City of San Diego
Dam Maintenance Program

City of San Diego Source Water System
Historical Resources Assessment

October 2022 | 00149.00032.020

Preapred for:

City of San Diego
Public Utilities Department
9192 Topaz Way, MS 901A
San Diego, CA 92123

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National Archaeological Database Information

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Submitted to:	City of San Diego Public Utilities Department
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Updated Sites:	City of San Diego Source Water System; Morena Reservoir Complex Historic District; Lower Otay Reservoir Complex Historic District; Upper Otay Reservoir Complex Historic District; Murray Reservoir Complex Historic District; Dulzura Conduit; Lake Hodges Reservoir Complex Historic District; Barrett Reservoir Complex Historic District; El Capitan Reservoir Complex Historic District; San Vicente Reservoir Complex Historic District; Sutherland Reservoir Complex; Miramar Reservoir Complex
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ACRONYMS AND ABBREVIATIONS

CBP	Continuing Best Practice
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
County	San Diego County
CRHR	California Register of Historical Resources
CSDHRR	City of San Diego Historical Resources Register
CSDSWS	City of San Diego Source Water System
DPR	Department of Parks and Recreation
DSOD	Division of Safety of Dams
HELIX	HELIX Environmental Planning, Inc.
HRB	Historic Resources Board
HRG	Historic Resources Guidelines
HRR	Historical Resources Regulations
LDM	Land Development Manual
MWD	Metropolitan Water District
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PRC	Public Resources Code
project	City of San Diego Dam Maintenance Program
PUD	City of San Diego Public Utilities Department
SCIC	South Coastal Information Center
SCMWC	Southern California Mountain Water Company
SDCWA	San Diego County Water Authority
SDMC	San Diego Municipal Code
SHPO	State Historic Preservation Officer
SR	State Route
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey

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EXECUTIVE SUMMARY

HELIX Environmental Planning, Inc. (HELIX) was contracted by the City of San Diego Public Utilities Department (PUD) to provide historic resources services for the City of San Diego Dam Maintenance Program (project) in San Diego County, California. The program proposes to implement various maintenance activities within 14 PUD facilities located across the County. One facility, Black Mountain Reservoir, was established circa 2002 and is not included in this study due to its age. Thirteen of the properties are included in this study: Barrett Dam, Chollas Dam, El Capitan Dam, Hodges Dam, Miramar Dam, Morena Dam, Murray Dam, Rancho Bernardo Dam, San Vicente Dam, Savage (Lower Otay) Dam, Sutherland Dam, Upper Otay Dam, and Dulzura Conduit.

A *City of San Diego Source Water System Historic Context Statement* was prepared for PUD in June 2020 by Dudek (Murray et al. 2020). The study, written by Samantha Murray, Sarah Corder, Nicole Frank, Kate Kaiser, Kara Dotter, and Jessica Colston, documents and evaluates the historical significance and historic register eligibility of the 10 historic reservoir complexes and one conduit, within the PUD jurisdiction. These 11 historic resources are located within the proposed project. The 2020 Dudek study identifies a potential discontiguous historic district, called the City of San Diego Source Water System (CSDSWS), which includes Morena, Lower Otay (Savage), Upper Otay, Murray, Hodges, Barrett, El Capitan, and San Vicente Reservoir Complexes, as well as the Dulzura Conduit, as eligible contributing resources. The discontiguous historic district was recommended eligible for listing in the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHR), and City of San Diego Historical Resources Register (CSDHRR). The study also identifies Morena, Lower Otay (Savage), Upper Otay, Murray, Hodges, Barrett, El Capitan, and San Vicente Reservoir Complexes as individually eligible under the NRHP, CRHR, and CSDHRR. Miramar and Sutherland Reservoir Complexes were found not eligible for listing as contributors to the proposed discontiguous historic district, nor as individual historical resources.

This study concurs with Dudek's findings and builds upon the 2020 report by documenting the eligible reservoir complexes as historic districts with comprehensive maps that define the historic district boundaries and illustrate contributing resource locations within each district. Furthermore, this study implemented data from the South Coastal Information Center (SCIC), as well as data from the project surveys.[1] This report details the methods and results of the CSDSWS historical resources assessment for the project and has been prepared to comply with the California Environmental Quality Act (CEQA) per City of San Diego guidelines.

A separate report was completed for this study by IS Architecture to evaluate the PUD faculties that were not included in the Dudek study but are within the project area and over 50 years in age: Chollas Reservoir Complex and Rancho Bernardo Reservoir. The *Historic Context Statement and Evaluation of Chollas Reservoir Complex and Rancho Bernardo Reservoir* is included as Appendix B. The report documents and evaluates the Chollas Reservoir Complex and the Rancho Bernardo Reservoir as potential contributors to the CSDSWS and as individual historic resources. Chollas Reservoir Complex and Rancho Bernardo Reservoir are recommended not eligible for listing in the NRHP, CRHR, and CSDHRR and are therefore not considered historical resources/properties under CEQA/National Historic Preservation Act (NHPA) Section 106.

[1] The 2020 Dudek study did not incorporate SCIC data.

Morena, Lower Otay (Savage), Upper Otay, Murray, Hodges, Barrett, El Capitan, and San Vicente Reservoir Complexes, as well as the Dulzura Conduit, are all considered historical resources under CEQA and historic properties under Section 106 of the NHPA.[2]

Sutherland Reservoir Complex, Miramar Reservoir Complex, Chollas Reservoir Complex, and Rancho Bernardo Reservoir are not considered historical resources under CEQA or historic properties under Section 106 of the NHPA.

The project does not include any significant alterations, demolitions, relocations, or replacements involving the historical resources and their historic materials and fabric. Given the limited scale of the maintenance activities compared with the expansive, multi-property resources comprising the CSDSWS discontiguous district and the individual reservoir complex historic districts, project implementation would not be expected to result in significant adverse impacts, and therefore, material impairment to historical resources. To maintain and preserve character-defining materials and features, however, this study included a series of Continuing Best Practices for use by PUD when projects are planned and implemented.

In addition, future projects that fall outside of the current program-level maintenance activities would be subject to independent review and evaluation.

A separate Cultural Resources Technical report, addressing archaeological and other historic built-environment resources not associated with the CSDSWS, was prepared separately for the project (Wilson et al. 2022).

[2] Dudek used the title "Lake Hodges Reservoir Complex" in their 2020 report. To be consistent with PUD terminology the resource is referred to as the "Hodges Reservoir Complex" in this report.

1.0 INTRODUCTION

HELIX Environmental Planning, Inc. (HELIX) was contracted by the City of San Diego (City) Public Utilities Department (PUD) to provide historic resources services for the City of San Diego Dam Maintenance Program (Program; proposed project) in San Diego County, California. The Program includes the oversight and routine maintenance of 13 of the City's dams, Dulzura Conduit, and associated infrastructure located throughout the County of San Diego. Twelve of the dam properties and the Dulzura Conduit are addressed in this historic resources study, which includes a historic resource inventory and evaluations of newly identified historic resources associated with the dam facilities. One facility, Black Mountain Dam, was established circa 2002 and is not included in this study due to its modern age. Intensive pedestrian surveys were conducted within the following properties: Barrett Dam, Chollas Dam, El Capitan Dam, Hodges Dam, Miramar Dam, Morena Dam, Murray Dam, Rancho Bernardo Dam, San Vicente Dam, Savage Dam, Sutherland Dam, Upper Otay Dam, and Dulzura Conduit. This report details the methods and results of the historic resources assessment and has been prepared to comply with the California Environmental Quality Act (CEQA) per City of San Diego guidelines.

1.1 PROJECT LOCATION

The proposed project includes routine maintenance of 13 City dams and associated infrastructure, and the approximately 13-mile Dulzura Conduit, located throughout San Diego County (Figure 1, *Regional Location*). Project area maps are included for all Program locations in Figures 3a-n, *Existing Facilities and Maintenance Areas*. The location of each dam facility is detailed below.

1.1.1 Barrett Dam

Barrett Dam is located in the eastern portion of the County, in the unincorporated community of Dulzura. It lies within Section 22 of Township 17 South, Range 3 East, on the U.S. Geological Survey (USGS) 7.5-minute Barrett Lake quadrangle map (Figure 2a, *USGS Topography – Barrett Dam & Access Roads*). The Barrett Dam Access Roads are located within Sections 7, 8, 17, 16, 21, 22, 28, and 33 of Township 17 South, Range 3 East, and Section 12 of Township 17 South, Range 2 East on the USGS 7.5-minute Barrett Lake quadrangle map. Barrett Dam is located at the outlet of Barrett Reservoir along Barrett Lake Road to the north of Campo Road (State Route [SR] 94), south of Skye Valley Road, east of Lyons Valley Road, and west of Horizon View Drive (Figure 3a, *Existing Facilities and Maintenance Areas – Barrett Dam and Access Roads*). The access road is located southeast of Lyons Valley Road, south and west of Barrett Lake, and north of SR 94. The Barrett Dam project area occurs in the City's Barrett Reservoir Open Space area and Cleveland National Forest.

1.1.2 Black Mountain Dam

Black Mountain Dam is located in the northern portion of the City, in the community of Black Mountain Ranch. It lies within Section 6 of Township 14 South, Range 2 West, on the USGS 7.5-minute Del Mar quadrangle map (Figure 2b, *USGS Topography – Black Mountain Dam*). The dam is located to the south of Carmel Valley Road, east of Black Mountain Road, and north of Maler Road (Figure 3b, *Existing Facilities and Maintenance Areas – Black Mountain Dam*). The Black Mountain Dam APE occurs within the City's Black Mountain Open Space Park.

Black Mountain Dam was established circa 2002 and is not included in this study due to its age which is less than 50 years old.

1.1.3 Chollas Dam

Chollas Dam is located in the central portion of the City (Figure 1). It lies in an unsectioned portion (Mission San Diego land grant) of Township 16 South, Range 2 West, on the USGS 7.5-minute National City quadrangle map (Figure 2c, *USGS Topography – Chollas Dam*). Chollas Dam is located at the outlet of Chollas Heights Reservoir to the north of College Grove Road, south of Fauna Drive, east of Chollas Station Road, and west of College Grove Way (Figure 3c, *Existing Facilities and Maintenance Areas – Chollas Dam*).

1.1.4 El Capitan Dam

El Capitan Dam is located in the eastern portion of the County, in the unincorporated community of Lakeside. It lies within Sections 7 and 8 of Township 15 South, Range 2 East, on the USGS 7.5-minute El Cajon Mountain quadrangle map (Figure 2d, *USGS Topography – El Capitan Dam*). The dam is located at the outlet of El Capitan Reservoir along El Monte Road to the north Interstate 8, south of Featherstone Canyon Road, east of Lake Jennings Road, and west of Peutz Valley Road (Figure 3d, *Existing Facilities and Maintenance Areas – El Capitan Dam*). The El Capitan Dam project area occurs in City's El Capitan Reservoir Open Space Area and Cleveland National Forest.

1.1.5 Hodges Dam

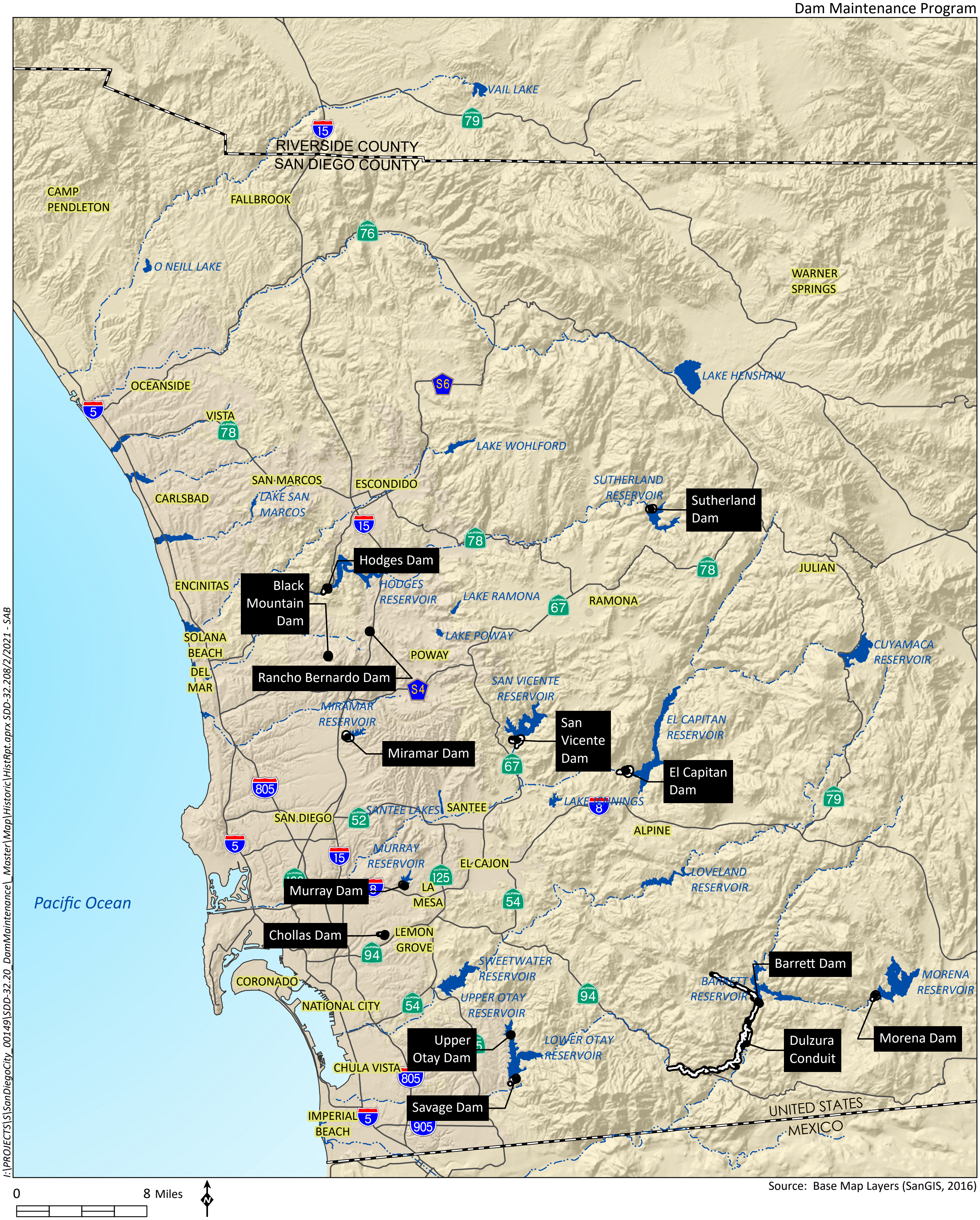
Hodges Dam is located in the north portion of the City. It lies within Section 18 of Township 13 South, Range 2 West, on the USGS 7.5-minute Escondido and Rancho Santa Fe quadrangle maps (Figure 2e, *USGS Topography – Hodges Dam*). The dam is located at the outlet of Hodges Reservoir to the north of Camino Santa Fe, south of Del Dios Road, east of Lake Drive, and west of Calle Ambiente (Figure 3e, *Existing Facilities and Maintenance Areas – Hodges Dam*). The Hodges Dam project area occurs in the City's Hodges Reservoir Open Space area.

1.1.6 Miramar Dam

Miramar Dam is located in the northern portion of the City. It lies within Section 32 of Township 14 South, Range 2 West, on the USGS 7.5-minute Poway quadrangle map (Figure 2f, *USGS Topography – Miramar Dam*). The dam is located at the outlet of Miramar Reservoir to the north of Scripps Lake Drive, south and east of Scripps Ranch Boulevard, and west of Mira Lago Terrace (Figure 3f, *Existing Facilities and Maintenance Areas – Miramar Dam*). The Miramar Dam project area occurs in the City's Miramar Reservoir Open Space area.

1.1.7 Morena Dam

Morena Dam is located in the eastern portion of the County, in the unincorporated community of Lake Morena. It lies within Section 23 of Township 17 South, Range 4 East, on the USGS 7.5-minute Morena Reservoir quadrangle map (Figure 2g, *USGS Topography – Morena Dam*). The dam is at the outlet of Morena Reservoir along Morena Reservoir Road, north of Hauser Creek Road, south of Skye Valley Road, and west of Lake Morena Drive (Figure 3g, *Existing Facilities and Maintenance Areas – Morena Dam*).



Source: Base Map Layers (SanGIS, 2016)

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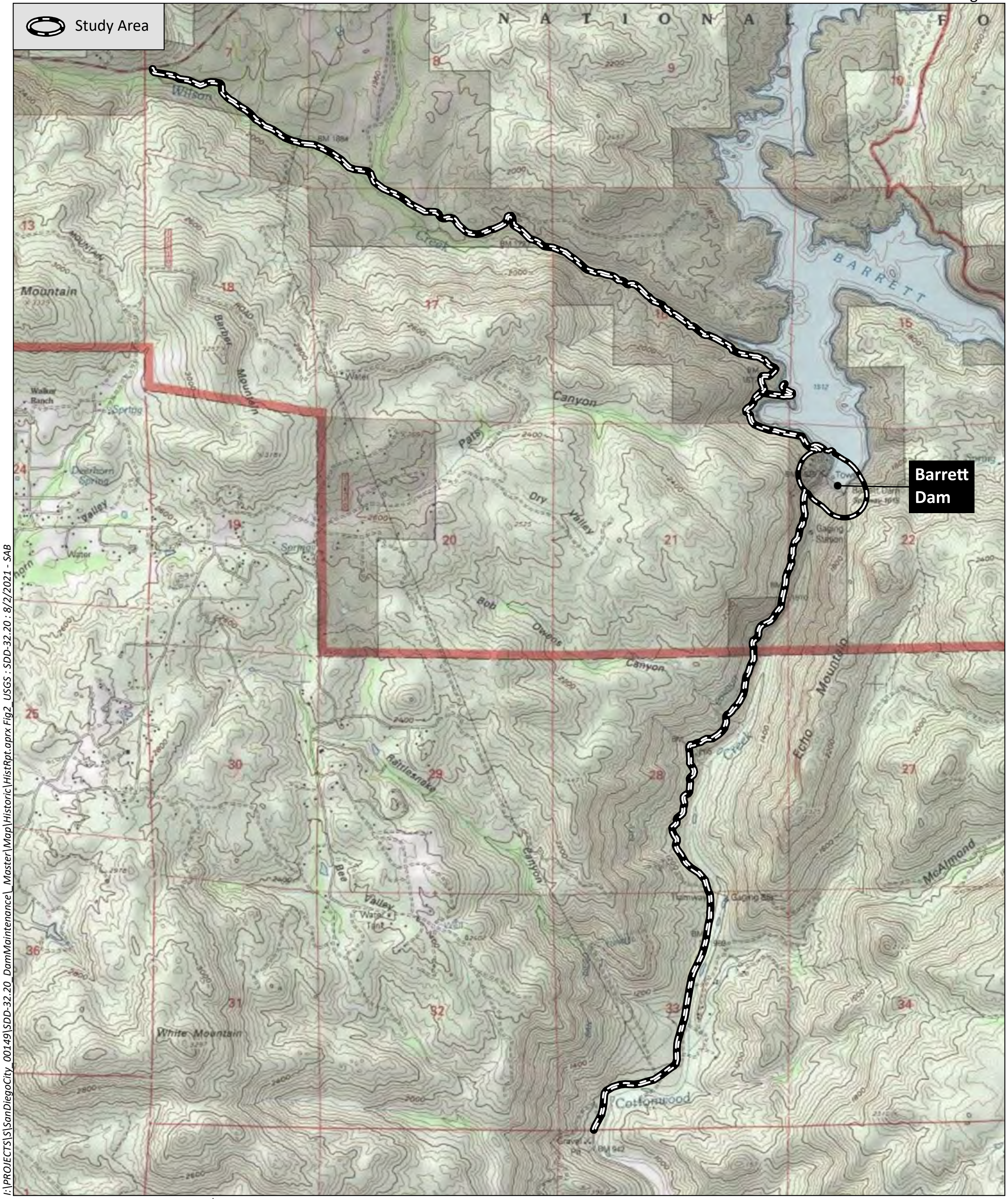
Regional Location

Figure 1



Source: BARRETT LAKE 7.5' Quad (USGS)

0 3,000 Feet

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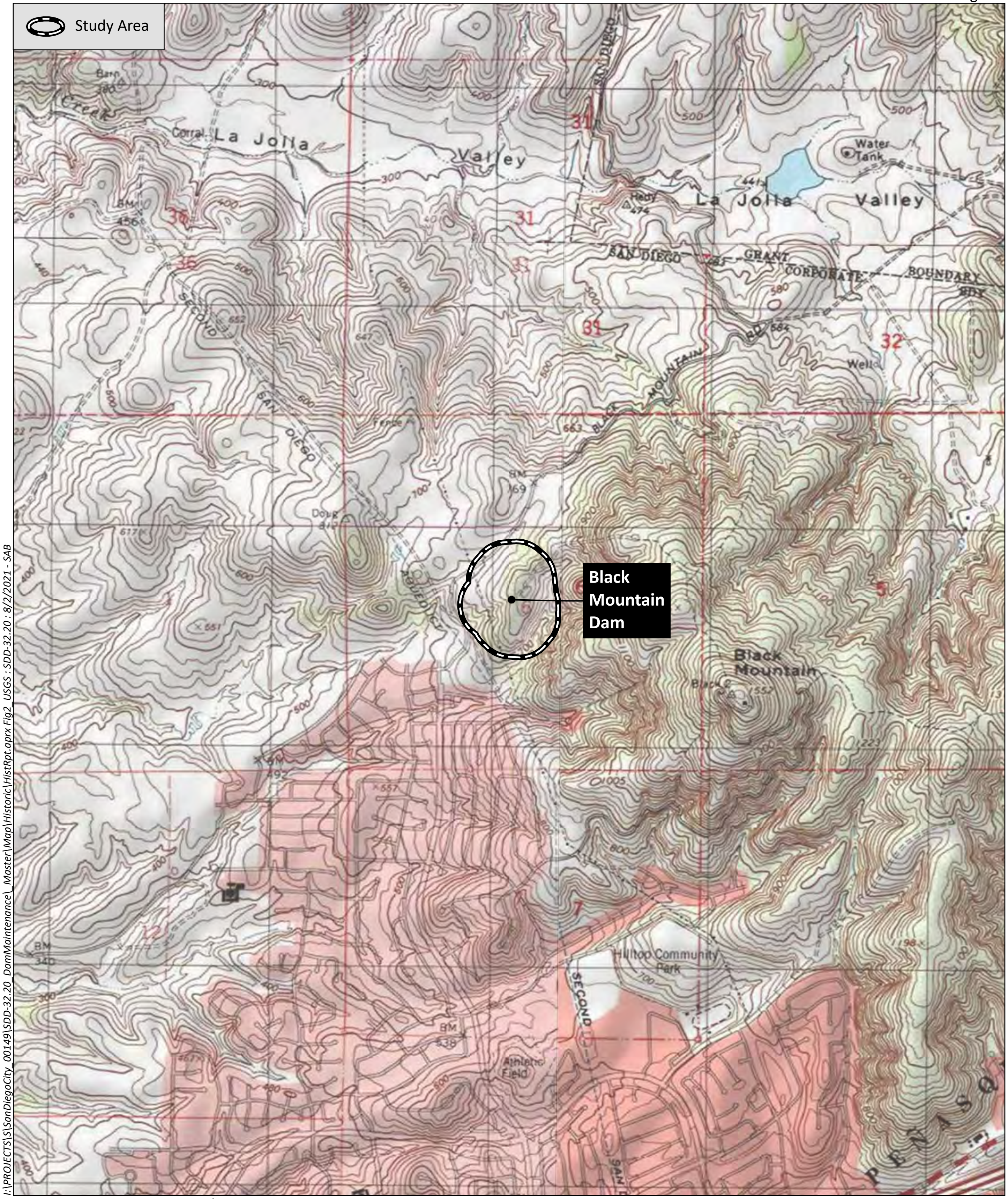
USGS Topography - Barrett Dam & Access Roads

Figure 2a



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Source: ESCONDIDO ,RANCHO SANTA FE ,POWAY ,DEL MAR 7.5' Quad (USGS)

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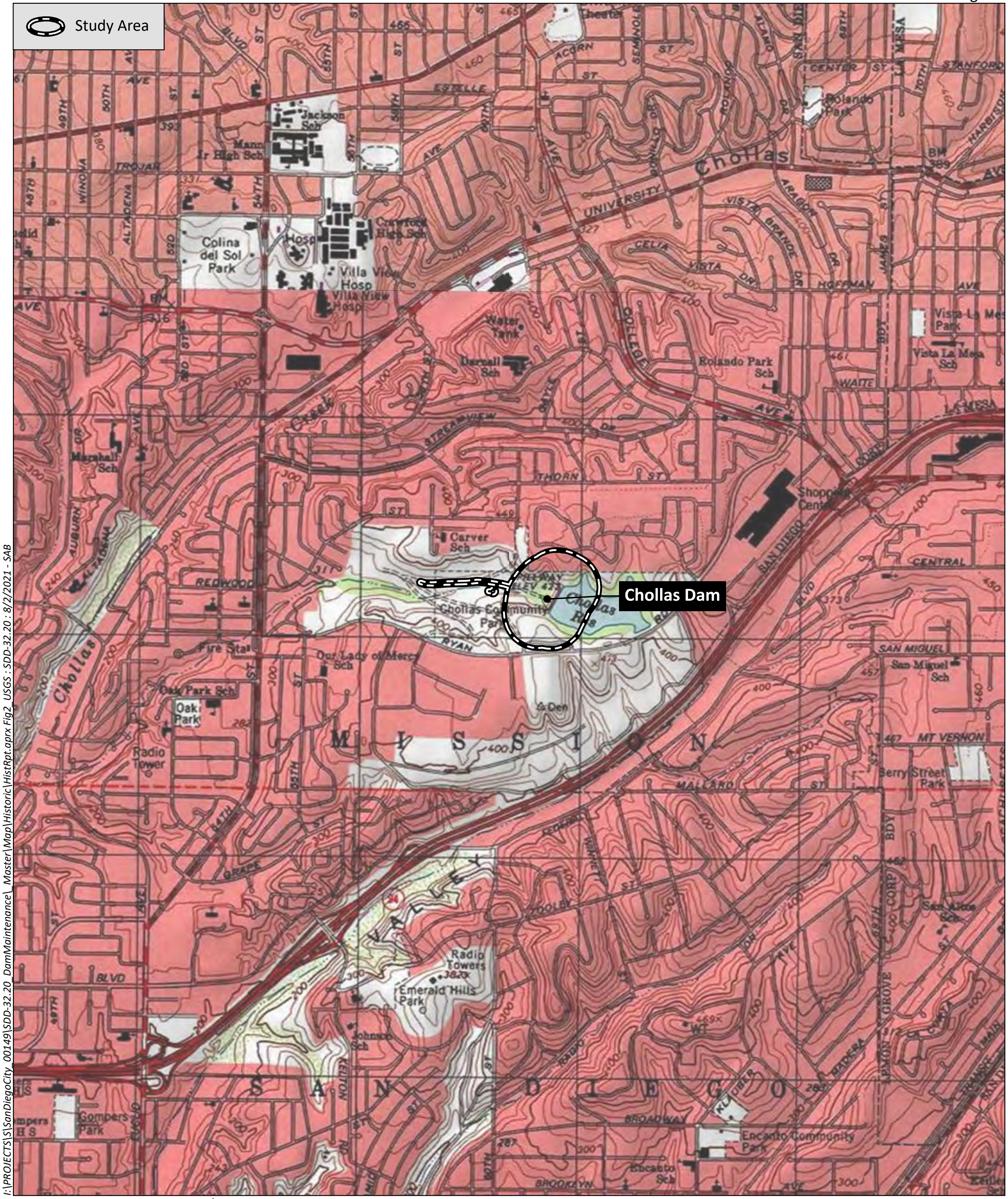
USGS Topography - Black Mountain Dam

Figure 2b



Source: LA MESA ,NATIONAL CITY 7.5' Quad (USGS)

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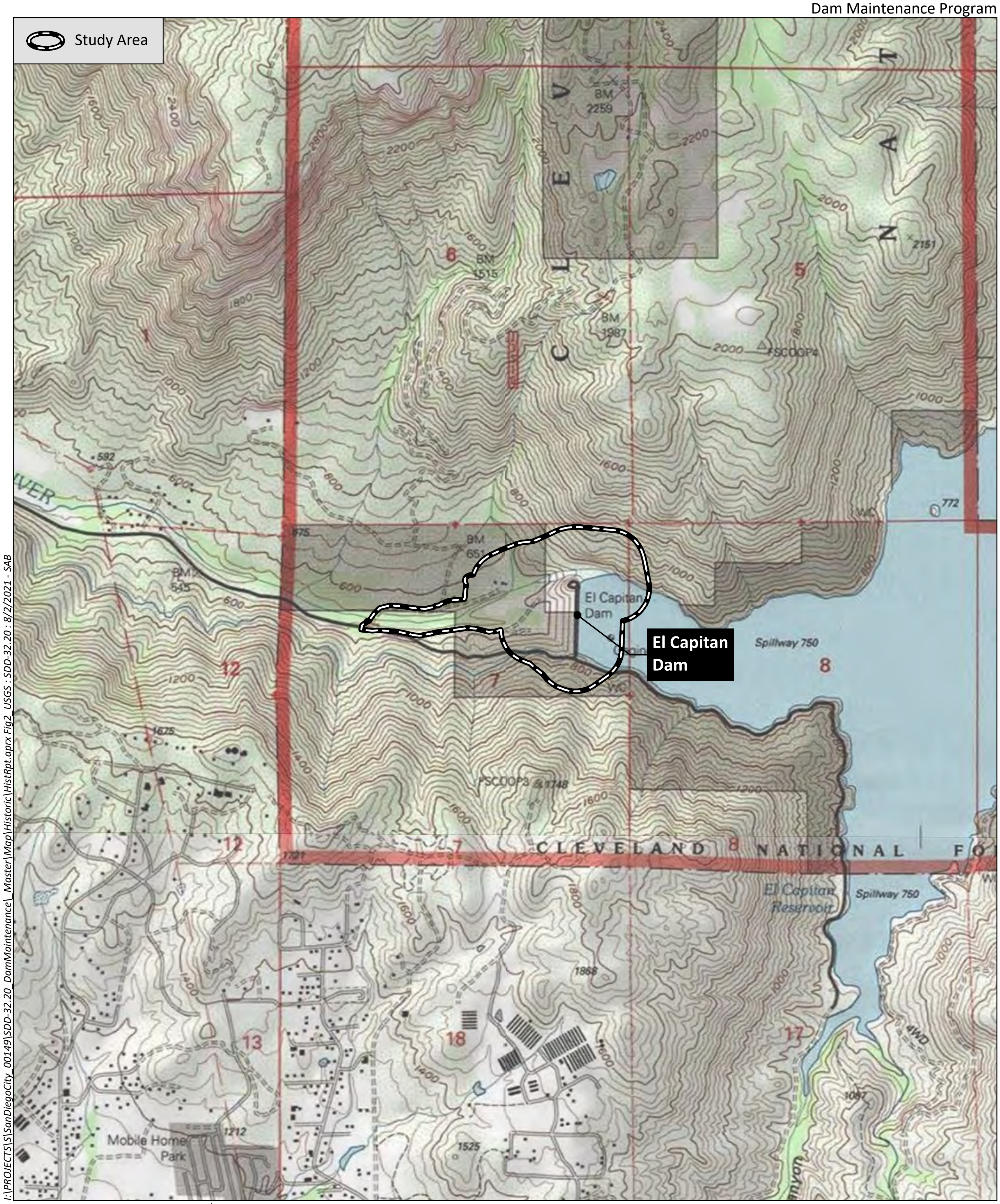
USGS Topography - Chollas Dam

Figure 2c



Source: EL CAJON MTN. ,ALPINE 7.5' Quad (USGS)

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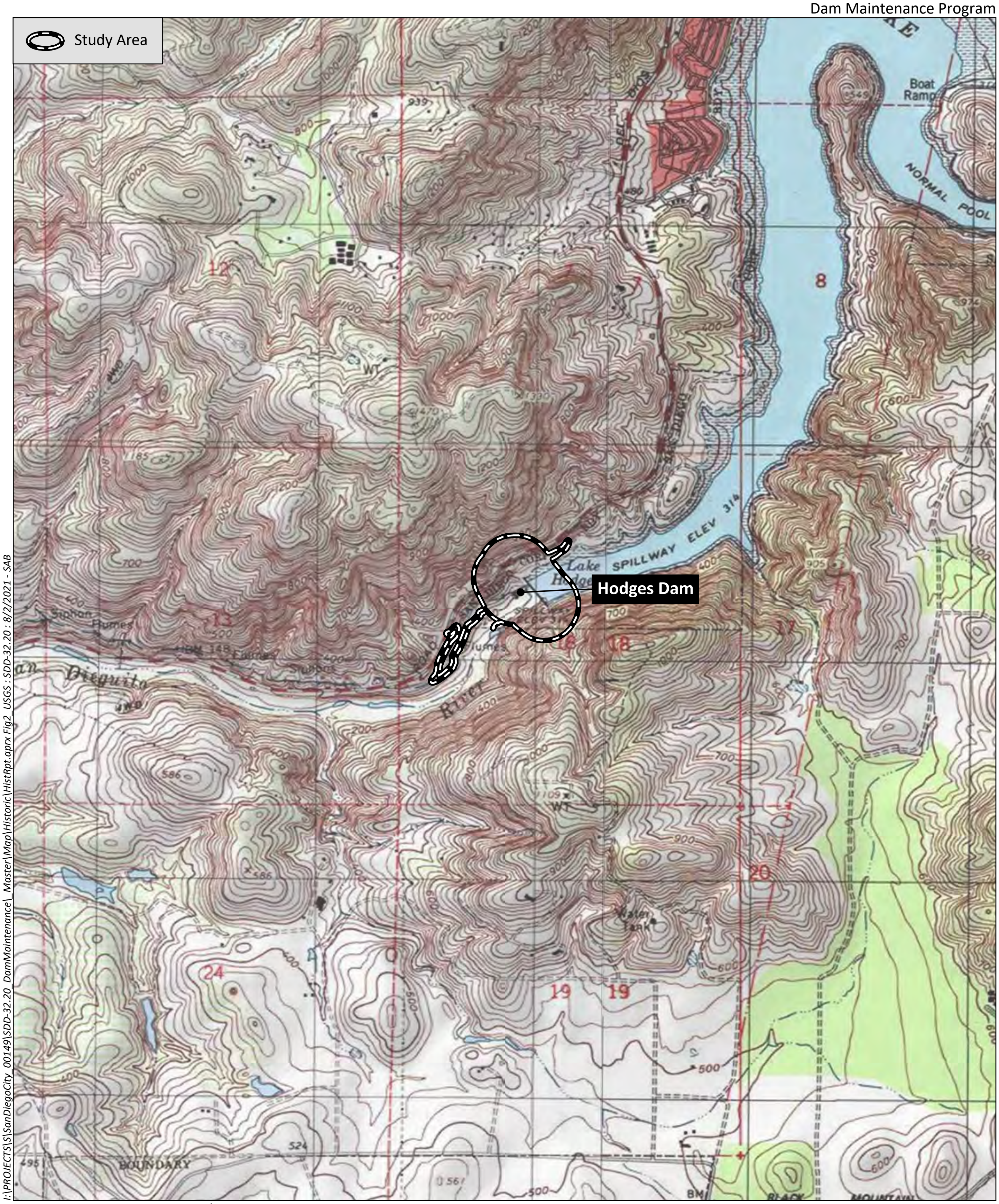
USGS Topography - El Capitan Dam

Figure 2d



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Source: ESCONDIDO ,RANCHO SANTA FE 7.5' Quad (USGS)

0 2,000 Feet

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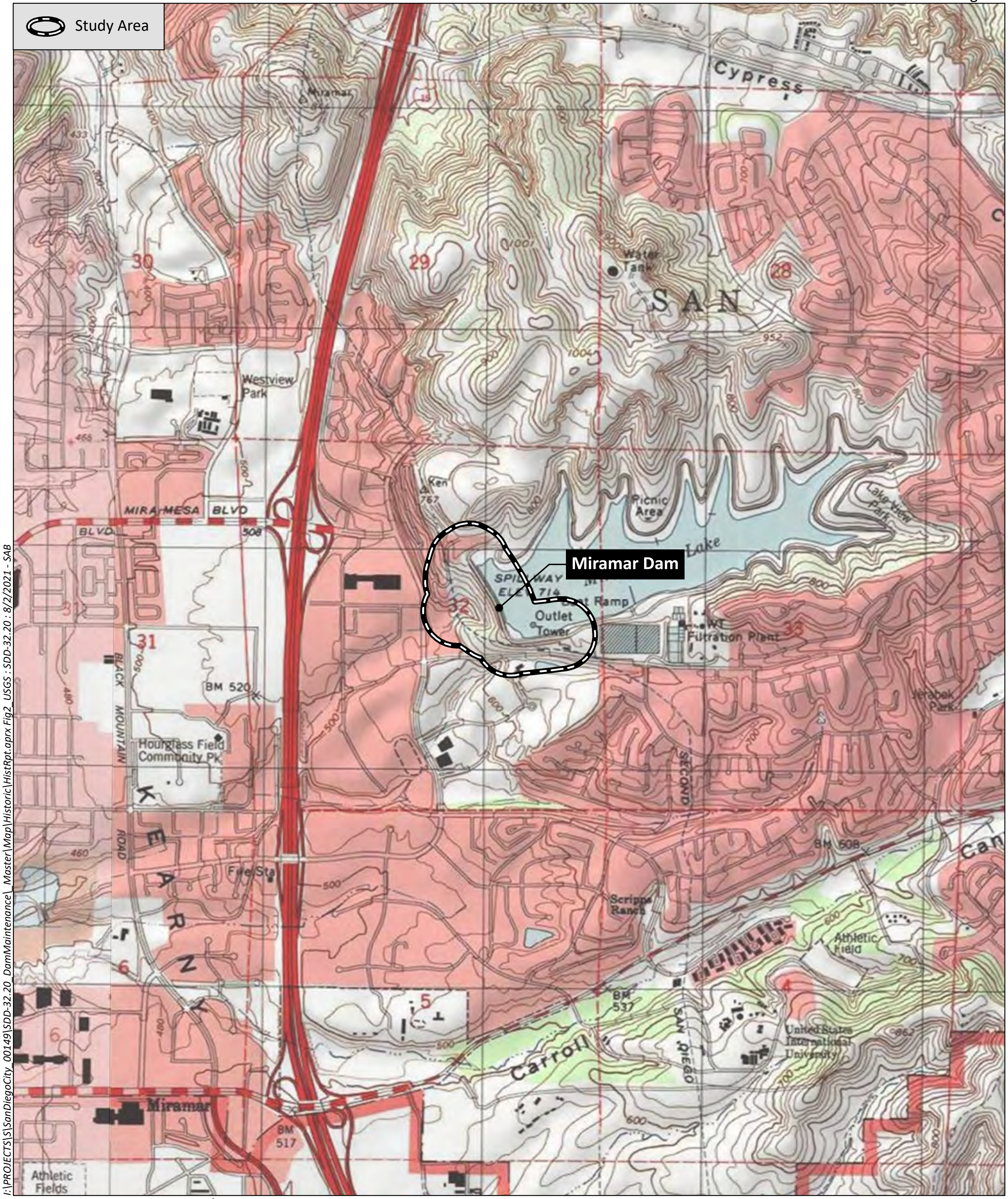
USGS Topography - Hodges Dam

Figure 2e



Source: POWAY ,DEL MAR 7.5' Quad (USGS)

0 2,000 Feet

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USGS Topography - Miramar Dam

Figure 2f

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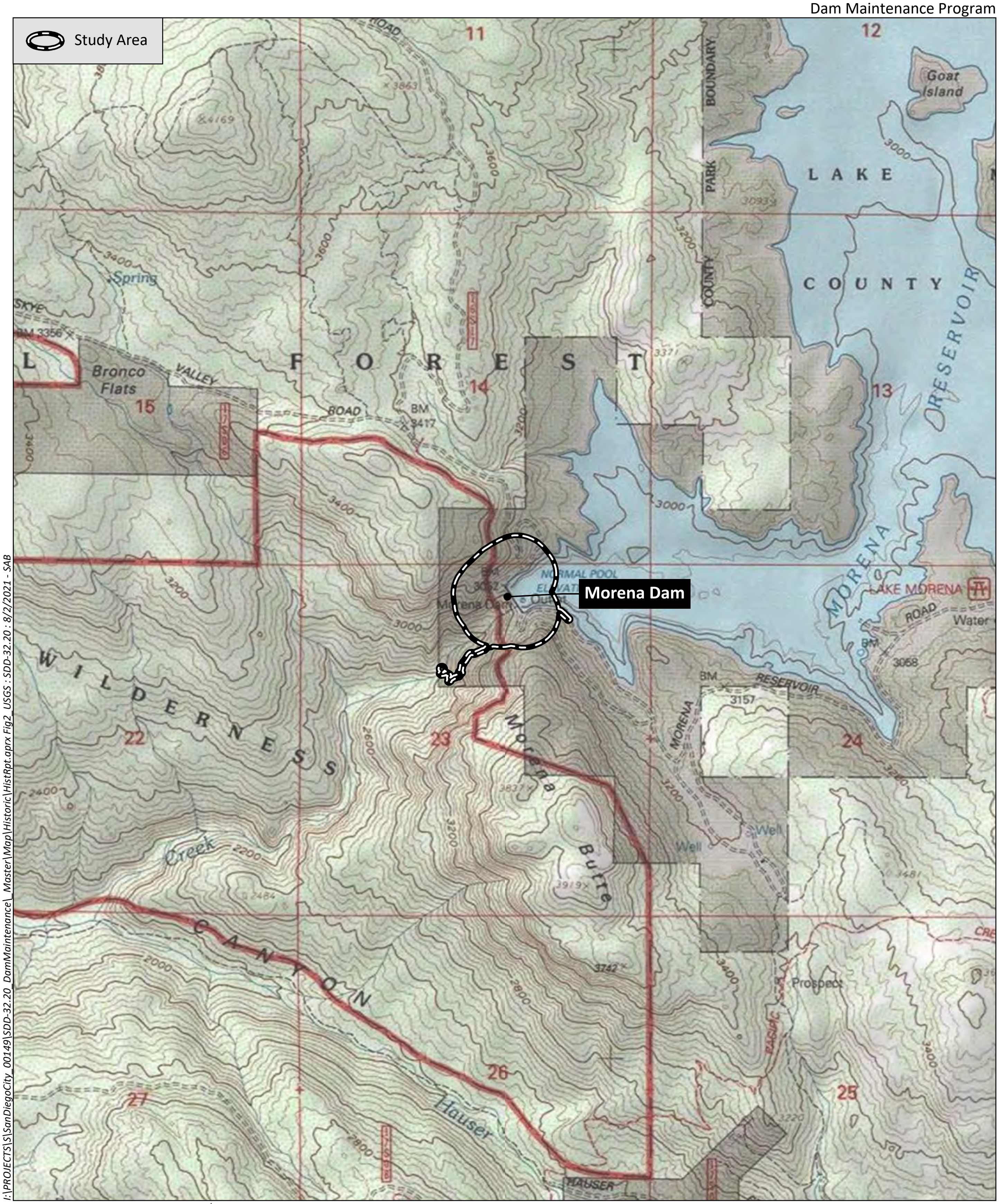

Source: MORENA RESERVOIR 7.5' Quad (USGS)

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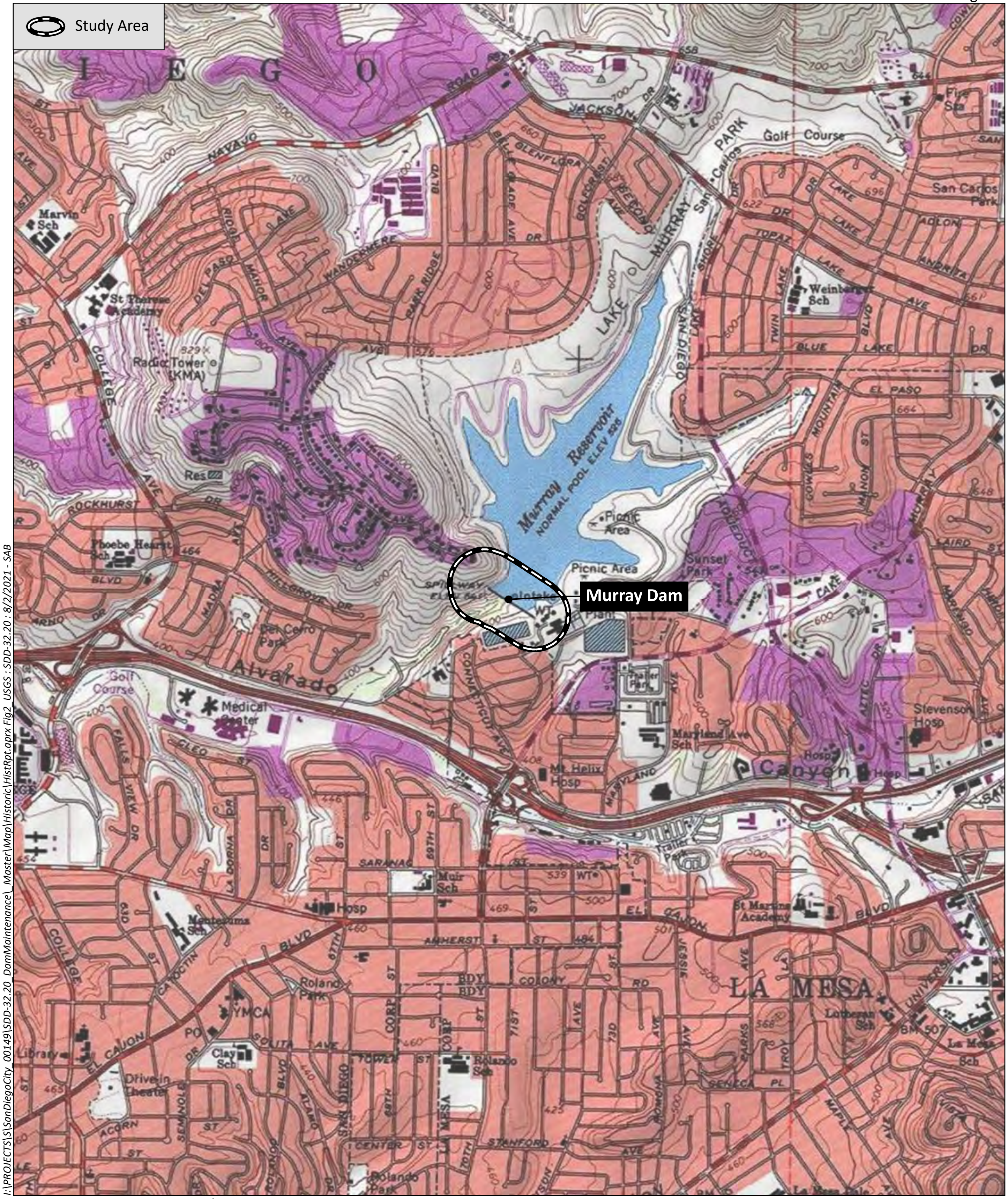
USGS Topography - Morena Dam

Figure 2g



Source: LA MESA 7.5' Quad (USGS)

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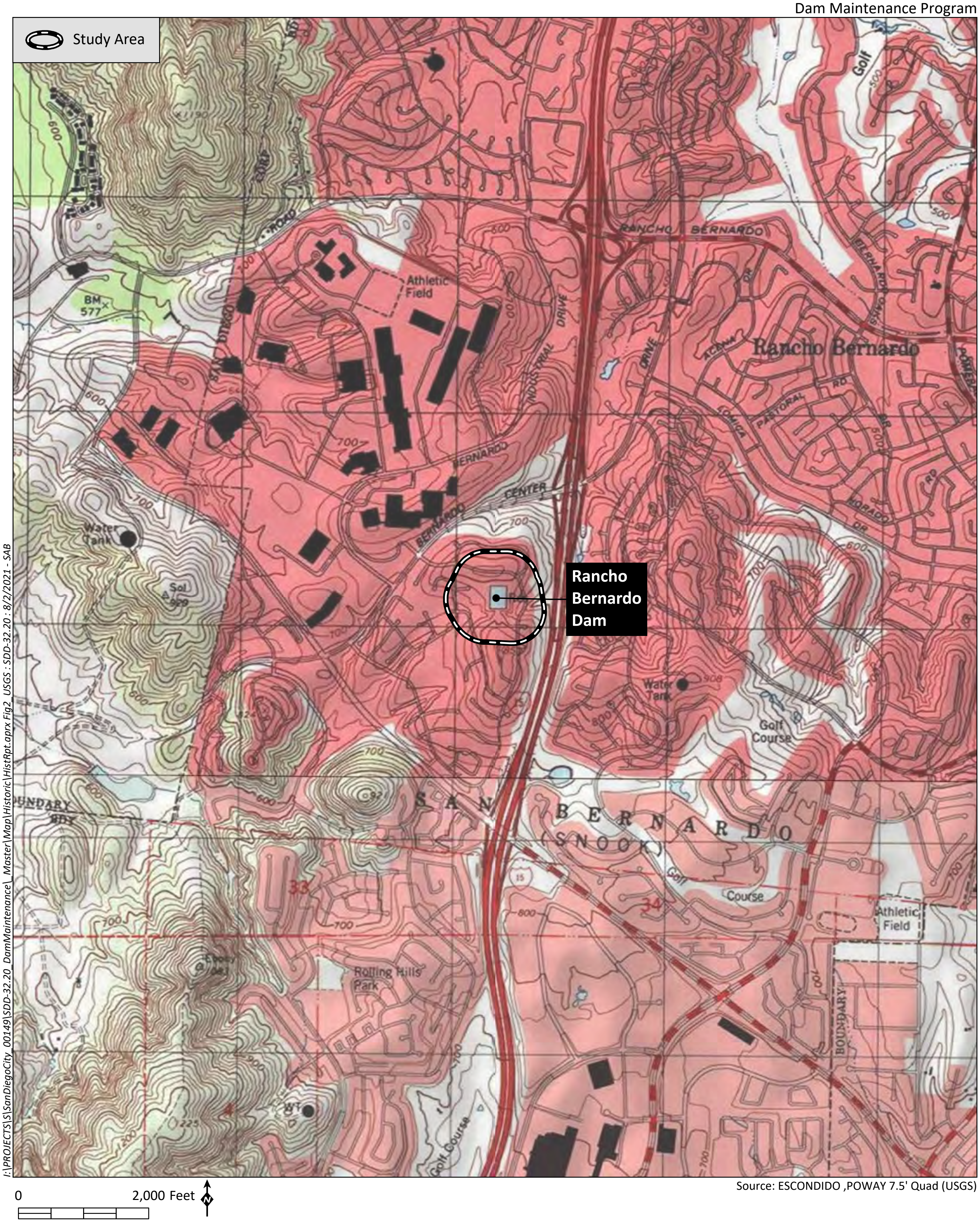
USGS Topography - Murray Dam

Figure 2h



Source: ESCONDIDO ,POWAY 7.5' Quad (USGS)

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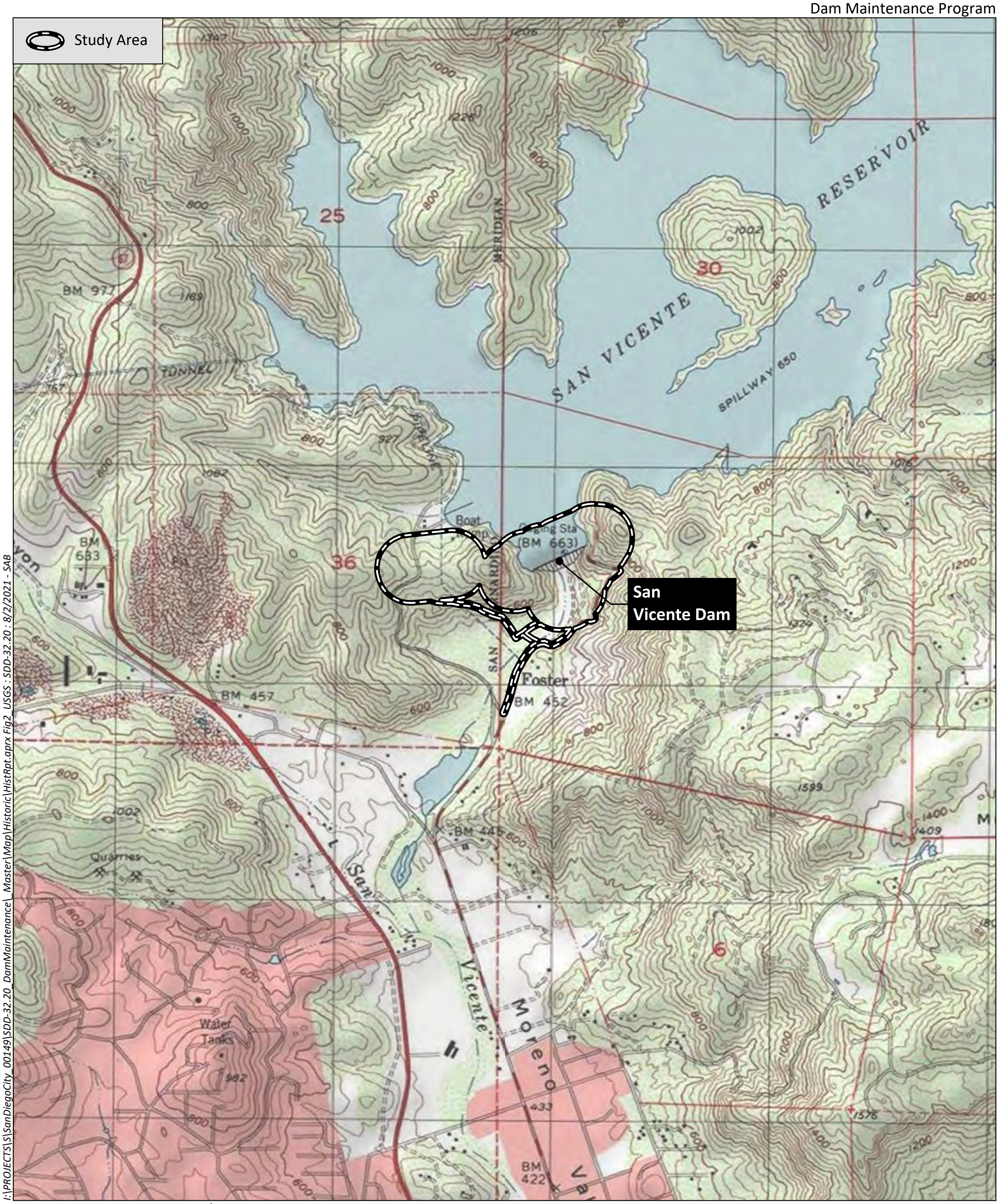
USGS Topography - Rancho Bernardo Dam

Figure 2i



Source: SAN VICENTE RESERVOIR 7.5' Quad (USGS)

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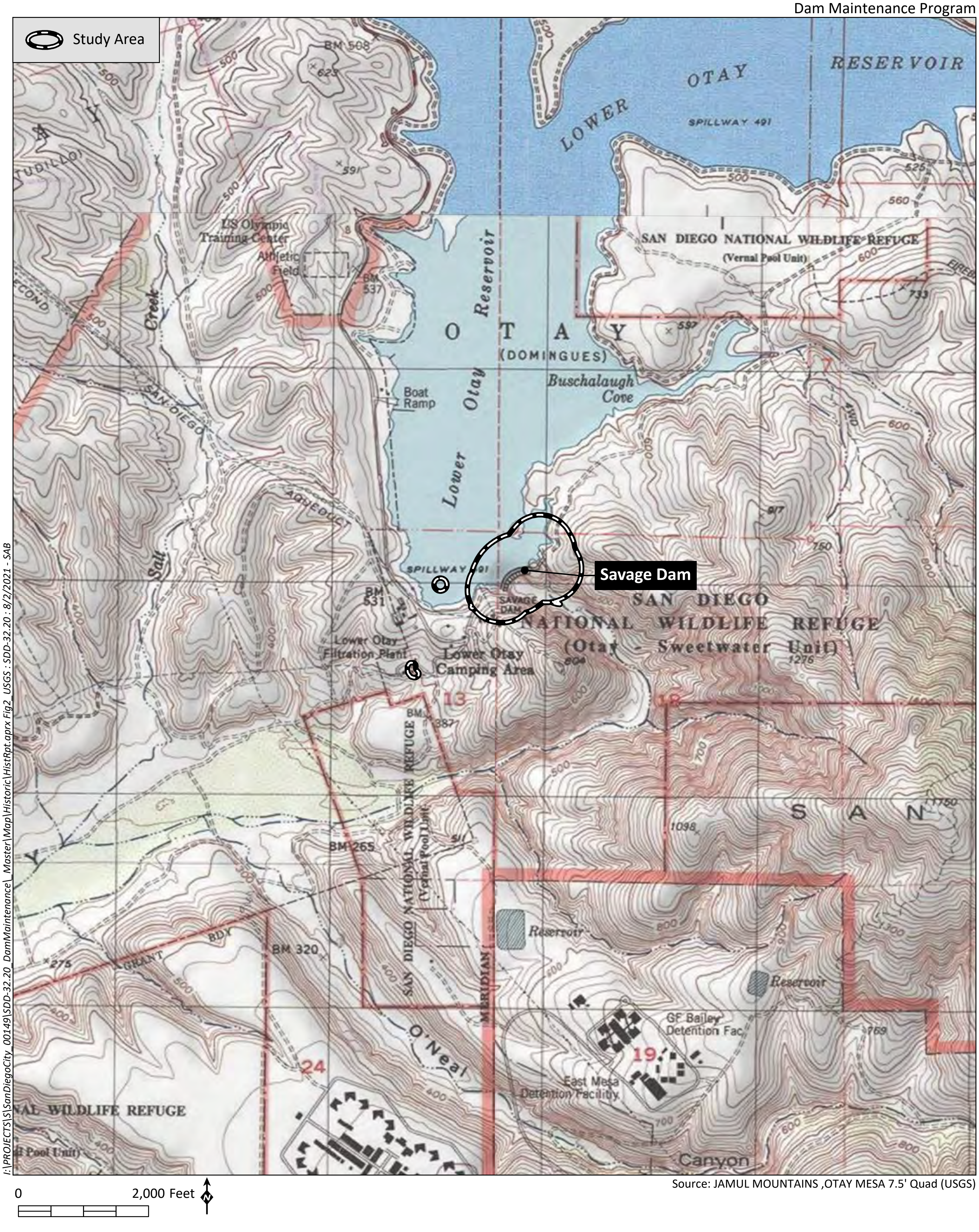
USGS Topography - San Vicente Dam

Figure 2j



Source: JAMUL MOUNTAINS ,OTAY MESA 7.5' Quad (USGS)

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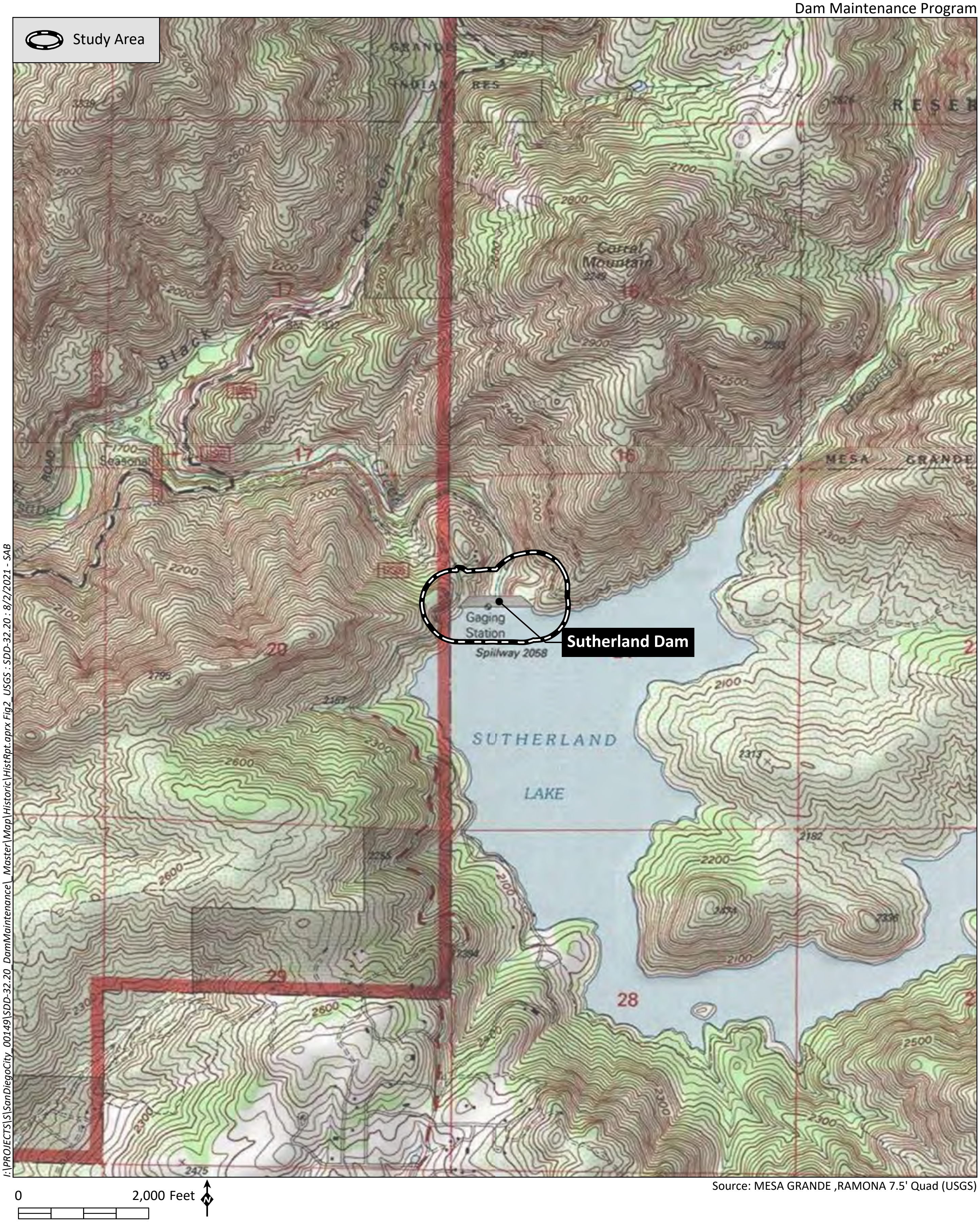
USGS Topography - Savage Dam

Figure 2k



Source: MESA GRANDE ,RAMONA 7.5' Quad (USGS)

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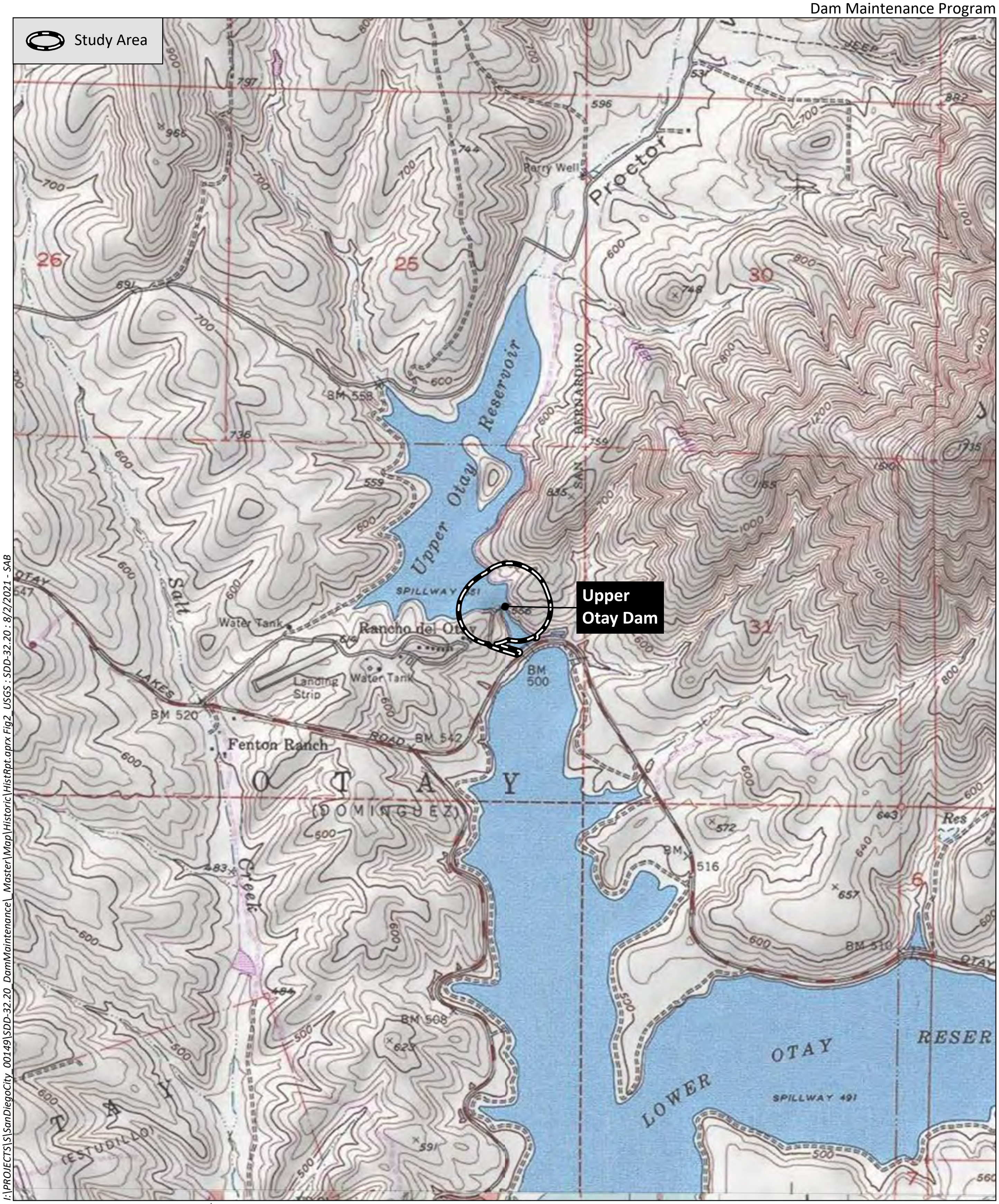
USGS Topography - Sutherland Dam

Figure 2l



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Source: JAMUL MOUNTAINS ,OTAY MESA 7.5' Quad (USGS)

0 2,000 Feet

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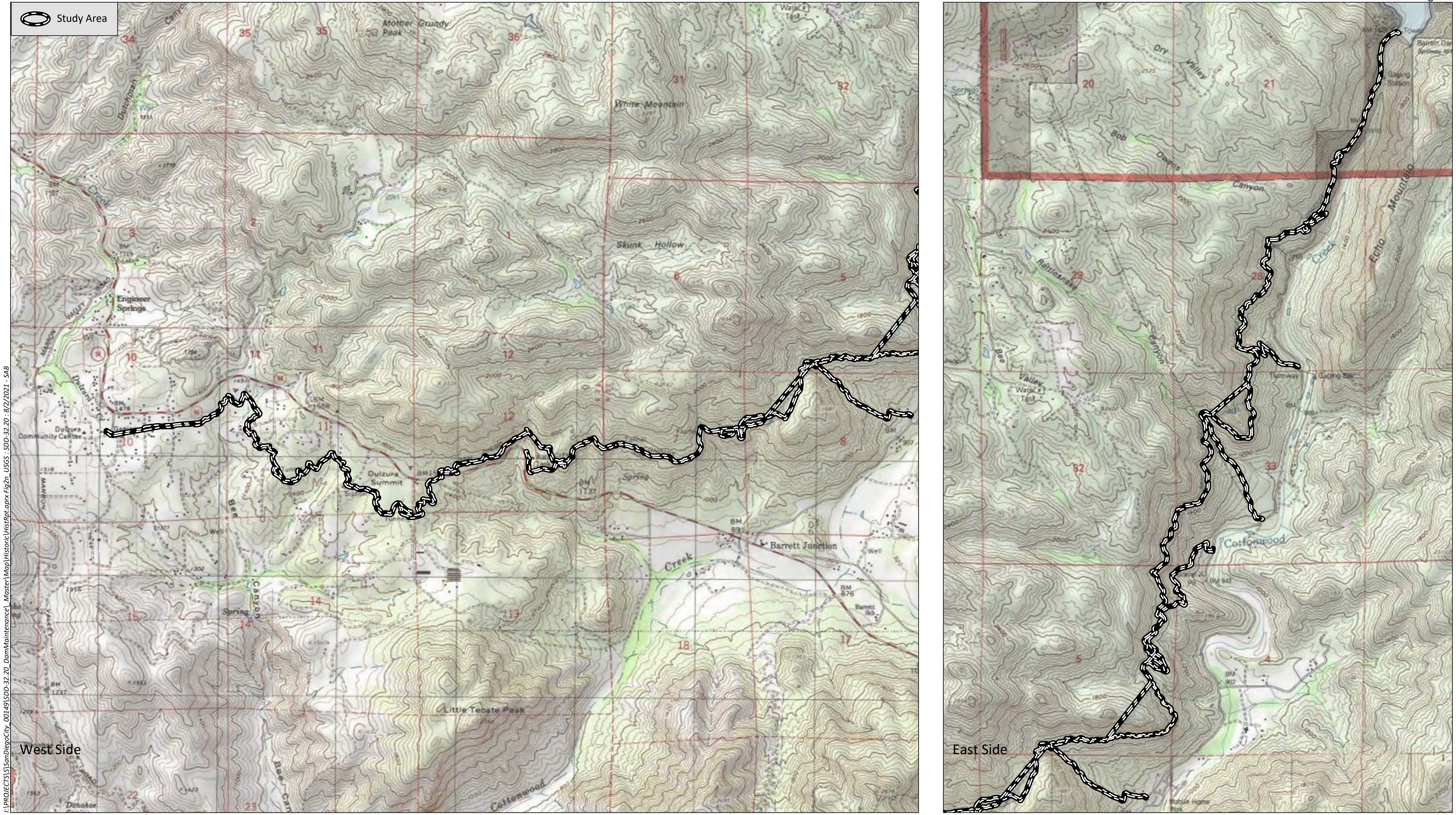
USGS Topography - Upper Otay Dam

Figure 2m



0 2,500 Feet

Source: OTAY MOUNTAIN, BARRETT LAKE & TECATE 7.5' Quad (USGS)

Source: BARRETT LAKE & TECATE 7.5' Quad (USGS)

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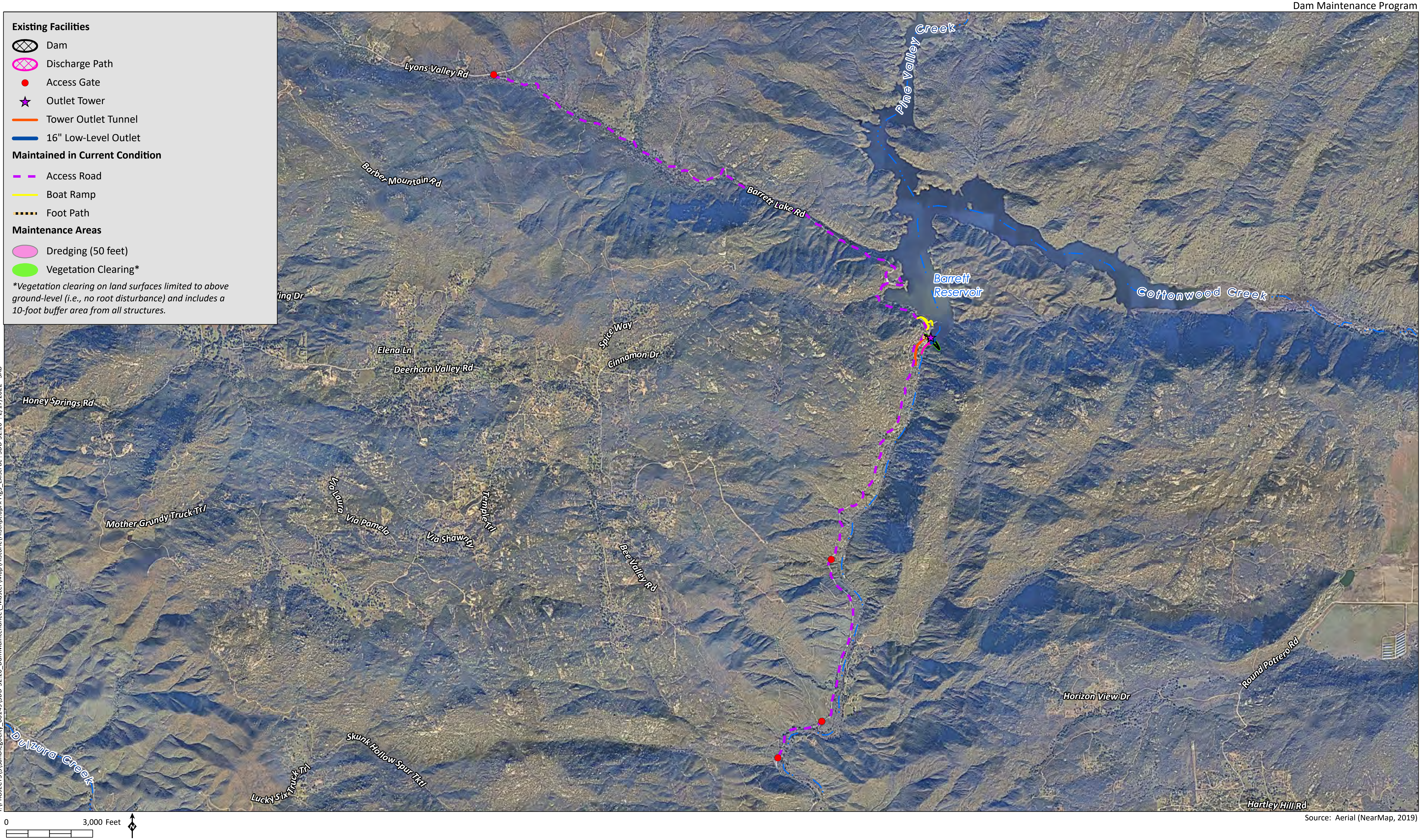
USGS Topography - Dulzura Conduit

Figure 2n



Source: Aerial (NearMap, 2019)

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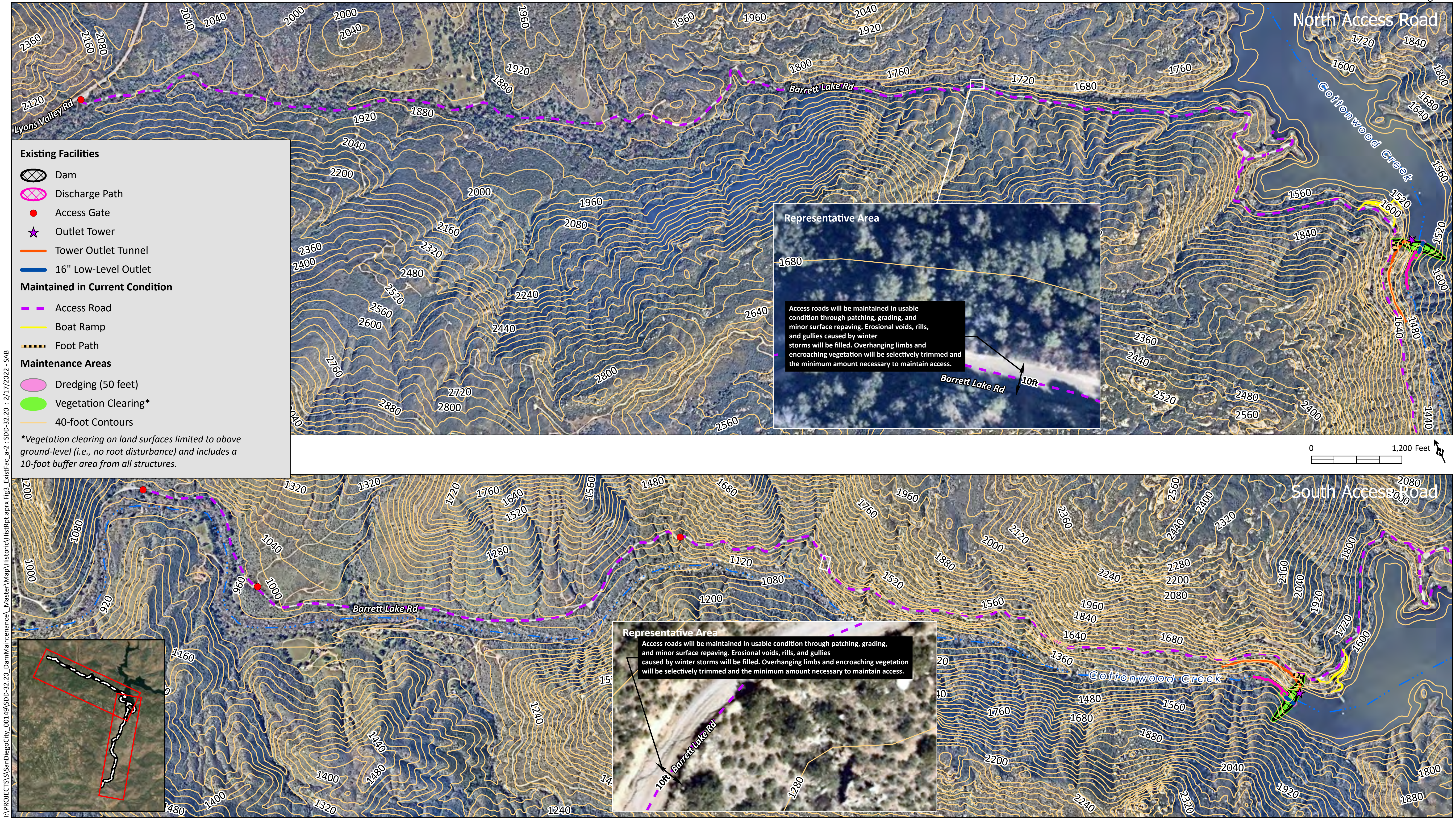
Existing Facilities and Maintenance Areas - Barrett Dam and Access Roads Overview

Figure 3a-1



Source: Aerial (NearMap, 2019)

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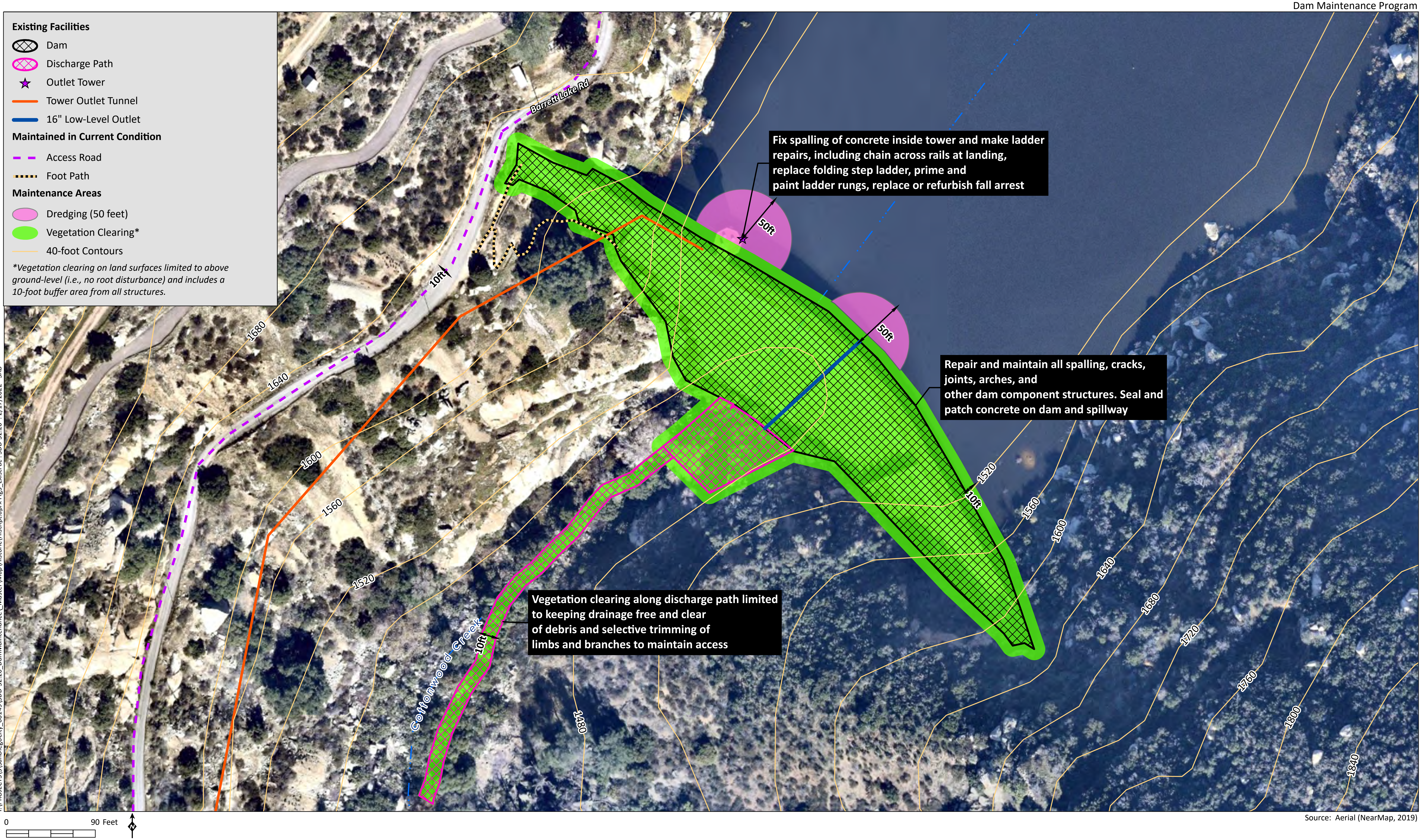
Existing Facilities and Maintenance Areas - Barrett Dam Access Roads

Figure 3a-2



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Source: Aerial (NearMap, 2019)

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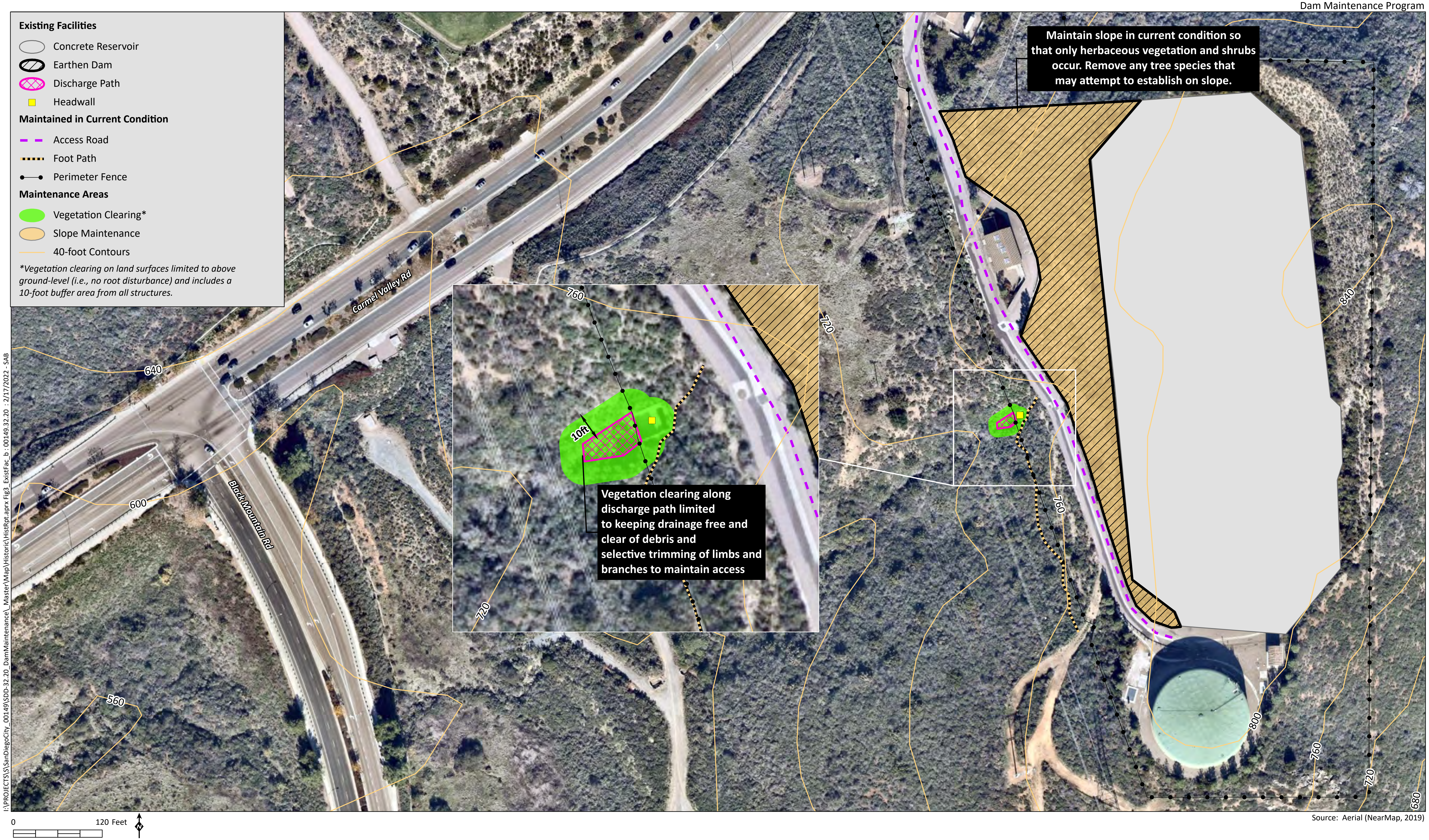
Existing Facilities and Maintenance Areas - Barrett Dam

Figure 3a-3



Source: Aerial (NearMap, 2019)

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Existing Facilities and Maintenance Areas - Black Mountain Dam

Figure 3b

Source: Aerial (NearMap, 2019)

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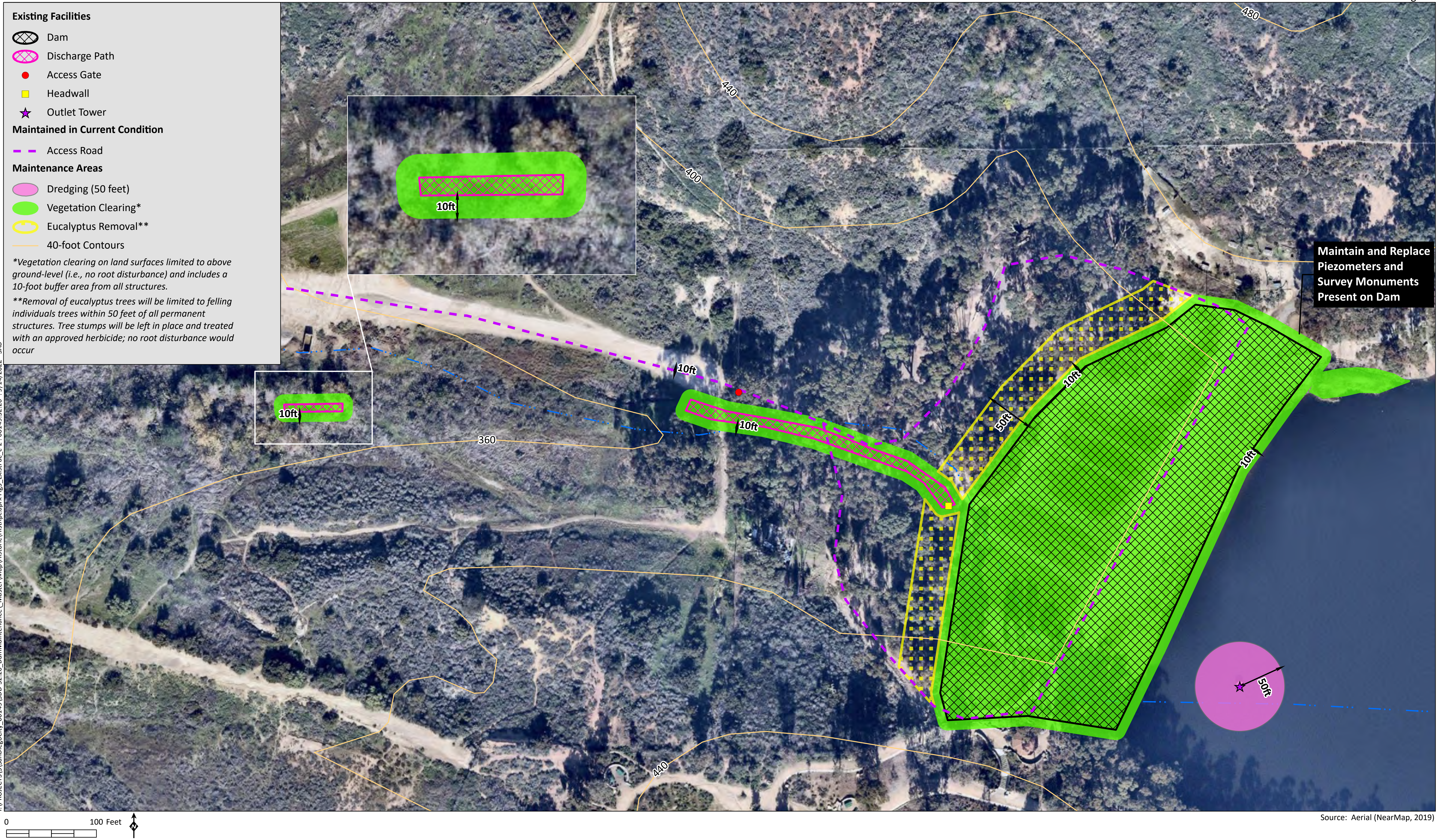
Existing Facilities and Maintenance Areas - Chollas Dam Overview

Figure 3c-1



Source: Aerial (NearMap, 2019)

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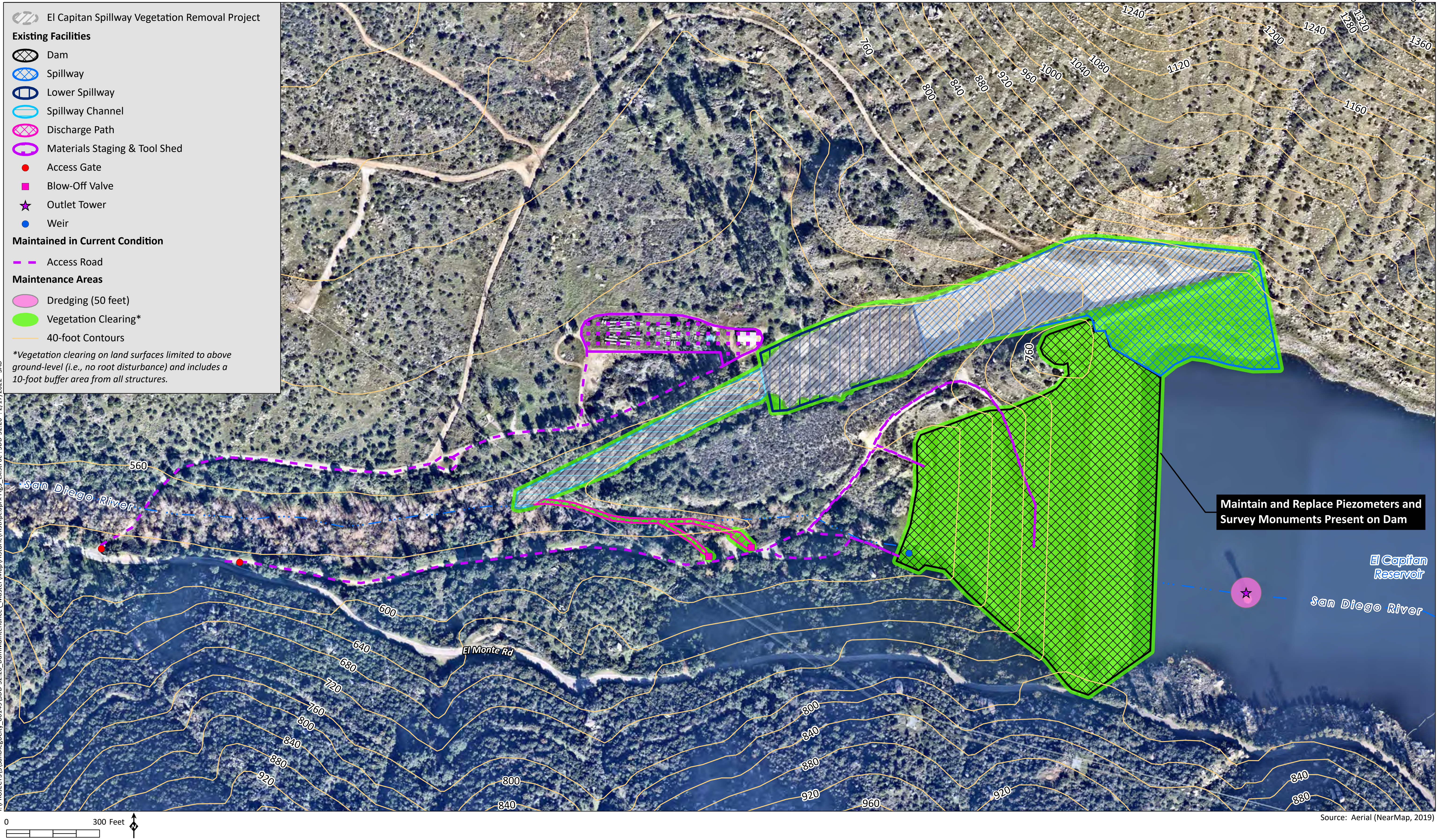
Existing Facilities and Maintenance Areas - Chollas Dam

Figure 3c-2



Source: Aerial (NearMap, 2019)

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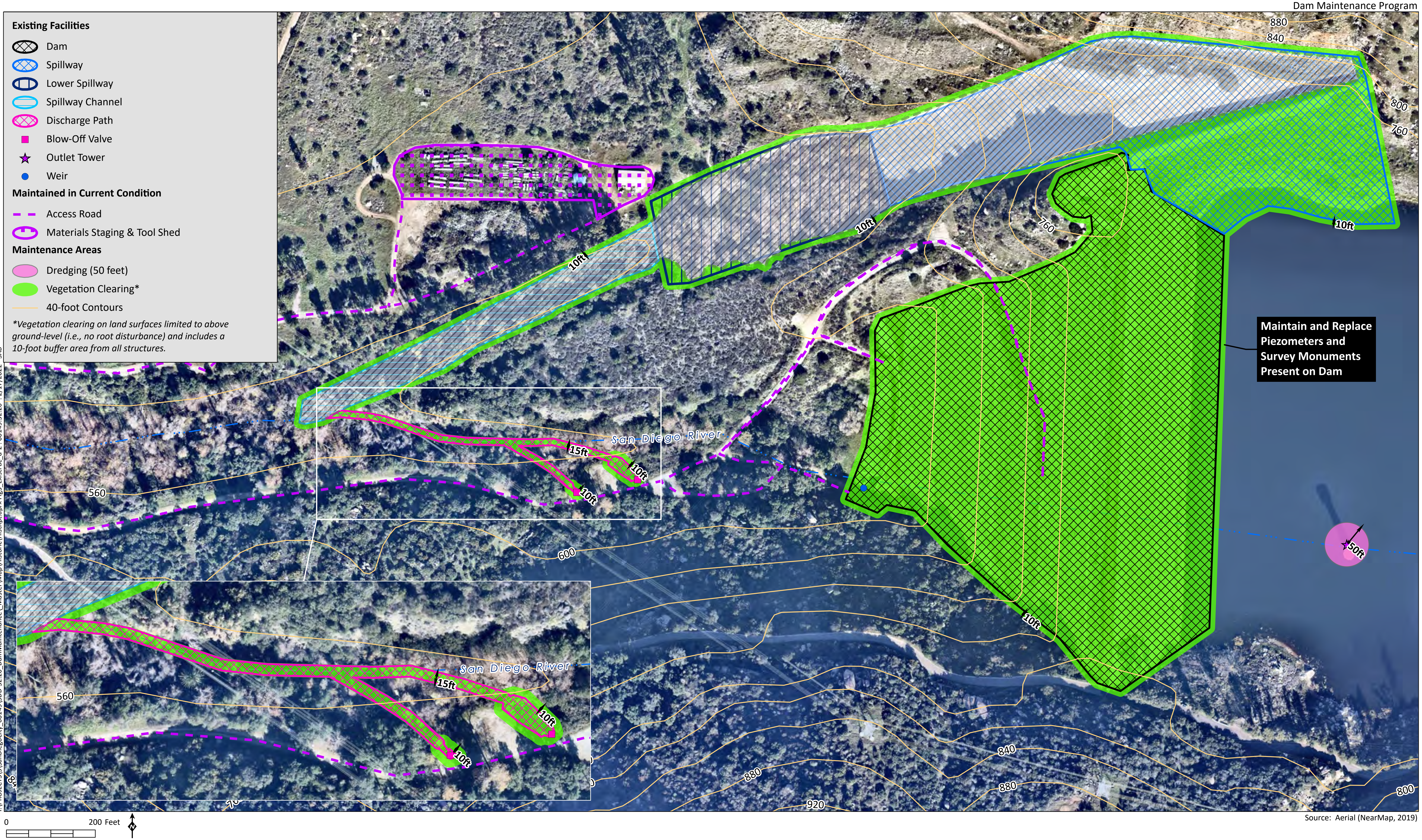
Existing Facilities and Maintenance Areas - El Capitan Dam Overview

Figure 3d-1



Source: Aerial (NearMap, 2019)

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Existing Facilities and Maintenance Areas - El Capitan Dam

Figure 3d-2

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HELIX
Environmental Planning

Existing Facilities and Maintenance Areas - Hodges Dam Overview

Figure 3e-1

HELIX Environmental Planning

Existing Facilities and Maintenance Areas - Hodges Dam

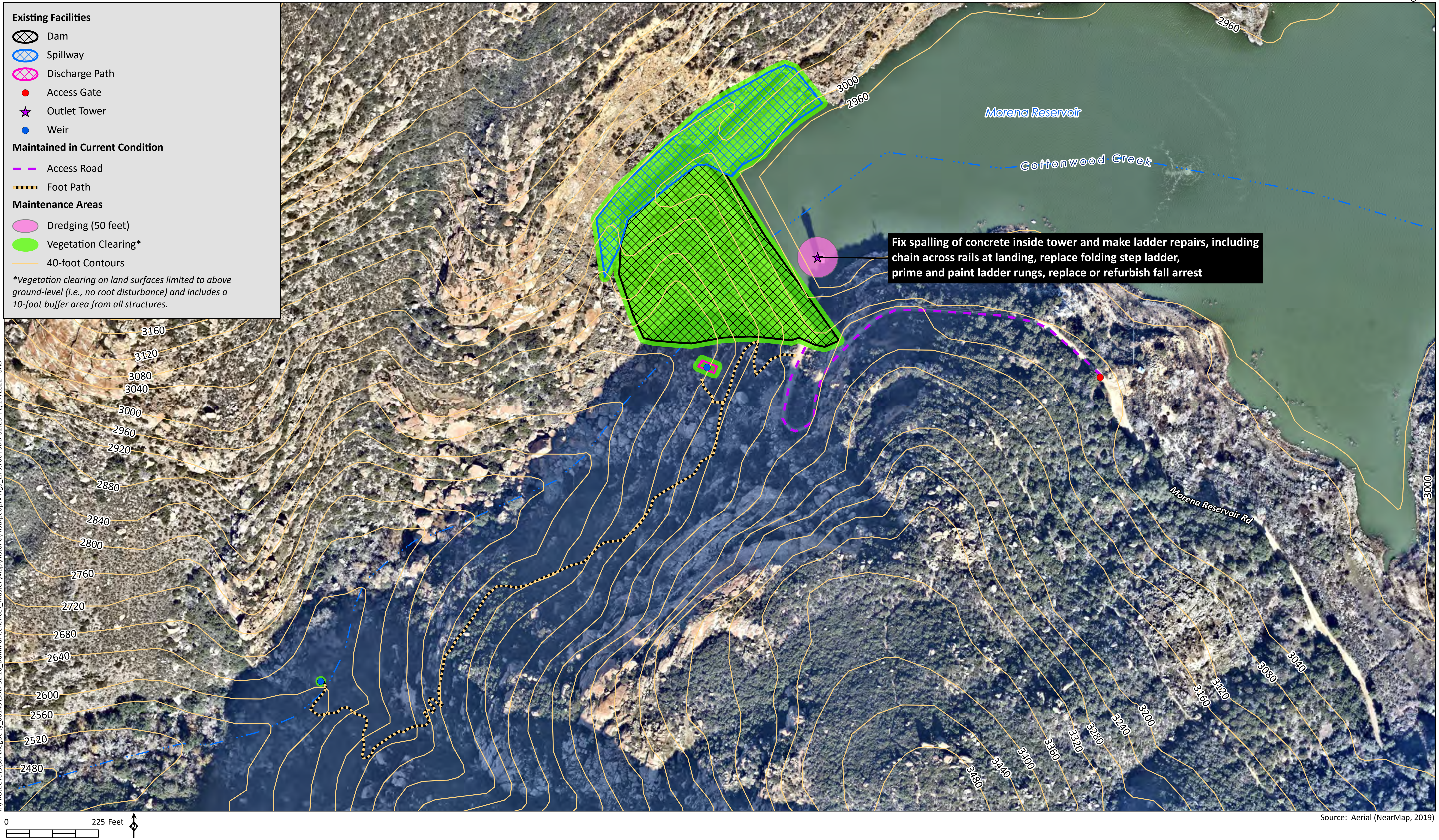
Figure 3e-2

Source: Aerial (NearMap, 2019)

HELIX Environmental Planning

Existing Facilities and Maintenance Areas - Miramar Dam

Figure 3f



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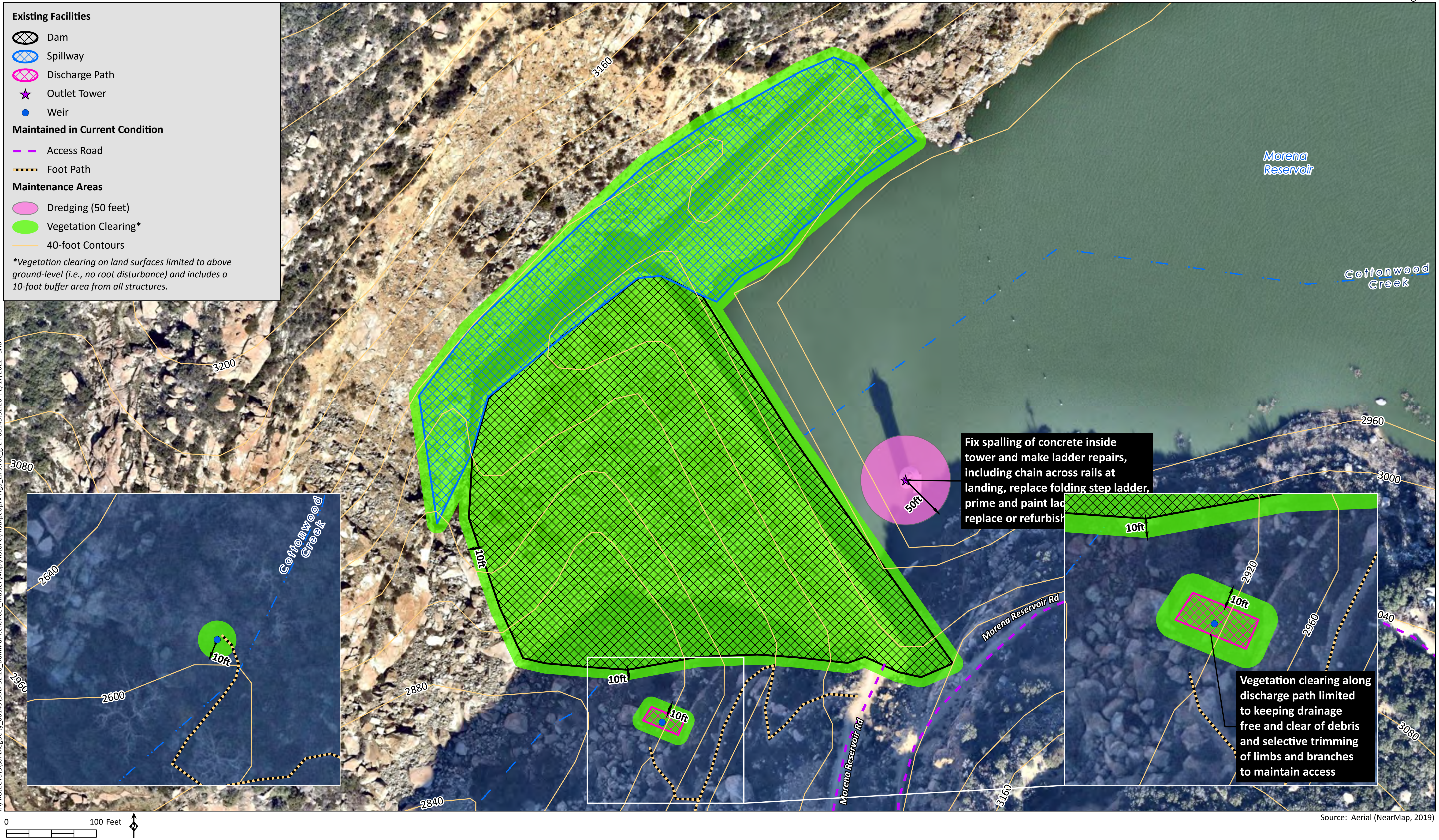
Source: Aerial (NearMap, 2019)

HELIX Environmental Planning

Existing Facilities and Maintenance Areas - Morena Dam Overview

Figure 3g-1



Source: Aerial (NearMap, 2019)

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HELIX Environmental Planning

Existing Facilities and Maintenance Areas - Morena Dam

Figure 3g-2

0 80 Feet

Source: Aerial (NearMap, 2019)

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Existing Facilities and Maintenance Areas - Murray Dam

Figure 3h

Source: Aerial (NearMap, 2019)

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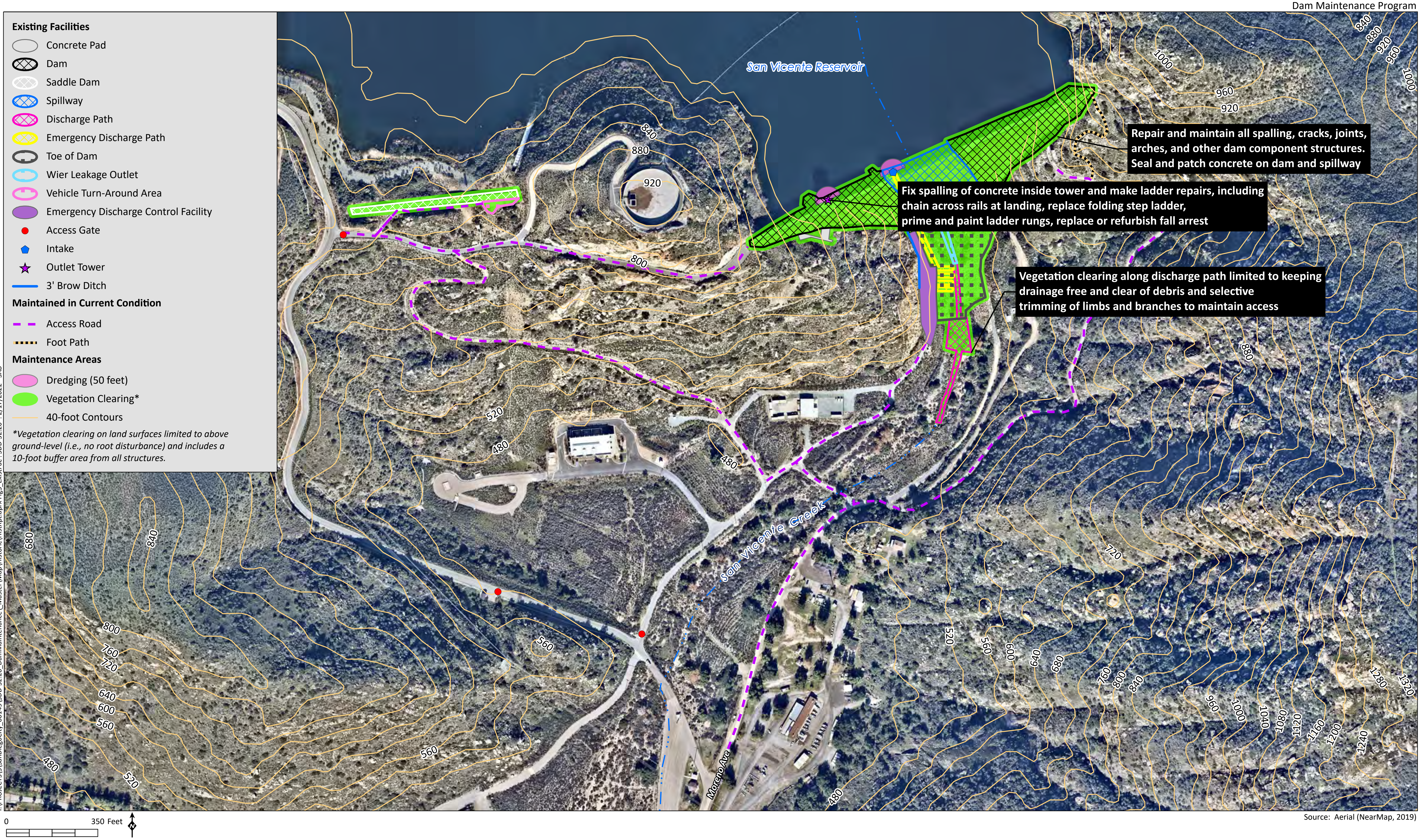
Existing Facilities and Maintenance Areas - Rancho Bernardo Dam

Figure 3i



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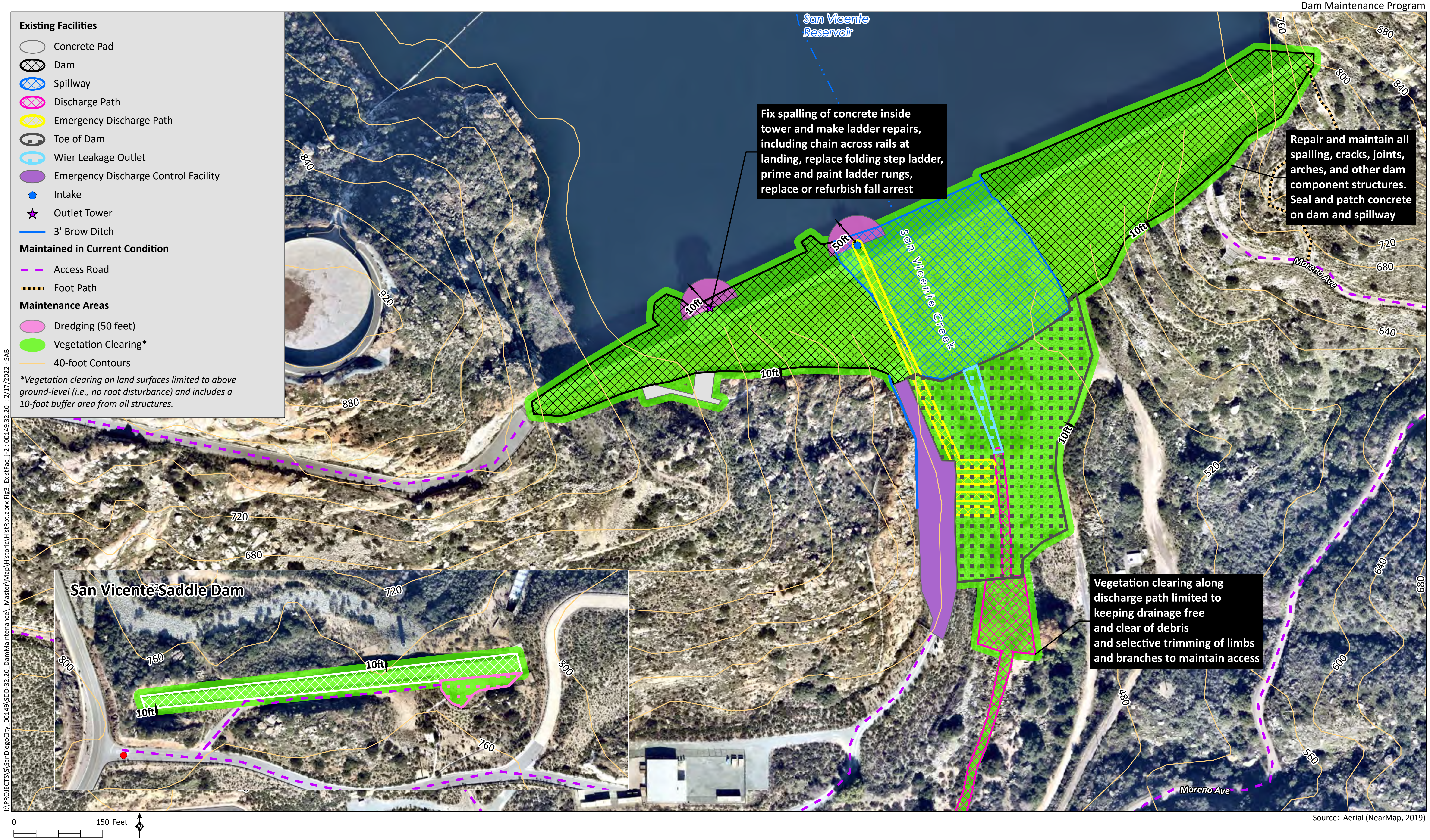
HELIX
Environmental Planning

Existing Facilities and Maintenance Areas - San Vicente Dam Overview

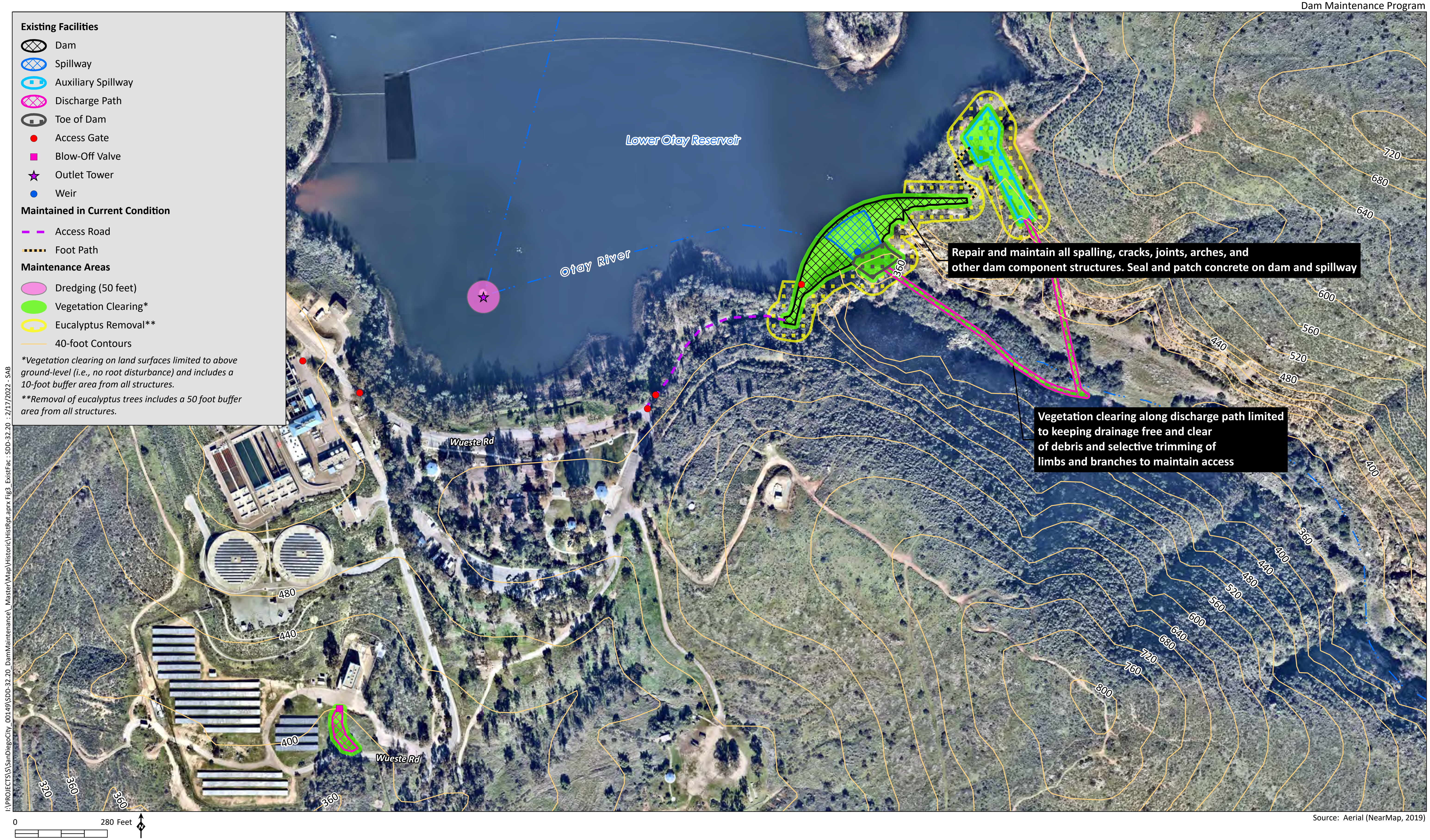
Figure 3j-1



HELIX
Environmental Planning

Existing Facilities and Maintenance Areas - San Vicente Dam

Figure 3j-2

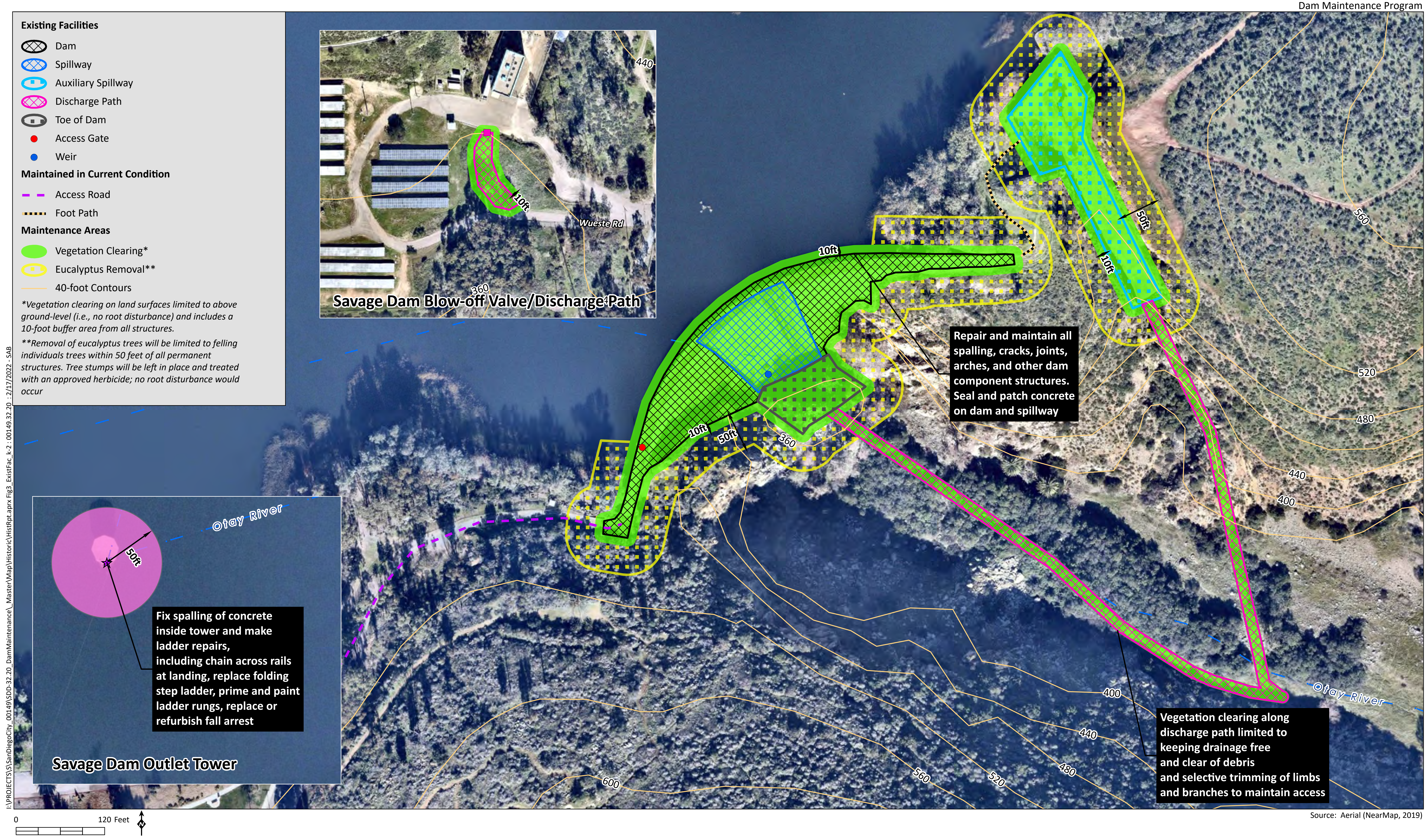


Source: Aerial (NearMap, 2019)

HELIX Environmental Planning

Existing Facilities and Maintenance Areas - Savage Dam Overview

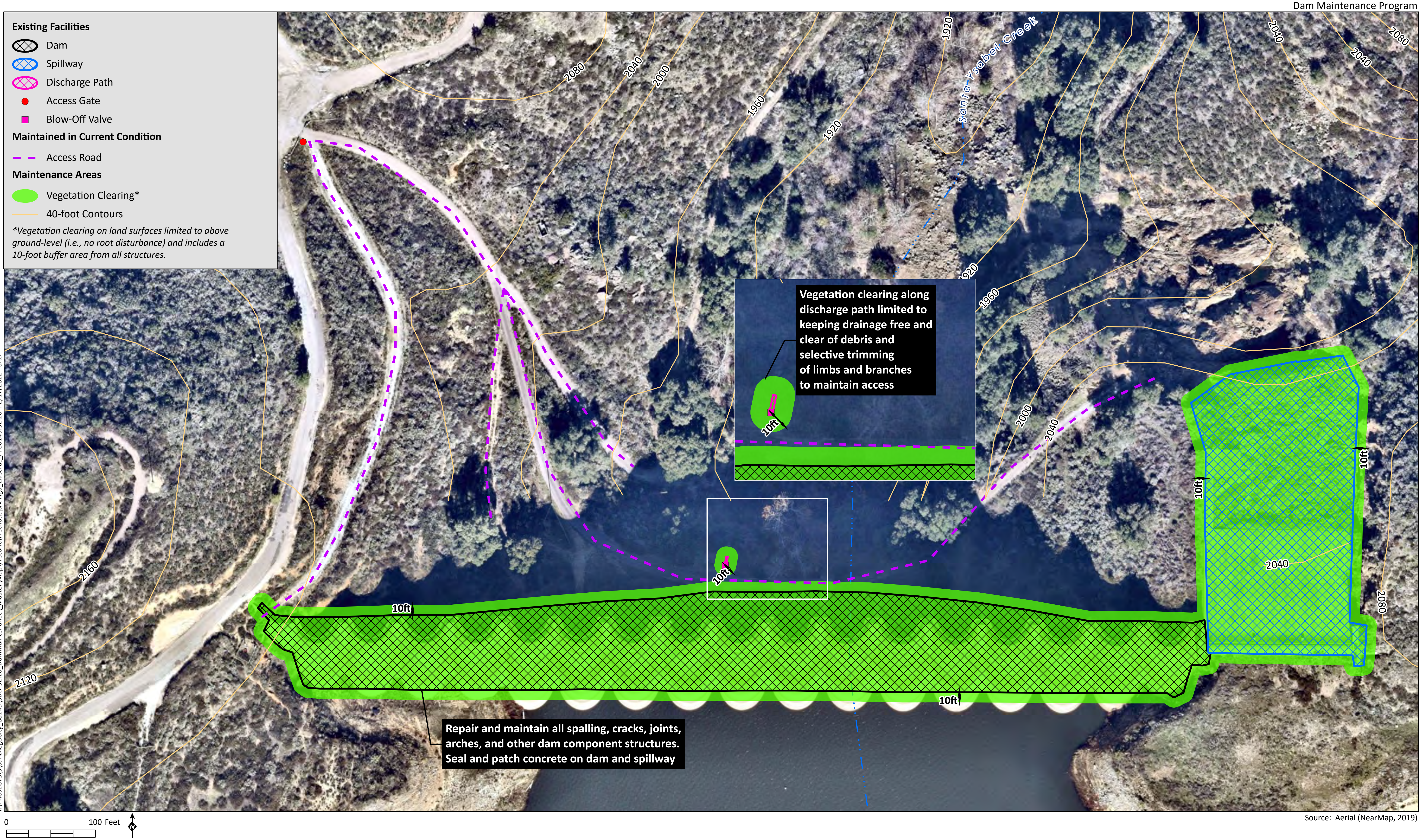
Figure 3k-1



HELIX Environmental Planning

Existing Facilities and Maintenance Areas - Savage Dam

Figure 3k-2

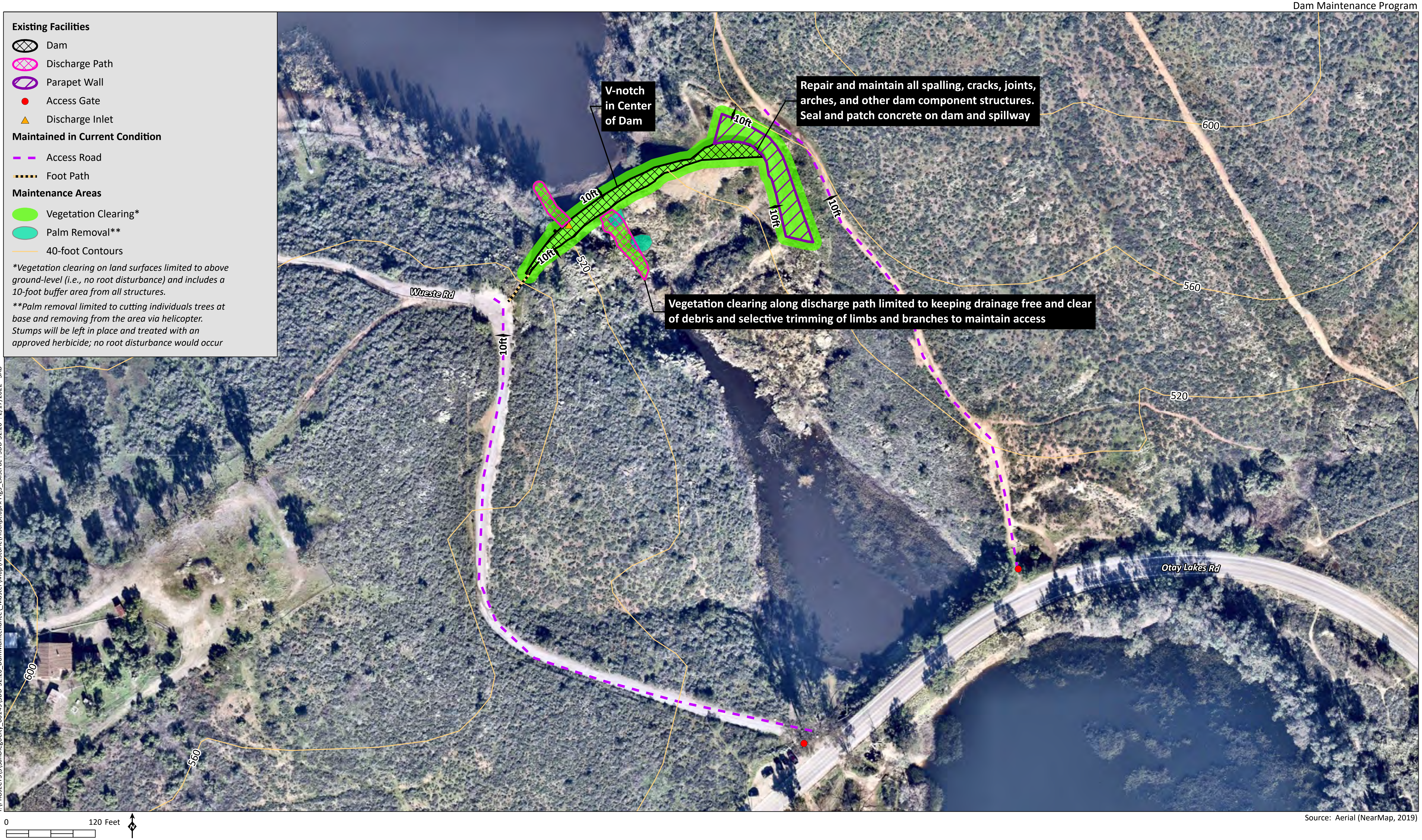


Source: Aerial (NearMap, 2019)

HELIX
Environmental Planning

Existing Facilities and Maintenance Areas - Sutherland Dam

Figure 3l



Source: Aerial (NearMap, 2019)

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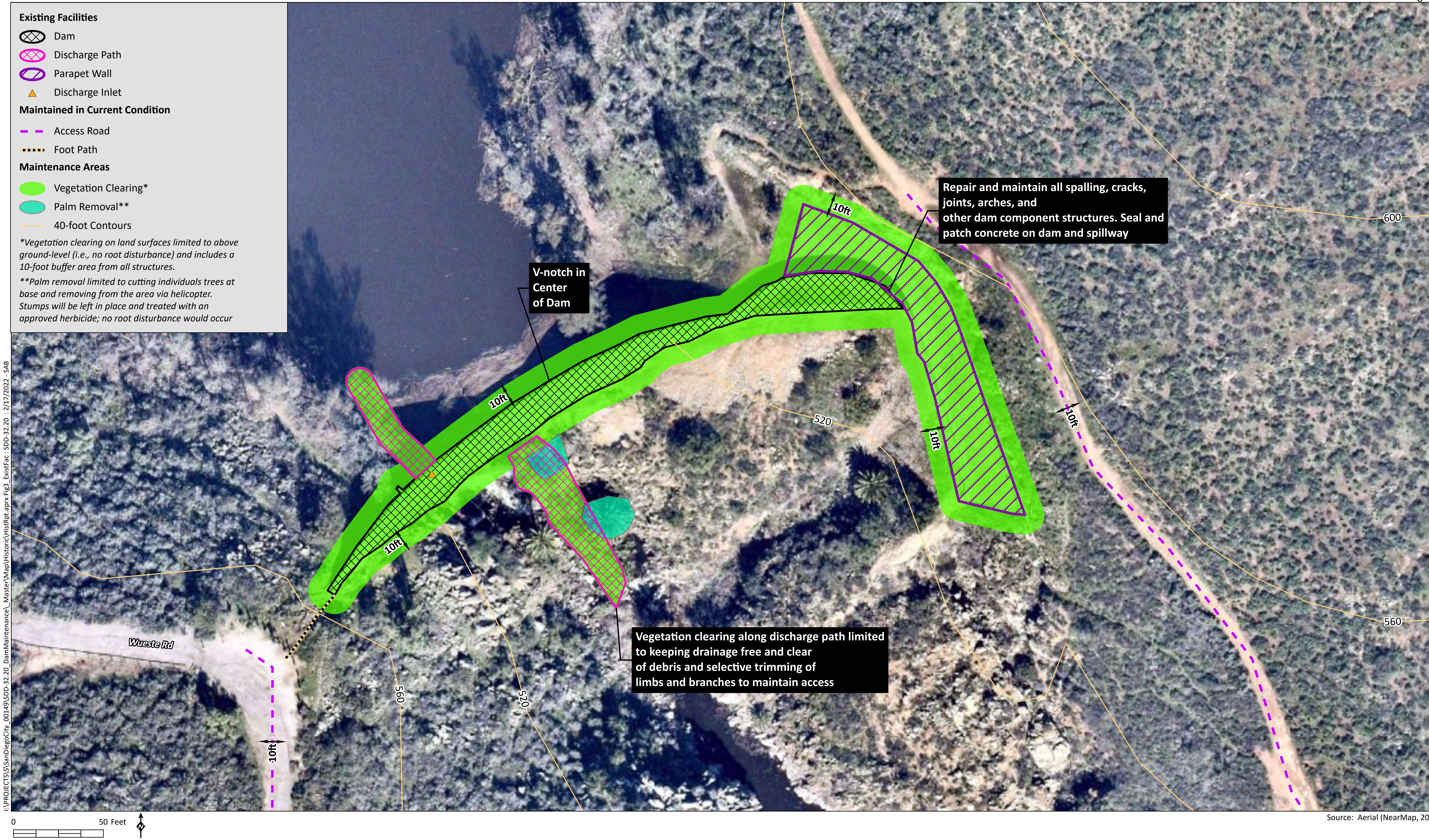
HELIX
Environmental Planning

Existing Facilities and Maintenance Areas - Upper Otay Dam Overview

Figure 3m-1



Source: Aerial (NearMap, 2019)

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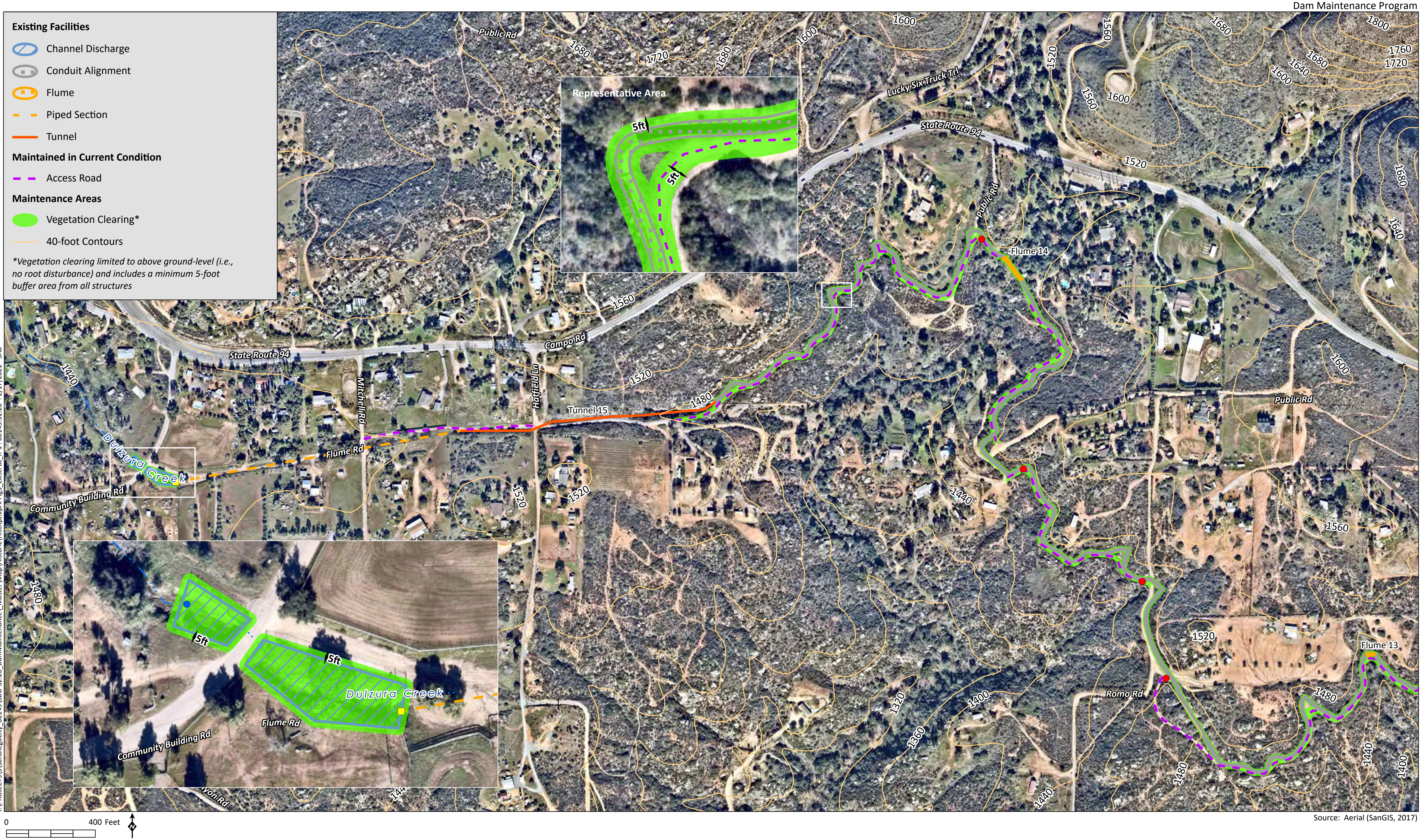
HELIX Environmental Planning

Existing Facilities and Maintenance Areas - Upper Otay Dam

Figure 3m-2



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Source: Aerial (SanGIS, 2017)

HELIX Environmental Planning

Existing Facilities and Maintenance Areas - Dulzura Conduit

Figure 3n-1

HELIX Environmental Planning

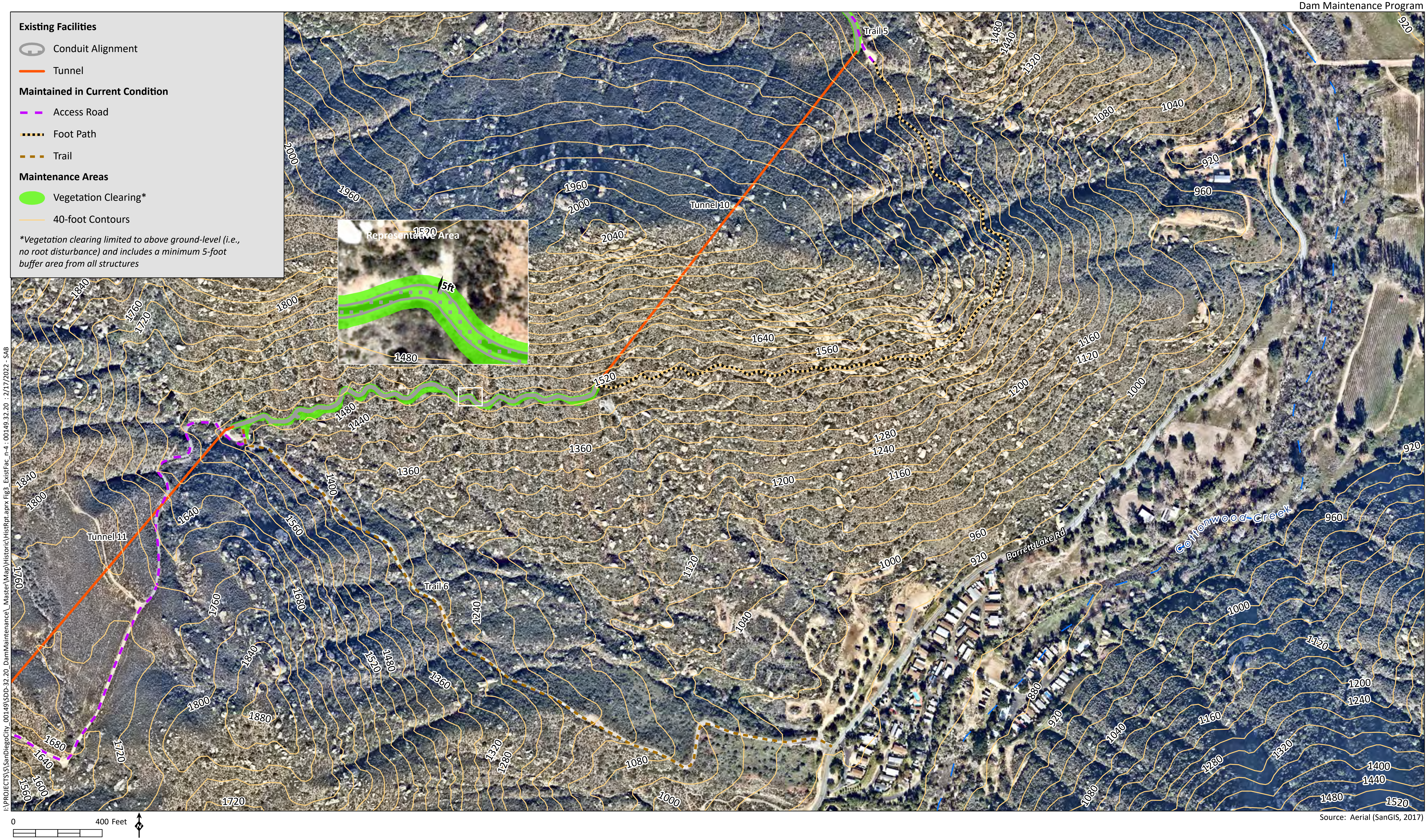
Existing Facilities and Maintenance Areas - Dulzura Conduit

Figure 3n-2

HELIX Environmental Planning

Existing Facilities and Maintenance Areas - Dulzura Conduit

Figure 3n-3



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Environmental Planning

Existing Facilities and Maintenance Areas - Dulzura Conduit

Figure 3n-4

Source: Aerial (SanGIS, 2017)

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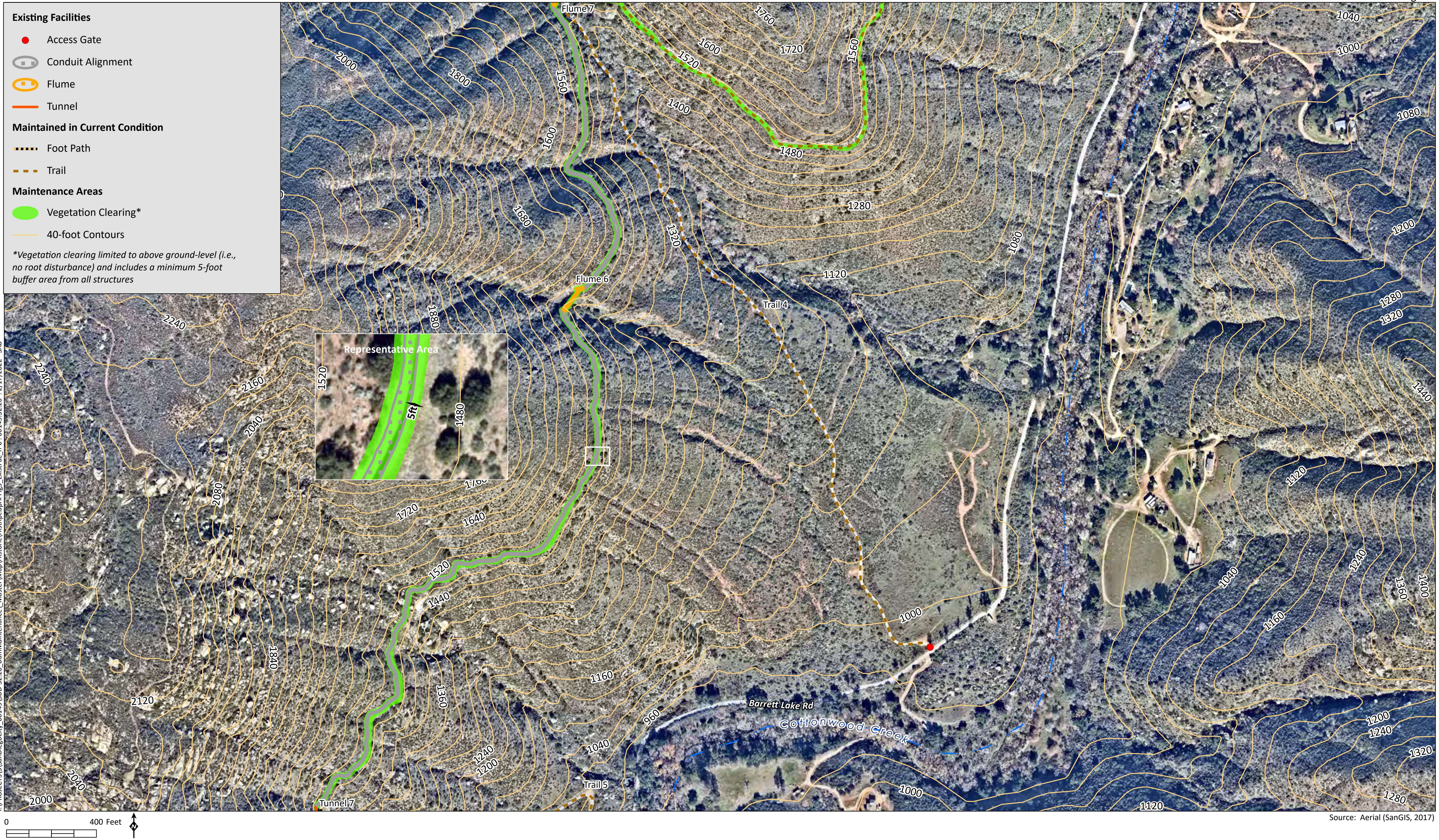
HELIX
Environmental Planning

Existing Facilities and Maintenance Areas - Dulzura Conduit

Figure 3n-5



Source: Aerial (SanGIS, 2017)

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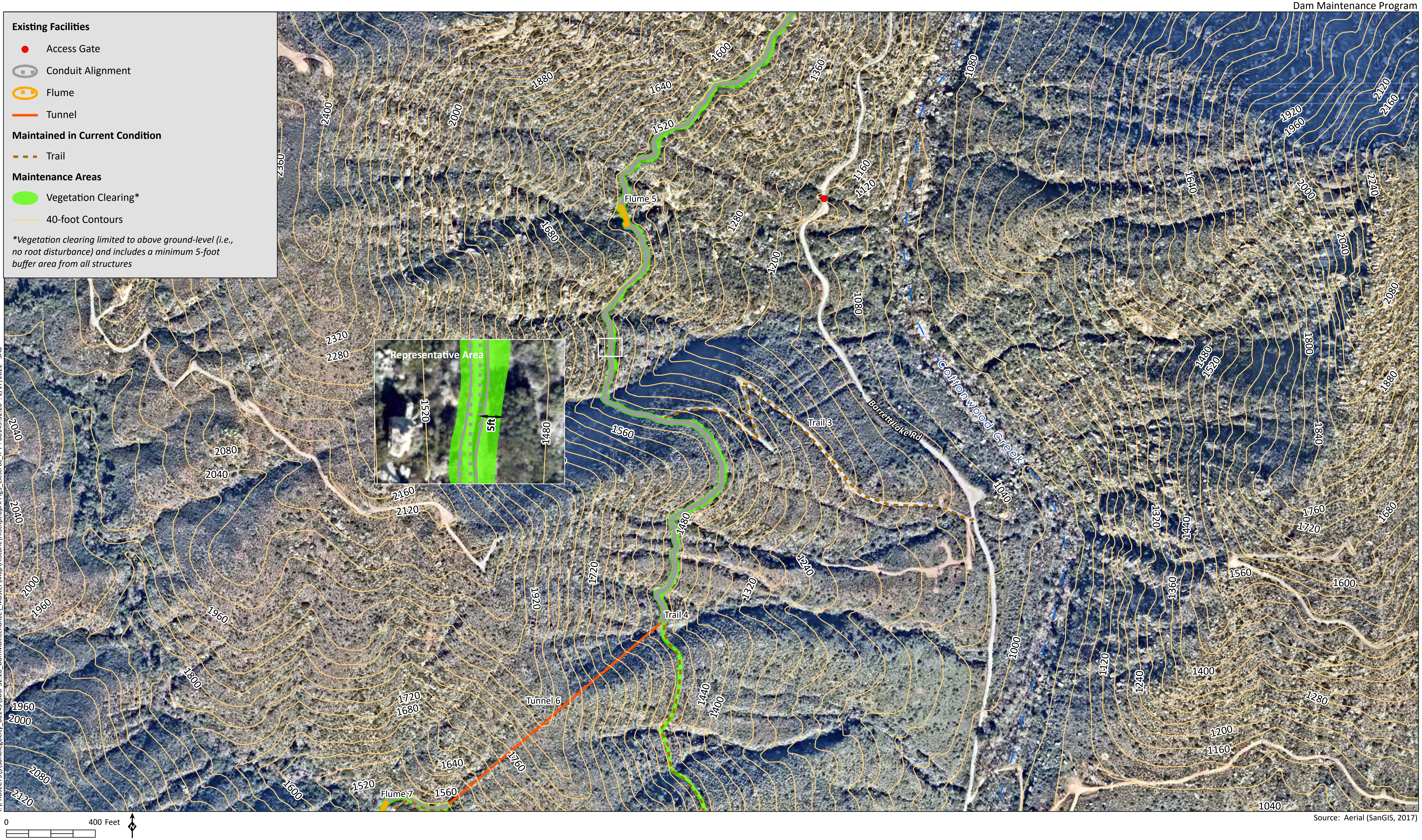
HELIX Environmental Planning

Existing Facilities and Maintenance Areas - Dulzura Conduit

Figure 3n-6



HELIX
Environmental Planning

Existing Facilities and Maintenance Areas - Dulzura Conduit

Figure 3n-7

Source: Aerial (SanGIS, 2017)

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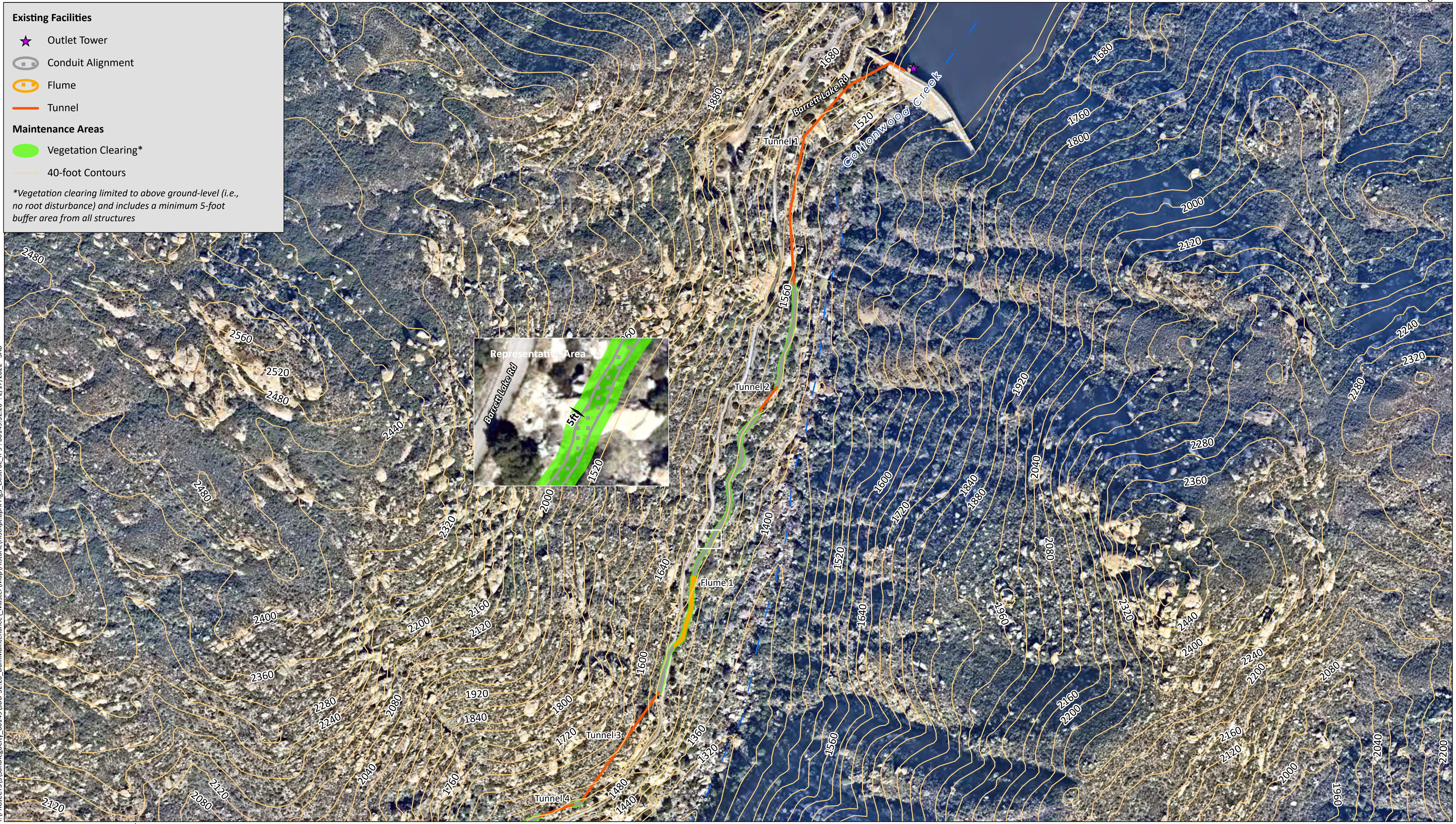
HELIX
Environmental Planning

Existing Facilities and Maintenance Areas - Dulzura Conduit

Figure 3n-8



0 400 Feet

Source: Aerial (SanGIS, 2017)

I:\PROJECTS\S\SanDiegoCity_00149\SDD-32.20_DamMaintenance_Master\Map\Historic\HistRpt.aprx Fig3_ExistFac_n-9 : 00149.32.20 : 2/17/2022 - SAB

HELIX
Environmental Planning

Existing Facilities and Maintenance Areas - Dulzura Conduit

Figure 3n-9

The Morena Dam project area occurs in the County's Lake Morena Regional Park and Cleveland National Forest.

1.1.8 Murray Dam

Murray Dam is located in the central portion of the City. It lies within an unsectioned portion (Mission San Diego land grant) of Township 16 South, Range 2 West, on the USGS 7.5-minute La Mesa quadrangle map (Figure 2h, *USGS Topography – Murray Dam*). The dam is located at the outlet of Murray Reservoir to the north of Lake Murray Boulevard, south of Jackson Drive, east of Del Cerro Boulevard, and west of Baltimore Drive (Figure 3h, *Existing Facilities and Maintenance Areas – Murray Dam*). The Murray Dam project area occurs in the City's Lake Murray Open Space area.

1.1.9 Rancho Bernardo Dam

Rancho Bernardo Dam is located in the northern portion of the City. It lies within an unsectioned portion (San Bernardo [Snook] land grant) of Township 13 South, Range 2 West, on the USGS 7.5-minute Escondido quadrangle map (Figure 2i, *USGS Topography – Rancho Bernardo Dam*). Rancho Bernardo Dam is located to the north of Sun Summit Point, south of Cloudcrest Drive, east of Lofty Trail Drive, and west of Turtleback Road (Figure 3i, *Existing Facilities and Maintenance Areas – Rancho Bernardo Dam*).

1.1.10 San Vicente Dam

San Vicente Dam is located in the central portion of the County, in the unincorporated community of Lakeside. It lies within Sections 31 and 36 of Township 14 South, Ranges 1 West and 1 East, on the USGS 7.5-minute San Vicente Reservoir quadrangle map (Figure 2j, *USGS Topography – San Vicente Dam*). The dam is located at the outlet of San Vicente Reservoir to the north of Moreno Avenue, south of Foster Truck Trail, east of SR 67, and west of Muth Valley Road (Figure 3j, *Existing Facilities and Maintenance Areas – San Vicente Dam*). The San Vicente Dam project area occurs in the City's San Vicente Reservoir recreation area.

1.1.11 Savage Dam

Savage (Lower Otay) Dam is located in the southern portion of the County, in the unincorporated community of Otay. It lies within Sections 13 and 18 and unsectioned portions (Otay [Estudillo] land grant) of Township 18 South, Ranges 1 West and 1 East, on the USGS 7.5-minute Otay Mesa quadrangle map (Figure 2k, *USGS Topography – Savage Dam*). The dam is located at the outlet of Lower Otay Reservoir to the north of Alta Road, south of Otay Lakes Road, east of Wueste Road and Otay Lakes County Park, and west of the Otay Open Space Preserve (Figure 3k, *Existing Facilities and Maintenance Areas – Savage Dam*). The Savage (Lower Otay) Dam project area occurs in the City's Otay Lakes recreation area.

1.1.12 Sutherland Dam

Sutherland Dam is located in the northern portion of the County, in the unincorporated community of Ramona. It lies within Sections 20 and 21 of Township 12 South, Range 2 East, on the USGS 7.5-minute Ramona quadrangle map (Figure 2l, *USGS Topography – Sutherland Dam*). The dam is located at the outlet of Sutherland Reservoir along Sutherland Dam Road to the north of SR 78, south and east of Black Canyon Road, and west of Rancho Ballena Road (Figure 3l, *Existing Facilities and Maintenance Areas –*

Sutherland Dam). The Sutherland Dam project area occurs in the City's Sutherland Reservoir Open Space area and Cleveland National Forest.

1.1.13 Upper Otay Dam

Upper Otay Dam is located in the southern portion of the County, in the unincorporated community of Otay (Figure 1). It lies within unsectioned portions (Otay [Dominguez] land grant) of Township 17 South, Range 1 West, on the USGS 7.5-minute Jamul Mountains quadrangle map (Figure 2m, *USGS Topography – Upper Otay Dam*). The dam is located at the outlet of Upper Otay Reservoir to the north of Otay Lakes Road, south of Proctor Valley Road, east of Centennial Trail, and west of Wueste Road (Figure 3m, *Existing Facilities and Maintenance Areas – Upper Otay Dam*). The Upper Otay Dam project area occurs in the City's Otay Lakes recreation area.

1.1.14 Dulzura Conduit

The approximately 13-mile long Dulzura Conduit is located in the eastern portion of the County, in the unincorporated community of Dulzura. It lies within Sections 4, 5, 7, 8, 10, 11, 12, 13, 14, 22, 28, and 33 of Townships 17 and 18 South, Ranges 2 and 3 East, on the USGS 7.5-minute Barrett Lake, Otay Mountain, and Tecate quadrangle maps (Figure 2n, *USGS Topography – Dulzura Conduit*). The northern terminus of the Dulzura Conduit is located at Barrett Dam, and the southern terminus is located at the conduit's confluence with Dulzura Creek to the west of the Community Building Road and Flume Road intersection (Figure 3n, *Existing Facilities and Maintenance Areas – Dulzura Conduit*). The conduit traverses from Barrett Dam southward to Campo Road (SR 94), primarily along the eastern facing slopes west of Barrett Lake Road. The conduit then travels under Campo Road and continues in a westerly direction towards Dulzura Creek with the western underground portion paralleling Flume Road.

1.2 PROJECT BACKGROUND AND DESCRIPTION

The City PUD owns and manages 13 dams, spillways, and other associated infrastructure, including the approximately 13-mile Dulzura Conduit, located throughout San Diego County as part of the City's drinking water infrastructure. Each dam has a unique system of outlet works and spillway components to control the reservoir water levels and safely release water during severe storm events or impending dam failure. Associated dam infrastructure includes, but is not limited to, groins, toes, saddle dams, spillways and auxiliary spillways, training and parapet walls, outlet works, storm drain headwalls that are associated with the outlet works, and appurtenant structures. These facilities are subject to the regulatory jurisdiction of the Division of Safety of Dams (DSOD), part of the California Department of Water Resources. The DSOD oversees dam safety in California with the goal of avoiding dam failure, which could lead to potential loss of life and destruction of property. As part of the dam safety program, the DSOD completes detailed semi-annual inspections and provides an annual report of the City's dams to identify maintenance activities such as vegetation removal, grading, dredging, and repairs to infrastructure and may request certain maintenance work to be performed to improve dam safety.

The proposed Program would cover the long-term maintenance of these facilities and include maintenance activities that are routinely included in these DSOD annual inspection reports. As of recent, DSOD is in the process of providing a regulatory framework that could potentially penalize an agency through monetary fines should violations occur. The proposed Program provides the City oversight to address items in DSOD's inspection reports and avoid potential violations. The Program describes the maintenance methods and overall potential impacts that are anticipated to occur during the implementation of the Program. It also includes the protocols to address the impact of maintenance activities with respect to environmental resources.

1.2.1 Maintenance Activities

Maintenance activities covered under the proposed Program include the maintenance of access roads and pedestrian footpaths, maintenance of staging and material storages areas, trimming and clearing of vegetation, dredging, maintenance of outlet/intake towers and trash racks, removal of debris along spillways and other appurtenant structures to provide a clear path and remove obstructions, maintenance and repair of the dams and appurtenant structures to prevent deterioration that could lead to dam failure, concrete maintenance and repairs, maintenance and replacement of piezometers and survey monuments, and geotechnical investigations as described further below.

Access Road and Staging Area Maintenance

Under the proposed Program, existing access roads, pedestrian footpaths, and staging and material storage areas would continue to be maintained in a useable condition along the current path alignments and existing disturbed/developed footprints. No widening, expansion, relocation, or establishment of new access roads, footpaths, or staging areas are proposed as part of the Program. Routine maintenance activities include patching and minor surface repaving of paved access roads and staging areas; patching and minimal grading of gravel and dirt access roads and staging areas; filling of erosional voids, rills, and gullies caused by winter storms; and minor trimming of vegetation to remove overhanging branching and other encroaching vegetation. Minor trimming of vegetation would also occur along footpaths, which are necessary to maintain pedestrian access to the toe of dams, dam leakage measuring structures, and weir and outlet work structures. Maintenance and repair activities along existing paved, gravel, and dirt access roads would be limited to the current road width, generally 10 feet wide, and established road rights-of-way, where present. Maintenance of pedestrian footpaths would be limited to minor trimming of vegetation along the path alignment; no soil disturbance or removal of vegetation would occur as part of footpath maintenance. Maintenance and repair activities within staging and material storage areas would be limited to the current disturbed and developed footprints.

Access to the dams and associated infrastructure to complete maintenance activities covered under this Program, and detailed below, would occur along established access roads and pedestrian footpaths. Any staging of equipment or materials required to complete activities would occur within existing staging and material storage areas, within disturbed and developed portions of the dam, or within existing developed lands on nearby City property at the reservoirs. These areas are maintained as parking and operational space for dam and reservoir maintenance staff. If direct access to outlet/intake towers from the dam is not available, crews, materials, and the necessary equipment to perform maintenance and repair activities, including dredging, would be transported to the outlet/intake towers utilizing a boat or barge launched from the reservoir’s boat ramp.

Vegetation Clearing

Vegetation growing on and adjacent to the dams and associated infrastructure has the potential to hinder site access and safety inspections, visually obstruct dam components, interfere with safe operations, damage critical infrastructure, and possibly lead to dam failure. Removal of vegetation and debris is critical to the functioning of the dams and associated infrastructure, and Dulzura Conduit, as vegetation could reduce design capacity and prevent proper inspection of infrastructure. Clearing of vegetation would continue to be conducted on a routine basis under the Program to keep the maintenance area free and clear of vegetation. This will avoid the re-establishment of upland and wetland vegetation, as well as decrease the chances of introducing a new species into an existing maintenance area.

Vegetation clearing would be limited to the following activities and areas:

- Clearing of all vegetation located within at least five feet of Dulzura Conduit;
- Clearing of all vegetation located within 10 feet of the dams and associated infrastructure;
- Clearing of all marsh habitat (i.e., giant reed [*Arundo donax*], cattail [*Typha* spp.], bulrush [*Schoenoplectus* spp.], etc.) located within 10 feet of the dam;
- Removal of all trees located within 10 feet of the dams, saddle dams, parapet walls, and spillways;
- Removal of all eucalyptus (*Eucalyptus* spp.) trees located within 50 feet of the dam, saddle dams, parapet walls, and spillways;
- Clear and maintain all vegetation within 10 feet of all weirs; headwalls; blow-off and outlet valves; inlet and outlet pipes; discharge, leakage, and seepage pipes and associated discharge paths; and
- Maintain slopes surrounding Black Mountain and Rancho Bernardo Dams so that no trees are permitted to establish. The slopes shall be maintained in their current condition so that only herbaceous vegetation and low-growing shrubs occur.

Clearing of vegetation on land surfaces would be limited to above ground level, and the roots of all cut vegetation would be left in place to prevent soil disturbance and reduce potential erosion. Clearing of t eucalyptus and other tree species would be completed by cutting trees at the base and treating the stumps with herbicide. Aquatic vegetation, such as marsh habitat, would either be cut at the water surface and treated with an herbicide approved for aquatic use by the U.S. Environmental Protection Agency (USEPA) by a licensed applicator, or removed with the use of mechanical equipment where feasible. All vegetation clearing work would be conducted with hand tools such as pole saws, chain saws, and weed eaters. Felled trees and aquatic vegetation shall be removed from the area with the use of mechanized equipment (such as a bobcat, backhoe, or excavator), where feasible, and transported to an appropriate waste management facility for disposal. Felled trees in areas inaccessible to mechanized equipment would be removed via helicopter.

Dredging

Accumulated lake bottom sediment covering dam infrastructure, such as lower saucer valve ports, would be removed through dredging to maintain operational function. Dredging would occur within a 50-foot radius of the outlet/intake tower base at Barrett, Chollas, El Capitan, Miramar, Morena, Murray, San Vicente, and Savage Dams, and within a 50-foot radius at the low-level outlet intake at Barrett, Hodges, and San Vicente Dams. The depth of dredging activities would be variable depending on site conditions.

There are two main dredging methods that are anticipated to be employed under the proposed Program: mechanical and hydraulic. Mechanical dredging typically involves a stationary, bucketed machine (such as a boom, clamshell, or backhoe) positioned on a barge that is lowered into the water to scoop up material. The dredged material is then raised above the water surface and deposited on a barge or other above-water surface. Hydraulic dredging utilizes a high-powered water pump to suction up material that is then pumped away from the dredge site. A dredging plan would be prepared prior to the commencement of dredging activities at each proposed location. The dredging plan would describe the scope of work, amount of material to be removed, method of dredging, equipment, access roads and points, staging area(s), duration and schedule, and protocols to be implemented. Dredged material would be removed from the reservoir and either disposed of at an appropriate disposal facility or reused in a beneficial capacity (i.e., agricultural).

Outlet Tower & Trash Rack Maintenance

The Program includes maintenance and minor repairs to the outlet/intake towers to maintain and improve the operational safety of the towers. These activities include filling cored holes on the operating platform; repairing the valve rack; repairing concrete spalls; applying a top seal to waterproof and protect concrete surfaces and seal hairline cracks; coating metal covers, access ladders, and handrails to prevent corrosion; repair and replacement of access ladders; replacement of access hatches (in-kind); replacement of the safety chains across rails at the landing (in-kind); replacement or refurbishment of fall arrests; coating of the roof structural steel; and strengthening the concrete roof slab with the application of a fabric reinforced matrix. Equipment required to complete these activities would be limited to the use of manual and mechanical hand tools; no heavy machinery would be required. Additionally, trash racks would be regularly cleared, maintained, and kept free of debris that may block intake and outlet valves and other critical dam infrastructure, hindering operational functionality.

Spillway Clearing

Accumulated debris such as dirt, rocks, boulders, and vegetation present on the spillways, spillway channels, and auxiliary spillways would be removed as part of the Program to maintain operational function and prevent damage to infrastructure. Debris would be removed by hand, where feasible, and heavy equipment including, but not limited to, a truck-mounted crane, rubber-wheeled front-end loader, track-mounted long arm excavator, track-mounted bobcat with jackhammer attachment, and dump trucks. Small equipment (such as a bobcat) would be lowered into the spillways and other appurtenant structures with a truck-mounted crane to move the debris to a point where it can be accessed by a long arm-track mounted excavator positioned at the top of the structure. Boulders would be broken up into manageable pieces with a hydraulic jackhammer to allow for removal. A track-mounted excavator would lift the debris from the spillway and appurtenant structures and place it in a dump truck to be hauled away and disposed of at a licensed landfill or stock-piled on-site within disturbed/developed areas of the dam. Spillway clearing activities would be contained within the un-vegetated spillways and appurtenant structures, existing access roads, previously disturbed workspaces and staging areas, and disturbed and developed areas adjacent to the dams.

Removal of soil, debris, and vegetation along the El Capitan Dam spillway, lower dam spillway, and spillway channel will be conducted as part of the El Capitan Dam Spillway Vegetation Removal Project. Long-term maintenance of these areas will be covered under the El Capitan Dam Spillway Vegetation Removal Project and is not included as part of the proposed Program.

Dam Maintenance and Repairs

Maintenance and repair of the dams and appurtenant structures would be completed as part of the Program to prevent deterioration and maintain the integrity and functionality of critical dam infrastructure. The 13 City-owned dams covered under this Program include four earthen dams (Chollas, El Capitan, Miramar, and Morena Dams), seven concrete dams (Barrett, Hodges, Murray, San Vicente, Savage, Sutherland, and Upper Otay Dams), and two concrete reservoirs (Black Mountain and Rancho Bernardo).

Maintenance of earthen dams includes filling of voids, gullies, and rills caused by erosion on the upstream and downstream faces of the dam, and minor grading and regular compaction of the dam face and toe of dam. Maintenance of concrete dams, reservoirs, and concreted appurtenant structures at earthen and concrete dams (i.e., saddle dams, parapet walls, spillways, etc.) includes repairs such as sealing of all joints and cracks with gaps with a flexible sealant to prevent infiltration of water and buildup of stagnation pressures; repairing all degraded concrete, spalls, and boulder impact areas within the spillway (channel floor and walls) and dam face and walls by cutting-out existing material then replacing and patching material to prevent further damage; repair of spalled concrete on all elements of the dam, especially where reinforcing steel is exposed; and smoothing vertically-displaced joints on concrete surfaces by surface grinding or other approved methods.

Additionally, auxiliary infrastructure located on or within the dams would be maintained, repaired, and or replaced, including perimeter fencing, piezometers and survey monuments, ladders, micrometers, electronic level sensors, and other instrumentation. All maintenance and repairs activities would be performed on existing structures, with work activities limited to disturbed and developed portions of the dam.

Dulzura Conduit

Maintenance and repair of Dulzura Conduit are required to prevent flow impairment through the conduit and maintain design capacity. The Dulzura Conduit is an approximately 13-mile-long aqueduct constructed to divert water from Barrett Dam Reservoir to Lower Otay Reservoir through a series of canals, flumes, and tunnels. Water is released into the conduit through the Barret Dam outlet tower by a 30-inch drainpipe. The conduit has been updated as recently as 2011, with a majority of the conduit now constructed of concrete channels and steel pipes. The average depth of the concrete trench segments is approximately four and a half feet, with a bottom width of three feet, and a top width of approximately six feet. The flume is a combination of enclosed metal flumes, measuring approximately four feet in interior diameter, and board-formed poured concrete. Existing access roads and trails are constructed of decomposed granite, gravel, or concrete. Pedestrian footpaths primarily consist of dirt paths, and in some cases, small steel catwalks.

Maintenance activities along Dulzura Conduit involve the removal of landslide debris, rocks and boulders, and vegetation within the concrete conduit, and the repair of damaged or deteriorating sections of the existing conduit with in-kind materials. Repairs of the existing concrete conduit would be completed with shotcrete and include the installation of reinforcing mesh, ground wires, and compound curing. The shotcrete would be broom finished by hand. Activities also include chemical rock breaking of large boulders that are found to be blocking the conduit.

All inspection, repair, and maintenance activities along Dulzura Conduit would occur within the existing developed footprint of the conduit, pedestrian footpaths, and access roads and trails. The remote location of the conduit, rugged terrain, and limited vehicle access makes typical maintenance activities challenging. Maintenance and construction personnel would access the site through existing access roads, access trails, and pedestrian footpaths. Helicopters would airlift all supplies, equipment (i.e., mini-excavator, bobcat, etc.), and debris that cannot be hand carried to and from the repair sites. Helicopter landing, materials, and equipment staging areas would be located within existing developed lands on nearby City property at Barrett Reservoir. These areas are maintained as parking and operational space for dam and reservoir maintenance staff.

Geotechnical Investigations

Subsurface geotechnical investigation of the dams, foundations, and associated infrastructure would occur as part of periodic condition assessments under the proposed Program. Geotechnical investigations shall include seismic stability analysis using modern techniques, penetration tests, and borings. The techniques used to perform the investigations shall be limited to a small footprint within existing disturbed and developed areas associated with the dams and along access roads. No vegetation would be removed as part of the geotechnical investigation activities, and no native soil would be impacted, as excavations would be conducted within disturbed soils of previously installed infrastructure (i.e., rockfill and concrete).

1.2.2 Frequency of Maintenance Activities

The frequency of maintenance activities would be based upon routine inspections and recommendations identified in the DSOD annual inspection reports. Factors influencing the timing and frequency of maintenance events would include, but are not limited to, current conditions, past maintenance history, and risk assessment. In general, clearing of vegetation is anticipated to occur annually, though the extent of clearing would depend on the current conditions at each site. Other maintenance activities would occur on an as needed basis as directed by the DSOD and City PUD.

2.0 REGULATORY FRAMEWORK

This section describes the applicable regulatory framework considered in this study.

2.1 FEDERAL

2.1.1 National Register of Historic Places

The National Register of Historic Places (NRHP) was established by the National Historic Preservation Act of 1966 as "an authoritative guide to be used by Federal, State, and local governments, private groups and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment" (CFR 36 CFR 60.2). The NRHP recognizes properties that are significant at the national, state, and local levels. To be eligible for listing in the NRHP, a resource must be significant in American history, architecture, archaeology, engineering, or culture. A property is eligible for the NRHP if it:

Criterion A Is associated with events that have made a significant contribution to the broad patterns of our history; or

Criterion B Is associated with the lives of persons significant in our past; or

Criterion C Embodies the distinctive characteristics of a type, period, or method of installation, or represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or

Criterion D Has yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting these criteria, a property must retain historic integrity, which is defined in National Register Bulletin 15 as the "ability of a property to convey its significance" (National Park Service 1995). To assess integrity, the National Park Service (NPS) recognizes seven aspects or qualities that, considered together, define historic integrity.

To retain integrity, a property must possess several, if not all, of these seven qualities, which are defined in the following manner in National Register Bulletin 15:

(1) **Location.** The place where the historic property was constructed or the place where the historic event occurred.

(2) **Design.** The combination of elements that create the form, plan, space, structure, and style of a property.

(3) **Setting.** The physical environment of a historic property.

(4) **Materials** are the physical elements that were combined or deposited during a particular period and in a particular pattern or configuration to form a historic property.

(5) **Workmanship.** The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.

(6) **Feeling.** A property's expression of the aesthetic or historic sense of a particular period.

(7) **Association.** The direct link between an important historic event or person and a historic property.

Some aspects of integrity may be accorded more weight than others, depending on the type of resource being evaluated and the applicable eligibility criteria. Integrity can be assessed only after it has been concluded that a resource is significant.

2.1.2 Secretary of the Interior's Standards for Rehabilitation

In accordance with the NPS and CEQA Guidelines, projects that comply with the *Secretary's Standards for the Treatment of Historic Properties* and *Secretary's Standards for Rehabilitation* (*Secretary's Standards*) are projects that retain the historic integrity of the resource. According to CEQA Guidelines, a project that complies with the *Secretary's Standards* is generally considered to be a project that will not cause a significant adverse impact to a historical resource.

The goal of the *Secretary's Standards* is to outline treatment approaches that allow for the retention of and/or sensitive changes to the distinctive materials and features that lend a historical resource its significance. The *Secretary's Standards* and Guidelines offer general recommendations for preserving, maintaining, repairing, and replacing historical materials and features, as well as designing new additions or making alterations. These standards also provide guidance on new construction adjacent to historic districts and properties, to ensure that there are no indirect adverse impacts to historic properties.

Rehabilitation is the most flexible treatment approach of the *Secretary's Standards*. The ten *Secretary's Standards for Rehabilitation* are:

(1) A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

(2) The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

(3) Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

(4) Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

(5) Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

(6) Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires the replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

(7) Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

(8) Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

(9) New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old, and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

(10) New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

The *Secretary's Standards and Guidelines* offer general recommendations for preserving, maintaining, repairing, and replacing historical materials and features, as well as designing new additions or making alterations. The *Secretary's Standards for Rehabilitation* also provide guidance on new construction adjacent to historic districts and properties, to ensure that there are no adverse indirect impacts to integrity because of a change in setting. Applying the *Secretary's Standards* to new construction adjacent to historic resources helps ensure avoidance of indirect impacts and retention of the setting and feeling of the historic resource and its surrounding environment.

Secretary's Standards compliance begins with the identification and documentation of the "character-defining," or historically significant, features of the historical resource. According to National Park Service Preservation Brief 17, *Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character*, there is a three-step process to identifying character-defining features. Step 1 involves assessing the physical aspects of the building exterior, including its setting, shape and massing, orientation, roof and roof features, projections, and openings. Step 2 looks at the building more closely—at materials, trim, secondary features, and craftsmanship. Step 3 encompasses the interior, including individual spaces, relations or sequences of spaces (floor plan), surface finishes and materials, exposed structure, and interior features and details. Alterations and replacement of character-defining features over time can impair a historic property's integrity and result in a loss of historic status. Therefore, to ensure that a historic property remains eligible after the implementation of projects, character-defining features should be identified and preserved.

2.2 STATE

The policies of the NHPA are implemented at the state level by the California Office of Historic Preservation (OHP), a division of the California Department of Parks and Recreation (DPR). The OHP is also tasked with carrying out the duties described in the Public Resources Code (PRC) and maintaining the California Historic Resources Inventory and CRHR. The state-level regulatory framework also includes CEQA, which requires the identification and mitigation of substantial adverse impacts that may affect the significance of eligible historical and archeological resources.

2.2.1 California Register of Historical Resources

Created in 1992 and implemented in 1998, the CRHR is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Sections 21083.2 and 21084.1). Certain properties, including those listed in or formally determined eligible for listing on the NRHP and California Historical Landmarks, numbered 770 and higher, are automatically included on the CRHR.

According to PRC Section 5024.1(c), a resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on NRHP criteria:

Criterion 1: It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

Criterion 2: It is associated with the lives of persons important in our past;

Criterion 3: It 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;

Criterion 4: Has yielded, or may be likely to yield, information important in prehistory or history.

Properties that do not retain sufficient integrity for NRHP listing can still qualify for listing in the CRHR. Historical resources eligible for listing in the California Register must meet one of the criteria of significance described above and retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance.

2.2.2 California Environmental Quality Act

CEQA requires a lead agency to analyze whether historic and/or archaeological resources may be adversely impacted by a proposed project. Under CEQA, a "project that may cause a substantial adverse change in the significance of a historic resource is a project that may have a significant effect on the environment" (PRC Section 21084.1). Answering this question is a two-part process: First, the determination must be made as to whether the proposed project involves cultural resources. Second, if cultural resources are present, the proposed project must be analyzed for a potential "substantial adverse change in the significance" of the resource.

According to CEQA Guidelines Section 15064.5, historic resources are:

(1) A resource listed in, or formally determined eligible for listing in, the California Register of Historical Resources (PRC 5024.1, Title 14 CCR, Section 4850 et seq);

(2) A resource included in a local register of historical resources, as defined in PRC Section 5020.1(k), or identified as significant in a historic resources survey meeting the requirements of PRC Section 5024.1(g); and or

(3) Any building, structure, object, site, or district that the lead agency determines eligible for national, state, or local landmark listing; generally, a resource shall be considered by the lead agency to be historically significant (and therefore, a historic resource under CEQA) if the resource meets the criteria for listing on the California Register (as defined in PRC Section 5024.1, Title 14 CCR, Section 4852).

Resources nominated to the CRHR must retain enough of their historic character or appearance to convey the reasons for their significance. Resources whose historic integrity (as defined in the previous section) does not meet NRHP criteria may still be eligible for listing in the CRHR.

According to CEQA, the fact that a resource is not listed in or determined eligible for listing in the California Register, or is not included in a local register or survey, shall not preclude the lead agency from determining that the resource may be a historical resource (PRC Section 5024.1). Pursuant to CEQA, a project with an effect that may cause a substantial adverse change in the significance of a historical resource may have a significant effect on the environment (CEQA Guidelines, Section 15064.5(b).

CEQA Guidelines specify that "substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired" (CEQA Guidelines, Section 15064.5). Material impairment occurs when a project alters in an adverse manner or demolishes "those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion" or eligibility for inclusion in the NRHR, CRHR, or local register. In addition, pursuant to CEQA Guidelines Section 15126.2, the "direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects."

2.2.2.1 Criteria Considerations

Certain kinds of historic properties are not usually considered for listing in the NRHP, including religious properties, moved properties, birthplaces and graves, cemeteries, reconstructed properties, commemorative properties, and properties achieving significance within the past 50 years. These properties can be eligible for listing, however, if they meet special requirements, called Criteria Considerations, in addition to meeting the regular requirements (that is, being eligible under one or more of the four Criteria and possessing integrity) (NPS 1995). The seven Criteria considerations include the following:

(1) Religious property deriving primary significance from architectural or artistic distinction or historical importance;

(2) Building or structure removed from its original location, but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event;

(3) Birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his or her productive life;

(4) Cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, from association with historic events;

(5) Reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived;

(6) Property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

(7) Property achieving significance within the past 50 years if it is of exceptional importance.

2.3 LOCAL

2.3.1 City's Historical Resources Regulations

The purpose of the City's Historical Resources Regulations (HRR; San Diego Municipal Code [SDMC] Chapter 14, Article 3, Division 2) is to protect, preserve and, where damaged, restore the historical resources of San Diego, which include historical buildings, historical structures, or historical objects, important archaeological sites, historical districts, historical landscapes, and traditional cultural properties (City 2018). These regulations are intended to assure that development occurs in a manner that protects the overall quality of historical resources. It is further the intent of these regulations to protect the educational, cultural, economic, and general welfare of the public, while employing regulations that are consistent with sound historical preservation principles, and the rights of private property owners.

The regulations apply to proposed development when the following historical resources are present on the site, whether a Neighborhood Development Permit or Site Development Permit is required: designated historical resources; historical buildings; historical districts; historical landscapes; historical objects; historical structures; important archaeological sites; and traditional cultural properties. Where any portion of a premise contains historical resources, the regulations shall apply to the entire premises.

2.3.1.1 City of San Diego Historical Resources Guidelines

The purpose and intent of the City's Historical Resources Guidelines (HRG), located in the City's Land Development Manual (LDM; City 2001), is to protect, preserve and, where damaged, restore the historical resources of San Diego. These guidelines are designed to implement the City's HRRs in compliance with applicable local, state, and federal policies and mandates, including, but not limited to, the City's General Plan, CEQA, and Section 106 of the NHPA. The intent of the guidelines is to ensure consistency in the management of the City's historical resources, including identification, evaluation, preservation/mitigation, and development. The HRG states that if a project will potentially impact a resource 45 years or older, the resource's significance must be determined, even if it is not listed in or previously considered eligible for the California Register or a local register (LDM Section II.D.5).

To be designated as historic and potentially listed in the CSDHRR, one or more of the following Criteria must be met:

A. Exemplifies or reflects special elements of the City's, a community's, or a neighborhood's historical, archaeological, cultural, social, economic, political, aesthetic, engineering, landscaping, or architectural development;

B. Is identified with persons or events significant in local, state, or national history;

C. Embodies distinctive characteristics of a style, type, period, or method of construction or is a valuable example of the use of indigenous materials or craftsmanship;

D. Is representative of the notable work of a master builder, designer, architect, engineer, landscape architect, interior designer, artist, or craftsman;

E. Is listed, or has been determined eligible by the NPS for listing on the NRHP, or is listed or has been determined eligible by the California State OHP for listing on the CRHR; and or

F. Is a finite group of resources related to one another in a clearly distinguishable way, or is a geographically definable area or neighborhood, containing improvements that have a special character, historical interest, or aesthetic value or which represent one or more architectural periods or styles in the history and development of the City.

In addition to meeting one or more of the above Criteria, an SCDHRR-eligible resource must also retain sufficient integrity to convey its significance. Although the City's municipal code does use a 45-year threshold to review resources that may be adversely impacted by development, a resource need not be 45 years of age to be eligible for listing on the City's register.

Eligible resources, which may include an improvement, building, structure, sign, interior element and fixture, feature, site, place, district, area, or object, are designated to the City's Register of Designated Historical Resources by the City's Historical Resources Board (HRB) at a publicly noticed hearing. The City's HRG also states that if a project will potentially impact a resource, the resource's significance must be determined, even if it is not listed in or previously considered eligible for the CRHR or a local register (LDM Section II.D.5). The City has established baseline archaeological resource significance criteria based upon CEQA as follows:

> An archaeological site must consist of at least three associated artifacts/ecofacts (within a 50-square meter area) or a single feature and must be at least 45 years of age. Archaeological sites containing only a surface component are generally considered not significant, unless demonstrated otherwise. Such site types may include isolated finds, bedrock milling stations, sparse lithic scatters, and shellfish processing stations. All other archaeological sites are considered potentially significant. The determination of significance is based on a number of factors specific to a particular site including site size, type, and integrity; presence or absence of a subsurface deposit, soil stratigraphy, features, diagnostics, and datable material; artifact and ecofact density; assemblage complexity; cultural affiliation; association with an important person or event; and ethnic importance (City 2001:15).

Non-significant resources are addressed in Section II.D.6 in the LDM as including sites with no subsurface component, such as isolates, lithic scatters, isolated bedrock milling stations, and shellfish processing stations.

2.3.1.2 Historic Districts

The City's historic preservation program provides for the designation of individually significant resources as well as historic districts (City 2001). A historic district is defined by the City's municipal code as *"a significant concentration, linkage, or continuity of sites, buildings, structures, or objects that are united historically, geographically, or aesthetically by plan or physical development and that have a special character, historical interest, cultural or aesthetic value, or that represent one or more architectural periods or styles in the history and development of the City*" (SDMC §113.0103).

3.0 HISTORIC CONTEXTS

This chapter includes the historic contexts utilized for the historical significance evaluations of the newly identified resources associated with the CSDSWS. Contexts from the *City of San Diego Source Water System Historic Context Statement* were utilized, as well as newly developed contexts produced for this study.

3.1 CITY OF SAN DIEGO SOURCE WATER SYSTEM CONTEXTS

This following historic contexts are direct excerpts from the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020:29-49). For the complete historic context with historic photographs and citation references, please refer to the complete report provided in Appendix C.

3.1.1 Early Water System Development (1887-1916)

The procurement of water has played an instrumental role in the growth and development of the City since its founding. The region receives very little rainfall, and local mountain streams and groundwater provide only a limited supply of water. Cattle raising and dry-farmed wheat were the predominant forms of agriculture in the 1850s to 1880s, largely because of the region's water supply limitations. As the San Diego region, and the State of California as a whole, aggressively developed its agricultural industry during the Mission Period and beyond, water became a highly prized and widely disputed topic. Seven principal streams that originate in the Peninsula Range and discharge to the Pacific Ocean provided fresh water sources and, later, ideal locations for dams and reservoirs: Santa Margarita River, San Luis Rey River, San Dieguito River, San Diego River, Sweetwater River, Otay River, and Tijuana River (which consisted of two major reaches). The state's first instances of irrigation came from diverting such streams using riparian rights and lacked a formal water storage system (California Department of Transportation and JRP Historical Consulting Services 2000; Fowler 1953; SWRB 1951; cited in Murray et al. 2020).

During the Spanish Period (1769–1821), Franciscan missionaries sought an adequate water supply for irrigation purposes by digging wells near the San Diego River and constructing water conveyance ditches, small dams, and cisterns. Kumeyaay neophytes and laborers worked to build the Old Mission Dam (also called the Old Padre Dam) and an aqueduct to the Mission beginning in 1803 and completed it in 1816; portions of both remain intact. During the Mexican and early American Periods, there was no regional coordination to procure and maintain a reliable water supply. At the end of the Mexican Period and the beginning of the American Period, fresh water in San Diego was becoming increasingly difficult to acquire because of ranching practices, aggressive hydraulic gold mining, and American homesteaders throughout the state (California Department of Transportation and JRP Historical Consulting Services 2000; Sholders 2002; SWRB 1951; cited in Murray et al. 2020).

In response to the population growth and regional limitations on irrigation from low rainfall and lack of proper storage, multiple areas of Southern California, including the San Diego region, began to develop water storage reservoirs and dams. In the 1860s, this meant the acquisition of riparian water rights, which allowed a landowner access to water that abuts or flows through their property. One of the earliest attempts at the development of an organized water system in the County began when F.A. Kimball acquired the riparian rights to water on the lower reaches of the Sweetwater River in 1869. Kimball purchased 27,000 acres of the former Rancho de la Nación in 1868 and selected and surveyed a site for a dam and reservoir. He organized a water company and, in June 1869, acquired land for Kimball Brothers Water Company. Kimball's venture failed without ever producing water for the City, and in 1880, Kimball organized the California Southern Railway Company and conveyed his land and riparian rights to the new rail company (Fowler 1953; SWRB 1951; cited in Murray et al. 2020).

The first major steps toward organized water infrastructure within the San Diego metropolitan area began in 1873, with the formation of the San Diego Water Company. The corporation began drilling a well near B Street and Eleventh Street that supplied the City's first pipe water to a few residences in 1874. Unfortunately, the groundwater was poor in quality, and the supply was low, which led to the origination of the City's former "bad water" reputation. To remedy its supply and quality issues, the San Diego Water Company increased its stock from $10,000 to $250,000 in 1875, which allowed for the drilling of wells in the San Diego River, construction of a new pumping plant, and extension of the distribution system. The wells proved insufficient for the quickly growing City, and soon the City began to turn to privately owned water companies to supply the City (Fowler 1953; Smythe 1908; cited in Murray et al. 2020).

The development of reliable water infrastructure throughout the region did not begin in earnest until the 1880s, because of a significant population boom and the incoming California Southern Railway, which connected the City to the eastern United States. The County's population swelled from 8,600 in 1880 to over 30,000 residents by 1887. Developers and land speculators emerged throughout the region, looking to capitalize on the City's rapid growth. During this period, over 50 private water companies formed, all with the same goal of racing to be the first to provide the region with a reliable water supply. These companies worked to design, construct, and implement water conveyance projects as quickly as possible, with some successes and many failures. Out of the original 50, 10 companies emerged with plans to develop water for the City, six reached construction, and only four managed to deliver water. These four companies were the San Diego Flume Company (1886), the San Diego Land and Town Company (1881), the Otay Water Company (1886), and the Volcan Land and Water Company (1885) (Fowler 1953; Hill 2002; Meixner 1951; cited in Murray et al. 2020).

Water system developments were further encouraged by the passage of the Wright Act of 1887, which provided for the organization of irrigation districts, acquisition, and distribution of water for such districts. The irrigation district boards were to have the right to acquire, by purchase or by condemnation, all lands, waters and water rights, and other property for the construction of waterworks (particularly canals and reservoirs). The Wright Act gave irrigation districts the power to settle water rights troubles by giving the districts the right of eminent domain and power to condemn riparian rights. After the passage of the Wright Act, 49 irrigation districts were incorporated across the state, six of which were formed in the County. Only one of these districts, the Escondido Irrigation District, delivered water in the County, and all others eventually succumbed to debt. The Wright Act's shortcomings would be rectified in 1897 when the California Legislature repealed and replaced the Wright Act with the Irrigation District Act (Bridgeford Act) (Fowler 1953; Gidney 1912; SWRB 1951; cited in Murray et al. 2020).

One of the great engineering achievements during the 1880s was the construction of the Sweetwater Dam by the San Diego Land and Town Company, designed by engineer James D. Schuyler and constructed from 1886 to 1888. In 1888, Sweetwater Dam was the tallest masonry arch dam in the United States. Constructed on a part of the former Rancho de la Nación, the arch dam provided the necessary infrastructure to establish the townsites of Chula Vista and National City, which pass along the Sweetwater River (Crawford 2011; Fowler 1953; Schuyler 1909; cited in Murray et al. 2020).

Simultaneously, the Cuyamaca Dam was constructed on Boulder Creek in the Cuyamaca Mountains in 1887. It was followed, in 1889, by a 45-mile-long flume constructed on Boulder Creek in the Cuyamaca Mountains. The dam and flume were designed by Theodore S. Van Dyke and constructed by the San Diego Flume Company as a 41-foot-high earth-fill dam with a rock face. Established in 1885, the San Diego Flume Company supplied water to the City through their 35.6-mile-long redwood flume and roughly 10 miles of metal piping. When completed in 1889, the flume proceeded down the Capitan Grande Valley to El Cajon Valley, to the Eucalyptus Reservoir, before being delivered to the La Mesa Reservoir outside San Diego City limits. From there, it proceeded east and south of El Cajon, and from El Cajon, it was brought to the City by Mesa Road (Hill 2002; Lakeside Historical Society 2015; Meixner 1951; San Diego Union 1889; Strathman 2004; cited in Murray et al. 2020).

The San Diego Flume Company was successful for several years; however, it began to face several issues that slowly led to its failure. Plans to divert the headwaters of the Tijuana, Sweetwater, and San Diego Rivers to storage reservoirs on the San Diego River failed due to high construction costs. As a result, their system was often in short supply during the driest periods of the year. Additionally, the company was losing between one-third and one-half of the water supply during delivery due to evaporation and leakage, which required that the entire flume be relined. To add to these problems, the local demand for water continued to increase with the growing population. A nearly 11-year drought between 1895 and 1905 also dried up the Cuyamaca reservoir, forcing the company to rely on San Diego River water and reinforcing its former reputation for poor water quality (Fowler 1953; Hennessey 1978; Hill 2002; cited in Murray et al. 2020).

To address the ongoing water needs, the City entered into agreements with other private water companies, including the Southern California Mountain Water Company (SCMWC). The SCMWC was led by Elisha Spurr Babcock Jr. (1848–1922), a native of Indiana, who gained his fortune in the railroad industry. He purchased property on Coronado Beach, establishing the Coronado Beach Company, which incorporated the Otay Water Company in 1886. John Diedrich Spreckels (1853–1926) of San Francisco was another capitalist whose fortune came from the shipping business and Hawaiian sugar industry. During an 1887 visit to San Diego, Spreckels was impressed by the real estate boom at the time, which led him to invest in the construction of a wharf and coal bunkers at Broadway (at the time known as D Street). The boom ended quickly, but Spreckels continued his interest in the area. He acquired control of Babcock's Coronado Beach Company, then the San Diego Union newspaper in 1890, the San Diego Tribune in 1891, and the City's street railway system in 1892. Babcock persuaded Spreckels to invest in several his other organizations, including Otay Water Company and the Mount Tecarte Land and Water Company. The SCMWC was born from a consolidation of water companies that included the Otay Water Company and the Mount Tecarte Land and Water Company in 1894. Because of these transactions, Spreckels owned nearly half of Babcock's enterprises (Crawford 2011; Fowler 1953; Hennessey 1978; LAT 1896; McGrew 1922; Ormsby 1966; San Diego History Center 2018; Smythe 1908; cited in Murray et al. 2020).

Though Babcock's previous Otay Water Company (1886) and Mount Tecarte Land and Water Company (1888) held land interests in Otay Canyon, it was not until the SCMWC incorporated in 1894, and the City engaged the company with a water supply contract, that tangible plans for the Lower Otay Dam, Upper Otay Dam, Morena Dam, and the Dulzura Conduit emerged. The planned system would be established along the Otay-Cottonwood watershed, beginning with the construction of the Morena Dam, and following downstream with the Upper and Lower Otay Dams. Years later, the Barrett Dam would be added to the watershed. From Lower Otay Dam, water would be piped through the Dulzura Conduit and then distributed throughout the region. The design of the system was described as follows:

> Two [reservoirs] on the upper stream and two on the lower, and known as the Lower Otay, Upper Otay, Barrett, and Moreno [sic] reservoirs, their altitudes being respectively 400, 540, 1,450, and 2,900 feet. Their aggregate storage capacity is 13,600 miner's inches, which can be vastly increased by carrying the two upper dams to a height of 200 feet or more. (San Diego Union 1895; cited in Murray et al. 2020).

Babcock ordered the construction of the Lower Otay Dam without consulting the expertise of an engineer, a policy that would lead to future problems for the company. The Lower Otay Dam was constructed under the charge of civil engineer Walter S. Russell. This rock-filled embankment dam, with a riveted steel plate and concrete core, was started in 1894 and completed in 1897. While not part of the original plan, by February of 1896, SCMWC halted construction of the Lower Otay Dam due to the lack of coordination with the City for the overall water system plan for the City of San Diego. The SCMWC hoped to get funding for the completion of the dam from the City to build a city plant and dams for private irrigation needs (LAT 1896). After struggling with the question of investing in water infrastructure for many years, voters passed a City of San Diego bond measure to approve $1,500,000 in funding for the acquisition and construction of a new water system in June 1896. The new water system would bring in 1,000 inches (13 million gallons) of water from the mountains daily (SFC 1896a, SFC 1896b, SFC 1896d; cited in Murray et al. 2020).

The 1894 Lower Otay Dam design was flawed and could only safely discharge a small amount of water compared to the Sweetwater Dam. Drought during the construction years hid this flaw, and the normal runoff was insufficient to fill the reservoir. Despite Lower Otay Dam's issues, the Upper Otay Dam on the western branch of Otay Creek at Proctor Valley was started in 1896, a then-novel, thin-arch dam design intended to reach the lake edge of the Lower Otay Dam if the reservoir were ever full. The location was chosen so that when the Lower Otay Reservoir was full, the water surface would reach the toe of the Upper Otay Dam. The Upper Otay Dam was patterned after the Bear Valley Dam in the San Bernardino Mountains and was selected by Babcock. The engineers in charge of constructing the dam and reservoir were C. M. Bose and H. N. Savage, who served as consulting engineers for the SCMWC beginning in 1893. After a brief construction delay in 1900, Upper Otay Dam was officially completed on January 1, 1902 (Crawford 2011; Fowler 1953; Meixner 1951; Jorgensen 1916; San Diego Union 1900, 1902; cited in Murray et al. 2020).

The SCMWC made plans for another dam on the Cottonwood Creek watershed, which would discharge through a conduit to the Otay watershed. These were the Morena Dam and the Dulzura Conduit. Construction of the rock-filled embankment dam, Morena Dam, began in 1896; however, construction halted in 1898 due to serious construction concerns. City Engineer Edwin M. Capps found that the early dam construction had significant holes and cracks, some big enough to fit his limbs through, throughout the dam. Capps also reported that when the wall was tested with 1 to 30 feet of water pressure, it resulted in gushing leaks (the final wall would need to be able to withstand 150 to 185 feet of pressure). Capps concluded his report stating, "I attribute this faulty work, not to a desire of Mr. Babcock to do poor work or to curtail in cement, but solely to a zealous desire to complete the work before the winter rains, and from an over confidence in his own ability and that of his foreman" (Crawford 2011; Fowler 1953; Meixner 1951; Capps 1896; cited in Murray et al. 2020).

On October 9, 1897, the City Council voted unanimously to stop all work on the Morena Dam after reviewing Capps report (Los Angeles Times 1897; cited in Murray et al. 2020). Original project notes indicate that because of Babcock's deviation from the plans and specifications agreed upon in the contract, and a lack of written agreement to remedy the issues, the construction of Morena Dam was officially ordered to be stopped in 1898.

Few of the regional water companies survived the 11-year drought from 1895 to 1905. Mid-drought, the City's population in 1900 was 17,700. In 1901, City voters approved a municipal water supply, and the City purchased the holdings of the San Diego Water Company and the SCMWC within City limits. Such holdings included reservoirs, pumping plants and machinery, pipelines, buildings, and tools. One such property was the Chollas Heights Reservoir. In 1901, the SCMWC constructed the Chollas Heights Reservoir, an earth-fill embankment dam on a tributary to Las Chollas Creek east of the City limits and built to serve as terminal storage for the pipeline extending from the Lower Otay Reservoir. This pipeline delivered water to the Coronado Water Company, which supplied the City of Coronado (Department of Commerce 1930; Fowler 1953; Meixner 1951; Pyle 1935; Smythe 1908; cited in Murray et al. 2020).

Even post-drought, the City's water supply was insufficient for its growing population. In 1905, City voters clashed over funding municipal water and were forced to approve more bonds for new works. The City entered a new contract with SCMWC in fall 1905 to purchase water from Upper and Lower Otay Reservoir system for $0.04 per 1,000 gallons. The mayor vetoed the City's proposed SCMWC contract, citing the lack of power afforded to the City in such a contract, but the City Council overrode his veto, and the Bonita Pipeline from Lower Otay Reservoir to Chollas Reservoir and the branch line to the City of Coronado were completed shortly after (Crawford 2011; Smythe 1908; cited in Murray et al. 2020).

From 1907 to 1912, SCMWC contracted Michael Maurice O'Shaughnessy to serve as chief engineer for the SCMWC and to oversee completion of the Morena Dam and Dulzura Conduit. O'Shaughnessy (1864-1934) was a civil engineer from Ireland, chiefly engaged in projects in the western United States, and is best recognized for his later role as the City Engineer of San Francisco from 1912 to 1932. O'Shaughnessy was contracted by San Francisco to design and build the Lake Eleanor Dam and O'Shaughnessy Dam, which at the time were contentiously placed water supply projects opposed by John Muir for their boundary with Yosemite National Park. In 1913, he won the James Laurie Prize for his Society of Civil Engineers article, "Construction of the Morena Rockfill Dam" (1911), in which the dam was noted arguably as the largest rockfill embankment dam in the world at the time (Fowler 1953; SNAC Cooperative 2018; cited in Murray et al. 2020).

O'Shaughnessy began work on the Dulzura Conduit in August 1907. The conduit was already partially complete and consisted of a tunnel around the future Barrett Dam site. O'Shaughnessy designed and oversaw the building of 17 unlined tunnels, an open ditch section, and a short length of wooden flume for the remaining 13 miles of the Dulzura Conduit. O'Shaughnessy chose to terminate the conduit at the head of Dulzura Creek, which was a tributary to Otay Creek, and would eventually make its way to the Upper and Lower Otay Reservoirs. The Dulzura Conduit was intended to be a major piece of water infrastructure that would connect Barrett Reservoir with Dulzura Creek, preventing water runoff from flowing into the Tijuana River in Mexico. Constructing the conduit would increase the water supply of San Diego 12-fold, with the daily capacity reaching 50,000,000 gallons and costs more than $375,000 upon completion. The length of the conduit was approximately 13 miles, including 10,000 feet of tunnel, 2 miles through solid granite; 1.25 miles of wooden flume lines; and 9 miles of open canals. The canals were lined with solid concrete, the thickness depending on the nature of the material through which the ditch passed. Most of the conduit was lined with about 4 inches of concrete; where there was loose gravel or decomposed granite, 6- to 12-inch-thick concrete was required; and where there was solid granite, no concrete lining was necessary. It was completed in 1909 (Fowler 1953; LAT 1909; San Diego Union 1908a; cited in Murray et al. 2020).

Under O'Shaughnessy's work as chief engineer for the SCMWC, he was given the task of completing the Morena Dam in spring 1909, which had stopped construction in 1896 after being fraught with issues. O'Shaughnessy altered the original design of the dam to change the upstream slope to a steeper granite and concrete mortared construction and the downstream slope to an un-coursed rubble rock face. O'Shaughnessy also added his original designs for the outlet tower, spillway, and outlet tunnel. The top of the dam was 16 feet wide and capped with a three-foot thick concrete coping to provide for wave wash. To provide for future extensions in raising the dam, the back slope was changed to 1.5 horizontal to 1 vertical with a berm of 21 feet at the 100-foot contour. This berm was created by altering the face slopes, which was originally designed to have a flatter water slope. Furthermore, a large part of the old fill located behind the toe wall was torn out, and all objectionable materials placed during the initial construction period were removed and replaced with clean, well-placed rockfill. A small slot measuring 1 foot wide by 5 feet deep was left in the original toe wall to support new reinforced concrete facing. The new dam materials provided a water-tight skin for the face of the dam, which kept the rockfill clear of any soil or silt that could cause leaks. Construction was completed in 1912 (Fowler 1953; O'Shaughnessy 1913; San Diego Union 1912; cited in Murray et al. 2020).

Later in 1913, the City purchased the Barrett-Morena-Otay portion of the SCMWC for $2,500,000, including dams and reservoirs, and in 1914, the pipeline that connected Otay Valley with the SCMWC's Lower Otay Reservoir was purchased by the Coronado Water Company. As the major portions of the SCMWC had already been purchased by the City, Morena Dam was also agreed to be purchased at a fixed price following a 10-year lease. Thus, by 1914, all portions of the SCMWC were owned by the City (Fowler 1953; cited in Murray et al. 2020).

For the time being, it seemed that the City had addressed its immediate and long-term water problems. Population growth had more than doubled from 17,700 in 1900 to over 39,500 in 1910, and water was relatively plentiful. However, beginning in 1912, a drought struck the City, which continued through 1915. Since most of the water stored in the region's dams was replenished by captured rainfall, the reserves diminished quickly. The City's solution to their drought problem was Charles Mallory Hatfield (1875–1958), a native of Kansas who was a former sewing machine salesman, and a self-proclaimed "moisture accelerator." As a young boy, his family moved to the City, and in later years, he accredited his dedication to rainmaking to the terrible years of drought near the end of the nineteenth century. Hatfield's technique involved the mixing of liquid chemicals and then dispersing them into the open air, which he claimed attracted rain. Between 1899 and 1912, Hatfield traveled to Alaska and throughout central California to provide his rainmaking services (Crawford 2011; Department of Commerce 1930; Hill 2002; Patterson 1970; Tuthill 1954; cited in Murray et al. 2020).

On December 8, 1915, the City's Common Council received a letter from Hatfield, who offered to produce at least 40 inches of rain in the vicinity of the Morena Reservoir: "By June 1, [I will] produce 40 inches of rain (at Morena Reservoir) free gratis, I to be compensated from the 40th to the 50th inch by $1,000 per inch" (Patterson 1970). The next day, Hatfield submitted another letter to the Common Council offering to fill the Morena Reservoir by December 20, 1916, or to cause a rainfall of 50 inches by June 1, 1916, again asking for $1,000 for each inch over 40 inches. Following receipt of his letter, the City hired Hatfield for $10,000 to address the severe drought and, more specifically, to fill the Morena Dam. To begin the rainmaking process, Hatfield and his brother Paul built a tower at Morena Reservoir with a square basin on a wooden platform measuring approximately 12 feet high on a slope alongside the road leading to the dam. After this initial display, there was a period of inactivity, and the Hatfield name began to vanish from local newspapers (Crawford 2011; Patterson 1970; Tuthill 1954; cited in Murray et al. 2020).

3.1.2 Flood Recovery and Reinvestment (1916-1928)

On January 5, 1916, a good rain was reported at Morena Reservoir, and 48.5 million gallons had been impounded since December 27. The rain fell again on January 10, 1916 and continued until January 18 in the City and the surrounding area. On January 27, a second storm hit, bursting open the Lower Otay Dam and flooding the Tijuana River Valley. The storms caused the San Diego River to overflow its banks and spread across Mission Valley. Nearby infrastructure, including rail lines and bridges, was destroyed, and local trains were stopped for more than one month. Highways and the telegraph and telephone lines were also cut off, wherein the only means of transportation was through the sea. Three days later, the Sweetwater Dam was overtopped by more than three feet, and the canyon side walls began eroding away. Although the dam itself was undamaged, its abutments had been breached, and it was unable to retain water. The waters behind Morena Dam rose within 18 inches of the top of the parapet wall, or 18 inches above the crest of the dam. Debris that had been washed into the reservoir accumulated on the trash racks in front of the spillway and choked the flow of water (Crawford 2011; McGlashan and Ebert 1918; Patterson 1970; Tuthill 1954; cited in Murray et al. 2020).

SCMWC's 1894 Lower Otay Dam was a complete loss. The floods left scars on mountains and hills and washed-out river channels down to bedrock. The saturated hillsides gave way and resulted in mudslides. In addition, the pumping plants of the Coronado Water Company were destroyed, cutting off supplies from the Otay Valley. Nevertheless, water service was maintained through the City's pipeline under the bay with water from the Cuyamaca Water Company (formerly the San Diego Flume Company) system (Crawford 2011; Fowler 1953; McGlashan and Ebert 1918; cited in Murray et al. 2020).

The Hatfield brothers remained in the Morena area until a few days after the second storm. They deconstructed the tower before leaving the site in early February. Hatfield then attempted to collect his fee from the City. In the wake of crippling damages across the City and County, the City refused to compensate him for his rainmaking services, and Hatfield filed a suit against the City the next December, which was eventually dismissed by the State Supreme Court. Although the controversy and litigation continued for many years, it did not hurt Hatfield's career. Eventually, the Depression forced him to leave the rainmaking practice and return to his original trade of selling sewing machines (Crawford 2011; Patterson 1970; Tuthill 1954; cited in Murray et al. 2020).

In the years immediately following the flood of 1916, several new water infrastructure projects were completed throughout the City to replace what was destroyed and accommodate the constantly increasing needs. These dams were built by the City and by private water companies hoping to be bought by the City or to get a City water contract.

The Cuyamaca Water Company, owned by Ed Fletcher and James A. Murray, began to plan the Murray Dam in 1916, just after the flood. Fletcher (1872–1955) was born in Massachusetts and moved to the City as a young man. Fletcher, known for his persistence and bravado, became knowledgeable about the watersheds surrounding the City through his time spent exploring them and eventually leveraged this knowledge to find work as an intermediary on important infrastructure projects in the San Diego region. Murray (1840–1921) was an Irish immigrant and a prominent real estate, mining company, and business owner in Montana before moving to California in 1904. Fletcher and Murray met through a mutual acquaintance and acquired the bankrupt San Diego Flume Company in 1910, renaming it the Cuyamaca Water Company (Farley 2016; Fowler 1953; Jackson 2009; Meixner 1951; cited in Murray et al. 2020).

The Cuyamaca Water Company hired engineer John S. Eastwood (1857–1924) to design the Murray Dam. Once considered to be the largest dam in Southern California, the Murray Dam featured a 990-foot-wide, 117-foot-tall multiple arch dam, with the upstream side comprised of a series of cylindrical arches supported on buttresses. The Murray Dam subsumed the earthen La Mesa Dam, a much smaller embankment dam already at that location. Murray Dam featured a siphon spillway, a unique feature with five barrel-shaped arches arranged in a semi-circle, with the crest placed at the same level as the top of the dam. Approval of the plan for Murray Dam occurred with almost no delay because of the Cuyamaca Water Company's familiarity with the engineer's work, and the dam was completed in March 1918. John S. Eastwood designed the world's first concrete multiple arch dam at

Hume Lake, California in 1908, and had subsequently designed 17 multiple arch dams in California, Idaho, Arizona, British Columbia, and Mexico despite some opposition from the professional engineering community against multiple arch dam designs. Before designing Hodges Dam, Eastwood's multiple arch dam designs were strongly and publicly criticized by fellow engineer John R. Freeman. Eastwood was replaced at the Big Meadows Dam project in 1913 as a result. However, recognizing the economic savings of multiple arch dams, and despite the design's criticisms, Fletcher embraced Eastwood's designs for Murray Dam. Under Fletcher, Eastwood would design four dams in the County, including Murray Dam in 1918 and Hodges Dam, completed in 1919 (Farley 2016; Fletcher 1919; Fowler 1953; Jackson 2009; Meixner 1951; San Diego Union 1918; cited in Murray et al. 2020).

In 1917, the San Dieguito Water Company (formerly the Volcan Land and Water Company), owned by William Henshaw and Fletcher and financed by the Santa Fe Railroad Company, announced plans to build three dams: Hodges Dam, San Dieguito Dam, and San Elijo Dam. The ambitious project would irrigate more land than the holdings of the Cuyamaca, Sweetwater, and Escondido systems combined. In 1917, Eastwood designed Hodges Dam, a concrete, multiple arch dam, roughly 30 miles north of the City on the San Dieguito River watershed. Hodges Dam was completed in 1919 and was eventually purchased by the City in 1925. In comparison to other public utility projects, the construction of the Hodges Dam was relatively quick. The actual pouring and placing of concrete took only 12 months, from November 1917 to November 1918. In March 1918, as the dam neared the 60 percent completion mark, a severe flood overtopped the dam. The dam was undamaged by the overtopping, a credit to Eastwood's design. Hodges Dam consisted of 23 hollow 24-foot wide, 24-inch-thick reinforced concrete arches, supported with buttresses of mass concrete. It was 550 feet long and 137 feet high. The San Dieguito Dam, also completed in 1918, was another hollow, multiple arch dam, also designed by Eastwood, and was completed in just four months. The dam was also on the San Dieguito River watershed, receiving water from Lake Hodges through the Carroll Conduit. San Elijo Dam was proposed but never fully realized (Fletcher 1919; Fowler 1953; Meixner 1951; Jackson 2009; San Diego Union 1918a; Eastwood 1916; San Diego Evening Tribune 1918, 1919; cited in Murray et al. 2020).

From 1917 to 1919, the City replaced the Lower Otay Dam with a new concrete curved gravity dam, named Savage Dam, in honor of hydraulic engineer Hiram Newton Savage. Savage (1861–1934), who was hired on June 4, 1917, to assist with repairing the damaged water infrastructure, was an engineer with expertise in infrastructure, working in railroad, mining, and water industries throughout the United States. He arrived in the City in the 1890s and was employed by the San Diego Land and Town Company of National City. He was hired to work on the construction of the Sweetwater Dam and distribution system and the associated City plan and rail lines. He also served as a consulting engineer for the SCMWC in 1895, where he assisted with the construction of the Upper and Lower Otay Dams. From 1903 to 1915, Savage worked for the U.S. Reclamation Service, designing and managing several important water projects throughout the west. Following the floods, Savage returned to the City and took the role of consulting and supervising engineers for the Sweetwater Company of California. During that time, he was engaged in the reconstruction and enlargement of the Sweetwater Dam, spillway, and abutments, which were damaged during the floods. Savage designed a 145-foot-high curved gravity dam for the Lower Otay Dam, which would encapsulate the old masonry dam remains that were partially destroyed in the flood of 1916. Despite the sound design, the building period was fraught with issues, including suspension of the City's contract with James Kennedy, the main contractor, citing "delinquency." As a result, the Lower Otay Dam was finished by day labor forces in 1919 (City of San Diego 1919; Fowler 1953; Sholders 2002; Meixner 1951; San Diego Evening Tribune 1917; San Diego Union 1919; SNAC 2018; cited in Murray et al. 2020).

After completing construction at the Lower Otay Dam, the City began construction on Barrett Dam in 1919 at the location originally chosen by the SCMWC, just downstream of Morena Dam. This location was avoided during the construction of the Dulzura Conduit, which had accounted for the location of the future dam. The City transferred laborers, tools, and leftover materials from the newly completed Lower Otay Dam to the Barrett Dam site. Like Lower Otay Dam, Savage designed Barrett Dam as a curved gravity dam. Construction costs were estimated at $881,270. Initially, the Mayor of San Diego, Louis J. Wilde, sought to pay for the dam out of existing water funds. However, in November 1919, voters authorized Resolution 70, which released $1 million in water bonds to be used for the construction of Barrett Dam. During construction, the Barrett Dam met with issues of overtopping during a spring 1922 rainstorm. Water came within several feet of overtopping the lowest constructed height of the dam at that time, which was at elevation 1543, or gauge 99. Continued spring rains in 1922 kept the water level at Barrett Reservoir high as construction drew towards its completion. By April, over 800 million gallons of water had been discharged from the reservoir via the Dulzura Conduit, but crews still had to work two shifts to prevent the dam from overtopping. Barrett Dam was completed and dedicated in the summer of 1922. The final height of Barrett Dam was 215 feet, resulting in an 862-acre reservoir fed by a 130-square mile drainage area (City of San Diego 1919, 1923; San Diego Evening Tribune 1922a; Fowler 1953; cited in Murray et al. 2020).

While working in his capacity as City Water Engineer, Savage made several unfavorable reports to the City Common Council during the course of Barrett Dam construction. In February 1922, Savage reported that the City had no right to water in the Barrett Drainage basin and that Spreckels' water permit was non-transferable. He was accused of holding the Barrett Dam project hostage while demanding more funding to complete the dam. In addition, Savage opposed enlarging the Morena spillway, which was required by the state, and purchasing the Cuyamaca Water System. Savage openly opposed developing the El Capitan Dam site, favoring instead the Mission Gorge Dam site, which was an expensive alternative. The City selected the dam location at El Capitan and hired an outside consultant engineer, Freeman, to oppose Savage's opinion as they had for Eastwood's dam designs. The water commission was split over retaining Savage while still being held responsible for the lack of water supply by voters and the mayor. The final straw in the Council's decision was the report of leaking at Lower Otay Dam, further threatening the water supply of the City. After the completion of the Barrett Dam, Savage was fired from his job as City Engineer. The Common Council of San Diego unanimously voted to repeal the ordinance that employed Savage and denied an appeal to retain Savage as City Engineer. At the urging of Council Member Heilbron, Freeman was retained in Savage's place (City of San Diego 1921; San Diego Sun 1922a, 1922b, 1922c, 1922d, 1923; San Diego Evening Tribune 1923a, 1923b; cited in Murray et al. 2020).

The City's population grew from 39,578 in 1910 to 74,361 by 1920; however, there were few significant developments in the local water infrastructure. One dam was constructed in the early 1920s: Henshaw Dam, owned by the San Dieguito Water Company, an earthen-fill embankment dam completed in 1923. The early 1920s were instead characterized by the legal battle for the water of the San Diego River, Imperial Valley, and the Colorado River. Legal issues arose around the San Diego River watershed under the control of the Cuyamaca Water Company. In 1921, the City went to court to validate its paramount claim to the water against the La Mesa, Lemon Grove, and Spring Valley Irrigation District (1913), which had an ongoing contract with Cuyamaca Water Company. In 1926, the courts sided with the City, confirming the water rights initially established by the City's pueblo water rights. While the City sued for its water, in 1921, California and other states bordering the Colorado River had been exploring the possibility of exploiting the great watershed. It would take over 20 years for Colorado River water to flow into the City. The City initiated studies and agreements to bring Colorado River water west, through the construction of the Colorado River Aqueduct (1939), the All-American Canal (1942), and the Boulder Dam (1935). Surveys in Imperial Valley for the All-American Canal began in 1919, 15 years before construction of the canal began (Department of Commerce 1930; Fowler 1953; Pourade 1977; Schaefer and O'Neill 2001; cited in Murray et al. 2020).

3.1.3 Post-St. Francis Dam Disaster Development (1928-1947)

The business of water production changed dramatically after the failure of the St. Francis Dam in 1928. Located in the Santa Clara Valley, the St. Francis Dam was built in 1926 and designed by Los Angeles Water Engineer William F. Mulholland. Constructed for the City of Los Angeles, the dam was designed to contain one year's water supply for the City of Los Angeles. The dam was designed as a curved concrete gravity dam with a height of 205 feet and was reportedly the second-largest reservoir in Southern California at the time it was completed. The dam survived more floods in 1927, but the dam caretaker repeatedly reported issues to the City of Los Angeles about small leaks in the dam. At approximately midnight on March 12, 1928, a massive landslide occurred along the dam's left abutment, pushing a 140-foot wall of water down the canyon. As a result of the flooding, 7,900 acres of farmland were lost, 1,250 buildings were destroyed, and 430 people lost their lives, making it one of the worst recorded dam failures in U.S. history. The disaster rocked the engineering world in Southern California, triggering a State-wide interest in dam safety (Elrick and the Friends of the Los Angeles River 2007; Roderick 2001; cited in Murray et al. 2020).

Following the St. Francis Dam disaster, more than a dozen panels convened to investigate the failure. Because of the findings, California passed increased safety legislation, giving the State Engineer authority to review non-federal dams over 25 feet in height. Additionally, the State Engineer was tasked to examine the dams in the state. Between August 1929 and November 1931, the State Engineer inspected 827 dams. Approximately one-third were found to require significant repairs, particularly needing increases to the spillway capacity. In the City of San Diego, there were significant public concerns about the safety of the largest dams, including the Barrett, Lower and Upper Otay, and Morena Dams. Several improvements were completed to the City's dams following the St. Francis Dam disaster, which included: a reservoir capacity and spillway enlargement at Morena Dam; a spillway enlargement and new pipeline and filtration system at Lower Otay Dam; enlargement of reservoir capacity at Chollas Dam; and height increase and spillway enlargement at Barrett Dam. Another result of the safety survey was the identification of structural issues at Hodges Dam. Cracks were recorded at Hodges Dam, and the California state engineering surveyors recommended a strengthening project to resolve the cracked buttresses. After some study, the State Engineer determined that the cracks were not caused by loading stress and recommended that the cracks be monitored with a pins system (City of San Diego 1928; San Diego Union 1930; Savage 1929; Wueste 1933; cited in Murray et al. 2020).

An unintended victim of the St. Francis Dam disaster was Sutherland Dam. Construction of Sutherland Dam was urged at City Council's request in 1925, and a short drought increased the City and public's desire for another dam. Construction on Sutherland Dam in the San Dieguito River watershed began in 1927. Almost immediately, the project encountered problems. The supervising engineer, J.W. Williams, took issue with the undesirable foundation conditions of the dam. Because of diminished confidence in dams, the next year, voters denied bond funding for water projects, including Sutherland Dam. The Sutherland Dam project had to be moved upstream to a new location, and the cost of the project was staggering. In 1928, the Common Council turned to the engineer they had fired in 1923, Savage. Savage was immediately critical of the multiple arch design, favoring instead the curved gravity dam design, like the designs of his Lower Otay and Barrett Dams. Savage spent the following year attempting to convince the City to fund the Sutherland Dam project, but after a wildfire, the project was abandoned, and the previous voter-approved water bond money was funneled instead toward the El Capitan Dam project. The City would not revisit the Sutherland Dam project until 1949 (Crawford 2011; San Diego Evening Tribune 1925, 1928, 1933; Fowler 1953; cited in Murray et al. 2020).

The population of the City continued to grow at an alarming rate. In 1921, the population had been 74,361. By 1930, the population had doubled again to 147,995. Anxious to accommodate its growing population, the City began the El Capitan Dam construction in 1932. For nearly two decades prior to its completion, the El Capitan Dam site had been held by the Cuyamaca Water Company and was sold piecemeal to the City from 1923 to 1926. In 1928, the City began to siphon money from the Sutherland Dam project to the El Capitan Dam project, to use the money from the water bond. Recently rehired for the El Capitan project, Savage designed a hydraulic rock-filled embankment dam, an update to the 1923 design by his former rival and replacement, Freeman. The City and Savage continued a tense relationship, appointing a water council member to be Savage's "official watchdog" (San Diego Progress 1931; cited in Murray et al. 2020). Savage's obstinate reputation, and the expense of his large dam projects, were met with open derision. The San Diego Herald accused Savage of having killed the Sutherland Dam project for personal benefit and openly and repeatedly called for his firing again. However, Savage's rock-fill dam plans were approved by the state, and ground was broken later in 1931. Despite moving forward with El Capitan Dam, public opinion and the City Council did not favor Savage. Multiple attempts to silence or curb the authority of Savage were made successfully. The new City manager and the water council were at odds over retaining Savage. By all accounts, Savage seemed to continue his work at El Capitan Dam quietly. In May 1933, approximately one year before his death, Savage wrote a letter to the Common Council stating that he wished to resign as the City's Hydraulic Engineer after his contract expired in July 1933. Details of the plans for the El Capitan dam were captured in an article from the WCN in 1932 and were as follows (Crawford 2011; LAT 1934; San Diego Herald 1931; San Diego Progress 1931; San Diego Sun 1931, 1932, 1933; San Diego Union 1931a, 1931b, 1932; cited in Murray et al. 2020):

> El Capitan reservoir dam is to be a hydraulic fill-rock embankment structure. It will be 1160 ft. long on top and 1240 ft. thick at the base and will provide storage to elev. 750 ft. The foundation will be about 25 ft. below streambed and the spillway crest 197 ft. above streambed, the parapet crest rising 20 ft. above the spillway lip, or to elev. 770 ft. Clear width on the crest will be 20 ft. A vertical reinforced-concrete flexible core-wall 18 in. thick at the bottom and 16 in. at the top will extend from the base of the cutoff trench to elev. 770 ft. Enclosing the concrete wall will be a puddle core of fine, impervious material 30 ft. thick at the top and 125 ft. at the base (WCN 1932 cited in Murray et al. 2020).

Savage's former assistant Fred Pyle picked up where Savage left off. As with Lower Otay Dam, the City clashed with the contractor H.W. Rohl and T.E. Connolly over non-payment issues at the dam. In addition, the Indians of the Capitan Grande Reservation opposed the dam's construction on the grounds of having to disinter their graveyard established at the dam's proposed location. As the disagreement continued into 1934, the Bureau of Indian Affairs interceded and moved the reservation and their graveyard to Viejas Valley. The dam struggled with these issues, but it was eventually completed in 1935 (City of San Diego 1935; Crawford 2011; Department of Commerce 1930; Meixner 1951; San Diego Union 1935; Thorne 2010; WCN 1932; cited in Murray et al. 2020).

There was little development of the water system during the remainder of the 1930s, other than to secure water from the Colorado River. The Boulder Dam (later, the Hoover Dam) was completed in

1935, and the All-American Canal was completed from 1934 to 1941. Floods in 1937 filled the reservoirs instead of destroying them, and small damages to pipelines were the only notable issues. The population growth of the City finally slowed, only growing from 147,995 to 203,321. However, with the start of World War II in 1941, the population in the City again expanded to approximately 276,000, mainly as the growth of military bases and their populations. Two dam projects took place during the war years. From 1941 to 1943, the City built the San Vicente Dam, a straight axis gravity dam on the San Vicente Creek. While dam construction was delayed by material shortages during World War II, its construction was continued to provide safety and additional water supply for the city and military bases around San Diego. The dam was dedicated with a wooden plaque, due to metal rationing during World War II. From 1943 to 1945, the California Water and Telephone Company constructed the Loveland Dam on the Sweetwater River watershed. The Loveland Dam was a curved gravity dam (Dolan 2004; Fowler 1953; San Diego Union 1943; cited in Murray et al. 2020).

3.1.4 Water Importation and Post-War Development (1947-1960)

The San Diego County Water Authority, consisting of five cities, three irrigation districts, and one public utility district, was organized June 9, 1944, under the County Water Authority Act. The water authority focused on arranging the import of water to the County rather than building new reservoirs. The next stage was to fulfill the City's contract with the United States Bureau of Reclamation and bring Colorado River water to San Diego. As the population of San Diego ballooned from 300,000 in 1940 to over 600,000 in 1944, even the new local water projects like San Vicente Dam were not sufficient to meet the demand. In 1945, construction finally began on the San Diego Aqueduct, which would bring Metropolitan Water District (MWD) water from the Colorado River Aqueduct at the San Jacinto Tunnel to the San Vicente Reservoir. The United States' involvement in World War II limited the City's ability to get adequate amounts of steel and concrete to make a new pipeline or aqueduct, so it opted to branch off the existing MWD Colorado River Aqueduct, which had been completed in 1939. To facilitate this, in 1944, the City of San Diego eventually ceded its rights to Colorado River water, and control of the San Diego County Water Authority to the MWD, thereby becoming entitled to water from the MWD system (City of San Diego 2018; Crawford 2010, 2011; San Diego Union 1944; Fowler 1953; Pourade 1977; USBR 2020; cited in Murray et al. 2020).

After the San Diego Aqueduct route was inspected, contracts were awarded, and W.E. Callahan Construction Company and Gunther & Shirley Company of Los Angeles began work on the project. Given that miners and steel could not be spared under the War Manpower restrictions in effect until January 1946, concrete was chosen as the primary aqueduct material out of necessity. In the fall of 1946, the City contract reassigned the Colorado River water point of delivery from Imperial Dam to Parker Dam and assigned its Colorado River water rights to the MWD (San Diego Union 1945a, 1945b; USBR 2020; cited in Murray et al. 2020).

The San Diego Aqueduct was delayed by a worker's strike in 1946 and again in early 1947. Delays from steel production also set the project back by several months. Despite issues and delays, the project was completed in November 1947, under budget at only $14.1 million versus the $17 million estimated for the project. Water from the Colorado River flowed into San Vicente Reservoir for the first time in late November 1947. The San Diego Aqueduct was dedicated in December of 1947; the San Diego County Water Authority was formally annexed by the MWD and became legally entitled to Colorado River water from the MWD system. The San Vicente Dam was the first dam in the County to receive Colorado River Water (Crawford 2010; San Diego Union 1946, 1947a, 1947b, 1947c, 1947d; cited in Murray et al. 2020).

Forever catching up to its population growth, the City again expanded its water supply in 1950. The population in the City was now 334,387 and 556,808 in the County. In 1950, the City bought the Murray Reservoir from Cuyamaca Water Company. The City also commissioned the Alvarado Filtration plant in 1951, building it beside Murray Reservoir, and decommissioning and demolishing the University Heights Filtration Plant in 1952. Also, in 1952, the City finally revisited the once-promising Sutherland Dam project. The San Diego Water Committee determined that having the water supply was necessary and passed water bonds to fund the project in 1952 for $6.5 million. The dam used Eastwood's originally proposed multiple arch dam design. The largest modification from the 1927 dam design was the addition of reinforced concrete diaphragms, additional struts between buttresses in certain bays, and the omission of struts in other bays. The purpose of these changes was to provide increased seismic stability in the direction of the dam's axis and conform to current practices and requirements of the State Department of Water Resources, Division of Dams. By dividing the dam into rigidly connected groups of buttresses, diaphragms, struts, and arches, separated by more flexible arches in the bays where bracing was omitted, the dam could adapt to higher seismic forces (WDCSD 1957; cited in Murray et al. 2020). Upon completion in 1954, the dam measured 1,020 feet wide for the dam proper and 1,240 feet including the spillway. Its maximum height from streambed to the top of the parapet wall measured 161 feet (Crawford 2011; Fowler 1953; Hennessey 2002; San Diego Union 1954; WDCSD 1957; cited in Murray et al. 2020).

When San Diego began incorporating imported water into the City's supply in 1947, it started a new trend in the City's water storage and management. At the time of its completion, the first San Diego Aqueduct added 65,000 acre-feet/year of water and accounted for 70 to 80 percent of the City's water supply, with the remainder coming from local reservoirs. A second barrel was added to the San Diego Aqueduct in 1954, adding another 65,000 acre-feet/year of water (Durfor and Becker 1964; Fraser 2007; cited in Murray et al. 2020).

In 1958, the City started the Second San Diego Aqueduct project, which also called for the construction of Miramar Dam and Miramar Water Treatment Plant in the Scripps Ranch region. Reservoir water originates from both the Colorado River Aqueduct and the California Aqueduct. On September 15, 1960, Miramar Dam, an earth-filled embankment dam, and the Miramar Filtration plant were dedicated. When the Second San Diego Aqueduct was completed in 1961, it added 200,000 acre-feet/year, but during dry years, the ratio of imported water increased. In 1961, after two drought years, imported Colorado River Water accounted for 92 to 94 percent of the City's water supply (City of San Diego 2018; Crawford 2011; Durfor and Becker 1964; Fraser 2007; Pourade 1977; San Diego Union 1960; cited in Murray et al. 2020).

The California Aqueduct, part of the State Water Project which captured water from the Feather River in Northern California, was approved by voters in 1959 and brought water to the Bay Area (1962), the San Joaquin Valley (1968), and finally, Southern California and San Diego (1972). At the time of construction, the California Aqueduct added 325,000 acre-feet/year of water to San Diego's water supply. Today, roughly 17 percent of San Diego's water supply comes from the State Water Project (Center for Biological Diversity 2020; SDCWA 2020; cited in Murray et al. 2020).

In 1968, the Parks Department took over reservoir recreation from the PUD. Recreation at dams, including fishing, boating, watersport, and picnicking on the reservoir shores, became common occurrences as the Parks Department encouraged the public to utilize the reservoirs' park-like settings. In 1969, the City sold San Dieguito Dam to the San Dieguito and Santa Fe Irrigation District. All dams and reservoirs performed admirably in the floods of 1978 and 1980, preventing considerable flood damage in the City (City of San Diego 2018; Crawford 2011; Pourade 1977; San Diego County Water Authority 2016; cited in Murray et al. 2020).

As the local San Diego population swelled in the late 1970s and 1980s, the region's water use also increased. By 1991, imported water accounted for 95 percent of the City's supply, leaving the City vulnerable to water supply cuts. A severe drought from 1991-1992 caused the MWD to drastically cut water sent to San Diego and other member cities. As a result, in 1992, the City legislature passed a multi-decade plan to diversify the City's water supply and reduce reliance on MWD water. This plan involved rehabilitating reservoirs, adding desalinization plants, reviving groundwater projects, and purchasing imported water from other water companies. While still in progress, this plan intended to provide a more sustainable water solution for the city and end over-reliance on a single source.

The last few decades have seen a few improvements to the source water infrastructure throughout the greater San Diego region. In 2003, the Olivenhain Dam was the first major new dam built in the County of San Diego in more than 50 years. This was followed in 2008 by the Twin Oaks Valley Water Treatment Plant, which went into service near San Marcos. In 2014, a multi-year dam raise project was completed at San Vicente Dam, increasing the reservoir capacity by greater than 150,000 acre-feet. Most recently, in 2015, the Carlsbad Desalination Plant, the largest seawater desalination project in North America, went into service. Today, there are 54 dams in San Diego County, ten of which remain under the City of San Diego's ownership. The City's residents continue to rely on imported water for 75 to 95 percent of its total supply, depending on if there is a drought year or not, but the City's Public Utility Department continues to explore the diversification of water sources, including rehabilitating some older reservoirs to meet demand (SDCWA 2020; Sholders 2002; WNW 2019; cited in Murray et al. 2020).

3.2 UPPER BARRETT LAKE ROAD (BARRETT RESERVOIR COMPLEX)

The Cottonwood Creek watershed, including one of its tributaries, Wilson Creek, was prone to flooding events in the nineteenth and early twentieth centuries. In fact, the devastating 1916 flood destroyed the original Barrett Dam, which was constructed in 1897, and prompted the need for a new larger dam.

Barrett Lake Road, originally a portion of Lyon's Valley Road, was, and continues to be, a main access road to the Barrett Reservoir Complex since the late nineteenth century (Plate 1).

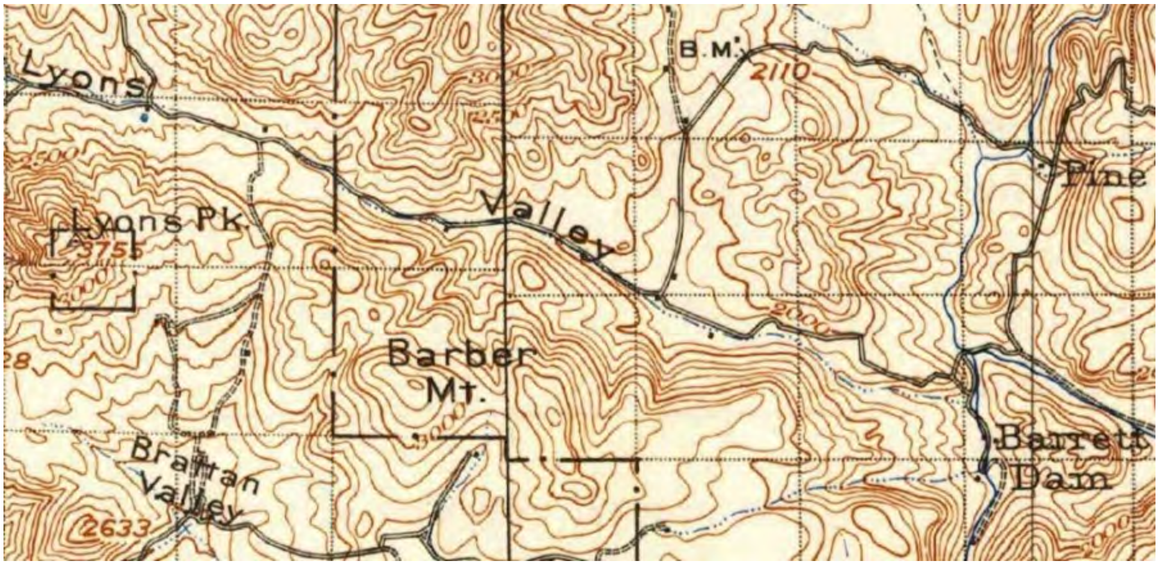


Plate 1. 1903 Cuyamaca topographic map showing Lyons Valley Road to Barrett Dam (USGS 1903). Notice that the southern portion of Barrett Lake Road in the Cottonwood Creek gorge is not yet constructed.

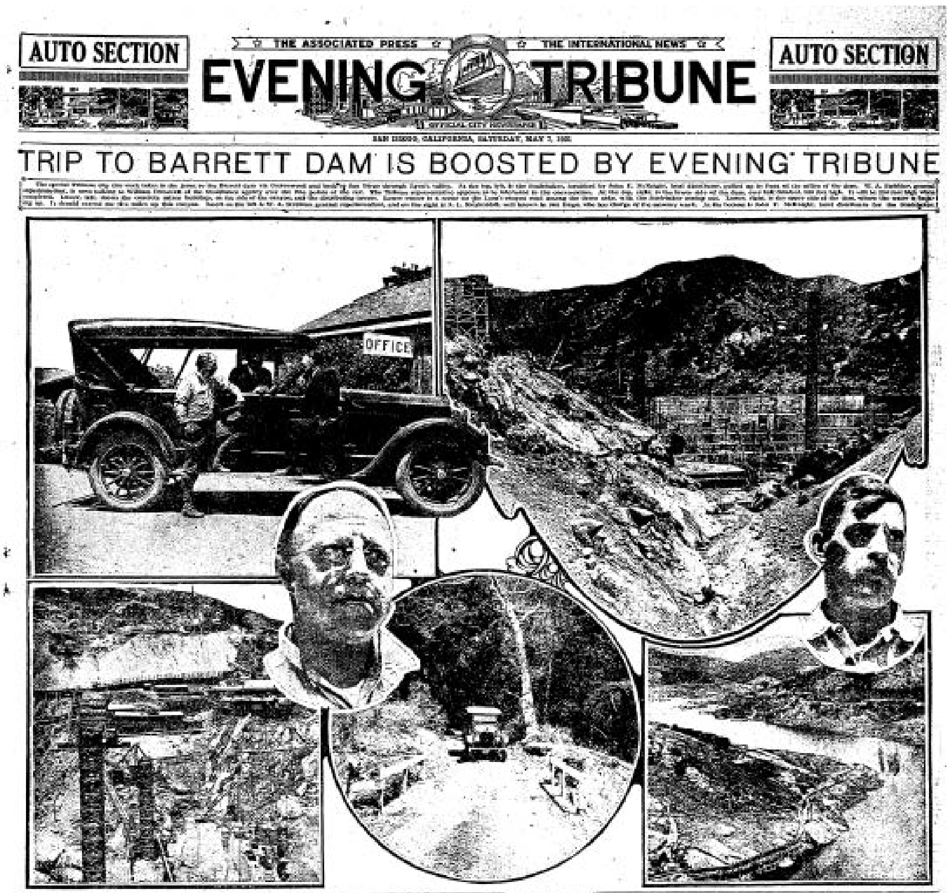
The other segment of Barrett Lake Road runs north by south along the Cottonwood Creek gorge, connecting Imperial Highway (SR 94) (also known as Campo Road) to the Barrett Reservoir Complex. The north by south portion in the gorge was constructed in 1905 by Spreckels during the construction of the earlier Barrett Dam and was named Barrett Lake Road (The Evening Tribune 1919). At some point, the subject segment of Lyon's Valley Road was renamed Barrett Lake Road. Both segments were utilized during the construction of Barrett Dam between 1919 and 1922. The roads allowed for a loop route from the Jamul post office (The Evening Tribune 1919).

The subject segment of Barrett Lake Road is a graded dirt road that curves along Wilson Creek and is surrounded by a native oak forest and remnants of a no longer extant ranch (various barbwire fences and remnant wooden posts). When Barrett Dam construction commenced in 1919, traffic increased on the road. Construction haulers, Barrett Dam camp residents, and sightseers alike utilized the route to access the dam construction site, as shown in Plate 2 (The Evening Tribune 1919).

Dam engineer, H.S. Savage, assured the public in a newspaper article that the "road will be in excellent condition for sightseers as well as dam construction purposes" and he further urged "travel to the dam while it is being constructed" (The Evening Tribune 1919). Barrett Lake Road (Lyon's Valley Road) was improved by the County of San Diego in circa 1921 (The Evening Tribune 1921). In 1922, a newspaper article described Lyon's Valley Road from Barrett Dam to be a "dirt road in good condition but crossed by a number of small streams which do not offer difficulty if care is exercised in driving" (San Diego Union 1922). It is possible that the dam masonry workers who built the dam also built the various stone masonry culverts along the road, as well as the water crossing, since the road was an essential piece of infrastructure for access to the dam construction site and village. The culverts and water crossing made the road safer to travel during heavy rain events.

Once the road was improved it was promoted by automobile enthusiast publications (Plate 3). The road was considered scenic, and it was the recommended route for San Diegans visiting the dam construction camp (The Evening Tribune 1921).

Plate 2. Barrett Dam construction supply pack mules and wagons on Barrett Lake Road (Lyons Valley Road), circa 1920 (Schoenherr 2019:20). Courtesy of the South Bay Historical Society.


AUTO SECTION

THE ASSOCIATED PRESS — THE INTERNATIONAL NEWS

EVENING TRIBUNE

AUTO SECTION

TRIP TO BARRETT DAM IS BOOSTED BY EVENING TRIBUNE

Plate 3. Headline article about the scenic route to Barrett Dam, May 7, 1921 (The Evening Tribune 1921). Courtesy of Genealogy Bank.

3.3 LOWER BARRETT LAKE ROAD (NEWLY DOCUMENTED)

The lower portion of Barrett Lake Road runs north by south along the Cottonwood Creek gorge, connecting Barrett Dam to Campo Road (also known as Imperial Highway, SR 94) at what is known as Barrett Junction. The road was constructed in 1905 by the Southern California Water Company, which was owned by Elisha Babcock and John D. Spreckels. The road was constructed specifically to provide access to the Dulzura Conduit and Barrett dam construction sites. The road was hewn out of the steep rock face. Spreckels sold the Barrett Dam and the Dulzura Conduit to the City of San Diego in 1913. According to a newspaper article, improvements were also made to this access road circa 1921. It appears that additional improvements to the road occurred circa 1920 during the construction of the current Barrett Dam (The Evening Tribune 1919). The article describes the scenic route up the gorge (Plate 4).

Fortunately, there is a good road up the Cottonwood creek gorge, built by the Spreckels interests back in 1905 when they prepared to build a dam there, but additional work must be done by the city to prepare for hauling and fully restore the road to its condition before the big flood of 1916.

Great Scenic Loop

This gorge approach to the Barrett dam site affords one of the finest scenic rides in the county for a six-mile distance up from the Imperial valley highway at Cottonwood. The roadway climbs up along the western side of the gorge and nature has painted a wonderful color scheme on the loft walls with rock and earth and growths. Down in the stream bed great boulders lend a foundation of shining white and blue due to polishing by rushing waters in the rainy season.

Plate 4. Portion of newspaper article about Barrett Lake Road up the Cottonwood gorge (The Evening Tribune 1919).

4.0 SOURCES CONSULTED

4.1 CITY OF SAN DIEGO PUD RECORDS AND ARCHIVE

PUD provided relevant reports related to the reservoir complexes, including the *City of San Diego Source Water System Historic Context Statement*, which was prepared for PUD in June 2020 (Murray et al. 2020).

4.2 RECORDS SEARCH

HELIX obtained a record search of the California Historical Resources Information System from the South Coastal Information Center (SCIC) on June 11, 2020. The records search covered a half-mile radius around each of the proposed project areas and included the identification of previously recorded cultural resources (archaeological and historical resources), locations and citations for previous cultural resources studies, and a review of the OHP historic properties directory.

For a detailed summary of the records search results for the project, please refer to the separate Cultural Resources Report produced by HELIX for this project (Wilson et al. 2021:27-34). For the purposes of this CSDSWS focused study, only previous reports and previously recorded resources associated with the CSDSWS are included in the summary sections below.

4.2.1 Previously Recorded Resources

The historic resources provided in Table 1, *Previously Recorded CSDSWS Related Historic Resources*, are associated with the CSDSWS. Each of these resources have been identified as either contributors or non-contributors to each reservoir complex, as described in Section 5.1. The resources are presented according to their associated reservoir complex and conduit. A few of these resources are outside of the project area, as illustrated in Figures 4a-4m, *Historic Resources,* but are included in this study because they are associated with the larger CSDSWS discontiguous historic district. The DPR 523 Forms for these previously recorded associated resources are included in Appendix D, *SCIC DPR 523 Forms associated with the CSDSWS Historic District*.

Table 1
PREVIOUSLY RECORDED CSDSWS RELATED HISTORIC RESOURCES

Primary Number	Resource	Current Condition	Reservoir Complex/Conduit	Recorder, Date
P-37-025926	Refuse scatters associated with Barrett Dam construction camps	Extant	Barrett	de Barros, 2004
P-37-038717	The lower Barrett Dam, used for storage, is located approximately 1,000 feet downstream from the current Barrett Dam. The foundation for the storage dam was completed in 1898.	Extant	Barrett	Yerka and Shultz, 2018
P-37-031888*	The El Capitan Dam, completed in 1934, is constructed of hydraulic earthen and rock fill. The dam is approximately 1170 feet long, 237 feet high, and 26 feet thick.	Extant	El Capitan	Dalope and Gunderman, 2009; Kaiser 2018b
P-37-038887*	Structure is a northeast-southwest oriented fieldstone wall immediately east of a dirt road. The wall is approximately 2.5-3 feet wide, with a variable height, and is approximately 1,300 to 1,500 feet in length.	Extant	El Capitan	Price et al., 2017
P-37-038888*	Structure is a fieldstone wall measuring 3 to 4 feet wide, with a variable height, and is approximately 958 feet in length.	Extant	El Capitan	Price et al., 2017
P-37-038881*	Historic fieldstone-lined ditch on the north side of an east-west asphalt road. The ditch is approximately 53 feet long and approximately 46 inches wide, with an interior width of 24 to 30 inches.	Extant	El Capitan	Price et al., 2018
P-37-031889*	A wood framed utilitarian building with a rectangular ground plan, wooden cladding, and a corrugated metal side gabled roof.	Extant	El Capitan	Dalope and Gunderman, 2009

Primary Number	Resource	Current Condition	Reservoir Complex/Conduit	Recorder, Date
P-37-038885*	Site consists of the foundations of two houses and accompanying structures. Both structures appear to have been constructed between 1953 and 1967 based on historic aerials.	Extant	El Capitan	Price et al., 2017
P-37-038884	Site consists of a concrete slab, a small concrete block building, a cistern, two small, fenced areas, and a larger fence enclosing the other features. The building was constructed between 1953 and 1964 based on historic aerials.	Extant	El Capitan	Price, Yerka, Kitchen, Sowles, and Soto, 2017
P-37-023709*	The Hodges Flume; built in 1917 to 1919 to transport water from Lake Hodges to the San Dieguito Reservoir. Flume consists of a 4.6-mile-long concrete-lined ditch with 22 associated trestles and six siphons.	Extant	Hodges	Shaefer and Moslak, 2000; Gregory and Bowden-Renna, 2007; AECOM, 2011
P-37-015585	Remains of a residence, possibly the early Dam Keeper's residence, dating to the early twentieth century. Features include stone walls, ceramic stairs and walkways, and a variety of landscaping plants. "August 6, 1927" is inscribed in cement at the base of a stairway.	Site was located during survey	Hodges	York and Mullen, 1996
P-37-037080*	The Morena Dam was finished in 1930 and is a 283.5-foot tall, 550-foot wide loose rockfill structure with a concrete masonry water face.	Extant	Morena	Murray and Hosseini, 2015; Murray, 2015
P-37-016024	Murray Dam Keeper's House constructed between 1910 and 1928.	No longer extant	Murray	Van Wormer, 1998
P-37-024354*	San Vicente Dam. Built in 1941-1943, San Vicente Dam is a concrete gravity section dam with a straight axis. The dam is 199 feet tall, 980 feet long, and 14 feet wide.	Extant	San Vicente	Gustafson, 2002; Gunderman and Dalope, 2009; Corder and Kaiser 2018

Primary Number	Resource	Current Condition	Reservoir Complex/Conduit	Recorder, Date
P-37-011605*	Dulzura Conduit	Extant	Dulzura Conduit	Van Wormer, 1989; Robbins-Wade, 2002; and Tsunoda and DeGiovine, 2007; Iverson, 2009; Droessler, 2013; Gunderman, 2010; Frank 2018

* Within project area

4.3 OTHER ARCHIVAL RESEARCH

Intensive archival research was conducted as needed for any newly identified historic resources included in this study. The following repositories were utilized for historic sources relevant to this study:

- UC Riverside-Water Resources Collections and Archives (photographs, written histories);
- San Diego History Center (building permit records);
- UC San Diego-Special Collections and Archives;
- U.S. Geological Survey (topographic maps); and
- Newspapers.com (newspaper articles).

5.0 METHODS

5.1 PROJECT PERSONNEL

HELIX architectural historian, Annie McCausland, M.A., who meets the Secretary of Interior's Professional Standards for architectural history, served as the principal investigator for architectural history. Ms. McCausland conducted all the historic-built environment surveys and was the primary report author. She also provided senior historian review for subconsultant, IS Architecture (ISA). Kelsey Kaline, M.A., of ISA, who also meets the Secretary of Interior's Professional Standards for architectural history, conducted archival research and evaluated the significance and eligibility of newly documented City of San Diego Source Water System (CSDSWS) historic resources within the project areas. Resumes for key HELIX project personnel are presented in Appendix A.

5.2 SURVEY METHODOLOGY

The historic built environment surveys were conducted by HELIX architectural historian, Ms. Annie McCausland. Dam keepers met with Ms. McCausland on-site and accompanied her during the surveys to provide facility knowledge and resource locations. Survey dates are provided in the list below.

Field investigation consisted of examination and photography of the exterior of the buildings, structures, and features within the reservoir complexes. Field notes included resource descriptions including current conditions, alterations, character-defining features, and integrity. Historic context sources were also noted during the survey, including historic photographs within facilities and facility knowledge from the Dam keepers.

- Barrett Reservoir Complex (July 28, 2020)
- Chollas Reservoir Complex (June 30, 2020)
- Dulzura Conduit (July 28, 2020)
- El Capitan Reservoir Complex (August 11, 2020)
- Hodges Reservoir Complex (August 4, 2020)
- Miramar Reservoir Complex (June 23, 2020)
- Morena Reservoir Complex (July 1, 2020)
- Murray Reservoir Complex (August 6, 2020)
- Rancho Bernardo Reservoir (June 23, 2020)
- San Vicente Reservoir Complex (August 10, 2020)
- Savage (Lower Otay) Reservoir Complex (August 26, 2020)
- Sutherland Reservoir Complex (July 13, 2020)
- Upper Otay Reservoir Complex (June 26, 2020)

5.2.1 Documentation

Each reservoir complex was documented as a historic district on the appropriate DPR 523 Forms, including any associated historic resources and features newly identified during the field surveys. Location and comprehensive sketch maps are included for each reservoir complex, illustrating the historic district boundaries and the location of the contributing resources and features. SCIC data was also incorporated into the updated DPR 523 Forms for each reservoir complex. All completed DPR 523 Forms were submitted to the SCIC and are provided in Appendix E.

6.0 RESULTS

In total, 11 reservoir complexes, one reservoir, and one conduit were surveyed for this project. Each reservoir complex includes a dam and various associated buildings and structures. The following results section provides a summary of each complex and resource based on the *City of San Diego Source Water System Historic Context Statement* and previously documented resources associated with the reservoir complexes on file with the SCIC. Then any newly identified resources associated with the CSDSWS within each complex are summarized. Eligible complexes are referred to as Historic Districts. Historic resources identified within the reservoir complexes, reservoir, and conduit are illustrated in Figures 4a-4m. City of San Diego Source Water System Resource Descriptions

This section provides descriptions of the historical resources (built environment resources and historic archaeological resources) within each reservoir complex, Rancho Bernardo Reservoir, and Dulzura Conduit. Photographs of newly identified resources within each complex are provided. For photographs and detailed descriptions of the previously documented resources within each reservoir complex, please refer to the *City of San Diego Source Water System Historic Context Statement* report, provided in

Source: Aerial (NearMap, 2019)

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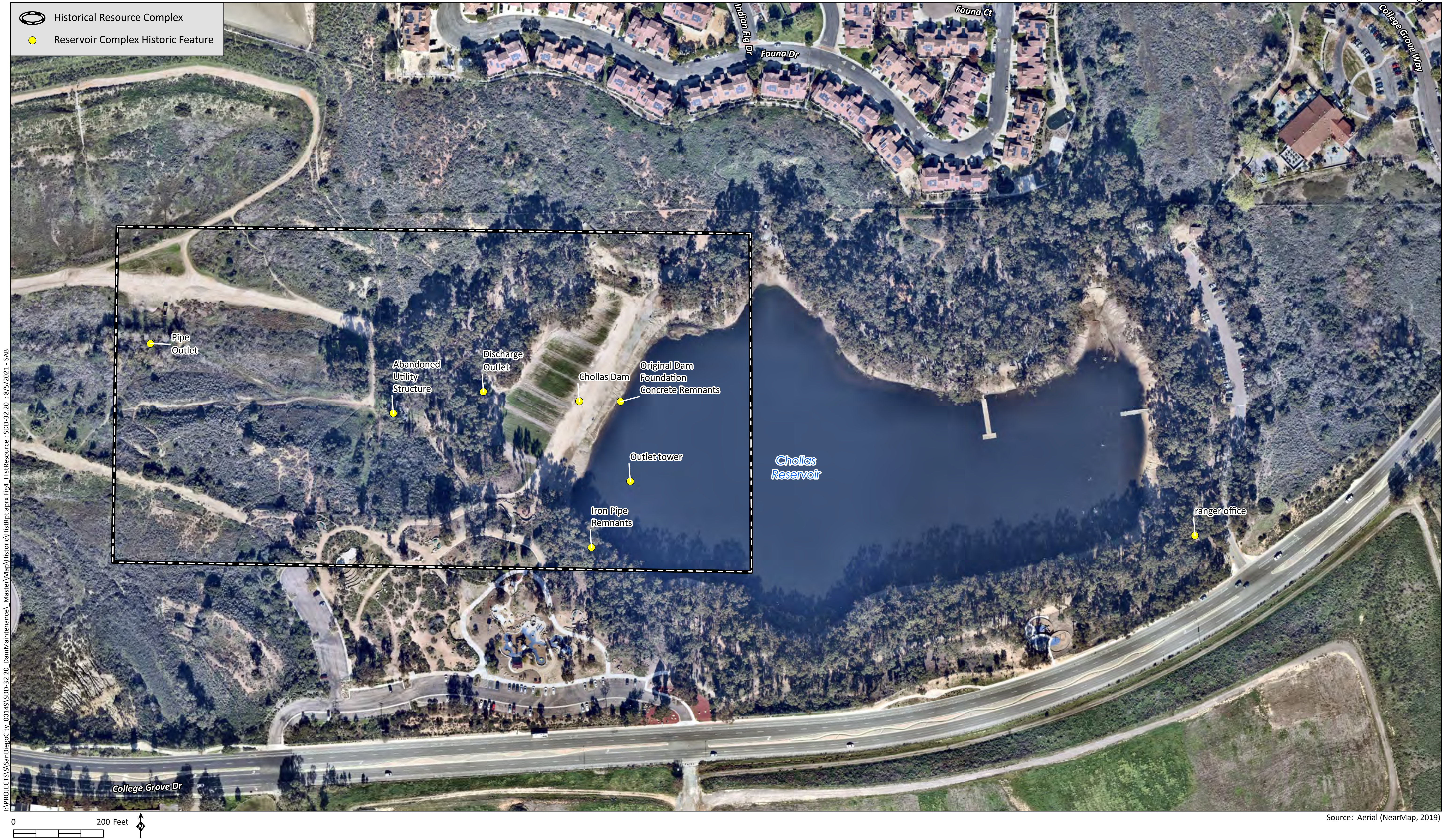
HELIX Environmental Planning

Historic Resources - Barrett Reservoir Complex

Figure 4a



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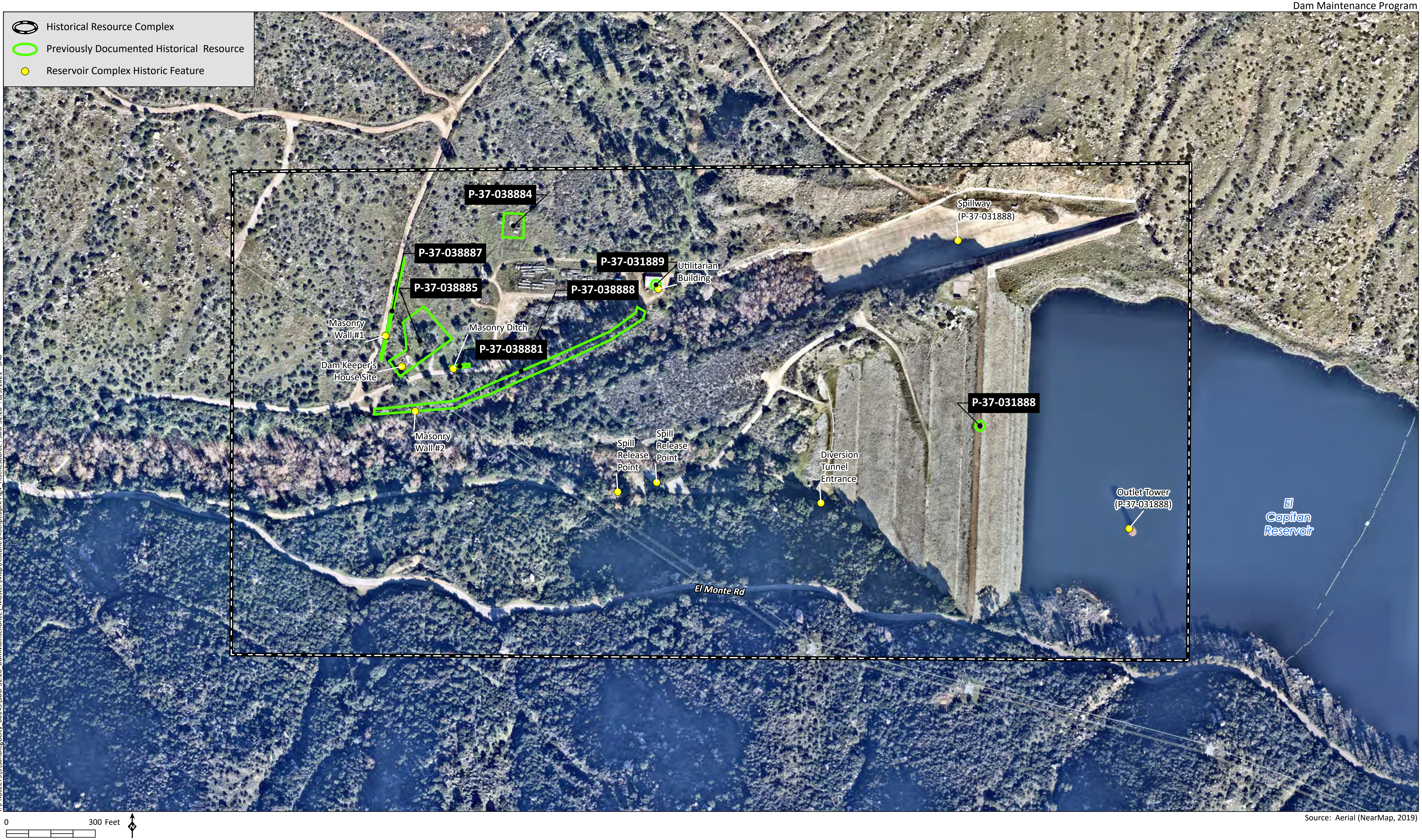
Source: Aerial (NearMap, 2019)

HELIX Environmental Planning

Historic Resources - Chollas Reservoir Complex

Figure 4b



Source: Aerial (NearMap, 2019)

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HELIX Environmental Planning

Historic Resources - El Capitan Reservoir Complex

Figure 4c

0 600 Feet

Source: Aerial (NearMap, 2019)

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HELIX
Environmental Planning

Historic Resources - Hodges Reservoir Complex

Figure 4d

Source: Aerial (NearMap, 2019)

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HELIX Environmental Planning

Historic Resources - Miramar Reservoir Complex

Figure 4e

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Source: Aerial (NearMap, 2019)

HELIX
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Historic Resources - Morena Reservoir Complex

Figure 4f

HELIX Environmental Planning

Historic Resources - Murray Reservoir Complex

Figure 4g

Source: Aerial (NearMap, 2019)

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Historic Resources - Rancho Bernardo Reservoir

Figure 4h

HELIX Environmental Planning

Historic Resources - San Vicente Reservoir Complex

Figure 4i

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Source: Aerial (NearMap, 2019)

HELIX
Environmental Planning

Historic Resources - Sutherland Reservoir Complex

Figure 4j

Source: Aerial (NearMap, 2019)

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HELIX Environmental Planning

Historic Resources - Lower Otay Reservoir Complex

Figure 4k

0 200 Feet

Source: Aerial (NearMap, 2019)

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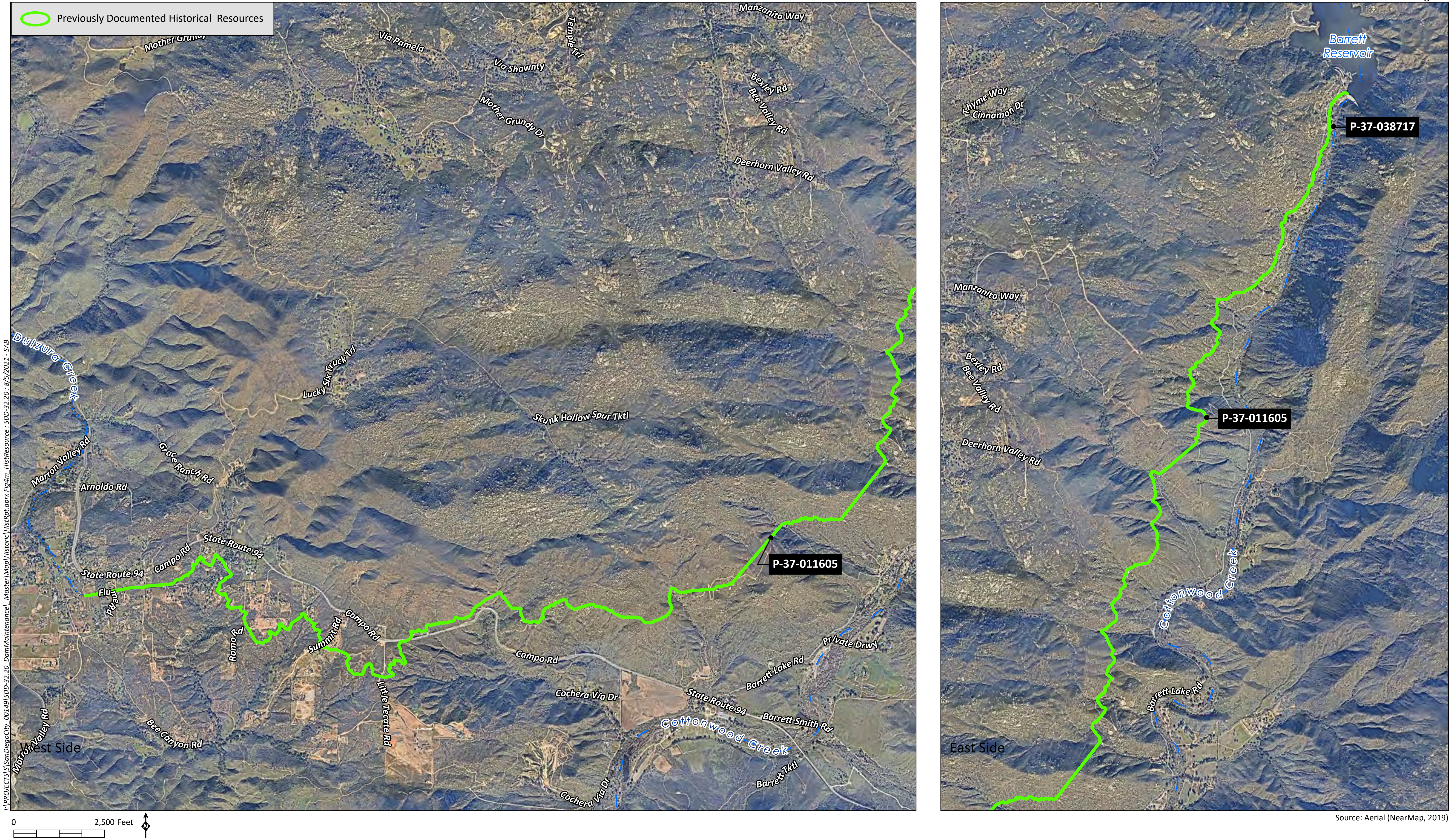
HELIX Environmental Planning

Historic Resources - Upper Otay Reservoir Complex

Figure 4l



Source: Aerial (NearMap, 2019)

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HELIX Environmental Planning

Historic Resources - Dulzura Conduit

Figure 4m

Appendix C. Previously documented resource DPR 523 forms, not included in Dudek's 2020 report but associated with the CSDSWS, are included in Appendix D. Reservoir Complex Historic District DPR 523 Form updates and other appropriate updates are included in Appendix E.

6.1 BARRETT RESERVOIR COMPLEX HISTORIC DISTRICT

Barrett Reservoir Complex was documented in June 2018 for the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020). The Barrett Reservoir Complex, as identified in 2018, includes the following contributing resources: Barrett dam, outlet tower, spillway, two dam keeper's houses, two pump houses, remnants of a flume, a powder magazine, and a picnic area featuring a concrete foundation and rubble masonry (Kaiser 2018a).

This study identifies previously documented and evaluated Lower Barrett Dam (P-37-038717), and the newly identified and documented Barrett Lake Road (upper and lower), as contributing historical resources within the Barrett Reservoir Complex Historic District and the CSDSWS discontiguous Historic District.

Please refer to the Barrett Reservoir Complex DPR 523 Forms provided in Appendix C and the Historic District update in Appendix E. Resource locations are provided in Figure 4a, *Historic Resources – Barrett Reservoir Complex*.

6.1.1 Lower Barrett Dam (P-37-038717)

Another dam, known as Lower Barrett Dam (P-37-038717), is located downstream of the Barrett Dam, and was documented in 2018 for the *Historical Resources Survey for the Barrett Dam Drainpipe Replacement Project* (Yerka and Shultz 2018). The masonry dam, originally called the Bear Canyon Dam, was constructed in 1897 by the Southern California Mountain Water Company (Kaiser 2018a). The 2018 study found the resource as part of the larger Otay-Cottonwood water storage system and recommended it eligible for the NRHP and CRHR under Criteria A/1 for its role in the development of San Diego water infrastructure (Zepeda-Herman and Price 2018:23). Based on these findings, it appears that Lower Barrett Dam should be a considered a contributor to the Barrett Reservoir Complex Historic District. A photograph of the dam in 2018 is provided in Plate 5, and a historic photograph of the dam is provided in Plate 6. The 2018 DPR 523 form is included in Appendix D, and it is also included in the DPR 523 form update for the Barrett Reservoir Complex Historic District, provided in Appendix E.

Plate 5. Lower Barrett Dam, 2018 (Zepeda-Herman and Price 2018:1).

Plate 6. Photograph of the earlier Barrett Dam in 1898 (Kaiser 2018a:12). Courtesy of the PUD Archives.

6.1.2 Upper Barrett Lake Road (Newly Documented)

Upper Barrett Lake Road is a newly identified historic resource associated with the CSDSWS and was documented during this study. This graded dirt road connects Lyons Valley Road to the Barrett Dam complex. It runs approximately 3.89 miles from Lyons Valley Road to the crest of Barrett Dam. The road features a series of masonry culverts and a water crossing and appears to be a contributor to the Barrett Reservoir Complex Historic District (Plates 7 and 8). The updated DPR 523 Form for Barrett Reservoir Complex Historic District, including Upper Barrett Lake Road, is included in Appendix E.

Plate 7. Masonry water crossing on Barrett Lake Road, looking west.

Plate 8. Masonry culvert located on Barrett Lake Road, looking south.

It appears that this segment of Barrett Lake Road was improved circa 1921 as a part of the larger Barrett Dam construction project sponsored by the City of San Diego between 1916 and 1928. The road is unchanged from circa 1921, and it conveys the feeling of an early twentieth-century rural automobile route. Driving the road to Barrett Dam sets the stage for the historical significance of the Barrett Dam

Reservoir Complex and is recommended to be a contributing resource within the Barrett Reservoir Complex Historic District.

6.1.3 Lower Barrett Lake Road (Newly Documented)

Lower Barrett Lake Road, an approximately 6.3-mile two-lane road, runs from Campo Road in its southernmost end to the Barrett Dam to the north. Portions of the road are paved with asphalt, and others are graded dirt, and several gates are located along the alignment. The road was constructed in 1905 to provide access to the Dulzura Conduit and the Barrett Dam site in the early twentieth century and appears to be a contributor to the Barrett Reservoir Complex Historic District (Plate 9). The updated DPR 523 Form for Barrett Reservoir Complex Historic District, including Lower Barrett Lake Road, is included in Appendix E.

Plate 9. Lower Barrett Lake Road traverses along the west side of Cottonwood Creek Gorge on the mountain side, looking south.

6.1.4 Refuse Scatter: "BL-1" (P-37-025926)

This resource was initially recorded as consisting of five historic trash scatters associated with the former location of at least five married employees' cottages within the Barrett Dam construction camp (de Barros 2004). Artifacts dated between 1918 and 1929 and include cans, bottles, and ceramic sherds.

During the current survey, the site location was reidentified, but the recorded features were not visible along the graded dirt roads within the project area. Only a few fragments of ceramics were found in push piles left from grading. No other associated artifacts were identified during the survey within the project area.

The original DPR 523 form is included in Appendix D, and the updated form is included in Appendix E. This resource does not appear to be a contributor to the Barrett Reservoir Complex Historic District.

6.2 CHOLLAS RESERVOIR COMPLEX (NEWLY DOCUMENTED)

Chollas Reservoir Complex was documented and evaluated by ISA for this project. The Chollas Reservoir Complex includes an earthen-embankment dam, outlet tower, original dam concrete foundation remnants, discharge outlet, iron pipe remnants, abandoned utility structure, and a pipe outlet. ISA's study, *Historic Context Statement and Evaluation of Chollas Reservoir Complex and Rancho Bernardo Reservoir*, recommends the Chollas Reservoir Complex as not eligible for the NRHP, CRHR, and the CSDHRR. The full report and DPR 523 Forms for the Chollas Reservoir Complex is included in Appendix B. For a more detailed description of the historic resources within the complex, please refer to the Chollas Reservoir Complex DPR 523 Forms provided in Appendix B. Historic resource locations within the complex are provided in Figure 4b, *Historic Resources – Chollas Reservoir Complex*.

6.3 EL CAPITAN RESERVOIR COMPLEX HISTORIC DISTRICT

El Capitan Reservoir Complex was documented in June 2018 for the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020). The El Capitan Reservoir Complex, as identified in 2018, includes the following contributing resources: El Capitan dam, spillway, flume remnants, storage structure, keeper's house foundations and remnants, a bronze commemorative plaque, and outlet tower (Kaiser 2018b). Please refer to the El Capitan Reservoir Complex DPR 523 Forms provided in Appendix C. The updated record in Appendix E documents the complex as a historic district. Historical resource locations within the complex historic district are provided in Figure 4c, *Historic Resources – El Capitan Reservoir Complex*. It is important to note that one contributing resource within the complex, the flume remnants, identified in 2018, was not located during the project survey because locational data was not available in the previous documentation (Murray et al. 2020).

A few of the contributing resources within the El Capitan Complex Historic District were previously documented resources, prior to the 2018 documentation. These resources are included in the DPR 523 form update for the El Capitan Reservoir Complex Historic District. A few previously documented historic resources, including fieldstone walls and a ditch, appear to be associated with the dam keeper's house site and are included in the El Capitan Reservoir Complex Historic District for this study. No newly identified resources were encountered during the project survey.

6.3.1 El Capitan Dam and Reservoir (P-37-031888)

The El Capitan dam and reservoir were initially documented in 2009 during an assessment of indirect visual impacts for the San Diego Gas & Electric Sunrise Powerlink (Dalope and Gunderman 2009c). The dam is a contributing resource to the larger El Captain Reservoir Complex Historic District and the CSDSWS Historic District. The DPR 523 Form is included in Appendix D.

6.3.2 Fieldstone Wall: "8863-NDY-1" (P-37-038887)

This previously recorded fieldstone wall was initially documented in 2017 (Price et al. 2017a). The wall appears to be a remnant of the El Capitan dam keeper's house site and is included in the 2018 El Capitan Reservoir Complex documentation (Kaiser 2018b). This resource appears to be a contributor to the El

Capitan Reservoir Complex Historic District. Please refer to the DPR 523 form provided in Appendix C and D.

6.3.3 Fieldstone Wall: "8863-NDY-2" (P-37-038888)

This previously recorded fieldstone wall was initially documented in 2017 (Price et al. 2017b). The wall appears to be a remnant of the El Capitan dam keeper's house site and is possibly a contributing resource to the larger El Captain Reservoir Complex Historic District. Please refer to the DPR 523 form provided in Appendix D.

6.3.4 Concrete Building: "8863-HJP-1" (P-37-038884)

This previously recorded site consists of a concrete slab, a small concrete block building, a cistern, two small, fenced areas, and a larger fence enclosing the other features. The building was constructed between 1953 and 1964, based on historic aerials (Price et al. 2017c). It is unclear what this site is associated with. The site is outside of the project area, and it is unclear if it is a contributing resource to the larger El Captain Reservoir Complex. Please refer to the DPR 523 form provided in Appendix D.

6.3.5 House Remnants: "8863-HJP-2" (P-37-038885)

This previously recorded site consists of the foundations of two houses and accompanying structures. Both structures appear to have been constructed between 1953 and 1967, based on historic aerials (Price et al. 2017d). The site appears to be the El Capitan dam keeper's house site and is included in the 2018 El Capitan Reservoir Complex documentation (Kaiser 2018b). Please refer to the DPR 523 forms provided in Appendix C and D.

6.3.6 Fieldstone-Lined Ditch: "8863-BAO-4" (P-37-038881)

This previously recorded historic fieldstone-lined ditch is located on the north side of an east-west asphalt road. The ditch is approximately 53 feet long and approximately 46 inches wide, with an interior width of 24 to 30 inches (Price et al. 2018). The ditch appears to be part of the El Capitan dam keeper's house site and is possibly a contributing resource to the larger El Captain Reservoir Complex. Please refer to the DPR 523 form provided in Appendix D.

6.3.7 Utilitarian Building: "402-070-05" (P-37-031889)

This previously recorded wood-framed utilitarian building is a contributing resource within the El Capitan Reservoir Complex Historic District, as identified in the 2018 El Capitan Reservoir Complex documentation (Dalope and Gunderman 2009; Kaiser 2018b). Please refer to the DPR 523 forms provided in Appendices C and D.

6.4 HODGES RESERVOIR COMPLEX HISTORIC DISTRICT

Hodges Reservoir Complex was documented in June 2018 for the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020). The Hodges Reservoir Complex includes the following contributing resources: Hodges Dam and integrated spillway, flume remnants, a utility shed, Quonset hut and shed, dam keeper's house, public outreach display, and a culvert with associated foundation (Kaiser 2018c). The dam keeper's house has been recently demolished and is no longer extant. Please refer to the Hodges Reservoir Complex DPR 523 form provided in Appendix C and the Historic District update provided in Appendix E. Historical resource locations within the complex historic district are provided in Figure 4d, *Historic Resources – Hodges Reservoir Complex*.

Other Hodges Reservoir Complex Historic District related resources were identified during this study. These resources are described in detail below.

6.4.1 Dam Keeper's House Site: "LH-2" (P-37-015585)

During the survey on August 4, 2020, for this study, the original dam keeper's residence site was identified (P-37-015585), which was previously documented in 1996 (York and Mullen 1996). This site appears to be a contributing resource within the Hodges Reservoir Complex Historic District. The current dam keeper, Conway Bowman, identified the site as the original dam keeper's house site (Plate 10). Please refer to the DPR 523 form provided in Appendix D and the Hodges Reservoir Complex Historic District record provided in Appendix E.

Plate 10. Original Hodges dam keeper's house, 1936 (Courtesy of the City of San Diego Public Utilities Department Archives).

6.4.2 Lake Hodges Flume (P-37-023709)

Lake Hodges Flume, a 4.6-mile-long water conveyance structure, was found eligible for the CRHR and NRHP in 2000 (Schaefer and Moslak 2000). The DPR 523 Form from the year 2000 is included in Appendix D. Historic American Engineering Record documentation was completed in 2002. Portions of the flume are still extant and are considered contributing to the Hodges Reservoir Complex in the 2018 documentation of the complex (Kaiser 2018c). This resource is a contributor to the Hodges Reservoir Complex Historic District and is included in the DPR 523 Form update provided in Appendix E. Masonry and Concrete Structures: "ASM5660-3" (P-37-019224)

Two masonry structures, and a concrete pad, were documented in 2000 (Moslak 2000). The DPR 523 Form from the year 2000 is included in Appendix D. They were identified as structures possibly associated with the construction of Hodges Dam or Lake Hodges Flume. These structures were included in the 2018 documentation of the Hodges Reservoir Complex (Kaiser 2018c). A portion of one of the masonry structures was identified during the survey for this project (Plate 11). The site was inaccessible due to heavy vegetation on the hillside, but a portion was visible from the road. It appears that only a small remnant of the structures remains; therefore, this study does not recommend this resource to be a contributor to the Hodges Reservoir Complex Historic District. A DPR 523 Form update was prepared and is included in Appendix E.

Plate 11. Remnant of masonry structure, looking north.

6.5 MIRAMAR RESERVOIR COMPLEX

Miramar Reservoir Complex was documented in June 2018 for the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020). The Miramar Reservoir Complex, including the Miramar dam, overflow spillway culvert, outlet tower, and Miramar Filtration Plant, was found not individually eligible for the NRHP, CRHR, and the CSDHRR, nor was it found to be a contributor to the larger CSDSWS Historic District (Kaiser 2018d). Therefore, the Miramar Reservoir Complex is not considered a historical resource for the purposes of CEQA. Please refer to the Miramar Reservoir Complex DPR 523 Forms provided in Appendix C for the complete description and evaluations. Historic resource locations within the complex are provided in Figure 4e, *Historic Resources – Miramar Reservoir Complex.*

No new resources associated with the Miramar Reservoir Complex were identified during the project survey, and there were no previously recorded resources to incorporate into the documentation.

6.6 MORENA RESERVOIR COMPLEX HISTORIC DISTRICT

Morena Reservoir Complex was documented in June 2015 for the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020). The Morena Reservoir Complex includes the following contributing resources: Morena dam, spillway, and outlet tower (Murray 2015). Please refer to the Morena Reservoir Complex DPR 523 form provided in Appendix C and the Historic District update provided in Appendix E. Historical resource locations within the complex historic district are provided in Figure 4f, *Historic Resources – Morena Reservoir Complex.*

The Morena Dam and Outlet Tower had been previously documented in 2015 (Murray and Hosseini 2015).

Newly identified resources within the Morena Reservoir Complex Historic District were located during the project survey. These resources are described in detail below.

6.6.1 Morena Dam and Outlet Tower (P-37-037080)

Morena Reservoir Complex was documented in June 2015 for the *Cultural/Historical Resource Technical Report: Morena Reservoir Outlet Tower Replacement Project* (Murray et al. 2016). The Morena Reservoir Complex, as identified in 2015, includes the following contributing resources: Morena dam, spillway, and outlet tower (Murray and Hosseini 2015). The dam, spillway, and outlet tower are all contributors to the Morena Reservoir Complex Historic District. This DPR 523 Form is included in Appendix D.

6.6.2 Morena Dam Lower Weir

The Morena dam lower weir is located downstream from the dam at the bottom of the Cottonwood Creek canyon. The concrete weir was recently replaced with a new metal measuring device in 2020 (Plate 12). The board-formed concrete approach channel walls appear to be constructed circa 1913. The lower weir appears to be a contributor to the Morena Reservoir Complex Historic District and is included in the DPR 523 Form update in Appendix E.

Plate 12. Morena dam weir with modern metal measuring device, looking east.

6.6.3 Morena Dam Upper Weir, Outlet Tunnel and Outlet Gate

The upper weir, outlet tunnel, and outlet iron gate are located on the downstream face of the dam and are accessible via a single-track dirt path. The iron gate is lying on the ground near the outlet tunnel and upper weir (Plates 13 and 14). The iron gate appears to be the appropriate size to fit and cover the tunnel entrance (Plate 15). The upper weir, outlet tunnel, and outlet gate appear to be contributors to the Morena Reservoir Complex Historic District and is included in the DPR 523 Form update in Appendix E.

Plate 13. Upper weir and iron outlet gate, looking from above, facing west. The outlet gate is laying on the south side of the weir (left side of the photo).

Plate 14. Outlet tunnel iron gate.

Plate 15. Outlet tunnel entrance, looking southeast.

6.6.4 Morena Dam Construction Artifacts

Various artifacts were identified on the downstream face of the dam that appear to be associated with the construction of the dam. These artifacts include iron buckets and other iron objects and tools (Plates 16 and 17). A sand dredger machine is also located in the reservoir near the upstream face of the dam (Plate 18). According to the dam keeper, sometimes the dredger is not visible due to fluctuating water levels. These historic objects appear to be contributing features of the Morena Reservoir Complex Historic District and are included in the DPR 523 Form update in Appendix E.

Only the sand dredger is highlighted on Figure 4f, *Historic Resources – Morena Reservoir Complex.*

Plate 16. Iron remnants on the downstream face of the dam, looking northwest.

Plate 17. Iron buckets on the downstream face of the dam, looking southeast.

Plate 18. Sand dredging machine, looking east.

6.7 MURRAY RESERVOIR COMPLEX HISTORIC DISTRICT

Murray Reservoir Complex was documented in June 2018 for the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020). The Murray Reservoir Complex includes the following contributing resources: Murray dam, outlet tower, a bronze commemorative plaque, and stairwell down to the overflow outlet (Frank, 2018b). Please refer to the Murray Reservoir Complex DPR 523 form provided in Appendix C for the complete description and evaluation. The Historic District DPR 523 Form update is provided in Appendix E. Historical resource locations within the complex historic district are provided in Figure 4g, *Historic Resources – Murray Reservoir Complex*.

One resource associated with the Murray Reservoir Complex Historic District was identified during this study and is discussed below.

6.7.1 Murray Dam Keeper's House (P-37-016024)

The Murray Dam Keeper's House was documented in 1998 (Van Wormer 1998). The house is no longer extant and is not a contributing resource within the Murray Reservoir Complex Historic District (Plate 19). A DPR 523 Form update was prepared for this resource and is provided in Appendix E.

Plate 19. Murray Dam Keeper's House site, looking north.

6.8 RANCHO BERNARDO RESERVOIR (NEWLY DOCUMENTED)

Rancho Bernardo Reservoir was documented and evaluated by ISA for this project. The Rancho Bernardo Reservoir is a 10-million-gallon, gravity-fed reservoir that provides drinking water storage for the community of Rancho Bernardo. The reservoir includes an overflow concrete box structure and an inlet-outlet line pipe. ISA's study, *Historic Context Statement and Evaluation of Chollas Reservoir Complex and Rancho Bernardo Reservoir*, recommends Rancho Bernardo Reservoir not eligible for listing in the NRHP, CRHR, or the CSDHRR. For the complete description and evaluation please refer to the report and DPR 523 Forms provided in Appendix B. A map of the facility is provided in Figure 4h, *Historic Resources – Rancho Bernardo Reservoir*.

6.9 SAN VICENTE RESERVOIR COMPLEX HISTORIC DISTRICT

San Vicente Reservoir Complex was documented in June 2018 for the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020). The San Vicente Reservoir Complex includes the following contributing resources: San Vicente dam, incorporated outlet tower, incorporated spillway, a commemorative plaque, ice house, keeper's house, keeper's office, auxiliary structure, concrete mixer and batching plant foundation, San Diego Aqueduct outlet structure, and the Mussey Grade Road (Old Julian Highway) (Corder and Kaiser 2018). Please refer to the San Vicente Reservoir Complex DPR 523 form provided in Appendix C and the historic district update provided in Appendix E. Resource locations are provided in Figure 4i, *Historic Resources – San Vicente Reservoir Complex.*

The 2018 DPR 523 Form does not include photographs or descriptions of the following contributing resources: the keeper's office and auxiliary structure, which are located in the downstream valley of the dam. Here are photos of these contributing resources within the San Vicente Complex Historic District (Plates 20 and 21).

One new resource was identified during the project survey. The resource is a Quonset hut which is discussed below.

Plate 20. Dam keeper's office, looking southeast.

Plate 21. Auxiliary structure, looking north.

6.9.1 San Vicente Dam and Reservoir (P-37-024354)

The San Vicente Dam and Reservoir were first documented in 2002 (Gustafson 2002). In 2009, a DPR 523 Form update was completed for the San Vicente Dam and Reservoir (Dalope and Gunderman 2009). These earlier DPR 523 Forms are provided in Appendix D. In 2014, a multi-year dam raise project was completed at San Vicente Dam, increasing the reservoir capacity by greater than 150,000 acre-feet. The 2020 study found San Vicente Dam eligible for listing in all the historic registers despite this significant alteration to the historic dam. The San Vicente Dam and Reservoir are contributing resources within the San Vicente Reservoir Historic District.

6.9.2 Old Julian Highway (P-37-026974)

Old Julian Highway is included in the 2018 documentation of the San Vicente Reservoir Complex; however, it is referred to as Mussey Grade Road (Corder and Kaiser 2018). Old Julian Highway is a contributing historical resource within the San Vicente Reservoir Complex Historic District. Old Julian Highway was first documented in 2005 and later in 2009 (Van Wormer 2005; Williams 2009). These DPR 523 Forms are provided in Appendix D.

6.9.3 Quonset Hut (Newly Identified)

Another storage structure was identified during the project survey. The structure is a Quonset hut currently used for storage and appears to be associated with the dam keeper’s office and storage structure constructed circa 1940 (Plates 22 and 23). Due to its age and association with the adjacent dam keeper’s office, the Quonset hut appears to be a contributing historical resource within the San Vicente Reservoir Complex Historic District and is included in the DPR 523 Form update in Appendix E.

Plate 22. Primary south façade of Quonset hut, looking north.

Plate 23. Interior view of Quonset hut, looking north.

6.10 SUTHERLAND RESERVOIR COMPLEX

The Sutherland Reservoir Complex was documented in June 2018 for the City of San Diego Source Water System Historic Context Statement (Murray et al. 2020). The Sutherland Reservoir Complex, including the Sutherland dam, spillway, support structures, depth gauge, structure foundations, and bridge, was found not individually eligible for the NRHP, CRHR, and the CSDHRR, nor was it found to be a contributor to the larger CSDSWS Historic District (Frank and Corder 2018). Therefore, the Sutherland Reservoir Complex is not considered a historic resource for the purposes of CEQA. Please refer to the Sutherland DPR 523 form provided in Appendix C. Historic resource locations within the complex are provided in Figure 4j, *Historic Resources – Sutherland Reservoir Complex*.

No new resources associated with the Sutherland Reservoir Complex were identified during the project survey, and there were no previously recorded resources to incorporate into the documentation.

6.11 LOWER OTAY (SAVAGE) RESERVOIR COMPLEX HISTORIC DISTRICT

Lower Otay (Savage) Reservoir Complex was documented in June 2018 for the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020). The Lower Otay (Savage) Complex includes the following contributing resources: Lower Otay dam, outlet tower, spillway, original dam remnants, and a powder magazine (Kaiser 2018e). Please refer to the Lower Otay (Savage) Reservoir Complex DPR 523 Forms provided in Appendix C and the historic district update provided in Appendix E.

Historical resource locations within the complex historic district are provided in Figure 4k, *Historic Resources – Lower Otay (Savage) Reservoir Complex*, for historical resource locations.

Photographs of the original dam remnants and the identified powder magazine were not included in the 2018 DPR 523 Forms. Below are a few photos of these contributing resources within the Lower Otay (Savage) Reservoir Complex Historic District (Plates 24, 25, 26, 27).

Another power magazine and bridge remnants near the spillway were identified during the survey and are described in more detail in the sections below. It appears that the second powder magazine and the bridge remnants are also contributors to the Lower Otay (Savage) Reservoir Complex Historic District.

Plate 24. Original dam concrete infrastructure.

Plate 25. Original dam concrete infrastructure remnant, looking south.

Plate 26. Original dam concrete infrastructure remnant, looking southwest.

Plate 27. Powder magazine #2, looking south.

6.11.1 Powder Magazine #1 (Newly Identified)

What appears to be another powder magazine structure was identified during the project survey (Plate 28). This structure appears to be a contributor to the Lower Otay (Savage) Reservoir Complex Historic District and is included in the District record update provided in Appendix E.

Plate 28. Powder magazine #1 entry.

6.11.2 Highway Bridge Remnants (Newly Identified)

Bridge remnants across the Lower Otay (Savage) spillway were identified during the project survey. Concrete bridge approach slabs are extant on the east and west sides of the spillway (Plates 29, 30, and 31). Wooden posts, possibly remnants of a fence, are extant on the east side of the spillway, near the concrete approach way (Plate 31). Concrete pier remnants are attached to the floor of the spillway in alignment with the concrete approach slabs (Plate 32). The bridge is illustrated in the 1916 plans by Hiram N. Savage (Plate 33). It appears that these bridge remnants are contributing resources within the Lower Otay (Savage) Reservoir Complex, and they are included in the Lower Otay (Savage) Complex Historic District record provided in Appendix E.

Plate 29. Concrete approach slab on the west side of the spillway, looking north.

Plate 30. Close up of concrete approach slab with layer of rocks and a top layer of asphalt, looking southeast.

Plate 31. Concrete approach slab and wooden posts and fence remnants on the east side of the spillway, looking northeast.

Plate 32. Concrete bridge pier remnants extant on the concrete floor of the spillway, looking east.

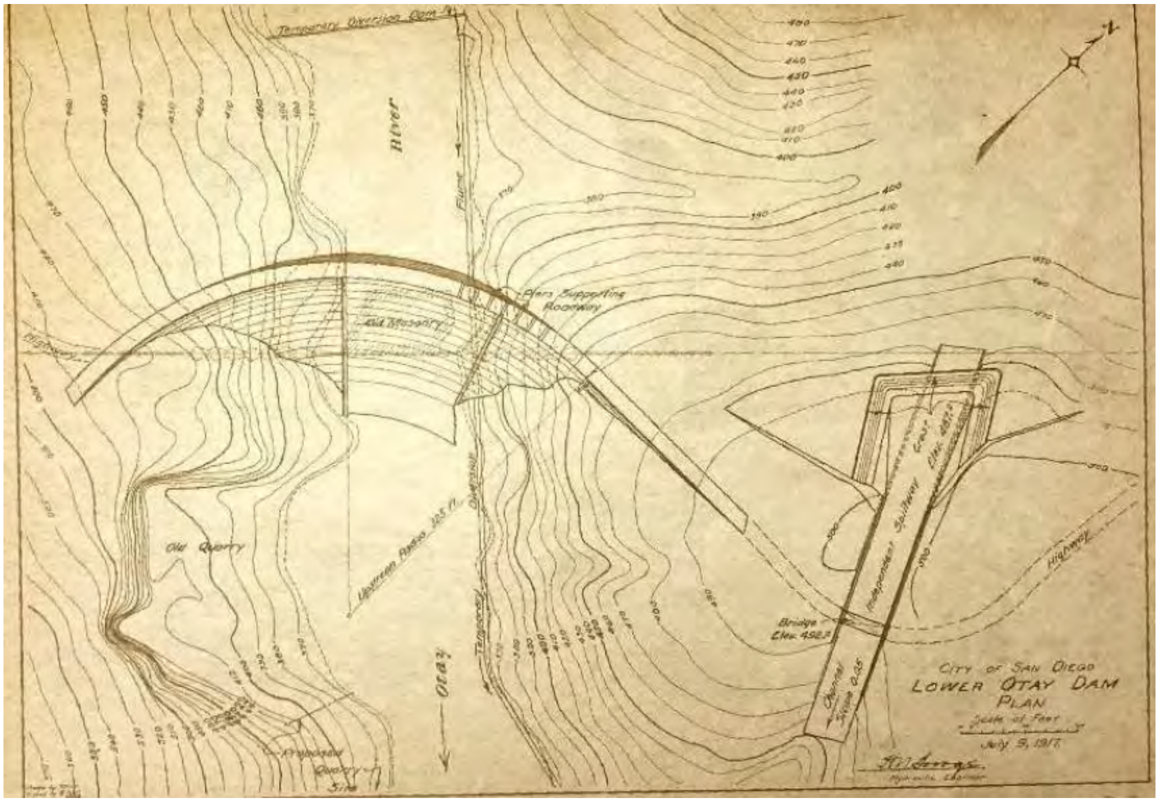

Plate 33. Lower Otay Dam plan by Hiram N. Savage, 1916. Notice the highway bridge across the spillway (Murray et al. 2020:39).

6.12 UPPER OTAY RESERVOIR COMPLEX HISTORIC DISTRICT

Upper Otay Reservoir Complex was documented in May 2018 for the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020). The Upper Otay Reservoir Complex includes the following contributing resources: Upper Otay dam, spillway, and the Otay Lakes Road underpass (Corder 2018). Please refer to the Upper Otay Reservoir Complex DPR 523 form provided in Appendix C for complete resource descriptions as well as the historic district update provided in Appendix E. Historical resource locations within the complex historic district are provided in Figure 4l, *Historic Resources – Upper Otay Complex*.

No new resources associated with the Upper Otay Reservoir Complex Historic District were identified during the project survey, and there were no previously recorded resources to incorporate into the documentation.

6.13 DULZURA CONDUIT

Dulzura Conduit was documented in June 2018 for the *City of San Diego Source Water System Historic Context Statement* (Murray et al. 2020). The Dulzura Conduit is a linear resource that extends approximately 13.38 miles from the southern side of Barrett Dam downhill to Lower Otay (Savage) reservoir. The conduit features various segments of formed concrete trenches, metal trestle supported flumes, and concrete-lined tunnels. There do not appear to be any remaining timber trestle structures (Frank 2018a). The timber flumes and trestles were replaced with metal flumes and trestles, as shown in

Plate 34. Please refer to the Dulzura Conduit DPR 523 forms provided in Appendices C and D for complete resource descriptions and the update provided in Appendix E. The footprint of this linear resource is illustrated in Figure 4m, *Historic Resources – Dulzura Conduit*.

During the project survey, a timber support structure was identified within Tunnel 2 (Plates 35 and 36). This might be one of the last remaining portions of the Dulzura Conduit timber infrastructure remaining.

Plate 34. Dulzura Conduit metal flume and trestle near Barrett Dam, looking south.

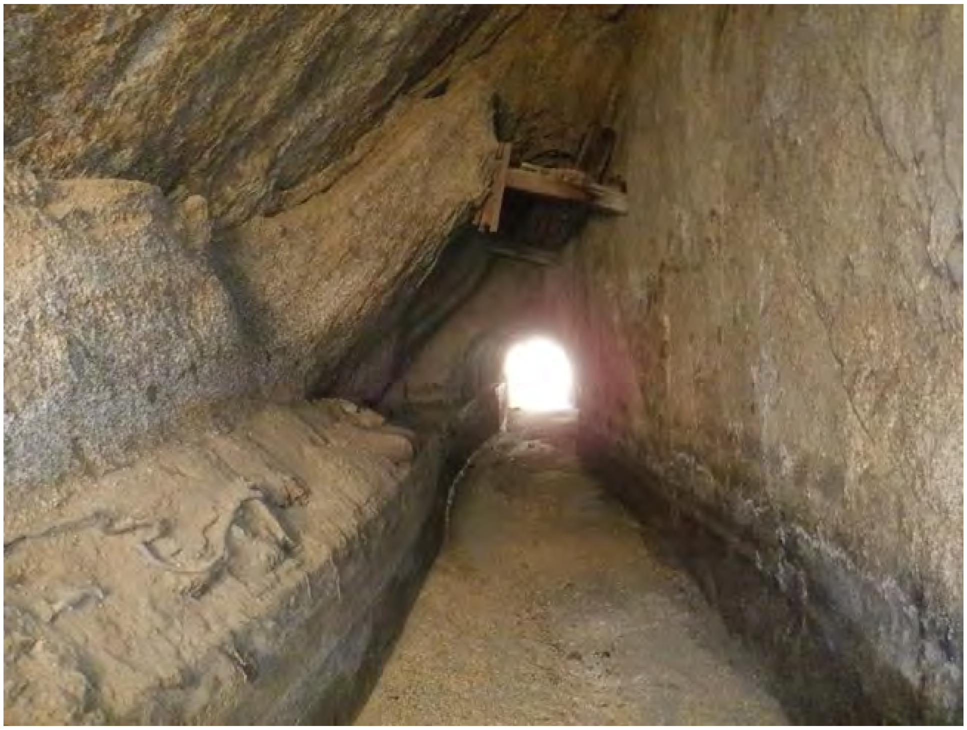

Plate 35. Timber support structure within Tunnel 2, looking southwest.

Plate 36. Close-up of timber support structure in Tunnel 2.

6.13.1 Dulzura Conduit (P-37-011605)

The Dulzura Conduit has been documented several times, beginning in 1989, when the remaining six timber flumes were documented to mitigate the effects of their removal (Van Wormer 1989). A DPR 523

Form update was prepared in 2002 when a remaining timber flume section (Flume 12) was destroyed during the Barrett Fire (Robbins-Wade 2002). In 2007, another update for the conduit was prepared for a State Route 94 improvement project, which included the documentation of a southern portion of the conduit (Tsunoda and DeGiovine 2007). Another segment, 1/8 mile west of Barrett Lake Road, was documented in 2010, which included the identification of a metal flow control gate and the replacement of once wooden Flume 5 with a modern metal flume resting on metal trestles (Gunderman 2010). In 2013, a portion of the conduit was located four miles north of the Campo Road/Barrett Lake Road junction, and 0.25 mile west up an access road from Barrett Lake Road. The segment includes contemporary cinder blocks stacked along the sides of the conduit as well as concrete covers over the conduit. A contemporary drainage opening was also documented northeast of Tunnel 6. The original concrete had also been removed and replaced with new concrete. The old concrete was left stacked nearby (Droessler 2013). These earlier DPR 523 Forms are included in Appendix D.

The Dulzura Conduit is regularly repaired, most recently in 2019. Shotcrete was used to repair 10 deteriorated sections of the conduit, adhering to the Secretary of the Interior Standards for Rehabilitation (Murray 2019). As shown in Plate 37, portions of historic concrete are deteriorating and flaking off.

Plate 37. Section of Dulzura Conduit concrete flume near Barrett Dam, looking southwest.

6.14 ELIGIBILITY SUMMARY AND RECOMMENDATIONS

This report identifies the historical resources within the project area, as well as the contributing and potentially contributing historical resources within the proposed discontiguous CSDWS historic district. The discontiguous CSDWS historic district is recommended eligible for listing in the NRHP, CRHR, and CSDHRR and includes Barrett, El Capitan, Hodges, Morena, Murray, San Vicente, Lower Otay (Savage), and Upper Otay Reservoir Complexes, as well as Dulzura Conduit. Morena, Lower Otay (Savage), Upper Otay, Murray, Hodges, Barrett, El Capitan, and San Vicente Reservoir Complexes are also individually eligible for listing in the NRHP, CRHR, and CSDHRR. The individual eligibility for the Morena Dam and Outlet tower within the Morena Reservoir Complex has been concurred by the State Historic Preservation Officer (SHPO) on March 15, 2019 (Consultation Ref: EPA_2019_0215_001) (Murray et al. 2020: 12). It is recommended that PUD facilitates consultation with SHPO for concurrence for the proposed discontiguous CSDSWS Historic District and its contributing resources, as well as the individual reservoir complex historic districts identified in this study.

Chollas, Miramar, and Sutherland Reservoir Complexes, as well as Rancho Bernardo Reservoir, were found not eligible for listing as contributors to the proposed discontiguous historic district nor as individual historical resources.

Please refer to Table 2, *NHRP/CRHR/CSDHRR Eligibility for CSDSWS Reservoir Complexes and Historic Resources,* for an eligibility breakdown of the historic resources associated with the CSDSWS included in this study. The resources are presented in the order that they were presented in Section 6.1.1 through Section 6.1.13.

Table 2
NHRP/CRHR/CSDHRR ELIGIBILITY FOR CSDSWS RESERVOIR COMPLEXES AND HISTORIC RESOURCES

Resource Name & Number	Description	Within Project Area?	Historic Resource Status
Barrett Reservoir Complex			
Barrett Reservoir Complex Historic District **Number Pending**	**Barrett dam, outlet tower, spillway, two dam keeper's houses, two pump houses, remnants of a flume, a powder magazine, and a picnic area featuring a concrete foundation and rubble masonry** **Newly identified contributing resources: Lower Barrett Dam; Upper Barrett Road; Lower Barrett Road** **Thirteen resources total within the complex historic district**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District and as an individual resource.**
Lower Barrett Dam **P-37-038717**	**Masonry dam located downstream from Barrett Dam. This resource appears to be contributor within the Barrett Reservoir Complex Historic District.**	**No**	**Appears eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Barrett Reservoir Complex Historic District and as an individual resource.**
Historic Refuse Scatter P-37-025926 (CA-SDI-17241)	Historic refuse scatters associated with former location of employees' cottages. Resource was reidentified, though only a few fragments of ceramics remain. This resource does not appear to be contributor within the Barrett Reservoir Complex Historic District.	No	Ineligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Barrett Reservoir Complex Historic District or as an individual resource.
Upper Barrett Lake Road **Number Pending**	**This graded dirt road connects Lyons Valley Road to the Barrett Dam complex. It runs approximately 3.89 miles from Lyons Valley Road to the crest of Barrett Dam. The road features a series of masonry culverts and a water crossing. The road appears to be contributor within the Barrett Reservoir Complex Historic District.**	**Yes**	**Appears eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Barrett Reservoir Complex Historic District.**

Resource Name & Number	Description	Within Project Area?	Historic Resource Status
Lower Barrett Lake Road **Number Pending**	**Two lane road, 6.3-miles long, which runs from Campo Road in its southernmost end to Barrett Dam to the north. Portions of the road are paved with asphalt, and others are graded dirt, and several gates are located along the alignment. The road appears to be contributor within the Barrett Reservoir Complex Historic District.**	**Yes**	**Appears eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Barrett Reservoir Complex Historic District.**
Chollas Reservoir Complex			
Chollas Reservoir Complex Number Pending	Earthen-embankment dam, outlet tower, original dam concrete foundation remnants, discharge outlet, iron pipe remnants, abandoned utility structure, and a pipe outlet Seven (7) resources total within the complex	Yes	Ineligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District or as an individual resource.
El Capitan Reservoir Complex			
El Capitan Reservoir Complex Historic District **Number Pending**	**El Capitan dam, spillway, flume remnants, storage structure, keeper's house foundations and remnants, bronze commemorative plaque, and outlet tower** **Newly identified contributing resources: 8863-NDY-1; 8863-NDY-2; 8863-HJP-1; 8863-HJP-2; 8663-BAO-4** **Twelve (12) resources total within the complex historic district**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District and as an individual resource.**
El Capitan Dam **P-37-031888**	**The El Capitan Dam, completed in 1934, is constructed of hydraulic earthen and rock fill. Included in the 2018 complex documentation and is a contributor within the El Capitan Reservoir Complex Historic District.**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to El Capitan Reservoir Complex Historic District and as an individual resource.**

Resource Name & Number	Description	Within Project Area?	Historic Resource Status
8863-NDY-1 **P-37-038887**	**Fieldstone wall associated with the El Capitan Dam keeper's house site. Appears to be a contributor within the El Capitan Reservoir Complex Historic District.**	**Yes**	**Appears eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to El Capitan Reservoir Complex Historic District.**
8863-NDY-2 **P-37-038888**	**Fieldstone wall associated with the El Capitan Dam keeper's house site. Appears to be a contributor within the El Capitan Reservoir Complex Historic District.**	**Yes**	**Appears eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to El Capitan Reservoir Complex Historic District.**
8863-HJP-1 **P-37-038884**	**Concrete slab, a small concrete block building, a cistern, two small, fenced areas, and a larger fence enclosing the other features. Possibly associated with the El Capitan Dam keeper's house site, but the association is unclear. Appears to be a contributor within the El Capitan Reservoir Complex Historic District.**	**No**	**Appears eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to El Capitan Reservoir Complex Historic District.**
8863-HJP-2 **P-37-038885**	**Two house foundations and accompanying structures. Appears to be remnants of the El Captain Dam keeper's house site. Included in the 2018 complex documentation and is a contributor to within the El Capitan Reservoir Complex Historic District.**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to El Capitan Reservoir Complex Historic District.**
8863-BAO-4 **P-37-038881**	**Fieldstone-lined ditch. Appears to be a remnant of the El Captain Dam keeper's house site, and a contributor to within the El Capitan Reservoir Complex Historic District.**	**Yes**	**Appears eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to El Capitan Reservoir Complex Historic District.**
402-070-05 **P-37-031889**	**Wood-framed utilitarian building. Included in the 2018 complex documentation and is contributing resource within the El Capitan Reservoir Complex Historic District.**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to El Capitan Reservoir Complex Historic District.**

Resource Name & Number	Description	Within Project Area?	Historic Resource Status
Hodges Reservoir Complex			
Hodges Reservoir Complex Historic District **Number Pending**	**Hodges Dam and integrated spillway, flume remnants, a utility shed, Quonset hut, shed, dam keeper's house (no longer extant), public outreach display, and a culvert with associated foundation** **Newly identified contributing resources:** **LH-2 (Dam keeper's house site)** **Nine (9) resources total within the complex historic district**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District and as an individual resource.**
Hodges Flume **P-37-023709**	**Flume consists of a 4.6-mile-long concrete-lined ditch with 22 associated trestles and six siphons. Included in the 2018 complex documentation and is contributing resource within the Hodges Reservoir Complex Historic District.**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Hodges Reservoir Historic District.**
LH-2 **P-37-015585**	**Hodges dam keeper's house site. Appears to be a contributor to the Hodges Reservoir Complex Historic District.**	**No**	**Appears eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Hodges Reservoir Complex Historic District.**
Masonry and Concrete Structures P-37-019224	Two masonry structures and a concrete pad	No	Ineligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Hodges Reservoir Historic District resource or as an individual resource.
Miramar Reservoir Complete			
Miramar Reservoir Complex Number is Pending	Miramar dam, overflow spillway culvert, outlet tower, and Miramar Filtration Plant Four (4) resources within the complex	Yes	Ineligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District or as an individual resource.

Resource Name & Number	Description	Within Project Area?	Historic Resource Status
Morena Reservoir Complex			
Morena Reservoir Complex Historic District **Number is Pending**	**Morena dam, spillway, and outlet tower** **Newly identified contributing resources: Morena dam lower weir; Morena dam upper weir; outlet tunnel; outlet gate; and Morena dam construction artifacts** **Eight (8) contributing resources within the complex historic district**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District and as an individual resource.**
Morena Dam and Outlet Tower **P-37-037080**	**Morena dam, spillway, and outlet tower. Included in the 2018 complex documentation and is a contributing resource within the Morena Reservoir Complex Historic District.**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Morena Reservoir Complex Historic District and as an individual resource.**
Morena Dam Lower Weir **Number is Pending**	**Concrete weir with board-formed concrete approach channel, located downstream of Morena Dam. Appears to be a contributing resource within the Morena Reservoir Complex Historic District.**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Morena Reservoir Complex Historic District.**
Morena Dam Upper Weir, Outlet Tunnel and Outlet Gate **Number is Pending**	**Concrete weir located on the downstream face of the dam adjacent to the outlet tunnel. The outlet gate is detached from the tunnel entrance and is located near the weir. These resources appear to be contributors to the Morena Reservoir Complex Historic District.**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Morena Reservoir Complex Historic District**
Morena Dam Construction Artifacts **Number is Pending**	**Iron buckets, objects and tools, and a sand dredger dating to the construction or Morena Dam. These resources appear to be contributors to the Morena Reservoir Complex Historic District.**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Morena Reservoir Complex Historic District**

Resource Name & Number	Description	Within Project Area?	Historic Resource Status
Murray Reservoir Complex			
Murray Reservoir Complex Historic District **Number Pending**	**Murray dam, outlet tower, bronze commemorative plaque, and stairwell down to the overflow outlet** **Four (4) contributing resources within the complex historic district**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District and as an individual resource**
Murray Dam Keeper's House P-37-016024	The dam keeper's house is no longer extant.	No	Ineligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Murray Reservoir Complex Historic District or as an individual resource.
Rancho Bernardo Reservoir			
Rancho Bernardo Reservoir Number Pending	Concrete-lined reservoir constructed in 1964	Yes	Ineligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District or as an individual resource.
San Vicente Reservoir Complex			
San Vicente Reservoir Complex Historic District **Number Pending**	**San Vicente dam, incorporated outlet tower, incorporated spillway, commemorative plaque, ice house, keeper's house, keeper's office, concrete mixer and batching plant foundation, San Diego Aqueduct outlet structure, and the Mussey Grade Road (Old Julian Highway)** **Newly identified contributing resources: Quonset hut** **Eleven contributing resources total within the complex historic district**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District and as an individual resource.**

Resource Name & Number	Description	Within Project Area?	Historic Resource Status
San Vicente Dam and Reservoir **P-37-024354**	**Straight axis gravity dam constructed in 1943 and designed by engineers Hinds and Pyle. The dam was raised in 2014. Was included in the 2018 complex documentation and is a contributing resource within the San Vicente Reservoir Complex Historic District.**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District and as an individual resource.**
Old Julian Highway **P-37-026974**	**Historic concrete highway also known as Mussey Grade Road. Was included in the 2018 complex documentation and is a contributing resource within the San Vicente Reservoir Complex Historic District.**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the San Vicente Reservoir Complex Historic District.**
Quonset Hut	**Storage structure which appears to be associated with the dam keeper's office and storage structure constructed circa 1940. Appears to be a contributor to the San Vicente Reservoir Complex Historic District.**	**No**	**Appears eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the San Vicente Reservoir Complex Historic District.**
Lower Otay (Savage) Reservoir Complex			
Lower Otay (Savage) Reservoir Complex Historic District **Number Pending**	**Lower Otay dam, outlet tower, spillway, original dam remnants, and a powder magazine** **Newly identified contributing resources: another powder magazine and highway bridge remnants** **Eight (8) contributing resources within the complex historic district**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District and as an individual resource.**
Highway Bridge Remnants **Number Pending**	**Bridge remnants across the Lower Otay (Savage) Dam spillway. Bridge was constructed to carry a highway over the spillway. Appears to be a contributor to the Lower Otay (Savage) Reservoir Complex Historic District.**	**Yes**	**Appears eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the Lower Otay (Savage) Reservoir Complex Historic District.**

Resource Name & Number	Description	Within Project Area?	Historic Resource Status
Sutherland Reservoir Complex			
Sutherland Reservoir Complex Number Pending	Sutherland dam, spillway, support structures, depth gauge, structure foundations, and bridge Seven (7) resources within the complex	Yes	Ineligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District or as an individual resource.
Upper Otay Reservoir Complex			
Upper Otay Reservoir Complex Historic District **Number Pending**	**Upper Otay dam, spillway, and the Otay Lakes Road underpass** **Three (3) contributing resources within the complex historic district**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District and as an individual resource.**
Dulzura Conduit			
Dulzura Conduit **P-37-011605**	**The 13.38-mile conduit features various segments of formed concrete trenches, metal trestle supported flumes, and concrete-lined tunnels** **One (1) linear resource**	**Yes**	**Eligible for listing in the NRHP/CRHR/CSDHRR as a contributor to the discontiguous CSDSWS Historic District.** **Ineligible as an individual resource.**

***Bold resources are considered historical resources for the purposes of CEQA.**

7.0 PROJECT IMPACTS ANALYSIS AND RECOMMENDATIONS

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 a historical resource would be materially impaired" (CEQA Guidelines Section 15064.5(b)(1); PRC Section 5020.1(q)). In turn, the significance of a historical resource is materially impaired when a project does any of the following:

(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; 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 a 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 as determined by a lead agency for purposes of CEQA [CEQA Guidelines Section 15064.5(b)(2)].

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.

Given the limited scale of the maintenance activities compared with the expansive, multi-property resources comprising the CSDSWS discontiguous district and the reservoir complex historic districts, project implementation would not be expected to result in significant adverse impacts, and therefore, material impairment to historical resources.

The contributing historical resources within the CSDSWS discontiguous historic district are active and functioning facilities, and therefore, routine maintenance activities are necessary to maintain and preserve them. Maintenance activities covered under the proposed project include maintenance of access roads and pedestrian footpaths, trimming and clearing of vegetation, dredging, maintenance of outlet/intake towers and track racks, removal of debris along spillways and other appurtenant structures to provide a clear path and remove obstructions, maintenance and repair of the dams and appurtenant structures to prevent deterioration that could lead to dam failure, concrete maintenance and repairs, maintenance and replacement of piezometers and survey monuments, and geotechnical investigations. The project does not include any significant alterations, demolitions, or relocation of historic resources. In terms of historic resources, the project at a maximum would involve patching/repairs to spalling and deteriorated concrete in isolated sections rather than wholesale removal of contributors and their materials. Given the character and complexity of the eligible reservoir complexes, as well as the overarching discontiguous historic district, it is not expected that project implementation would result in significant adverse impacts to historical resources. Therefore, material impairment of historical resources would not be expected to result from project implementation, and further CEQA study is not required.

In terms of future maintenance activities, the following Continuing Best Practices (CBPs) would help ensure that historic materials and fabric are preserved and maintained. These are not mitigation measures; mitigation measures are only required where a significant adverse impact has been identified. Rather, these management strategies will allow for the long-term retention and preservation of the historic resources identified in this study. The following CBPs adhere to the Standards and Guidelines for repair/replacement of historic concrete and protection of adjacent materials as outlined in *the NPS Preservation Brief 15: Preservation of Historic Concrete* (Gaudette and Slaton 2007). These recommendations were written by Samantha Murray for the *Historical Resources Impact Assessment for Shotcrete Maintenance on the Dulzura Conduit* (Murray 2019).

CBP-1: Repairs should include limited replacement of original historic materials (where possible) and should be made in kind or with a compatible substitute material.

CBP-2: Repair concrete by cutting back and removing the damaged sections and patching with new concrete that duplicates the old in strength, composition, color, and texture.

CBP-3: Patching concrete without identifying and removing the source of deterioration is not recommended. For example, corrosion on existing metal reinforcement bars/mesh should be removed and replaced prior to the application of new concrete.

CBP-4: New concrete patches should be applied carefully to ensure a satisfactory bond and match with the historic concrete surrounding it.

CBP-5: Adjacent portions of the resource that are not damaged and not proposed for repair should be adequately protected during repair activities.

CBP-6: The use of a chemical demolition agent to break-up large rocks would avoid the use of heavier and damaging equipment such as jackhammers or hydraulic breakers, which have the potential to cause extensive vibration. However, chemicals must be used with care to ensure that surrounding historic materials are protected and not inadvertently damaged.

7.1 CUMULATIVE IMPACTS

The proposed project includes a multi-faceted, comprehensive program of maintenance activities that are needed within the dam facilities. There is not currently additional program- or project-level activities planned or coming online in the foreseeable future for the facilities.

Therefore, with no other anticipated projects that could significantly impact historical resources within the dam facilities, no significant cumulative impacts would be expected because of project implementation.

7.2 CONCLUSION

The proposed project includes a variety of routine maintenance and upkeep activities. The most relevant project items for historical resources would be those repairs to historic concrete and materials, including the in-kind replacement of spalling and deteriorated concrete and other materials.

Given the limited scale of the maintenance activities compared with the expansive, multi-property resources comprising the CSDSWS discontiguous district as well as the individual reservoir complex historic districts, project implementation would not be expected to result in significant adverse impacts, and therefore, no material impairment to historical resources. To maintain and preserve character-defining materials and features, however, this study included a series of Continuing Best Practices for use by PUD when projects are planned and implemented.

In addition, future projects that fall outside of the current program-level maintenance activities would be subject to independent review and evaluation.

8.0 REFERENCES

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Appendix A

Resumes

Annie McCausland

Architectural Historian

Summary of Qualifications

Ms. McCausland meets the Secretary of the Interior's Professional Qualification Standards for Architectural History and History. Her expertise includes the Secretary of the Interior's Standards for the Treatment of Historic Properties, archival research, preparation of historic contexts, Department of Parks and Recreation (DPR) 523 forms, significance and integrity evaluations, and historic district documentation. She has completed studies for residential, agricultural, military, rural, urban, commercial, and industrial properties across California. She has prepared numerous technical reports including Historical Resources Evaluation Reports (HRER), Historical Resources Technical Reports (HRTR), Historic Property Survey Reports (HPSR), Treatment Reports, and Cultural Resources Phase I and II Reports, to satisfy compliance requirements under National Historic Preservation Act (NHPA) Section 106, California Environmental Quality Act (CEQA), and local government preservation ordinances. Ms. McCausland has worked extensively under the California Department of Transportation (Caltrans) Districts 5, 8, and 11, as well as the U.S. Army Corps of Engineers (USACE), Bureau of Land Management (BLM), and the Bureau of Reclamation (BOR), as well as many local government agencies.

Selected Project Experience

Dam Maintenance Program (2019 - Present). Architectural Historian for the Dam Maintenance Program at 13 dam facilities across San Diego County. Led effort to survey, document, research, and assess impacts within the 13 project areas, which include the City of San Diego Water System discontiguous historic district. Lead author for the HRTR and co-author for the Cultural Resources Technical Report. Historic contexts, evaluations, and DPR 523 forms were prepared utilizing archival sources. Work performed for the City of San Diego Public Utilities Department (PUD) with PUD as lead agency under CEQA.

Buckman Springs Road Bridge Widening Project (2020 - Present). Architectural Historian working on the rehabilitation and widening of Cottonwood Creek Bridge crossing of Buckman Springs Road, located in eastern San Diego County. Responsibilities include field survey and preparation of an HRER and HPSR consistent with Caltrans format and content requirements. Duties also included the direction and oversight of the completion of a Finding of No Adverse Effect and Secretary of Interior's Standards Action Plan. Work performed for the County of San Diego Department of Public Works (County) with the County as the lead agency under CEQA and Caltrans as the lead agency under NHPA Section 106

Pasadena Water & Power Sunset Reservoir Replacement Project (2021 - Present). Architectural Historian preparing an HRER for a reservoir replacement project in the City of Pasadena. A historic district, eligible for the national, state, and local registers was identified and documented. Work performed for Kennedy Jenks with the City of Pasadena as the lead agency under CEQA.

Education

Master of Arts, Public History, California State University, Sacramento, California, 2015

Bachelor of Arts, History, Chapman University, Orange, California, 2010

Registrations/ Certifications

Huntington Library San Marino, Registered Reader

Professional Affiliations

California Council for the Promotion of History

American Association for State and Local History

National Council on Public History

California Preservation Foundation

Los Angeles Conservancy

Society of Architectural Historians

Copper Basin Dam Valve Replacement Project (2021 - Present). Architectural Historian preparing an HRTR for a valve replacement project on Copper Basin Dam, a contributing resource within the Colorado River Aqueduct Historic District in eastern San Bernardino County. Work performed for Metropolitan Water District of Southern California (Metropolitan) with Metropolitan as the lead agency under CEQA.

Santee Lakes Drain and Dredge Project (2021 - Present). Architectural Historian preparing an HRTR for a lake dredging and in-fill project at Santee Lakes Recreational Preserve in Santee, California. The Santee Lakes Recreational Preserve was identified and documented as a historic landscape eligible for national, state, and local listing. Work performed for Padre Dam Municipal Water District (Padre Dam) with Padre Dam as the lead agency under CEQA.

Pure Water San Diego Conveyance Project (2019 - Present). Architectural Historian providing support for environmental compliance under the Construction Management contract for Phase 1 (also referred to as the North City Project) of the San Diego Pure Water Program. Responsibilities include preparation of a Cultural Resources Monitoring and Treatment Plan and a Site Protection and Stabilization Plan for a stone wall associated with a 1930s residence and providing environmental compliance monitoring oversight and reporting during construction. Work performed as subconsultant, with the City of San Diego as lead agency under CEQA.

San Diego High School Whole Site Modernization and Long-Range Facilities Master Plan EIR (2020 - Present). Architectural Historian preparing a Cultural Resources Technical Report and supporting Environmental Impact Report (EIR) sections, for near- and long-term project components as part of campus master plan at San Diego High School in downtown San Diego. A total of 10 historic built environment resources were documented and evaluated in the report and DPR 523 forms. Appropriate mitigation measures were implemented in the EIR. Work performed for the San Diego Unified School District (SDUSD) with SDUSD as lead agency under CEQA.

Cortez Hills Affordable Housing NEPA Environmental Assessment (2021 - 2021). Architectural Historian preparing an HRER for an affordable housing development project in downtown San Diego. Work performed for Community Housing Works with the U.S. Department of Housing and Urban Development as lead agency under NHPA Section 106.

Oak Valley Town Center (2021 - 2021). Architectural Historian preparing an HRER for a development project in Calimesa, California. Historic resources associated with a proposed archaeological historic district were documented and evaluated for significance and eligibility for listing in the state register. Work performed for Oak Valley Development Company with City of Calimesa as lead agency under CEQA.

Learn and Play Montessori School Project (2021). Architectural Historian preparing an HRER and DPR 523 forms for a historic 1930s Minimal Traditional house in Union City, California. The house was evaluated for state and local listing eligibility. Work performed for Union City with Union City as the lead agency.

Escondido Centre City Pkwy Condominium (2020 - 2021). Architectural Historian preparing an HRER for a housing development project in the City of Escondido. Historic resources were evaluated for state and local listing eligibility. Work performed for Warmington Residential, with City of Escondido as the lead agency under CEQA.

Aramis Solar Energy Generation and Storage Project EIR (2020). Architectural Historian performing built-environment survey, archival research, and preparing DPR 523 forms, historic contexts, and significance and eligibility evaluation for an active historic ranch in east Alameda County. The ranch features a post and beam barn and shed and is owned and managed by the same family since circa 1869. The resource was recommended eligible for listing in the national, state, and local registers. A potential historic landscape and/or historic district in this portion of eastern Alameda County was also identified. Work performed for Intersect Power with the County of Alameda as the lead agency under CEQA.

7-Eleven at 43 Middle Rincon Road (2020 - Present). Architectural Historian preparing an HRER for a retail development project in the City of Santa Rosa, California. A Craftsman dwelling was recommended eligible for listing in the state and local registers for association with an historically significant person in the Rincon Valley community. Work performed for TAIT & Associates, with City of Santa Rosa as the lead agency under CEQA.

Hidden Valley Restaurant Project (2020). Architectural Historian preparing an HRER for a development project in the community of Hidden Valley Lake in Lake County, California. Work performed for the Hidden Valley Lake Association with Lake County as the lead agency under CEQA.

Padre Dam Municipal Water District East County Advanced Water Purification Program Year 3 (2019 - 2021). Architectural Historian preparing appropriate State of California DPR 523 forms for three historic resources: Ray Stoyer Wastewater Treatment Facility, Chet Harritt Dam, and Monte Tunnel (San Diego Flume). Responsibilities also included the preparation of the El Monte Tunnel Rehabilitation Plan. The DPR forms and rehabilitation plan were prepared to supplement the Environmental Package component of the Financial Assistance Application for the State Water Resources Control Board (SWRCB) Clean/Drinking Water State Revolving Fund. Work performed for the Padre Dam Municipal Water District.

Previous Project Experience

196 San Miguel and 379 Second Street Historic Evaluation Report (2019). Architectural Historian preparing an HRER including built-environment survey, site record, historic contexts, and significance evaluation for a 1940s vernacular beach cottage located in the community of Avila Beach in San Luis Obispo County. The study found the cottage eligible for the national, state, and local registers. Work performed for private developer, Sullivan & Associates, with San Luis Obispo County as the lead agency under CEQA.

De la Vina Street Bridge Replacement (2018 - 2019). Architectural Historian preparing an HRER, HPSR, and City Memo for a bridge replacement project in the City of Santa Barbara California. Nine properties were included in the study and one property was found eligible as a local historic landmark. Presented findings to the City of Santa Barbara Historic Landmarks Commission, who approved the local designation. Work performed for Bengal Engineering, Inc. with the City of Santa Barbara as the lead agency in consultation with Caltrans District 5.

Chuckwalla Valley Road Bridge Replacements (2019). Architectural Historian preparing an HRER for the replacement of four historic bridges on Chuckwalla Valley Road, near the community of Desert Center in Riverside County, California. The bridges were found eligible for listing as character defining features of

Chuckwalla Valley Road (Highway 60/70), a historical resource/property under CEQA and NHPA Section 106. Work performed for Riverside County in consultation with Caltrans District 8.

East Mountain Drive Water Crossing Replacement (2018 - 2019). Architectural Historian preparing an HRER for a water crossing replacement project in the community of Montecito in Santa Barbara County, California. The study recommended a resource/property eligible for listing in the national and state registers. Work performed for the design engineer in consultation with the County of Santa Barbara and Caltrans District 5.

Montecito Creek Bridge Emergency Replacement (2018). Architectural Historian preparing an HRER for emergency replacement of a historical bridge in the community of Montecito in Santa Barbara County, California. The bridge no longer retained integrity after the 2018 mudslide event and was found not eligible for listing in the national and state registers prior to its emergency demolition. Work performed for Santa Barbara County in consultation with Caltrans District 5.

Railroad Avenue Bridge (2019). Architectural Historian preparing an HRER for the replacement of two historic bridges on Railroad Avenue located in Riverside County. The bridges were recommended not eligible for listing in any register. A segment of the Pacific Crest Trail was documented and found eligible for listing in the national and state registers. Work performed for Riverside County in consultation with Caltrans District 8.

Historic Building Assessment at 250 South Tustin Street (2018). Architectural Historian preparing a Historic Building Assessment for an early twentieth century Craftsman house in the City of Orange. Work performed for private developer, Klassic Engineering and Construction, Inc., with the City of Orange as lead agency under CEQA.

Avila Beach Schoolhouse Conversion (2018 - 2019). Architectural Historian consulting with contractor on the rehabilitation of a schoolhouse in San Luis Obispo County, into a bed and breakfast, adhering to the Secretary of the Interior's Standards for the Treatment of Historic Properties. Work performed for private developer, Hodge Company, with County of San Luis Obispo as the lead agency under CEQA.

Brea Dam Electrical Modernization (2018 - 2019). Architectural Historian consulting with contractors on the electrical and utility rehabilitation of Brea Dam, a USACE property in the City of Fullerton. Prepared a Historic Property Rehabilitation Report and monitored removal and positioning of historic features. Work performed for Power Pro Plus, Inc. in consultation with USACE Los Angeles District as lead agency.

Port of Long Beach Master Plan Update (2018 - 2019). Architectural Historian producing the cultural resource chapter of a Programmatic EIR for the Port of Long Beach, as well as a technical survey and evaluation report. Conducted intensive and windshield surveys for historic built environment resources within the entire Port of Long Beach. Work performed as a subconsultant in consultation with the Port of Long Beach as lead agency under CEQA.

1121 Montalban Street (2019). Architectural Historian preparing the Historic Building Assessment for a development project in the City of San Luis Obispo. The assessment included two properties and a 1920s Spanish Colonial Revival house. The study found the properties and dwelling not eligible for listing in the state or local registers. Work performed for CoVelop, Inc. with the City of San Luis Obispo as the lead agency under CEQA.

Annie McCausland
Architectural Historian

Tranquillity Irrigation District Southeast Service Area Water Conservation and Conveyance Improvement (2018). Architectural Historian performing the built environment study for a Cultural Resource Inventory and Evaluation in Fresno County. Work performed for Provost & Pritchard Consulting Group, with BOR as the lead agency.

Gordon Acres Water Company Water System Improvements (2018). Architectural Historian implementing the built environment survey and preparation of architectural resources investigation report for water system improvements in the community of Lucerne Valley in San Bernardino County, California. Work performed for NV5, with the California State Water Resources Control Board as the lead agency.

Bloomington Commerce Center (2018). Architectural Historian implementing the built environment survey and preparation of Cultural Resources Assessment Report for a 56.6-acre commercial site in the community of Bloomington in San Bernardino County, California. Work performed for Howard Industrial Partners with San Bernardino County as the lead agency under CEQA.

Prologis Trailer Parking Expansion (2018). Architectural Historian implementing the built environment survey and preparation of the Cultural Resources Assessment Report for expansion of a trailer parking area near the City of Redlands in San Bernardino County, California. Work performed for Albert A. Webb Associates with San Bernardino County as the lead agency under CEQA.

Interstate 215 and University Parkway Interchange Improvements (2018). Architectural Historian preparing an HRER for improvements to the I-215 interchange in the City of San Bernardino. A Scottish Freemasonry Temple was documented and evaluated for historical significance and eligibility for listing in the national register. Work performed for HDR in consultation with the City of San Bernardino and Caltrans District 8.

Interstate 10/Monroe Street Interchange Improvements (2018). Architectural Historian preparing an HRER for interchange improvements in the City if Indio. Work performed for Michael Baker in consultation with the City of Indio and Caltrans District 8.

Biola Community Services District Recycled Water Improvements Feasibility Study (2018). Architectural Historian implementing the built environment survey and preparation of architectural resources investigation report for recycled water improvements in Fresno County. Work performed for Crawford & Bowen Planning, Inc., with BOR as the lead agency.

Athos Renewable Energy Project (2018 - 2019). Architectural Historian implementing the built environment survey and preparation of historic contexts and resource evaluations for a 2,848-acre solar facility, a 6-mile-long transmission line corridor, and a surrounding 5-mile-wide buffer in Riverside County. Resources documented were associated with Desert Training Center/California-Arizona Maneuver Area, a designated multi-property historic district. Work performed for IP Athos, LLC and Aspen Environmental Group, with BLM as the lead agency.

Blythe Airport Fence Project (2018). Architectural Historian implementing the built environment survey and preparation of Phase-I Cultural Report for an improvement project within the Blythe Army Air Base Historic District. Contributing features to the historic district were newly identified and documented during the study. The overall significance evaluation of the Blythe Army Air Base Historic District was also updated as a historic district contributing to the Desert Training Center/California-Arizona Maneuver Area

Multiple Property Historic District. Work performed as a subconsultant for Mead & Hunt, with the Federal Aviation Administration (FAA) as the lead agency.

University of California Riverside Plant Growth Facility (2018). Architectural Historian implementing the built environment survey and preparation of a Historic Building Assessment report for a campus facility expansion project in the City of Riverside. Work performed for Albert A. Webb Associates with University of California Riverside as the lead agency under CEQA.

Victorville Water District Distribution System Phase I Cultural Resource Assessment (2017). Architectural Historian preparing site records, significance evaluations, and historic contexts for a water distribution system project in the City of Victorville. Work performed for Meridian Consultants, LLC., with City of Victorville as the lead agency.

Alabama and Palmetto Project Phase 1 Cultural Resources Assessment (2019). Architectural Historian preparing a built-environment survey, site records, historic contexts, and significance evaluations for a development project in San Bernardino County. Two historic-period components of a gravity-fed irrigation system, a flume and a weir were identified within the Project area and documented as a result of the survey. These resources were found to be eligible for listing in the state register. The resources may also be contributing elements to a possible citrus industry historic district in this portion of Redlands. Work completed for Albert A. Webb Associates with County of San Bernardino as lead agency under CEQA.

Sierra Avenue Widening Project Cultural Resources Assessment Revision (2018). Architectural Historian preparing a built-environment survey, site record, historic context, and significance evaluation for a street widening project in the City of Fontana. Work completed for HDR with the City of Fontana as lead agency under CEQA.

City of Orange Cove Water Treatment Improvement Project Historic Property Identification Report (2019). Architectural Historian preparing a Historic Property Identification Report in the City of Orange Cove in Fresno and Tulare counties. Work performed for Crawford & Bowen Planning Inc. with the City of Orange Cove as lead agency under CEQA.

LA Waterwheel Project Cultural Resources Assessment Report (2019). Architectural Historian preparing a built-environment survey, site record, historic context, and significance evaluation for a portion of the Los Angeles River Channel in the City of Los Angeles. Work performed for Ruth Villalobos & Associates, Inc. with the City of Los Angeles as lead agency under CEQA.

Southern California Logistics Airport Cultural Resources Assessment Report (2019). Architectural Historian preparing a site record update for George Airforce Base in the City of Victorville, California. Work performed for Michael Baker and Associates with the City of Victorville as lead agency under CEQA.

Fort Visalia Historic Review (2018). Architectural Historian assisting with research and preparing historic contexts for the Fort Visalia site investigation. Work performed for the City of Visalia.

Appendix B

Historic Context Statement and Evaluation of Chollas Reservoir Complex and Rancho Bernardo Reservoir

PUBLIC UITLITIES DEPARTMENT- DAM MAINTENANCE PROGRAM

HISTORIC CONTEXT STATEMENT + EVALUATION

OF

CHOLLAS RESERVOIR COMPLEX

RANCHO BERNARDO RESERVOIR

SAN DIEGO COUNTY, CA

Spring 2021, Updated August 2021

Prepared for:
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PART I: INTRODUCTION

PROJECT SCOPE

The *Historic Context Statement and Evaluation of the Chollas Reservoir Complex and Rancho Bernardo Reservoir* was prepared by IS Architecture at the request of the City of San Diego Public Utilities Department (PUD), Dam Maintenance Program. IS Architecture was contracted through HELIX Environmental Planning, Inc. (HELIX) to provide the context and evaluation for the Chollas Reservoir Complex and Rancho Bernardo Reservoir.

This historic context statement addresses the significant themes and eligibility criteria associated with the two identified reservoirs in San Diego County, California. A framework for identifying and evaluating properties relating to San Diego Source Water System resources and PUD reservoir structures was compiled by Dudek in *The City of San Diego Source Water System Historic Context Statement* (June 2020). The Dudek report was utilized to evaluate the resources.

This historic context statement:

- Provides the foundation for the historical overview of the establishment of the Chollas Reservoir Complex and Rancho Bernardo Reservoir.

The significance evaluation:

- Evaluates the identified resources against the San Diego Source Water System context and themes, along with applicable local, state, and national criteria for historic significance and listing on the applicable register.

This context statement is not intended to serve as the definitive history of the study area, but rather provides historical background to identify and discuss the thematic contexts in order to evaluate significance.

PURPOSE

The City of San Diego's (City) PUD provides drinking water to over 1.36 million customers. The City owns and operates 10 local source water reservoirs with approximately 566,238 acre-feet (AF) of capacity, which are connected directly or indirectly to three water treatment plants. Nearly all of the City's major source water infrastructure is over 50 years old. For this reason, it is important for the city to understand the historical significance of its major water infrastructure within the context of the larger system in order to adequately assess future project-specific impacts/effects on these resources in consideration with the City's obligations under the California Environmental Quality Act (CEQA) and Section 106 of the National Historic

Preservation Act (NHPA). This study will look at the Chollas Reservoir Complex and the Rancho Bernardo Reservoir, identify any potential themes under which they are significant, and discuss their eligibility as historic resources.

STUDY AREA

The study area encompasses two City owned reservoir resources in the San Diego Source Water System.

Chollas Reservoir Complex (Figure 1) is located in the City of San Diego, just west of the community of Lemon Grove, within San Diego County, California.

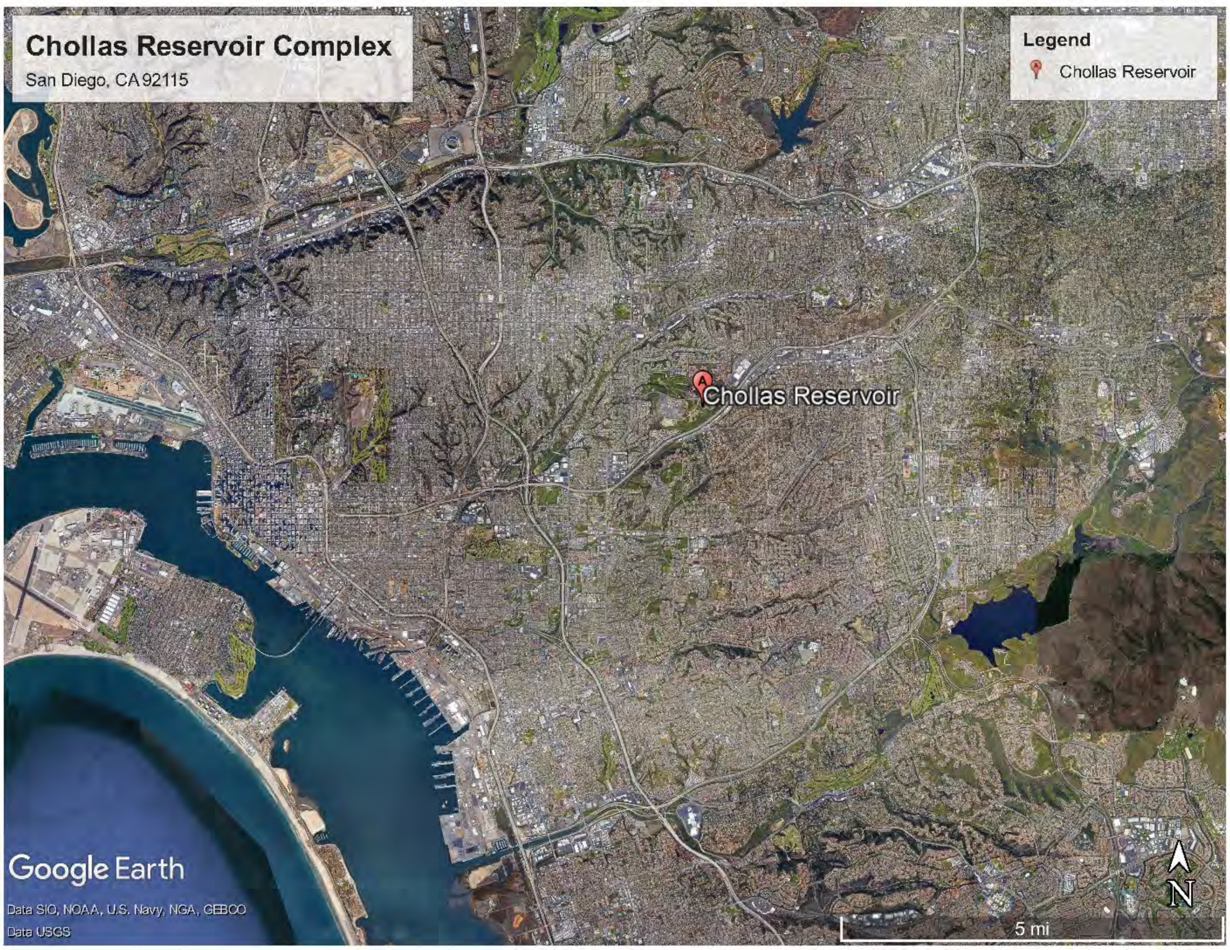

Figure 1: Regional location of the Chollas Reservoir. Google Earth Map.

The Rancho Bernardo Reservoir (Figure 2) is located in the master planned community of Rancho Bernardo in the north hills of the City of San Diego, County of San Diego, California.

Figure 2: Rancho Bernardo Reservoir and its regional location. Google Earth Map.

METHODOLOGY

This historic context statement is the result of research, review, and analysis of related studies, archival research, and review of survey/site visit materials.

Primary and secondary sources, oral histories, historic photographs, newspapers, and maps were consulted (See Existing Literature Section). The following groups provided research materials and sources, during the research phase of this project:

- HELIX
    - Site Visit, Survey
- Dudek
    - Existing historic context drafts
- San Diego Parks and Recreation
    - Chollas Reservoir Archival Materials
    - Rancho Bernardo Reservoir Archival Materials
- San Diego History Center
    - Historic photographs
    - Aerial photography
    - San Diego development history
- University of California, Riverside
    - Water Archives and Photographs

EXISTING LITERATURE, ARCHIVES, AND OUTREACH

This historic context was based off the foundation set by Dudek with *The City of San Diego Source Water System Historic Context Statement* (June 2020).

The following list of sources and collections outline the existing literature, archives, and histories that were consulted for this context. A bibliography is included at the end of the document.

- San Diego Union Newspaper Archives
- San Diego Evening Tribune Newspaper Archives
- San Diego History Center Online Archives
- City of San Diego Parks and Recreation Archival Material
- Historic Aerials
- Calisphere Digital Archive
- University of California, Riverside – Water Resources Collections and Archives

PERSONNEL

This Historic Context Statement was researched and written by Kelsey Kaline, MHC/MPL, Historic Preservation Specialist and Architectural Historian for IS Architecture. Ione Stiegler, FAIA, Principal Historic Preservation Architect for IS Architecture provided additional project research and assistance. All team members meet and exceed the Secretary of the Interior's Professional Qualification Standards, as published in the Code of Federal Regulations, 36 CFR Part 61 for architectural history.

Project oversight and quality assurance/quality control review was performed by Annie McCausland, Architectural Historian with HELIX.

TERMS AND ACRONYMS

AF	Acre-Feet
amsl	Above mean sea level
APE	Area of Potential Effect
CEQA	California Environmental Quality Act
City	City of San Diego
County	County of San Diego
CRHR	California Register of Historical Resources
DSOD	California State Health Department's Division of Safety of Dams
GWPC	Great Western Power Company
HELIX	HELIX Environmental Planning, Inc.
HRB	City of San Diego Historical Resources Board
MWD	Metropolitan Water District of Southern California
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PRC	California Public Resources Code
PUD	Public Utilities Department
SDCWA	San Diego County Water Authority
SDHC	San Diego History Center
SHPO	State Historic Preservation Officer
SJEC	San Joaquin Electric Company
SCMWC	Southern California Mountain Water Company
UCR	University of California Riverside
UCSD	University of California at San Diego
USGS	United States Geological Survey
WRCA	Water Resources Collection and Archives, held by University of California, Riverside

PART II: HOW TO USE THIS DOCUMENT

WHAT IS A HISTORIC CONTEXT STATEMENT?

Historic context statements identify important themes in history and provide frameworks for evaluating extant resources for significance and integrity. Historic context statements are not intended to be all-encompassing narrative histories. Instead, historic contexts establish the significance of themes and related topics and then provide guidance regarding the characteristics of the built environment as it relates to the theme. The overriding goal of this context statement is to distill much of what is known about the evolution and development of San Diego's Chollas and Rancho Bernardo Reservoirs and to help establish if these physical places may be considered historically significant within one or more of the identified themes. It is intended to be used as a starting point for determining whether a specific resource/property is eligible for designation as a historical resource under a national, state, or local designation program.

OVERVIEW OF APPLICABLE DESIGNATION PROGRAMS/ REGULATORY SETTING

The following designation programs guide the discussion of eligibility criteria and integrity thresholds that the resources are evaluated against.

National Register of Historic Places

The National Register of Historic Places (NRHP) is an "authoritative guide to be used by federal, state, and local governments, private groups and citizens to identify the nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment."[1]

National Register of Historic Places (NRHP) Eligibility Criteria

To be eligible for listing in the NRHP, a property must be at least 50 years of age and possess significance in American history and culture, architecture, or archaeology. A property of potential significance must meet one or more of four established criteria:[2]

A. Associated with events that have made a significant contribution to the broad patterns of our history; or

[1] Title 36 Code of Federal Regulations Part 60.2.

[2] Title 36 Code of Federal Regulations Part 60.4.

B. Associated with the lives of persons significant in our past; or

C. 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. Yield, or may be likely to yield, information important in prehistory or history.

Historic resources eligible for listing in the NRHP may include buildings, sites, structures, objects, and historic districts.

Integrity

Integrity is the ability of a property to convey its significance. To be listed in the NRHP, a property must not only be shown to be significant under the criteria, but it also must retain integrity to convey its significance. The evaluation of integrity is grounded in an understanding of a property's physical features and how they relate to its significance. Within the concept of integrity, all criteria recognize seven aspects of integrity. These seven aspects include location, setting, design, materials, workmanship, feeling and association. To retain historic integrity a property will always possess several, and usually most, of the aspects. The seven aspects of integrity are defined as follows:

- Location: The place where the historic property was constructed or the place where the historic event occurred.
- Setting: The physical environment of a historic property.
- Design: The combination of elements that create form, plan, space, structure, and style of a property.
- Materials: 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: The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
- Feeling: A property's expression of the aesthetic or historic sense of a particular period of time.
- Association: The direct link between an important historic event or person and a historic property.

The National Park Service's website features PDF documents of National Register Brochures and Bulletins, technical guidance, and guidance by property type.

California Register of Historical Resources

In 1992, Governor Wilson signed Assembly Bill 2881 into law, establishing the California Register of Historical Resources (CRHR). The CRHR is an authoritative guide used by state and local agencies, private groups, and citizens to identify historic resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change.

The CRHR consists of properties that are automatically listed as well as those that must be nominated through an application and public hearing process.[3] The CRHR automatically includes the following:

- California properties listed in the NRHP and those formally Determined Eligible for the NRHP;
- California Registered Historical Landmarks from No. 0770 onward; and
- Those California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Resources Commission for inclusion on the CRHR.

Designation Criteria

The criteria for CRHR listing eligibility are based upon NRHP criteria, but are identified as 1-4 instead of A-D. To be eligible for listing in the CRHR, a property must be at least 50 years of age and possess significance at the local, state, or national level under one or more of the following 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; and/or
2. It is associated with the lives of persons important to local, California, or national history; and/or
3. It embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values; and/or
4. It has yielded, or has the potential to yield, information important in the prehistory or history of the local area, California, or the nation.

Historic resources eligible for listing in the CRHR may include buildings, sites, structures, objects, and historic districts.

[3] Public Resources Code Section 5024.1.

For the purposes of this report, the evaluation of significance under NRHP and CRHR are combined. This is denoted as A/1, B/2, C/3, and D/4.

Integrity

The CRHR uses the same seven aspects of integrity as the NRHP. While the enabling legislation for the CRHR is less rigorous regarding the issue of integrity, there is the expectation that properties reflect their appearance during their period of significance.[4]

City of San Diego

City of San Diego Land Development Code

The Designation of Historical Resources Procedures found in the Land Development Code (Chapter 12, Article 3, Division 2) establishes the City's process to identify and designate significant historical resources for preservation. The decision to designate historical resources rests with the City's Historical Resources Board (HRB) in accordance with the requirements of Chapter 12, Article 3, Division 2, and the Historical Resources Guidelines of the Land Development Manual. A decision by the HRB to designate a resource may be appealed to the City Council. The Historical Resources Regulations of the Land Development Code (Chapter 14, Article 3, Division 2) serve to protect, preserve and, where damaged, restore the historical resources of San Diego. The regulations apply to all proposed development within the City of San Diego when historical resources are present on the premises regardless of the requirement to obtain a Neighborhood Development Permit or Site Development Permit. When any portion of a project area contains historical resources, as defined in the Land Development Code Chapter 11, Article 3, Division 1, the regulations apply to the project area.

City of San Diego Register of Historical Resources Designation Criteria

The Historical Resources Guidelines of the City's Land Development Manual identifies the criteria under which a resource may be historically designated. It states that any improvement, building, structure, sign, interior element and fixture, site, place, district, area, or object may be designated a historic resource on the San Diego Register of Historical Resources (San Diego Register) by the HRB if it meets one or more of the following HRB designation criteria:

A. Exemplifies or reflects special elements of the City's, a community's, or a neighborhood's historical, archeological, cultural, social, economic, political, aesthetic, engineering, landscaping, or architectural development; and/or

[4] Public Resources Code Section 4852.

B. Is identified with persons or events significant in local, state, or national history; and/or
C. Embodies distinctive characteristics of a style, type, period, or method of construction or is a valuable example of the use of indigenous materials or craftsmanship; and/or
D. Is representative of the notable work of a master builder, designer, architect, engineer, landscape architect, interior designer, artist, or craftsman; and/or
E. Is listed or has been determined eligible by the National Park Service for listing in the NRHP or is listed or has been determined eligible by the OHP for listing in the CRHR; and/or
F. Is a finite group of resources related to one another in a clearly distinguishable way or is a geographically definable area or neighborhood containing improvements which have a special character, historical interest or aesthetic value or which represent one or more architectural periods or styles in the history and development of the city.

Integrity

The San Diego Register uses the same seven aspects of integrity as the NRHP and CRHR.

Integrity Requirements

The City of San Diego Source Water System Historic Context Statement identifies specific integrity requirements for potential contributing resources. The following tables identify these integrity requirements.[5]

Table 2. Integrity Requirements for Contributing Resources to the City of San Diego Source Water System

NRHP/CRHR Criteria	City of San Diego Criteria	Type of Significance	Integrity Requirements
A/1 and B/2	A, B, F	Association with Events, People, Patterns of Development; Special Elements of the City	Retains the following physical attributes as they relate to the integrity of location, setting, feeling, and association: • Maintains original alignment/location from its period of significance. • Continues to maintain its historic function as part of the larger water system

[5] Murray et al. "City of San Diego Source Water System Historic Context Statement." Historic Context Statement. San Diego, June 2020.

Table 2. Integrity Requirements for Contributing Resources to the City of San Diego Source Water System

NRHP/CRHR Criteria	City of San Diego Criteria	Type of Significance	Integrity Requirements
C/3	C, D, F	Engineering; Design; Notable Work	Retains the following physical attributes as they relate to the integrity of workmanship, materials, design, location, setting, feeling, and association: • Exhibits most construction methods and engineering details associated with the resource's period of significance. Buildings and other non-engineering structures should retain the essential character-defining features from their period of significance. • Retains original alignment/location from its period of significance. • Continues to retain its historic function as part of a larger water system.

Figure 3: Integrity Requirements Supplied from the City of San Diego Source Water System Historic Context Statement by Dudek

PART III: HISTORIC CONTEXT STATEMENT

INTRODUCTION

This historic context was based off the foundation set by Dudek Consultants with *The City of San Diego Source Water System Historic Context Statement* (June 2020).

The Historic Context Statement divides the history of the City of San Diego Source Water System into chronologically ordered periods of development which also serve as the identified themes:

- Early Water System Development (1887-1916)
- Flood Recovery and Reinvestment (1916-1928)
- Post St. Francis Dam Disaster Development (1928-1947)
- Water Importation and Post-war Development (1947-1960)

Dudek concluded that the City of San Diego Source Water System discontiguous historic district is eligible under NRHP/CRHR Criteria A/1 and City of San Diego Criteria A and B for its ability to convey important associations with the City's municipal water supply and the development of its critical water infrastructure prior to the importation of water from the Colorado River and State Water Project.

The *Historic Context Statement for City of San Diego Public Utilities Department Reservoir Structures* (2020) provides context about the development of San Diego's Source Water System, which provides valuable information for evaluating the Chollas Reservoir Complex and the Rancho Bernardo Reservoir. The following is an excerpt from the 2020 report:

> **Development of San Diego's Source Water System**[6]
>
> The procurement of water has played an instrumental role in the growth and development of the City since its founding. The region receives very little rainfall, and local mountain streams and groundwater provide only a limited supply of water. Cattle raising and dry-farmed wheat were the predominant forms of agriculture in the 1850s–1880s because of the water supply limitations. As the San Diego region, and the state of California as a whole, aggressively developed its agricultural industry in the Spanish mission–era and beyond, water supply became a highly prized and widely disputed topic from the colonial period onward. Seven principal streams originate in the peninsula range and discharge to the Pacific Ocean and provided fresh water sources and, later, ideal locations for dams and reservoirs: Santa Margarita river, San Luis Rey river, San Dieguito river, San Diego river, Sweetwater river, Otay river, and Tijuana river (which

[6] Murray et al., ""City of San Diego Source Water System Historic Context Statement." Historic Context Statement. San Diego, June 2020., p20-22.

consisted of two major reaches). The state's first instances of irrigation came from diverting such streams using riparian rights and lacked a formal water storage system (Caltrans and JRP historical consulting services 2000; Fowler 1953; SWRB 1951;).

During the mission period (1769–1834), Franciscan missionaries sought an adequate water supply for irrigation purposes by digging wells near the San Diego river and constructing ditches, small dams, and cisterns. Kumeyaay neophytes and laborers built the old mission dam (also called the old padre dam) in 1803 at mission gorge and an aqueduct to the mission; portions of both remain intact. During the Mexican and early American periods, there was no regional coordination when it came to procuring and maintaining a reliable water supply. At the end of the Mexican period and the beginning of the American period fresh water in San Diego was becoming increasingly difficult to acquire, because of ranching practices, aggressive hydraulic gold mining, and American homesteaders throughout the state (Caltrans and JRP historical consulting services 2000; Sholders 2002; SWRB 1951; cited in Murray et al. 2020).

In response to the population growth and regional limitations on irrigation based on low rainfall and lack of proper storage, multiple areas of Southern California, including the San Diego region, began to develop water storage reservoirs and dams.

The first major steps toward organized water infrastructure within the San Diego metropolitan area began with the 1873 formation of the San Diego Water Company. The corporation began drilling a well near B and Eleventh Streets in the City that supplied the City's first pipe water to a few residences in 1874. Unfortunately, the groundwater was poor in quality, and the supply was low, which led to the origination of the City's long-standing "bad water" reputation. To remedy its supply and quality issues, the San Diego Water Company increased its stock from $10,000 to $250,000 in 1875, which allowed for drilling of wells in the San Diego River, construction of a new pumping plant, and extension of the distribution system. The wells proved insufficient for the quickly growing City, and soon the City began to turn to privately owned water companies to supply the City (Fowler 1953; Smythe 1908; cited in Murray et al. 2020).

The development of reliable water infrastructure throughout the region did not begin in earnest until the 1880s, as a result of a significant population boom and the incoming California Southern Railway which connected the City to the eastern United States. The County's population swelled from 8,600 in 1880 to over 30,000 residents by 1887. Developers and land speculators emerged throughout the region, looking to capitalize on the City's rapid growth.

To address the ongoing water needs, the City entered into agreements with other water companies, including the Southern California Mountain Water Company (SCMWC). The SCMWC was led by Elisha Spurr Babcock Jr. (1848–1922), a native of Indiana, who earned his fortune in the railroad industry. He purchased property on Coronado Beach, establishing the Coronado Beach Company, which incorporated the Otay Water Company in 1886. John Diedrich Spreckels (1853–1926) of San Francisco earned his fortune in the shipping business and Hawaiian sugar industry. During an 1887 visit to the City, Spreckels was impressed by the real estate boom at the time, which led him to invest in construction of a wharf and coal bunkers at Broadway (at the time known as D Street). The boom ended quickly, but Spreckels continued his interest in the area. He acquired control of Babcock's Coronado Beach Company, then the *San Diego Union* in 1890, the *San Diego Tribune* in 1891, and the City's street railway system in 1892. Babcock persuaded Spreckels to invest in a number of his other organizations, including Otay Water Company and the Mount Tecarte Land and Water Company. The SCMWC was born from a consolidation of water companies that included the Otay Water Company and the Mount Tecarte Land and Water Company in 1894. Because of these transactions, Spreckels owned nearly half of Babcock's enterprises (Crawford 2011; Fowler 1953; Hennessey 1978; LAT 1896; McGrew 1922; Ormsby 1966; San Diego History Center 2018; Smythe 1908; cited in Murray et al. 2020).

Southern California Mountain Water Company (SCMWC)

The Southern California Mountain Water Company (SCMWC) was a private water company in San Diego, associated with Elisha Babcock Jr., and the Spreckels Brothers.[7] Notable engineers, including Hiram Newton Savage, were hired by the company throughout the years. SCMWC was a pivotal player in getting water to San Diego and contributed to the early dams and reservoirs in the region.

The SCMWC was founded by Elisha Spurr Babcock Jr. (1848–1922), a native of Indiana, who amassed his wealth from the burgeoning railroad industry. In 1886, Babcock Jr., purchased property on Coronado Beach, establishing the Coronado Beach Company, which incorporated the Otay Water Company. John Diedrich Spreckels (1853-1926) acquired control of Babcock's Coronado Beach Company, then the *San Diego Union* in 1890, the *San Diego Tribune* in 1891, and the City's street railway system in 1892. Babcock persuaded Spreckels to invest in several of his other organizations, including Otay Water Company and the Mount Tecarte Land and Water Company. The SCMWC was born from a consolidation of the Otay Water Company and the Mount Tecarte Land and Water Company in 1894. Because of these transactions, Spreckels owned nearly half of Babcock's enterprises.[8,9,10] In 1895 Babcock sold half interest of the Otay Water Company to the Spreckels Brothers and the name of the corporation was changed to the Southern California Mountain Water Company.

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[7] Southern California Mountain Water Company. "Report on the Works of the Southern California Mountain Water Company." San Diego, 1911. UCSD Special Collections.
[8] Smythe, William Ellsworth. "Chapter 4: Water Development." In *History of San Diego, 1542-1908*. San Diego: The History Company, 1908. https://sandiegohistory.org/archives/books/smythe/part4-4/.
[9] Murray et al., "City of San Diego Source Water System Historic Context Statement."
[10] Smythe, William Ellsworth. "Chapter 4: Water Development." In *History of San Diego, 1542-1908*. San Diego: The History Company, 1908. https://sandiegohistory.org/archives/books/smythe/part4-4/.

To get water to San Diego, the SCMWC began building a pipeline made of wood stretching from Otay to San Diego, with additional branch lines to supply farmers in the Otay Valley and residents of Coronado.

According to "The Way We Were in San Diego", a book about early San Diego by Richard Crawford:

> In the early century, wood-stave pipes were the modern method for bringing water to cities. The first public water system in America had brought water to Boston through wooden pipes in 1652. Two-and-a-half centuries later, the technique was still state of the art. "It is common knowledge that wood pipe buried in the ground or kept saturated with water, has an indefinitely long life," noted the American Water Works Association in 1922. For the San Diego project, engineers designed 40-inch-diameter pipe made from Humboldt County redwood. The pipeline would run north from Lower Otay for 19 miles, ending at a reservoir being built at Chollas Heights. From Chollas the water would run four miles northwest through cast-iron pipes to the city filtration plant in University Heights at Howard Avenue and Oregon Street. There, the water would be aerated in a fountain before being piped to customers. Construction began in December 1900, when laborers from the Mountain Water Co. began building tunnels and trestles in preparation for the redwood pipe, which was being cured in Coronado. The contract for trimming the lumber into pipe staves went to the Russ Lumber Co. of San Diego.[11]

As the City continued to face growing water demands, the City of San Diego entered into agreements with other water companies, including the SCMWC. The City purchased numerous holdings of the SCMWC in 1901 and purchased their entire holdings in 1913. The SCMWC was an important player in the early development of the San Diego water system and associated engineering feats.

An excerpt from the *San Diego Source Water Historic Context Statement* (June 2020) outlines the later theme of water importation and post-war development of the San Diego water system:

> **Water Importation and Post-War Development (1947-1960)**[12]
>
> The completion of the San Diego Aqueduct was the culmination of a multi-decade-long project to diversify water sources for the City of San Diego in the event of a flood or other emergency. Importing Colorado River water ended the City's complete dependence on local reservoirs and emergencies during multi-year droughts. When San Diego began incorporating imported water into the City's supply in 1947, it started a new trend in the City's water storage and management. At the time of its completion, the first San Diego Aqueduct added 65,000 acre-feet/year of water and accounted for

[11] Crawford, "The Wooden Pipeline to San Diego." P70-74.
[12] Murray et al., "City of San Diego Source Water System Historic Context Statement." P24-26.

70-80% percent of the City's water supply, with the remainder coming from local reservoirs. The San Diego Aqueduct's completion marked a shift in the priorities of the City, and it would continue to rely on the imported water for greater than 90% of the city's total supply well into the 1990s (Fraser 2007; SDCWA 2020, Sholders 2002; cited in Murray et al. 2020).

While this period is significant because of the switch to imported water from the Colorado River, this period also saw the completion of Sutherland Dam (1954) and the Miramar Dam (1960). Miramar Dam, the final dam constructed in the City of San Diego's system, was constructed to supply local water to the northern part of the City of San Diego, as well as service the Miramar Naval Air Station, after the area was annexed to the city, expanding the city's population and utilities. While the water system continues to grow and develop after through alterations and additions, no new dams have been added to City of San Diego's system since Miramar was completed.

PART III: CHOLLAS RESERVOIR COMPLEX EVALUATION

CHOLLAS RESERVOIR COMPLEX

Resource Description

The Chollas Reservoir Complex, commonly known as Chollas Lake Park, is composed of the Chollas Dam and Chollas Reservoir, and Outlet Tower, along with recreational elements including trails, fishing piers, loading ramps, and a parking lot. A map of Chollas Lake Park is provided in Figure 4. The complex was historically called the Chollas Heights Reservoir/Dam. For the purposes of this evaluation, Chollas Reservoir Complex is used for brevity.

The Chollas Dam is a concrete and earthen embankment dam. The dam has a steep, northwest facing earthern slope. The crest of the Dam measures 55', with a discharge headwall and Weir that directs the waterflow west, and eventually flows into Chollas creek. The waterflow travels south of and parallel to the west access road to the Dam.

The Chollas Reservoir is a dammed, small, urban lake to the east of the Dam. The Reservoir features the Outlet Tower and currently serves as a recreational lake. The reservoir is irregular in shape, although generally oriented in a "U" shape with the dam along the western edge. The diameter is approximately 8/10s of a mile. A walking path encompasses the reservoir, along with a surface parking lot, picnic tables, a children's playground, and fishing docks.

The complex also has surrounding parkland that consists of 16 surface acres. Native and non-native vegetation was thick to the sides of the access road, west entrance to the Dam from North Chollas Park parking lot. Eucalyptus trees are the main vegetation around the Dam and at the base of the northwest facing slope of the Dam.

The complex is located between Fauna Drive and College Grove Road to the north-south, and 54th Street and College Grove Way to the east-west. Pictures of the complex can be found in the attached DPR 523 forms.

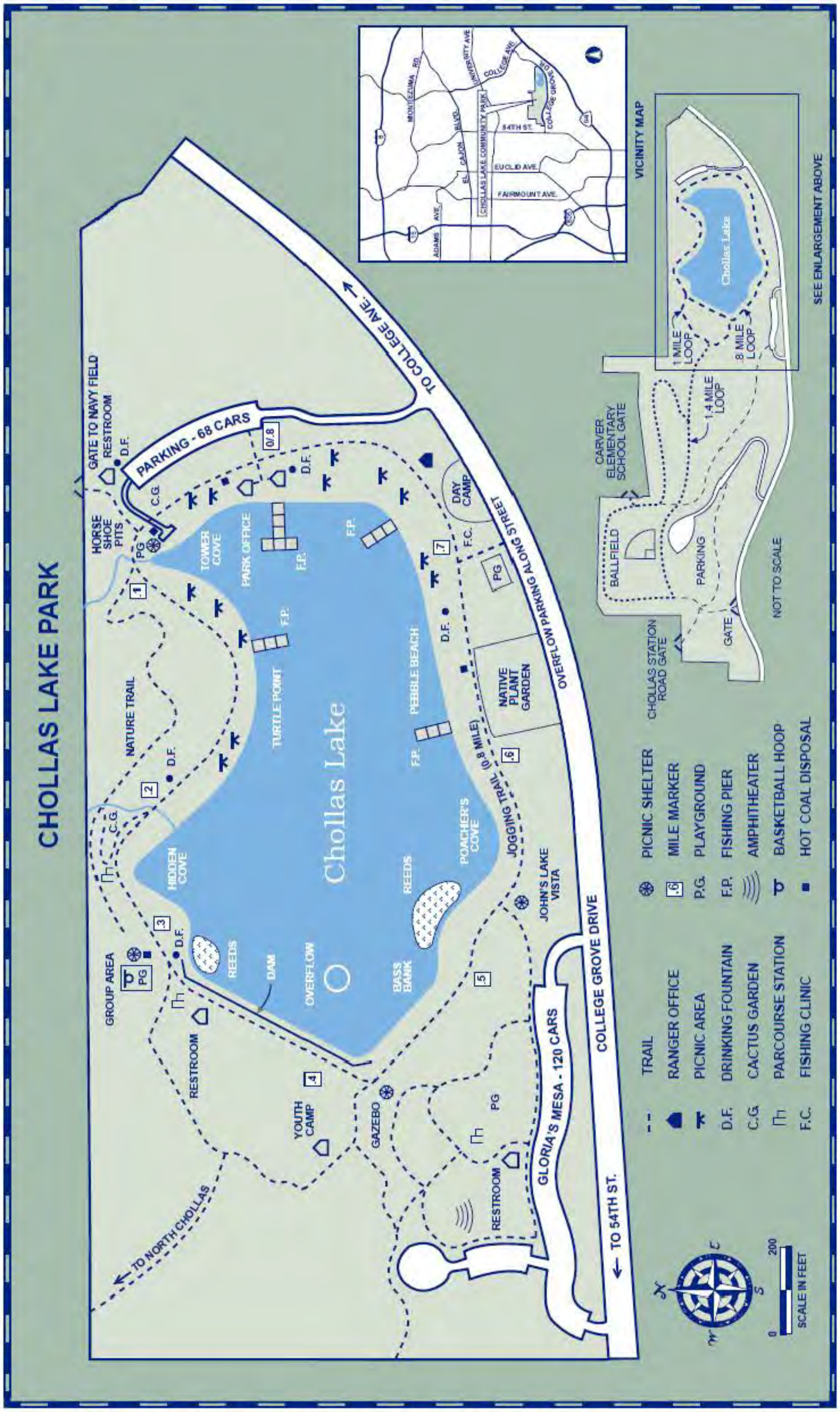

Figure 4: Chollas Park Facility Map. City of San Diego

Historic Context of the Chollas Reservoir Complex

Construction of the Chollas Heights Dam and Reservoir

The Chollas [Heights] Dam and Reservoir was constructed in 1901 for the private SCMWC. E. S. Babcock, President of the SCMWC, was an instrumental figure in the development of the dam. The engineer in charge of constructing the dam and reservoir was Hiram Newton (H. N.) Savage, who served as consulting engineer for the SCMWC beginning in 1893.[13] The earth-fill embankment dam was constructed on a tributary to Las Chollas Creek east of the City limits and built to serve as terminal storage for the pipeline extending from the Lower Otay Reservoir.[14] (See Figure 5-7). This pipeline delivered water to the Coronado Water Company, which supplied the City of Coronado. Later, it was also used a component part of the system distributing water from both the Lake Morena and Otay Lakes to the City distribution reservoir in University Heights. Further, upon completion, the reservoir was used as a storage and transfer facility. To this purpose, the reservoir was used for emergency containment and storage of water for the City of San Diego daily water supply until it was decommissioned in 1966.[15]

The dam was constructed with earthen fill, with a quarter-inch steel core plate anchored into a foundation wall. Soon after its construction, a filtration plant was constructed adjacent to the reservoir. In 1906 the Bonita Pipeline from Lower Otay Reservoir to the Chollas Reservoir was constructed. At an undated time during the early 20th century, a Caretaker's House was constructed on site, aerial photography seems to locate this resource directly north of the Dam. C. Moore is listed as Caretaker of the Chollas Reservoir in City Reports and newspaper articles in the year 1917.[16]

A steel pedestrian bridge led east from the Dam to the Outlet tower, as seen in photographs from 1917.[17]

Earth-filled Embankment Dams were a common dam type in Southern California and across the region. The following excerpt outlines the resource typology:

> Earth-filled Embankment Dams[18]
>
> Earth-filled embankment dams were the first type of dam to be constructed by humans and were first documented in approximately 3,000 BC in the Middle East. In fact, earth-filled embankment dams are still the most prevalent dam-type, and a 2005 report on

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[13] Gregg Hennessey, "The Politics of Water in San Diego 1895-1897," *The Journal of San Diego History* 24, no. 3 (Summer 1978), https://sandiegohistory.org/journal/1978/july/water/.
[14] Southern California Mountain Water Company, "Report on the Works of the Southern California Mountain Water Company" (San Diego, 1911), UCSD Special Collections.
[15] City of San Diego, "Chollas Lake Facilities," City of San Diego, accessed November 20, 2020, https://www.sandiego.gov/sites/default/files/chollaslake.pdf.
[16] San Diego Union, 1917.
[17] San Diego History Center Archives, 1917.
[18] Murray et al., "City of San Diego Source Water System Historic Context Statement." P24.

> large federal dams estimated that of the 70,000 dams present in the United States, 85% were earth-filled embankment dams. Many of the dams in the United States were built in the early twentieth century prior to the advent of technology that would have facilitated the construction of structural dams. However, the report goes on to say that throughout the twentieth century, even with the advent of new technology, 65% of the dams built were earth-filled embankment dams. Earth-filled dams are the most prevalent type of dam because they can be built from locally available materials that require minimal processing, saving money on the construction process. The main detraction from earth-filled dams is that they are subject to the erosive action of water if a sufficient spillway is not provided as part of the dam design (Billington et al. 2005; Bureau of Reclamation 1987).

Purchase by City of San Diego, 1912-1913

Although the City of San Diego Water Department was formed in 1901 and began developing a distribution system, the Chollas facility was not yet acquired.[19]

Most of San Diego's private water companies failed to survive the drought of 1895-1904 and disappeared by 1905. Realizing the need to gain better control of its infrastructure, the City began purchasing holdings of the SCMWC that were within the City limits. Such holdings included reservoirs, pumping plants and machinery, pipelines, buildings, and tools. The City also began constructing its own facilities and infrastructure to meet increasing demand (Fowler 1953).[20] On August 13, 1906, the City reentered into a contract with the SCMWC for water supply of up to 7,776,000 gallons per day at the price of 4 cents per 1,000 gallons from the Chollas Reservoir.[21]

In August 1912, the City voted on a bond issue of $2,500,000 to purchase the Otay Lakes, as well as the Barrett intake, dam, and reservoir site; Dulzura Conduit; and Chollas Reservoir System from the SCMWC (Fowler 1953). The purchase was effective on February 1, 1913. Babcock wrote a statement that the council should be commended for having obtained such favorable terms from the SCMWC:

> By 1915 we will have at least 100,000 people. This increased population will need more water or else they will leave here and go to Los Angeles. So, I think our only recourse is to buy out the system of the Southern California Mountain Water company, as it is cheap at the price offered for four million dollars… I have no interest whatever professionally in the matter, or I do not own a dollar in this system, but I know what it cost, what its influence has been on the growth of San Diego and realize that the best

[19] Smythe, "Chapter 4: Water Development."
[20] Murray et al., "City of San Diego Source Water System Historic Context Statement."
[21] San Diego Union Archives, See Appendix C.

> interests of the citizens will be served by municipal ownership (SDU 1912; cited in Murray et al. 2020).

The impounding capacity of the system purchased was 29,180,000,000 gallons total. By purchasing this system, the City of San Diego assumed a servitude to supply water to the Coronado Water Company. In 1913, the sum of $705,000,000 was voted to improve the water system which would add an impounding capacity of 15,000,000 gallons and a further delivering capacity of filtered water by gravity of 7,250,000 gallons daily.[22]

Population growth more than doubled from 17,700 in 1900 to over 39,500 in 1910, and water was relatively plentiful. However, the drought that struck San Diego in 1912 once again brought water security fears to the fore.[23]

<u>Alterations and Post-construction Development, 1902-1966</u>

By 1912, City Water Supply reports note that the Chollas reservoir typically maintained a capacity of two weeks supply of water for the San Diego population. The resource was appraised by a Southern California Water Company Engineer at $134,668.20. During this time, from 1912-1915, newspaper articles reports that the filtration plant on site was outpaced due to daily demand on the water system.[24]

In 1914, the U.S Navy chose adjacent land as site for one of its three radio stations that would complete a system providing their first worldwide wireless communications. This Chollas Heights Radio Station was composed of three large metal towers, was completed in 1916. The towers were removed in the 1990s.[25]

[22] Murray et al., "City of San Diego Source Water System Historic Context Statement."
[23] Smythe, "Chapter 4: Water Development."
[24] San Diego Union, 1912-1915. See Appendix C.
[25] "Naval Radio Transmitting Facility NRTF Chollas Heights NPL."

Figure 5: Chollas Dam shortly after Construction, 1901 (University of California Riverside (UCR) Collection)

Figure 6: Chollas Heights Construction Camp, 1901 (UCR Collection)

Figure 7: Chollas Heights Dam and Reservoir after Construction, 1901 (UCR Collection)

A 1916 flood inspired a critical water infrastructure boom for the City of San Diego. This era of development was also motivated by the potential loss of seasonal rainfall and loss of infrastructure after a severe drought that almost ran water resources dry.[26] By 1916, the reservoir complex was severely stressed by local demand, paralleling the local population growth. A water shortage was noted in the newspapers, and the reservoir was nearly depleted. The daily consumption of water during that year was above 10 million gallons daily. The Chollas Reservoir dropped to less than 45 million gallons, which equaled less than a four-day supply for the city.[27]

1917, saw an arson incident to the complex, with an unnamed individual setting fire to brush. No physical damage was noted in the newspaper archives or City reports. This same year, a large storm causes most of the water distribution network to fail, and the city is forced to rely on the Chollas Reservoir Complex for all water needs.[28]

By 1926, as the City water demands continued to grow, booster pumps were added to the Chollas reservoir filtration system. A large flooding event in 1927 required the repair of cracking in the Chollas reservoir and dam, and plans show the erection of a fence surrounding the resource. In 1929, plans were introduced to enlarge the Reservoir using City bonds after a breach at the St. Francis Dam. A number of improvements were completed by 1930 including the enlargement of reservoir capacity.[29]

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[26]Murray et al., "City of San Diego Source Water System Historic Context Statement.""
[27] "Water Is Increased," *San Diego Evening Tribune*, February 4, 1916.
[28] "Fire Menaces City Plant at Chollas," *San Diego Evening Tribune*, October 27, 1917.
[29] Ibid.

Repairs were done to the Outlet Tower in 1955, and specs were found for a new Outlet Tower ladder.[30]

The Chollas complex was decommissioned in 1966, and through a ballot initiative, the lake was turned over to the Park and Recreation Department to operate it as a public park centered around youth fishing. It was officially designated a youth fishing lake in 1971, which included development and operation of a recreation program. Initially, the lake was open only on weekends and holidays, but within the first year the recreation program was expanded to include weekday evenings.[31]

Since 1971, the Chollas Lake Park has been used for a variety of recreational fishing and lake activities. (See Figure 8). Significant repairs were done to the complex in 1985. The improvements listed include clearing and demolition of existing vegetation, pipelines, and debris, foundation excavation, buttress fill, the installation of seepage and chimney drains, and the construction of a drainage ditch.[32]

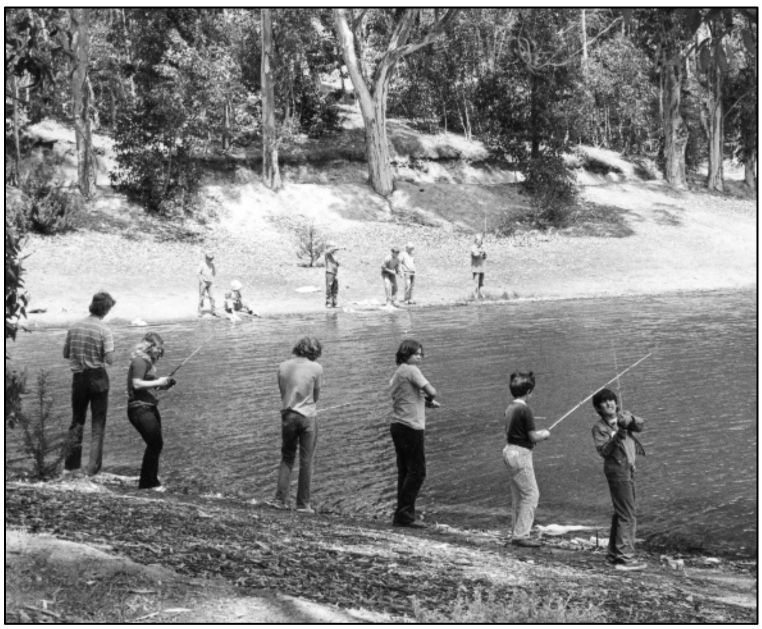

Figure 8: Youth Fishing at Chollas Reservoir, 1972, (Bob, Brown, City of San Diego Digital Archives)

Periodic vegetation plantings and cleanings, along with recreational improvements have occurred since the complex's decommission.

[30] City of San Diego Parks and Recreation, "Chollas Heights Reservoir Outlet Tower Plans", 1953.
[31] City of San Diego, "Chollas Lake Facilities."
[32] City of San Diego, "Chollas Lake Improvement Plans."

Timeline of Chollas Heights Dam and Reservoir

- 1901- Reservoir and Dam are constructed
- 1902- Filtration Plant is completed
- 1912- held 2 weeks supply of water for the population. The resource was appraised by a Southern California Water Company Engineer at $134,668.20.
- 1912-1915- Newspaper reports that the filtration plant was outpaced based on demand
- 1913- City purchases the reservoir and filtration plant from the Southern California Water Company.
- 1916- A water shortage is noted in San Diego and the reservoir is nearly depleted. The daily consumption of water is 10,000,000 by the City. Reservoir drops to less than 45,000,000 gallons, or less than 4 days' supply of water.
- 1917- C. Moore is listed as caretaker of the reservoir who lived in a house on-site. A brush fire is intentionally caused nearby. Later in the year, a large storm causes local water system to fail, the city must rely on the Chollas dam solely.
- 1926- Booster pumps are added to the filtration system
- 1929- Plans are introduced to enlarge the reservoir using City bonds. Plans are put on hold. Plans eventually are shelved when the city decides to build a new facility in Otay.
- 1930- Fishing and hunting is banned from the reservoir.
- 1966- City decommissions the plant and turns it into a recreational reservoir.
- 1985- Numerous alterations to the Complex including demolition of pipelines and creation of a drainage ditch.

Thematic Contexts:

Property Type: Reservoir and Dam Complexes

The Chollas Reservoir Complex follows the typical elements of a reservoir and dam complex as outlined by the *City of San Diego Source Water System Historic Context Statement in 2020.*

Reservoir complexes are usually comprised of several elements including the water-retaining structure (dam), a water-retention area (reservoir), a water-releasing structure (spillway), a water-conveying structure (conduits and outlet tower), and other essential elements including water treatment plants.[33] The Chollas Reservoir Complex contains an earthen dam, reservoir, and outlet tower. Although the Reservoir is no longer used for water storage and distribution, each of these portions of the reservoir provided an essential function that ensures water will be retained and released safely. Because of these components, the Chollas Reservoir Complex can be viewed as a primary property type for the identified *City of San Diego Source Water Historic Context Statement.* Primary property types are distinguished from secondary property types in that each is required for the water system to work effectively and for the reservoir system to

[33] Murray et al., "*City of San Diego Source Water System Historic Context Statement.*"

continue its intended functions. Primary property types also reflect the elements of a reservoir complex that are required to convey its significance.

The purpose of a dam is to store water and facilitate flood control for human and livestock water supply, irrigation, energy generation, recreation, and pollution control. Typically dams fulfill a combination of these functions. The Chollas Reservoir Complex is a manmade earthen dam, which was used for water storage and distribution. Currently, it is used for recreation.

Associations with Historic Figures

The Chollas Reservoir Complex is associated with two influential figures. The complex was designed by Hiram Newton Savage, and owned by Elisha Babcock, Jr and John Spreckels, identified in the thematic context earlier in the report.

Hiram Newton Savage: Engineer (1861-1934)[34]

The Chollas Reservoir Complex was engineered by H.N Savage, who was the consulting engineer for the SCMWC. According to Murray et. al:

> Hiram Newton Savage was born in Lancaster, New Hampshire, to farmer Hazen Nelson Savage and Laura Ann (Newton) Savage. In 1887, he graduated with a Bachelor's in Science (B.S.) from New Hampshire College of Agriculture and Mechanical Arts, following that degree in 1891 with a Civil Engineering degree from Thayer School of Engineering at Dartmouth College.[35] After graduating, Savage immediately began seeking engineering work.
>
> While completing his degree at Dartmouth, Savage began his engineering career in Tennessee, where he was hired as assistant engineer by the East Tennessee and Georgia Railway, the Nashville and Tellico Railway, and the Athens (Tennessee) Improvement Company in 1888. In 1889 he was an Assistant Engineer for the Hydraulic Mining and Irrigation Company in the San Pedro Mining District of New Mexico, and later that same year he served as Chief Engineer at the Rio Grande Water Company in New Mexico. In 1891, Savage relocated to Southern California, where the San Diego Land and Town Company in National City, California, hired him as chief engineer; he worked there until 1903.[36] His biggest achievement at San Diego Land and Town Company was the enlargement of the Sweetwater Dam, raising the dam to 110 feet tall and resulting in a total storage capacity greater than 26,000 acre-feet. Completed in 1911, the work entailed addition of a 20-foot-tall parapet along the top of the dam; addition of concrete to the downstream side of the dam to compensate for the extra pressure from the

[34] The biographical information was pulled from Murray et al., "City of San Diego Source Water System Historic Context Statement.", along with the finding aid for the H.N Savage papers at UCR.
[35] Hiram Newton Savage Papers Finding Aid, University of California, Riverside.
[36] Jeremy Hollins, "'Until Kingdom Come' The Design and Construction of La Jolla's Children's Pool," *The Journal of San Diego History*, n.d., 4.

increased water storage; inserting a two-chute overflow weir on left side of the dam; and raising the height of the outlet tower (Reynolds 2008, WRCA 2005).

While with the San Diego Land and Town Company, Savage also took outside consultant work. He took consulting jobs with several San Diego-area railroads: the San Diego and Cuyamaca Railway, the San Diego and La Jolla Railway Company, and the Cuyamaca Beach Railway Company. He also consulted for water-related engineering projects with the Cuyamaca Water Company, including the Zuninga Shoals Jetty Project for the City of San Diego. In 1895, the SCMWC hired Savage as a Consulting Engineer in connection with the Morena, Upper Otay, and Lower Otay Dams, and the water-conveyance system to the City (WRCA 2005).

In 1903, Savage was appointed Consulting Engineer for the United States Reclamation Service (a predecessor to the Bureau of Reclamation). In 1905, Savage was promoted to the Supervising Engineer of the Northern Division of the Reclamation Service in Montana, North Dakota, and Wyoming, where he oversaw several Reclamation Service dam projects, such as: the Milk River Project and Sun River Dam Project in Montana, the Williston Dam project in North Dakota, and the Shoshone Dam Project in Wyoming, which was at the time of its construction the highest dam in the world. Savage also consulted on other Reclamation Service projects for other regional divisions, including the Southern Division's Salt River Valley and Roosevelt Dam projects in Arizona. During his time with the Reclamation Service, New Hampshire State College awarded Savage with an honorary Doctor of Science in Engineering degree in 1913. His engagement at the federal level lasted from 1905 until 1915, before he resigned and returned to Southern California. In 1916, the Sweetwater Water Company of California hired Savage as a Consulting Engineer and later as a Supervising Engineer for the enlargement of the Sweetwater Dam, which had been damaged in the 1916 floods (Bureau of Reclamation 2018; WRCA 2005).

Savage was officially hired by the City of San Diego as the city's Hydraulic Engineer on June 4, 1917. The position had not previously existed for the city and came with the authority to direct the water department, design infrastructure, and make recommendations There he continued the water infrastructure recovery from the 1916 floods. The flood of 1916 had destroyed Lower Otay dam, a structural failure that flooded Otay Valley and caused 22 drowning deaths. Savage's role in the reconstruction of Lower Otay Dam, the construction of Barrett Dam, and the repairs to Sweetwater Dam and Morena Dam, solidified the important role that he played in San Diego's water system. The acquisition of Savage was an immeasurable triumph, the results of which would put the City of San Diego ahead both technologically and financially (McGlashan and Ebert 1918; San Diego Evening Tribune 1917; San Diego Union 1918c; Scientific American 1923; WRCA 2005).

In addition to Savage's successful dam projects, he also submitted several reports on the City's future needs for new water resources and infrastructure development. Savage also brokered several deals to secure water rights for the City in several cases. These reports and legal issues contributed to the deterioration of Savage's relationship and rapport with the City Council. Savage's employment as City Hydraulic Engineer for the City of San Diego lasted until 1923, when he was summarily dismissed after multiple disputes with the City Council and consulting hydraulic engineers J. B Lippincott and John R. Freeman (LAT 1922; San Diego Evening Tribune 1923b; San Diego Sun 1923; WRCA 2005).

After his dismissal from the City's employment, Savage embarked on two world tours from 1923 to 1925, studying foreign engineering projects at the Aswan Dam in Egypt, water supply projects in England, and irrigation projects in Brazil, before returning to the United States and offering hydraulic engineering consulting services. Savage's work during this period is unknown (WRCA 2005).

Meanwhile, by 1928, the City of San Diego's water infrastructure development suffered without Savage's leadership, culminating in the ultimate failure and abandonment of the Sutherland Dam project. The City invited Savage to return as Hydraulic Engineer, heading the Municipal Bureau of Water Development, Operations, and Maintenance. Savage returned to San Diego in 1928, with the condition that he be allowed to work independently of political interference. This was not to be. The City Council resumed their antagonistic relationship with Savage almost immediately, undercutting his authority by hiring consulting engineers who publicly dissented with Savage's ideas and publicly criticizing Savage's reports. Savage, for his part, resumed securing water rights for the City and began the El Capitan Dam project in 1928. His re-employment with the city of San Diego lasted until 1933 when Savage resigned, but he remained a consultant until the dam was completed. Shortly after Savage's resignation, he succumbed to a longstanding sickness and died in 1934 from heart failure (Savage 1932; San Diego Evening Tribune 1934; San Diego Sun 1932, 1933; San Diego Union 1932a, 1934a; WRCA 2005).

Savage's career as an engineer extended 46 years, from 1888 to his death in 1934.

He was a member of the University Club and the Rotary Club of San Diego. He was also a member of the Masonic Order. Mr. Savage was elected an Associate Member of the American Society of Civil Engineers on March 7, 1894, and a Member on October 7, 1896. He died in San Diego in 1934. In recognition of the valuable work he had done for the City of San Diego in the development of its water supply, the City Council on July 9, 1934, changed the name of Lower Otay Dam to Savage Dam.[37]

[37] Hiram Newton Savage Papers Finding Aid, University of California, Riverside.

Elisha Spurr Babcock Jr.: Owner (1848-1922)[38]

Elisha Spurr Babcock Jr. was raised in Evansville, Indiana, and graduated from Evansville High School. After high school he began working for the Evansville and Terre Haute Railroad Company and quickly worked his way up to the position of general freight agent of the road by age 24. He left the railroad industry to help develop the Cumberland Telegraph and Telephone Company, a Bell subsidiary, which controlled a large territory from Evansville to New Orleans, while at the same time having sole ownership of the Eugene Ice Company. At this point in his life, Babcock had enough wealth to purchase five large houses and a number of agencies, in addition to being a partner in the firm of E.S. Babcock & Son. He married Isabella Graham (1850-1932), a native of Cincinnati, Ohio, and had two children, Arnold and Graham Babcock.

In 1884, Babcock retired to San Diego for his health, where he continued to advance his enterprises. In 1885, he and Hampton Story, purchased the property known as Coronado Beach, a tract of over 4,000 acres across the bay from the City of San Diego. The men organized the Coronado Beach Company, of which Babcock was president and active manager. The company soon laid out the City of Coronado, selling $2,750,000 worth of the area's property and with the profits from the land sale built the Hotel del Coronado. In 1886, Babcock created the San Diego and Coronado Ferry Company to accommodate the growing number of visitors to Coronado Island. Babcock and his three associates also built the water works for both Coronado and San Diego, the street railway lines, a railroad twenty-two miles long around San Diego Bay, an electric light plant, a shipyard, and many other enterprises (Coronado Historical Association 2020).

Bringing water to San Diego and Coronado was a high priority for Babcock, who persuaded John D. Spreckels to invest in several his organizations, including the SCMWC in 1895 (Smythe 1908). John D. Spreckels and A.B. Spreckels, sons of the sugar king Claus Spreckels, were also highly influential businessmen in the San Diego area. The three men became the sole owners of several enterprises developed by Babcock, and Spreckels eventually owned nearly half of Babcock's enterprises, yet he retained Babcock as his business manager (Hennessey 1978).

In 1912, after completion of the Morena Dam, Babcock sold his interests to the Spreckels companies. Later, the City of San Diego took over the water system and continued its development (San Diego Union 1922).

As an engineer, the Upper Otay Dam is the only existing structure Babcock designed. Despite being patterned after the Bear Valley Dam engineered by John Eastwood, Babcock is given recognition with the dam constructed at the Upper Otay as his own creation (Jackson 1999). The rock fill Lower Otay Dam, also designed by Babcock, was destroyed in the 1916 flood. For

[38] The biographical information was pulled from Murray et al., "City of San Diego Source Water System Historic Context Statement.", along with Smythe, "Chapter 4: Water Development." William Smythe. The NRHP nomination for the University Heights water tower was also used as corroborative information. (North Park Historical Society, "University Heights Water Storage and Pumping Station Historic District National Register Nomination.")

the majority of his career Babcock functioned as an organizer or controller of corporations, which included the Cuyamaca Railway, the Los Angeles and San Diego Beach Railway otherwise known as the La Jolla Line), the Western Salt Works, and the South San Diego Investment Company (San Diego Evening Tribune 1922b). Babcock died of a stroke in his office on October 8, 1922, at the age of 73. Short list of Babcock's known engineering works includes the Upper and Lower Otay Dam (1896, 1894, respectively).

Significance Evaluation for the Chollas Reservoir Complex

The Chollas Reservoir Complex is a primary building type (Dam and Reservoir), constructed during the period of significance for Source Water Infrastructure (1897-1947), as defined in the *City of San Diego Source Water System Historic Context Statement*. The Chollas Reservoir Complex is associated with, and its period of significance falls under, the theme of Early Water System Development (1887-1916). The Reservoir Complex is associated with water storage and distribution. The Chollas Reservoir Complex was decommissioned in the 1960s and the reservoir was converted to a recreational lake. The complex no longer retains its historic function as a part of the larger San Diego water system (for further discussion see Integrity Evaluation).

The following is a summary of the significance and integrity for the Chollas Reservoir Complex; see the appended DPR 523 forms (Appendix F) for further documentation.

The complex was evaluated under the NRHP/CRHR criteria A/1–D/4/, as a potential contributor to the San Diego Source Water System Historic District and as an individual resource as follows:

Criteria A/1: Associated with events that have made a significant contribution to the broad patterns of our history.

The Chollas Reservoir Complex reflects special elements of San Diego's historical development. Construction of the dam made a significant contribution to the history of water development in the San Diego region and was a milestone in the City's quest to achieve source water independence.

The Chollas Reservoir Complex also reflect special elements of San Diego's engineering development as it embodies the distinctive characters of an earthen embankment dam. Any Dam which predates the significant flooding events in the first quarter of the twentieth century are exceedingly rare. The Chollas Dam survived flooding events and was relied upon for drinking water by the City during severe flooding events. Because of this, the subject property is recommended significant under NRHP/CRHR Criteria A/1 with a period of significance of 1901-1916.

Criteria B/2: Associated with the lives of significant person(s) in our past.

Although the Chollas Reservoir Complex is associated with Hiram Newton Savage and Elisha Babcock, Jr., neither of these associations can be connected to the resource in a meaningful way. Therefore, the complex is recommended not significant under NRHP/CRHR Criteria B/2 for associations with important person(s).

Criteria C/3: 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.

Although the Dam and Reservoir were constructed during the period of significance for source water infrastructure (1887-1947), and exemplifies very early twentieth century engineering practices, it is not an intact representation of a recognizable and notable engineering type at any level. Earthen-embankment dams are the most common type of Dams.The complex is not eligible under NRHP/CRHR Criteria C/3 for embodying the distinctive characteristics of dam engineering types and methods seen throughout the late 19th and early 20th centuries, or for representing an important facet of the body of work of master water engineer H.N Savage. The Chollas Reservoir Complex is recommended not significant under NRHP/CRHR Criteria C/3.

Criteria D/4: Have yielded or may be likely to yield information important in history or prehistory.

An archaeological survey was not conducted for this project. At this time there is no indication that the Chollas Reservoir Complex has the potential to yield information important to national, state or local history. Therefore, the property appears not eligible under NRHP/CRHR Criteria D/4.

The resource was evaluated under the City of San Diego local designation criteria A-F as follows:

Criterion A: Exemplifies or reflects special elements of the City's, a community's, or a neighborhood's historical, archeological, cultural, social, economic, political, aesthetic, engineering, landscaping, or architectural development

The Chollas Reservoir Complex reflects special elements of San Diego's historical development. Construction of the dam made a significant contribution to the history of water development in the San Diego region and was a milestone in the City's quest to achieve source water independence.

The Chollas Reservoir Complex also reflects special elements of San Diego's engineering development as it embodies the distinctive characters of an earthen embankment dam. Any Dam which predates the significant flooding events in the first quarter of the twentieth century are exceedingly rare. The Chollas Dam survived flooding events and was relied upon for drinking water by the City during severe flooding events. Because of this, the complex is recommended significant under City of San Diego Criterion A with a period of significance of 1901-1916.

<u>Criterion B: Is identified with persons or events significant in local, state, or national history</u>

<u>Persons:</u> Although the complex does have connections to noted individuals, including E.S. Babcock, the Spreckels brothers, and Hiram Newton Savage who hold importance within the history of San Diego, the subject property is not connected with any of these individuals in a way that directly represents their contributions within the local historic context.

<u>Events:</u> The Chollas Reservoir Complex is associated with events significant in local, history. Construction of the Chollas Dam and Reservoir was a major undertaking in a remote part of San Diego that required significant planning and coordination. The subject property is directly associated with important events related to water development in the San Diego region, namely with the City gaining source water independence and being a critical component to the water infrastructure that supported the City's growth and development until the end of World War II. Therefore, the complex is recommended significant under City Criterion B.

<u>Criterion C: Embodies distinctive characteristics of a style, type, period, or method of construction or is a valuable example of the use of indigenous materials or craftsmanship</u>

The Chollas Reservoir Complex is not eligible under NRHP/CRHR Criterion C/3. Although the Dam and Reservoir were constructed during the period of significance for Source Water Infrastructure (1887-1947), it is representative of the most common type of engineering practice and dam typology and fails to rise to a level of significance of a notable engineering type at any level.

<u>Criterion D: Is representative of the notable work of a master builder, designer, architect, engineer, landscape architect, interior designer, artist, or craftsman</u>

The Chollas Reservoir Complex is not significant as representative of a notable work of a master engineer. The Chollas Reservoir Complex was designed by engineer H.N Newton in 1901. Hiram Newton Savage is not currently designated as a master engineer by the City of San Diego. If, in the future H.N Savage is designated as a Master by the City's Historical Resources Board, this resource should be re-evaluated.

<u>Criterion E: Is listed or has been determined eligible by the National Park Service for listing in the National Register of Historic Places or is listed or has been determined eligible by the State Historic Preservation Office for listing in the California Register of Historical Resources.</u>

The Chollas Reservoir Complex has not been determined eligible by the National Park Service for listing in the NRHP and has not been previously listed. Therefore, the Chollas Reservoir Complex is not significant under Criterion E.

Criterion F: Is a finite group of resources related to one another in a clearly distinguishable way or is a geographically definable area or neighborhood containing improvements which have a special character, historical interest or aesthetic value or which represent one or more architectural periods or styles in the history and development of the City.

As described under NRHP/CRHR Criteria A/1 and see full discussion above), the Chollas Reservoir Complex is eligible for significance for its role, function, and design within the larger City of San Diego Source Water System, and as a contributor to the larger City of San Diego Source Water System Historic District.

The City of San Diego Source Water System has previously identified ten (10) impounding reservoir complexes owned/operated by the City that function as part of the City's municipal water-supply system. These resources and their related infrastructure (e.g., dams, outlet towers, conduits, flumes, and pipelines) constitute a finite group of resources related to one another in a clear way, steeped in historical interest and representative of significant engineering achievements. Taken as a whole, these resources (including the Chollas Reservoir Complex) are significant for their role in the City's source water system, starting with the earliest efforts to establish privatized water in the 1880s soon followed by construction of the earliest reservoirs, Lake Cuyamaca (1887) and Sweetwater Reservoir (1888). The period of significance ends with construction of the San Diego Aqueduct, and the importation of Colorado River Water for the first time into the San Vicente Reservoir (1947), which forever changed the composition of City's source water supply. Therefore, the Chollas Reservoir Complex appears significant under City Criterion F.

Integrity

The question of integrity is another factor that must be addressed when determining the eligibility of a resource for listing in a historic register. The Secretary of the Interior describes integrity as “the ability of a property to convey its significance.” A property must retain certain intact physical features to convey its significance under one or more of the applicable criteria.

Integrity is judged on seven aspects: *location, design, setting, workmanship, materials, feeling, and association*. If a particular resource meets one of the A/1 through D/4 criteria and retains sufficient integrity to convey its historic significance, it is considered as an eligible “historic property” for listing in the NRHP/CRHR. Additionally, unless exceptionally significant, a property must be at least 50 years old to be eligible for listing.

The Chollas Reservoir Complex was constructed in 1901 and meets the 50-year-old threshold for NRHP/CRHR listing. The City of San Diego typically recommends a 45-year-old threshold for resources, which is also met by the 1901 date of construction.

Integrity Assessment

The San Diego Source Water System Historic Context Statement identifies integrity requirements for contributing resources to the City of San Diego Source Water System Historic District. For resources potentially significant under Criteria A/1 and B/2 (City of San Diego Criteria A, B, F), it is necessary for the resource to:

Retains the following physical attributes as they relate to the integrity of location, setting, feeling, and association:

- Maintains original alignment/location from its period of significance.
- Continues to maintain its historic function as part of the larger water system

For resources potentially significant under Criteria C/3 (City of San Diego Criteria C, D, F), it is necessary for the resource to:

Retain the following physical attributes as they relate to the integrity of workmanship, materials, design, location, setting, feeling, and association:

- Exhibits most construction methods and engineering details associated with the resource’s period of significance. Buildings and other non-engineering structures should retain the essential character-defining features from their period of significance.
- Retains original alignment/location from its period of significance.
- Continues to retain its historic function as part of the larger water system.

The following is the evaluation of integrity for the Chollas Reservoir Complex:

Location: The complex retains integrity of location. The dam has never been shifted or relocated, and the complex retains its location relative to other reservoirs in the system.

Setting: The complex's setting has been diminished by subsequent developments along the shores of the reservoir. These include the development of a San Diego County parks site near the dam structure (1966), and the encroaching suburban development of the Chollas Heights community. The most significant impact to the setting has been the shift in use from a water storage and distribution resource to a recreational facility. The Reservoir serves as a fishing lake, with fishing piers- and there are walking trails that surround the Dam and Reservoir. Therefore, the Complex has a diminished integrity of setting.

Design: The Chollas Reservoir Complex retains integrity of design. Though there have been minor repairs to all structures, there are no significant alterations or incompatible departures from Savage's design. While the reservoir no longer plays a part of the larger water system, it is still used as a water storage system for recreational purposes. New elements such as two dock/pier structures, and site improvements such as parking lots, do not detract from the integrity of design.

Therefore, the complex retains the requisite integrity of design.

Materials: The Dam, Reservoir, and associated engineering structures do not retain integrity of materials. Numerous, significant repairs were done after the complex was decommissioned in 1966. These repairs include new infill to the embankment, the excavation of foundation structures, the removal of pipelines, and creation of new drainage, and removal of all ancillary structures except for the Outlet Tower. The number of materials altered have severely degraded the integrity of materials and the Complex does not retain integrity of materials.

Workmanship: The Chollas Reservoir Complex and associated engineering structures retain integrity of workmanship. The evidence of the craftsmanship of the workers who built the dam is evident in the still-visible embankment and crest of the Dam, the auxiliary spillway, and outlet tower. While there have been material and use changes to the Complex, the workmanship integrity remains.

Association: The dam, outlet tower, auxiliary spillway, and associated features and buildings do not retain integrity of association. They were designed, built, and operated by City employees for the purpose of supplying water to the City of San Diego. The association to the City of San Diego is non-existent because the Dam and Reservoir no longer operate as intended by the Engineers. Therefore, Chollas Reservoir Complex does not retain integrity of association.

Feeling: The Chollas Reservoir Complex no longer retains integrity of feeling. The modern development on the shore of the reservoir, the change of use within sight of the Dam structure reduces the original feeling of an early-twentieth century dam and reservoir operating as an extension of the City of San Diego outside of city limits. With the Chollas Heights neighborhood encroaching on the Reservoir and the increasing visual and physical disturbance of modern development, the feeling of a remote site can no longer be conveyed. Further, the entire complex is used for a recreational purpose, and there are numerous new features such as fishing piers, parking lots, and trails that diminish the feeling of a piece of the water system. Therefore, the integrity of feeling is significantly diminished.

Overall, the Chollas Reservoir Complex retains integrity of location, design, and workmanship. However, the Complex does have a diminished integrity of association, setting, materials and feeling. In conclusion, the complex does not retain sufficient integrity to convey its 1901-1916 period of significance under Criteria A/1/A/F.

Eligibility Findings:

The Chollas Reservoir Complex is recommended significant under Criteria A/1/A/F as a part of the San Diego Source Water System Historic District. However, the historic resources within the complex do not retain sufficient integrity for the complex to convey its significance under Criteria A/1/A/F with a 1901-1916 period of significance. Therefore, the Chollas Reservoir Complex is recommended not eligible for listing in the NRHP/CRHR and the local City register.

PART III: RANCHO BERNARDO RESERVOIR EVALUATION

RANCHO BERNARDO RESERVOIR

Resource Description

Originally constructed in 1964 by Peter Kiewit & Sons, Co., the 10-million-gallon, gravity-fed, Rancho Bernardo Reservoir, is an in-ground drinking water storage reservoir that provides a reliable water supply to the Rancho Bernardo community.[39] As an off-stream regulation reservoir, water is brought into the Rancho Bernardo Reservoir from Miramar reservoir and is gravity-fed back into several areas in the local Rancho Bernardo community.

The Rancho Bernardo Reservoir is composed of the reservoir, outlet, and spillway. The spillway is an overflow concrete box structure measuring 4'x12'x6.5' to a 36-inch RCP pipe, with a capacity of 129 cubic feet per second (cfs). The outlet is a combination inlet-outlet line pipe. The Reservoir is rectangular, measuring 370-foot by 298-feet and is rubber-lined asphalt concrete. The concrete roof is supported by 66 precast concrete columns. The side slopes on a ratio of 2:1. The total height of the structure is 27.01 feet. The Reservoir has a cathodic protection system.[40]

The Reservoir, contained within a chain-link fence, is located next to a soccer field in the High-Country West subdivision and is surrounded by single-family residences (Figure 8). Cloudcrest Drive is located to the north, Big Springs Way and Lofty Trail Drive runs parallel to the 1-15 freeway to the west of the Reservoir. Photos of the resource can be found in the attached DPR 523 forms.

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[39] City of San Diego, "Rancho Bernardo Reservoir Fact Sheet."
[40] Ibid.

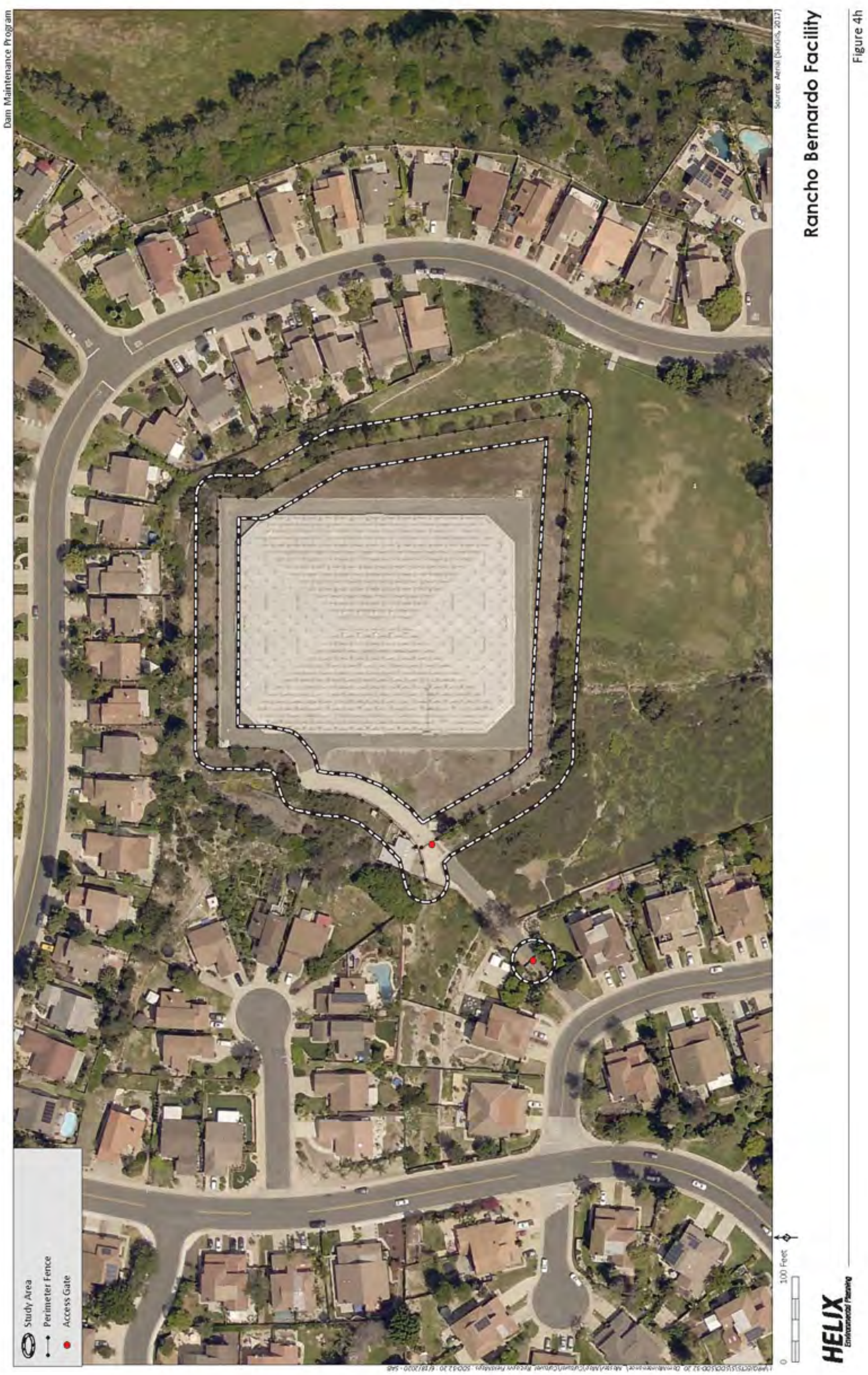

Figure 8: Rancho Bernardo Reservoir Location Map

Historic Context

Development of Rancho Bernardo (1769-1962)[41]

The land that is modern-day Rancho Bernardo was originally Kumeyaay land. When the Spanish and Franciscan missionaries arrived in San Diego in 1769, they established a military headquarters, or presidio, along with a church, Mission San Diego de Alcalá, beginning the colonization process that would be repeated over the entire state. Under Spanish rule, from 1769 to 1821, the land of Rancho Bernardo was under the authority of the missions. After Mexico won its independence from Spain in 1821, the mission lands came under the control of the new Mexican government, which offered massive tracts of land to anyone agreeing to settle on and work the lands.[42]

Over the space of two years, between 1842 and 1845, the Mexican government granted the 17,763-acre Rancho San Bernardo to Don Jose Snook. Contemporary writings described Rancho San Bernardo as one of the largest stock-raising operations in the region. In December of 1846, the Battle of San Pasqual took place on and around his rancho. It is considered the bloodiest and most controversial battle of the war. The war ended in victory for the United States on February 2, 1848, bringing California under the U.S. flag. Don Jose Snook died later that same month. Ownership of Rancho San Bernardo passed to six Snook nieces and nephews in England. In 1867 they sold the rancho to Thomas Fox, representing the interests of James McCoy.[43]

The town of Bernardo flourished for a time, then declined and disappeared by the early 1920s. Its demise was hastened by the growth of the city of Escondido a few miles north and the completion of the Lake Hodges Dam and Reservoir in 1919. The biggest remaining unsubdivided portion of the old Rancho San Bernardo, about 5,800 acres, was owned by Ed Fletcher and then William Henshaw in the early 1920s. Then it passed to the San Diego County Water Company. In the late 1920s, the water company began leasing the property to George Daley. The Daleys were a pioneer ranching family in San Diego County who had large ranches in Escondido and Jamul by the time George began raising livestock and grain under lease on the San Bernardo property. George Daley bought Rancho San Bernardo outright in 1943. When George Daley died in 1957 the ranch passed to his nephews, Donald, and Lawrence. As late as the 1960s, the property was still rugged country, with more horse trails than auto roads.[44]

In November 1961, developer Harry Summers and business partner W.R. “Fritz” Hawn announced a joint venture with Lawrence and Donald Daley to develop the ranch into a planned community to be called Rancho Bernardo.[45]

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[41] The history of Rancho Bernardo was developed using help and media from the Rancho Bernardo Historical Society.
[42] Rancho Bernardo Historical Society, “History | Rancho Bernardo Historical Society.”
[43] Ibid.
[44] Ibid.
[45] Ibid.

The joint venture, initially named Rancho Bernardo, Inc., devised a master plan for a self-contained community offering housing, employment, schools, community, and recreation centers. The community plan was submitted to the City of San Diego in late 1961 as part of Rancho Bernardo, Inc.'s proposal for annexation, the ranch at that time being unincorporated county land.

In February 1962, the San Diego city council voted to approve annexation of Rancho Bernardo. Rancho Bernardo, Inc. set to work grading the ranch terrain to make way for new roads and model homes.

The first sales office for the new community opened in July 1962 at the intersection of Rancho Bernardo and Pomerado Roads. The first model homes erected represented the neighborhoods of Bernardo Greens, Bernardo Hills, and Seven Oaks. A community plan drawn in 1962 does not demark the reservoir.

The first residents moved into Rancho Bernardo in 1963. That year also saw the opening of the Rancho Bernardo Inn and the community's first shopping center.[46]

Construction of the Reservoir (1963-1964)

By February 1964, the new community had grown to 1,300 residents. By June of the same year, 2,000 people called Rancho Bernardo home. 1963-1964 also saw the completion of the construction of the Rancho Bernardo Reservoir.[47] At the time of construction, the reservoir was in an undeveloped section of the community. Peter Kiewit & Sons Co. was contracted to construct the reservoir, which cost $492,000. [48]

Post Construction Alterations and Development (1965-2018)

In July of 1966, the City of San Diego received Certificate of Approval from the Division of Safety of Dams to impound water for the Rancho Bernardo Reservoir, which approved its use.

In February 1967, testing and minor repairs were performed to prevent small leakage. Subsequently, piezometers were installed to monitor the saturation level of the west embankment.[49]

In January of 1971, a 36" valve was installed at the inlet/outlet.[50]

Aerial images indicate that there was no development surrounding the reservoir until 1980. Between 1978 and 1980, residential development occurred directly surrounding the reservoir.[51]

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[46] Rancho Bernardo Historical Society, "History | Rancho Bernardo Historical Society."
[47] "Poway Annexing Boundaries OKd by County Group," *San Diego Union*, December 31, 1963.
[48] "Notice to Bidders," *San Diego Union*, April 28, 1963; City of San Diego, "Dam Fact sheet Rancho Bernardo Dam (NGVD)", October 2019.
[49] City of San Diego, "Dam Fact sheet Rancho Bernardo Dam (NGVD)", October 2019.
[50] Ibid.
[51] Rancho Bernardo Aerials, HistoricAerials.com

In April 2009, the reservoir basin underwent a rehabilitation, with structural, mechanical, corrosion, and site improvements.[52] These improvements were done to comply with a mandate from the California Department of Health. The structural improvements included seismic retrofitting, installation of a new rubber liner on the reservoir floor, and replacement of the original concrete roof structure. Mechanical improvements included repairs and replacement of piping and plumbing, installation of a chlorine analyzer, sampling stations and access hatch and drain replacements.[53]

No known alterations have occurred between 2009 and 2021.

Significance Evaluation for the Rancho Bernardo Reservoir

The following is a summary of the significance and integrity for the Rancho Bernardo Reservoir; also, see the appended DPR 523 forms (Appendix F).

The resource was evaluated under the NRHP/CRHR criteria A/1–D/4/ as follows:

Criteria A/1: Associated with events that have made a significant contribution to the broad patterns of our history.

While the Rancho Bernardo Reservoir is a component of the larger City of San Diego Source Water System, it was constructed outside the significant periods of development associated with the system, 1887-1947, and is therefore a non-contributing component to the historic district.

While many of the earlier elements of the system represent the growth and development of the larger system of source water, Rancho Bernardo Reservoir was constructed largely in response to population pressures and sprawl. By the end of the 1950s, San Diego's population was on the rise and there was an urgent need for new water distribution facilities to keep pace with the City's growth. The primary purpose of constructing the Rancho Bernardo Reservoir was to provide water to the new master planned community of Rancho Bernardo. Ground broke for the construction of the Rancho Bernardo Reservoir in 1963 and was completed in 1964.

Given its date of completion in 1963-1964, which falls outside of the established periods of significance for the larger water system, Rancho Bernardo Reservoir does not rise to the level of significance required for associations with the larger water system, nor does it merit individual designation. Therefore, the Rancho Bernardo Reservoir appears not significant under Criteria A/1 as an individual resource or a contributor to the larger City of San Diego Source Water System Historic District.

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[52] City of San Diego, "Dam Fact sheet Rancho Bernardo Dam (NGVD)", October 2019.
[53] Ibid.

Criteria B/2: Associated with the lives of significant persons in our past

To be found eligible under B/2 the resource has to be directly tied to an important person and the place where that individual conducted or produced the work for which he or she is known. Archival research did not reveal the Rancho Bernardo Reservoir to have any connections to noted individuals significant at the national, state, or local level. There is no indication that the resource illustrates a person's important achievements, rather it was part of the natural expansion of the City of San Diego's water system and thus not associated with any one individual.

Criteria C/3: 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.

Constructed from 1963-1964, the Rancho Bernardo Reservoir, an in-ground concrete lined reservoir, is representative of a common water containment type used throughout the western United States.

The Rancho Bernardo Reservoir retains elements of its original 1963-1964 features, including its profile, slope, and shape. The largest alteration to the Reservoir was undertaken in 2009 when the City of San Diego approved a rehabilitation project which upgraded the mechanical, plumbing, site, and structural features of the reservoir. The materials of the lining, inlet/outlet piping, and cap have been replaced and updated to keep in compliance with code requirements. New instrumentation including piezometers and chlorine monitors were implemented at this time. Although most of this alteration did not affect the overall visual appearance of the structure, the original concrete cap was demolished, and replaced.

Despite the lack of visible alterations to the reservoir, this type of reservoir falls outside the period of significance for dam/reservoir construction and does not represent a unique or innovative engineering achievement. Further, archival research failed to indicate a specific engineer for the project, just the builder. Constructed as part of the master planned community of Rancho Bernardo, the Reservoir was constructed by Peter Kiewit & Sons Co. from 1963-1964. Archival research did not reveal that any of the builders or engineers meet the threshold of being considered notable or having reached recognized greatness in the field of construction or engineering.

While the Rancho Bernardo Reservoir is a component of the larger San Diego water system, its 1963-1964 date of construction prevents it from being a contributor to the City of San Diego Source Water System Historic District which has a period of significance between 1887 and 1947. Furthermore, the reservoir is considered a common type, nor does it represent the work of master or possess high artistic values. As such, the Rancho Bernardo Reservoir is recommended not significant under NRHP/CRHR Criteria C/3 as an individual resource nor as a contributor to the larger City of San Diego Source Water Historic District.

<u>Criterion D/4: Have yielded or may be likely to yield information important in history or prehistory.</u>

An archaeological survey was not conducted for this project. At this time there is no indication that the Rancho Bernardo Reservoir has the potential to yield information important to state or local history. Therefore, the property is recommended not significant under NRHP/CRHR Criterion D/4.

The resource was evaluated under the City of San Diego local designation criteria A-F as follows:

<u>Local Criterion A: Exemplifies or reflects special elements of the City's, a community's, or a neighborhood's historical, archeological, cultural, social, economic, political, aesthetic, engineering, landscaping, or architectural development</u>

As described in NRHP/CRHR A/1 and C/3 Criterion discussions above, the Rancho Bernardo Reservoir fails to rise to the level of significance required under Criterion A, as itis not associated within any of the significant periods of local source water history, nor any other City of San Diego significant elements of development. It is associated with the postwar population boom that was seen throughout the United States and let to an expansion of infrastructure, and a period where the city had stopped relying on local sources and began importing the vast majority of its water.

<u>Local Criterion B: Is identified with persons or events significant in local, state, or national history</u>

No archival research indicated that the Rancho Bernardo Reservoir is associated with persons or events significant in local, state, or national history.

<u>Persons:</u> Archival research did not indicate that the Rancho Bernardo Reservoir had any connections to noted individuals who hold importance within the history of development in San Diego. There is no indication that the subject property illustrates a person's important achievements rather was part of the natural expansion of the system and not associated with one individual.

<u>Events:</u> As described in the evaluation of NRHP/CRHR A/1 Criteria discussion above, the reservoir was completed in 1964 and is outside of the period of significance for the larger water system and does not have any associations with significant events in local and state history. The Rancho Bernardo Reservoir is associated with the statewide post-World War II population boom that required an increase of City constructed water infrastructure, and to facilitate the importation of water from the Colorado River and State Water Project. Therefore, the Rancho Bernardo Reservoir is recommended not significant under City Criterion B.

Criterion C: Embodies distinctive characteristics of a style, type, period, or method of construction or is a valuable example of the use of indigenous materials or craftsmanship

As described under NRHP/CRHR Criteria C/3 (see full discussion above), the Rancho Bernardo Reservoir is a good example of an in-ground gravity-fed reservoir system that retains some elements of its original design. However, the type of reservoir is common, and does not contain a high threshold of significance. While the Rancho Bernardo Reservoir is a component of the larger San Diego Water System, its date of construction (1963-1964) prevents it from being a contributor to the City of San Diego Source Water System Historic District which has a period of significance between 1887 and 1947. Furthermore, the reservoir is considered a common type nor does it represent the work of master or possess high artistic values. As such, the Rancho Bernardo Reservoir is recommended not significant under City of San Diego Criteria C as an individual resource nor as a contributor to the larger City of San Diego Source Water Historic District.

Criterion D: Is representative of the notable work of a master builder, designer, architect, engineer, landscape architect, interior designer, artist, or craftsman

As described under NRHP/CRHR Criteria C/3 (see full discussion above), the Rancho Bernardo Reservoir is not representative of a notable work of a master engineer or builder. Constructed as part of the master planned community of Rancho Bernardo, the Reservoir was constructed by Peter Kiewit & Sons Co. from 1963-1964. Archival research did not reveal that any of the builders or engineers meet the threshold of being considered notable or having reached recognized greatness in the field of construction or engineering. Therefore, the Rancho Bernardo Reservoir is recommended not significant under Criterion D,

Criterion E: Is listed or has been determined eligible by the National Park Service for listing in the National Register of Historic Places or is listed or has been determined eligible by the State Historic Preservation Office for listing in the California Register of Historical Resources

Rancho Bernardo Reservoir is not known to be on any local, state, or national list of significant properties, nor is it known to have been determined eligible for listing on any register. Therefore, the Rancho Bernardo Reservoir is recommended not significant under the City of San Diego's Criterion E.

Criterion F: Is a finite group of resources related to one another in a clearly distinguishable way or is a geographically definable area or neighborhood containing improvements which have a special character, historical interest, or aesthetic value or which represent one or more architectural periods or styles in the history and development of the City.

As previously discussed, the Rancho Bernardo Reservoir was constructed in 1964, which is outside of the established period of significance for the City of San Diego Source Water System Historic District (1887-1947). There are no other group of resources that the Rancho Bernardo

Reservoir is a part of. Therefore, the Rancho Bernardo Reservoir is recommended not significant under Criterion F.

Integrity

The question of integrity is another factor that must be addressed when determining the eligibility of a resource for listing in a historic register. The Secretary of the Interior describes integrity as "the ability of a property to convey its significance." A property must retain certain intact physical features to convey its significance under one or more of the applicable criteria.

Integrity is judged on seven aspects: *location, design, setting, workmanship, materials, feeling, and association*. If a particular resource meets one of the A/1 through D/4 criteria and retains sufficient integrity to convey its historic significance, during the period of significance, then it is considered as an eligible historic resource for listing in the NRHP/CRHR. Additionally, unless exceptionally significant, a resource must be at least 50 years old to be eligible for listing.

The Rancho Bernardo Reservoir was constructed in 1963-1964 and meets the 50-year-old threshold for NRHP/CRHR listing. The City of San Diego typically recommends a 45-year-old threshold for resources, which is also met by the 1964 date of construction.

The Rancho Bernardo Reservoir maintains its historic function as a water reservoir.

The Rancho Bernardo Reservoir retains integrity of location, design, workmanship, and association, but does not retain integrity of materials, feeling or setting as discussed below:

Location: The reservoir retains integrity of location. The reservoir has not been moved since its construction. The contributing features to the site, which include the reservoir, spillway, and outlet/inlet have never been shifted or relocated. As such, the reservoir retains its integrity of location.

Design: The reservoir retains integrity of design. Since its construction, the reservoir has undergone no major design alterations. The elements of form, plan, space, structure, and style have all been retained and the dam can easily be recognized as an in-ground reservoir type.

Setting: The reservoir no longer retains integrity of setting. The physical conditions surrounding the dam since its construction in 1964 have been heavily altered. Upon its construction in 1964, primarily open land surrounded the resource. Since the dam's construction, surrounding development of residential and commercial neighborhoods has increased exponentially, especially after 1980 when single family residential homes encroached upon the immediate vicinity of the reservoir.

Materials: The reservoir does not retain integrity of materials. The lining, concrete cap, and outlet/inlet pipe have all been replaced since their construction in 1964. Therefore, the majority of the original construction materials no longer remain intact, significantly detracting from the material integrity of the resource.

Workmanship: The reservoir retains integrity of workmanship. The original slope and profile of the reservoir have been retained, and no alterations have been undertaken to obscure or alter original workmanship.

Feeling: The reservoir does not retain integrity of feeling. The reservoir has been altered since its construction, although it retains the majority of its physical features as designed. Despite this, the resource no longer retains enough integrity in its setting to fully represent the appearance of a 1960s reservoir constructed in rural San Diego. Upon construction, the reservoir was primarily surrounded by open land with very little development. Comparing the reservoir's historic sense to its current appearance, all of the open land seen in the 1960s has been developed with residential communities. Therefore, the reservoir no longer retains integrity of feeling.

Association: The reservoir retains integrity of association. The reservoir was associated with the accommodation in water infrastructure for the growth of the City of San Diego in the late 1950s to early 1960s. The reservoir was originally designed to be used by the master planned Rancho Bernardo community. Since its construction, the reservoir has remained a part of the City owned water system and continues to service the northern portion of San Diego. Therefore, the reservoir retains integrity of association. However, its association with water development is not significant.

Eligibility Findings

Given its date of completion in 1963-1964, which falls outside of the established periods of significance for the larger water system historic district, common engineering type, and numerous alterations, Rancho Bernardo Reservoir does not rise to the level of significance required for associations with the larger water system, nor does it merit individual designation under any Local, State, or National Criteria.

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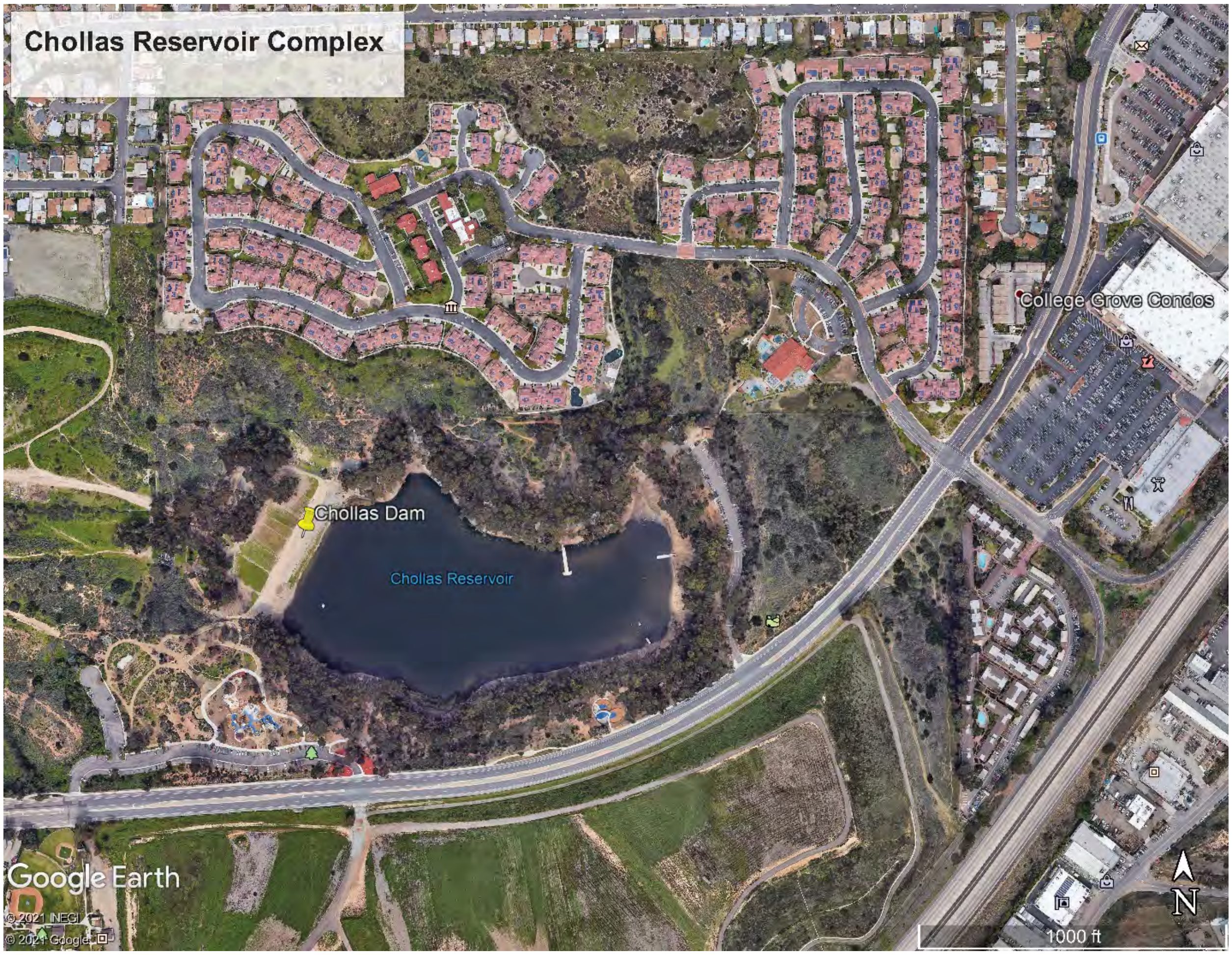
APPENDIX A: PREPARER'S QUALIFICATIONS

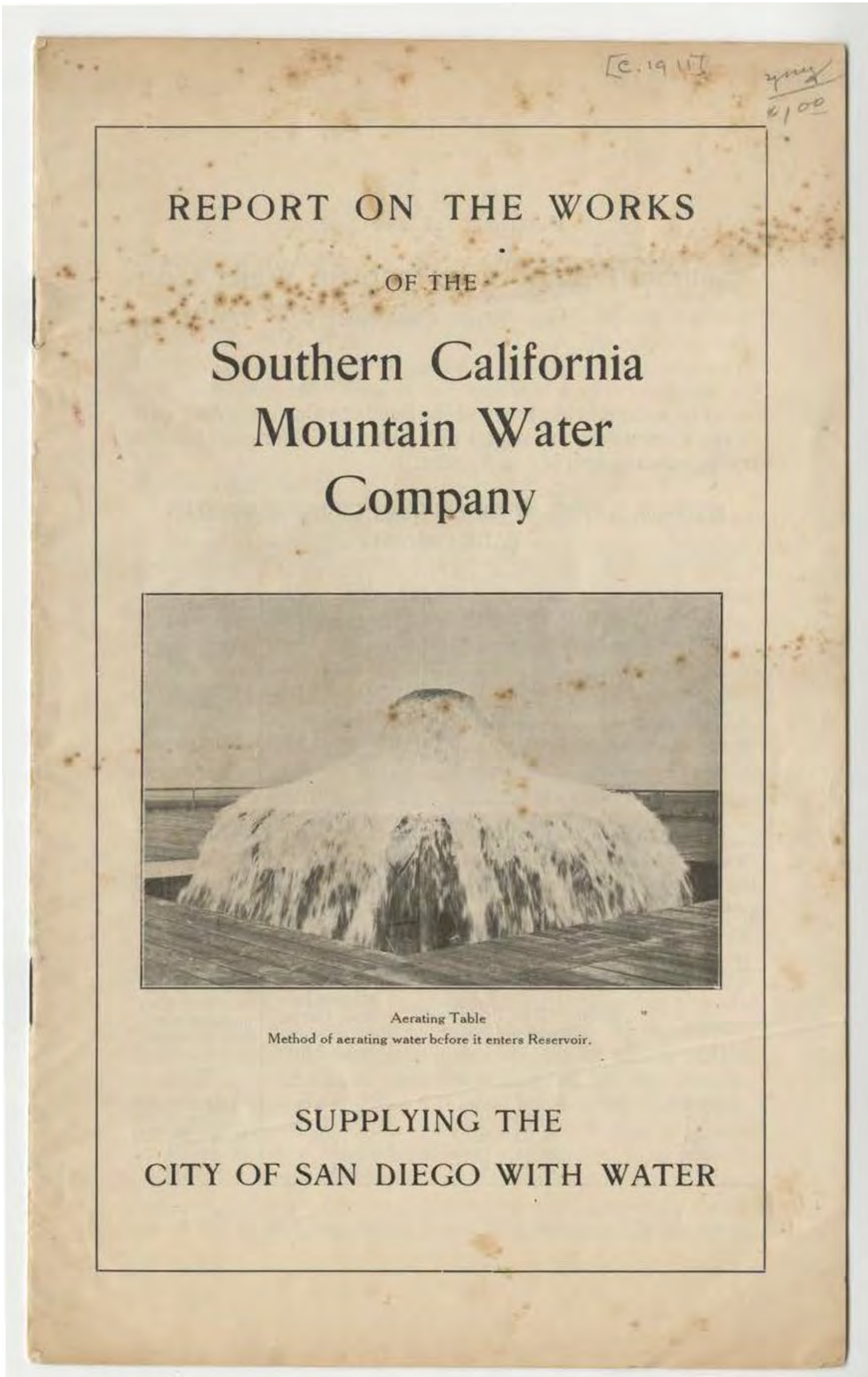
This Historic Context Statement was researched and written by Kelsey Kaline, MHC, Historic Preservation Specialist and Architectural Historians for IS Architecture. Ms. Kaline exceeds the Secretary of the Interior's Professional Qualification Standards, as published in the Code of Federal Regulations, 36 CFR Part 61 for architectural history.

Project oversight was performed by HELIX. Ione R. Stiegler, FAIA is the Principal Historic Preservation Architect of IS Architecture and reviewed the report for quality management.

APPENDIX B: CHOLLAS RESERVOIR COMPLEX MAP



APPENDIX C: CHOLLAS RESERVOIR ARCHIVAL MATERIALS



REPORT ON THE WORKS

OF THE

Southern California Mountain Water Company

Aerating Table
Method of aerating water before it enters Reservoir.

SUPPLYING THE
CITY OF SAN DIEGO WITH WATER

Southern California Mountain Water Company Report Circa 1911. UCSD Special Collections.

Description of Works of

Southern California Mountain Water Co.

San Diego, California.

The water works system of the Southern California Mountain Water Company is the largest of its kind in California outside of the aqueduct system of Los Angeles.

RESERVOIR SUPPLIES OF THE SOUTHERN CALIFORNIA MOUNTAIN WATER COMPANY:

Name of Reservoir	Type of Dam	Height in Feet	Outlet Altitude in Feet	Area Submerged Acres	Capacity in Gallons
Lower Otay.......	Rock fill...........	150	400	1000	13,000,000,000
Upper Otay.......	Arched Concrete	77	521	164	1,090,000,000
Chollas Heights...	Earth and Steel Plate.	34	385	17	90,000,000
Morena.....	Rock fill............	265	2912	1370	15,000,000,000
	Total Capcity...........				29,180,000,000

This gives a total storage capacity for San Diego of over twenty-nine billion gallons as against twenty-six billion gallons, the supply of San Francisco for four hundred and fifty thousand people.

RAINFALL:

Year	Barrett Dam Rain Guage. Elevation 1,700 ft.	Morena Dam Rain Gauge. Elevation 3300 ft.	Run-off in gallons from Cottonwood watershed at Barrett, 250 sq. miles area.
1906	29.94 inches	34.73 inches	19,506,000,000
1907	12.79 "	18.56 "	11,080,000,000
1908	16.82 "	20.56 "	4,227,000,000
1909	24.54 "	32.98 "	9,414,000,000
1910	.11.28 "	13.94 "	5,500.000,000

2

Southern California Mountain Water Company Report Circa 1911. UCSD Special Collections.

HISTORY

LOWER OTAY DAM—

The Lower Otay Dam was commenced in 1887 and completed August 18th, 1897, to the 130-foot level above the stream bed. The masonry core at the base is 62 feet wide, 28 feet high and 160 feet across the valley of the Otay River. It has a steel-plate core, protected with concrete on each side, and is composed of loose rock fill. It has a water-shed of about 100 square miles behind it, with an average altitude of about 1600 feet.

UPPER OTAY DAM—

This structure, of original and bold design, is composed of reinforced concrete, built on the arched type, being curved upstream with a radius of 359.26 feet from the center line of the crest. The dam is only four feet thick on top, and fourteen feet thick at the base, being eighty-four feet high and stepped with offsets on the down stream side. Two tiers of steel plates were placed longitudinally on the foundation at the axis of the dam, while above this at intervals of two feet vertical, 1¼-inch railway cable for reinforcing was placed. The highest cable was five feet from the top of the dam. The concrete near the base was made of a very rich mixture, becoming gradually poorer as it reached the top. This dam is a splendid example of efficient engineering construction, and was built by Mr. C. M. Bose under the general direction of Mr. Babcock.

CHOLLAS HEIGHTS—

This dam is located along the route of the main supply pipe from the Lower Otay reservoir into San Diego, and is built across the Chollas Valley about four miles from the city limits of San Diego. It is situated on a tract of land comprising 180 acres in area, a short distance east of the filter plant. At the 23-foot contour, the Chollas reservoir contains over ninety million gallons of water, being about five times the capacity of the New University Heights reservoir, which has cost the city about $110,000. The Chollas dam is of the earth-fill type, with a ¼-inch steel core plate anchored into a foundation wall of concrete. It is fifty-six feet high above this foundation and 526 feet long on top, and was completed between June and September, 1901, under the direction of Mr. E. F. Tabor, as engineer. It is connected by means of

Southern California Mountain Water Company Report Circa 1911. UCSD Special Collections.

WATER RUNNING TO CHULA VISTA

OTAY SUPPLY TURNED INTO LAND AND TOWN COMPANY'S SYSTEM.

The First Nine Miles of the Pipe Line Finished and Operating Without a Hitch---The Rest of the Work.

Water from the Otay reservoir was turned into the system of pipes of the San Diego Land and Town company at Bonita yesterday morning, and before night the lemon and orange orchardists on the system below Bonita were receiving their supply from the Southern California Mountain Water company. It was about the first delivery of water in any large quantity from the system for public use, and the grat success which attended this first delivery gives encouragement and foundation for the belief that success will attend the further efforts of the company to deliver water along the line of proposed distribution to the city limits of San Diego and inside of the limits to the University Heights reservoir.

During the preceding two or three days the workmen had been putting in the outlets, gates and blow-offs needed along the line, and as fast as they were put in for two miles and a half, which was the distance that the gates were placed apart, the upper gates were opened and the sections were allowed to fill with water, until the last section was completed yesterday morning and the water was allowed to move down to the measuring boxes and through them into the distributing system of the Land and Town company.

There was not a hitch in the arrangements anywhere, and the water filled the pipes with an ample supply. It is expected that the Land and Town company will take about four million gallons of water a day during the remainder of the irrigating season, but there will be a watchman at the point of delivery all the time, and the amount delivered to the Land and Town company will be regulated to the amount that is used.

This side of Bonita the work of preparation for the pipe line is about completed, and the work on the big Chollas Heights reservoir is nearing completion. Trestles will have to be built, but no more tunnels will have to be driven. Lumber for the trestles as well as for the pipe line, has been ordered, and some of it has been delivered, but for the past month every steam schooner has been tied up because of the strike, and no lumber is being delivered by them.

When the lumber is in sight for the work, or there is prospect of getting it seasoned and in condition for such work, the contracts for the extension of the pipe line toward the city and to the Chollas reservoir.

San Diego Union, August 23, 1901

LOCAL BREVITIES.

The water pipe from the Flume company's pipes to the Chollas Heights reservoir wll be completed today.

Ramon Tapia was taken to San Quentin prison last evening to serve a life sentence for the murder of Jacob J. Veltinger.

San Diego Union, June 6, 1901

First Quartermaster Sergeant A. Hirte after a service of thirty-one years which entitles him to retirement and a pension has re-enlisted at the Barracks in the United States army.

A movement of machinery and supplies to the desert oil section is reported. It is said that operations on many of the wells will begin as soon as the weather is cool enough to permit work.

Thirteen wagons and twenty road scrapers belonging to the Southern California Mountain Water company which have been employed at the Chollas Heights reservoir have been transferred this morning to Coronado where it is thought they will be used in street grading.

San Diego Union, September 25, 1901

THE CITY RESERVOIR.

The Chollas Heights reservoir, which is to be the end of the pipe line nearest the city, is well under way, but there being an immense amount of earth to move in making the reservoir, it will be some time before it is finished. From this reservoir the city's supply will eventually be taken, but whether all will go by way of the University Heights reservoir or not is a question. The better pressure can be secured from Chollas Heights, and there will be quite a saving in ditch making and pipe laying if some of the city and Point Loma are supplied from there.

A LITTLE SYSTEM.

During the construction of the reservoir there has been constructed also a little system from the system of the San Diego Water company to supply the camp at the reservoir with water. This supplemental system has been built of 6 and 8-inch pipe; wooden where the pressure was light and iron where it was heavy. The camp has an ample supply of water from the flume line.

SUPERINTENDENT OF THE WORK.

A. S. Riffle of San Francisco, the representative of D. C. Henny, the contractor for building the pipe, arrived in San Diego on Tuesday and with Mr. Savage, the engineer who has had charge of the work, made a trip over that portion of the line which is covered by the present contract. With the amount of material on hand he saw no chance of his pipe makers having a chance to lay off on account of lack of material. He will remain here in charge of the work for Contractor Henny.

San Diego Union, June 13, 1901

ENGINEER H. N. SAVAGE.

CHOLLAS HEIGHTS RESERVOIR.

The next storage work was the construction of the Chollas Heights dam and reservoir. This is located four miles southeast of the San Diego city University Heights reservoir, and has been constructed for the purpose of supplementing the city's reservoir, and holding in reserve a large quantity of water convenient to the city. The dam is constructed of earth, with a masonry and sheet steel core. An abundance of suitable material for constructing the earth dam was found in the reservoir, and thus removing the organic matter from the reservoir, also enlarging same and increasing the depth of water to be stored. The slopes of the dam are 1 to 2 and 1 to 3, for the outer and inner slopes, respectively, 249 feet thick at base, with a 20-foot top. The dam is 526 feet in length, 52 feet in height, and water will be impounded to the level of 433 feet above sea level, which is some 40 feet higher than the University Heights reservoir.

San Diego Union, September 24, 1903

EXTENDED SURVEY WORK IN SOUTHERN DISTRICT

Engineer H. N. Savage's Departure this Afternoon for Site of Government Irrigation Enterprise on the Colorado

H. N. Savage, who has recently entered the employ of the government as consulting and supervising engineer in the reclamation service of the geological survey, left this afternoon for Los Angeles. There he will be joined by Morris Bien of the legal department of the service, J. P. Lippincott, chief engineer, and Mr. Saunders one of the consulting engineers, the party leaving tomorrow for the site of the governments irrigation enterprise a few miles up the Colorado river from Yuma.

Mr. Savage says that the work has been prosecuted in the northern arid states during the hot weather and that the plan is to work in the south during the winter months.

As to the Colorado river government proposition he says that there is no disposition on the part of the government to interfere with the water rights of individuals or corporations.

"The purpose of the government," said he today, "is to store the flood waters. It has no right neither does it propose to take water which has been legally appropriated by individuals or corporations. The fact that we have filed on four millions miners inches of water on the Colorado, above the point of withdrawal of the Imperial Land Co. need cause no alarm. Our filing relates to the unappropriated water."

For 13 years he has been chief engineer of the San Diego Land and Town company.

Mr. Savage, who was born in New Hampshire in 1861, was educated at Dartmouth college, from which institution he received his degree. He subsequently pursued a two year's post-graduate course at the Thayer school of Civil engineering and graduated with the degree of civil engineer.

Since his graduation Mr. Savage has pursued his profession in its various branches. In the New England and Southern states, he has devoted much atention to railroads, municipal works, parks and sewerage systems; in the Western states, inaddition to railroad engineering, he has been engaged with many difficult problems relating to hydraulic mining, domestic and irrigation water works, location, construction and operation.

Mr. Savage is also consulting engineer of the Southern California Mountain Water company, and supervised the location, design and construction of Morena dam, Barrett dam, Lower Otay dam, Upper Otay dam, Chollas Heights dam, the San Diego twenty-mile wooden stave conduit, as well as tunnels and other constructions. He is also the engineer in charge of the Sweetwater dam, and the domestic and irrigation system.

In addition to serving as one of a board of four engineers to finally pass upon plans, estimates and feasibility of

San Diego Union, September 24, 1903

CONSTRUCTION WORK ON GIGANTIC WATER SYSTEM

Large Expenditures During the Year for the Preservation and Distribution of Water in San Diego County.

WATER is king in Southern California, and as usual a large amount of money has been expended in this county during the past year for its preservation and distribution. The most important work in this direction, however, was undertaken by the Southern California Mountain Water company. Construction work on this gigantic water system has been actively carried on during the calendar year 1901, the upper Otay dam being completed the first of the year. It is a concrete masonry structure, located on the north branch of the Otay river, with its base substantially identical in elevation with the top of the lower Otay dam; the water impounded by the latter structure backs up to the former. The upper Otay dam is one of the boldest in design ever constructed. It has a length the lower Otay mesa, thence continuing to the head of the bay to supply the adjacent territory and Coronado, which now receives its water from the pumping plant.

WORK FOR THIS YEAR.

Five cargoes, something over one million feet B. M. of redwood stave pipe stock has already been received from Humboldt county, and is being seasoned at Coronado, preliminary to building the pipe line from the Sweetwater to San Diego. About a quarter of a million feet of Douglas fir stave pipe stock has also been received to be used in constructing the pipe where it will be subjected to the heaviest pressure. At the Sweetwater crossing the pipe will be under a pressure head of 420 feet, which will require three-fourth inch diameter rods placed as near together as their fastenings will permit. The construction of this water system is increasingly meeting with the hearty approval and co-operation of all who are Fruit company," which with the California Citrus Products company and and the National City and Otay Railway company, comprises the more important of the San Diego Land and Town company's allied interests.

SWEETWATER WATER COMPANY.

The run-off from the drain basin of 187 square miles the past winter yielded some three hundred million gallons of water, which was sufficient for domestic and irrigation purposes up to about June, when it was necessary to start the various pumping plants heretofore operated. Several new pumping plants were also installed in the Sweetwater reservoir, and the combined results of this pumping provided a reasonable supply of water up to August 23, when connection was made from the lower Otay reservoir to the Sweetwater system, since which time an ample supply of water has been available for all purposes under the Sweetwater system. With the increased protection thus af-

San Diego Union, January 1, 1902

FINEST WATER SUPPLY ON COAST IS POSSESSED BY SAN DIEGO

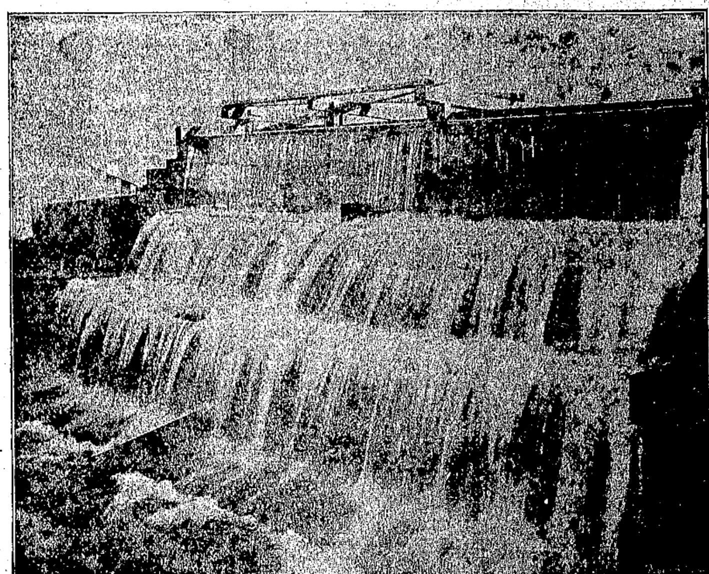
Supply is Abundant and Amply Sufficient for a Large City---Absolute Purity is Insured by Expensive Filtering Plant---Magnificent System Owned by Southern California Water Company

In facing the problem that California cities have had to face since the early days when settlers and goldseekers first swarmed over the mountain passes and became a nucleus around which has been centered one of the greatest commonwealths in the Union, the problem of securing an ample suppiy of wholesome water, San Diego has surmounted the barriers which have separated her from the cool, clear streams of the back country mountains and has started a perpetual flow of water into her ample reservoirs that will suffice for the needs of the city when San Diego has become known throughout the world as the greatest seaport of the Pacific coast.

The Southern California Mountain Water company is now finishing one of the most gigantic schemes that was ever conceived by a similar enterprise and, when the vast undertaking has reached completion, San Diego will have at her command fifty billion gallons of water which nature and science have combined to make as pure and sweet as could be obtained anywhere. Mountain streams are brought together far back in the country and united in one stream which flows through a chain of reservoirs, joined by miles of tunnel and trench into the huge receptacle which hol it in check and at the service of the thousands of consumers to whom it is supplied at 4 cents per thousand gallons.

Water of Purest Quality

There is no city on the entire Pacific coast which possesses a supply of water of better quality than that furnished San Diego. In fact, it is doubtful if any city has water of such great purity. The water is of the purest mountain variety, but nevertheless the Southern California Mountain Water company has gone to great expense to even further improve its quality. To this end one of



AERATING TABLE USED TO ASSIST IN FURNISHING PURE SUPPLY OF WATER FOR SAN DIEGO.

time was lost by the management of the Southern California Mountain Water company in preparing for the delivery of the water to the city. Contracts for the construction of an im-

a radius for the center line of the crest of 359.26 feet. The maximum thickness of 14 feet, the first 24 feet in height above the lowest point being substantially of this thickness,

available head of about 500 feet here, and after passing the power station the water will be at an elevation of 600 feet above sea level.

MAY ERECT F CITY HALL CORONADO

Board of Trustees Pu Orange Ave. Property Municipal Purpose

NEW ENGINE HOUSE I ALSO BEING CONSI

Obtain Money From App tion Made For Protec Of Sewer Line

A new city hall and also a engine house will probably at Coronado in the near futu board of trustees of that city purchased four 50-foot lots ange avenue, for the purpos voting the property to some m improvement and the genera tion of the trustees, now is these two buildings.

This situation was brough through peculiar circumstanc arose among the officials of t Some time ago Ocean boulev washed away in places by he and rains, to such an extent entire sewer line along that st threatened to be destroyed a dered useless. Fearing th would happen and knowing sewer was an urgent neces trustees of Coronado made propriation of $2,000 to be us building the line. This act taken to avoid any delay ahead with the work when th damage would be done, but ju rains abated and the sewer w The money remained idle treasury from that time til weeks ago when the trustees to put it to some useful pur good offer having been made they bought some property t voted to municipal purposes.

The property in question is on the west side of Orange just north of the city park These four lots covering an 100 by 140 feet, will give am

San Diego Union, August 29, 1907

After an examination of the water as it enters the Chollas reservoir, Prof. Smith stated that it was of exceptional purity. Therefore, the sole purpose in installing the filtering plant was for the destroying of any microscopic life, such as algae and bacteria, that may form while the water is standing. Nothing that is known to science in the art and work of keeping a city's water supply pure has been neglected by Prof. Smith and his assistants. The plans called for a filtering plant that is one of the most complete in every respect that is to be found on the entire Pacific coast. The water is first treated in the reservoir itself. It is then passed through the finest filter plant made, and thereafter passes over aerating tables for further purification. The treatments at the reservoir will rid the water of the greater portion of the organic impurities that it may contain. The filters will take out the remaining impurities, if there are any, and the aerating tables will liberate such gases as may have been generated, so that the water, when it reaches the consumer, will be simply perfectly pure.

The filter plant is located in a building 80 by 65 feet in ground dimensions, and 23½ feet high to the eaves. The building contains ten filters, each eight feet in diameter and twenty feet long. There are also connections and foundations for two more filters, and sufficient space for still two more. These tanks have been placed on either side of a central passageway through which the main pipe line enters and leaves the building.

The big pipe from the reservoir enters the building from the east and near the top of the filtration tanks. From this pipe there are connections with the tanks on either side. The connections from the tanks to the main through which the water leaves the plant are made at a level with the lower portion of the filter tanks. Of necessity, the pipe which takes the water from the plant is of the same size as that which brings the water to it.

The entire plant is managed from the operating floor, which extends the length of the building and covers the central pasageway in which are the entering and exit pipes and their connections. The valves are all controlled by means of wheels on the operating floor, and at each tank there are gauges through which the water entering and leaving the filter tanks can be watched by the operator.

These tanks are filled with filtration materials, the material in each case being brought from the place where it can be found in the best quality. For instance, the sand which is used in the filters has been brought all the way from New Jersey by steamship, though there is plenty of sand right here in San Diego county. The New Jersey sand, however, is the best for the purpose and, therefore, the company went there for it.

San Diego Union, August 29, 1907

PAGE TWO THE SAN DIEGO WEEKLY UNION: THURSDAY JULY 2, 1908

WATER ENOUGH FOR CITY OF 400,000 ASSURED BY FIVE IMMENSE IMPOUNDING RESERVOIRS

TUNNEL INTO GRANITE TO DIVERT FLOW

Hundreds of Workmen With Heavy Machinery Employed in Immense Work.

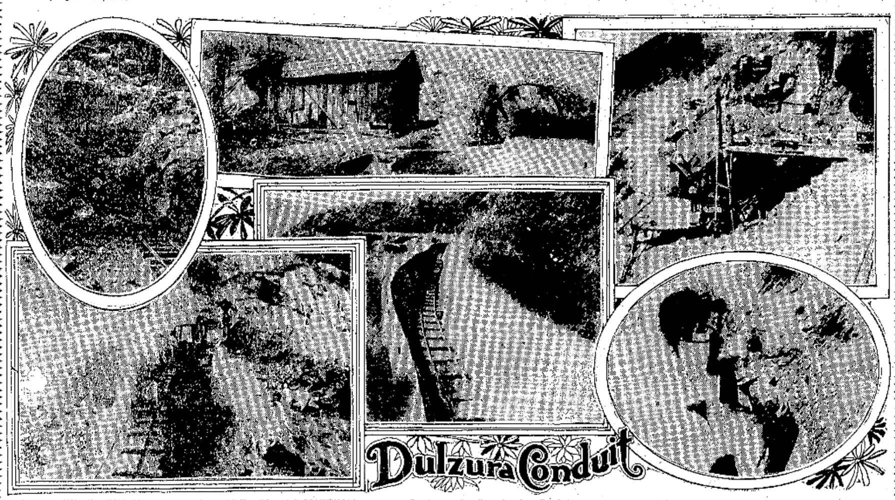
MAKE 10,000 FOOT CUT THROUGH SOLID ROCK

New Section Alone to Rival Famous Spring Valley Plant in North.

Starting Work at North End of Tunnel 4, September, 1907.

SETTING UP 45 H. P. COMPRESSOR BETWEEN TUNNELS 3 AND 4

Unloading Platform on MountainSide at End of Cable Line.



LAYING RAILS IN CONDUIT FOR TRANSPORTATION OF MATERIAL ALONG LINE

Section of Completed Conduit Ready For Turning in Water.

Portion of Conduit Excavated Ready For Concrete.

17 SEPARATE TUNNELS IN SINGLE LINK

Drainage of Two Watersheds to Be Added to Already Large Flow in Otays.

DISTANCE FROM CITY ENHANCES HEAVY COST

Miles of Roads, Trams and Cables Give Hint of Extent of Big Task.

...on in the construction of the conduit and tunnels. In blasting on the ditch 20 or more charges are set off in succession at one time. The noise is deafening, like the discharge of a huge battleship gun, and can be heard for miles. At a distance the rumble is very similar to that of thunder and would be taken for that by one who was not aware that blasting was being done in that vicinity. The blasting in the ditch, however, is nothing more than the firing of a toy pistol when compared with that done in the tunnels. The roar is tremendous and the terrific force can be realized when it is stated that the mountain side for a radius of several hundred feet can be distinctly felt to tremble as though shaken by an earthquake. In the digging of the tunnels about twenty or more charges are set off at one firing. It takes about twelve hours to prepare the blast and to clear the debris after the shots. The broken rock is removed by means of small steel cars operated on a miniature railroad, the track of which is eighteen inches wide, built of 8-pound steel rails. The...

...rett dam will hold the flow of the Pine creek and the overflow from Morena dam. The conduit on which construction work is now being rushed will convey the water from the Barrett dam across the divide into the Otay shed and from there it will flow into the Lower Otay dam. Thence the water will pass to the Chollas Heights reservoir and finally into the city's reservoirs, from which it will be delivered to the consumer through the street mains.

Water Held Back by Big Steel Diaphragm

The Chollas Heights balancing and storage reservoir, one of the three that...

FEW people realize the magnitude of the system which the Southern California Mountain Water company is developing for San Diego and the important part that the Dulzura conduit will play in furthering its completion. The company controls 350 square miles of mountain water shed varying in elevation from 400 feet to 6000 feet above the sea and covering mostly a granite formation from which the water flows absolutely pure and free from contaminating salts.

To capture the great volume of water which flows annually from this immense area of land a chain of five large dams is being planned and worked out, ranging in distance from 8 to 60 miles from the city. The dams, three of which have already been completed are the Morena, Barrett, Upper and Lower Otay and the Chollas Heights Reservoir.

...up to 7500; 24c per 1000 gallons from 7500 to 15,000; 21 1-3c per 1000 for over 15000 gallons.

Pacific Grove—65c per 1000 gallons; minimum bill of $5; 60c per 1000 gallons, minimum bill of $10; 55c per 1000 gallons, minimum bill of $20; 50c per 1000 gallons, minimum bill of $30; 45c per 1000 gallons, minimum bill of $40; 40c per 1000 gallons, minimum bill of $50; 35c per 1000 gallons, minimum bill of $100.

Petaluma—40c per 1000 gallons up to 5000 gallons; 30c per 1000 gallons from 5000 to 15,000 gallons; 25c per 1000 gallons from 15,000 to 30,000; 20c per 1000 gallons for over 30,000 gallons...

...amounting to nearly 10,000,000 gallons daily, if necessary, at the 4 cents per 1000 gallon rate. On the very start the offer was received with great favor by a large majority of the people. Soon after that the common council entered into a contract on behalf of the people, and the document was soon signed by John L. Sehon, mayor of the city at that time.

Another contemplated improvement in the development of the system is the construction of 20 miles more of conduit line north of the Jamul ranch house by way of the Jamul postoffice. This would be an extension of the present conduit now under construction for the purpose of carrying the water by this system the entire distance from the Barrett dam to the Otay dam, instead of letting the water follow the natural course of the Jamul creek from Dulzura pass to the Otay dam. This will eventually be done and probably in the immediate future. It will be an...

San Diego Union, July 2, 1908

"With the Barrett dam completed there would be no question about the continuous supply and if the necessity should arise the dam could be rushed to completion.

"The proposition to the city would be a straight business proposition to begin supplying all the water the city should need at 4 cents per 1,000 gallons, at a certain fixed date and to keep up that supply continuously thereafter.

"The lumber for the continuation of the pipe line to Chollas Heights reservoir, is on hand and the machinery for shaping the lumber is already up. The steel bands for the pipe could be ordered for quick delivery just as soon as we get the reply from the council."

Railroad Extensions

San Diego Union, April 4, 1905

SAN DIEGO CALIFORN

MOUNTAIN WATER CO. PEOPLE ARE GETTING BUSY

PROSPECT THAT THE CONTRACT TO FURNISH THE CITY WITH WATER WILL SOON BE SIGNED CAUSES RENEWED ACTIVITY

Specifications and Blue prints are Almost Ready for the Contractors to Bid Upon—All Needed Lumber for Pipe Line is on Hand —Company Will Do Its Own Grading Work

The weeks that intervene between now and the first of next May are to be busy ones with the Southern California Mountain Water company in preparing for carrying out the contract with the city to furnish the people with a supply of water for the city's and the people's needs. When the ordinance directing the mayor to sign the contract passed the city council on Monday night there was applause in the lobby of the council chamber, and when the news was told to the people in these columns the following morning there was applause throughout the city because of the long step taken toward the settling of the water question, which has been in the way of progress long enough.

The rejoicing was increased yesterday when Mayor Sehon announced that while the proposed contract was not to his liking in its entirety, he proposed to sign it as soon as the contract was presented to him after the ordinance directing him to do so had come into effect. In the nature of things the ordinance would go into effect on the 7th of next month, and as the time in which to do the work is none too long, the water company will undoubtedly be on hand to sign up as soon as the mayor can do so.

Now that the making of the contract is practically assured, there will be no waiting on the part of the Southern ration all the time since we began to think that the contract was likely to be closed," said Vice President Clayton yesterday, "and now that the prospect grows brighter, the work will be increased and pushed with ever more vigor.

"At present we have a force of men at work at the Lower Otay reservoir clearing the ground around the edges of the present lake of all vegetation, so that there will be none for the large amount of water which we hope to impound this season to cover. The whole of the present system is in excellent shape, but it will be subjected to a thorough examination in all its parts.

"Much office work has been done and is being done at present in preparation for the letting of contracts. There are between 100 and 125 blue prints, copies of which have been made for the use of the contractors who will be asked to bid on the contract of building the pipe line. These are all finished and everything is ready in that direction save a profile map, which is awaiting the examination and approval of Mr. H. N. Savage, the consulting engineer of the company.

"We expect to have things in shape very shortly for submission to possible contractors, and will give them fifteen to twenty days in which to make their bids, and will let the contract for the construction.

"All the lumber for the construction is known, the grading for the pipe line from its present terminus near Bonita to the Chollas Heights reservoir is complete, but the company will have a force of its own men go over that grade and see that it is in proper shape everywhere. The same force or another will attend to the grading for the pipe line from Chollas Heights reservoir to the University Heights reservoir, and they will be a long way ahead of the pipe layers.

"The company will do its own grading and will furnish the lumber for the pipe contractors. The contract will be for furnishing the steel bands for the pipe and putting it together in place. The grading work from the Chollas Heights reservoir to University Heights will not be a large undertaking, nor will the examination of the grade made some years ago from Bonita to Chollas Heights, and our forces will be ready to commence it by the time the contract with the city is signed, possibly before that time."

The Chollas Heights reservoir can give the city a supply of water at the University Heights reservoir, or it could give a direct supply to the city mains on R street, as contemplated in the old plans for a water supply which were adopted years ago when the city was planning to put in a distributing system of its own without buying the present one.

The company also has a force of men at work at the Barrett damsite

San Diego Union, November 9, 1905

MOUNTAIN WATER COMPANY WILL SUPPLY THE CITY

CONTRACT BETWEEN CORPORATION AND MUNICIPALITY WAS SIGNED, SEALED AND DELIVERED YESTERDAY

Water Company Immediately Started the Activities Which Were Prepared For Moving as Soon as the Legal Agreement Was Exchanged —Bids For Work Will be Opened on the Afternoon of the 27th Inst

Hardly was the ink dry on the contract which was entered into yesterday between the Southern California Mountain Water company and the city of San Diego before the activities already prepared by the water company were put in motion toward filling the company's part of that agreement.

Notices were sent to prospective bidders that bids for the construction of the large wooden pipe, which is to connect the present end of the pipe near Bonita with the already completed reservoir at Chollas Heights.
reservoir at Chollas Heights, would be opened on the afternoon of the 27th inst. at 2 o'clock.

The Chollas Heights reservoir has no watershed of its own save what it covers itself, for it is located at the very highest point of the Chollas hills, and if filled to overflowing the water would be on a level with the highest land anywhere thereabouts.

The Contract Signed.

The contract and agreement between the two corporations was signed yesterday morning at the office of Mayor Sehon. A meeting of the board of directors of the water company had been called for the forenoon and was held. A resolution was passed authorizing the president of the company, J. D. Spreckels, to sign for the company. Immediately on the adjournment of the company's meeting the president and secretary, A. H. Kayser, accompanied by the attorney for the company, A. H. Sweet, went to the office of Mayor Sehon, making the object of their visit known. Mayor Sehon sent for the city clerk, and all who were authorized to sign were present. The contract was read in part, being known quite thoroughly to all present, and the signatures were affixed to the contract in triplicate.

The First Work.

The water company has the lumber on hand for the construction of the pipe line, and the grade for the pipe line is completed as far as Chollas Heights. The contract will be let for supplying the steel bands, with which the wooden staves are bound together, and for constructing the pipe in place.

The first work will be the running over of the grade, which is already completed, but will be worked over again to get out any irregularities, fill any washes and cut out any growths that may have been occasioned by nature since the grade was completed five years ago.

San Diego Union, December 12, 1905

MANY GANGS WORKING ON THE PIPE LINE

Foreman Smoot Is Rushing the Work on the Line and Calling for More Men—Bands Arriving Daily

J. Smoot, the foreman for the Atlantic, Gulf & Pacific Construction company, which is building the pipe line from Bonita to the Chollas Heights reservoir and from the Chollas Heights reservoir to the University Heights reservoir, is rushing the work and says that if he don't run out of material he will come about as near catching up with the grading forces as anyone could.

Although fifteen men were sent out to him on Wednesday and twenty more yesterday, he says that he wants more, and they will be sent as fast as they can be picked up. If he can get the men he will have seven gangs at work at five different points along the line. Five of the gangs will be constructing the pipe itself, while two gangs will be putting on additional bands and tightening them.

As the construction gangs put the pipe together they use only as many of the bands as will properly and securely hold the staves in place. They may be six inches or even a foot apart, but they hold the pipe in form until the second gang gets along and puts in the extra bands until they are only about an inch and a half apart, and then the ends are drawn together until the bands themselves cut into the wood and the pipe would be able to stand a pressure of more pounds to the square inch than will ever be put on that pipe.

Over at the mill on the other side of the bay R. C. Byers, the millwright, has a good force at work and is turning out the finished lumber in the form of staves ready to go into the pipe at the rate of about 21,000 feet a day. He has a good start on the pipe builders and does not intend that they shall catch up with him.

More bands are arriving each day and they are being dipped as fast as they arrive, and are then sent forward to the line of the work. With every portion of the work moving so smoothly, the contractors look forward to an early completion of the work before them.

San Diego Union, March 3, 1906

Water Held Back by Big Steel Diaphragm

The Challos Heights balancing and storage reservoir, one of the three that has been completed, has a capacity of 60,000,000 U. S. gallons, sufficient to supply the city for twenty days in its present requirements. Its dam is an embankment of earth deposited in layers and rolled. Beneath the upper stream portion of the dam the natural soil was stripped to a depth of about one foot, but under the down-stream portion of the dam no stripping was done. The cut-off consists of a concrete wall built in a trench thirty inches wide at the bottom extending across the valley and a riveted steel plate diaphragm having its lower edges and ends embedded in the concrete. The dam is 526 feet long, 20 feet wide at the top and 56 feet high. It was constructed during the summer of 1901. Water is drawn from the reservoir through a 24-inch cast iron pipe laid in a trench excavated in the natural earth beneath one end of the dam about 38 feet below the top.

FEW people realize the magnitude of the system which the Southern California Mountain Water company is developing for San Diego and the important part that the Dulzura conduit will play in furthering its completion. The company controls 350 square miles of mountain water shed varying in elevation from 400 feet to 6000 feet above the sea and covering mostly a granite formation from which the water flows absolutely pure and free from contaminating salts.

To capture the great volume of water which flows annually from this immense area of land a chain of five large dams is being planned and worked out, ranging in distance from 8 to 60 miles from the city. The dams, three of which have already been completed are the Morena, Barrett, Upper and Lower Otay and the Chollas Heights Reservoir.

the creek bed to bedrock and build from that level upward. The founda- | for the entire year of 1907, and the first five months of this year, follows: | est of its kind in the state of California.

San Diego Union, July 7, 1908

CITY IS OFFERED WATER SYSTEM FOR $4,000,000

Plans Include Payment of $2,500,000 For All Properties From East of Barrett's Reservoir to City

OPTION ON UPPER RESERVOIRS

Mountain Water Company Agrees To Lease Morena and Sheds For $67,500 Year With Right To Buy For $1,500,000

What City Can Buy For $2,500,000

The Southern California Mountain Water Company agrees to sell to the city within six months the following property for $2,500,000:

The Barrett dam site and reservoir site, consisting of nine hundred and thirty-six acres of land, together with eight hundred and twenty-four acres in addition thereto adjoining and adjacent to the same, with buildings and construction plant, including all lands in the Barrett reservoir site to the one hundred and seventy-five foot contour line above the bed of the stream at the Barrett dam site.

All the water rights, lands and riparian rights of the Southern California Mountain Water company along the Cottonwood and Pine creeks from the Dulzura conduit intakes to the international boundary line between the United States and Mexico.

The Dulzura conduit running from and including the diverting intakes at the Pine and Cottonwood creeks to the Dulzura divide, with all the lands and rights of way owned by the Southern California Mountain Water company along the same.

All flowage rights, riparian rights, rights of way and lands of the Southern California Mountain Water company along the Dulzura and Jamul creeks, from the western end of the Dulzura conduit to the Lower Otay reservoir.

The Upper Otay dam and reservoir, consisting of one hundred and sixty-four acres of land, together with the lands adjoining and adjacent thereto, consisting of four hundred and fifty and sixty-four hundredths acres.

The Lower Otay dam and reservoir, consisting of one thousand and sixty-four acres of land, and the land owned by the Southern California Mountain Water company adjoining, appertinent and adjacent to the same, consisting of one thousand, four hundred and twenty-one and eighteen hundredths acres, including all buildings, orchards, gardens and improvements thereon.

The pipe system and rights of way therefor, from the Lower Otay dam and reservoir to the University Heights reservoir, in the city of San Diego, California, with pipe walkers' houses along the same.

The Chollas Heights reservoir, consisting of fifteen and seventy-three hundredths acres, together with the lands adjoining and adjacent thereto, consisting of one hundred and sixty-four and twenty-seven hundredths acres, and also the water filtering plant, with the land adjoining and adjacent thereto, consisting of five acres.

The Morena system is offered for a ten-year lease at $67,500, with an option of purchase at $1,250,000 any time within the decade.

Tentative terms provide a rate of eight cents a thousand gallons for ten years, and for arbitration of rates if after that the parties to the contract cannot agree.

San Diego Union, February 11, 1912

GROWING CITY MUST HAVE MORE WATER SAYS WHITNEY

Engineer Is Preparing Comprehensive Report Showing Improvements Needed.

WOULD BUILD PIPE LINE

Fay Plans to Open New Sources Of Supply in San Diego River.

City Hydraulic Engineer Whitney is preparing a comprehensive report showing the improvements in the impounding and distributing system which must be made before the opening of the Exposition in 1915.

According to Superintendent Fay the first step must be the building of another pipe line from the Chollas Heights reservoir to the city limits, preferably terminating in the southern part of the city, the cost of which would be in the neighborhood of $300,000. Next in line would come the rebuilding of the present pipe line through Encanto and East San Diego to the University Heights reservoir.

To Open New Sources

Fay also has under consideration plans to open up new sources of water supply in the headwaters and bed of the San Diego river, as well as preliminary engineering work for the construction of a dam at Barrett, the building of a flume from Morena reservoir to Barrett and the building of a high contour line from the end of the Dulzura conduit to the entrance of the Lower Otay reservoir. All of these are not immediate needs, however.

San Diego Union, July 8, 1913

From Saturday's Daily

"San Diegans need not be nervous a minute about a shortage of water," said Mayor Capps last night.

"We can get all the water we need," he said. "I have received word from the officials of the Sweetwater company that they can make a connection with our Bonita line as quickly as we desire it and give us several million gallons a day. The Cuyamaca company has plenty of water to spare. Then we have the pumping plant in Mission valley, Chollas Heights reservoir and the Upper Otay reservoir. The city will have all the water it can use until we can fix up the line to Morena. That has water enough to last nearly five years."

At present the city is being supplied from the Chollas Heights reservoir, which has a total capacity of 90,000,000 gallons. It was filled a day or two ago. According to city officials, there is no danger of the 28-inch woodstave pipe line from Chollas Heights reservoir to University Heights reservoir being washed away. The only stream in its path is Chollas creek, and the pipeline is siphoned deep under the bed of this stream.

San Diego Union, February 3, 1963

FAY URGES SAN DIEGO CONTROL WATER SYSTEM

Councilman Places Three Propositions on Municipal Ownership Question Before Mayor Wadham for Consideration

Councilman H. R. Fay, superintendent of the water department, in a special communication to Mayor James E. Wadham, makes three propositions: First to purchase the entire Southern California Mountain Water system; second, to acquire Chollas reservoir, filtering plant and 24-inch pipe line and the laying of an additional 30-inch main to assure adequate water supply; third, to perfect arrangements between the city and the water company whereby the 30-inch main could be laid without making any purchase in whole or in part of the company's property.

"I always have and always will advocate municipal ownership of the city's water supply. From mountains to meters is my choice but I appreciat the bonding situation of this city and therefore would gladly accept any temporary or partial remedy that would obviate our present condition and prospective shortage of water within the city while there are billions of gallons, impounded in the mountains, awaiting our service."

Mr. Fay refers to the 24-inch main which is not sufficient to carry all the water the city needs from the reservoir.

The councilman's letter follows in full:

Explains Water Supply

"Honorable James E. Wadham, Mayor of the City of San Diego, California:

"Sir:

"Having with gratification noted the interest you have taken in the water situation of the city, and that your suggestions relative to same concur with the recommendations upon this subject embodied in my last annual report of the water department, I have the honor to render the following account of my personal investigation of the water supply back of the city, together with a statement regarding the city's distributing system, the increasing demands upon the service and supply, our contract with the Southern California Mountain Water company and its bearing upon the entire situation, together with such suggestions and recommendations that I, as superintendent of the water department, feel I should place before you for your knowledge and action.

"Accompanied by Councilman Percival E. Woods, City Clerk Allen H. Wright and John Q. Symons, assistant superintendent of the water department, I left this city Saturday, June 10, 1911, visiting in turn the Chollas Valley, Lower Otay, Upper Otay, Dulzura Conduit, Morena and Barrett dams, as well as the Cuyamaca lake, and all tributaries to a water supply for this city in that section wherein these reservoirs are located or contemplated.

Three Days on Trip

"In all we occupied three and one-half days with our investigation and I suggest an inspection of these water-sheds and basins by the mayor and councilmen, accompanied by the city engineer, that a clearer knowledge may be had of the city's source of water supply.

"There can be no question of the sufficiency of water in these mountains to supply the city, provided the rainfall is properly conserved, but in this the city has seen fit to let the corporations act while we have contentedly drifted along until now something must be done to insure water being delivered to the city sufficient to care for our rapid growth and therefore greater consumption.

"Impounded in the reservoirs supplying the city at this time are approximately ten billion gallons, which, allowing for evaporation, is sufficient to last the city at its present size and consumption about five years, while the entire impounding capacity is 42 billions. Therefore with no rainfalls during the remaining period the city's contract for water with the Southern California Mountain Water company continues, there is no need to fear a water famine so far as the source of supply is concerned.

Serious Problem Confronts

"The serious problem that confronts us is to have a greater amount of water delivered daily to the city than is now called for in our present contract.

"Undoubtedly the Southern California Mountain Water company would gladly furnish this extra supply were it possible for them to do so with their present 24-inch main entering the city, which is only large enough to supply the water called for in the present contract, which is a maximum of 7,776,000 gallons in any one day.

"During 1910 this limit was nearly reached at various times in the summer, and the condition this year will be even more serious.

"As the city grows the distributing system is extended to meet the needs of the consumers. This increases the demands upon the service and supply and even this early there are complaints regarding the scarcity of water, and before the year passes it will be necessary for a readjustment of conditions between the city and the Southern California Mountain Water company to provide for our increased consumption, and this can only be done by cancelling the present contract for a new one, which will be a rather delicate matter and require careful consideration.

Favors Municipal Ownership

"I always have, and always will advocate municipal ownership of the city's water supply.

"From mountains to meters is my choice, but I appreciate the bonding situation of this city, and therefore would gladly accept any temporary or partial remedy that would obviate our present condition and prospective shortage of water within the city, while there are billions of gallons impounded in the mountains awaiting our service.

"In conclusion I submit three possible plans of action for the city to consider, solicit your co-operation in this matter, and respectively request that you name a commission of two or three officials to represent the city to meet with a like commission representing the Southern California Mountain Water company, they to submit to you some feasible plan whereby this present situation may be relieved.

"My first plan calls for the purchase of the entire Southern California Mountain Water company system.

"Second, the acquiring of the Chollas reservoir, filtering plant and 24-inch pipe line into the city, and the laying of an additional 30-inch main, thus increasing the service into the city distributing system.

Additional Main Necessary

"Third, the perfecting of an arrangement between the city and the Southern California Mountain Water company, whereby an additional main may be laid from the Chollas reservoir to the city without the necessity at this time of making any purchase as noted in the first and second suggestions.

"As to the question of values that might be placed upon these properties, either in part or intact, I am prepared to quote to your commission such figures as I have gathered.

"A good and sufficient water supply is without price to any city. Los Angeles is spending twenty-three millions to increase its water system and San Francisco is also expending millions upon its service for the same purpose, and San Diego with this excellent supply so favorably located should at once consider and perfect plans and means whereby our growing city may acquire same.

"Very respectfully,

"HERBERT R. FAY,

"Superintendent, Department of Water."

San Diego Union, June 24, 1911

WONDERS OF BIG WATER SYSTEM ARE TOLD

(Continued From Page Nine.)

"gate house." To the end of the 30-inch pipe, two 24-inch pipes are connected, the one running through the filtering plant as described, the other in the opposite eastern direction into the

Chollas Heights Reservoir.

This reservoir is situated in the Chollas Valley on a tract of land comprising 180 acres. It contains ninety million gallons of water and is filled from the Otay pipe line. It serves solely as an emergency source in case of any accident to the main pipe line from Otay. Whenever it becomes necessary to shut off the supply from Otay, the Chollas supply is turned on, and flows directly into the city. It is always kept full and thus can furnish the city with water for two weeks, during which time any repairs that may become necessary on the main line can be made.

The water is kept in Chollas reservoir by a dam of the earth-fill type, with a one-quarter inch steel core plate anchored into a foundation wall of concrete, similar to the Otay dam. It is 56 feet high above this foundation and 526 feet long on top.

The filtration plant is in a strong building with concrete floor and foundation. It consists of a battery of ten huge boiler-like tanks made of steel plates one-half inch thick. Each is eight feet in diameter and twenty feet long. They are filled with pure silica sand through which the water is forced from the top by gravity pressure, leaving any impurities on top of the sand. Every 48 hours these tanks are cleansed by simply forcing the water through from below, when all objectionable matter is carried off through waste pipes. These ten filters have a daily capacity of 7,000,000 gallons, but space is provided for adding more filters, increasing the capacity to 12,000,000 per day. One man does the entire work and also tends to the dam and reservoir.

It may here be added that every other reservoir and dam of the entire system requires the attendance of but one man for each, while two men are sufficient to patrol the entire pipe line.

Leak and "Rotten" Pipe

In concluding the description of the system of the Southern California Mountain Water company, I wish to revert particularly to the conditions of the Lower Otay dam and of the pipe line.

San Diego Union, July 27, 1912

LAUDS SETTING AS

$2,350,000 IN BONDS VOTED BY CITIZENS WILL BE USED IN HUGE DEVELOPMENT PLAN

Construction Work Already Under Way on New Otay Pipe Line; Chollas Heights Reservoir to Be Enlarged and Morena Spillway to Be Raised; $250,000 Will Be Devoted to Filtration Plants, Engineering Investigation.

With the excavation work already started preparatory to construction of the new Otay pipe line, San Diego is embarked on a conservative, yet progressive, program of water development that promises to continue until the city is provided with water resources adequate to care for the steady, assured growth in population here for many years to come.

When citizens voted for $2,350,000 water bonds July 16, last year, they did far more than guarantee a direct improvement of the city's water system. Their decisive action at the polls was a patent declaration that they were eager to support H. N. Savage, city hydraulic engineer, in his plan to provide San Diego with a permanent water supply system that will adequately care for the needs of the fast growing community.

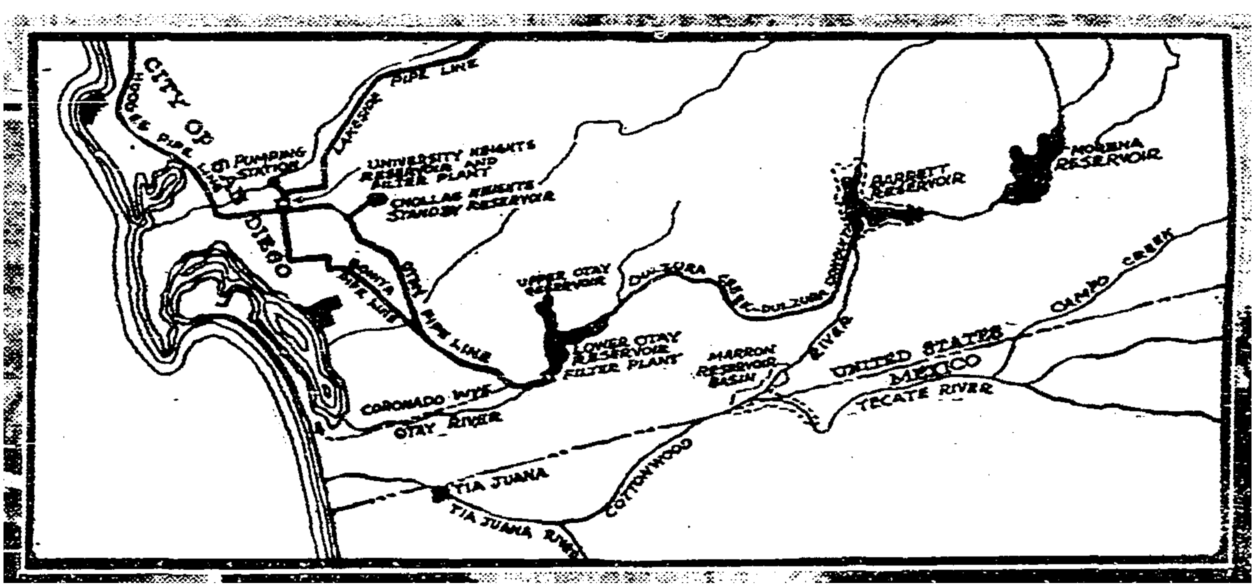
San Diego Union, February 16, 1930

CHOLLAS HEIGHTS STORAGE GREATER

Enlargement of the capacity of Chollas Heights reservoir to be accomplished by use of funds voted in the July water election, will remove the spectre of water famine from San Diego, if the city ever needs to depend solely on this emergency supply.

This reservoir now contains only a three-day supply. This will be increased to a 30-day supply under the modernization program outlined by H. N. Savage, city hydraulic engineer, and for which the money now is available.

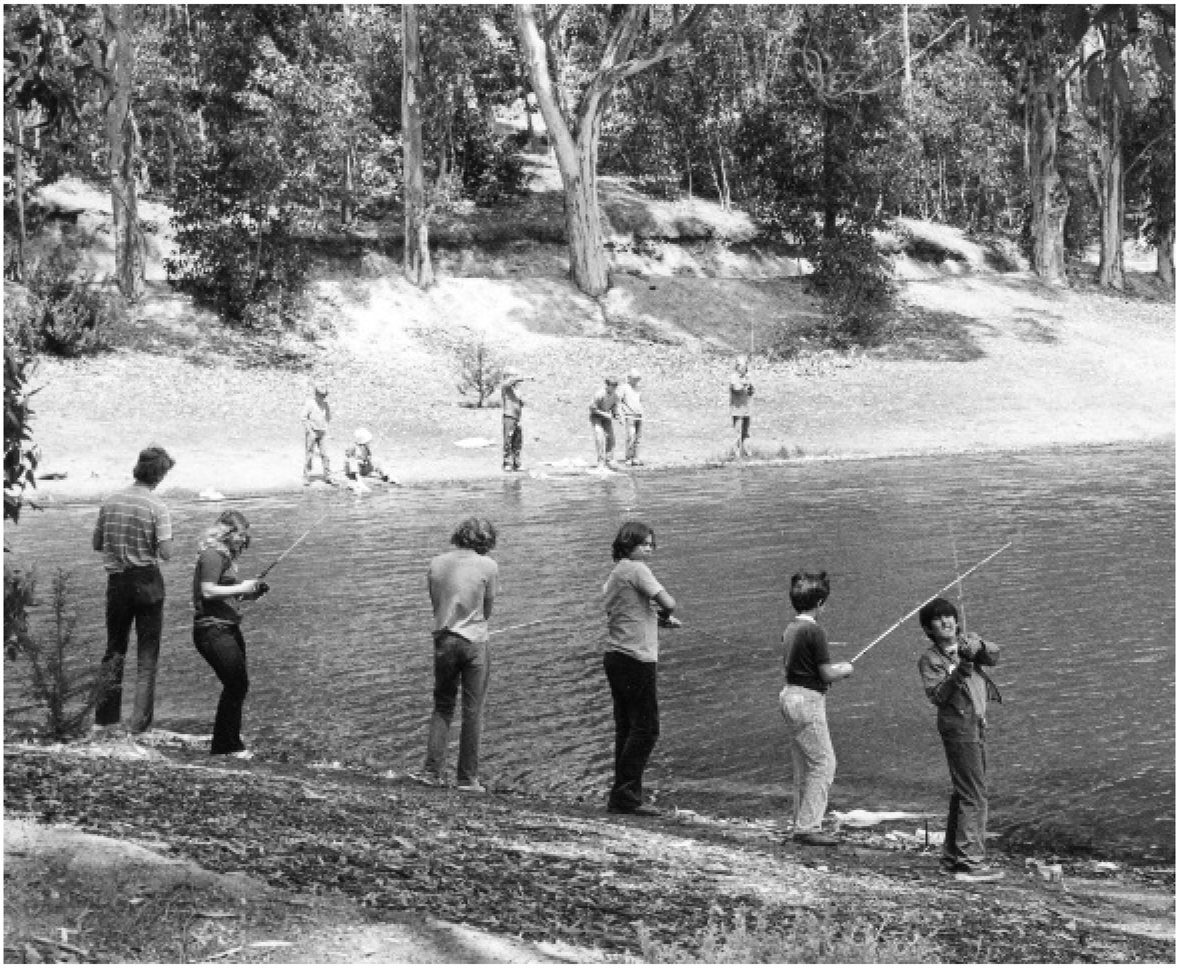
San Diego Union, February 16, 1930

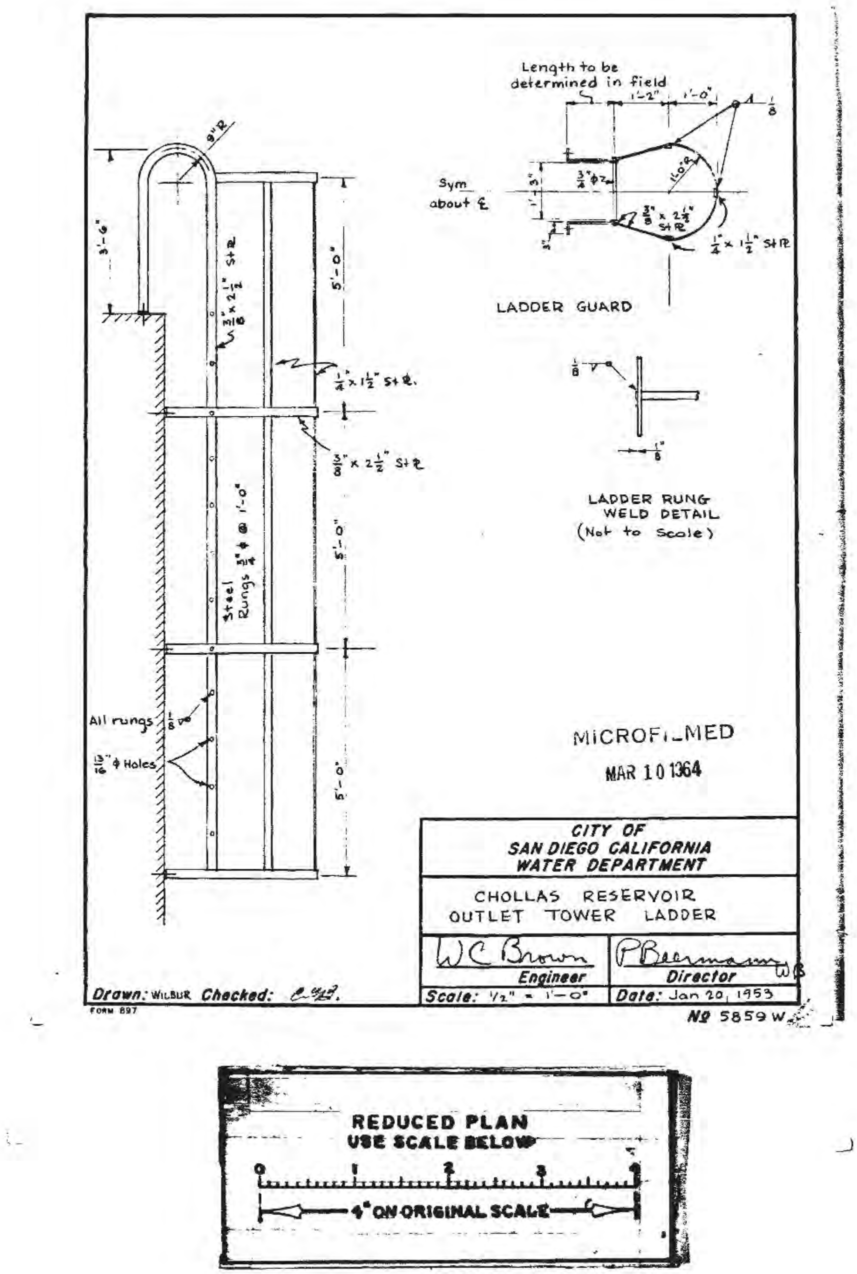


The Naval Radio Transmitting Facility, Chollas Heights, as it appeared upon completion in 1917. "This is a high-powered radio station and contains three 600-foot steel towers, with necessary power house, office building, shop, water tank, main barracks, four quarters for operators and quarters for the officer in charge." –Rear Admiral Roger Welles, first Commandant of Naval Operating Base, San Diego, 1920.

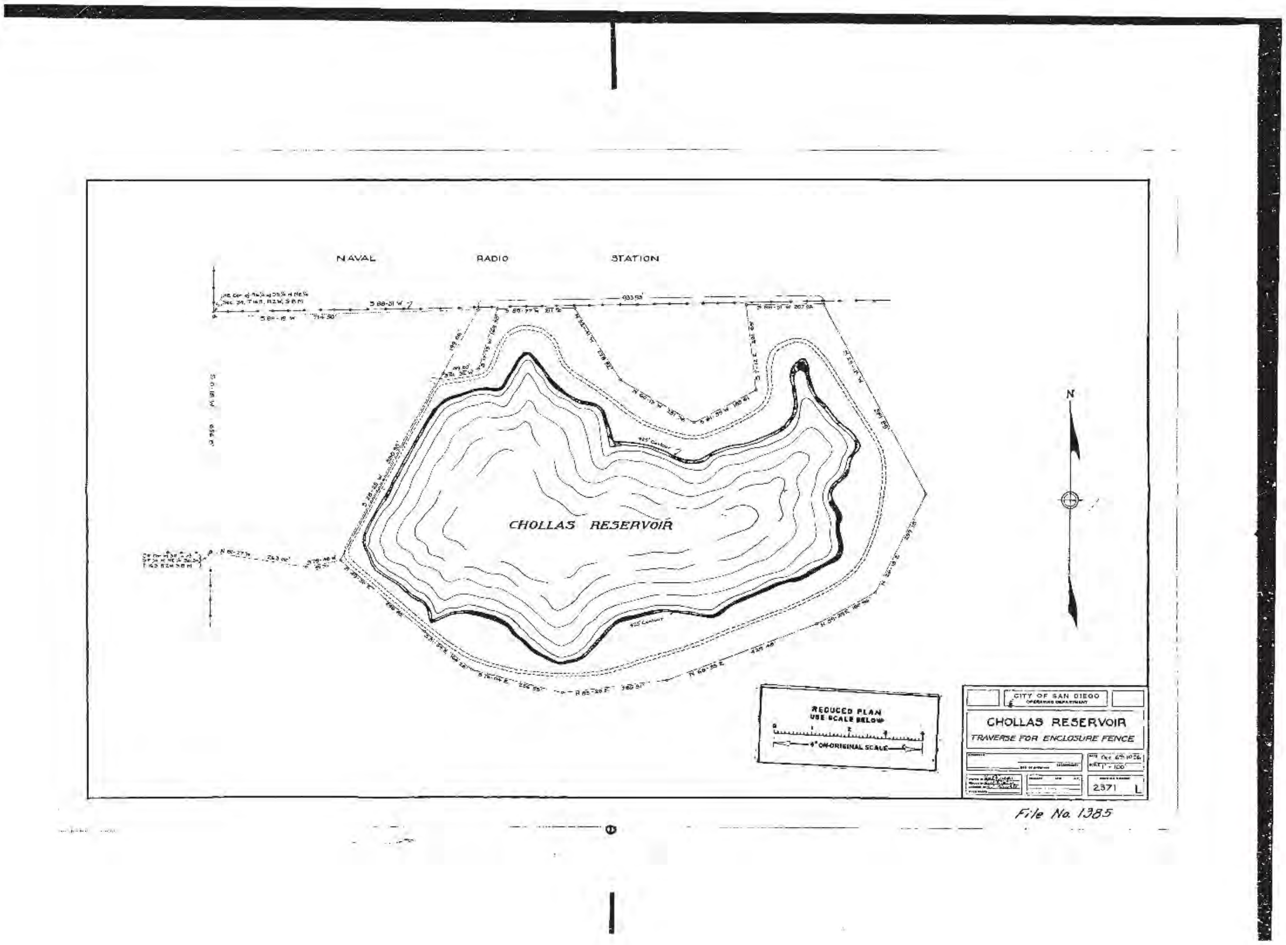
Naval Radio Transmitting Facility, 1917

Chollas Reservoir in early 1900s. San Diego History Center.

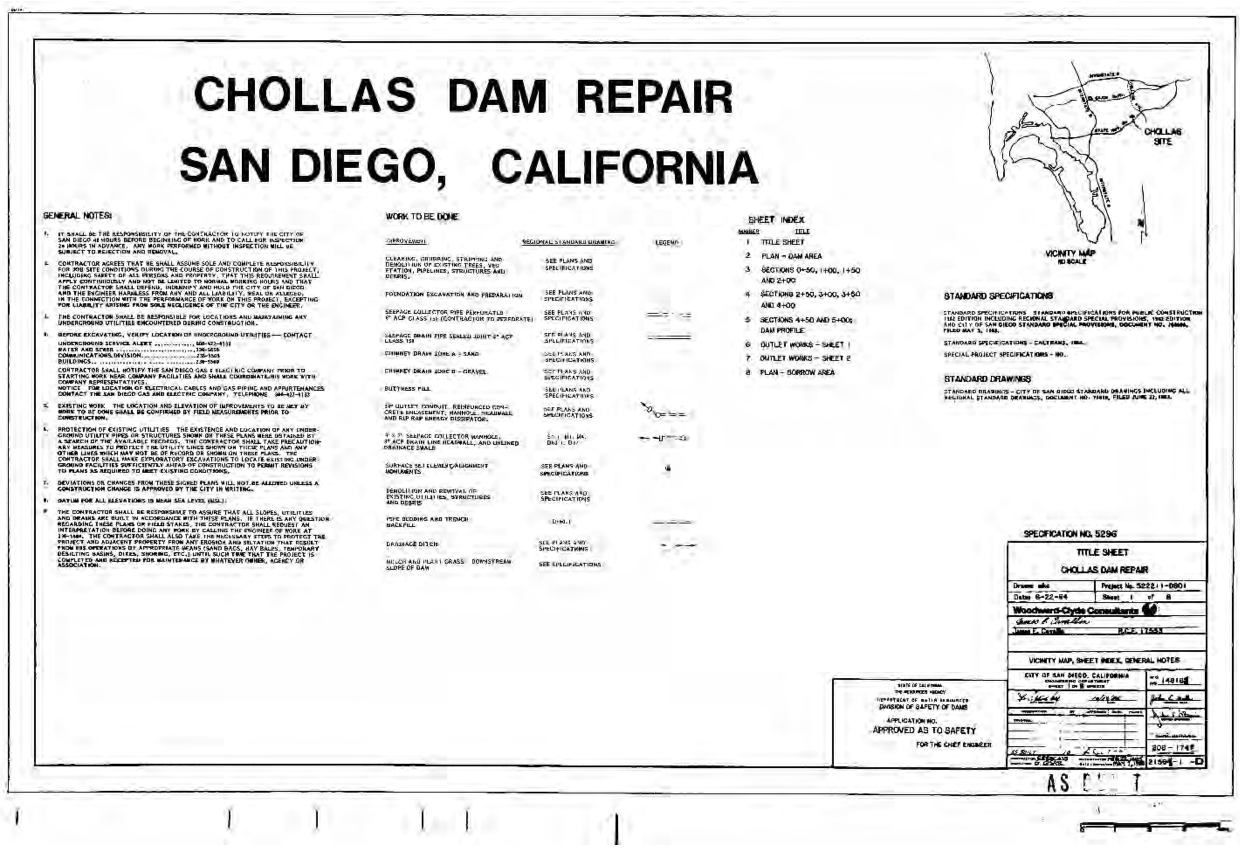

Youth Fishing in Chollas Lake, 1970s. San Diego History Center.



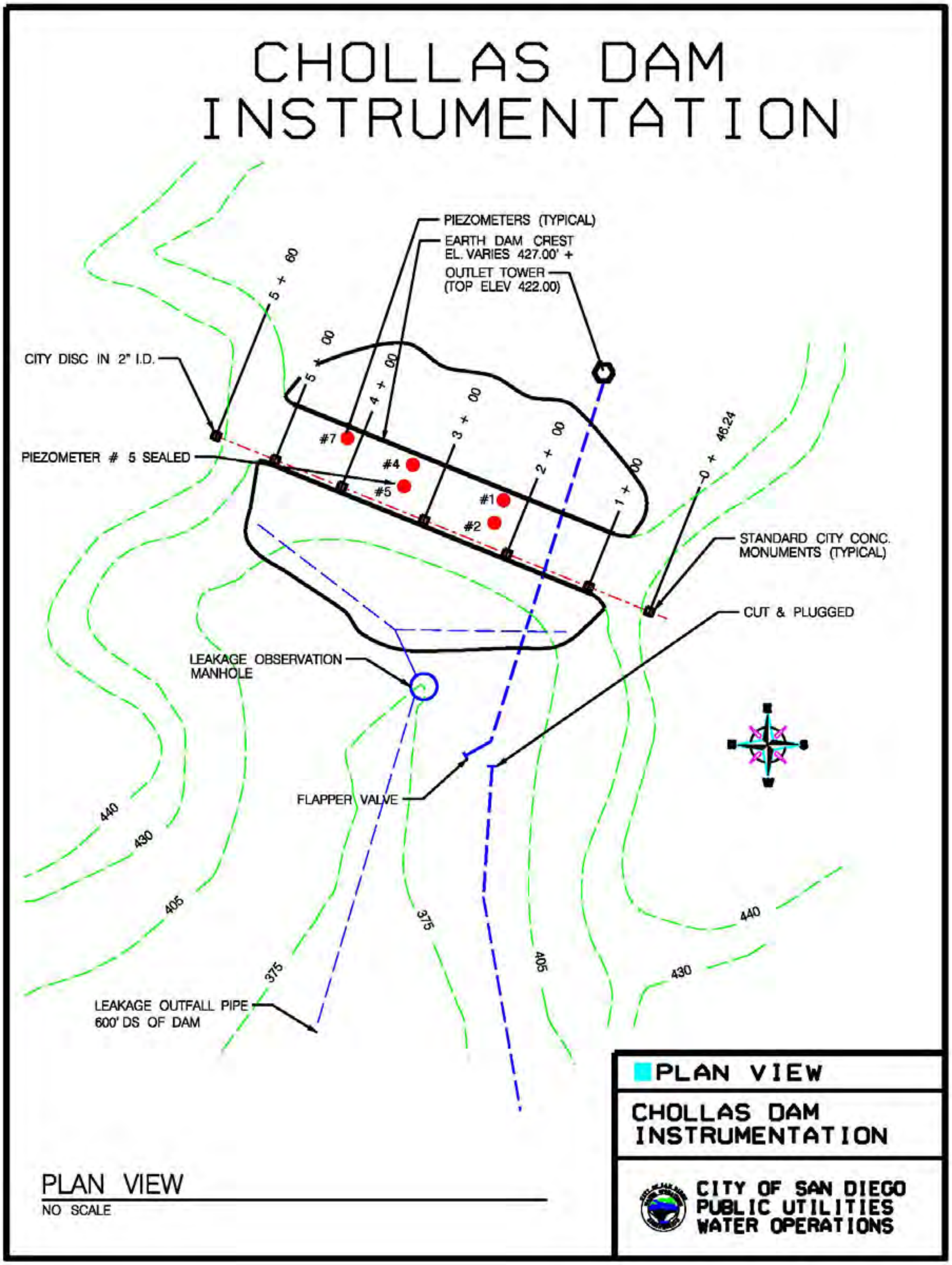
Outlet Tower Repair Plans- City of San Diego 1955.



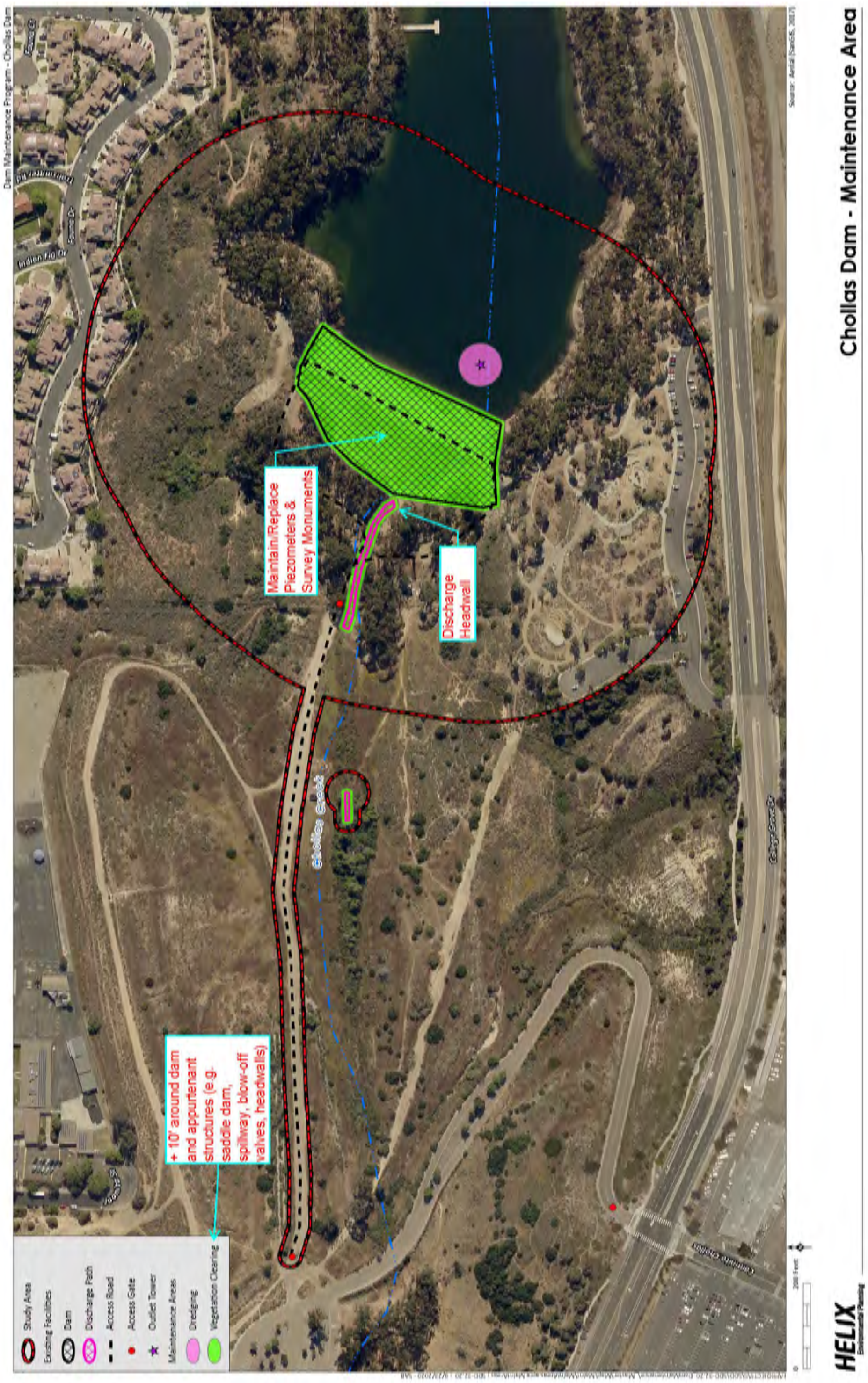
Chollas Reservoir Topographic Map, City of San Diego 1926



Chollas Dam Improvement Plans, City of San Diego 1984



Chollas Complex Instrumentation Plan, City of San Diego PUD



Chollas Complex Site Annotations, HELIX 2019

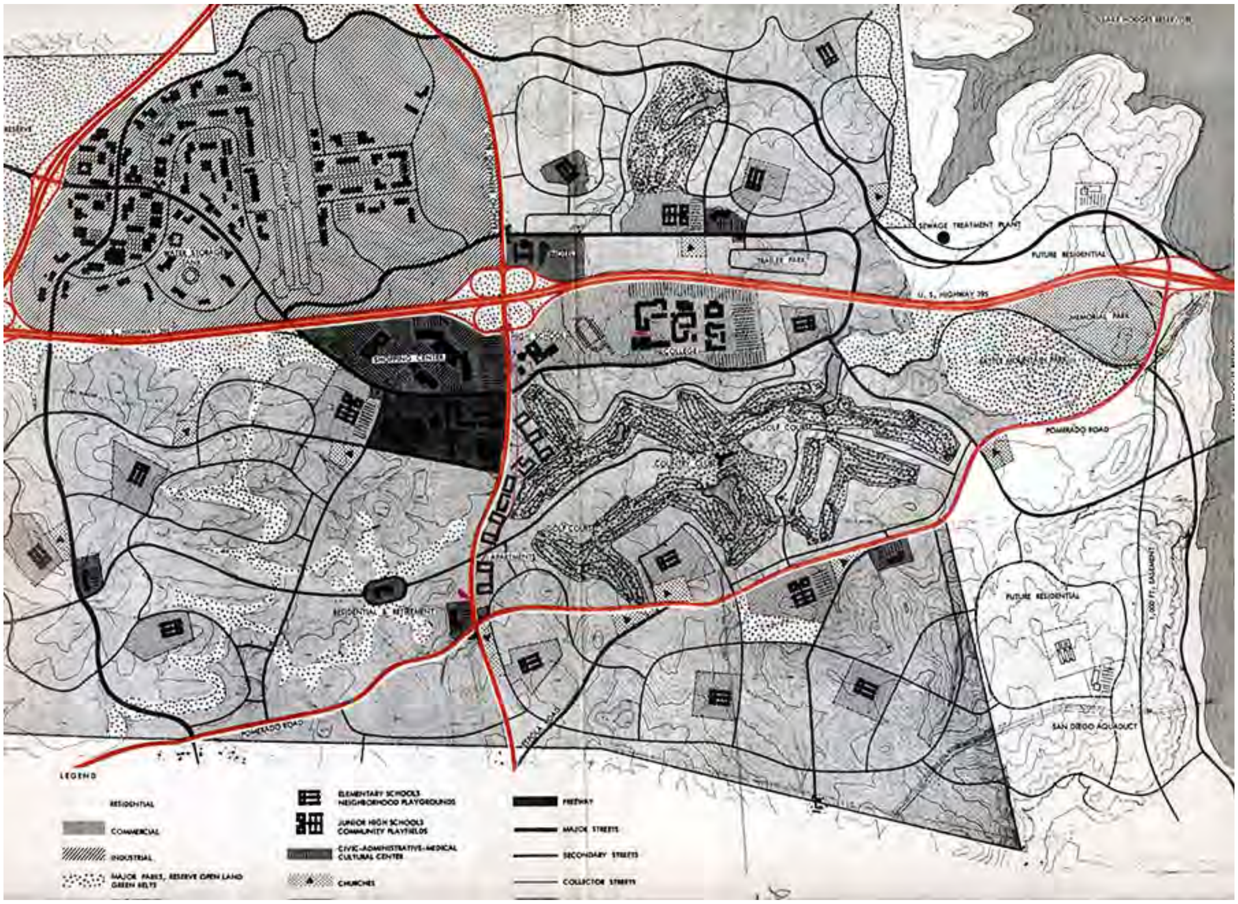
APPENDIX D: RANCHO BERNARDO RESERVOIR MAP

APPENDIX E: RANCHO BERNARDO RESERVOIR ARCHIVAL MATERIALS

Figure 9: 1964 Aerial of Reservoir

Figure 10: 1980 Aerial Showing New Development

1962 Rancho Bernardo Community Plan



NOTICE TO BIDDERS

NOTICE IS HEREBY GIVEN that the City of San Diego will receive bids for work and for commodities listed below, at time and place specified, as follows:

1. Construction of storm drain in 47th Street from Market Street to existing drain at Pera Street, Specification Document 654420. Bid opening date 11:00 A.M., May 14, 1963, Room 161, Civic Center. Deposit on plans $10.00.

2. Construction of Rancho Bernardo reservoir, Specification Document 654419. Bid opening date 11:00 A.M., May 21, 1963, Room 161, Civic Center. Deposit on plans $10.00.

3. Aerial photography and photogrammetric mapping, city wide, San Diego and vicinity, Specification Document 653541. Bid opening date 11:00 A.M., May 14, 1963, Room 161, Civic Center.

San Diego Union, April 28, 1963

Would Decrease Boundary Perimeter

Officials pointed out yesterday the annexation would decrease the city boundary perimeter since the Poway tract would join San Diego on a V-shaped southwestern boundary.

Poway is composed mainly of subdivisions developed within the last four years. Green Valley and Poway Valley are expanding residential communities, with the central and eastern portions containing older homes, the Planning Department survey noted.

Sewer service in the southern portion of the tract is provided by the Pomerado County Water District. Sewers have been constructed in new subdivisions and a treatment plant is located in Penasquitos Valley about a mile east of U.S. 395.

The survey said the annexed area could obtain water service from the Miramar system with a connection to the Rancho Bernardo Reservoir, which is under construction.

The survey recommended that both water districts be dissolved if the tract is annexed. No community planning and zoning plan has been prepared for the area, the survey said.

San Diego Union, December 31, 1963

RANCHO BERNARDO DAM

LOCATION OR APPURTENANCE:	RESERVOIR GAUGE:	USGS DATUM:	NAVD88 DATUM:	CAPACITY ACRE FEET:	CAPACITY M.G.:
Spillway Crest	26.08	793.00	795.20	30.7	10.0
Inlet/Outlet Structure	0.88	767.80	770.00		
Zero Gauge	0.00	766.90	769.10		

COMMENTS:	None
DSOD CODE NO.:	8-14
STREAM:	Off-stream regulating reservoir.
LOCATION:	Northwest 1/4 of Sec. 43, and Southwest 1/4 of Sec. 27, R2W, T13S (SBBM). The center of the reservoir is located at N306,996.00 - E1,744,730.00 on the California Zone 6 coordinates.
WATER RIGHTS:	No application required - regulating reservoir.

DAM STRUCTURE

TYPE:	Rectangular, Rubber-lined asphalt concrete, concrete roof supported by 66 precast concrete columns, 2:1 side slopes
HEIGHT ABOVE STREAMBED:	54'
DEPTH BELOW STREAMBED:	N/A
TOTAL HEIGHT:	27.08' max
LENGTH OF CREST:	N/A
WIDTH OF CREST:	N/A
WIDTH OF FOUNDATION AT STREAMBED:	N/A
PLAN:	216' x 144' Base; 322' x 250' Top; 53' radius at corners; 2:1 side slopes
INSTRUMENTATION:	Piezometers: 5, Leak Weir: 3, Monuments: 15.

SPILLWAY INFORMATION

SPILLWAY TYPE:	Overflow structure: 4' x 12' x 6.5' concrete box to a 36" RCP
SPILLWAY CAPACITY:	129 cfs (83 MGD) max
SPILLWAY CREST LENGTH:	32'
SPILLWAY CHANNEL LENGTH:	N/A

OUTLET WORKS

DESCRIPTION:	Combination inlet-outlet line is 36" SC, class 100 pipe, with the inner end turned up to a horizontal position at invert elevation 767.80 USGS. Flow is controlled by 2-30" BFV's, one manually and the other hydraulically operated by an altitude valve.
MAXIMUM DRAFT RATE:	N/A

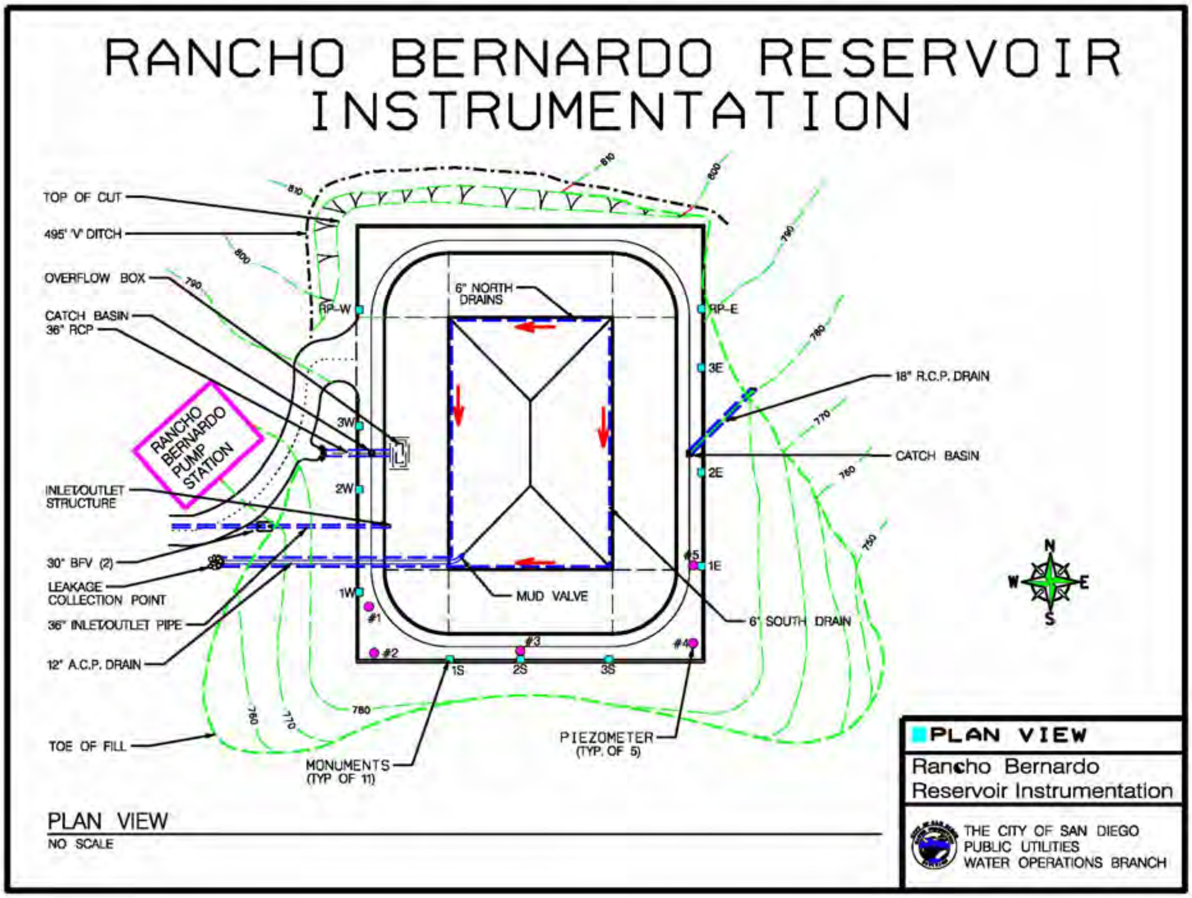
GENERAL INFORMATION

AREA OF WATERSHED:	N/A		
CONSTRUCTION PERIOD:	1963-1964		
CONSTRUCTED BY:	Peter Kiewit & Sons Co.		
COST:	$492,000		
AVERAGE ANNUAL RUNOFF (1888-2005):	N/A		
MEDIAN ANNUAL RUNOFF (1888-2005):	N/A		
AVERAGE ANNUAL RAINFALL at Reservoir (1888-2005):	N/A	(1995-2005):	N/A
YEARS SPILLED:	None		

HISTORICAL INFORMATION SUMMARY

July, 1966:	City of San Diego received Certificate of Approval from DSOD to impound water.
February, 1967:	Testing and minor reparis were performed to prevent small leakage. Subsequently, piezometers were installed to monitor the saturation level of the west embankment.
January, 1971:	A 36" valve was installed at the inlet/outlet.
April 2009	Water Tank Rehab: concrete structural repairs, new liner and roof, new drainage vault.

Rancho Bernardo Reservoir Site Annotations, HELIX 2019



Rancho Bernardo Reservoir Instrumentation Plan, City of San Diego PUD

State of California The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings
Review Code | Reviewer | Date

 ***Resource Name or #:** Chollas Reservoir Complex

P1. Other Identifier: N/A
***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted**
***a. County:** San Diego **and *b. USGS 7.5' Quad:** San Diego **Date:** 1996
c. Address: N/A City: San Diego Zip: 92118
d. UTM: Zone: 11S; 493893.00 mE/ 3622188.00 mN (G.P.S.)
e. Other Locational Data: 32.43' 35" N latitude, -117.04'30" W longitude

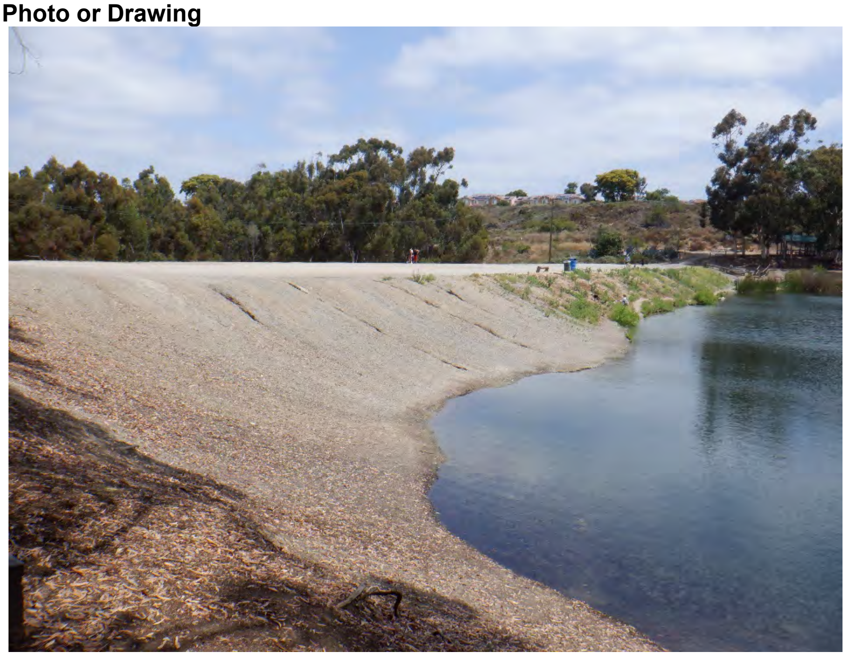
Location: NW 100 Acres of Ex-Mission San Diego Lot #13, in the Eastern Part of the City in Section 35.

***P3a. Description:**

The Chollas Reservoir Complex is composed of a man-made reservoir and dam structure. The Complex lies between Fauna Drive and College Grove Road to the north-south, and 54th Street and College Grove Way to the east-west. Chollas Dam is a concrete and earthen man-made dam. To the east is Chollas Lake and to the west, at the bottom of a steep, northwest facing earthen slope, a weir that directs the waterflow west and eventually flows into Chollas creek. The waterflow travels south of and parallel to the west access road to the dam. (Continued Page 3.)

***P3b. Resource Attributes:** HP11-Enginerring Structure; HP21-Dam; HP31 – Urban Open Space
***P4. Resources Present:** ☐Building ☑Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing



P5b. Description of Photo: Chollas dam, looking northwest. Helix, 2019.

***P6. Date Constructed/Age and Sources:** ☑Historic ☐Prehistoric ☐Both
1901: City of San Diego

***P7. Owner and Address:**
City of San Diego

***P8. Recorded by:**
Kelsey Kaline, MHC
IS Architecture
5645 La Jolla Boulevard
La Jolla, California 92037

***P9. Date Recorded:** November 2020, Updated August 2021

***P10. Survey Type:** Intensive

***P11. Report Citation:** IS Architecture, "Historic Context Statement and Evaluation of Chollas Reservoir Complex and Rancho Bernardo Reservoir, San Diego County CA," August 2021.

***Attachments:** ☐NONE ☑Location Map ☑Sketch Map ☑ Continuation Sheet ☑ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☑ Other (List): Photographs

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #**: Chollas Reservoir Complex

***NRHP Status Code** 6Z

B1. Historic Name: Chollas Heights Dam

B2. Common Name: Chollas Lake Park, Chollas Reservoir

B3. Original Use: Water Storage and Distribution

B4. Present Use: Recreational Lake

***B5. Architectural Style:** N/A

***B6. Construction History:**

The Chollas Reservoir Complex includes an earthen dam constructed in 1901 as the storage reservoir terminal point for the Bonita pipeline which brought water from Lower Otay reservoir. The dam features a steel plate and concrete core, covered with earth and rock. Underground redwood pipe completed in 1906 brought water to a filtration plant. The plant was decommissioned in 1950 and in 1966 the lake become solely a fishing lake, creating Chollas Lake Park. (Continued page 3).

***B7. Moved?** ☑**No** ☐**Yes** ☐**Unknown** **Date:** **Original Location:** N/A

***B8. Related Features:** City of San Diego Source Water System (P-XXX-XXX).

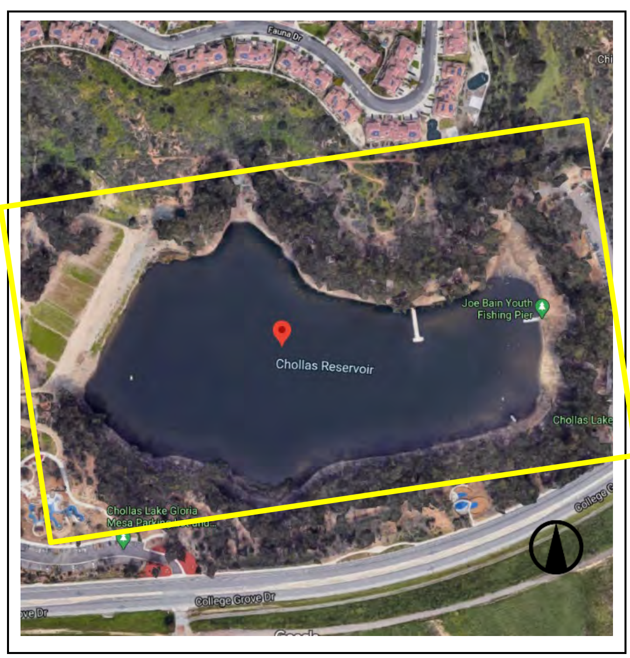
B9a. Architect: Engineer: Hiram Newton Savage

b. Builder: Southern California Mountain Water Co.

***B10. Significance: Theme:** N/A **Area:** N/A

Period of Significance: N/A **Property Type:** N/A **Applicable Criteria:** N/A

(continued page 3)



B11. Additional Resource Attributes: N/A

***B12. References:** See bibliography (p17,18).

B13. Remarks: None

***B14. Evaluator:** Kelsey Kaline, MHC (IS Architecture)

***Date of Evaluation:** November 2020, August 2021

(This space reserved for official comments.)

***P3a. Description (Continued):**

The Chollas Reservoir Complex is composed of the Chollas Dam and Chollas Reservoir, and Outlet Tower, along with recreational elements including trails, fishing piers, loading ramps, and a parking lot. The complex was historically called the Chollas Heights Reservoir/Dam. For the purposes of this evaluation, Chollas Reservoir Complex is used for brevity.

The Chollas Dam is a concrete and earthen embankment dam. The dam has a steep, northwest facing earthen slope. The Crest measures 55', with a discharge headwall and Weird that directs the waterflow west, and eventually flows into Chollas creek. The waterflow travels south of and parallel to the west access road to the Dam.

The Chollas Reservoir is a dammed, small, urban lake to the east of the Dam. The Reservoir features the Outlet Tower. The Reservoir currently serves as a recreational lake. The reservoir is irregular in shape, although generally oriented in a "U" shape with the dam along the western edge. The diameter is approximately 8/10s of a mile. A walking path encompasses the reservoir, along with a surface parking lot, picnic tables, a children's playground, and fishing docks.

The Complex also has surrounding parkland that consists of 16 surface acres. Native and non-native vegetation was thick to the sides of the access road, west entrance to the Dam from North Chollas Park parking lot. Eucalyptus trees are the main vegetation around the Dam and at the base of the northwest facing slope of the Dam.
The Complex is located between Fauna Drive and College Grove Road to the north-south, and 54th Street and College Grove Way to the east-west.

***B6. Construction History (continued):**

<u>Construction of the Chollas Heights Dam and Reservoir</u>

The Chollas [Heights] Dam and Reservoir was constructed in 1901 for the private Southern California Mountain Water Company. E. S. Babcock, President of the SCMWC, was an instrumental figure in the development of the dam. The engineer in charge of constructing the dam and reservoir was Hiram Newton (H. N.) Savage, who served as consulting engineer for the SCMWC beginning in 1893. The earth-fill embankment dam was constructed on a tributary to Las Chollas Creek east of the City limits and built to serve as terminal storage for the pipeline extending from the Lower Otay Reservoir. This pipeline delivered water to the Coronado Water Company, which supplied the City of Coronado. Later, it was also used a component part of the system distributing water from both the Lake Morena and Otay Lakes to the City distribution reservoir in University Heights. Further, upon completion, the reservoir was used as a storage and transfer facility. To this purpose, the reservoir was used for emergency containment and storage of water for the City of San Diego daily water supply.

The dam was constructed with earthen fill, with a quarter-inch steel core plate anchored into a foundation wall. Soon after its construction, a filtration plant was constructed adjacent to the reservoir. In 1906 the Bonita Pipeline from Lower Otay Reservoir to the Chollas Reservoir was constructed. At an undated time during the early 20th century, a Caretaker's House was constructed on site, aerial photography seems to locate this resource directly north of the Dam. C. Moore is listed as Caretaker of the Chollas Reservoir in City Reports and newspaper articles in the year 1917.

A steel pedestrian bridge led east from the Dam to the Outlet tower, as seen in photographs from 1917.

Earth-filled Embankment Dams

Earth-filled embankment dams were the first type of dam to be constructed by humans and were first documented in approximately 3,000 BC in the Middle East. In fact, earth-filled embankment dams are still the most prevalent dam-type, and a 2005 report on large federal dams estimated that of the 70,000 dams present in the United States, 85% were earth-filled embankment dams. Many of the dams in the United States were built in the early twentieth century prior to the advent of technology that would have facilitated the construction of structural dams. However, the report goes on to say that throughout the twentieth century, even with the advent of new technology, 65% of the dams built were earth-filled embankment dams. Earth-filled dams are the most prevalent type of dam because they can be built from locally available materials that require minimal processing, saving money on the construction process. The main detraction from earth-filled dams is that they are subject to the erosive action of water if a sufficient spillway is not provided as part of the dam design (Billington et al. 2005; Bureau of Reclamation 1987).

Purchase by City of San Diego, 1912-1913

Although the City of San Diego Water Department was formed in 1901 and began developing a distribution system, the Chollas facility was not acquired.

Most of San Diego's private water companies failed to survive the drought of 1895-1904 and disappeared by 1905. Realizing the need to gain better control of its infrastructure, the City began purchasing holdings of the SCMWC that were within the City limits. Such holdings included reservoirs, pumping plants and machinery, pipelines, buildings, and tools. The City also began constructing its own facilities and infrastructure to meet increasing demand (Fowler 1953). On August 13, 1906, the City reentered into a contract with the SCMWC for water supply of up to 7,776,000 gallons per day at the price of 4 cents per 1,000 gallons from the Chollas Reservoir.

In August 1912, the City voted on a bond issue of $2,500,000 to purchase the Otay Lakes, as well as the Barrett intake, dam, and reservoir site; Dulzura Conduit; and Chollas Reservoir System from the SCMWC (Fowler 1953). The purchase was effective on February 1, 1913. Babcock wrote a statement that the council should be commended for having obtained such favorable terms from the SCMWC:

> By 1915 we will have at least 100,000 people. This increased population will need more water or else they will leave here and go to Los Angeles. So, I think our only recourse is to buy out the system of the Southern California Mountain Water company, as it is cheap at the price offered for four million dollars… I have no interest whatever professionally in the matter, or I do not own a dollar in this system, but I know what it cost, what its influence has been on the growth of San Diego and realize that the best interests of the citizens will be served by municipal ownership (SDU 1912).

The impounding capacity of the system purchased was 29,180,000,000 gallons total. By purchasing this system, the City of San Diego assumed a servitude to supply water to the Coronado Water Company. In 1913, the sum of $705,000,000 was voted to improve the water system which would add an impounding capacity of 15,000,000 gallons and a further delivering capacity of filtered water by gravity of 7,250,000 gallons daily (Fowler 1953; FWE 1914).

In 1914, the City agreed to purchase the Morena Dam at a fixed price following a 10-year lease, solidifying its ownership of all portions of the former SCMWC. The owners of the company incurred a large profit by selling the system to the City, instead of the loss they would have incurred by selling water for the full ten-year term of the contract. For the time being, it seemed that the City had addressed its immediate and long-term water problems. Population growth more than doubled from 17,700 in 1900 to over 39,500 in 1910, and water was relatively plentiful. However, the drought that struck San Diego in 1912 once again brought water security fears to the fore (Fowler 1953).

<u>Alterations and Post-construction Development, 1902-1966</u>

By 1912, City Water Supply reports note that the Chollas reservoir typically maintained a capacity of two weeks supply of water for the San Diego population. The resource was appraised by a Southern California Water Company Engineer at $134,668.20. During this time, from 1912-1915, newspaper articles reports that the filtration plant on site was outpaced due to daily demand on the water system.

In 1914, the U.S Navy chose adjacent land as site for one of its three radio stations that would complete a system providing their first worldwide wireless communications. This Chollas Heights Radio Station was composed of three large metal towers, was completed in 1916. The towers were removed in the 1990s.

A 1916 flood inspired a critical water infrastructure boom for the City of San Diego. This era of development was also motivated by the potential loss of seasonal rainfall and loss of infrastructure after a severe drought that almost ran water resources dry. By 1916, the Reservoir complex was severely stressed by local demand, paralleling the local population growth. A water shortage was noted in the newspapers, and the reservoir was nearly depleted. The daily consumption of water during that year was above 10 million gallons daily. The Chollas Reservoir dropped to less than 45 million gallons, which equaled less than a four-day supply for the City.

1917, saw an arson incident to the complex, with an unnamed individual setting fire to brush. No physical damage was noted in the newspaper archives or City reports. This same year, a large storm causes most of the water distribution network to fail, and the City is forced to rely on the Chollas Reservoir complex for all water needs.
By 1926, as the City water demands continued to grow, booster pumps were added to the Chollas reservoir filtration system. A large flooding event in 1927 required the repair of cracking in the Chollas reservoir and dam, and plans show the erection of a fence surrounding the resource. In 1929, plans were introduced to enlarge the Reservoir using City bonds after a breach at the St. Francis Dam. A number of improvements were completed by 1930 including the enlargement of reservoir capacity.

Repairs were done to the Outlet Tower in 1955, and specs were found for a new Outlet Tower ladder.
The Chollas complex was decommissioned in 1966, and through a ballot initiative, the lake was turned over to the Park and Recreation Department to operate it as a public park centered around youth fishing. It was officially designated a youth fishing lake in 1971, which included development and operation of a recreation program. Initially, the lake was open only on weekends and holidays, but within the first year the recreation program was expanded to include weekday evenings.

Since 1971, the Chollas Lake Park has been used for a variety of recreational fishing and lake activities. Significant repairs were done to the Complex in 1985. The improvements listed include clearing and demolition of existing vegetation, pipelines, and debris, foundation excavation, buttress fill, the installation of seepage and chimney drains, and the construction of a drainage ditch.

Periodic vegetation plantings and cleanings, along with recreational improvements have occurred since the Complex's decommission.

Timeline of Chollas Heights Dam and Reservoir

- 1901- Reservoir and Dam are constructed
- 1902- Filtration Plant is completed
- 1912- held 2 weeks supply of water for the population. The resource was appraised by a Southern California Water Company Engineer at $134,668.20.
- 1912-1915- Newspaper reports that the filtration plant was outpaced based on demand
- 1913- City purchases the reservoir and filtration plant from the Southern California Water Company.
- 1916- A water shortage is noted in San Diego and the reservoir is nearly depleted. The daily consumption of water is 10,000,000 by the City. Reservoir drops to less than 45,000,000 gallons, or less than 4 days' supply of water.
- 1917- C. Moore is listed as caretaker of the reservoir who lived in a house on-site. A brush fire is intentionally caused nearby. Later in the year, a large storm causes local water system to fail, the city must rely on the Chollas dam solely.
- 1926- Booster pumps are added to the filtration system
- 1929- Plans are introduced to enlarge the reservoir using City bonds. Plans are put on hold. Plans eventually are shelved when the city decides to build a new facility in Otay.
- 1930- Fishing and hunting is banned from the reservoir.
- 1966- City decommissions the plant and turns it into a recreational reservoir.
- 1985- Numerous alterations to the Complex including demolition of pipelines and creation of a drainage ditch.

***B10. Significance (continued):**

Historical Overview:
History of the Chollas Dam (See Construction History).

In 1901 the City of San Diego purchased the holdings of the San Diego Water Company (for $500,000) and the Southern California Mountain Water Company ($100,000) that were within the city limits.

In 1912 the city purchased the Barrett intake, dam and reservoir site, Dulzura Conduit, Otay Lakes, and Chollas Reservoir System for $2.5 million from the Southern California Mountain Water Company.

Thematic Contexts:

This historic context was based off the foundation set by Dudek consultants with *The City of San Diego Source Water System Historic Context Statement* (June 2020) and the *Draft Historic Context Statement for City of San Diego Public Utilities Department Reservoir Structures* (July 2018).

The Historic Context Statement divides the history of the City of San Diego Source Water System into chronologically ordered periods of development which also serve as the identified themes:

- Early Water System Development (1887-1916)
- Flood Recovery and Reinvestment (1916-1928)
- Post St. Francis Dam Disaster Development (1928-1947)
- Water Importation and Post-war Development (1947-1960)

Dudek concluded that the City of San Diego Source Water System is eligible under NRHP/CRHR Criterion A/1 and City of San Diego Criteria A and B for its ability to convey important associations with the City's municipal water supply and the development of its critical water infrastructure prior to the importation of water from the Colorado River and State Water Project.

The *Historic Context Statement for City of San Diego Public Utilities Department Reservoir Structures* (June 2020) provides context about the development of San Diego's Source Water System, which provides valuable information for evaluating the Chollas Reservoir Complex and the Rancho Bernardo Reservoir Complex:

Development of San Diego's Source Water System

The procurement of water has played an instrumental role in the growth and development of the city since its founding. The region receives very little rainfall, and local mountain streams and groundwater provide only a limited supply of water. Cattle raising and dry-farmed wheat were the predominant forms of agriculture in the 1850s–1880s because of the water supply limitations. As the San Diego region, and the state of California as a whole, aggressively developed its agricultural industry in the Spanish mission–era and beyond, water supply became a highly prized and widely disputed topic from the colonial period onward. Seven principal streams originate in the peninsula range and discharge to the Pacific Ocean and provided fresh water sources and, later, ideal locations for dams and reservoirs: Santa Margarita river, San Luis Rey river, San Dieguito river, San Diego river, Sweetwater river, Otay river, and Tijuana river (which consisted of two major reaches). The state's first instances of irrigation came from diverting such streams using riparian rights and lacked a formal water storage system (Caltrans and JRP historical consulting services 2000; Fowler 1953; SWRB 1951).

During the mission period (1769–1834), Franciscan missionaries sought an adequate water supply for irrigation purposes by digging wells near the San Diego river and constructing ditches, small dams, and cisterns. Kumeyaay neophytes and laborers built the old mission dam (also called the old padre dam) in 1803 at mission gorge and an aqueduct to the mission; portions of both remain intact. During the Mexican and early American periods, there was no regional coordination when it came to procuring and maintaining a reliable water supply. At the end of the Mexican period and the beginning of the American period fresh water in San Diego was becoming increasingly difficult to acquire, because of ranching practices, aggressive hydraulic gold mining, and American homesteaders throughout the state (Caltrans and JRP historical consulting services 2000; Sholders 2002; SWRB 1951).
In response to the population growth and regional limitations on irrigation based on low rainfall and lack of proper storage, multiple areas of Southern California, including the San Diego region, began to develop water storage reservoirs and dams.

The first major steps toward organized water infrastructure within the San Diego metropolitan area began with the 1873 formation of the San Diego Water Company. The corporation began drilling a well near B and Eleventh Streets in the City that supplied the City's first pipe water to a few residences in 1874. Unfortunately, the groundwater was poor in quality, and the supply was low, which led to the origination of the City's long-standing "bad water" reputation. To remedy its supply and quality issues, the San Diego Water Company increased its stock from $10,000 to $250,000 in 1875, which allowed for drilling of wells in the San Diego River, construction of a new pumping plant, and extension of the distribution system. The wells proved insufficient for the quickly growing City, and soon the City began to turn to privately owned water companies to supply the City (Fowler 1953; Smythe 1908).

The development of reliable water infrastructure throughout the region did not begin in earnest until the 1880s, as a result of a significant population boom and the incoming California Southern Railway which connected the City to the eastern United States. The County's population swelled from 8,600 in 1880 to over 30,000 residents by 1887. Developers and land speculators emerged throughout the region, looking to capitalize on the City's rapid growth. To address the ongoing water needs, the City entered into agreements with other water companies, including the Southern California Mountain Water Company (SCMWC). The SCMWC was led by Elisha Spurr Babcock Jr. (1848–1922), a native of Indiana, who earned his fortune in the railroad industry. He purchased property on Coronado Beach, establishing the Coronado Beach Company, which incorporated the Otay Water Company in 1886. John Diedrich Spreckels (1853–1926) of San Francisco earned his fortune in the shipping business and Hawaiian sugar industry. During an 1887 visit to the City, Spreckels was impressed by the real estate boom at the time, which led him to invest in construction of a wharf and coal bunkers at Broadway (at the time known as D Street). The boom ended quickly, but Spreckels continued his interest in the area. He acquired control of Babcock's Coronado Beach Company, then the *San Diego Union* in 1890, the *San Diego Tribune* in 1891, and the City's street railway system in 1892. Babcock persuaded Spreckels to invest in a number of his other organizations, including Otay Water Company and the Mount Tecarte Land and Water Company. The SCMWC was born from a consolidation of water companies that included the Otay Water Company and the Mount Tecarte Land and Water Company in 1894. Because of these transactions, Spreckels owned nearly half of Babcock's enterprises (Crawford 2011; Fowler 1953; Hennessey 1978; LAT 1896; McGrew 1922; Ormsby 1966; San Diego History Center 2018; Smythe 1908).

<u>Southern California Mountain Water Company (SCMWC)</u>

The Southern California Mountain Water Company was a private water company associated with Elisha Babcock Jr., and the Spreckels Brothers.

The SCMWC was led by Elisha Spurr Babcock Jr. (1848–1922), a native of Indiana, who earned his fortune in the railroad industry. He purchased property on Coronado Beach, establishing the Coronado Beach Company, which incorporated the Otay Water Company in 1886. John Diedrich Spreckels (1853–1926) of San Francisco earned his fortune in the shipping business and Hawaiian sugar industry. During an 1887 visit to the City, Spreckels was impressed by the real estate boom at the time, which led him to invest in construction of a wharf and coal bunkers at Broadway (at the time known as D Street). The boom ended quickly, but Spreckels continued his interest in the area. He acquired control of Babcock's Coronado Beach Company, then the *San Diego Union* in 1890, the *San Diego Tribune* in 1891, and the City's street railway system in 1892. Babcock persuaded Spreckels to invest in a number of his other organizations, including Otay Water Company and the Mount Tecarte Land and Water Company. The SCMWC was born from a consolidation of water companies that included the Otay Water Company and the Mount Tecarte Land and Water Company in 1894. Because of these transactions, Spreckels owned nearly half of Babcock's enterprises (Crawford 2011; Fowler 1953; Hennessey 1978; LAT 1896; McGrew 1922; Ormsby 1966; San Diego History Center 2018; Smythe 1908).

In 1895 Babcock sold half interest of the Otay Water Company to the Spreckels Brothers and the name of the corporation was changed on May 1 to the Southern California Mountain Water Company. Spreckels had provided funds to resume construction of the Lower Otay Dam in 1894, and the dam was finished by August 1897. A pipeline was built to San Diego and the Southern California Mountain Water Company replaced the Flume company as the most important supplier of city water. The water company built three more dams on the Otay-Cottonwood river system, the Upper Otay Dam, the Barrett dam and the Morena Dam. In 1912 the city of San Diego purchased the company from Spreckels and it became the municipal water company. When the Lower Otay Dam was destroyed in the 1916 flood, it was rebuilt by the City of San Diego, finished in 1918 and renamed the Savage Dam after its chief engineer, Hiram Newton Savage. In 1920 the city of San Diego proposed to pump water from the Tijuana River Valley into the Lower Otay pipeline.

To get water to San Diego, the Southern California Mountain Water Co. began building a pipeline made of wood stretching from Otay to San Diego, with additional branch lines to supply farmers in the Otay Valley and residents of Coronado. In the early century, wood-stave pipes were the modern method for bringing water to cities. The first public water system in America had brought water to Boston through wooden pipes in 1652. Two-and-a-half centuries later, the technique was still state of the art. "It is common knowledge that wood pipe buried in the ground or kept saturated with water, has an indefinitely long life," noted the American Water Works Association in 1922. For the San Diego project, engineers designed 40-inch-diameter pipe made from Humboldt County redwood. The pipeline would run north from Lower Otay for 19 miles, ending at a reservoir being built at Chollas Heights. From Chollas the water would run four miles northwest through cast-iron pipes to the city filtration plant in University Heights at Howard Avenue and Oregon Street. There, the water would be aerated in a fountain before being piped to customers. Construction began in December 1900, when laborers from the Mountain Water Co. began building tunnels and trestles in preparation for the redwood pipe, which was being cured in Coronado. The contract for trimming the lumber into pipe staves went to the Russ Lumber Co. of San Diego. (*The San Diego Union-Tribune,* June 6, 2009.)

To address the ongoing water needs, the City entered into agreements with other water companies, including the Southern California Mountain Water Company (SCMWC). The City purchased numerous holdings of the SCMWC in 1901 and purchased their entire holdings in 1913.

<u>Reservoir and Dam Complexes</u>

Reservoir complexes are usually comprised of several elements including the water-retaining structure (dam), a water-retention area (reservoir), a water-releasing structure (spillway), a water-conveying structure (conduits and outlet tower), and other essential elements including water treatment plants (Zhang et al 2016). Each of these portions of the reservoir provides an essential function that ensures water will be retained and released safely. Primary property types are distinguished from secondary property types in that each is required for the water system to work effectively and for the reservoir system to continue its intended functions. Primary property types also reflect the elements of a reservoir complex that are required to convey its significance.
The purpose of a dam is to store water and facilitate flood control for human and livestock water supply, irrigation, energy generation, recreation, and pollution control (Figure 3). Typically dams fulfill a combination of these functions. Manmade dams are classified according to their type of construction, materials, slope, seepage control method, and resistance to the forces of water pressure. The materials used to construct modern dams included earth, rocks, concrete, masonry, steel, timber, rubber, and sometimes a combination of these materials.
A reservoir is typically formed by the construction of a dam across a linear water source, such as a river or creek, to create an artificial lake where water is stored (Figure 4). The adjacent dam is responsible for the amount of water that flows out of the reservoir, therefore controlling its water level. The amount of water in a reservoir can also be controlled by natural elements including rainfall, snowfall, and droughts. In conjunction with storing water, reservoirs often become recreation centers for boating and fishing. The water in a reservoir is very still causing sediment to pile up on the bottom.

<u>Hiram Newton Savage: Engineer (1861-1934)</u>

The Chollas Reservoir Complex was engineered by H.N Savage, who was the consulting engineer for the SCMWC. Hiram Newton Savage was born in Lancaster, New Hampshire, to farmer Hazen Nelson Savage and Laura Ann Savage (née Newton). In 1887, he graduated with a Bachelor's in Science (B.S.) from New Hampshire College of Agriculture and Mechanical Arts, following that degree in 1891 with a Civil Engineering degree from Thayer School of Engineering at Dartmouth College. After graduating, Savage immediately began seeking engineering work (WRCA 2005). While completing his degree at Dartmouth, Savage began his engineering career in Tennessee, where he was hired as assistant engineer by the East Tennessee and Georgia Railway, the Nashville and Tellico Railway, and the Athens (Tennessee) Improvement Company in 1888. In 1889 he was an Assistant Engineer for the Hydraulic Mining and Irrigation Company in the San Pedro Mining District of New Mexico, and later that same year he served as Chief Engineer at the Rio Grande Water Company in New Mexico. In 1891, Savage relocated to Southern California, where the San Diego Land and Town Company in National City, California, hired him as chief engineer; he worked there until 1903. His biggest achievement at San Diego Land and Town Company was the enlargement of the Sweetwater Dam, raising the dam to 110 feet tall and resulting in a total storage capacity greater than 26,000 acre-feet. Completed in 1911, the work entailed addition of a 20-foot-tall parapet along the top of the dam; addition of concrete to the downstream side of the dam to compensate for the extra pressure from the increased water storage; inserting a two-chute overflow weir on left side of the dam; and raising the height of the outlet tower (Reynolds 2008, WRCA 2005).

While with the San Diego Land and Town Company, Savage also took outside consultant work. He took consulting jobs with several San Diego-area railroads: the San Diego and Cuyamaca Railway, the San Diego and La Jolla Railway Company, and the Cuyamaca Beach Railway Company. He also consulted for water-related engineering projects with the Cuyamaca Water Company, including the Zuninga Shoals Jetty Project for the City of San Diego. In 1895, the SCMWC hired Savage as a Consulting Engineer in connection with the Morena, Upper Otay, and Lower Otay Dams, and the water-conveyance system to the City (WRCA 2005).

In 1903, Savage was appointed Consulting Engineer for the United States Reclamation Service (a predecessor to the Bureau of Reclamation). In 1905, Savage was promoted to the Supervising Engineer of the Northern Division of the Reclamation Service in Montana, North Dakota, and Wyoming, where he oversaw several Reclamation Service dam projects, such as: the Milk River Project and Sun River Dam Project in Montana, the Williston Dam project in North Dakota, and the Shoshone Dam Project in Wyoming, which was at the time of its construction the highest dam in the world. Savage also consulted on other Reclamation Service projects for other regional divisions, including the Southern Division's Salt River Valley and Roosevelt Dam projects in Arizona. During his time with the Reclamation Service, New Hampshire State College awarded Savage with an honorary Doctor of Science in Engineering degree in 1913. His engagement at the federal level lasted from 1905 until 1915, before he resigned and returned to Southern California. In 1916, the Sweetwater Water Company of California hired Savage as a Consulting Engineer and later as a Supervising Engineer for the enlargement of the Sweetwater Dam, which had been damaged in the 1916 floods (Bureau of Reclamation 2018; WRCA 2005).

Savage was officially hired by the City of San Diego as the city's Hydraulic Engineer on June 4, 1917. The position had not previously existed for the city and came with the authority to direct the water department, design infrastructure, and make recommendations There he continued the water infrastructure recovery from the 1916 floods. The flood of 1916 had destroyed Lower Otay dam, a structural failure that flooded Otay Valley and caused 22 drowning deaths. Savage's role in the reconstruction of Lower Otay Dam, the construction of Barrett Dam, and the repairs to Sweetwater Dam and Morena Dam, solidified the important role that he played in San Diego's water system. The acquisition of Savage was an immeasurable triumph, the results of which would put the City of San Diego ahead both technologically and financially (McGlashan and Ebert 1918; San Diego Evening Tribune 1917; San Diego Union 1918c; Scientific American 1923; WRCA 2005).

In addition to Savage's successful dam projects, he also submitted several reports on the City's future needs for new water resources and infrastructure development. Savage also brokered several deals to secure water rights for the City in several cases. These reports and legal issues contributed to the deterioration of Savage's relationship and rapport with the City Council. Savage's employment as City Hydraulic Engineer for the City of San Diego lasted until 1923, when he was summarily dismissed after multiple disputes with the City Council and consulting hydraulic engineers J. B Lippincott and John R. Freeman (LAT 1922; San Diego Evening Tribune 1923b; San Diego Sun 1923; WRCA 2005).

After his dismissal from the City's employment, Savage embarked on two world tours from 1923 to 1925, studying foreign engineering projects at the Aswan Dam in Egypt, water supply projects in England, and irrigation projects in Brazil, before returning to the United States and offering hydraulic engineering consulting services. Savage's work during this period is unknown (WRCA 2005).

Meanwhile, by 1928, the City of San Diego's water infrastructure development suffered without Savage's leadership, culminating in the ultimate failure and abandonment of the Sutherland Dam project. The City invited Savage to return as Hydraulic Engineer, heading the Municipal Bureau of Water Development, Operations, and Maintenance. Savage returned to San Diego in 1928, with the condition that he be allowed to work independently of political interference. This was not to be. The City Council resumed their antagonistic relationship with Savage almost immediately, undercutting his authority by hiring consulting engineers who publicly dissented with Savage's ideas and publicly criticizing Savage's reports. Savage, for his part, resumed securing water rights for the City and began the El Capitan Dam project in 1928. His re-employment with the city of San Diego lasted until 1933 when Savage resigned, but he remained a consultant until the dam was completed. Shortly after Savage's resignation, he succumbed to a longstanding sickness and died in 1934 from heart failure (Savage 1932; San Diego Evening Tribune 1934; San Diego Sun 1932, 1933; San Diego Union 1932a, 1934a; WRCA 2005).

Savage's career as an engineer extended 46 years, from 1888 to his death in 1934.He was a member of the University Club and the Rotary Club of San Diego. He was also a member of the Masonic Order. Mr. Savage was elected an Associate Member of the American Society of Civil Engineers on March 7, 1894, and a Member on October 7, 1896. He died in San Diego in 1934. In recognition of the valuable work he had done for the City of San Diego in the development of its water supply, the City Council on July 9, 1934, changed the name of Lower Otay Dam to Savage Dam.

Elisha Spurr Babcock Jr.: Owner (1848-1922)

Elisha Spurr Babcock Jr. was raised in Evansville, Indiana, and graduated from Evansville High School. After high school he began working for the Evansville and Terre Haute Railroad Company and quickly worked his way up to the position of general freight agent of the road by age 24. He left the railroad industry to help develop the Cumberland Telegraph and Telephone Company, a Bell subsidiary, which controlled a large territory from Evansville to New Orleans, while at the same time having sole ownership of the Eugene Ice Company. At this point in his life, Babcock had enough wealth to purchase five large houses and a number of agencies, in addition to being a partner in the firm of E.S. Babcock & Son. He married Isabella Graham (1850-1932), a native of Cincinnati, Ohio, and had two children, Arnold and Graham Babcock.

In 1884, Babcock retired to San Diego for his health, where he continued to advance his enterprises. In 1885, he and Hampton Story, purchased the property known as Coronado Beach, a tract of over 4,000 acres across the bay from the City of San Diego. The men organized the Coronado Beach Company, of which Babcock was president and active manager. The company soon laid out the City of Coronado, selling $2,750,000 worth of the area's property and with the profits from the land sale built the Hotel del Coronado. In 1886, Babcock created the San Diego and

Coronado Ferry Company to accommodate the growing number of visitors to Coronado Island. Babcock and his three associates also built the water works for both Coronado and San Diego, the street railway lines, a railroad twenty-two miles long around San Diego Bay, an electric light plant, a shipyard, and many other enterprises (Coronado Historical Association 2020).

Bringing water to San Diego and Coronado was a high priority for Babcock, who persuaded John D. Spreckels to invest in several his organizations, including the SCMWC in 1895 (Smythe 1908). John D. Spreckels and A.B. Spreckels, sons of the sugar king Claus Spreckels, were also highly influential businessmen in the San Diego area. The three men became the sole owners of several enterprises developed by Babcock, and Spreckels eventually owned nearly half of Babcock's enterprises, yet he retained Babcock as his business manager (Hennessey 1978).
In 1912, after completion of the Morena Dam, Babcock sold his interests to the Spreckels companies. Later, the City of San Diego took over the water system and continued its development (San Diego Union 1922).
As an engineer, the Upper Otay Dam is the only existing structure Babcock designed. Despite being patterned after the Bear Valley Dam engineered by John Eastwood, Babcock is given recognition with the dam constructed at the Upper Otay as his own creation (Jackson 1999). The rock fill Lower Otay Dam, also designed by Babcock, was destroyed in the 1916 flood. For the majority of his career Babcock functioned as an organizer or controller of corporations, which included the Cuyamaca Railway, the Los Angeles and San Diego Beach Railway otherwise known as the La Jolla Line), the Western Salt Works, and the South San Diego Investment Company (San Diego Evening Tribune 1922b). Babcock died of a stroke in his office on October 8, 1922, at the age of 73. Short list of Babcock's known engineering works includes the Upper and Lower Otay Dam (1896, 1894, respectively).

Significance Evaluation for the Chollas Reservoir Complex
The resource was evaluated under the NRHP/CRHR criteria A/1–D/4/ as follows:

The Chollas Reservoir Complex is a primary building type (Dam and Reservoir), constructed during the period of significance for Source Water Infrastructure (1997-1947). The Chollas Reservoir Complex is associated with, and its period of significance falls under, the theme of Early Water System Development (1887-1916). The Reservoir Complex is associated with Water storage and distribution. The Chollas Reservoir Complex was decommissioned in the 1960s and the reservoir was converted to a recreational purpose. The Complex no longer retains its historic function as a part of the larger San Diego water system (for further discussion see Integrity Evaluation).

The following is a summary of the significance and integrity for the Chollas Reservoir Complex; see the appended DPR 523 forms (Appendix F) for further documentation.

The Complex was evaluated under the NRHP/CRHR criteria A/1–D/4/ as a contributor to the San Diego Source Water System District Draft Historic District and Individual Resource as follows:

Criterion A/1: Associated with events that have made a significant contribution to the broad patterns of our history.

The Chollas Reservoir Complex reflects special elements of San Diego's historical development. Construction of the dam made a significant contribution to the history of water development in the San Diego region and was a milestone in the City's quest to achieve source water independence.
The Chollas Reservoir Complex also reflect special elements of San Diego's engineering development as it embodies the distinctive characters of an earthen embankment dam. Any Dam which predates the significant flooding events in the first quarter of the twentieth century are exceedingly rare. The Chollas Dam survived flooding events and was relied upon for drinking water by the City during severe flooding events. Because of this, the subject property appears

eligible under City of San Diego Criterion A.

Criterion B/2: Associated with the lives of significant persons in our past

Although the Chollas Reservoir Complex is associated with Hiram Newton Savage and Elisha Babcock, Jr., neither of these associations can be connected to the resource in a meaningful way. Therefore, the Complex is not eligible under NRHP/CRHR Criterion B/2 for associations with important persons.

Criterion C/3: 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.

The Complex is not eligible under NRHP/CRHR Criterion C/3 for embodying the distinctive characteristics of dam engineering types and methods seen throughout the late 19th and early 20th centuries, and for representing an important facet of the body of work of master water engineer H.N Savage. The Chollas Reservoir Complex is not eligible under NRHP/CRHR Criterion C/3. Although the Dam and Reservoir were constructed during the period of significance for source water infrastructure (1887-1947), and exemplifies very early twentieth century engineering practices, it is not an intact representation of a recognizable and notable engineering type at any level. Earthen-embankment dams are the most common type of Dams, and the use of the Chollas Complex diminishes the feeling and association that are needed to convey significance.

Criterion D/4: Have yielded or may be likely to yield information important in history or prehistory.

An archaeological survey was not conducted for this project. At this time there is no indication that the Chollas Reservoir Complex has the potential to yield information important to national, state or local history. Therefore, the property appears not eligible under NRHP/CRHR Criterion D/4.

The resource was evaluated under the City of San Diego local designation criteria A-F as follows:

Criterion A: Exemplifies or reflects special elements of the City's, a community's, or a neighborhood's historical, archeological, cultural, social, economic, political, aesthetic, engineering, landscaping, or architectural development

The Chollas Reservoir Complex reflects special elements of San Diego's historical development. Construction of the dam made a significant contribution to the history of water development in the San Diego region and was a milestone in the City's quest to achieve source water independence.

The Chollas Reservoir Complex also reflect special elements of San Diego's engineering development as it embodies the distinctive characters of an earthen embankment dam. Any Dam which predates the significant flooding events in the first quarter of the twentieth century are exceedingly rare. The Chollas Dam survived flooding events and was relied upon for drinking water by the City during severe flooding events. Because of this, the subject property appears eligible under City of San Diego Criterion A.

Criterion B: Is identified with persons or events significant in local, state, or national history

Persons: Although the subject property does have connections to noted individuals, including E.S. Babcock, the Spreckels brothers, and Hiram Newton Savage who hold importance within the history of San Diego, the subject property is not connected with any of these individuals in a way that directly represents their contributions within the local historic context.

Events: The Chollas Heights Reservoir Complex is associated with events significant in local, history. Construction of the Chollas Heights Dam and Reservoir was a major undertaking in a remote part of San Diego that required significant planning and coordination. The subject property is directly associated with important events related to water development in the San Diego region, namely with the City gaining source water independence and being a critical component to the water infrastructure that supported the City's growth and development until the end of World War II. Therefore, the subject property appears eligible under City Criterion B.

Although the Chollas Reservoir Complex is associated with important individuals, none of these associations can be connected to the Complex in a meaningful way. Therefore, the system is not eligible under the City of San Diego Criteria B for associations with important persons. The Chollas Heights Reservoir Complex is associated with the development of the Water System in broader San Diego and is eligible under Criterion B at the local level.

Criterion C: Embodies distinctive characteristics of a style, type, period, or method of construction or is a valuable example of the use of indigenous materials or craftsmanship

The Chollas Reservoir Complex is not eligible under NRHP/CRHR Criterion C/3. Although the Dam and Reservoir were constructed during the period of significance for source water infrastructure (1887-1947), and exemplifies very early twentieth century engineering practices, it is not an intact representation of a recognizable and notable engineering type at any level. Earthen-embankment dams are the most common type of Dams, and the use of the Chollas Complex diminishes the feeling and association that are needed to convey significance.

Criterion D: Is representative of the notable work of a master builder, designer, architect, engineer, landscape architect, interior designer, artist, or craftsman

The Chollas Reservoir Complex is not significant as representative of a notable work of a master engineer. The Chollas Reservoir Complex was designed by engineer H.N Newton in 1901. Hiram Newton Savage is not currently designated as a master engineer by the City of San Diego. If, in the future H.N Savage is designated as a Master by the City's Historical Resources Board, this resource should be re-evaluated.

Criterion E: Is listed or has been determined eligible by the National Park Service for listing in the National Register of Historic Places or is listed or has been determined eligible by the State Historic Preservation Office for listing in the California Register of Historical Resources.

The Chollas Reservoir Complex has not been determined eligible by the National Park Service for listing in the NRHP and has not been previously listed. Therefore, the Chollas Reservoir Complex is not significant under Criterion E.

Criterion F: Is a finite group of resources related to one another in a clearly distinguishable way or is a geographically definable area or neighborhood containing improvements which have a special character, historical interest or aesthetic value or which represent one or more architectural periods or styles in the history and development of the City.

As described under NRHP/CRHR Criteria A/1 and C/3 (see full discussion above), the Chollas Reservoir Complex is eligible for significance for its role, function, and design within the larger City of San Diego Source Water System, and as a contributor to the larger City of San Diego Source Water System.

The City of San Diego Source Water System has previously identified ten (10) impounding reservoir complexes owned/operated by the City that function as part of the City's municipal water-supply system. These resources and their related infrastructure (e.g., dams, outlet towers, conduits, flumes, and pipelines) constitute a finite group of resources related to one another in a clear way, steeped in historical interest and representative of significant engineering achievements. Taken as a whole, these resources (including the Chollas Reservoir Complex) are significant for their role in the City's source water system, starting with the earliest efforts to establish privatized water in the 1880s soon followed by construction of the earliest reservoirs, Lake Cuyamaca (1887) and Sweetwater Reservoir (1888). The period of significance ends with construction of the San Diego Aqueduct, and the importation of Colorado River Water for the first time into the San Vicente Reservoir (1947), which forever changed the composition of City's source water supply. Therefore, the Chollas Reservoir Complex appears eligible under City Criterion F.

Integrity

The question of integrity is another factor that must be addressed when determining the eligibility of a resource for listing in a historic register. The Secretary of the Interior describes integrity as "the ability of a property to convey its significance." A property must retain certain intact physical features to convey its significance under one or more of the applicable criteria.

Integrity is judged on seven aspects: *location, design, setting, workmanship, materials, feeling, and association*. If a particular resource meets one of the A/1 through D/4 criteria and retains sufficient integrity to convey its historic significance, it is considered as an eligible "historic property" for listing in the NRHP/CRHR. Additionally, unless exceptionally significant, a property must be at least 50 years old to be eligible for listing.

The Chollas Reservoir Complex was constructed in 1901 and meets the 50-year-old threshold for NRHP/CRHR listing. The City of San Diego typically recommends a 45-year-old threshold for resources, which is also met by the 1901 date of construction.

Integrity Assessment

The San Diego Source Water System Historic Context Statement identifies integrity requirements for contributing resources to the City of San Diego Source Water System. For resources potentially significant under Criteria A/1 and B/2 (City of San Diego Criteria A, B, F), it is necessary for the resource to:
Retains the following physical attributes as they relate to the integrity of location, setting, feeling, and association:

- Maintains original alignment/location from its period of significance.
- Continues to maintain its historic function as part of the larger water system

For resources potentially significant under Criterion C/3 (City of San Diego Criteria C, D, F), it is necessary for the resource to:

Retains the following physical attributes as they relate to the integrity of workmanship, materials, design, location, setting, feeling, and association:

- Exhibits most construction methods and engineering details associated with the resource's period of significance. Buildings and other non-engineering structures should retain the essential character-defining

features from their period of significance.
- Retains original alignment/location from its period of significance.
- Continues to retain its historic function as part of the larger water system.

The following is the evaluation of integrity for the Chollas Reservoir Complex:

Location: The complex retains integrity of location. The dam has never been shifted or relocated, and the complex retains its location relative to other reservoirs in the system.

Setting: The complex's setting has been diminished by subsequent developments along the shores of the reservoir. These include the development of a San Diego County parks site near the dam structure (1966), and the encroaching suburban development of the Chollas Heights community. The most significant impact to the setting has been the shift in use from a water storage and distribution resource to a recreational facility. The Reservoir serves as a fishing lake, with fishing piers- and there are walking trails that surround the Dam and Reservoir. Therefore, the complex has a diminished integrity of setting.

Design: The Chollas Reservoir Complex retains integrity of design. Though there have been minor repairs to all structures, there are no significant alterations or incompatible departures from Savage's design. While the reservoir no longer plays a part of the larger water system, it is still used as a water storage system for recreational purposes. New elements such as two dock/pier structures, and site improvements such as parking lots, do not detract from the integrity of design. Therefore, the complex retains the requisite integrity of design.

Materials: The Dam, Reservoir, and associated engineering structures do not retain integrity of materials. Numerous, significant repairs were done after the complex was decommissioned in 1966. These repairs include new infill to the embankment, the excavation of foundation structures, the removal of pipelines, and creation of new drainage, and removal of all ancillary structures except for the Outlet Tower. The number of materials altered have severely degraded the integrity of materials and the Complex does not retain integrity of materials.

Workmanship: The Chollas Reservoir Complex and associated engineering structures retain integrity of workmanship. The evidence of the craftsmanship of the workers who built the dam is evident in the still-visible embankment and crest of the Dam, the auxiliary spillway, and outlet tower. While there have been material and use changes to the Complex, the workmanship integrity remains.

Association: The dam, outlet tower, auxiliary spillway, and associated features and buildings do not retain integrity of association. They were designed, built, and operated by City employees for the purpose of supplying water to the City of San Diego. The association to the City of San Diego is non-existent in that the Dam and Reservoir no longer operate as intended by the Engineers. Therefore, Chollas Reservoir Complex does not retain integrity of association.

Feeling: The Chollas Heights Reservoir Complex no longer retains integrity of feeling. The modern development on the shore of the reservoir, the change of use within sight of the Dam structure reduces the original feeling of an early-twentieth century dam and reservoir operating as an extension of the City of San Diego outside of city limits. With the Chollas Heights neighborhood encroaching on the Reservoir and the increasing visual and physical disturbance of modern development, the feeling of a remote site can no longer be conveyed. Further, the entire complex is used for a recreational purpose, and there are numerous new features such as fishing piers, parking lots, and trails that diminish the feeling of a piece of the water system. Therefore, the integrity of feeling is significantly diminished.

Significance Findings:

The Chollas Reservoir Complex is significant under Criterion A/1/A as a contributor to the larger City of San Diego Source Water System. The Complex is also individually significant on the local level under Criterion A/1/A for its association with the early Water Development of San Diego. However, the complex has severely degraded integrity, which preclude its eligibility to any register. Overall, the Chollas Reservoir Complex retains integrity of location, design, and workmanship. However, the complex does have a diminished integrity of association, setting, materials and feeling. The Complex fails to meet the integrity requirements for a contributing resource to the City of San Diego Source Water System Historic District, or as an individually significant resource, under any of the identified significance criteria. The Chollas Reservoir Complex is recommended not eligible for listing in the NRHP/CRHR or for the local City register and is therefore not considered a historical resource for the purposes of CEQA.

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PHOTOGRAPHS

(Photographs begin on the following page.)

Photo 1. Overview from west parking lot looking at access road. View to the east.

Photo 2. Overview of water flow from Weir to Chollas Creek. Taken from east end of west access road. View to the northwest.

Photo 3. View of Parks and Recreation Outbuildings Adjacent to the Reservoir. View looking west.

Photo 4. View of fishing pier, and recreation facilities looking south.

Photo 4. View of fishing pier, and recreation facilities looking south.

Photo 5. View of trails and recreation equipment along north side of reservoir.

Photo 6. View of outlet tower from earthen embankment. Looking southeast.

Photo 7. View of walkway over earthen embankment, looking north.

Photo 8. Remnants of concrete along earthen embankment. Looking west towards parking lot.

Photo 9. View of walkway and stairs over earthen embankment, looking south.

Photo 10. View of shade shelter on earthen embankment. Looking southwest

Photo 11. Typical walking trail along reservoir.

Photo 12. View of Parks and Recreation Storage and Office. Looking east.

Photo 13. Children's playground located to the south of the reservoir along walking trail.

Photo 14. Overview of directed waterflow at Dam gate, The Weir is loacted in the background at base of slope. View to the southeast.

Photo 15. Overview of base of Dam slope. View to the south.


Photo 16. Overview of top of Dam and northwest facing slope. View to the south.


Photo 17. Overview of top of Dam and southeast slope to lake. View to the northeast.

Photo 18. Overview of P-37-016321 associated glass scatter along west access road. View to the east.

State of California The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings
Review Code | Reviewer | Date

 *Resource Name or #: Rancho Bernardo Reservoir

P1. Other Identifier: N/A
***P2. Location:** ☐ Not for Publication ■ Unrestricted
***a. County:** San Diego **and *b. USGS 7.5' Quad:** San Diego **Date:** 1996
c. Address: N/A City: San Diego Zip: 92127
d. UTM: Zone: 11S; 492198.64 mE/ 3652144.72 mN (G.P.S.)
e. Other Locational Data: 33.007710 latitude, -117.083567 longitude

Northwest ¼ of Sec. 43, and Southwest ¼ of Sec. 27. The center of the Reservoir is located at N306,996.00, - E1,744,730.00 on the California Zone 6 Coordinates.

***P3a. Description:**

The Rancho Bernardo Reservoir Complex is composed of a man-made reservoir with a capped concrete cover. Originally constructed in 1964 by Peter Kiewit & Sons, Co., the 10-million-gallon, gravity-fed, Rancho Bernardo Reservoir, is an in-ground drinking water storage reservoir that provides a reliable water supply to the Rancho Bernardo community. As an off-stream regulation reservoir, water is brought into the Rancho Bernardo Reservoir from Miramar Lake, and is gravity-fed back into several areas in the local Rancho Bernardo community. (Continued Page 3.)

***P3b. Resource Attributes:** HP11-Engineering Structure
***P4. Resources Present:** ☐Building ☑Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing

P5b. Description of Photo:
Reservoir showing concrete cap. Helix, 2019.

***P6. Date Constructed/Age and Sources:** ☑Historic ☐Prehistoric ☐Both
1964: City of Rancho Bernardo

***P7. Owner and Address:**
Public Utilities Dept
City of San Diego
9192 Topaz Way, San Diego CA

***P8. Recorded by:**
Kelsey Kaline, MHC
IS Architecture
5645 La Jolla Boulevard
La Jolla, California 92037

***P9. Date Recorded:** November 2020, Updated August 2021.
***P10. Survey Type:** Intensive
***P11. Report Citation:** IS Architecture, "Historic Context Statement and Evaluation of Chollas Reservoir Complex and Rancho Bernardo Reservoir, San Diego County CA," August 2021.

***Attachments:** ☐NONE ☑Location Map ☑☐Sketch Map ☑ Continuation Sheet ☑ Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☑ Other (List): Photographs

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** Rancho Bernardo Reservoir ***NRHP Status Code** 6Z

B1. Historic Name: N/A

B2. Common Name: Rancho Bernardo Reservoir

B3. Original Use: Water Storage and Distribution B4. Present Use: Water Storage and Distribution

***B5. Architectural Style:** Concrete, Lined Water Reservoir

***B6. Construction History:**

Construction of the Reservoir (1963-1964)

By February 1964 the new community had grown to 1,300 residents. By June of the same year, 2,000 people called Rancho Bernardo home. 1964 also saw the completion of the construction of the Rancho Bernardo Reservoir. At the time of construction, the reservoir was located in an undeveloped section of the community. Peter Kiewit & Sons Co. was contracted to construct the reservoir, which cost $492,000. (Continued Page 3.)

***B7. Moved?** ☑**No** ☐**Yes** ☐**Unknown** **Date:** **Original Location:** N/A

***B8. Related Features:** None

B9a. Architect: Unknown b. Builder: Peter Kiewit & Sons, Co.

***B10. Significance:** **Theme:** N/A **Area:** N/A

Period of Significance: N/A **Property Type:** N/A **Applicable Criteria:** N/A

Given its date of completion in 1964, which falls outside of the established periods of significance for the San Diego Source Water System, the Reservoir's common engineering type, and numerous alterations, Rancho Bernardo Reservoir Complex does not rise to the level of significance required for associations with the larger water system, nor does it merit individual designation under any Local, State, or National Criteria (Continued page 3).

B11. Additional Resource Attributes: N/A

***B12. References:** See Bibliography.

B13. Remarks: None

***B14. Evaluator:** Kelsey Kaline, MHC (IS Architecture)

***Date of Evaluation:** November 2020, August 2021.

(This space reserved for official comments.)

***B3a. Description (continued):**

The Reservoir Complex is composed of the reservoir, outlet, and spillway. The spillway is an overflow concrete box structure measuring 4'x12'x6.5' to a 36-inch RCP pipe, with a capacity of 129 cubic feet per second (cfs). The outlet is a combination inlet-outlet line pipe. The Reservoir is rectangular, measuring 370-foot by 298-feet and is rubber-lined asphalt concrete. The concrete roof is supported by 66 precast concrete columns. The side slopes on a ratio of 2:1. The total height of the structure is 27.01 feet. The Reservoir has a cathodic protection system.

The reservoir, contained within a chain-link fence, is located next to a soccer field in High Country West and is surrounded by single-family residences. Cloudcrest Drive is located to the north, Big Springs Way and Lofty Trail Drive runs parallel to the 1-15 freeway to the west of the Reservoir.

***B6. Construction History (continued):**

<u>Post Construction Alterations and Development (1965-2018)</u>

According to a fact sheet provided by the City of San Diego[1]:

- In July of 1966, the City of San Diego received Certificate of Approval from the Division of Safety of Dams to impound water for the Rancho Bernardo Reservoir, which approved its use.
- In February 1967, testing and minor repairs were performed to prevent small leakage. Subsequently, piezometers were installed to monitor the saturation level of the west embankment.
- In January of 1971 a 36" valve was installed at the inlet/outlet.
- Aerial images indicate that there was no development surrounding the reservoir complex until 1980. Between 1978 and 1980, residential development occurred directly surrounding the reservoir.
- In April 2009, the water tank underwent a rehabilitation, with structural, mechanical, corrosion, and site improvements. These improvements were done to comply with a mandate from the California Department of Health. The structural improvements included seismic retrofitting, installation of a new rubber liner on the reservoir floor, and replacement of the original concrete roof structure. Mechanical improvements included repairs and replacement of piping and plumbing, installation of a chlorine analyzer, sampling stations and access hatch and drain replacements.

No known alterations have occurred between 2009 and 2021.

[1] City of San Diego, "Dam Fact sheet Rancho Bernardo Dam (NGVD)", October 2019.

***B10. Significance (continued):**

Historical Overview:

Thematic Contexts:
From the *Historic Context Statement for City of San Diego Public Utilities Department Reservoir Structures* (June 2020):

Development of San Diego's Source Water System

The procurement of water has played an instrumental role in the growth and development of the city since its founding. The region receives very little rainfall, and local mountain streams and groundwater provide only a limited supply of water. Cattle raising and dry-farmed wheat were the predominant forms of agriculture in the 1850s–1880s because of the water supply limitations. As the San Diego region, and the state of California as a whole, aggressively developed its agricultural industry in the Spanish mission–era and beyond, water supply became a highly prized and widely disputed topic from the colonial period onward. Seven principal streams originate in the peninsula range and discharge to the Pacific Ocean and provided fresh water sources and, later, ideal locations for dams and reservoirs: Santa Margarita river, San Luis Rey river, San Dieguito river, San Diego river, Sweetwater river, Otay river, and Tijuana river (which consisted of two major reaches). The state's first instances of irrigation came from diverting such streams using riparian rights and lacked a formal water storage system (Caltrans and JRP historical consulting services 2000; Fowler 1953; SWRB 1951).

During the mission period (1769–1834), Franciscan missionaries sought an adequate water supply for irrigation purposes by digging wells near the San Diego river and constructing ditches, small dams, and cisterns. Kumeyaay neophytes and laborers built the old mission dam (also called the old padre dam) in 1803 at mission gorge and an aqueduct to the mission; portions of both remain intact. During the Mexican and early American periods, there was no regional coordination when it came to procuring and maintaining a reliable water supply. At the end of the Mexican period and the beginning of the American period fresh water in San Diego was becoming increasingly difficult to acquire, because of ranching practices, aggressive hydraulic gold mining, and American homesteaders throughout the state (Caltrans and JRP historical consulting services 2000; Sholders 2002; SWRB 1951).

In response to the population growth and regional limitations on irrigation based on low rainfall and lack of proper storage, multiple areas of Southern California, including the San Diego region, began to develop water storage reservoirs and dams.

The first major steps toward organized water infrastructure within the San Diego metropolitan area began with the 1873 formation of the San Diego Water Company. The corporation began drilling a well near B and Eleventh Streets in the City that supplied the City's first pipe water to a few residences in 1874. Unfortunately, the groundwater was poor in quality, and the supply was low, which led to the origination of the City's long-standing "bad water" reputation. To remedy its supply and quality issues, the San Diego Water Company increased its stock from $10,000 to $250,000 in 1875, which allowed for drilling of wells in the San Diego River, construction of a new pumping plant, and extension of the distribution system. The wells proved insufficient for the quickly growing City, and soon the City began to turn to privately owned water companies to supply the City (Fowler 1953; Smythe 1908).

The development of reliable water infrastructure throughout the region did not begin in earnest until the 1880s, as a result of a significant population boom and the incoming California Southern Railway which connected the City to the eastern United States. The County's population swelled from 8,600 in 1880 to over 30,000 residents by 1887. Developers and land speculators emerged throughout the region, looking to capitalize on the City's rapid growth.

To address the ongoing water needs, the City entered into agreements with other water companies, including the Southern California Mountain Water Company (SCMWC).

The SCMWC was led by Elisha Spurr Babcock Jr. (1848–1922), a native of Indiana, who earned his fortune in the railroad industry. He purchased property on Coronado Beach, establishing the Coronado Beach Company, which incorporated the Otay Water Company in 1886. John Diedrich Spreckels (1853–1926) of San Francisco earned his fortune in the shipping business and Hawaiian sugar industry. During an 1887 visit to the City, Spreckels was impressed by the real estate boom at the time, which led him to invest in construction of a wharf and coal bunkers at Broadway (at the time known as D Street). The boom ended quickly, but Spreckels continued his interest in the area. He acquired control of Babcock's Coronado Beach Company, then the *San Diego Union* in 1890, the *San Diego Tribune* in 1891*,* and the City's street railway system in 1892. Babcock persuaded Spreckels to invest in a number of his other organizations, including Otay Water Company and the Mount Tecarte Land and Water Company. The SCMWC was born from a consolidation of water companies that included the Otay Water Company and the Mount Tecarte Land and Water Company in 1894. Because of these transactions, Spreckels owned nearly half of Babcock's enterprises (Crawford 2011; Fowler 1953; Hennessey 1978; LAT 1896; McGrew 1922; Ormsby 1966; San Diego History Center 2018; Smythe 1908).

From the *Historic Context Statement for City of San Diego Public Utilities Department Reservoir Structures* (June 2020):

Water Importation and Post-War Development (1947-1960)

The completion of the San Diego Aqueduct was the culmination of a multi-decade-long project to diversify water sources for the City of San Diego in the event of a flood or other emergency. Importing Colorado River water ended the City's complete dependence on local reservoirs and emergencies during multi-year droughts. When San Diego began incorporating imported water into the City's supply in 1947, it started a new trend in the City's water storage and management. At the time of its completion, the first San Diego Aqueduct added 65,000 acre-feet/year of water and accounted for 70-80% percent of the City's water supply, with the remainder coming from local reservoirs. The San Diego Aqueduct's completion marked a shift in the priorities of the City, and it would continue to rely on the imported water for greater than 90% of the city's total supply well into the 1990s (Fraser 2007; SDCWA 2020, Sholders 2002).

While this period is significant because of the switch to imported water from the Colorado River, this period also saw the completion of Sutherland Dam (1954) and the Miramar Dam (1960). Miramar Dam, the final dam constructed in the City of San Diego's system, was constructed to supply local water to the northern part of the City of San Diego, as well as service the Miramar Naval Air Station, after the area was annexed to the city, expanding the city's population and utilities. While the water system continues to grow and develop after through alterations and additions, no new dams have been added to City of San Diego's system since Miramar was completed.

The Development of Rancho Bernardo (1769-1962)[2]

The land that is modern-day Rancho Bernardo was originally Kumeyaay land. When the Spanish and Franciscan missionaries arrived in San Diego in 1769, they established a military headquarters, or presidio, along with a church, Mission San Diego de Alcalá, beginning the colonization process that would be repeated over the entire state. Under Spanish rule, from 1769 to 1821, the land of Rancho Bernardo was under the authority of the missions. After Mexico won its independence from Spain in 1821, the mission lands came under the control of the new Mexican government, which offered massive tracts of land to anyone agreeing to settle on and work the lands.

Over the space of two years, between 1842 and 1845, the Mexican government granted the 17,763-acre Rancho San Bernardo to Don Jose Snook. Contemporary writings described Rancho San Bernardo as one of the largest stock-raising operations in the region. In December of 1846, the Battle of San Pasqual took place on and around his rancho. It is considered the bloodiest and most controversial battle of the war.The war ended in victory for the United States on February 2, 1848, bringing California under the U.S. flag. Don Jose Snook died later that same month. Ownership of Rancho San Bernardo passed to six Snook nieces and nephews in England. In 1867 they sold the rancho to Thomas Fox, representing the interests of James McCoy.

The town of Bernardo flourished for a time, then declined and disappeared by the early 1920s. Its demise was hastened by the growth of the city of Escondido a few miles north and the completion of the Lake Hodges Dam and Reservoir in 1919. The biggest remaining unsubdivided portion of the old Rancho San Bernardo, about 5,800 acres, was owned by Ed Fletcher and then William Henshaw in the early 1920s. Then it passed to the San Diego County Water Company. In the late 1920s, the water company began leasing the property to George Daley. The Daleys were a pioneer ranching family in San Diego County who had large ranches in Escondido and Jamul by the time George began raising livestock and grain under lease on the San Bernardo property. George Daley bought Rancho San Bernardo outright in 1943. When George Daley died in 1957 the ranch passed to his nephews, Donald, and Lawrence. As late as the 1960s, the property was still rugged country, with more horse trails than auto roads.
In November 1961, developer Harry Summers and business partner W.R. “Fritz” Hawn announced a joint venture with Lawrence and Donald Daley to develop the ranch into a planned community to be called Rancho Bernardo. The joint venture, initially named Rancho Bernardo, Inc., devised a master plan for a self-contained community offering housing, employment, schools, community, and recreation centers. The community plan was submitted to the city of San Diego in late 1961 as part of Rancho Bernardo, Inc.’s proposal for annexation, the ranch at that time being unincorporated county land.

In February 1962, the San Diego city council voted to approve annexation of Rancho Bernardo. Rancho Bernardo, Inc. set to work grading the ranch terrain to make way for new roads and model homes.

The first sales office for the new community opened in July 1962 at the intersection of Rancho Bernardo and Pomerado Roads. The first model homes erected represented the neighborhoods of Bernardo Greens, Bernardo Hills, and Seven Oaks. A community plan drawn in 1962 does not demark the reservoir.

The first residents moved into Rancho Bernardo in 1963. That year also saw the opening of the Rancho Bernardo Inn and the community’s first shopping center.

[2] Rancho Bernardo Historical Society, “History | Rancho Bernardo Historical Society.”

Significance Evaluation for the Rancho Bernardo Reservoir

The resource was evaluated under the NRHP/CRHR criteria A/1–D/4/ as follows:

Criterion A/1: Associated with events that have made a significant contribution to the broad patterns of our history.
While the Rancho Bernardo Reservoir is a component of the larger City of San Diego Source Water System, it was constructed outside the significant periods of development associated with the system, 1887-1947, and is therefore a non-contributing component.

While many of the earlier elements of the system represent the growth and development of the larger system of source water, Rancho Bernardo Reservoir Complex was constructed largely in response to population pressures and sprawl. By the end of the 1950s, San Diego's population was on the rise and there was an urgent need for new water distribution facilities to keep pace with the City's growth. The primary purpose of constructing the Rancho Bernardo Reservoir was to provide water to the new master planned community of Rancho Bernardo. Ground broke for the construction of the Rancho Bernardo Reservoir Complex in 1963 and was completed in 1964.

Given its date of completion in 1964, which falls outside of the established periods of significance for the larger water system, Rancho Bernardo Reservoir Complex does not rise to the level of significance required for associations with the larger water system, nor does it merit individual designation. Therefore, the Rancho Bernardo Reservoir Complex appears not eligible under Criterion A/1 as an individual property and or a contributor to the larger City of San Diego Source Water System.

Criterion B/2: Associated with the lives of significant persons in our past

To be found eligible under B/2 the resource has to be directly tied to an important person and the place where that individual conducted or produced the work for which he or she is known. Archival research did not reveal the Rancho Bernardo Reservoir to have any connections to noted individuals. There is no indication that the subject property illustrates a person's important achievements rather was part of the natural expansion of the City of San Diego's water system and thus not associated with any one individual.

Criterion C/3: 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.

The Rancho Bernardo Reservoir is representative of a common water containment type used throughout the western United States, an in-ground concrete lined Reservoir. Further contributing to its lack of significance is the fact that its period of construction falls outside of the significant periods of development for the City of San Diego Source Water System, which span 1887-1947. Constructed ended in 1964, with the Reservoir measuring 216' x 144' at its base and 322' x 250' at its top. There is a 2:1 ratio for the side slopes.

The Rancho Bernardo Reservoir retains elements of its original 1964 features, including its profile, slope, and shape. The largest alteration to the Reservoir was undertaken in 2009 when the City of San Diego approved a rehabilitation project which upgraded the mechanical, plumbing, site, and structural features of the reservoir. The materials of the lining, inlet/outlet piping, and cap have been replaced and updated to keep in compliance with code requirements. New instrumentation including piezometers and chlorine monitors were implemented at this time. Although most of this alteration did not affect the overall visual appearance of the structure, the original concrete cap was demolished, and replaced.

Despite the lack of visible alterations to the reservoir, this type of reservoir falls outside the period of significance for dam/reservoir construction and does not represent a unique or innovative engineering achievement. Further, archival research failed to indicate a specific engineer for the project, just the builder. Therefore, while the Rancho Bernardo Reservoir Complex is a component of the larger San Diego water system, its common design, lack of notable engineer, alterations, and its 1964 date of construction prevent it from conveying any significance. As such, the Rancho Bernardo Reservoir appears not eligible under NRHP/CRHR Criteria C/3 as an individual property and as a contributor to the larger City of San Diego Source Water features.

<u>Criterion D/4: Have yielded or may be likely to yield information important in history or prehistory.</u>
An archaeological survey was not conducted for this project. At this time there is no indication that the Rancho Bernardo Reservoir has the potential to yield information important to state or local history. Therefore, the property is recommended not eligible under NRHP/CRHR Criterion D/4.
The resource was evaluated under the City of San Diego local designation criteria A-F as follows:

<u>Local Criterion A: Exemplifies or reflects special elements of the City's, a community's, or a neighborhood's historical, archeological, cultural, social, economic, political, aesthetic, engineering, landscaping, or architectural development</u>

As described in NRHP/CRHR A/1 and C/3 Criterion discussions above, the Rancho Bernardo Reservoir fails to rise to the level of significance required under Criterion A, as it is not associated within any of the significant periods of local source water history, nor any other City of San Diego significant elements of development. It is associated with the postwar population boom that was seen throughout the United States and let to an expansion of infrastructure, and a period where the City had stopped relying on local sources and began importing the vast majority of its water.

<u>Local Criterion B: Is identified with persons or events significant in local, state, or national history</u>

No archival research indicated that the Rancho Bernardo Reservoir is associated with persons or events significant in local, state, or national history.

<u>Persons:</u> Archival research did not indicate that the Rancho Bernardo Reservoir had any connections to noted individuals who hold importance within the history of development in San Diego. There is no indication that the subject property illustrates a person's important achievements rather was part of the natural expansion of the system and not associated with one individual.

<u>Events:</u> As described in the evaluation of NRHP/CRHR A/1 Criterion discussion above, the subject property was completed in 1960 and is outside of the period of significance for the larger water system and does not have any associations with significant events in local and state history. The Rancho Bernardo Reservoir is associated with the statewide post-World War II population boom that required an increase of City constructed water infrastructure, and to facilitate the importation of water from the Colorado River and State Water Project. Therefore, the Rancho Bernardo Reservoir appears not eligible under City Criterion B.

<u>Criterion C: Embodies distinctive characteristics of a style, type, period, or method of construction or is a valuable example of the use of indigenous materials or craftsmanship</u>

As described under NRHP/CRHR Criterion C/3 (see full discussion above), the Rancho Bernardo Dam is a good example of an in-ground gravity-fed reservoir system that retains some elements of its original design. However, the type of Reservoir is common, and does not contain a high threshold of significance. Further, there have been numerous significant alterations to the materials of the structure. While the Rancho Bernardo Reservoir Complex is a component of the larger San Diego Water System, its date of construction (1964) prevents it from conveying any significance. Therefore, the Rancho Bernardo Reservoir is not eligible under City of San Diego criterion C.,

Criterion D: Is representative of the notable work of a master builder, designer, architect, engineer, landscape architect, interior designer, artist, or craftsman

As described under NRHP/CRHR Criterion C/3 (see full discussion above), the Rancho Bernardo Reservoir Complex is not representative of a notable work of a master engineer or builder. Constructed as part of the master planned community of Rancho Bernardo, the Reservoir was constructed by Peter Kiewit & Sons Co. from 1963-1964. Archival research did not reveal that any of the builders or engineers meet the threshold of being considered notable or having reached recognized greatness in the field of construction or engineering. Therefore, the Rancho Bernardo Reservoir Complex appears not eligible under Criterion D.

Criterion E: Is listed or has been determined eligible by the National Park Service for listing in the National Register of Historic Places or is listed or has been determined eligible by the State Historic Preservation Office for listing in the California Register of Historical Resources

Rancho Bernardo Reservoir Complex is not known to be on any local, state, or national list of significant properties, nor is it known to have been determined eligible for listing on any register. Therefore, the Rancho Bernardo Reservoir Complex appears not eligible under the City of San Diego's Criterion E.

Criterion F: Is a finite group of resources related to one another in a clearly distinguishable way or is a geographically definable area or neighborhood containing improvements which have a special character, historical interest, or aesthetic value or which represent one or more architectural periods or styles in the history and development of the City.

As previously discussed, the Rancho Bernardo Reservoir Complex was constructed in 1964, which is outside of the established period of significance for the City of San Diego Source Water System (1887-1947). There are no other group of resources that the Rancho Bernardo Reservoir is a part of. Therefore, the Rancho Bernardo Reservoir Complex appears not eligible under Criterion F at the local level.

Integrity

The question of integrity is another factor that must be addressed when determining the eligibility of a resource for listing in a historic register. The Secretary of the Interior describes integrity as "the ability of a property to convey its significance." A property must retain certain intact physical features to convey its significance under one or more of the applicable criteria.

Integrity is judged on seven aspects: *location, design, setting, workmanship, materials, feeling, and association*. If a particular resource meets one of the A/1 through D/4 criteria and retains sufficient integrity to convey its historic significance, it is considered as an eligible "historic property" for listing in the NRHP/CRHR. Additionally, unless exceptionally significant, a property must be at least 50 years old to be eligible for listing.

The Rancho Bernardo Reservoir Complex was constructed in 1964 and meets the 50-year-old threshold for NRHP/CRHR listing. The City of San Diego typically recommends a 45-year-old threshold for resources, which is also met by the 1964 date of construction.

The Rancho Bernardo Reservoir maintains its historic function as a water reservoir.

The Rancho Bernardo Reservoir Complex retains integrity of location, design, workmanship, and association, but does not retain integrity of materials, feeling or setting as discussed below:

Location: The complex retains integrity of location. The reservoir complex has not been moved since its construction. The contributing features to the site, which include the reservoir, spillway, and outlet/inlet have never been shifted or relocated. As such, the complex retains its integrity of location.

Design: The complex retains integrity of design. Since its construction, the reservoir has undergone no major design alterations. The elements of form, plan, space, structure, and style have all been retained and the dam can easily be recognized as an in-ground reservoir type.

Setting: The complex no longer retains integrity of setting. The physical conditions surrounding the dam since its construction in 1964 have been heavily altered. Upon its construction in 1964, primarily open land surrounded the complex. Since the dam's construction, surrounding development of residential and commercial neighborhoods has increased exponentially, especially after 1980 when single family residential homes encroached upon the immediate vicinity of the reservoir.

Materials: The complex does not retain integrity of materials. The lining, concrete cap, and outlet/inlet pipe have all been replaced since their construction in 1964. Therefore, the majority of the original construction materials no longer remain intact, significantly detracting from the material integrity of the resource.

Workmanship: The complex retains integrity of workmanship. The original slope and profile of the Reservoir have been retained, and no alterations have been undertaken to obscure or alter original workmanship.

Feeling: The complex does not retain integrity of feeling. The complex has been altered since its construction, although it retains the majority of its physical features as designed. Despite this, the site no longer retains enough integrity in its setting to fully represent the appearance of a 1960s reservoir complex constructed in rural San Diego. Upon construction, the Reservoir was primarily surrounded by open land with very little development. Comparing the complex's historic sense to its current appearance all of the open land seen in the 1960s has been developed with residential communities therefore the complex no longer retains integrity of feeling.

Association: The complex retains integrity of association. The complex was associated with the accommodation in water infrastructure for the growth of the City of San Diego in the late 1950s to early 1960s. The complex was originally designed to be used by the master planned Rancho Bernardo community. Since its construction, the complex has remained a part of the City owned water system and continues to service the northern portion of San Diego. Therefore, the complex retains integrity of association. However, its association with water development is not significant.

Significance Findings

Given its date of completion in 1964, which falls outside of the established periods of significance for the larger water system, common engineering type, and numerous alterations, Rancho Bernardo Reservoir does not rise to the level of significance required for associations with the larger water system, nor does it merit individual significance under any Local, State, or National Criteria. In conclusion, Rancho Bernardo Reservoir is recommended not eligible for listing in the NRHP, CRHR, or the local City register and is therefore not considered a historical resource for the purposes of CEQA.

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PHOTOGRAPHS

(Photographs begin on the following page.)

Photo 1: Aerial Image of Rancho Bernardo Reservoir, Google 2021.


Photo 2: Discharge Outlet and earthen dam, HELIX 2019.

Photo 3: Access Road, Earthen Dam. HELIX 2019.

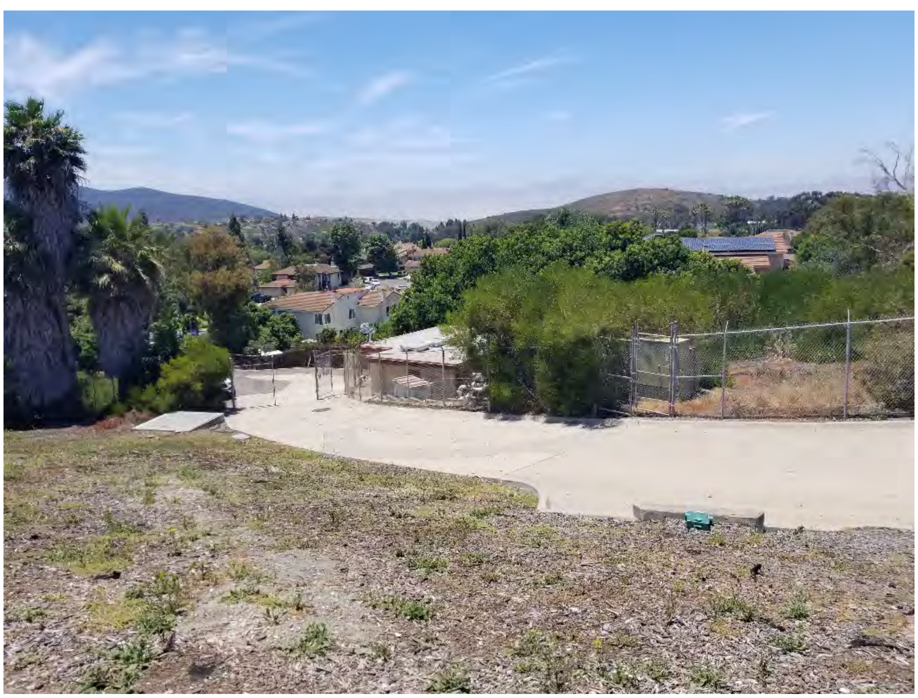

Photo 4: Access Road, Earthen Dam. HELIX 2019.


Photo 5: Covered reservoir (northwest corner). HELIX 2019.


Photo 6: Covered Reservoir (northeast corner). HELIX 2019.

Photo 7: Covered reservoir (southeast corner). HELIX 2019.

Photo 8: Covered Reservoir (southeast corner). HELIX 2019.

Photo 9: Covered reservoir (southwest corner). HELIX 2019.

Photo 10: Covered Reservoir (southwest corner). HELIX 2019.