 15126.2(d) of the CEQA Guidelines, growth-inducing effects are not necessarily beneficial, detrimental, or of little significance to the environment. This issue is presented to provide additional information on ways in which this Project could contribute to significant changes in the environment.

Population growth in Orange County has maintained a strong but diminishing pace in recent decades. From 1980 to 1990, the population increased by 47,785 people annually, slowing to an average annual increase of 43,573 people during the 1990s. From 2000 to 2010, the average annual population increase dropped to 16,943 people per year. However, the Census estimates

for growth show an increase between 2010 and 2020 from 3,010,232 people in 2010 to 3,186,989 people in 2020. This is an average annual increase of 17,676 people (U.S. Census Bureau 2024). Based on US Census data as of July 1, 2022, the population of Orange County was 3,151,184 people (U.S. Census Bureau 2024). The recent lower growth in the County is a result of a number of factors, including lower fertility rates, a trend of increased mortality rates that was occurring prior to the COVID-19 pandemic, and lower net migration (CDR 2022).

Concurrently with significant increases in population, the economic character of Orange County overall has dramatically changed. The predominately rural/agricultural character of Orange County has changed to a diversified commercial/industrial economy. High technology industries, biomedical facilities, retail commercial, light manufacturing, administrative and financial services, and tourism have become major components of the County's economy. In 1965, the employment-to-population ratio was 22 percent. By 2010, the ratio had increased to approximately 49 percent countywide (note this was down from 54 percent in 2008). Not only had the proportion of jobs to residents increased, but it was also based on a dramatically larger population. The growth in population and employment is projected to continue through 2040 and beyond. Based on the Orange County Projections 2022, developed by the Center for Demographic Research, between 2019 and 2050 an approximate 4.1 percent increase in population and an 11.8 percent increase in employment is projected to occur in Orange County (CDR 2022). When considering growth-inducing impacts, it is important to consider the context and historical growth trends of the area. There are many factors that can affect the amount, location, and rate of growth in Orange County and the region in general. These factors include market demand for housing, employment, and commercial services; the desirability of climate and living/working environment and commercial economy; the availability of other services/infrastructure; and the land use and growth management policies of local jurisdictions.

To address this issue, potential growth-inducing effects, identified in CEQA Guidelines Section 15126.2(d), are examined through analysis of the following questions:

1) **Would this Project remove obstacles to growth (e.g., through the construction or extension of major infrastructure facilities that do not presently exist in the project area or through changes in existing regulations pertaining to land development)?**

   The proposed Project would provide for replacement of the Santiago Creek Dam outlet works and spillway facility as well as dam embankment and crest improvements in order to address specific seismic safety concerns and meet all applicable requirements as an existing public facility. Implementation of the Project would not increase employment and population in the area, and as such would not result in either direct or indirect population growth. The proposed Project is consistent with existing uses on the site and would not result in growth to the area.

2) **Would this Project result in the need to expand one or more public services to maintain desired levels of service?**

   Due to the nature of the proposed Project, no new demand for public services such as fire protection, police protection, schools, parks, libraries, or other public facilities would occur. No new population would be generated and no new facilities requiring public services would be constructed. Instead, the Project would continue operations of an existing facility with modifications to improve operations. Any increase in maintenance of the proposed facilities would be the responsibility of IRWD. This Project would not have any significant growth-inducing consequences with respect to public services.

3) Would this Project encourage or facilitate economic effects that could result in other activities that could significantly affect the environment?

Implementation of the Project would not increase employment and population in the area, and as such the Project would not result in either direct or indirect population growth. Given the nature of the Project, it would be self-sufficient and not expected to generate economic activity to the level that would necessitate an expansion of resources and supporting industry that would have significant effects on the environment. Therefore, this Project would not result in significant impacts with regards to facilitating economic effect leading to additional growth with environmental consequences.

4) Would approval of this Project involve some precedent-setting action that could encourage and facilitate other activities that could significantly affect the environment?

The proposed Project would provide replacement of the Santiago Creek Dam outlet works and spillway facility improvements as well as dam embankment and crest improvements in order to address specific seismic safety concerns and meet all applicable requirements as an existing public facility as well as modify the embankment to permit operation of the facilities for a long-term water resource benefit. Replacement and improvement of these structures is not unique such that its approval would set a precedent, facilitating other activities and resulting in significant impacts to the environment.

6.4 REFERENCES

Center for Demographic Research (CDR). 2022 (September 22, final approval). OCP-2022 Report Data (City and RSA Tabs) (an Excel Spreadsheet). Fullerton, CA: CDR.

U.S. Census Bureau. 2024 (November 12, date accessed). QuickFacts, Orange County, California. Washington, D.C.: U.S. Census Bureau. https://www.census.gov/quickfacts/orangecountycalifornia.

SECTION 7.0 PERSONS AND ORGANIZATIONS CONSULTED

7.1 AGENCY COORDINATION

7.1.1 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE, SOUTH COAST REGION 5

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7.1.2 SANTA ANA REGIONAL WATER QUALITY CONTROL BOARD

Hossein Shahrokhnia ..... Environmental Scientist

7.1.3 U.S. FISH AND WILDLIFE SERVICE

Carol Roberts ..... Field Response Coordinator

Willian Miller ..... Biologist

7.1.4 U.S. ARMY CORPS OF ENGINEERS

Eric Sweeney .....Project Manager

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7.2.1 OC WASTE AND RECYCLING

Aimee Halligan ..... CEQA & Habitat Program Manager

7.2.2 ORANGE COUNTY FIRE AUTHORITY

Tamera Rivers ..... Management Analyst

7.2.3 ORANGE COUNTY SHERIFF'S DEPARTMENT

Kyle Ishii..... Sergeant

7.2.4 SOUTHERN CALIFORNIA EDISON

Audry Williams .....Senior Advisor, Archaeology Program

7.2.5 AECOM

Bryan Paine .....Department Manager

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