

Proposition 1E Stormwater Flood Management Grant Proposal Lake Wohlford Dam Replacement Project

Attachment 3: Work Plan

Attachment 3 consists of the following items:

- ✓ **Project Background.** This attachment contains background, purpose and need, and objectives, as well as supporting documents such as regional and project maps, and existing data and studies.
- ✓ **Work Plan.** This attachment contains detailed information regarding the tasks that were and will be performed as part of this grant proposal.

The City of Escondido is located within the San Diego IRWM Region. The adopted 2007 San Diego IRWM Plan identified four goals and nine objectives that were established to guide water resource management in the Region. Each of the IRWM Plan goals and their corresponding objectives are listed in Table 1-1 in Attachment 1.

Project Background

Lake Wohlford, located northeast of the City of Escondido, is a man-made reservoir that was formed by Lake Wohlford Dam. Lake Wohlford Dam was originally constructed in 1895 to create Lake Wohlford, and was raised in 1924 to increase the overall height and storage capacity to its current value of approximately 6,500 acre-feet (AF). Figures 3-1, 3-2, and 3-3 provide images of the original dam construction. Current uses of Lake Wohlford include water supply, flood control, power generation, and recreation (GEI 2010a). The Federal Energy Regulatory Commission (FERC) regulates Lake Wohlford Dam, because it provides hydroelectric power as part of the FERC-licensed Escondido Project that provides 1.7 megawatts of energy (FERC No. 176) (GEI 2010a). In addition, the California Department of Water Resources (DWR) Division of Safety of Dams (DSOD) regulates the safety of Lake Wohlford Dam under Division 3 of the California Water Code (GEI 2010a).

Figure 3-1: Construction of Lake Wohlford Dam, Photo 1 (1895)



Figure 3-2: Construction of Lake Wohlford Dam, Photo 2 (1895)



Figure 3-3: Construction of Lake Wohlford Dam, Photo 3 (1895)



In 2004, FERC directed the City of Escondido to complete an evaluation of the potential for liquefaction-induced failure to occur at Lake Wohlford Dam. The geotechnical study conducted for the City of Escondido found that a liquefaction-induced mudflow slide of the upstream slope of the dam would likely occur as a result of the design earthquake loading (GEI 2010a). As a result, in 2007, FERC began requiring the City of Escondido to maintain Lake Wohlford at least 20 feet below the spillway crest level for dam safety purposes, which results in 43% of its 6,500 AF capacity (2,800 AF). This lowered reservoir level corresponds to the top of a relatively stable downstream rockfill section of the dam, and was recommended as the appropriate fill level in the aforementioned geotechnical study (GEI 2010a).

Following FERC's determination, the City of Escondido began pursuing alternatives to retrofit Lake Wohlford Dam in order to restore the lake to its full design capacity. An *Environmental Opinion* prepared in 2008 determined that the least environmentally damaging way to address potential environmental

impacts associated with mitigating the liquefaction potential from Lake Wohlford Dam would be to construct a new roller compacted concrete (RCC) dam downstream of the existing dam (ICF Jones and Stokes 2008a). However, a technical evaluation that was conducted in June 2010 found that an earth-core rockfill dam is preferred over a concrete-faced RCC dam in virtually every respect (GEI 2010a). Specifically, the *Evaluation of Alternatives for Replacement of Lake Wohlford Dam* found that conditions within the project area are not conducive to construction of an RCC dam, that local materials would be readily available to construct an earth-core rockfill dam, and that the construction costs for a RCC dam would be significantly greater than costs for construction of an earth-core rockfill dam (GEI 2010a). Therefore, the *Lake Wohlford Dam Replacement Project* contained within this proposal is requesting funds to assist with construction and implementation of an earth-core rockfill dam to replace the existing Lake Wohlford Dam structure.

The earth-core rockfill dam proposed to replace the existing Lake Wohlford Dam would contain five major components: dam structure, spillway, outlet works, road realignment, and dam access. Specifically, the proposed project would involve construction of a new earthfill dam immediately downstream of the existing dam. The top portion of the existing dam would be removed and the material disposed of within the reservoir. A new spillway would be cut through the north abutment of the new dam. A temporary access road would need to be constructed from Oakvale Road east to Guejito Road for use by local residents/businesses and fire trucks (ICF Jones and Stokes 2008a).

Project Purpose and Need

According to the San Diego IRWM Region Acceptance Process (RAP) report, approximately 88% of the Region's water supply was imported from the State Water Project (SWP) and the Colorado River in 2008. Recent legal and regulatory decisions regarding water management in the Sacramento-San Joaquin River Delta may reduce the amount of water delivered by the SWP. This situation, coupled with the recent droughts affecting both the SWP and the Colorado River, demonstrates that the region's water supply is vulnerable to events outside the region. Therefore, increasing the reliability of San Diego's local water supply is considered a regional priority. Similarly, the RAP notes that water quality is an increasingly significant issue for the San Diego Region due to the number of water bodies on the Clean Water Act Section 303(d) list and the fact that Total Maximum Daily Loads (TMDLs) have been established to address high priority impairments. Finally, the RAP acknowledges the importance of reducing the negative effects on waterways and watershed health caused by hydromodification and flooding.

Because of the potential for an earthquake to cause liquefaction-induced mudflow slide (GEI 2010a) and subsequent failure of the dam, it is essential for the City of Escondido to replace Lake Wohlford Dam. The potential for an earthquake above design magnitude to occur on the Elsinore Fault is between 11% and 24% over the next thirty years (see discussion in Attachment 7). Downstream properties that could be flooded during dam failure would include residential, commercial, and industrial structures, in addition to roadways and other utilities. This inundation potential in the event of dam failure is a significant public safety hazard that could result in destruction of both life and property. As such, replacement of Lake Wohlford Dam is a critical priority for the City of Escondido.

As described above, seismic issues related to Lake Wohlford Dam currently require the City of Escondido to restrict the amount of water that can be stored within the Lake Wohlford at a given time. This safety precaution requires the City of Escondido to discharge excess water from Lake Wohlford to the Escondido/Vista Water Treatment Plant, or transfer the water to hydroelectric facilities associated with the Escondido Project. Although it is considered rare, at times when Lake Wohlford reaches excess levels, water may be discharged through a drain structure at the base of the dam to Escondido Creek (GEI 2010a). Escondido Creek and Lake Wohlford are located within the Carlsbad Hydrologic Unit, which drains in a westerly direction to the Pacific Ocean through the San Elijo Lagoon (SDRWQCB 1994).

The full capacity of Lake Wohlford is approximately 6,500 AF. Due to seismic instability, however, the City has recently kept Lake Wohlford at approximately 43% of its 6,500 AF capacity (2,800 AF) (ICF Jones and Stokes 2008a). During the course of an average year, the water volume removed from Lake Wohlford for urban use is approximately 16,800 AF or the equivalent of filling and draining the entire reservoir approximately three times. Recent inflow-outflow volume, however, has averaged only half that of an average year due to the required maximum elevation restrictions set by FERC (Jones and Stokes 2008a). The City of Escondido, who diverts water from Lake Wohlford through the Escondido Canal,

supplements their annual water supplies with imported water purchased from the San Diego County Water Authority (SDCWA) (City of Escondido 2005). Specifically, the City of Escondido receives an estimated 70-80% of its annual water supply from imported supplies (City of Escondido 2005; see also discussion in Attachment 8). Historically, Lake Wohlford reached its full 6,500 AF capacity in the spring following winter rains (ICF Jones and Stokes 2008a). If Lake Wohlford Dam were to be reconstructed such that the lake could safely hold its entire 6,500 AF capacity, this would substantially increase the amount and reliability of local water supply available to the City of Escondido. Reliability increases would also benefit the Vista Irrigation District (VID), who utilizes Lake Wohlford as part of their water supply conveyance system. The presence of this additional local water supply would reduce imported water demands, and increase the reliability of the San Diego Region's local water supply.

The San Diego Regional Water Quality Control Board (RWQCB) listing of impaired water bodies (303(d) list) lists portions of Escondido Creek on the TMDL-required 303(d) list for dichlorodiphenyltrichloroethane (DDT), enterococci bacteria, fecal coliform, selenium, sulfates, total nitrogen, and toxicity. The San Elijo Lagoon is also listed on the 303(d) list for eutrophication, indicator bacteria, and sedimentation/siltation (SDRWQCB 2008). Lake Wohlford is not currently identified by the San Diego RWQCB as having water quality issues, although water entering the lake from the Escondido Canal has been found to have elevated levels of total coliform bacteria (SDRWQCB 2008 and ICF Jones and Stokes 2008a).

Current discharge activities from Lake Wohlford could potentially contribute to bacteria and eutrophication-related water quality issues downstream, due to the measured presence of total coliform bacteria within Lake Wohlford. In addition, downstream flows, particularly at rapid volumes, are known to generate erosion and increase sedimentation. If the existing Lake Wohlford Dam were to fail, it would generate high volumes of rapid downstream flows, scour, erosion, and sedimentation, which would impact all downstream tributaries. Sedimentation can generate direct water quality issues, and may also generate indirect water quality issues if the sediment in question contains contaminants such as heavy metals and bacteria. Therefore, discharge activities from Lake Wohlford could potentially exacerbate sedimentation- and bacteria-related water quality issues found within Escondido Creek and the San Elijo Lagoon. Furthermore, the potential for dam failure not only carries flood risks, but would also be expected to substantially damage the water quality of all downstream tributaries. Implementation of this proposal would reduce potential downstream water quality impacts from Lake Wohlford by eliminating downstream water quality impacts associated with flooding risks from affecting impaired water bodies such as Escondido Creek and the San Elijo Lagoon.

Goals and Objectives

The objectives of the *Lake Wohlford Dam Replacement Project* are to:

- Mitigate the potential for severe downstream flood inundation to occur due to failure of the existing Lake Wohlford Dam;
- Increase the local supply capacity of Lake Wohlford to its built capacity of 6,500 AF;
- Provide maximum protection from uncontrolled stormwater runoff and erosion-related water quality impacts;
- Increase local emergency supply reliability by increasing local storage capacity; and
- Increase local recreational opportunities within and surrounding Lake Wohlford.

This proposal is consistent with the 2007 San Diego IRWM Plan. The *Lake Wohlford Dam Replacement Project* is included within the online project database established for the Region, as shown in Attachment 1. Table 3-1 demonstrates that this project meets six objectives established for the region. The table provides an overview of the San Diego IRWM Plan objectives that are expected to be indirectly (○) or directly (●) achieved through implementation of the project.

Table 3-1: Consistency of Proposed Projects with IRWM Plan Objectives

Proposal Projects	IRWM Plan Objectives Addressed								
	A	B	C	D	E	F	G	H	I
<i>Lake Wohlford Dam Replacement Project</i>				●	●	●	●	●	●

● = directly related; ○ = indirectly related

- **Objective D - Develop and maintain a diverse mix of water resources:** Implementation of the *Lake Wohlford Dam Replacement Project* would increase the capacity of Lake Wohlford from 2,800 to 6,500 AF. Approximately 20-30% of the drinking water processed through the Escondido-Vista Irrigation District Water Treatment Plant comes from local water that passes through Lake Wohlford. This project would therefore increase the local water supply and help to reduce local dependency on imported water supplies.
- **Objective E – Construct, operate, and maintain a reliable infrastructure system:** Lake Wohlford Dam is one element of the regional water system that includes reservoirs, tanks, treatment facilities, pump stations, and distribution infrastructure. However, Lake Wohlford Dam has been classified as seismically unstable and in need of replacement. Constructing a new earth-core rockfill dam to replace the existing Lake Wohlford Dam would help increase the reliability of this facility, which would thereby increase the reliability of the entire water infrastructure system that it is associated with.
- **Objective F - Reduce the negative effects on waterways and watershed health caused by hydromodification and flooding:** One of the primary objectives of the *Lake Wohlford Dam Replacement Project* is to reduce seismic-related flooding hazards associated with the current instability of the Lake Wohlford Dam. This project would reduce negative effects on waterways by reducing flooding risks that could potentially impact multiple waterways throughout Northern San Diego County.
- **Objective G - Effectively reduce sources of pollutants and environmental stressors:** By eliminating seismic-related flood hazards, this project would also eliminate substantial water quality impacts that would occur as a result of failure of Lake Wohlford Dam. This would help to reduce future potential sources of pollutants and environmental stressors by reducing sedimentation and scour that would be caused by dam failure. Sedimentation and sedimentation-related constituents are known pollutant sources within water bodies such as Escondido Creek and San Elijo Lagoon, receiving waters of Lake Wohlford.
- **Objective H - Protect, restore, and maintain habitat and open space:** Lake Wohlford provides substantial habitat and open space to many aquatic and terrestrial species. The *Lake Wohlford Dam Replacement Project* would increase both the surface area and the volume of Lake Wohlford, which would protect, restore, and maintain this important open space.
- **Objective I - Optimize water-based recreational opportunities:** Lake Wohlford has always been a regional destination for fishing, camping, hiking, and other recreational uses. Current capacity restrictions associated with Lake Wohlford Dam instability have resulted in lower water levels within Lake Wohlford, which have reduced fishing activities by reducing the surface area and volume of Lake Wohlford. This project would restore the water surface level and optimize use of Lake Wohlford as a recreational resource.

Project Specifics

Table 3-2 provides an abstract of the proposed project, the current status of the project in terms of percent completion of design, implementing agency, the site specific geographic location, and the project's function with relation to other stormwater or sewage conveyance systems.

Table 3-2: Projects Included in the San Diego IRWM Implementation Grant Proposal

Project	Description	
<i>Lake Wohlford Dam Replacement Project</i>	<i>Abstract:</i>	The <i>Lake Wohlford Dam Replacement Project</i> addresses flooding, water supply, water quality, and recreational issues within and downstream of Lake Wohlford. The proposed project would construct an earth-core rockfill dam to replace the existing Lake Wohlford Dam. This would reduce seismic-related flooding hazards associated with dam instability, as well as allow Lake Wohlford to retain water at its 6,500 AF design capacity, improve local supply reliability, reduce erosion and scour downstream, and increase the recreational capacity of the lake.
	<i>Status:</i>	Preliminary planning, technical evaluations, and geologic investigations are complete. Formal design work will begin in November 2011.
	<i>Implementing Agency:</i>	City of Escondido
	<i>Location:</i>	Lake Wohlford is a water supply reservoir located northeast of the City of Escondido in north-western San Diego County.
	<i>Stormwater Conveyance:</i>	Stormwater runoff within the San Elijo Hydrologic Subarea flows into Lake Wohlford. Due to seismic-related safety issues, the City of Escondido must keep Lake Wohlford at 43% of its total capacity. To achieve this, the City must transfer and/or release water from Lake Wohlford, which substantially reduces the lake's supply reliability. In addition, seismic-related concerns also potentially threaten downstream water quality, because a failure of Lake Wohlford Dam would be expected to discharge excessive sedimentation to Escondido Creek, which is hydrologically connected to the Pacific Ocean through the San Elijo Lagoon. The <i>Lake Wohlford Dam Replacement Project</i> would increase reuse of local stormwater by allowing it to remain in Lake Wohlford Dam rather than transferring or releasing it for other uses.
	<i>State Plan for Flood Control:</i>	The State Flood Plan for Flood Control (SPFC) is not applicable to this project, because infrastructure related to the SPFC is not located within proximity nor is it connected to San Diego County.

Project Partners

This project would also benefit VID, a local water supplier that utilizes Lake Wohlford as a conduit for transporting their local supply from Lake Henshaw. The City of Escondido keeps VID informed about progress made in planning and technical evaluations for the *Lake Wohlford Dam Replacement Project*.

Integrated Elements of Projects

This project is not specifically integrated with other local or regional projects. Lake Wohlford is currently being considered by the City of Escondido for a potential indirect potable reuse project, should designed storage capacity of Lake Wohlford be restored. Indirect potable reuse projects relating to Lake Wohlford are currently in conceptual stages, however, and no formal plans are being put forward at this time. The *Lake Wohlford Dam Replacement Project* would increase the feasibility of such future projects to occur, because this project would substantially increase the capacity and reliability of Lake Wohlford.

Regional and Project Maps

Figure 3-4 provides an overview of the local hydrologic area within and around the *Lake Wohlford Dam Replacement Project* as well as the project's geographical location and the surrounding work boundaries (flood inundation area). Figure 3-5 shows the location of the existing flood inundation zone and Lake Wohlford with respect to the Elsinore Fault. Figure 3-6 is a detailed regional map that shows the location of Lake Wohlford Dam, the existing flood inundation zone, regional and local drainage systems, flood control level of protection (50 and 100 year floodplains), major water bodies and streams, and the project location in relation to the State Plan of Flood Control. Please note that these figures do not show flood management infrastructure, because this is not relevant to the *Lake Wohlford Dam Replacement Project*.

Figure 3-4: Local Hydrologic Overview

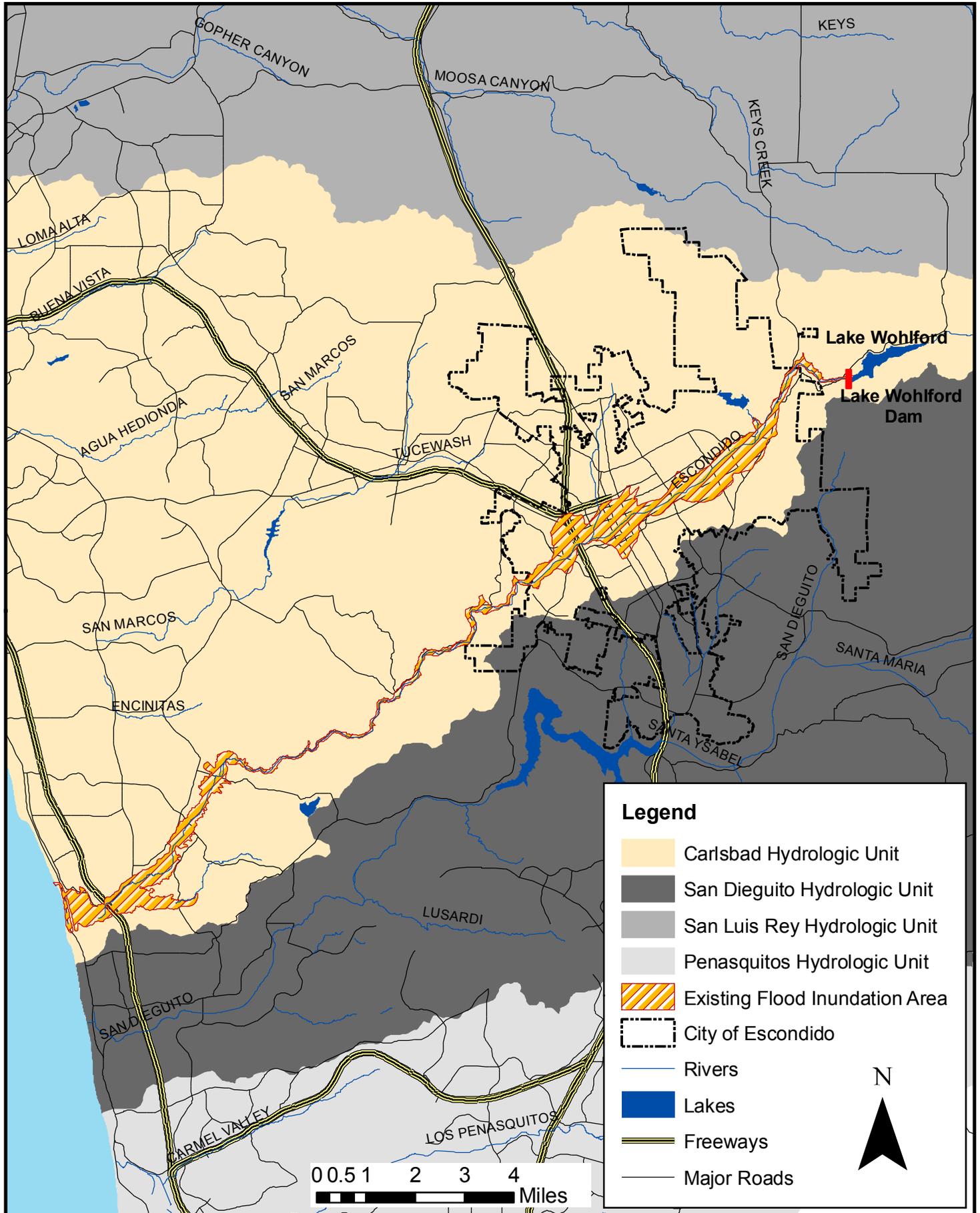


Figure 3-5: Regional Map

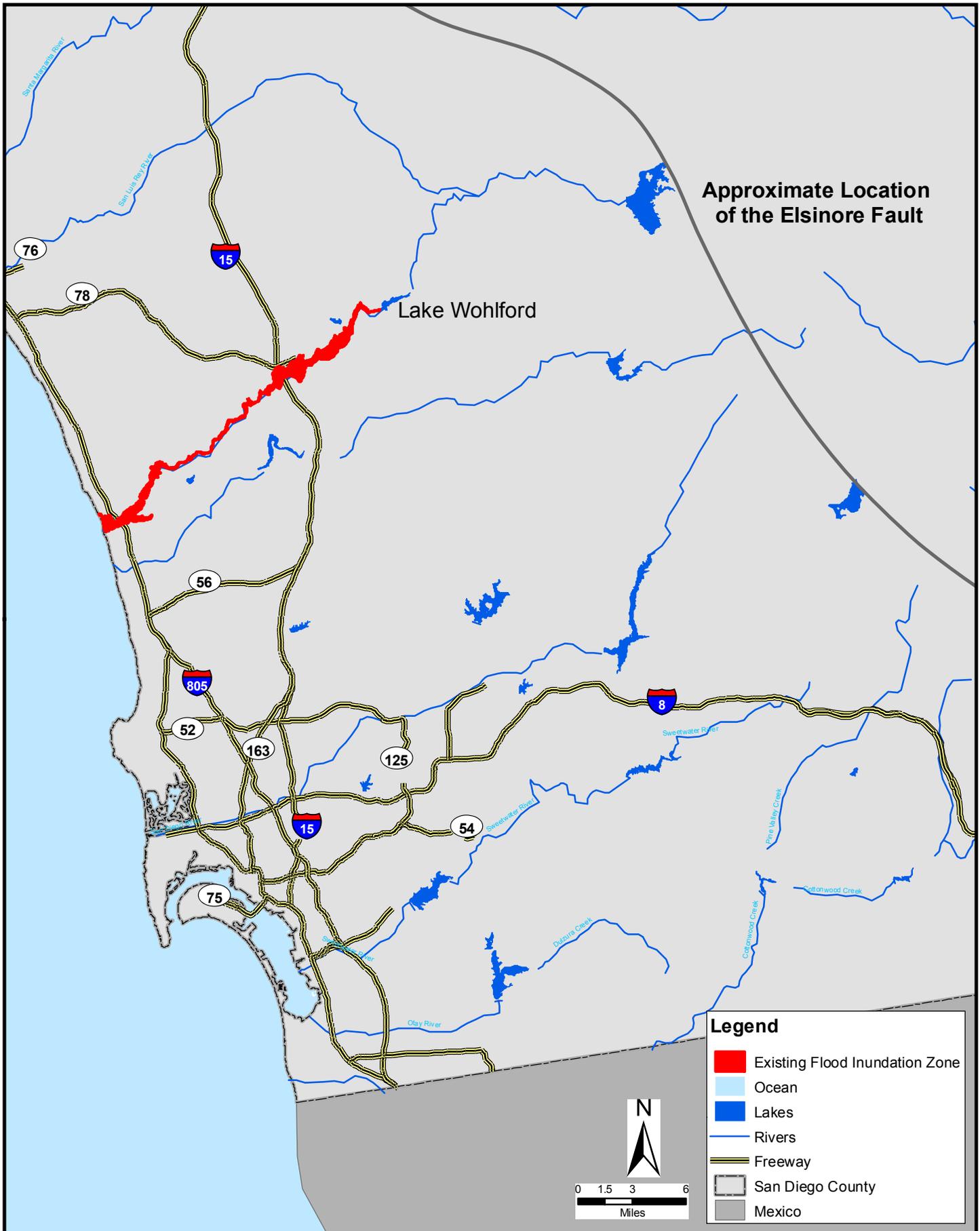
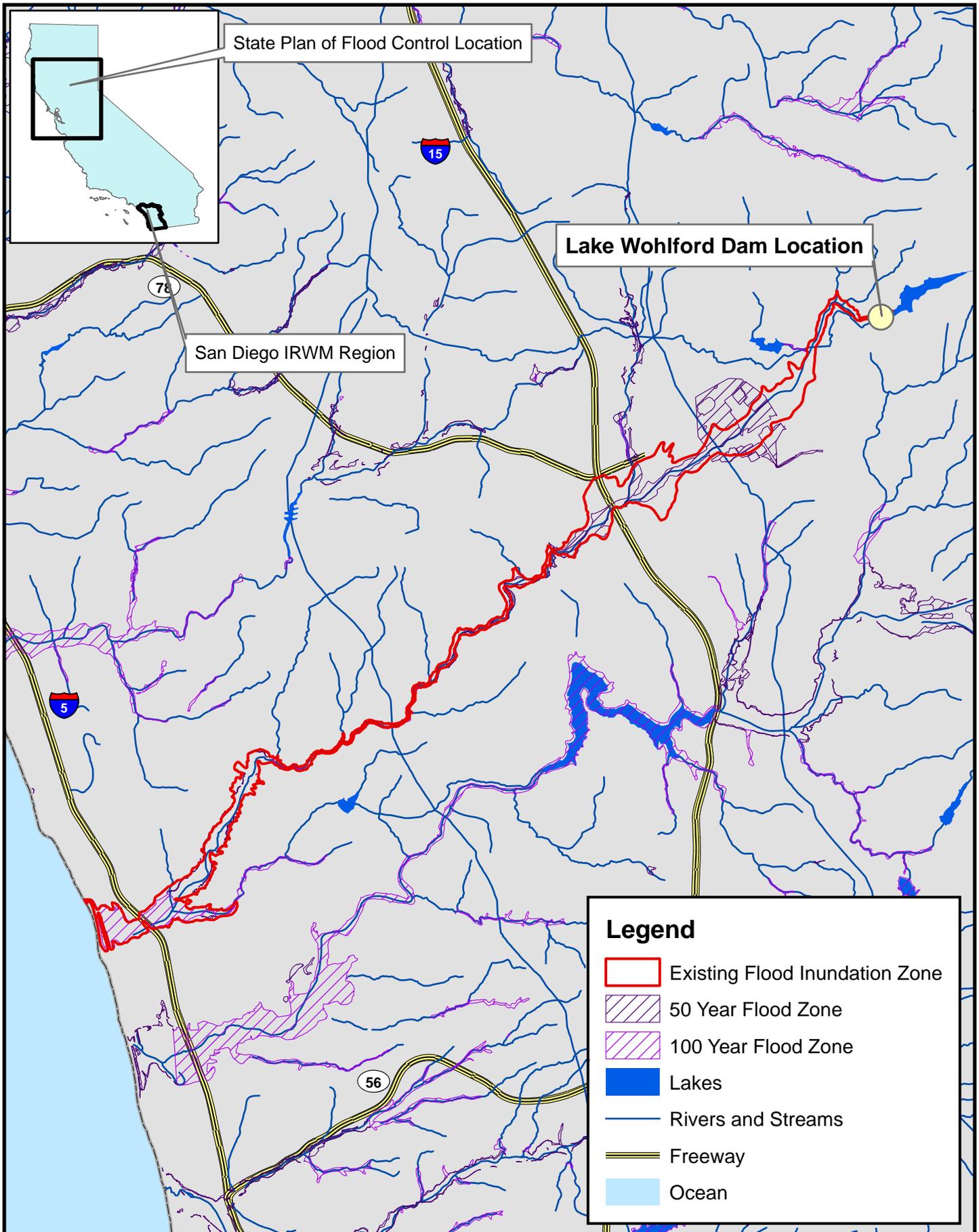


Figure 3-6: Detailed Regional Map



Completed Work

The City of Escondido has completed three technical documents related to the *Lake Wohlford Dam Replacement Project*. Details regarding these analyses are provided below. Please note that two additional studies, the *Evaluation of Alternatives for Replacement of Lake Wohlford Dam* and the *Wohlford Dam Replacement Geotechnical Data*, have also been completed for this project. These studies are included within the Work Plan (Task 4: Assessment and Evaluation) and on the data CD submitted to DWR with this grant proposal.

- The *Evaluation of Alternatives to Mitigate Liquefaction Potential of Lake Wohlford Dam* report was completed for the City of Escondido in November 2008 (GEI 2008a). This report presents the results of an evaluation of alternatives to mitigate the liquefaction potential of Lake Wohlford Dam. This analysis found that construction of a new rockfill dam or roller compacted concrete dam are preferred alternatives to mitigate seismic stability concerns of the existing Lake Wohlford Dam. As discussed below, analyses from the federal lead agency, FERC, determined that this analysis was acceptable.
- The *Lake Wohlford Dam Regulatory Permitting Summary* was completed for the City of Escondido Utilities Department in October 2008 (ICF Jones and Stokes 2008b). This report provides a description of the major federal, state, and local permits, consultations, and/or actions that may be required for the City of Escondido's Lake Wohlford Dam project. The purpose of this summary was to identify the regulatory permits and resource agency consultations that may be required, the general process required to comply with the applicable regulations, and where additional information may confirm necessity of these actions, future proposed work by the City.
- The *Lake Wohlford Dam Environmental Opinion* was completed for the City of Escondido Utilities Department in December 2008 (ICF Jones and Stokes 2008a). This document was created in order to provide an analysis and corresponding Environmental Opinion on the potential environmental impacts associated with the different engineering alternatives for mitigation of the Lake Wohlford Dam liquefaction potential. The Environmental Opinion includes an evaluation of the potential impacts of the proposed engineering alternatives on biological resources, cultural resources, water quality, land use, traffic, and recreation. The Environmental Opinion concluded that Alternative 6, constructing a new RCC dam downstream of the existing Wohlford Dam would have potential significant impacts on biological resources (i.e., jurisdictional wetlands and water, sensitive vegetation communities, sensitive species habitat, and T&E species) and water quality; and moderate potential impacts on cultural resources, land uses, traffic, and recreation. Despite these potential environmental impacts, the Environmental Opinion concluded that Alternative 6 would be the least environmentally damaging alternative. This document was reviewed by FERC in February of 2011, and at this point it was determined that further analyses should be carried out prior to finalization of design efforts (refer to Existing Data and Studies below for more information).

Existing Data and Studies

Due to the long history of the Lake Wohlford Dam, many studies and data have been collected and performed, which support the project's site location, feasibility, and technical methods. Those existing data and studies that are relevant to the project are described below and included on the data CD submitted to DWR with this grant proposal.

- Federal Energy Regulatory Commission (FERC) documents:
 - March 7, 2008: FERC letter to the City, which demonstrates that the proposed plan and schedule for the Wohlford Lake Dam remediation modifications were acceptable to FERC.
 - October 26, 2009: FERC evaluation of reports entitled "Evaluation of Remediation Alternatives to Mitigate Liquefaction Potential for Lake Wohlford Dam" and "Proposed Field Exploration Program for Evaluation of Alternatives to Mitigate Liquefaction Potential of Lake Wohlford Dam." This evaluation indicated that the proposed investigation program and evaluation report were acceptable to FERC.

- May 28, 2010: FERC letter indicating that Lake Wohlford Dam replacement will require a Board of Consultants to oversee the analysis, design, construction, and any potential problems that might arise during the design and construction of the Lake Wohlford Dam replacement structures.
- February 1, 2011: FERC evaluation of reports entitled “Evaluation of Alternatives for Replacement of Lake Wohlford Dam” and “Lake Wohlford Dam Replacement Geotechnical Data Report.” This evaluation indicated that an erosion study should be performed to determine discharge velocities such that appropriate slope protection along the toe of the downstream embankment and both abutments is provided. This analysis along with an anticipated approach flow analysis should be submitted to FERC for review and comment prior to completing the final design.
- California Department of Water Resources (DWR) Division of Safety of Dams (DSOD) documents:
 - June 8, 2010: DSOD letter summarizing comments regarding the reports entitled “Evaluation of Alternatives for Replacement of Lake Wohlford Dam” and “Lake Wohlford Dam Replacement Geotechnical Report.” The comments indicate that the preferred alternative of a zoned embankment with a central core is acceptable, and that additional subsurface investigations and testing will be required to complete final design of the new dam.
 - June 23, 2010: DSOD inspection of Lake Wohlford Dam and Reservoir. This inspection noted that the dam, reservoir, and appurtenances are judged safe for continued use at the restricted reservoir elevation of 1460 feet.
- City of Escondido Technical Reports: The City of Escondido has conducted various seismic safety, hydrologic, flood modeling, and other analyses from 1973 to present. All of these existing studies have contributed to determining the location, feasibility, and technical methods of the proposed dam replacement project. The most recent and relevant of these documents are listed below.
 - City of Escondido Public Works Department (City of Escondido). 2004. *Supporting Technical Information, Lake Wohlford Dam – FERC Project 176-CA*. [Please note that due to the sensitive nature of information contained within this document, it is not available for public release, and therefore has not been included on the data CD.]

Probable Maximum Flood Hydrology Reports

- GEI Consultants, Inc. 2000. *Probable Maximum Flood Hydrology for Lake Wohlford Dam*. Prepared for the City of Escondido. February 2000.
- GEI Consultants, Inc. 2002. *Revised Probable Maximum Flood Hydrology for Lake Wohlford Dam*. Prepared for the City of Escondido. January 2002.

Safety Reports

- Harlan, Richard C. 2004. *Report on Potential Failure Mode Analysis for Lake Wohlford Dam*. Prepared for the City of Escondido. November 2004. [Please note that due to the sensitive nature of information contained within this document, it is not available for public release, and therefore has not been included on the data CD.]
- GEI Consultants, Inc. 2007. *Liquefaction Evaluation of Lake Wohlford Dam*. Prepared for the City of Escondido. December 2007.
- GEI Consultants, Inc. 2008. *Lake Wohlford Dam Seismic Survey*. Prepared for the City of Escondido. November 2008.
- Black and Veatch. 2009. *Lake Wohlford Dam FERC Project No. 176-CA: Part 12 Dam Safety Inspection*. Prepared for the City of Escondido. October 2009.

Inundation/Flooding Reports

- o James M. Montgomery Consultants Engineers, Inc. (JMM Inc). 1990. *Inundation Study for Wohlford Dam, Escondido, CA*. Prepared for the City of Escondido. August 1990.

Project Timing and Phasing

This project would not include phases, but rather would be constructed as a single construction project. Studies discussed above indicate that replacement of the existing Lake Wohlford Dam would be the most feasible option for addressing seismic-related flooding issues.

Work Plan

The following sections outline the specific activities that will be performed to implement the *Lake Wohlford Dam Replacement Project*.

Row (a) Direct Project Administration

Task 1 – Project Administration

This project will involve project administration after the Grant Agreement is formalized on September 1, 2011. Project administration will involve coordination meetings with staff, project partners, and consultants as necessary. Deliverables that will be produced from these project administration efforts include updated budgets, schedules, and change orders. These efforts will require 8,500 hours of labor from multiple staff members from the City of Escondido.

Table 3-3: Task 1 Project Administration Scope

Labor Category	Level of effort	Status
AFTER September 1, 2011		
Department Assistant	2,000	Not started
Utilities Construction Manager	500	Not started
Deputy Director of Utilities Construction & Maintenance	500	Not started
Engineer II	2,500	Not started
Utilities Analyst	2,500	Not started
Management Analyst II	500	Not started

Task 2 – Labor Compliance Program

This task includes the work necessary to establish and adopt a Labor Compliance Program (LCP) in accordance with CCR §16421-16439. This LCP will be approved by the California Department of Industrial Relations, and details of the LCP will be included within the *Lake Wohlford Dam Replacement Project's* quarterly reports.

Under the required LCP, a contractor must enter into an Agreement with the City of Escondido in order for work to be performed. Standard language of the Contract encompasses specific reporting and performance standards in accordance with regulations adopted by the Director of the Department of Industrial Relations at CCR §16421-16439. Sample language is as follows:

Compliance with Applicable Laws, Permits and Licenses. CONTRACTOR shall keep itself informed of and comply with all applicable federal, state, and local laws, statutes, codes, ordinances, regulations, and rules in effect during the term of this Agreement. This shall include, but not limited to, all California Labor Code laws regarding payment of prevailing wages and all OSHA regulations. CONTRACTOR shall obtain any and all licenses, permits, and authorizations necessary to perform the services set forth in this Agreement. Neither CITY, nor any elected nor appointed boards, officers, officials, employees, or agents of CITY, shall be liable, at law or in equity, as a result of any failure of CONTRACTOR to comply with this section.

Work associated with this task will begin after the Grant Agreement is formalized on September 1, 2011. The City of Escondido will implement the LCP within the Construction Administration task (see Task 11); therefore, no budget is included here.

Task 3 – Reporting

All reporting for this project will occur after the Grant Agreement is formalized (after September 1, 2011). Reporting will include three components as listed below and be performed by staff members from the City of Escondido under the Project Administration task (see Task 1). The Project Assessment and Evaluation Plan (PAEP) and quarterly reports will be generated by the Utilities Construction Manager, approved by the Deputy Director of Utilities Construction and Maintenance, and sent and filed by the Department Assistant. Quarterly invoices will be generated by Utilities Analyst and the Management Analyst II, and approved by the Construction Manager and Deputy Director. The Project Completion Report will be generated by the Utilities Construction Manager and Deputy Director, and sent and filed by the Department Assistant.

Table 3-4: Task 3 Reporting Scope

Project Administration Submittals	Date	Status
AFTER September 1, 2011		
Project Assessment and Evaluation Plan (PAEP)	September 2011	Not started
Quarterly Reports and Invoices	Quarterly, beginning in December 2011	Not started
Project Completion Report	July 2016	Not started

*Based on completion of project by April 2016. Project completion report due 90 days after end of term.

Row (b) Land Purchase Easement

A land purchase easement is not applicable to this project.

Row (c) Planning/Design/Engineering/Environmental Documentation

Task 4 – Assessment and Evaluation

In addition to the technical documents described above under “Completed Work” and “Existing Data and Studies,” two technical reports have recently been completed for the *Lake Wohlford Dam Replacement Project*. It is not anticipated that this project will require additional assessment and evaluation technical studies. Below provides a brief description of each of these studies, and the table below demonstrates their respective statuses and completion dates.

- The *Lake Wohlford Dam Replacement Geotechnical Data* report was completed for the City of Escondido in June 2010 (GEI 2010b). This report presents details of a subsurface exploration program that was performed as a part of an evaluation of alternatives to replace the existing Lake Wohlford Dam. The results of this report were utilized to evaluate feasibility of various alternatives for Lake Wohlford Dam replacement. The alternative evaluation was conducted as part of a separate report, which is described below.
- The *Evaluation of Alternatives for Replacement of Lake Wohlford Dam* report was completed for the City of Escondido in June 2010 (GEI 2010a). This report presents the results of an evaluation to identify a preferred dam type to replace the existing Lake Wohlford Dam. The evaluation utilized geotechnical data to determine that an earth-core rockfill dam would be preferred over both an RCC dam and a concrete-faced rockfill dam. This evaluation included conceptual designs of dam and appurtenant facilities, which are anticipated to change and evolve as additional information is obtained during a future preliminary and final design process.

Table 3-5: Task 4 Assessment and Evaluation Scope

Study Performed	Date	Status
BEFORE September 1, 2011		
Evaluation of Alternatives for Replacement of Lake Wohlford Dam	June 2010	Complete
Lake Wohlford Dam Replacement Geotechnical Data Report	June 2010	Complete

Task 5 – Final Design

All design and engineering for this project will occur after initiation of the Grant Agreement on September 1, 2011. As discussed below, final design for this project will include 10%, 60%, 90%, and 100% design deliverables.

10% pre-design efforts will include a Pre-Design Report that will describe preliminary siting of project components, including the replacement dam, spillway, outlet tunnel, and other factors of major consideration. This report will also include a discussion of the suitability of onsite or nearby excavated materials for use in construction of the replacement dam. Finally, this report will summarize the previously performed geological investigations and reports, as well as meetings with owners and stakeholders and their concerns and responses to the project. 10% pre-design efforts will occur between November 2011 and February 2012.

60% design will be considered advanced design that will include preliminary details and sections of the proposed project. This design will define actions and activities associated with abutment and foundation tie-ins, spillway and piping, and all required demolition. At the time that 60% design is prepared, all geological field investigations will be complete, draft reports will be available, and recommendations associated with these investigations will be incorporated into the 60% design report. Finally, 60% design will include technical specifications such as a draft bid and schedule and preliminary construction cost estimates.

90% design will include a complete set of construction plans and technical specifications, a bid schedule, and final construction cost estimates. This design will be available for review and quality assurance and quality control (QA/QC).

100% final design will include preparation of a final design package that is ready to advertise. The final design package will be signed and sealed by relevant City of Escondido staff and council members.

The table below provides an anticipated timeline for the design deliverables discussed above.

Table 3-6: Task 5 Final Design Scope

Design Submittals	Date	Status
AFTER September 1, 2011		
10% Design – Pre-Design Report	February 2012	Not started
60% Design – Advanced Design and Geological Field Investigations	May 2012	Not started
90% Design – Construction Plans and Specifications	August 2012	Not started
100% Design – Bid Package	November 2012	Not started

Task 6 – Environmental Documentation

The Environmental Opinion (ICF Jones and Stokes 2008a) completed for the *Lake Wohlford Dam Replacement Project* outlines the potential environmental impacts that may be associated with this project. This assessment found that the project will need to comply with federal (National Environmental Policy Act – NEPA) and state (California Environmental Quality Act – CEQA) environmental laws, regulations, and guidelines. Because of the potential for significant adverse impacts to wetlands, waters of the United States, and waters of the State, this project will require preparation of a joint CEQA/NEPA document. At this time, it is assumed that this document would be an Environmental Impact Report/Environmental Assessment (EIR/EA).

The Environmental Opinion was completed in December 2008. Efforts to complete an EIR/EA or other relevant environmental documentation will not begin until after initiation of the Grant Agreement. It is anticipated that these efforts will take approximately 18 months to complete, and will occur between November 2011 and May 2013.

Table 3-7: Task 6 Environmental Documentation Scope

Environmental Documentation	Date	Status
BEFORE September 1, 2011		
Lake Wohlford Dam Environmental Opinion	December 2008	Completed
AFTER September 1, 2011		
Lake Wohlford Dam Replacement Project EIR/EA	May 2013	Not started

Task 7 – Permitting

In October 2008, a report was prepared for the City of Escondido entitled *Lake Wohlford Dam Regulatory Permitting Summary* (ICF Jones and Stokes 2008b). This report found that the City of Escondido would likely need multiple permits to complete the *Lake Wohlford Dam Replacement Project*. The following is a list of all of the regulations and agencies that may require permits for completion of the project.

- Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbor Act from the United States Army Corps of Engineers (USACE);
- Section 106 of the National Historic Preservation Act from the State Historic Preservation Office;
- Sections 7 and 10 of the Federal Endangered Species Act from the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service;
- Section 1602 of the California Fish and Game Code and the Endangered Species Act (ESA) from the California Department of Fish and Game (CDFG); and
- Sections 401 and 402 of the CWA from the Regional Water Quality Control Board (RWQCB).

The aforementioned list provides the potential regulatory requirements of the *Lake Wohlford Dam Replacement Project*; however the full scope of required permitting will be determined upon completion of design and preliminary environmental analyses. For purposes of this Work Plan, timing and cost estimates were based on assumptions from the *Lake Wohlford Regulatory Permitting Summary*, which determined that the project may require a CWA Section 401 Water Quality Certification and CWA Section 404 Authorization. Additionally, if the project involves impacts to Waters of the State that are not also regulated by the USACE, a waste discharge requirement may be required. Any new discharges of wastewater associated with City facilities would also require issuance of an National Pollutant Discharge Elimination System (NPDES) permit. In addition, if the project were to involve construction of a temporary access road on lands owned by the U.S. Bureau of Reclamation, additional easement permits may be required.

Currently, no permitting has been completed for this project. It is anticipated that the entire permitting process will require a minimum of 1,000 hours to complete. This effort is expected to occur between February and October of 2013.

Table 3-8: Task 7 Permitting Scope

Permitting	Date	Status
AFTER September 1, 2011		
Section 401 Water Quality Certification	October 2013	Not started
Section 404 Authorization Permit	October 2013	Not started
Waste Discharge Requirements	October 2013	Not started
Other Permits (as necessary)	October 2013	Not started

Row (d) Construction / Implementation

Task 8 – Construction / Implementation Contracting

Tasks associated with construction contracting will be completed by City of Escondido staff. Therefore, the timeline, tasks, and budget associated with this task are contained within Task 11, Construction Administration. In total, construction contracting is expected to occur from November 2013 to January 2014.

Task 9 – Construction / Implementation

Materials and/or Design Standards

Various alternatives were investigated and evaluated to either stabilize or replace the existing Lake Wohlford Dam (GEI 2010a). The alternatives analysis evaluated alternatives on both the upstream as well as the downstream sides of the Lake Wohlford Dam. This evaluation found that the most viable alternatives were for a replacement dam downstream of the existing dam. The replacement dam will be constructed to meet all current codes and regulations including those of DWR's DSOD.

The alternatives evaluation specifically evaluated the potential for a roller compacted concrete dam (RCC dam) or a rock fill dam to replace the existing Lake Wohlford Dam (GEI 2010a). A preliminary geological investigation, which included a seismicity study and three borings each over 100 feet in depth, was performed to support the alternatives analysis (GEI 2010b). The results of this geological investigation demonstrated that the RCC dam would be economically infeasible due to the excavation depth required to reach competent foundation material.

A rock fill dam with an earth-core is the preferred alternative based on current knowledge of the site. The earth-core made up of fine grained clay material is embedded within the heart of the dam and performs as a seepage barrier. This barrier inhibits the seepage of water through the dam and the migration of materials as the dam settles and shifts over time. Preliminary investigations revealed that some clay material is available locally.

As described previously, design has not been completed for this project. Further materials and design standards will be evaluated and determined within future design efforts (refer to Task 5).

Construction Tasks

Final design has not yet been completed for this project. Therefore, at this time specific construction specifications are not known. The following paragraphs generally describe construction efforts that will be necessary to complete the *Lake Wohlford Dam Replacement Project*. These subtasks are based on information within the alternatives analysis, which contained a conceptual design of the dam (GEI 2010a). Final construction specifications will be determined by November 2012 as part of the 100% Final Design deliverables (refer to Task 5). Construction is anticipated to begin following Construction Contracting in February 2014.

The upstream dam shell, a portion of the dam embankment upstream of the core, will primarily consist of earthfill. The makeup of the earthfill will consist of 3-inch minus materials placed against the downstream face of the existing dam with appropriate filter material placed between the two. Much of this earthfill may be available onsite from excavations for the foundation and abutments. Additional material may result from the spillway excavation near the northerly abutment. The southerly abutment may generate additional material from a borrow area and realignment of Oakvale Road. The desirable material for the earthfill would be decomposed or highly weathered granite having roughly 20% fines and classified as silty sand according to the Unified Soil Classification System. The upstream face would have a slope of 3:1 (horizontal: vertical).

The downstream dam shell, a portion of the dam embankment downstream of the core, will primarily consist of rockfill. Much of this material may also be available from excavations for the foundation and abutments. An appropriate filter layer would be placed adjacent to the clay earth-core as the rockfill is placed to prevent migration of fine earth-core particles through erosion to the coarser rockfill. The rockfill material would consist of hard granitic material with a size characteristic of 18-inch minus with a maximum of 20% being finer than 1-inch. The downstream face would have a slope of 2:1 (horizontal:vertical).

Preliminary estimates put the required materials for the dam embankment at between 220,000 and 250,000 cubic yards. Available appropriate local materials will be utilized to maximum amount possible, with the remainder being imported.

The final crest of the dam would be paved for maintenance purposes. The spillway at the northerly abutment would be cut through the existing rock material then lined with reinforced concrete. The spillway will be designed to carry the Probable Maximum Flood of approximately 7,000 cubic feet per second. The existing outlet piping will be properly designed and replaced as it passes under and through

the new dam. The downstream emergency release valve will also be relocated and replaced. A grouted curtain would be constructed below the foundation and extended into the earth-core as a cutoff wall to reduce seepage at the dam-foundation interface.

Figure 3-7 is the conceptual site plan prepared for the *Lake Wohlford Dam Replacement Project*, and shows the approximate location of the earth-core rockfill dam and new spillway. Figure 3-8 is the conceptual section view, which shows the positioning of the new dam in relation to the existing dam.

Table 3-9: Task 9 Construction / Implementation Scope

Implementation Submittals	Date	Status
AFTER September 1, 2011		
Dam Construction – Upstream Dam Shell, Downstream Dam Shell, Dam Embankment, Crest, Spillway, Outlet Piping, Emergency Release Valve, and Curtain	July 2015	Not started

Row (e) Environmental Compliance / Mitigation / Enhancement

Task 10 – Environmental Compliance / Mitigation / Enhancement

The Environmental Opinion completed for the *Lake Wohlford Dam Replacement Project* outlines the potential environmental impacts that may be associated with this project (ICF Jones and Stokes 2008a). This report found that the earthfill dam would potentially require mitigation for biological resources, cultural resources, water quality, land use, and traffic. The specific mitigation that would be required would be determined after completion of the EIR/EA (refer to task 6).

Potential mitigation to biological resources will likely require the greatest associated costs due compensatory mitigation requirements. The Environmental Opinion identified potential impacts to coast live oak woodland, southern mixed chaparral, non-native grassland, and freshwater marsh associated with construction of the earth core rock-fill dam. Mitigation ratios for these vegetation communities typically consist of 3:1 for coast live oak woodland, 1:1 for southern mixed chaparral, 0.5:1 to 1:1 for non-native grassland (depending on its value as raptor foraging habitat, presence of sensitive species, etc.), and 3:1 for freshwater marsh (with a minimum 1:1 in the form of wetland creation). Specific mitigation requirements will be determined through consultation with the regulatory agencies (U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and California Department of Fish and Game).

Potential mitigation for cultural resources, water quality, land use, and traffic will likely be included in the standard construction contract (for receipt of an NPDES General Construction Permit, preparation of a traffic control plan, etc).

Environmental compliance / mitigation / enhancement has not yet begun for the proposed project. It is anticipated that work for this task would last for one year, and would occur from April 2015 to April 2016. The main deliverable that will be produced for this task includes a Final Mitigation and Monitoring Report, which summarizes all mitigation required in the EIR/EA.

Table 3-10: Task 10 Environmental Compliance / Mitigation / Enhancement Scope

Environmental Compliance / Mitigation / Enhancement Documentation	Date	Status
AFTER September 1, 2011		
Final Mitigation Monitoring Report	April 2016	Not started

Figure 3-7: Conceptual Site Plan

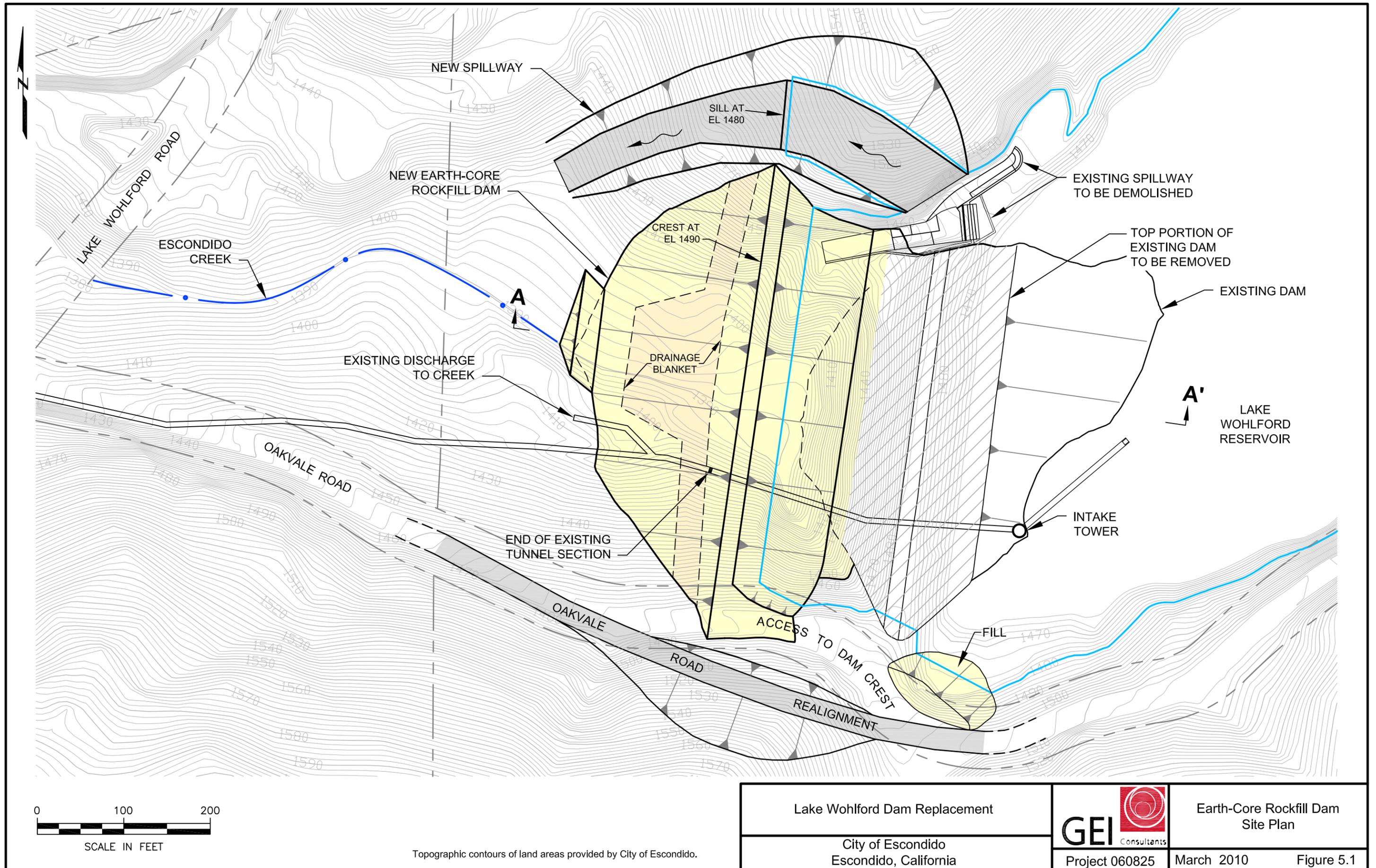
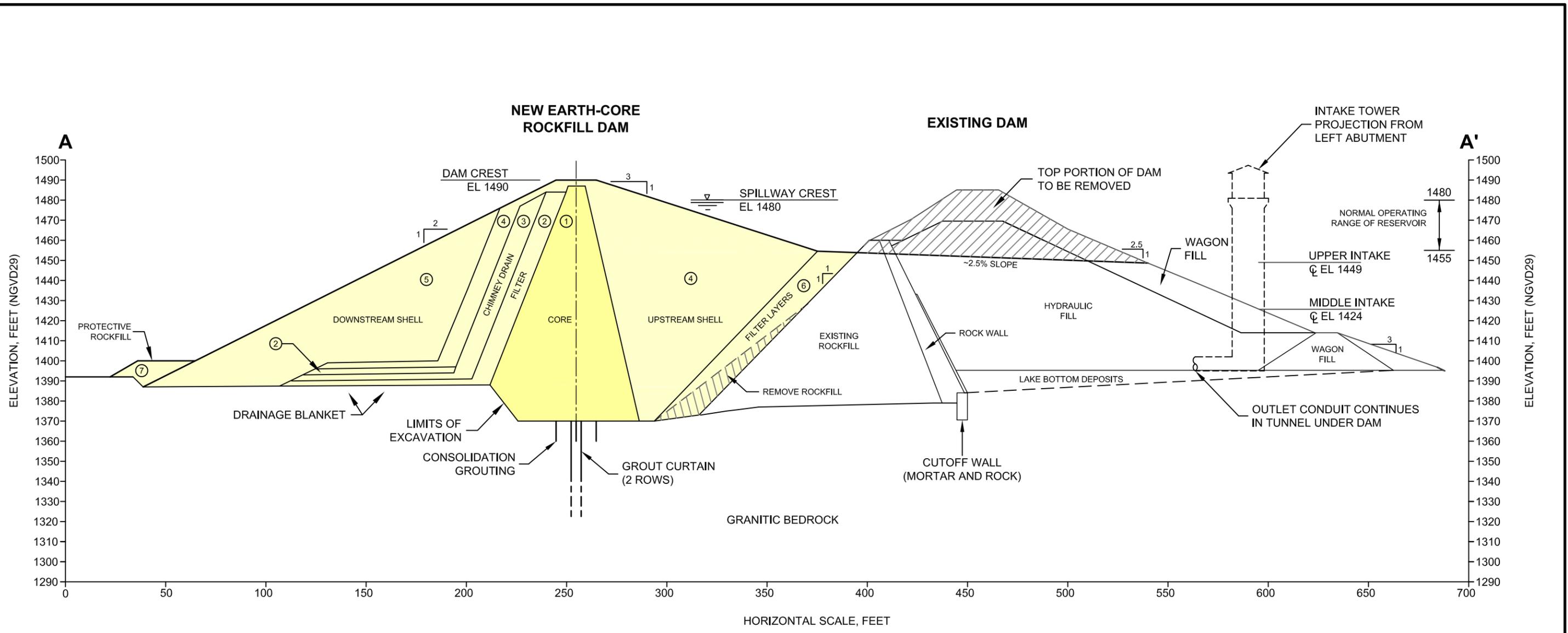


Figure 3-8: Conceptual Section View

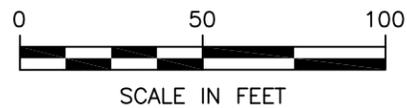


Approximate Dimensions of New Dam

Crest Length: 560 feet
 Crest Width: 20 feet
 Downstream Slope: 2H:1V
 Upstream Slope: 3H:1V

DAM ZONATION

- ① CLAYEY CORE
- ② SAND FILTER
- ③ GRAVEL DRAIN
- ④ EARTHFILL
- ⑤ ROCKFILL
- ⑥ FILTER LAYERS
- ⑦ REUSED LARGE ROCKFILL FROM EXISTING DAM



Lake Wohlford Dam Replacement		Earth-Core Rockfill Dam Section A-A'
City of Escondido Escondido, California	Project 060825	March 2010 Figure 5.2

Row (f) Construction Administration

Task 11 – Construction Administration

This task involves administration, coordination, and review of the construction contract and all other related construction tasks. This task will require labor from City of Escondido staff members and consultant construction managers and inspectors to oversee construction, mitigation, and other aspects of the project. The Contract Administration task is anticipated to require 7,010 hours of labor.

Table 3-11: Task 11 Construction Administration Scope

Labor Category	Level of effort	Status
AFTER September 1, 2011		
Construction Management	7,010 hours	Not started

Row (g) Other Costs

Other costs associated with the *Lake Wohlford Dam Replacement Project* include establishment of a Board of Consultants, as required by FERC (letter dated May 28, 2010). The Board of Consultants shall oversee the analysis, design, construction, and any potential problems that might arise during the design and construction of the Lake Wohlford Dam replacement structures. The Board of Consultants shall be comprised of at least three members with expertise in the following areas: geotechnical engineering, engineering geologist, and hydraulic structures.

The City of Escondido will solicit and bring under contract the Board of Consultants, invite review and comment on all design submittals, and monitor construction procedures and progress. Formal meetings of the Board of Consultants will be convened at important milestones.

Row (h) Construction Contingency

A Construction Contingency for the *Lake Wohlford Dam Replacement Project* is included within the budget (Attachment 4) to cover unforeseen overruns.

References

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