Appendix A
Little Lake Crossover Project
Air Quality Emissions Tables

Los Angeles Department of Water and Power

Road Construction Emissions Model, Version 8.1.0

Daily Emission Estimates for -> LADWP Little Lakes Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	5.24	55.49	44.93	2.81	2.31	0.50	2.07	1.97	0.10	0.15	14,565.19	3.35	0.16	14,697.73
Grading/Excavation	5.24	55.49	44.93	2.81	2.31	0.50	2.07	1.97	0.10	0.15	14,565.19	3.35	0.16	14,697.73
Drainage/Utilities/Sub-Grade	5.86	53.12	49.15	2.93	2.43	0.50	2.21	2.11	0.10	0.14	14,076.04	3.43	0.14	14,202.94
Paving	5.19	53.21	44.20	2.34	2.34	0.00	1.98	1.98	0.00	0.15	14,584.52	2.80	0.18	14,709.17
Maximum (pounds/day)	5.86	55.49	49.15	2.93	2.43	0.50	2.21	2.11	0.10	0.15	14,584.52	3.43	0.18	14,709.17
Total (tons/construction project)	0.53	5.40	4.54	0.27	0.23	0.04	0.21	0.20	0.01	0.01	1,430.13	0.33	0.02	1,443.00

Notes: Project Start Year -> 2023
Project Length (months) -> 9
Total Project Area (acres) -> 1
Maximum Area Disturbed/Day (acres) -> 0
Water Truck Used? -> Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	260	2,600	130
Grading/Excavation	10	0	260	0	2,600	130
Drainage/Utilities/Sub-Grade	0	0	0	0	2,600	130
Paving	0	0	0	520	2,600	130

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.
CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> LADWP Little Lakes Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.05	0.55	0.44	0.03	0.02	0.00	0.02	0.02	0.00	0.00	144.20	0.03	0.00	132.00
Grading/Excavation	0.26	2.75	2.22	0.14	0.11	0.02	0.10	0.10	0.01	0.01	720.98	0.17	0.01	660.02
Drainage/Utilities/Sub-Grade	0.15	1.31	1.22	0.07	0.06	0.01	0.05	0.05	0.00	0.00	348.38	0.08	0.00	318.90
Paving	0.08	0.79	0.66	0.03	0.03	0.00	0.03	0.03	0.00	0.00	216.58	0.04	0.00	198.16
Maximum (tons/phase)	0.26	2.75	2.22	0.14	0.11	0.02	0.10	0.10	0.01	0.01	720.98	0.17	0.01	660.02
Total (tons/construction project)	0.53	5.40	4.54	0.27	0.23	0.04	0.21	0.20	0.01	0.01	1430.13	0.33	0.02	1,309.08

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.
CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.
The CO2e emissions are reported as metric tons per phase.

Road Construction Emissions Model Version 8.1.0
Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	LADWP Little Lakes	
Construction Start Year	2023	Enter a Year between 2014 and 2025 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	9.00	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	3	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.03	miles
Total Project Area	1.00	acre
Maximum Area Disturbed/Day	0.05	acres
Water Trucks Used?	1	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing	20.00		
	Grading/Excavation	20.00		10.00
	Drainage/Utilities/Sub-Grade	20.00		
	Paving	20.00		
Asphalt	Grubbing/Land Clearing	20.00		
	Grading/Excavation	20.00		
	Drainage/Utilities/Sub-Grade	20.00		
	Paving	20.00		

Mitigation Options

On-road Fleet Emissions Mitigation		Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation		Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/ceqa/mitigation.shtml). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

The remaining sections of this sheet contain areas that require modification when 'Other Project Type' is selected.

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing		0.90		1/1/2023
Grading/Excavation		4.50		1/29/2023
Drainage/Utilities/Sub-Grade		2.25		6/15/2023
Paving		1.35		8/23/2023
Totals (Months)	9			

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions **User Input**	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing				0	0.00
Miles/round trip: Grading/Excavation	260.00			1	260.00
Miles/round trip: Drainage/Utilities/Sub-Grade				0	0.00
Miles/round trip: Paving				0	0.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Grading/Excavation (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Draining/Utilities/Sub-Grade (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Paving (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Hauling Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.04	0.21	0.69	0.06	0.02	0.01	882.81	0.00	0.03	891.51
Tons per const. Period - Grading/Excavation	0.00	0.01	0.03	0.00	0.00	0.00	43.70	0.00	0.00	44.13
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.01	0.03	0.00	0.00	0.00	43.70	0.00	0.00	44.13

Note: Asphalt Hauling emission default values can be overridden in cells D87 through D90, and F87 through F90.

Asphalt Hauling Emissions **User Input**	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing	260.00		1	0	260.00
Miles/round trip: Grading/Excavation				0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade				0	0.00
Miles/round trip: Paving	260.00		2	0	520.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Grading/Excavation (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Draining/Utilities/Sub-Grade (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Paving (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.04	0.21	0.69	0.06	0.02	0.01	882.81	0.00	0.03	891.51
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.01	0.00	0.00	0.00	8.74	0.00	0.00	8.83
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.07	0.42	1.38	0.12	0.05	0.02	1,765.62	0.00	0.06	1,783.01
Tons per const. Period - Paving	0.00	0.01	0.02	0.00	0.00	0.00	26.22	0.00	0.00	26.48
Total tons per construction project	0.00	0.01	0.03	0.00	0.00	0.00	34.96	0.00	0.00	35.30

Note: Worker commute default values can be overridden in cells D113 through D118.

Worker Commute Emissions **User Input**	User Override of Worker Commute Default Values	Default Values	Calculated Daily Trips	Calculated Daily VMT
Miles/ one-way trip	130			
One-way trips/day	2			
No. of employees: Grubbing/Land Clearing	10		20	2,600.00
No. of employees: Grading/Excavation	10		20	2,600.00
No. of employees: Drainage/Utilities/Sub-Grade	10		20	2,600.00
No. of employees: Paving	10		20	2,600.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.02	0.85	0.08	0.05	0.02	0.00	336.27	0.01	0.00	337.46
Grading/Excavation (grams/mile)	0.02	0.85	0.08	0.05	0.02	0.00	336.27	0.01	0.00	337.46

Draining/Utilities/Sub-Grade (grams/mile)	0.02	0.85	0.08	0.05	0.02	0.00	336.27	0.01	0.00	337.46
Paving (grams/mile)	0.02	0.85	0.08	0.05	0.02	0.00	336.27	0.01	0.00	337.46
Grubbing/Land Clearing (grams/trip)	0.81	1.86	0.14	0.00	0.00	0.00	77.20	0.01	0.01	79.12
Grading/Excavation (grams/trip)	0.81	1.86	0.14	0.00	0.00	0.00	77.20	0.01	0.01	79.12
Draining/Utilities/Sub-Grade (grams/trip)	0.81	1.86	0.14	0.00	0.00	0.00	77.20	0.01	0.01	79.12
Paving (grams/trip)	0.81	1.86	0.14	0.00	0.00	0.00	77.20	0.01	0.01	79.12
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.13	4.97	0.48	0.27	0.11	0.02	1,930.94	0.04	0.02	1,937.79
Tons per const. Period - Grubbing/Land Clearing	0.00	0.05	0.00	0.00	0.00	0.00	19.12	0.00	0.00	19.18
Pounds per day - Grading/Excavation	0.13	4.97	0.48	0.27	0.11	0.02	1,930.94	0.04	0.02	1,937.79
Tons per const. Period - Grading/Excavation	0.01	0.25	0.02	0.01	0.01	0.00	95.58	0.00	0.00	95.92
Pounds per day - Drainage/Utilities/Sub-Grade	0.13	4.97	0.48	0.27	0.11	0.02	1,930.94	0.04	0.02	1,937.79
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.12	0.01	0.01	0.00	0.00	47.79	0.00	0.00	47.96
Pounds per day - Paving	0.13	4.97	0.48	0.27	0.11	0.02	1,930.94	0.04	0.02	1,937.79
Tons per const. Period - Paving	0.00	0.07	0.01	0.00	0.00	0.00	28.67	0.00	0.00	28.78
Total tons per construction project	0.01	0.49	0.05	0.03	0.01	0.00	191.16	0.00	0.00	191.84

Note: Water Truck default values can be overridden in cells D145 through D148, and F145 through F148.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values	Calculated
User Input	Default # Water Trucks	Number of Water Trucks	Miles Traveled/Vehicle/Day	Miles Traveled/Vehicle/Day	Daily VMT
Grubbing/Land Clearing - Exhaust	1		130.00		130.00
Grading/Excavation - Exhaust	1		130.00		130.00
Drainage/Utilities/Subgrade	1		130.00		130.00
Paving	1		130.00		130.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Grading/Excavation (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Draining/Utilities/Sub-Grade (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Paving (grams/mile)	0.06	0.37	1.20	0.10	0.04	0.01	1,540.13	0.00	0.05	1,555.31
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.02	0.11	0.34	0.03	0.01	0.00	441.40	0.00	0.01	445.75
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	4.37	0.00	0.00	4.41
Pounds per day - Grading/Excavation	0.02	0.11	0.34	0.03	0.01	0.00	441.40	0.00	0.01	445.75
Tons per const. Period - Grading/Excavation	0.00	0.01	0.02	0.00	0.00	0.00	21.85	0.00	0.00	22.06
Pounds per day - Drainage/Utilities/Sub-Grade	0.02	0.11	0.34	0.03	0.01	0.00	441.40	0.00	0.01	445.75
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.01	0.00	0.00	0.00	10.92	0.00	0.00	11.03
Pounds per day - Paving	0.02	0.11	0.34	0.03	0.01	0.00	441.40	0.00	0.01	445.75
Tons per const. Period - Paving	0.00	0.00	0.01	0.00	0.00	0.00	6.55	0.00	0.00	6.62
Total tons per construction project	0.00	0.01	0.03	0.00	0.00	0.00	43.70	0.00	0.00	44.13

Note: Fugitive dust default values can be overridden in cells D171 through D173.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing	0.05		0.50	0.00	0.10	0.00
Fugitive Dust - Grading/Excavation	0.05		0.50	0.02	0.10	0.01
Fugitive Dust - Drainage/Utilities/Subgrade	0.05		0.50	0.01	0.10	0.00

Values in cells D183 through D216, D234 through D267, D285 through D318, and D336 through D369 are required when 'Other Project Type' is selected.

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Bore/Drill Rigs	0.20	1.89	1.90	0.06	0.06	0.01	853.27	0.28	0.01	862.48
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Excavators	0.19	3.36	1.60	0.08	0.07	0.01	515.93	0.17	0.00	521.49
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Generator Sets	0.61	7.34	5.43	0.26	0.26	0.01	1,246.07	0.05	0.01	1,250.23
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00			Model Default Tier	Off-Highway Trucks	2.01	13.09	14.20	0.51	0.47	0.05	5,094.09	1.65	0.05	5,148.92
5.00			Model Default Tier	Other Construction Equipment	1.74	20.01	17.19	0.90	0.82	0.03	2,991.31	0.97	0.03	3,023.62
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Tractors/Loaders/Backhoes	0.31	4.51	3.10	0.15	0.14	0.01	609.37	0.20	0.01	615.93
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing	pounds per day	5.06	50.20	43.42	1.96	1.82	0.12	11,310.04	3.31	0.10	11,422.68
Grubbing/Land Clearing	tons per phase	0.05	0.50	0.43	0.02	0.02	0.00	111.97	0.03	0.00	113.08

Grading/Excavation Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Bore/Drill Rigs	0.20	1.89	1.90	0.06	0.06	0.01	853.27	0.28	0.01	862.48
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Excavators	0.19	3.36	1.60	0.08	0.07	0.01	515.93	0.17	0.00	521.49
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Generator Sets	0.61	7.34	5.43	0.26	0.26	0.01	1,246.07	0.05	0.01	1,250.23
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00			Model Default Tier	Off-Highway Trucks	2.01	13.09	14.20	0.51	0.47	0.05	5,094.09	1.65	0.05	5,148.92
5.00			Model Default Tier	Other Construction Equipment	1.74	20.01	17.19	0.90	0.82	0.03	2,991.31	0.97	0.03	3,023.62
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Override of Default Number of Vehicles	Default Number of Vehicles	Override of Default Equipment Tier	Default Equipment Tier	Type	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Tractors/Loaders/Backhoes	0.31	4.51	3.10	0.15	0.14	0.01	609.37	0.20	0.01	615.93
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase	Units	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grading/Excavation	pounds per day	5.06	50.20	43.42	1.96	1.82	0.12	11,310.04	3.31	0.10	11,422.68
Grading/Excavation	tons per phase	0.25	2.49	2.15	0.10	0.09	0.01	559.85	0.16	0.00	565.42

Drainage/Utilities/Subgrade

Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option: Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Cranes	0.69	3.59	7.47	0.31	0.29	0.01	1,093.45	0.35	0.01	1,105.24
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Forklifts	0.10	1.14	0.96	0.06	0.05	0.00	148.03	0.05	0.00	149.63
2.00			Model Default Tier	Generator Sets	0.61	7.34	5.43	0.26	0.26	0.01	1,246.07	0.05	0.01	1,250.23
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00			Model Default Tier	Off-Highway Trucks	2.51	16.36	17.75	0.64	0.59	0.07	6,367.61	2.06	0.06	6,436.15
4.00			Model Default Tier	Other Construction Equipment	1.39	16.01	13.75	0.72	0.66	0.02	2,393.05	0.77	0.02	2,418.89
1.00			Model Default Tier	Other General Industrial Equipment	0.16	1.92	1.54	0.09	0.08	0.00	248.02	0.08	0.00	250.70
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Welders	0.25	1.68	1.42	0.06	0.06	0.00	207.48	0.02	0.00	208.56

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase	Units	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Drainage/Utilities/Sub-Grade	pounds per day	5.72	48.05	48.32	2.13	1.98	0.12	11,703.70	3.39	0.10	11,819.40
Drainage/Utilities/Sub-Grade	tons per phase	0.14	1.19	1.20	0.05	0.05	0.00	289.67	0.08	0.00	292.53

Default Mitigation Option

Paving Override of Default Number of Vehicles	Number of Vehicles *Program-estimate*	Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Air Compressors	0.26	2.41	1.74	0.09	0.09	0.00	375.26	0.02	0.00	376.67
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Generator Sets	0.61	7.34	5.43	0.26	0.26	0.01	1,246.07	0.05	0.01	1,250.23
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00			Model Default Tier	Off-Highway Trucks	2.01	13.09	14.20	0.51	0.47	0.05	5,094.09	1.65	0.05	5,148.92
4.00			Model Default Tier	Other Construction Equipment	1.39	16.01	13.75	0.72	0.66	0.02	2,393.05	0.77	0.02	2,418.89
			Model Default Tier	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Pumps	0.33	3.73	2.75	0.13	0.13	0.01	623.04	0.03	0.00	625.14
2.00			Model Default Tier	Rollers	0.31	3.75	3.26	0.18	0.17	0.01	514.57	0.17	0.00	520.11
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Skid Steer Loaders	0.07	1.39	0.86	0.03	0.03	0.00	200.49	0.06	0.00	202.65
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Paving	pounds per day	4.97	47.71	42.00	1.92	1.81	0.11	10,446.56	2.76	0.09	10,542.62
Paving	tons per phase	0.07	0.71	0.62	0.03	0.03	0.00	155.13	0.04	0.00	156.56
Total Emissions all Phases (tons per construction period) =>		0.52	4.88	4.40	0.20	0.18	0.01	1,116.61	0.32	0.01	1,127.60

Equipment default values for horsepower and hours/day can be overridden in cells D391 through D424 and F391 through F424.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		206		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		226		8
Crawler Tractors		208		8
Crushing/Proc. Equipment		85		8
Excavators		163		8
Forklifts		89		8
Generator Sets		84		8
Graders		175		8
Off-Highway Tractors		123		8
Off-Highway Trucks		400		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		167		8
Pavers		126		8
Paving Equipment		131		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		81		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		255		8
Rubber Tired Loaders		200		8
Scrapers		362		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		254		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		98		8
Trenchers		81		8
Welders		46		8

END OF DATA ENTRY SHEET

Appendix B
Little Lake Crossover Project
Biological Assessment Tables

Los Angeles Department of Water and Power
Watershed Resources
April 2021

Table 1. Wildlife, Sign and Plant Species Observed on April 1 and 8, 2021.

Wildlife and Plants	
Scientific Name	**Common Name**
Wildlife	
Amphispiza bilineata	Black-throated Sparrow
Callipepla gambelii	Gambel's Quail
Callisaurus draconoides	Western Zebra-tailed Lizard
Phrynosoma platyrhinos calidiarum	Southern Desert Horned Lizard
Zonotrichia leucophrys	White-crowned Sparrow
Insects	
Anthophora californica	California digger bee
Chlosyne acastus	Sagebrush checkerspot
Bombus sp.	Bumble bee
Plants	
Ambrosia dumosa	burrobush
Amsinckia tessellata	fiddleneck
Atriplex polycarpa	cattle saltbush
Atriplex canescens	shadscale
Bromus rubens	red brome
Bromus tectorum	cheatgrass
Coleogyne ramosissima	blackbrush
Datura wrightii	jimsonweed
Encelia actoni	Acton's brittlebush
Ericameria cooperi	Cooper's goldenbush
Ericameria nauseosa	rubber rabbitbrush
Ericameria paniculata	Mojave rabbitbrush
Eriogonum inflatum	desert trumpet
Eriogonum pusillum	yellow turbans
Erodium cicutarium	redstem stork's bill
Hymenoclea salsola	cheesebush
Krascheninnikovia lanata	winterfat
Larrea tridentata	creosote bush
Lepidium fremontii	desert pepperweed
Lycium cooperi	Cooper's box thorn
Penstomen sp.	Unknown species
Phacelia fremontii	Fremont's phacelia
Psorothamnus arborescens var. *minutifolius*	Mojave indigobush
Salvia columbariae	desert chia
Salvia dorrii	desert sage
Sphaeralcea ambigua	apricot mallow
Yucca brevifolia	Joshua tree

Table 2. Wildlife, Sign and Plant Species Observed on April 20 and October 23, 2020.

Wildlife and Plants	
Scientific Name	**Common Name**
Wildlife	
Ammospermophilus leucurus	Antelope Ground Squirrel
Amphispiza bilineata	Black-throated Sparrow
Canis latrans	Coyote
Dipodomys deserti	Desert Kangaroo Rat
Lepus californicus	Black-tailed Jackrabbit
Neotoma lepida	Desert Wood Rat
Peromyscus sp.	desert mice
Salpinctes obsoletus	Rock Wren
Plants	
Amsinckia tessellata	fiddleneck
Atriplex polycarpa	cattle saltbush
Bromus rubens	red brome
Bromus tectorum	cheatgrass
Ericameria cooperi	Cooper's goldenbush
Ericameria nauseosa	rubber rabbitbrush
Ericameria paniculata	Mojave rabbitbrush
Eriogonum inflatum	desert trumpet
Erodium cicutarium	redstem stork's bill
Gutierrezia microcephala	smallhead snakeweed
Hymenoclea salsola	cheesebush
Larrea tridentata	creosote bush
Lasthenia californica	California goldfields
Layia glandulosa	whitedaisy tidytips
Linanthus parryae	Parry's linanthus
Malacothrix glabrata	desert dandelion
Phacelia distans	lace-leaf phacelia
Phacelia fremontii	Fremont's phacelia
Psorothamnus arborescens	Mojave indigobush
Salvia columbariae	desert chia
Senna armata	desert senna

Table 3. Impact analysis for special-status species in the project area.

Scientific Name	Common Name	Regulatory Status	Suitable Habitat (Y/N)	Potential for Impact
Birds				
Aquila chrysaetos	Golden Eagle	MBTA; BEGPA; FP; USFS SCC; BLM S	No[1]	Unlikely
Athene cunicularia	Burrowing Owl	BLM S; CDFW SSC; MBTA	No	Unlikely
Fishes				
Rhinichthys osculus ssp. 2	Owens Speckled Dace	BLM S; CDFW SSC	No	Unlikely
Mammals				
Antrozous pallidus	Pallid Bat	BLM S; CDFW SSC	No[2]	Unlikely
Corynorhinus townsendii	Townsend's Big-eared Bat	BLM S; CDFW SSC	No[2]	Unlikely
Microtus californicus vallicola	Owens Valley vole	BLM S; CDFW SSC	No	Unlikely
Xerospermophilus mohavensis	Mohave Ground Squirrel	BLM S; CDFW ST	Yes	Medium
Reptiles				
Gopherus agassizii	Desert Tortoise	FT, ST	Yes	Medium
Invertebrates				
Bombus crotchii	Crotch bumble bee	N/A[3]	Yes	Low
Pyrgulopsis wongi	Wong's Springsnail	USFS SCC	No	Unlikely
Plants				
Aliciella ripleyi	Ripley's aliciella	CNPS 2B.3	No	Unlikely
Eremothera boothii ssp. *boothii*	Booth's evening primrose	CNPS 2B.3	Yes	Low
Mentzelia tridentata	Creamy blazing star	CNPS 2B.2	Yes	Low
Penstomen fruticiformis var. *amargosae*	Amargosa beardtongue	BLM S; CNPS 1B.3	Yes	Low
Phacelia nashiana	Charlotte's phacelia	BLM S; CNPS 1B.2	Yes	Low

1 Nesting habitat **2** Roosting habitat

3 Previously a candidate for listing under California Endangered Species Act (CESA). CDFW was petitioned to list the Crotch bumble bee under CESA in 2018; however, in 2020, the Sacramento Superior Court upheld a challenge to the decision by the California Fish and Game Commission to designate four subspecies of bumble bees as candidates for protection under the CESA because protection did not extend to insects. Therefore, we did not analyze this species in our impact analysis.

Federal Status

FT = Listed as threatened under the federal Endangered Species Act
BLM S = Bureau Sensitive species as designated by the BLM
USFS SCC = Species of Conservation Concern as designated by the USFS, Inyo National Forest

State Status

ST = Listed as threatened under the California Endangered Species Act
SCE = Candidate for listing under CESA as endangered

Other Status

MBTA = Birds protected under the Migratory Bird Treaty Act
BEGPA = Bald and Golden Eagle Protection Act

California National Plant Society

1A Plants presumed extirpated in California and either rare or extinct elsewhere
1B Plants rare, threatened, or endangered in California or elsewhere
2A Plants presumed extirpated in California, but common elsewhere
2B Plants rare, threatened, or endangered in California, but more common elsewhere

0.1 Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 Moderately threatened in California (20-80% occurrences threatened/moderate degree and immediacy of threat)
0.3 Not very threatened in California (less than 20% of occurrences threatened/low degree and immediacy of threat or no current threats known)

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

Query Summary:
Quad IS (Little Lake (3511788) OR Sacatar Canyon (3511881) OR Volcano Peak (3511787) OR Lamont Peak (3511871) OR Ninemile Canyon (3511778) OR Pearsonville (3511777) OR Long Canyon (3611811) OR Coso Junction (3611718) OR Cactus Peak (3611717))
AND County IS (Inyo)
AND Elevation IS greater than OR equal to 3000
AND Elevation IS less than OR equal to 4000

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Antrozous pallidus	pallid bat	Mammals	AMACC10010	420	1	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive, WBWG_H-High Priority	Chaparral, Coastal scrub, Desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Riparian woodland, Sonoran desert scrub, Upper montane coniferous forest, Valley & foothill grassland
Aquila chrysaetos	golden eagle	Birds	ABNKC22010	323	6	None	None	G5	S3	null	BLM_S-Sensitive, CDF_S-Sensitive, CDFW_FP-Fully Protected, CDFW_WL-Watch List, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest, Cismontane woodland, Coastal prairie, Great Basin grassland, Great Basin scrub, Lower montane coniferous forest, Pinon & juniper woodlands, Upper montane coniferous forest, Valley & foothill grassland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	2011	7	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	437	1	None	Candidate Endangered	G3G4	S1S2	null	null	null
Canbya candida	white pygmy-poppy	Dicots	PDPAP05020	30	1	None	None	G3G4	S3S4	4.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Joshua tree woodland, Mojavean desert scrub, Pinon & juniper woodlands
Corynorhinus townsendii	Townsend's big-eared bat	Mammals	AMACC08010	635	1	None	None	G4	S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive, WBWG_H-High Priority	Broadleaved upland forest, Chaparral, Chenopod scrub, Great Basin grassland, Great Basin scrub, Joshua tree woodland, Lower montane coniferous forest, Meadow & seep, Mojavean desert scrub, Riparian forest, Riparian woodland, Sonoran desert scrub, Sonoran thorn woodland, Upper montane coniferous forest, Valley & foothill grassland
Eremothera boothii ssp. boothii	Booth's evening-primrose	Dicots	PDONA03052	35	1	None	None	G5T4	S3	2B.3	null	Joshua tree woodland, Pinon & juniper woodlands
Gopherus agassizii	desert tortoise	Reptiles	ARAAF01012	970	3	Threatened	Threatened	G3	S2S3	null	IUCN_VU-Vulnerable	Joshua tree woodland, Mojavean desert scrub, Sonoran desert scrub

Lasionycteris noctivagans	silver-haired bat	Mammals	AMACC02010	139	1	None	None	G3G4	S3S4	null	IUCN_LC-Least Concern, WBWG_M-Medium Priority	Lower montane coniferous forest, Oldgrowth, Riparian forest
Mentzelia tridentata	creamy blazing star	Dicots	PDLOA031U0	51	3	None	None	G3	S3	1B.3	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Mojavean desert scrub
Microtus californicus vallicola	Owens Valley vole	Mammals	AMAFF11033	14	1	None	None	G5T3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern	Meadow & seep, Wetland
Phacelia nashiana	Charlotte's phacelia	Dicots	PDHYD0C350	72	5	None	None	G3	S3	1B.2	BLM_S-Sensitive, SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden, SB_USDA-US Dept of Agriculture	Joshua tree woodland, Mojavean desert scrub, Pinon & juniper woodlands
Pyrgulopsis wongi	Wong's springsnail	Mollusks	IMGASJ0360	50	1	None	None	G2	S2	null	IUCN_LC-Least Concern, USFS_S-Sensitive	Great Basin flowing waters, Meadow & seep
Rhinichthys osculus ssp. 2	Owens speckled dace	Fish	AFCJB3705F	28	1	None	None	G5T1T2Q	S1S2	null	AFS_TH-Threatened, BLM_S-Sensitive, CDFW_SSC-Species of Special Concern	Aquatic, Great Basin flowing waters
Xerospermophilus mohavensis	Mohave ground squirrel	Mammals	AMAFB05150	432	11	None	Threatened	G2G3	S2S3	null	BLM_S-Sensitive, IUCN_VU-Vulnerable	Chenopod scrub, Joshua tree woodland, Mojavean desert scrub

CNPS List

CNPS California Native Plant Society Inventory of Rare and Endangered Plants

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

11 matches found. *Click on scientific name for details*

Search Criteria

California Rare Plant Rank is one of [1A, 1B, 2A, 2B, 3, 4], FESA is one of [Endangered, Threatened, Candidate, Not Listed], CESA is one of [Endangered, Threatened, Rare, Not Listed], Found in Inyo County, Found in Quads 3611811, 3611718, 3611717, 3511881, 3511788, 3511787, 3511871, 3511778 and 3511777; Elevation is above 3000 or below 4000 feet

Modify Search Criteria Export to Excel Modify Columns Modify Sort Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Aliciella ripleyi	Ripley's aliciella	Polemoniaceae	perennial herb	May-Jul	2B.3	S2	G3
Canbya candida	white pygmy-poppy	Papaveraceae	annual herb	Mar-Jun	4.2	S3S4	G3G4
Clarkia xantiana ssp. parviflora	Kern Canyon clarkia	Onagraceae	annual herb	May-Jun	4.2	S3?	G4T3?
Eremothera boothii ssp. boothii	Booth's evening-primrose	Onagraceae	annual herb	Apr-Sep	2B.3	S3	G5T4
Eriastrum sparsiflorum	few-flowered eriastrum	Polemoniaceae	annual herb	May-Sep	4.3	S4	G5
Euphorbia vallis-mortae	Death Valley sandmat	Euphorbiaceae	perennial herb	May-Oct	4.2	S3	G3
Frasera tubulosa	Coville's green-gentian	Gentianaceae	perennial herb	Jul-Aug	4.3	S3	G3
Mentzelia tridentata	creamy blazing star	Loasaceae	annual herb	Mar-May	1B.3	S3	G3
Muilla coronata	crowned muilla	Themidaceae	perennial bulbiferous herb	Mar-Apr(May)	4.2	S3	G3
Penstemon fruticiformis var. amargosae	Amargosa beardtongue	Plantaginaceae	perennial herb	Apr-Jun	1B.3	S2	G4T3
Phacelia nashiana	Charlotte's phacelia	Hydrophyllaceae	annual herb	Mar-Jun	1B.2	S3	G3

Suggested Citation

California Native Plant Society, Rare Plant Program. 2021. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 08 March 2021].

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Special-Status Species That Could Potentially Occur in the Project Area (CDFW 2021, CNPS 2021).

Scientific Name	Common Name	Status	Suitable Habitat (Y/N)?	Preferred Habitat
Birds				
Aquila chrysaetos	Golden Eagle	MBTA; BGEPA; FP	No nesting habitat	Nest in high densities in open and semi-open habitat, but also may nest at lower densities in coniferous habitat when open space is unavailable. They can be found from the tundra, through grasslands, woodland-brushlands, and forested habitat, south to arid deserts, including Death Valley. Locally, Golden Eagles may nest wherever high cliffs offer protection from predators.
Athene cunicularia	Burrowing Owl	BLM S; CDFW SSC	Yes	This species occurs throughout the state of California with the exception of the coastal and interior mountain ranges. It is primarily a grassland species, but persists and even thrives in some landscapes highly altered by human activity. Preferred habitat includes burrows for roosting and nesting and relatively short vegetation with only sparse shrubs and taller vegetation.
Fish				
Rhinichthys osculus ssp. 2	Owens Speckled Dace	BLM S; CDFW SSC	No	Creeks, ditches, and canals in the Owens Valley with no predatory fish.
Mammals				
Antrozous pallidus	Pallid Bat	BLM S; CDFW SSC	No roosting habitat	Day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees, and various human structures such as bridges, barns, porches, bat boxes, and human-occupied as well as vacant buildings. Forage over open shrub-steppe grasslands, oak savannah grasslands,

				open Ponderosa pine forests, talus slopes, gravel roads, lava flows, fruit orchards, and vineyards.
Corynorhinus townsendii	Townsend's big-eared bat	BLM S; CDFW SSC	No roosting habitat	Nocturnal. Requires caves, mines, tunnels, buildings, or other human-made structures for roosting. Roosting sites are the most important limiting resource. Prefers mesic habitats. Gleans from brush or trees or feeds along habitat edges.
Microtus californicus vallicola	Owens Valley Vole	BLM S; CDFW SSC	No	Meadow, seeps, and wetland habitat.
Xerospermophilus mohavensis	Mohave ground squirrel	BLM S; ST	Yes	Inhabits open desert scrub, alkali scrub, and Joshua tree woodland with sandy or gravelly friable soils and an abundance of annual herbaceous vegetation. Avoids rocky areas.
Reptiles				
Gopherus agassizii	Desert Tortoise	FT, ST	Yes	Joshua tree woodland, Mojavean desert scrub, and Sonoran desert scrub.
Invertebrates				
Bombus crotchii	Crotch bumble bee	SCE	Yes	Occurs primarily in California, including the Mediterranean region, Pacific Coast, Western Desert, Great Valley, and adjacent foothills throughout most of southwestern California. It has also been documented in southwest Nevada, near the California border.
Pyrgulopsis wongi	Wong's Springsnail	USFS SCC	No	In Owens Valley, eastern Sierra Nevada from Pine Creek south to Little Lake, and along western side of valley from French Spring to Marble Creek. Also a few sites in Long, Adobe, and Deep Springs Valleys. Habitat includes seeps and spring-fed streams of small-moderate size in watercress and/or on small bits of travertine and stone.

Plants				
Aliciella ripleyi	Ripley's aliciella	2B.3	No	A perennial herd that blooms between May to July. Inhabits carbonate soil in Mojavean desert scrub.
Eremothera boothii ssp. boothii	Booth's evening-primrose	2B.3	Yes	Annual herd that blooms period between April and September. Found east of the Sierra Nevada on sandy flats and steep loose slopes in Joshua tree and pinyon-juniper woodland.
Mentzelia tridentata	Creamy blazing-star	1B.3	Yes	Annual herb that blooms between March and May. Inhabits rocky, gravelly, and sandy soils in Mojavean desert scrub.
Penstemon fruticiformis var. *amargosae*	Amargosa beardtongue	1B.3	Yes	Perennial herd that blooms between April and June. Inhabits Mojavean desert scrub.
Phacelia nashiana	Charlotte's phacelia	BLM S; 1B.2	Yes	Annual herb that blooms between March and June. Inhabits granitic, sandy soils in Joshua tree woodland, Mojavean desert scrub, and pinyon-juniper woodland.

Appendix C
Little Lake Crossover Project
Historical Resources Technical Report

Los Angeles Department of Water and Power

HISTORICAL RESOURCES TECHNICAL REPORT

Little Lake Aqueduct Crossover Project

April 11, 2023

Prepared for:
Los Angeles Department of Water and Power
Environmental Services
111 North Hope Street, Room 1044
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The conclusions in the Report titled Historical Resources Technical Report: Little Lake Aqueduct Crossover Project are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Los Angeles Department of Water and Power (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. The Report may be provided to applicable authorities having jurisdiction and to others for whom the Client is responsible, but Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

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LIST OF APPENDIX

Executive Summary

Stantec Consulting Services Inc. (Stantec), prepared this Historical Resources Technical Report (HRTR) on behalf of the Los Angeles Department of Water and Power (LADWP) for the Little Lake Aqueduct Crossover Project (Project). The Project involves the installation of a 60-inch diameter steel pipe between the First and Second Los Angeles Aqueducts near the Little Lake area in unincorporated Inyo County. The crossover pipe would allow water to flow through the Second Los Angeles Aqueduct from South Haiwee Reservoir to the Haiwee Hydropower Plant when the First Los Angeles Aqueduct is closed for maintenance. The Project site is approximately 2 mileswest of the Little Lake Reservoir and 1 mile west of U.S. Highway 395 (**Figure 1** and **Figure 2**).

The purpose of this report is to analyze whether the proposed Project would impact historical resources as defined by the California Environmental Quality Act (CEQA). LADWP is the lead agency for CEQA for the proposed Project. In accordance with relevant state guidelines for historical resources, this report identifies and documents potential historical resources on the Project site, evaluates the resources for inclusion in the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR), and assesses the Project's potential to result in a substantial adverse change to the significance of an historical resource pursuant to Title 14 California Code of Regulations (CCR) §15064.5.

For this HRTR, a Study Area was established to account for potential impacts to historical resources (**Figure 3**). It encompasses the Project site plus a radius of 100 feet from the center of the Project site. Identification of any listed or previously surveyed historical resources in the Study Area included a records search at the Eastern Information Center of the California Historical Resources Information System at the University of California, Riverside. It revealed that one recorded resource, the First Los Angeles Aqueduct (CA-INY-4591H), was previously identified as eligible for the NRHP.

The proposed Project would alter segments of the NRHP–eligible First Los Angeles Aqueduct, completed in 1913, and the Second Los Angeles Aqueduct, completed in 1970. The Second Los Angeles Aqueduct is not currently listed in national, state, or local landmark or historic district programs and is not included as significant in any historic resource surveys of the area. Since this structure is more than 50 years old, it was evaluated for the NRHP and CRHR to determine if it qualifies as a historical resource Inyo County does not have a local landmark designation program or maintain a local historic register; therefore, the Second Los Angeles Aqueduct was not evaluated for local landmark programs.

The Second Los Angeles Aqueduct is recommended eligible for the NRHP and CRHR at a local level of significance under Criterion A/1 for its association with the history of Los Angeles' water supply system (Appendix A, Department of Parks and Recreation [DPR] Form Set). It therefore is a historical resource for the purposes of CEQA, pursuant to Title 14 CCR §15064.5. The recommended status code is 3S and 3CS, which is defined as appearing individually eligible for the NRHP and CRHR through survey evaluation.

The threshold for determining significant impacts to historical resources in the CEQA Guidelines is whether the proposed project would cause a substantial adverse change, which is defined as demolition, destruction, relocation, or alteration of the resource or its immediate vicinity such that the historical resource is materially impaired. The Project has the potential to directly impact the two historical resources on the Project site. An 80-foot-long segment of the First Los Angeles Aqueduct and a 23-foot-long segment of the Second Los Angeles Aqueduct would be demolished and replaced as part of the Project. A new crossover pipe would be added below grade and a new mechanical platform would be constructed atop the replacement segment of the First Los Angeles Aqueduct. The Project, together with the North Haiwee Dam Seismic Improvement Project, also has the potential to contribute to cumulative impacts to the two historical resources on the Project site. However, the Project would have no indirect impact on historical resources because, besides the aqueduct segments within the Project site, no other previously identified historical resources are in the Study Area.

The Project would directly impact the two historical resources within the Project site, but would not result in a substantial adverse change to the integrity of the identified historical resources to the degree that they would no longer be eligible CEQA–defined historical resources. The Project would not impact the vast majority of the First or Second Los Angeles Aqueducts as over 99.9 percent of the structures are outside the Project area; therefore, the two historical resources would retain all aspects of integrity overall. The Project, in conjunction with the North Haiwee Dam Seismic Improvement Project, would contribute to incremental impacts to the First Los Angeles Aqueduct, but the impact would be less than cumulatively considerable. Together, both projects only constitute 0.37 miles, or 0.0016 percent, of the approximately 233-mile-long First Aqueduct system. The remaining portion of the historical resource—approximately over 232.7 miles—would remain intact and its integrity of location, setting, design, materials, workmanship, feeling, and association would be preserved. For these reasons, the Project would have a less than significant impact on historical resources. No mitigation is required or recommended.

Preparer Qualifications

Stantec personnel who meet the Secretary of the Interior Professional Qualification Standards in architectural history and history as defined in 36 Code of Federal Regulations Part 61 prepared this report.

Stantec Architectural Historian Emily Rinaldi-Williams authored this report. Ms. Rinaldi-Williams received a Master of Science degree in Historic Preservation from Columbia University and more than eight years of cultural resource management experience. Ms. Rinaldi qualifies as an Architectural Historian and Historian under the Secretary of the Interior's Professional Qualification Standards.

Stantec Senior Historian Amy E. Dase peer reviewed this report. Ms. Dase received a Master of Arts degree in History from Middle Tennessee State University and has more than 35 years of cultural resources management experience. Ms. Dase exceeds the Secretary of the Interior's Professional Qualification Standards for Architectural Historian and Historian.

Acronyms / Abbreviations

APN	Assessor Parcel Number
BERD	California Built Environment Resources Database
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
CRHR	California Register of Historical Resources
DPR 523 Form	Department of Parks and Recreation 523 Form
EIC	Eastern Information Center
HRTR	Historical Resources Technical Report
IS/MND	Initial Study/Mitigated Negative Declaration
LADWP	Los Angeles Department of Water and Power
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OHP	California Office of Historic Preservation
PRC	Public Resource Code
Project	Little Lake Aqueduct Crossover Project
Stantec	Stantec Consulting Services Inc.
U.S. 395	U.S. Highway 395

1 Project Description

The Los Angeles Department of Water and Power (LADWP) proposes to construct the Little Lake Aqueduct Crossover Project (Project) in Rose Valley within unincorporated Inyo County approximately 1 mile west of U.S. Highway 395 (U.S. 395) (**Figure 1**). The Project site is within Township 23S, Range 37E, Section 1 and occupies 0.115 acres of assessor parcel number (APN) 037-100-BLM (**Figure 2**).

The Project would install a 60-inch diameter pipe to connect the First Los Angeles Aqueduct and the Second Los Angeles Aqueduct, allowing water to be diverted from the first structure to the second. Both aqueducts deliver water from the Haiwee Reservoir Complex to the City of Los Angeles. The First Los Angeles Aqueduct is routinely taken out of service for inspection and maintenance for an average of 117 days per year. During these outages, water cannot flow to the Haiwee Power Plant, and as a result, the power plant cannot generate power. If aqueduct water flow was uninterrupted by these outages, the Haiwee Power Plant would generate on average approximately 3,150 megawatt hours of additional power per year that could be sold through the Power System for an average increase in revenue of $79,000 per year for the City of Los Angeles. The Project would also increase operational flexibility by approximately doubling the existing capacity of flowing water from the South Haiwee Reservoir through the Second Los Angeles Aqueduct.

Both the First and Second Los Angeles Aqueducts are below grade at the Project location. The 60-inch diameter crossover pipe would be approximately 135 feet in length, extending below grade between the two existing aqueducts. The pipe would likely be constructed of welded steel; however, the final pipe material will be determined during design based on factors including pressure, constructability, operational requirements, seismic requirements, installation, cost, and procurement durations. Two 60-inch diameter butterfly valves would be installed near the center of the crossover pipe to prevent back flow into the First Los Angeles Aqueduct when the Second Los Angeles Aqueduct is in service.

Approximately 80 feet of the First Los Angeles Aqueduct and 23 feet of the Second Los Angeles Aqueduct would be removed and replaced to accommodate the construction of the Project. The existing metal conduit of the Second Los Angeles Aqueduct would be replaced in kind. The existing concrete conduit of the First Los Angeles Aqueduct would be replaced with a new rectangular concrete conduit that is 11 feet, 10 inches tall by 12 feet, 4 inches wide at the base—approximately 2 feet, 3 inches taller and 2 feet, 7.5 inches wider than the existing conduit which is 9 feet, 7 inches tall by 10 feet, 11.5 inches wide at the base. Two new slide gates would be installed within the replaced conduit. Each would be 8 feet, 8 inches tall by 11 feet, 6 inches wide. The new slide gates would be raised and lowered using an above-ground mechanical platform. The platform would be 13 feet, 7 inches tall by 8 feet, 10 inches wide, and constructed of metal. The top of the platform, surrounded by a metal pipe railing, would be accessed via a flight of metal stairs. The existing concrete paving atop the First Los Angeles Aqueduct would be replaced in kind. Three maintenance hatches would be installed on the top of the new conduit for access to the slide gates.

Figure 1. Project Location

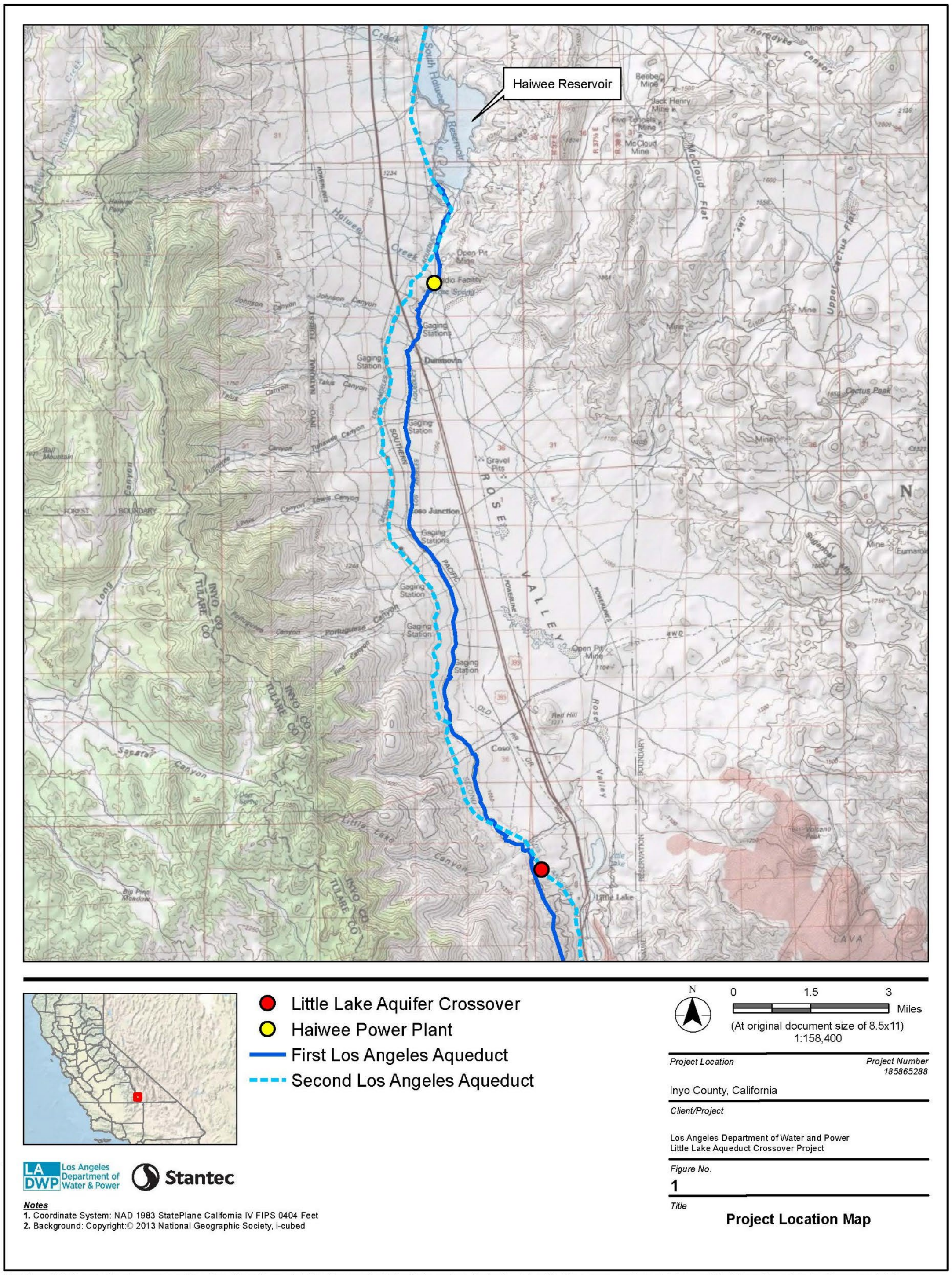

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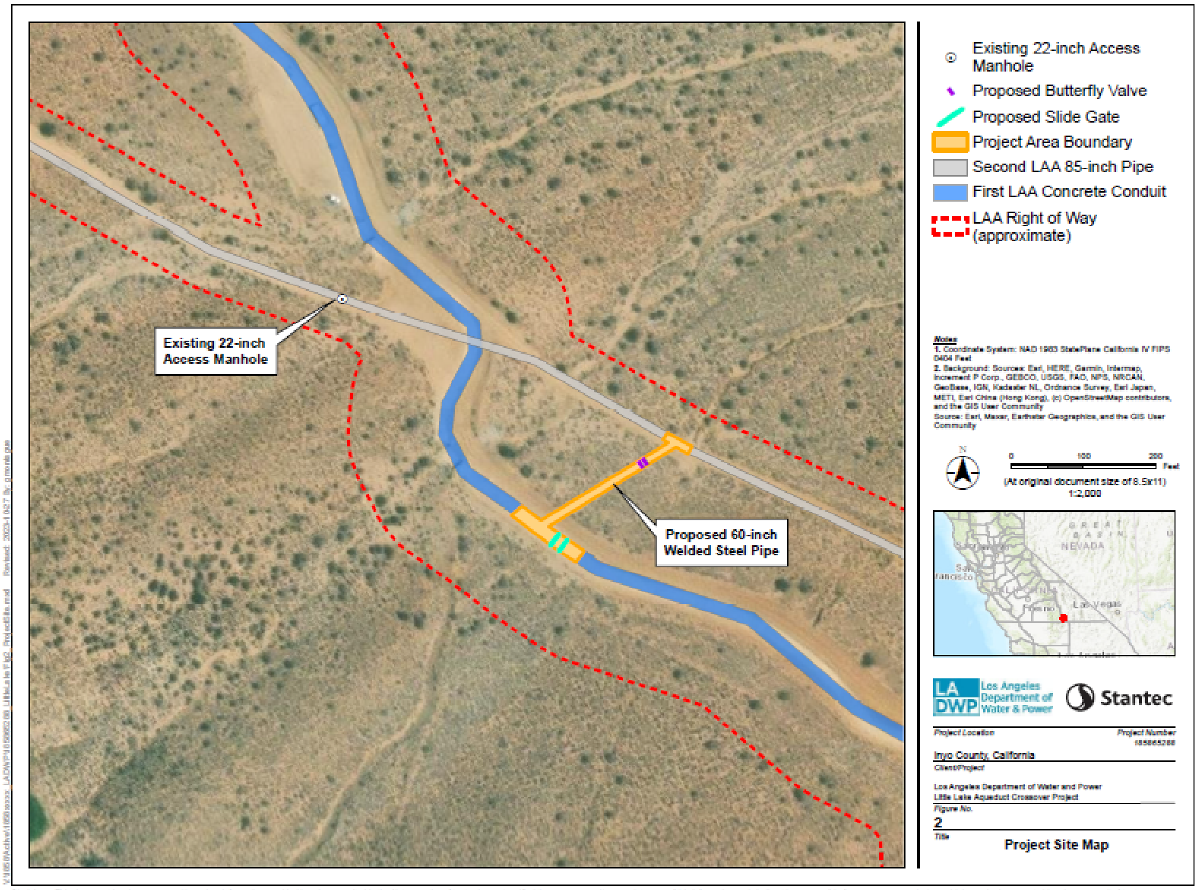
Figure 2. Project Site Map



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2 Regulatory Context

Generally, a lead agency must consider a property a historical resource under CEQA if it is eligible for the California Register of Historical Resources (CRHR), which is modeled after the National Register of Historic Places (NRHP). A property is presumed to be historically significant if it is listed in a local register of historical resources or has been identified as historically significant in a historic resources survey (provided certain statutory criteria and requirements are satisfied) unless a preponderance of evidence demonstrates that the property is not historically or culturally significant. A lead agency may also treat a resource as historical if it meets statutory requirements and substantial evidence supports the conclusion.

2.1 National Register of Historic Places

The National Historic Preservation Act of 1966, as amended, authorized the creation of the NRHP. The 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] For a property to be considered eligible for the NRHP, it must typically be at least 50 years old and meet one or more of four criteria for evaluation set forth in 36 Code of Federal Regulations Part 60.4:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
>
> A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B. That are associated with the lives of persons significant in our past; or
>
> C. That embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master or that possess high artistic values or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D. That have yielded, or may be likely to yield, information important in prehistory or history.[2]

A property must also be significant within a historic context under one or more of the criteria listed above. “National Register Bulletin #15: How to Apply the National Register Criteria for Evaluation” states that the significance of a historic property can be judged only when it is evaluated within its historic context. Historic contexts are “those patterns, themes, or trends in history by which a specific...property or site is

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[1] Title 36 Code of Federal Regulations (CFR) Part 60.2.
[2] Title 36 CFR Part 60.4.

understood and its meaning...is made clear."[3] A historic property must therefore represent an important aspect of history or prehistory.

In addition to possessing significance, a property must possess integrity, defined by seven aspects:

> Location: the place where the historic property was constructed or the place where the historic event took place.
>
> Design: the composition of elements that constitute the form, plan, space, structure, and style of a property.
>
> Setting: the physical environment of a historic property that illustrates the character of the place.
>
> Materials: the physical elements combined in a particular pattern or configuration.
>
> Workmanship: the physical evidence of the crafts of a particular culture or people during any given period of history.
>
> Feeling: the quality that a historic property has in evoking the aesthetic or historic sense of a past period of time.
>
> Association: the direct link between a property and the event or person for which the property is significant.[4]

2.2 California Register of Historical Resources

The CRHR was established in 1992 by Assembly Bill 2881. It is an authoritative guide used by state and local agencies, private groups, and citizens to identify historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse impacts.[5] The criteria for eligibility of listing in the CRHR are based upon the NRHP criteria, and are identified as 1–4 instead of A–D. To be eligible for the CRHR, a property generally must be at least 50 years of age and must possess significance at the local, state, or national level, under one or more of these four criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; or
2. It is associated with the lives of persons important to local, California, or national history; 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; or

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[3] "National Register Bulletin #15: How to Apply the National Register Criteria for Evaluation," U.S. Department of the Interior, National Park Service, Cultural Resources, eds. Patrick Andrus and Rebecca Shrimpton, accessed February 24, 2023, https://www.nps.gov/subjects/nationalregister/upload/NRB-15_web508.pdf, 7-8.
[4] "National Register Bulletin #15," 44.
[5] Public Resource Code (PRC) Section 5024.1(a).

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.

Like the NRHP, properties eligible for the CRHR may include buildings, sites, structures, objects, and districts. The enabling legislation for the CRHR is less rigorous than the NRHP with regard to the issue of integrity, yet the expectation is that eligible properties should retain enough of their historic-period character or appearance to be recognizable as historical resources and to convey the reasons for their significance.[6]

Evaluations for the CRHR are based upon the evaluation instructions and classification system prescribed by the California Office of Historic Preservation (OHP) in its "Instructions for Recording Historical Resources," which include Status Codes to classify potential historical resources. These Status Codes are used statewide in the preparation of historical resource surveys and evaluation reports. The specific Status Codes referred to in this report are:

3S Appears eligible for the NRHP as an individual property through survey evaluation

3CS Appears eligible for the CRHR as an individual property through survey evaluation

6Y Determined ineligible for the NRHP by consensus through Section 106 process

The CRHR may include properties identified during historic resource surveys. However, properties included must be based on surveys that meet these criteria:

1. The survey has been or will be included in the State Historic Resources Inventory;
2. The survey and the survey documentation were prepared in accordance with office (OHP) procedures and requirements;
3. The resource is evaluated and determined by the office (OHP) to have a significance rating of Category 1 to 5 on a DPR Form 523; and
4. If the survey is five or more years old at the time of its nomination for inclusion in the CRHR, the survey is updated to identify historical resources that have become eligible or ineligible due to changed circumstances or further documentation and those that have been demolished or altered in a manner that substantially diminishes the significance of the resource.[7]

2.3 California Environmental Quality Act

The State CEQA Guidelines set the standard for determining whether a proposed project will result in a "substantial adverse change" in the significance of historical resources in Title 14 CCR Section 15064.5(b), which states:

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[6] "California Office of Historic Preservation Technical Assistance Series #7: How to Nominate a Resource to the California Register of Historical Resources," California Office of Historic Preservation, accessed February 24, 2023, https://ohp.parks.ca.gov/pages/1056/files/07_TAB%207%20How%20To%20Nominate%20A%20Property%20to%20California%20Register.pdf, 11.
[7] PRC Section 5024.1.

> A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.[8]

Title 14 CCR Section 15064.5(b)(1) further clarifies “substantial adverse change” as:

> 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 an historical resource would be materially impaired.[9]

Title 14 CCR Section 15064.5(b)(2) in turn explains that a historical resource is “materially impaired” when a project:

> Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.[10]

As a result, the test for determining if a proposed project will have a significant impact on an identified historical resource is whether the project will alter the physical integrity of the historical resource in an adverse manner such that it would no longer be eligible for the NRHP, the CRHR, or other landmark programs.

This report considers direct, indirect, and cumulative impacts to historical resources using these definitions:

- Direct or primary impacts are caused by the project and occur at the same time and place (14 CCR Section 15358 [a][1]).
- Indirect impacts, or secondary effects, are reasonably foreseeable and caused by a project but occur at a different time or place (14 CCR Section 15358 [a][2]).
- Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (14 CCR Section15355).

2.4 County of Inyo

Inyo County does not have a local historic preservation ordinance or landmark designation program nor does the County maintain a local historic register. However, the Inyo County General Plan does include goals and polies related to the protection of cultural resources, which states:

Policy CUL-1.1: Partnerships in cultural programs encourage and promote private programs and public/private partnership that express the cultural heritage of the area.

[8] Title 14 CCR Section 15064.5(b).
[9] Title 14 CCR Section 15064.5(b)(1).
[10] Title 14 CCR Section 15064.5(b)(2).

Policy CUL-1.2: Interpretive opportunities support and promote the development of interpretive facilities, such as roadside kiosks, museums, and restored historic buildings that highlight the County's cultural resources.

Policy CUL-1.3: Protection of cultural resources preserve and protect key resources that have contributed to the social, political, and economic history and prehistory of the area, unless overriding circumstances are warranted.

Policy CUL-1.4: Regulatory compliance development and/or demolition proposals shall be reviewed in accordance with the requirements of CEQA and the National Historic Preservation Act.

Policy CUL-1.5: Native American Consultation, the County and private organizations shall work with appropriate Native American groups when potential Native American resources could be affected by development proposals. [11]

[11] Jones & Stokes, BRW, Mintier & Associates, and Applied Development Economics, *Goals and Policies Report for the Inyo County General Plan* (Independence, CA: Inyo County, December 2001), 8-40–8-41.

3 Research and Methodology

3.1 Overview

To identify historical resources and assess any potential impacts the Project may have on identified resources, Stantec performed the following tasks:

- Conducted a field inspection of the Project site and vicinity, during which Stantec determined the scope of the study as well as assessed the general condition and physical integrity of the Project site and all above-ground features of the First and Second Los Angeles Aqueducts. Digital photographs of the Project site were taken during the field inspection.
- Identified a Study Area to account for potential impacts on historical resources in the vicinity. Section 3.2 provides more information.
- Reviewed existing information to determine if any listed or previously surveyed historical resources are on the Project site. These sources were consulted:
  - A records search was completed by the Eastern Information Center (EIC) at University of California, Riverside as part of the preparation of the *Little Lake Canyon Bridge Replacement Project and Little Lake Aquifer Crossing Project Phase I Cultural Resource Assessment* by AECOM in May 2021.[12] The purpose of this search was to determine whether or not the Study Area contained any resources that were currently listed in national, state, or local landmark or historic district programs and whether or not it contained resources that have been previously identified or evaluated as potential historical resources. Review of the California Historic Resources Inventory System (CHRIS) included data on properties: listed in and determined eligible for the NRHP, listed in and determined eligible for the CRHR, designated as California Registered Historical Landmarks or California Points of Historical Interest, as well as properties that have been evaluated in historic resource surveys and other planning activities.
  - Consulted the California Built Environment Resource Directory (BERD), maintained by the California OHP, to determine if the Project site or immediate vicinity contains any resources listed in or determined eligible for the NRHP, listed in or determined eligible the CRHR, or that had been evaluated in historic resource surveys and other planning activities.

[12] Allison Hill, AECOM, *Little Lake Canyon Bridge Replacement Project and Little Lake Aquifer Crossing Project Phase I Cultural Resource Assessment Inyo County, California* (Los Angeles: Los Angeles Department of Water and Power [LADWP], May 2021), 21.

- Reviewed the previously prepared cultural resource survey report for the Project area, the *Little Lake Canyon Bridge Replacement Project and Little Lake Aquifer Crossing Project Phase I Cultural Resource Assessment* by AECOM in May 2021.

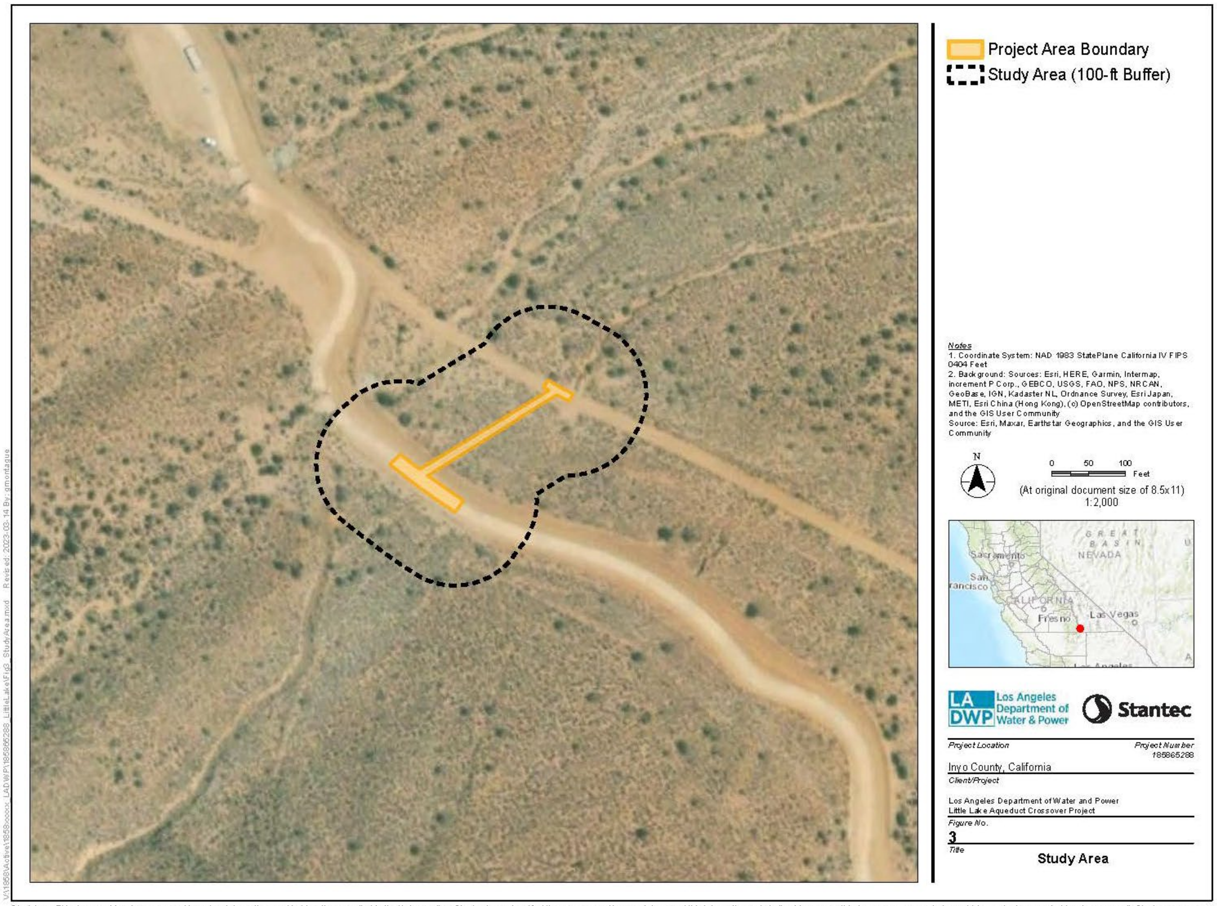
The results of this research are in Sections 3.3–3.4.

- Conducted archival research on the history of the Project site and the surrounding area. Sources consulted included newspapers, historic-period aerial photographs at the University of California, Santa Barbara, and LADWP materials.
- Reviewed and analyzed ordinances, statutes, regulations, bulletins, and technical materials relating to national, state, and local historic preservation designations, and assessment processes and programs to evaluate the historical significance and physical integrity of the Second Los Angeles Aqueduct as a potential historical resource.

3.2 Study Area

The Study Area was established to account for potential impacts on historical resources in the vicinity of the Project (**Figure 3**). It encompasses the Project site plus the area within a 100-foot radius, a total of 0.115 acres. The Study Area includes the areas of physical impact associated with ground-disturbing activities and new construction, and extends beyond the Project footprint to incorporate the immediately adjacent area, where any historical resources or potential historical resources may be affected by the introduction of new visual elements, atmospheric intrusions, shadow effects, vibration from construction activities, and other effects. The area beyond the 100-foot radius was excluded because the Project would have no potential to directly or indirectly impact cultural resources or their settings beyond this distance.

Figure 3. Study Area Map



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3.3 EIC Records Search

A records search was completed by the EIC at University of California, Riverside, as part of the preparation of the *Little Lake Canyon Bridge Replacement Project and Little Lake Aquifer Crossing Project Phase I Cultural Resource Assessment* by AECOM in May 2021. The purpose of this search was to determine the proximity of previously documented cultural resources to the Study Area. All recorded historic and precontact cultural resources situated within the Study Area were reviewed, as were all known cultural resource surveys and excavation reports. These sources were consulted during the search:

- National Register of Historic Places (NRHP)
- California Register of Historical Resources (CRHR)
- Built Environment Resource Directory (BERD)
- California Inventory of Historic Resources (CHRI)
- California Historical Landmarks (CHL) list
- California Points of Historical Interest (CPHI) list
- California Office of Historic Preservation (OHP) records

One previously recorded resource was identified within the Study Area—the First Los Angeles Aqueduct (**Table 1**). No other historic or precontact cultural resources are recorded within the Study Area. For more information, see *Little Lake Canyon Bridge Replacement Project and Little Lake Aquifer Crossing Project Phase I Cultural Resource Assessment*.[13]

Table 1. Previously Recorded Resources within the Study Area

Primary No.	Trinomial	Name	Description	Year Built	OHP Status Codes
N/A	CA-INY-4951H	First Los Angeles Aqueduct	Water conveyance system	1907–1913	3S; 3CS

A segment of the First Los Angeles Aqueduct (CA-INY-4951H) extends through the Project site. This resource is referred to in Department of Parks and Recreation (DPR) 523 forms as the Los Angeles Aqueduct. It was first recorded in 1992 by Foothill Resources, Ltd., and updated in 1993 by Archaeological Research, Inc., in 2000 by Michael Meyer and Michael Newland of Sonoma State University, and in 2014 by URS Corporation.

None of the previously recorded segments or features of the First Los Angeles Aqueduct are within the Study Area. The 1992 site record documents a 1-mile-long segment of the First Los Angeles Aqueduct that extends south from the Alabama Gates and includes three aqueduct features: Feature 1, the

[13] Hill, 21–23.

Alabama Gates and Spillway; Feature 2, the dynamited location and wash-out channel from the 1924 aqueduct bombing; and Feature 3, the concrete-lined open canal.[14] The segment south of the Alabama Gates was recommended eligible for the NRHP under Criteria A and C.[15] The 1993 update supplemented the record for the portion of the aqueduct within the Caltrans Manzanar 4 Lane Project area, corresponding with a 920-foot-long segment that crosses U.S. 395 about 7.4 mi. south of Independence, California.[16] The 2000 update provides information for Well 92, an associated feature of the aqueduct system.[17] Lastly, the 2014 update recorded a 210-foot-long unmortared rock retaining wall related to the aqueduct that is just north of the Haiwee Reservoir.[18]

In 2017, AECOM recommended the entire First Los Angeles Aqueduct eligible for the NRHP as part of the North Haiwee Dam No. 2 Project.[19] AECOM concluded that the aqueduct was eligible at a local and national level under Criterion A for its contribution to the development and growth of Los Angeles, the second largest city in the United States. The First Los Angeles Aqueduct was also recommended eligible under Criterion A for its role in demonstrating the efficacy of developing public water infrastructure and inspiring the construction of larger delivery systems across the state. Furthermore, AECOM recommended the resource eligible for the NRHP at a local and national level under Criterion C for its engineering feat that involved hundreds of miles of engineering features and for its association with William Mulholland, Chief Engineer of the city agency that would eventually become the LADWP. The boundary of the resource extends from the Los Angeles Aqueduct intake northeast of Independence in Inyo County to the Van Norman Reservoir Complex in Los Angeles County. The period of significance extends from the beginning of construction in 1907 through the 1913 completion of the project.

The structure has achieved other national and state designations. The First Los Angeles Aqueduct was designated a National Historic Civil Engineering Landmark in 1971 by the American Society of Civil Engineers for its significance as a prominent engineering feat of local and national importance. It is listed in California OHP's Archaeological Determinations of Eligibility as a contributor to a district of archaeological resources determined eligible for the NRHP and listed in the CRHR.[20]

3.4 California Built Environment Resource Directory

Stantec consulted the California BERD to determine if the Project site or Study Area contains any resources listed in or determined eligible for the NRHP, listed in or determined eligible for the CRHR, designated as California Registered Historical Landmarks or California Points of Historical Interest, or that

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[14] J. Costello, J. Marvin, and J. Tordoff, Foothill Resources, Ltd, "Los Angeles Aqueduct," Archaeological Site Record, Mono, Inyo, Kern, and Los Angeles Counties, CA, August 27, 1992.
[15] Elena Nilsson and Russell Bevill, AECOM, *Cultural Resources Inventory Report for the North Haiwee Dam No. 2 Project, Inyo County, California* (U.S. Department of the Interior, Bureau of Land Management [BLM] and LADWP, January 2017), 145.
[16] R. Reno, D. Soper, and A. McCabe, Archaeological Research Services, Inc., "Los Angeles Aqueduct," Department of Parks and Recreation Archaeological Site Record, Inyo County, CA, May 25, 1993.
[17] Michael Meyer and Michael Newland, Sonoma State University, "Manzanar Irrigation System," State of California Department of Parks and Recreation DPR 523 Form Set, Inyo County, CA, November 2000.
[18] Russell Bevill and Jerry Doty, URC Corporation, "Los Angeles Aqueduct," State of California Department of Parks and Recreation DPR 523 Form Set, Inyo County, CA, September 24, 2014.
[19] Nilsson and Bevill,145–146.
[20] Ibid., 145.

had been evaluated in historic resource surveys and other planning activities. No historical resources or potential historical resources listed in the BERD are either within the Project site or the Study Area. However, two resources associated with the Los Angeles Aqueduct, but outside the Study Area were previously identified in the BERD—a segment of the Los Angeles Aqueduct near Olancha and the Alabama Gates.

Table 2. Resources in BERD Associated with Los Angeles Aqueduct

Primary No.	Trinomial	Name	Description	Year Built	OHP Status Code(s)
N/A	CA-INY-4951H	Los Angeles Aqueduct	Segment near Olancha	1913	6Y
P-14-004895	N/A	Alabama Gates	Aqueduct dewatering structure	1913	6Y

4 Environmental and Cultural Settings

4.1 Description of the Project Site

The Project site is in a rural area of Inyo County off U.S. 395 within Rose Valley, a small basin directly south of the Owens Valley and north of Indian Wells Valley. Rose Valley is bounded by the foothills of the Sierra Nevada to the west and by the Coso Range to the east. It is part of the East Sierra Valley System which comprises the western boundary of the Great Basin Desert. The Project site is accessed via an unnamed, two-lane graded dirt road that extends west from U.S. 395 and then north to the Project site (**Photograph 1**). It is generally surrounded by unimproved natural landscape, and the topography of the neighboring area is relatively hilly. Vegetation is dominated primarily by sage and shadscale brush.

Photograph 1: Project site, looking south (Emily Rinaldi-Williams, Stantec, June 2022).

The segments of the First and Second Los Angeles Aqueducts that extend through the Project site are not visible since they are buried below ground. Visible indicators of the facility are concrete paving that marks the location of the First Los Angeles Aqueduct, a graded dirt road to the east of the concrete paving, and low concrete walls at regular intervals along the First Los Angeles Aqueduct right of way (**Photograph 2**). The walls are used as mile markers along the aqueduct right-of-way and all have an aqueduct location painted in one corner (**Photograph 3**). Below ground, the First Los Angeles Aqueduct consists of a trapezoidal reinforced concrete conduit with a concave base. The top closest to the surface is approximately 12 feet, 5 inches wide (**Figure 4**). The base is approximately 10 feet, 11.5 inches wide, and the sides are approximately 9 feet, 7 inches in height. Unlike the First Los Angeles Aqueduct, the location of the Second Los Angeles Aqueduct is unmarked. Below ground, it extends parallel to the First Los Angeles Aqueduct and consists of an 84-inch-diameter corrugated metal pipe.

Since the First Los Angeles Aqueduct was completed in 1913 and the Second Los Angeles Aqueduct was completed in 1970, there have been no known alterations to the two aqueduct segments within the

Project area. Steven Soliman, LADWP Project Engineer, was interviewed during the site visit on June 24, 2022, regarding alterations made to the First and Second Los Angeles Aqueducts since their construction. Steven Soliman noted that no known alterations have occurred to the two segments and no alterations were observed during field investigations.

Photograph 2. First Los Angeles Aqueduct, looking north (Emily Rinaldi-Williams, Stantec June 2022).

Photograph 3: Concrete wall along aqueduct, looking south (Emily Rinaldi-Williams, Stantec June 2022).

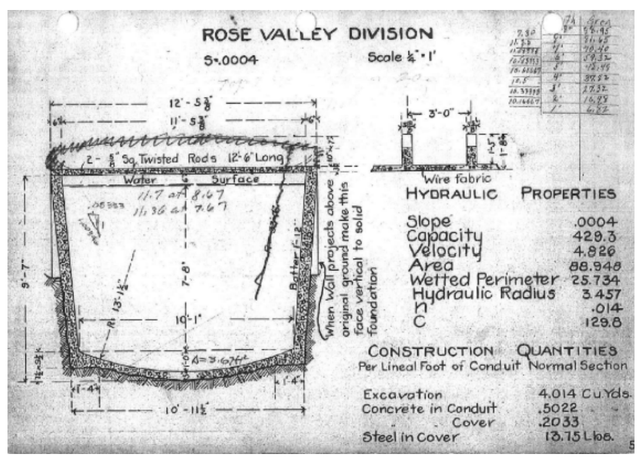

Figure 4: Typical section of the First Los Angeles Aqueduct (LADWP, ca. 1913).

4.2 History of the Los Angeles Aqueduct

By the turn of the twentieth century, the City of Los Angeles needed a water source to sustain its widespread growth. Throughout the nineteenth century, the city had relied on the Los Angeles River and its tributaries for its supply. But by the early 1900s, water demands began to surpass the local supply, prompting city leaders to seek other sources. They turned to the Owen Valley and beginning in 1905, started to buy water rights along the Owens River for a new aqueduct.

William Mulholland, superintendent of the newly formed Los Angeles Bureau of Water Works and Supply, was the primary proponent of the Los Angeles Aqueduct. Mulholland had started his career as a ditch tender for the Los Angeles City Water Company in 1878.[21] In 1886, he became superintendent of the company, overseeing a system with 300 miles of mains, 6 reservoirs, infiltration galleries, and pumping plants. By 1898, the Los Angeles City Water Company lease had expired, and the city negotiated to purchase this private company, establishing public ownership of the local water system. Because of his extensive knowledge of the existing infrastructure, Mulholland was retained to lead the new public agency.[22]

A water crisis in July 1904 persuaded city leaders to start planning for a new aqueduct system to convey water from sources outside Los Angeles. During the crisis, the city underwent a 10-day period when daily water consumption exceeded reservoir inflow by almost 4 million gallons.[23] As a result, Mulholland calculated Los Angeles' future water needs and determined that by the mid-1920s, the city's water demands would far exceed supply. Former Los Angeles Mayor and Superintendent of the Los Angeles City Water Company Fred Eaton believed the answer was to divert waters from the Owens River, more than 150 miles south of Los Angeles. Eaton envisioned reusing an old river channel near the southern end of the Owens Valley by modifying it to deliver water southward by gravity to the mountains north of the city. Mulholland, with Eaton and Joseph Barlow Lippincott who had surveyed the Owens Valley for the U.S. Reclamation Service, began devising an aqueduct and reservoir system to deliver water from the Owens River.

Los Angeles voters approved a $23 million bond measure in 1907 to fund the construction of the aqueduct. However, to build the project, the city first needed to acquire water rights for the aqueduct's operation, maintenance, and protection, as well as build the necessary infrastructure to support its construction and operation. The city purchased 124,929 acres in the Owens River drainage basin, 4,300 acres near Tehachapi, 69 acres for construction yards at Mojave, and 5,818 acres for reservoir sites, exclusive of the canal right of way.[24] The city constructed related electrical infrastructure, telegraph and telephone lines, water lines, cement plants, and a transportation network of railroads and vehicular roads to facilitate the aqueduct's construction.

Construction of the initial aqueduct system began in 1907 and was completed in 1913. The system originally extended approximately 233 miles with 4 storage reservoirs, 164 tunnels totaling 52 miles, 24 miles of open, unlined channel, 37 miles of concrete-lined channel, 12 miles of steel and concrete pipeline, and 98 miles of covered conduit.[25] The original aqueduct intake was 35 miles north of the

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[21] Nilsson and Bevill , 36.
[22] Ibid.
[23] Ibid., 38.
[24] Nilsson and Bevill, 38.
[25] Ibid., 40–41.

Owens River mouth at Owens Lake.[26] There, river water was diverted along 23 miles of an unlined open channel to the Alabama Gates north of Lone Pine. The water continued 37 more miles in an open concrete channel to the Haiwee Reservoir, then extended 15 miles within a covered concrete conduit to Little Lake. From Little Lake to Indian Wells, the aqueduct flowed through 24 miles of conduit, tunnels, and inverted steel siphons, then 20 miles of conduit, flumes, and siphon to Red Rock Summit, and from there continued 19 miles through tunnels and conduit to the Mojave Desert. At the Mojave Desert, it traveled 68 miles to the Fairmont Reservoir from which it flowed into the Elizabeth Tunnel, the longest tunnel of the original system extending more than 5 miles to the Dry Canyon Reservoir. Flowing from the Dry Canyon Reservoir, the water continued via tunnels, conduits, and siphons to the San Fernando Reservoir (now the Van Norman Reservoir) for distribution into the city's water system. To take advantage of the system's capabilities for hydroelectric power generation, the aqueduct was also designed with three power drops in San Francisquito Canyon. The San Francisquito Power Plant No. 1 later came online in 1917.

In the 1920s, demand for water continued to increase. Population growth in Los Angeles was one cause for demand, and expanding agricultural development in the Owens Valley was another. These, combined with several years of subnormal rainfall, resulted in severe water shortages. During this period, an insurgency in the Owens Valley opposed city control over their water rights. This movement instigated a surge in the illegal diversion of water from the aqueduct and incidents of sabotage, such as the 1924 bombing of the Alabama Gates spillway. As a result, the city's water agency pursued better control of water flow, especially above the aqueduct intake, in order to increase the water supply and prevent its unregulated diversion to irrigation canals.

The city purchased additional water rights in the Owens Valley, and soon owned continuous water-bearing lands from Owens Lake to 3 miles southeast of Bishop. Between 1921 and 1929, the city constructed seven new reservoirs for added water storage and further water flow regulation.[27] Only one of these, the Tinemaha Reservoir, was above the aqueduct intake. The others—the Upper San Fernando (now the Van Norman Reservoir), St. Francis, Drinkwater, Stone Canyon, Encino, and Hollywood Reservoirs—were all below the intake. The city also completed three new aqueduct power plants in the 1920s—the San Francisquito Power Plant No. 2, Big Pine Creek Power Plant, and Haiwee Power Plant. In 1928, the recently completed St. Francis Dam catastrophically failed, thus ending Mulholland's career at what had by that time had become the LADWP.[28] The St. Francis Dam was never rebuilt, although the Bouquet Reservoir in the nearby canyon of the same name was built as a replacement in 1934. San Francisquito Power Plant No. 2 was also destroyed by the St. Francis Dam failure and rebuilt that same year.

The city continued to expand the Los Angeles Aqueduct system with the construction of the Mono Basin Project. In preparation, the city purchased land in the Owens Valley until eventually 95 percent of all

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[26] Portia Lee, "Los Angeles Aqueduct," *Historic American Engineering Record* (HAER No. CA-298) (Washington, D.C.: U.S. Department of the Interior, National Park Service, August 2001), 5–6.
[27] Nilsson and Bevill, 46.
[28] The LADWP was established in 1925 through the merger of the city's water (Bureau of Water Works and Supply) and electricity divisions (Bureau of Power and Light).

water-bearing parcels were publicly owned.[29] The Mono Basin Project extended the aqueduct 105 miles north to channel water from Parker, Walker, Lee Vining, and Rush Creeks and funded construction of the Grant Lake and Crowley Lake Reservoirs.[30] Further, the project included construction of the Mono Craters Tunnel, which surpassed the Elizabeth Tunnel as the longest in the system by more than 6 miles for a total of 11.3 miles. The Mono Basin Project increased the capacity of the Los Angeles Aqueduct system by 35 percent to approximately 300 million gallons per day; however, the city could not divert as much water as it was entitled to under the 1940s water rights permits without building additional infrastructure downstream from Mono Basin.

The need for additional infrastructure downstream from Mono Basin incited construction of the Second Los Angeles Aqueduct between 1965 and 1970. The project increased city control of its own water during a period when Los Angeles had more limited access to outside sources from the Metropolitan Water District of Southern California's (MWD) and the Colorado River Aqueduct (1932–1939). In 1963, the U.S. Supreme Court ruling in *Arizona vs. California* called for the allocation of more water from the Colorado River to Arizona, which, as a result, decreased MWD's entitlement by more than 50 percent.[31] The Second Los Angeles Aqueduct increased water delivery within the aqueduct system by one half, thus reducing reliance on sources outside of the city's direct ownership.

The Second Los Angeles Aqueduct extends roughly parallel with the First Los Angeles Aqueduct for 137 miles between the Haiwee Reservoir and the Van Norman Reservoir. It comprises 64 miles of concrete conduit, 69 miles of steel pressure pipes, and 4 miles of other facilities.[32] Technological advances in building materials and engineering techniques simplified the design and construction of the Second Los Angeles Aqueduct, which was overseen by Robert Van Ness Philips, head of the Aqueduct Division from 1961 to 1967 and as chief engineer of water works and assistant manager from 1967 to 1972. The concrete conduit segment of the Second Los Angeles Aqueduct is designed similarly to the First, utilizing gravity flow, and advancements in the design of steel pressure pipes between the late 1900s and mid-1960s eliminated the need for the tunnels and siphons that Mulholland and his engineers designed to overcome mountain barriers and canyon crossings along the alignment.[33] The use of steel pressure pipes shortened the length of the Second Los Angeles Aqueduct, resulting in slight route variations. The biggest variation occurs at Antelope Valley, where engineers used pressure pipe for a straight-line crossing rather than duplicating the First Los Angeles Aqueduct route around the valley's rim. The Second Los Angeles Aqueduct boosted the entirety of the system's capacity, which could supply half the city's water. Additional hydroelectric infrastructure increased the city's power supply with the construction of the three Owens Valley Gorge Power Plants and Pleasant Valley Power Plant and Reservoir between 1952 and 1958 along the First Los Angeles Aqueduct and the construction of the Foothill Power Plant between 1971 and 1972 along the Second.

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[29] LADWP and Ecosystem Sciences, *Owens Valley Land Management Plan* (Los Angeles: City of Los Angeles, April 28, 2010), 6-11.
[30] Nilsson and Bevill, 47.
[31] "A Second Los Angeles Aqueduct," *Water and Power Associates*, accessed February 24, 2023, https://waterandpower.org/museum/A_Second_Aqueduct.html.
[32] Nilsson and Bevill, 47.
[33] Ibid., 72–73.

The aqueduct had a notable impact on Owens Valley residents. With restricted access to water for irrigation, the number of farms in the area continually decreased. In Inyo County, the number of farms and ranches decreased from 521 in 1920, 201 in 1935, 104 in 1959, to 79 in 1974.[34] Today, fewer than 100 farms remain.[35] The aqueduct's construction instigated periods of local resistance and unrest. Violence erupted in the 1920s with more than 10 instances of dynamiting the aqueduct.

Lawsuits filed by Owens Valley agencies and residents in the 1970s and 1990s changed LADWP's management of the aqueduct system. After the construction of the Second Los Angeles Aqueduct, Inyo County sued the City of Los Angeles. This lawsuit led to a long-term management of groundwater agreement. It established land management policies regarding leasing LADWP–owned land for farming and ranching as well as for opening the area for public recreational uses. In 1994, following a series of lawsuits, the California State Water Resources Control Board adopted the Mono Lake Basin Water Right Decision 1631 that defined instream flow requirements for Rush, Parker, Walker, and Lee Vining Creeks, and limited the amount of water the LADWP could divert from these waterways. The decision established water diversion criteria to protect wildlife and habitat and elevation criteria for Mono Lake. As a result, the portion of the city's water the Los Angeles Aqueduct supplied decreased from half in 1970 to around a third in the 1990s.[36] In 2021, the aqueduct supplied approximately 12 percent of Los Angeles' water.

The legacy of the Los Angeles Aqueduct is unrivaled in its impact to the history and development of the City of Los Angeles. From its completion in 1913 though the late 1980s, the aqueduct system supported and enabled the city's explosive and unprecedented population growth. It is an engineering feat that utilizes gravity flow to deliver water 338 miles from the Sierra Nevada Mountains to Los Angeles through a system of conduits, inverted siphons, tunnels, dams, and reservoirs. It also represents one of the most important contributions of its principal engineer-designer and superintendent, William Mulholland, who served and guided the Los Angeles water system for a half-century.

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[34] LADWP, *Owens Valley*, 6-11; and Janet Hensall Momsen, "Agriculture in the Sierra," *Sierra Nevada Ecosystem Project: Final Report to Congress*, vol. II (Davis, CA: University of California, Centers for Water and Wildland Resources, 1996), 522–525.
[35] "2017 Census of Agricultural: Inyo County, California," U.S. Department of Agriculture, accessed February 24, 2023, https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/California/cp06027.pdf.
[36] Dana Bartholomew, "Los Angeles' Water Future Remains Challenged by Drought and Short Supplies," *Los Angeles Daily News*, November 3, 2013.

5 Evaluation of Identified Resources

The Second Los Angeles Aqueduct is not currently listed in national, state, or local landmark or historic district programs. Because the resource is more than 50 years old, it was evaluated for the NRHP and CRHR to determine if it qualifies as a historical resource as defined by CEQA. Inyo County does not have a local landmark designation program or maintain a local historic register; therefore, the Second Los Angeles Aqueduct was not evaluated for local landmark programs.

5.1 Criterion A/1

The Second Los Angeles Aqueduct is significant for its association with the history and development of Los Angeles' water supply system. As part of the Los Angeles Aqueduct, this resource played a primary role in the development of water supply for the city, which in turn had a profound effect on the growth and development of Los Angeles and the surrounding communities in the postwar period. By boosting the aqueduct system's overall capacity, the Second Los Angeles Aqueduct ensured the LADWP could take full advantage of the water rights obtained through the Mono Basin Project and allowed the aqueduct to supply about half the city's water from 1970 through the late 1980s. The structure sustained Los Angeles' explosive postwar development when the population grew from 2,816,061 in 1970 to 3,485,567 in 1990, or 24 percent.[37] Construction of this infrastructure supported the growth and development of Los Angeles into the second largest city in the United States by 1984.[38] For these reasons, the Second Los Angeles Aqueduct is recommended eligible for the NRHP under Criterion A and for the CRHR under Criterion 1 at a local level for its historical importance to Los Angeles' history of water infrastructure.

5.2 Criterion B/2

Though Los Angeles' civic leaders were involved in the development of the Second Los Angeles Aqueduct, none were found to possess sufficient importance necessary to be considered a significant historical figure under Criterion B/2. Civic leaders who oversaw the development of the Second Los Angeles Aqueduct include Samuel B. Nelson (1903–1988), General Manager and Chief Engineer of the LADWP between 1961 and 1967, and Edgar L. Kanouse (1911–1991), General Manager and Chief Engineer of the LADWP between 1967 and 1972.

Research did not reveal Nelson's contributions to be significant within the history of Los Angeles' water supply system. Nelson began his career at the LADWP in 1926 as a draftsman and worked his way up to appointment as general manager and chief engineer in 1961.[39] During his tenure, Nelson supervised construction of $1 billion in water facilities, including the Second Los Angeles Aqueduct and the LADWP

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[37] "Historical General Population, City & County of Los Angeles, 1850-2020," *Los Angeles Almanac*, accessed February 23, 2023, http://www.laalmanac.com/population/po02.php#:~:text=City%20%26%20County%20of%20Los%20Angeles%2C%201850%20to%202020&text=Between%20the%20census%20counts%20of,to%20be%202%2C837%20times%20larger.
[38] "Los Angeles Replaces Chicago as Second City," *New York Times*, April 8, 1984.
[39] "Samuel B. Nelson (Obituary)," *Los Angeles Times*, January 26, 1988.

General Headquarters Building (also known as the John Ferraro Building) at 111 N. Hope Street in downtown Los Angeles. After retiring from the LADWP, Governor Ronald Reagan appointed Nelson the state's director of public works and he managed California's $1-billion-a-year freeway building program. Between 1968 and 1970, Nelson was general manager of the Southern California Rapid Transit District (now the Los Angeles County Metropolitan Transit Authority).

Research also did not reveal Kanouse's contributions to be significant within the history of Los Angeles' water supply system. Kanouse started his career at the LADWP as a junior electrical engineer in the testing laboratories in 1936.[40] He served in various roles within the distribution and the transmission departments until he was appointed assistant general manager in 1965 and then later general manager and chief engineer in 1967. Major projects completed during his tenure were the Second Los Angeles Aqueduct and the Pacific Intertie, a network of transmission lines that bring hydroelectric power from the Pacific Northwest to Southern California.

Both Nelson and Kanouse rose to prominent positions within the LADWP, but their achievements do not appear to rise to the level of historic importance for individual eligibility under Criterion B/2. Both oversaw the construction of the Second Los Angeles Aqueduct during their respective tenures as general manager and chief engineer of the LADWP; however, no known primary or secondary sources detail their specific activities, accomplishments, or influences as individuals in relation to the structure's development. Therefore, their individual contributions or roles cannot be justified as significant within the history of Los Angeles' water supply system, and it is reasonable to assume that neither was a significant historical figure. As a result, the Second Los Angeles Aqueduct does not appear to be eligible under Criterion B/2 at the local, state, or national level.

5.3 Criterion C/3

The Second Los Angeles Aqueduct does not embody the distinctive characteristics of a historical trend in aqueduct design under Criterion C/3 or demonstrate any innovative, important, or outstanding design features. The resource has a typical design within the context of postwar aqueducts and water conveyance systems and operates similarly to other water conveyance systems of this type. Gravity-flow water conveyance systems are common and date back thousands of years, and steel pressure pipes had become widely used in aqueduct construction by the early 1970s.[41] There is no evidence that any specific challenge in design or construction of the Second Los Angeles Aqueduct required pioneering engineering or construction innovation. Research did not reveal that the Second Los Angeles Aqueduct represented an evolution of this resource type or represented a transition between different classes of resources. As a result, the Second Los Angeles Aqueduct does not appear to rise to the level of architectural significance necessary for eligibility as a representative or unusual property type under Criterion C/3.

The resource does not represent the work of a master under Criterion C/3. Robert Van Ness Philips (1917–2008) supervised the design and construction of the Second Los Angeles Aqueduct as part of his

[40] "Edgar L. Kanouse (Obituary)," *Los Angeles Times*, August 18, 1991.
[41] W. E. Thompson, *Review of California's Regional Water Supply Systems and Possible Applications of Desalting* (Washington, D.C.: U.S. Department of Commerce, 1972), 63.

roles as head of the Aqueduct Division from 1961 to 1967 and as chief engineer of water works and assistant manager from 1967 to 1972.[42] Philips joined the LADWP as a civil engineer in 1939. He was chief engineer and general manager of the LADWP from 1972 to 1975. Limited scholarship on Philips suggests that he was not recognized for his engineering expertise at local, state, or national levels. Research did not reveal any specific information on contractors that assisted in construction of the Second Los Angeles Aqueduct to suggest that any were recognized for their respective fields at local, state, or national levels. As a result, the structure does not appear to rise to the level of architectural significance necessary for eligibility as a work of a master under Criterion C/3.

Like many utilitarian structures, the Second Los Angeles Aqueduct has limited ornamentation and detail to lend it high artistic value under Criterion C/3. The resource does not articulate a particular design concept that expresses an aesthetic ideal. As a result, the structure does not appear to rise to the level of architectural significance necessary for eligibility for high artistic value under Criterion C/3.

Finally, the Second Los Angeles Aqueduct may meet the last aspect of Criterion C/3 as a significant and distinguishable entity whose components lack individual distinction; however, evaluating this resource as a historic district and identifying contributing and non-contributing resources is beyond the scope of work for this report. Such an effort was not necessary given the large size of the resource and, especially, the limited potential for effects beyond the 23-foot segment that intersects the Project area. Further research may reveal that the resource may be considered eligible for the NRHP under the last aspect of Criterion C/3.

5.4 Criterion D/4

As a 1970 water conveyance system, the Second Los Angeles Aqueduct does not appear to have the potential to reveal information important to history. To be eligible under Criterion D/4, a resource's physical material must have yielded, or may be likely to yield, information important to history or prehistory. This criterion generally applies to archaeological sites, but may apply to buildings, structures, or objects in instances where a resource may contain important information about such topics as construction techniques or human activity. As the resource must be the principal source of information, this is unlikely to be true for a 1970 aqueduct. Therefore, the resource does not appear to be significant under Criterion D/4.

5.5 Integrity Analysis

The 23-foot segment of the Second Los Angeles Aqueduct within the Project area retains its physical and historical integrity from its period of significance, 1970, the date construction was completed. The Second Los Angeles Aqueduct is in its original location and has never been moved. With no known alterations to this segment since its 1970 construction, it retains integrity of design, materials, workmanship, and feeling. The character, topography, land uses, and spatial relationships with surrounding features within the setting of this aqueduct segment remain intact and have not noticeably changed since 1970. Finally, the Second Los Angeles Aqueduct retains its original use and sufficient physical integrity to convey its

[42] Valerie J. Nelson "DWP Chief Helped L.A. Manage Oil Embargo," *Los Angeles Times*, July 9, 2008.

associated significance under Criterion A/1 and, as a result, retains integrity of association with the history and development of Los Angeles' water supply system.

Outside the scope of work for this report, the integrity of the entire 137-mile-long aqueduct system was not analyzed. Such an effort was not necessary given the large size of the resource and, especially, the limited potential for effects beyond the 23-foot segment that intersects the Project area. However, research indicates that the Second Los Angeles Aqueduct has not been substantially altered beyond regular maintenance activities, like repair and replacement of individual features in kind.

5.6 Recommendation

The Second Los Angeles Aqueduct is recommended eligible for the NRHP and the CRHR under Criterion A/1 at a local level for its association with the history and development of Los Angeles' water supply system. The segment of the resource within the Project site retains its physical and historical integrity from its period of significance, 1970. It therefore appears to be a historical resource for the purposes of CEQA, pursuant to Title 14 CCR §15064.5. The recommended status codes are 3S and 3CS, which is defined as appearing individually eligible for the NRHP and the CRHR through survey evaluation.

6 Analysis of Project Impacts on Historical Resources

6.1 Potential Direct Impacts

The Project has the potential to directly impact the two historical resources on the Project site—the First and Second Los Angeles Aqueducts. An 80-foot-long segment of the First Los Angeles Aqueduct and 23-foot-long segment of the Second Los Angeles Aqueduct would be demolished and replaced as part of the Project. A new crossover pipe would be added below grade and a new mechanical platform would be constructed atop the replacement segment of the First Los Angeles Aqueduct.

The threshold for determining significant direct impacts on historical resources in the CEQA Guidelines is whether the proposed project would cause a substantial adverse change, meaning the Project would alter the physical integrity of the historical resource in an adverse manner such that it would no longer be eligible as a historical resource under CEQA. For rehabilitation or alteration of a historical resource, substantial adverse change is generally defined as a project that does not conform with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* specifically the Standards for Rehabilitation (Standards).[43] To assess whether the Project would cause a substantial adverse change to the integrity of the two historical resources to the degree they would no longer be eligible for the NRHP or the CRHR, the Standards were applied to evaluate the Project's direct impact on the First and Second Los Angeles Aqueducts.

6.1.1 STANDARDS ANALYSIS FOR FIRST LOS ANGELES AQUEDUCT

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.*

   The Project would not alter the historic or current use of the First Los Angeles Aqueduct as a water supply system. The historical resource would continue to convey water through a series of channels, pipelines, siphons, and reservoirs from the intake just north of Independence in Inyo County to the Van Norman Reservoir in Los Angeles County. The Project would not change any of these aspects of the system's use or functionality. The Project complies with Standard 1.

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.*

   Although the Project would remove an 80-foot segment of the First Los Angeles Aqueduct, the resource's historic-period character would be retained and preserved overall. The 80-foot segment represents a small portion of the total historical resource, which extends for approximately 233 miles and comprises a series of storage reservoirs, tunnels, unlined channels, concrete-lined channels, steel and concrete pipelines, and covered conduits. The remaining portion of the resource—over 99.9 percent of the structure—is outside the Project area and would not be

[43] 14 CCR § 15126.4(b)(1).

removed by the Project. The new conduit that would replace the 80-foot segment is approximately 3 feet wider than the original and rectangular in shape rather than trapezoidal. Buried below grade, the new conduit would not be visible and thus would not alter the visual character of the historical resource. The only visible portion of the aqueduct at this location is concrete paving that would be replaced in kind. Although not visible, the proposed conduit would be constructed of the same materials as the original and be similar in its size, scale, proportion, and massing. The Project complies with Standard 2.

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.*

   New features or changes to the First Los Angeles Aqueduct that would create a false sense of historical development are not proposed as part of the Project. Because its design differs slightly from the original, the new conduit would be identifiable as new and would not be mistaken as original concrete conduit. The Project complies with Standard 3.

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

   Within the Project area, there are no changes to the First Los Angeles Aqueduct that have acquired historic significance in their own right since 1913, the end of the property's period of significance. Changes outside the Project area include the location of the 1926 bombing of the aqueduct.[44] As the Project would have no potential to impact such features, Standard 4 does not apply.

5. *Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property will be preserved.*

   The 80-foot segment of the First Los Angeles Aqueduct is utilitarian in design and materials, and does not embody distinctive materials, features, finishes, or construction techniques nor is it an example of craftsmanship. The segment represents only a small portion of the larger aqueduct, which includes an approximate total of 98 miles of covered concrete conduit. As such, over approximately 97.99 miles of this type of conduit would be preserved elsewhere and continue to convey its original materials, finishes, and construction techniques. The Project complies with Standard 5.

6. *Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.*

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[44] Costello, Marvin, and Tordoff, 2.

The repair or replacement of deteriorated or missing features would not be undertaken as part of this Project. Standard 6 does not apply.

7. *Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.*

   Chemical or physical treatments for cleaning would not be undertaken for this Project. Standard 7 does not apply.

8. *Archaeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.*

   Since the Project's potential to encounter significant archaeological resources during Project-related ground disturbance is assessed in AECOM's *Little Lake Canyon Bridge Replacement Project and Little Lake Aquifer Crossing Project Phase I Cultural Resource Assessment*, Standard 8 does not apply.

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

   The new crossover pipe and mechanical platform would be attached to a new conduit and would not destroy historic materials or features of the First Los Angeles Aqueduct. The below-grade crossover pipe would not be visible; therefore, it would not destroy spatial relationships that characterize the aqueduct. Although the mechanical platform would be visible above grade, it would not destroy the spatial relationships that characterize the historical resource overall. At approximately 14 feet high and 9 feet wide, the mechanical platform is unobtrusive when compared to the approximately 233-mile-long aqueduct system. It would only be visible where adjacent to the Project site and would not be visible from other locations along the aqueduct. The new crossover pipe and mechanical platform would be differentiated from the old by their modern assembly that includes new materials and construction techniques. Both the pipe and platform are compatible with the First Los Angeles Aqueduct because of their similarly minimal design of plain geometric forms and modest size, scale, proportion, and massing. The Project complies with Standard 9.

10. *New additions and adjacent or related new construction will 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 new crossover pipe and mechanical platform would not be secured to the original conduit, only to the replacement conduit; therefore, if these features were removed in the future, the essential form and overall integrity of the First Los Angeles Aqueduct would be unimpaired. The new 80-foot segment would replace the original conduit, yet the Project would not impact the resource's historical use, nor would it impact its overall form or physical integrity. The remaining portion of the resource—over 99.9 percent of the structure—is outside of the Project area and would not be altered by the Project. The Project complies with Standard 10.

The First Los Angeles Aqueduct would be altered in compliance with the Standards and would retain sufficient integrity to convey its historic significance. The Project would not affect the historical resource's integrity of location. The Project would replace an 80-foot segment of covered conduit, but would not impact the remaining portion of the aqueduct—over 99.9 percent of the structure; therefore, the historical resource's integrity of design, materials, workmanship, and feeling would be preserved overall. Integrity of association would be unchanged because the Project would not impact the use of the historical resource or its ability to convey its significant association with the history of Los Angeles' water supply system. The Project would introduce a new visual feature within the setting of the historical resource; however, the new mechanical platform is unobtrusive when compared to the approximately 233-mile-long First Aqueduct system and would only be visible when adjacent to the Project site. The historical resource would therefore retain all aspects of integrity. As a result, the Project would not result in a substantial adverse change to the integrity of the First Los Angeles Aqueduct to the degree that it would no longer be eligible as a historical resource defined by CEQA.

6.1.2 STANDARDS ANALYSIS FOR SECOND LOS ANGELES AQUEDUCT

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.*

   The Project would not alter the historic or current use of the Second Los Angeles Aqueduct as a water supply system. The historical resource would continue to convey water through a series of conduits and pipelines between the Haiwee Reservoir in Inyo County and Van Norman Reservoir in Los Angeles County. The Project would not change any of these aspects of the system's use or functionality. The Project complies with Standard 1.

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.*

   Although the Project would remove a 23-foot segment of the Second Los Angeles Aqueduct, the resource's historic-period character would be retained and preserved overall. The 23-foot segment represents a small portion of the total resource, which extends for approximately 137 miles and comprises a series of concrete conduit and steel pressure pipes. The remaining portion of the historical resource— over 99.9 percent of the structure—is outside of the Project area and would not be removed by the Project. Furthermore, the 23-foot segment would be replaced in kind with a new steel pressure pipe; thus, preserving the historic character of the resource, despite the resource not being visible at this location. The Project complies with Standard 2.

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.*

   New features or changes to the Second Los Angeles Aqueduct that would create a false sense of historical development are not proposed as part of the Project. The 23-foot segment would be replaced in kind; therefore, the new pipe is neither a conjectural feature nor an element from another water conveyance system. The Project complies with Standard 3.

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

   There are no known changes to the Second Los Angeles Aqueduct that have acquired historic significance in their own right since 1970, the end of the period of significance. Standard 4 does not apply.

5. *Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property will be preserved.*

   The 23-foot segment of the Second Los Angeles Aqueduct is utilitarian in design and materials, and does not embody distinctive materials, features, finishes, or construction techniques nor is it an example of craftsmanship. The segment represents only a small portion of the larger aqueduct, which includes an approximate total of 69 miles of steel pressure pipe. As such, over approximately 68.99 miles of this type of pipe would be preserved elsewhere and continue to convey its original materials, finishes, and construction techniques. The Project complies with Standard 5.

6. *Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.*

   The repair or replacement of deteriorated or missing features would not be undertaken as part of this Project. Standard 6 does not apply.

7. *Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.*

   Chemical or physical treatments for cleaning would not be undertaken for this Project. Standard 7 does not apply.

8. *Archaeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.*

   Since the Project's potential to encounter significant archaeological resources during Project-related ground disturbance is assessed in AECOM's *Little Lake Canyon Bridge Replacement Project and Little Lake Aquifer Crossing Project Phase I Cultural Resource Assessment*, Standard 8 does not apply

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

   The new crossover pipe would be attached to a replacement steel pressure pipe and would not destroy historic materials or features of the Second Los Angeles Aqueduct. The below-grade crossover pipe would not be visible; therefore, it would not destroy the spatial relationships that characterize the aqueduct. A new mechanical platform would be added in the vicinity of the historical resource, but would only be visible where adjacent to the Project site and would not be visible from other locations along the aqueduct. The new crossover pipe and mechanical platform would be differentiated from the old by their modern assembly that includes new materials and construction techniques. Both are also compatible with the Second Los Angeles Aqueduct because of their similarly minimal design of plain geometric forms and modest size, scale, proportion, and massing. The Project complies Standard 9.

10. *New additions and adjacent or related new construction will 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 new crossover pipe would not be secured to the original aqueduct, only to the replacement pipe, while the new mechanical platform would be added adjacent to the historical resource; therefore, if these features were removed in the future, the essential form and overall integrity of the Second Los Angeles Aqueduct would be unimpaired. The Project complies with Standard 10.

The Second Los Angeles Aqueduct would be altered in compliance with the Standards and would retain sufficient integrity to convey its historic significance. The Project would not affect the historical resource’s integrity of location. The Project would replace a 23-foot segment of covered conduit, but would not impact the remaining portion of the aqueduct—over 99.9 percent of the structure; therefore, the historical resource’s integrity of design, materials, workmanship, and feeling would be preserved overall. Integrity of association would be unchanged because the Project would not impact the use of the historical resource or its ability to convey its significant association with the history of Los Angeles’ water supply system. The Project would introduce a new visual feature within the setting of the historical resource; however, the new mechanical platform is unobtrusive when compared to the approximately 137-mile-long Second Aqueduct system and would only be visible when adjacent to the Project site. The historical resource would therefore retain all aspects of integrity. As a result, the Project would not result in a substantial adverse change to the integrity of the Second Los Angeles Aqueduct to the degree that it would no longer be eligible as a historical resource defined by CEQA.

6.2 Potential Indirect Impacts

The Project would have no indirect impact on historical resources because there are no previously identified historical resources in the Study Area besides the two within the Project site.

6.3 Potential Cumulative Impacts

The Project has the potential to contribute to cumulative impacts to the two historical resources on the Project site. Unlike direct and indirect impacts which tend to be site specific, cumulative impacts would occur if the Project and related projects cumulatively affect historical resources, such as historical resources in the immediate vicinity, contribute to changes within the same historic district or to the same historical resource, or involve resources that are examples of the same property type as those within the

Project site. Therefore, related projects that contribute to changes to the same historical resources—the First and Second Los Angeles Aqueducts—were considered as part of this analysis. Three related projects were identified as potentially contributing to cumulative impacts to the First Los Angeles Aqueduct (**Table 3**). No related projects were identified as potentially contributing to cumulative impacts to the Second Los Angeles Aqueduct.

Table 3. Related Projects

Project Name	Location	Date	Impact to First Los Angeles Aqueduct	Impact to Cultural Resources Overall
Long-Term Routine Maintenance Activities for Waterways in Inyo and Mono Counties	Inyo and Mono Counties	2019	No Impact	Less Than Significant with Mitigation Incorporated
Haiwee Power Plant Penstock Replacement Project	1800 South Haiwee Loop Road, Inyo County	2016	No Impact	Less Than Significant with Mitigation Incorporated
North Haiwee Dam Seismic Improvement Project	Inyo County	2018	Less Than Significant	Less Than Significant with Mitigation Incorporated

The Long-Term Routine Maintenance Activities for Waterways in Inyo and Mono Counties Project would have no direct impact on the First Los Angeles Aqueduct. The project involves several different LADWP-operated waterways and water conveyance systems in Inyo and Mono Counties, including the First Los Angeles Aqueduct.[45] Ongoing maintenance activities for those systems include vegetation removal, clearing obstructions, and the replacement of existing facilities, typically in kind.[46] The Initial Study/Mitigated Negative Declaration (IS/MND) prepared by the LADWP in December 2017 notes that "maintenance activities are not expected to result in adverse impacts to historical, archaeological or paleontological resources," and that the "maintenance work on the unlined portions of LAA1 [the First Los Angeles Aqueduct] would not impact the integrity of this man-made waterway."[47] Therefore, this project does not contribute to changes to the First Los Angeles Aqueduct.

The Haiwee Power Plant Penstock Replacement Project would have no direct impact on the First Los Angeles Aqueduct. The project involves the replacement of the Haiwee Penstock, comprising approximately 10,000 feet of existing pipe connecting the South Haiwee Reservoir to the Haiwee Power Plant at 1800 South Haiwee Loop Road in Inyo County.[48] The IS/MND prepared by the LADWP and MWH Americas, Inc., in September 2016 concluded that the Haiwee Penstock was not individually

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[45] LADWP, *Initial Study/Mitigated Negative Declaration for the Long-Term Routine Maintenance Activities for Waterways in Inyo and Mono Counties* (Los Angeles: City of Los Angeles, December 2017), 1-1.
[46] LADWP, *Long-Term Routine Maintenance*, 1-13–1-15.
[47] LADWP, *Long-Term Routine Maintenance*, 2-21.
[48] LADWP and MWH Americas, Inc., *CEQA Initial Study and Mitigated Negative Declaration: Haiwee Power Plant Penstock Replacement Project* (Los Angeles: City of Los Angeles, September 2016), 1-1.

eligible for the NRHP or the CRHR nor was it eligible as a contributing resource to the First Los Angeles Aqueduct.[49] Because the Haiwee Penstock is not a contributing resource to the First Los Angeles Aqueduct, the IS/MND concluded that the project would not contribute to changes to this historical property.

The North Haiwee Dam Seismic Improvement Project would have a less than significant impact on the First Los Angeles Aqueduct. The project involves the construction of a new dam to the north of the existing North Haiwee Dam in Inyo County, as well as the realignment of a segment of Cactus Flats Road and the First Los Angeles Aqueduct.[50] At the North Haiwee Dam project site, the aqueduct comprises a trapezoidal concrete channel. Approximately 1,900 feet of the aqueduct would be demolished and relocated to accommodate the construction of the new dam. The proposed aqueduct channel, west of the existing aqueduct, would closely match the existing structure with a trapezoidal concrete channel approximately 32 to 35 feet wide and approximately 12 to 15 feet deep. The Cultural Resources Inventory Report prepared by AECOM in January 2017 concluded that the proposed project would not have an adverse effect on the First Los Angeles Aqueduct "due to the comparatively small length of aqueduct that would be removed, the lack of important engineering features at this location, and the visual compatibility of the new replacement facility."[51]

Both the Project and the North Haiwee Dam Seismic Improvement Project would contribute to changes to the First Los Angeles Aqueduct, but the two projects would not collectively diminish the integrity of the historical resource to the degree it would no longer be eligible for the NRHP or the CRHR. Together, both projects constitute 0.37 miles, or 0.0016 percent, of the 233-mile-long First Aqueduct system. The remaining portion of the historical resource— over 99.9 percent of the structure—would remain intact and its integrity of location, setting, design, materials, workmanship, feeling, and association would be preserved overall. Therefore, the Project's contribution would be less than cumulatively considerable and thus not significant.

7 Conclusions

The Project would directly impact two historical resources on the Project site, the First and Second Los Angeles Aqueducts; however, the Project would not result in a substantial adverse change to the integrity of the identified historical resources to the degree that they would no longer be eligible as historical resources defined by CEQA. Because there are no previously identified historical resources in the Study Area besides the two within the Project area, the Project would have no indirect impacts on historical resources in the vicinity. Finally, the Project, in conjunction with the North Haiwee Dam Seismic Improvement Project, would contribute to incremental impacts to the First Los Angeles Aqueduct, but the

[49] LADWP and MWH, 2-32.
[50] LADWP and BLM, *Draft Environmental Impact Report/Environmental Assessment: North Haiwee Dam No. 2 Project* (Los Angeles: City of Los Angeles, September 2017), ES-1.
[51] Nilsson and Bevill, 147.

impact would be less than cumulatively considerable. Therefore, the Project would have a less than significant impact on historical resources. No mitigation is required or recommended.

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APPENDIX

Appendix A DPR 523 Series Form Set

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 3S; 3CS

Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** (Assigned by recorder) Second Los Angeles Aqueduct
P1. Other Identifier:

***P2. Location:** ☒ **Not for Publication** ☐ **Unrestricted**
***a. County** Inyo County **and** (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Little Lake **Date** 2021 **T** 23S; **R** 37E; NE1/4 **of** SW1/4 **of Sec** 1 ; Mount Diablo **B.M.**
c. Address N/A City N/A Zip N/A
d. UTM: (Give more than one for large and/or linear resources) Zone 11S, 415513.65 mE/ 3979577.92 mN Center of Aqueduct Segment
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate)
0.115 acres of assessor parcel number (APN): 037-100-BLM

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The resource is a 23-foot-long segment of the Second Los Angeles Aqueduct in Inyo County. The segment comprises an 84-inch diameter steel pipe buried below grade. There are no visible features of the resource above ground. The Second Los Angeles Aqueduct extends roughly parallel to the First Los Angeles Aqueduct for a total of 137 miles between the Haiwee Reservoir in Inyo County and the Van Norman Reservoir in Los Angeles County. It consists of 64 miles of concrete conduit, 69 miles of steel pressure pipes, and 4 miles of other facilities.

***P3b. Resource Attributes:** (List attributes and codes) HP20. Canal/Aqueduct
***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

P5b. Description of Photo: (view, date, accession #) View of area where segment of Second Los Angeles Aqueduct is buried below grade, looking S, 6/24/2022.

***P6. Date Constructed/Age and Source:** ☒ Historic ☐ Prehistoric ☐ Both
1970; Los Angeles Department of Water and Power

***P7. Owner and Address:**
Los Angeles Department of Water and Power
111 N. Hope Street
Los Angeles, CA 90012

***P8. Recorded by:** (Name, affiliation, and address)
Emily Rinaldi
Stantec Consulting Services, Inc.
801 S. Figueroa St, Suite 300
Los Angeles, CA 90017

***P9. Date Recorded:** 3/3/2023

***P10. Survey Type:** (Describe)
Intensive Survey

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Stantec Consulting Services Inc., *Historical Resources Technical Report for the Little Lake Aqueduct Crossover Project*, Inyo County, California, March 2023.

***Attachments:** ☐NONE ☐Location 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):

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) Second Los Angeles Aqueduct ***NRHP Status Code** 3S; 3CS

B1. Historic Name: Second Los Angeles Aqueduct
B2. Common Name: Second Los Angeles Aqueduct
B3. Original Use: Aqueduct B4. Present Use: Aqueduct
***B5. Architectural Style:** No style
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Completed in 1970. No known alterations to this segment of the aqueduct.

***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A

B9a. Architect: Robert Van Ness Phillips (Lead Engineer) b. Builder: Unknown
***B10. Significance: Theme** History of the Los Angeles Aqueduct, 1907–1970 **Area** Los Angeles and Inyo Counties
Period of Significance 1970 **Property Type** Waterworks **Applicable Criteria** A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

This intensive survey and evaluation find that the Second Los Angeles Aqueduct is eligible for the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR) at a local level of significance under Criteria A/1. The resource has been evaluated in accordance with Section 15064.5(a)(2)-(3) of the California Environmental Quality Act Guidelines (CEQA), using the criteria outlined in Section 5024.1 of the California Public Resources Code and appears to be a historical resource for the purposes of CEQA (See continuation sheet).

B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:** See footnotes on continuation sheets.

B13. Remarks: None

***B14. Evaluator:** Emily Rinaldi, Stantec Consulting Services Inc.
801 S. Figueroa Street, Suite 300
Los Angeles, CA 90017
***Date of Evaluation:** 3/3/2023

(Sketch Map with north arrow required.)

(This space reserved for official comments.)

B10. Significance (Continued from Page 2):

Historic Context

By the turn of the twentieth century, the City of Los Angeles needed a water source to sustain its widespread growth. Throughout the nineteenth century, the city had relied on the Los Angeles River and its tributaries for its supply. But by the early 1900s, water demands began to surpass the local supply, prompting city leaders to seek other sources. They turned to the Owen Valley and beginning in 1905, started to buy water rights along the Owens River for a new aqueduct.

William Mulholland, superintendent of the newly formed Los Angeles Bureau of Water Works and Supply, was the primary proponent of the Los Angeles Aqueduct. Mulholland had started his career as a ditch tender for the Los Angeles City Water Company in 1878.[1] In 1886, he became superintendent of the company, overseeing a system with 300 miles of mains, 6 reservoirs, infiltration galleries, and pumping plants. By 1898, the Los Angeles City Water Company lease had expired, and the city negotiated to purchase this private company, establishing public ownership of the local water system. Because of his extensive knowledge of the existing infrastructure, Mulholland was retained to lead the new public agency.[2]

A water crisis in July 1904 persuaded city leaders to start planning for a new aqueduct system to convey water from sources outside Los Angeles. During the crisis, the city underwent a 10-day period when daily water consumption exceeded reservoir inflow by almost 4 million gallons.[3] As a result, Mulholland calculated Los Angeles' future water needs and determined that by the mid-1920s, the city's water demands would far exceed supply. Former Los Angeles Mayor and Superintendent of the Los Angeles City Water Company Fred Eaton believed the answer was to divert waters from the Owens River, more than 150 miles south of Los Angeles. Eaton envisioned reusing an old river channel near the southern end of the Owens Valley by modifying it to deliver water southward by gravity to the mountains north of the city. Mulholland, with Eaton and Joseph Barlow Lippincott who had surveyed the Owens Valley for the U.S. Reclamation Service, began devising an aqueduct and reservoir system to deliver water from the Owens River.

Los Angeles voters approved a $23 million bond measure in 1907 to fund the construction of the aqueduct. However, to build the project, the city first needed to acquire water rights for the aqueduct's operation, maintenance, and protection, as well as build the necessary infrastructure to support its construction and operation. The city purchased 124,929 acres in the Owens River drainage basin, 4,300 acres near Tehachapi, 69 acres for construction yards at Mojave, and 5,818 acres for reservoir sites, exclusive of the canal right of way.[4] The city constructed related electrical infrastructure, telegraph and telephone lines, water lines, cement plants, and a transportation network of railroads and vehicular roads to facilitate the aqueduct's construction.

Construction of the initial aqueduct system began in 1907 and was completed in 1913. The system originally extended approximately 233 miles with 4 storage reservoirs, 164 tunnels totaling 52 miles, 24 miles of open, unlined channel, 37 miles of concrete-lined channel, 12 miles of steel and concrete pipeline, and 98 miles of covered conduit.[5] The original aqueduct intake was 35 miles north of the Owens River mouth at Owens Lake.[6] There, river water was diverted along 23 miles of an unlined open channel to the Alabama Gates north of Lone Pine. The water continued 37 more miles in an open concrete channel to the Haiwee Reservoir, then extended 15 miles within a covered concrete conduit to Little Lake. From Little Lake to Indian Wells, the aqueduct flowed through 24 miles of conduit, tunnels, and inverted steel siphons, then 20 miles of conduit, flumes, and siphon to Red Rock Summit, and from there continued 19 miles through tunnels and conduit to the Mojave Desert. At the Mojave Desert, it traveled 68 miles to the Fairmont Reservoir from which it flowed into the Elizabeth Tunnel, the longest tunnel of the original system extending more than 5 miles to the Dry Canyon Reservoir. Flowing from the Dry Canyon Reservoir, the water continued via tunnels, conduits, and siphons to the San Fernando Reservoir (now the Van Norman Reservoir) for distribution into the city's water system. To take advantage of the system's capabilities for hydroelectric power generation, the aqueduct was also designed with three power drops in San Francisquito Canyon. The San Francisquito Power Plant No. 1 later came online in 1917.

In the 1920s, demand for water continued to increase. Population growth in Los Angeles was one cause for demand, and expanding agricultural development in the Owens Valley was another. These, combined with several years of subnormal rainfall, resulted in severe water shortages. During this period, an insurgency in the Owens Valley opposed city control over their water rights. This movement instigated a surge in the illegal diversion of water from the aqueduct and incidents of sabotage, such as the 1924 bombing of the Alabama Gates spillway. As a result, the city's water agency pursued better control of water flow, especially above the aqueduct intake, in order to increase the water supply and prevent its unregulated diversion to irrigation canals.

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[1] Nilsson and Bevill , 36.
[2] Ibid.
[3] Ibid., 38.
[4] Nilsson and Bevill, 38.
[5] Ibid., 40–41.
[6] Portia Lee, "Los Angeles Aqueduct," *Historic American Engineering Record* (HAER No. CA-298) (Washington, D.C.: U.S. Department of the Interior, National Park Service, August 2001), 5–6.

The city purchased additional water rights in the Owens Valley, and soon owned continuous water-bearing lands from Owens Lake to 3 miles southeast of Bishop. Between 1921 and 1929, the city constructed seven new reservoirs for added water storage and further water flow regulation.[7] Only one of these, the Tinemaha Reservoir, was above the aqueduct intake. The others—the Upper San Fernando (now the Van Norman Reservoir), St. Francis, Drinkwater, Stone Canyon, Encino, and Hollywood Reservoirs—were all below the intake. The city also completed three new aqueduct power plants in the 1920s—the San Francisquito Power Plant No. 2, Big Pine Creek Power Plant, and Haiwee Power Plant. In 1928, the recently completed St. Francis Dam catastrophically failed, thus ending Mulholland's career at what had by that time had become the LADWP.[8] The St. Francis Dam was never rebuilt, although the Bouquet Reservoir in the nearby eponymous canyon was built as a replacement in 1934. San Francisquito Power Plant No. 2 was also destroyed by the St. Francis Dam failure and rebuilt that same year.

The city continued to expand the Los Angeles Aqueduct system with the construction of the Mono Basin Project. In preparation, the city purchased land in the Owens Valley until eventually 95 percent of all water-bearing parcels were publicly owned.[9] The Mono Basin Project extended the aqueduct 105 miles north to channel water from Parker, Walker, Lee Vining, and Rush Creeks and funded construction of the Grant Lake and Crowley Lake Reservoirs.[10] Further, the project included construction of the Mono Craters Tunnel, which surpassed the Elizabeth Tunnel as the longest in the system by more than 6 miles for a total of 11.3 miles. The Mono Basin Project increased the capacity of the Los Angeles Aqueduct system by 35 percent to approximately 300 million gallons per day; however, the city could not divert as much water as it was entitled to under the 1940s water rights permits without building additional infrastructure downstream from Mono Basin.

The need for additional infrastructure downstream from Mono Basin incited construction of the Second Los Angeles Aqueduct between 1965 and 1970. The project increased city control of its own water during a period when Los Angeles had more limited access to outside sources from the Metropolitan Water District of Southern California's (MWD) and Colorado River Aqueduct (1932–1939). In 1963, the U.S. Supreme Court ruling in *Arizona vs. California* called for the allocation of more water from the Colorado River to Arizona, which, as a result, decreased MWD's entitlement by more than 50 percent.[11] The Second Los Angeles Aqueduct increased water delivery within the aqueduct system by one half, thus reducing reliance on sources outside of the city's direct ownership.

The Second Los Angeles Aqueduct extends roughly parallel with the First Los Angeles Aqueduct for 137 miles between the Haiwee Reservoir and the Van Norman Reservoir. It comprises 64 miles of concrete conduit, 69 miles of steel pressure pipes, and 4 miles of other facilities.[12] Technological advances in building materials and engineering techniques simplified the design and construction of the Second Los Angeles Aqueduct, which was overseen by Robert Van Ness Philips, head of the Aqueduct Division from 1961 to 1967 and as chief engineer of water works and assistant manager from 1967 to 1972. The concrete conduit segment of the Second Los Angeles Aqueduct is designed similarly to the First, utilizing gravity flow, and advancements in the design of steel pressure pipes between the late 1900s and mid-1960s eliminated the need for the tunnels and siphons that Mulholland and his engineers designed to overcome mountain barriers and canyon crossings along the alignment.[13] The use of steel pressure pipes shortened the length of the Second Los Angeles Aqueduct, resulting in slight route variations. The biggest variation occurs at Antelope Valley, where engineers used pressure pipe for a straight-line crossing rather than duplicating the First Los Angeles Aqueduct route around the valley's rim. The Second Los Angeles Aqueduct boosted the entirety of the system's capacity, which could supply half the city's water. Additional hydroelectric infrastructure increased the city's power supply with the construction of the three Owens Valley Gorge Power Plants and Pleasant Valley Power Plant and Reservoir between 1952 and 1958 along the First Los Angeles Aqueduct and the construction of the Foothill Power Plant between 1971 and 1972 along the Second.

The aqueduct had a notable impact on Owens Valley residents. With restricted access to water for irrigation, the number of farms in the area continually decreased. In Inyo County, the number of farms and ranches decreased from 521 in 1920, 201 in 1935, 104 in 1959, to 79 in 1974.[14] Today, fewer than 100 farms remain.[15] The aqueduct's construction instigated periods of local resistance and unrest. Violence erupted in the 1920s with more than 10 instances of dynamiting the aqueduct.

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[7] Nilsson and Bevill, 46.
[8] The LADWP was established in 1925 through the merger of the city's water (Bureau of Water Works and Supply) and electricity divisions (Bureau of Power and Light).
[9] LADWP and Ecosystem Sciences, *Owens Valley Land Management Plan* (Los Angeles: City of Los Angeles, April 28, 2010), 6-11.
[10] Nilsson and Bevill, 47.
[11] "A Second Los Angeles Aqueduct," *Water and Power Associates*, accessed February 24, 2023, https://waterandpower.org/museum/A_Second_Aqueduct.html.
[12] Nilsson and Bevill, 47.
[13] Ibid., 72–73.
[14] LADWP, *Owens Valley*, 6-11; and Janet Hensall Momsen, "Agriculture in the Sierra," *Sierra Nevada Ecosystem Project: Final Report to Congress*, vol. II (Davis, CA: University of California, Centers for Water and Wildland Resources, 1996), 522–525.
[15] "2017 Census of Agricultural: Inyo County, California," U.S. Department of Agriculture, accessed February 24, 2023, https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/California/cp06027.pdf.

Lawsuits filed by Owens Valley agencies and residents in the 1970s and 1990s changed LADWP's management of the aqueduct system. After the construction of the Second Los Angeles Aqueduct, Inyo County sued the City of Los Angeles. This lawsuit led to a long-term management of groundwater agreement. It established land management policies regarding leasing LADWP–owned land for farming and ranching as well as for opening the area for public recreational uses. In 1994, following a series of lawsuits, the California State Water Resources Control Board adopted the Mono Lake Basin Water Right Decision 1631 that defined instream flow requirements for Rush, Parker, Walker, and Lee Vining Creeks, and limited the amount of water the LADWP could divert from these waterways. The decision established water diversion criteria to protect wildlife and habitat and elevation criteria for Mono Lake. As a result, the portion of the city's water the Los Angeles Aqueduct supplied decreased from half in 1970 to around a third in the 1990s.[16] In 2021, the aqueduct supplied approximately 12 percent of Los Angeles' water.

The legacy of the Los Angeles Aqueduct is unrivaled in its impact to the history and development of the City of Los Angeles. From its completion in 1913 though the late 1980s, the aqueduct system supported and enabled the city's explosive and unprecedented population growth. It is an engineering feat that utilizes gravity flow to deliver water 338 miles from the Sierra Nevada Mountains to Los Angeles through a system of conduits, inverted siphons, tunnels, dams, and reservoirs. It also represents one of the most important contributions of its principal engineer-designer and superintendent, William Mulholland, who served and guided the Los Angeles water system for a half-century.

Criteria A/1

The Second Los Angeles Aqueduct is significant for its association with the history and development of Los Angeles' water supply system. As part of the Los Angeles Aqueduct, this resource played a primary role in the development of water supply for the city, which in turn had a profound effect on the growth and development of Los Angeles and the surrounding communities in the postwar period. By boosting the aqueduct system's overall capacity, the Second Los Angeles Aqueduct ensured the LADWP could take full advantage of the water rights obtained through the Mono Basin Project and allowed the aqueduct to supply about half the city's water from 1970 through the late 1980s. The structure sustained Los Angeles' explosive postwar development when the population grew from 2,816,061 in 1970 to 3,485,567 in 1990, or 24 percent.[17] Construction of this infrastructure supported the growth and development of Los Angeles into the second largest city in the United States by 1984.[18] For these reasons, the Second Los Angeles Aqueduct is recommended eligible for the NRHP under Criterion A and for the CRHR under Criterion 1 at a local level for its historical importance to Los Angeles' history of water infrastructure.

Criteria B/2

Though Los Angeles' civic leaders were involved in the development of the Second Los Angeles Aqueduct, none were found to possess sufficient importance necessary to be considered a significant historical figure under Criterion B/2. Civic leaders who oversaw the development of the Second Los Angeles Aqueduct include Samuel B. Nelson (1903–1988), General Manager and Chief Engineer of the LADWP between 1961 and 1967, and Edgar L. Kanouse (1911–1991), General Manager and Chief Engineer of the LADWP between 1967 and 1972.

Research did not reveal Nelson's contributions to be significant within the history of Los Angeles' water supply system. Nelson began his career at the LADWP in 1926 as a draftsman and worked his way up to appointment as general manager and chief engineer in 1961.[19] During his tenure, Nelson supervised construction of $1 billion in water facilities, including the Second Los Angeles Aqueduct and the LADWP General Headquarters Building (also known as the John Ferraro Building) at 111 N. Hope Street in downtown Los Angeles. After retiring from the LADWP, Governor Ronald Reagan appointed Nelson the state's director of public works and he managed California's $1-billion-a-year freeway building program. Between 1968 and 1970, Nelson was general manager of the Southern California Rapid Transit District (now the Los Angeles County Metropolitan Transit Authority).

Research also did not reveal Kanouse's contributions to be significant within the history of Los Angeles' water supply system. Kanouse started his career at the LADWP as a junior electrical engineer in the testing laboratories in 1936.[20] He served in various roles within the distribution and the transmission departments until he was appointed assistant general manager in 1965 and then later general manager and chief engineer in 1967. Major projects completed during his tenure were the Second Los Angeles Aqueduct and the Pacific

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[16] Dana Bartholomew, "Los Angeles' Water Future Remains Challenged by Drought and Short Supplies," *Los Angeles Daily News*, November 3, 2013.
[17] "Historical General Population, City & County of Los Angeles, 1850-2020," *Los Angeles Almanac*, accessed February 23, 2023, http://www.laalmanac.com/population/po02.php#:~:text=City%20%26%20County%20of%20Los%20Angeles%2C%201850%20to%202020&text=Between%20the%20census%20counts%20of,to%20be%202%2C837%20times%20larger.
[18] "Los Angeles Replaces Chicago as Second City," *New York Times*, April 8, 1984.
[19] "Samuel B. Nelson (Obituary)," *Los Angeles Times*, January 26, 1988.
[20] "Edgar L. Kanouse (Obituary)," *Los Angeles Times*, August 18, 1991.

Intertie, a network of transmission lines that bring hydroelectric power from the Pacific Northwest to Southern California.

Both Nelson and Kanouse rose to prominent positions within the LADWP, but their achievements do not appear to rise to the level of historic importance for individual eligibility under Criterion B/2. Both oversaw the construction of the Second Los Angeles Aqueduct during their respective tenures as general manager and chief engineer of the LADWP; however, no known primary or secondary sources detail their specific activities, accomplishments, or influences as individuals in relation to the structure's development. Therefore, their individual contributions or roles cannot be justified as significant within the history of Los Angeles' water supply system, and it is reasonable to assume that neither was a significant historical figure. As a result, the Second Los Angeles Aqueduct does not appear to be eligible under Criterion B/2 at the local, state, or national level.

Criteria C/3/3

The Second Los Angeles Aqueduct does not embody the distinctive characteristics of a historical trend in aqueduct design under Criterion C/3 or demonstrate any innovative, important, or outstanding design features. The resource has a typical design within the context of postwar aqueducts and water conveyance systems and operates similarly to other water conveyance systems of this type. Gravity-flow water conveyance systems are common and date back thousands of years, and steel pressure pipes had become widely used in aqueduct construction by the early 1970s.[21] There is no evidence that any specific challenge in design or construction of the Second Los Angeles Aqueduct required pioneering engineering or construction innovation. Research did not reveal that the Second Los Angeles Aqueduct represented an evolution of this resource type or represented a transition between different classes of resources. As a result, the Second Los Angeles Aqueduct does not appear to rise to the level of architectural significance necessary for eligibility as a representative or unusual property type under Criterion C/3.

The resource does not represent the work of a master under Criterion C/3. Robert Van Ness Philips (1917–2008) supervised the design and construction of the Second Los Angeles Aqueduct as part of his roles as head of the Aqueduct Division from 1961 to 1967 and as chief engineer of water works and assistant manager from 1967 to 1972.[22] Philips joined the LADWP as a civil engineer in 1939. He was later as chief engineer and general manager of the LADWP from 1972 to 1975. Limited scholarship on Philips suggest that he was not recognized for his engineering expertise at local, state, or national levels. Research did not reveal any specific information on contractors that assisted in construction of the Second Los Angeles Aqueduct to suggest that any were recognized for their respective fields at local, state, or national levels. As a result, the structure does not appear to rise to the level of architectural significance necessary for eligibility as a work of a master under Criterion C/3.

Like many utilitarian structures, the Second Los Angeles Aqueduct has limited ornamentation and detail to lend it high artistic value under Criterion C/3. The resource does not articulate a particular design concept that expresses an aesthetic ideal. As a result, the structure does not appear to rise to the level of architectural significance necessary for eligibility for high artistic value under Criterion C/3.

Finally, the Second Los Angeles Aqueduct may meet the last aspect of Criterion C/3 as a significant and distinguishable entity whose components lack individual distinction; however, evaluating this resource as a historic district and identifying contributing and non-contributing resources is beyond the scope of work for this report. Such an effort was not necessary given the large size of the resource and, especially, the limited potential for effects beyond the 23-foot segment that intersects the Project area. Further research may reveal that the resource may be considered eligible for the NRHP under the last aspect of Criterion C/3.

Criteria D/4

As a 1970 water conveyance system, the Second Los Angeles Aqueduct does not appear to have the potential to reveal information important to history. To be eligible under Criterion D/4, a resource's physical material must have yielded, or may be likely to yield, information important to history or prehistory. This criterion generally applies to archaeological sites, but may apply to buildings, structures, or objects in instances where a resource may contain important information about such topics as construction techniques or human activity. As the resource must be the principal source of information, this is unlikely to be true for a 1970 aqueduct. Therefore, the resource does not appear to be significant under Criterion D/4.

Integrity Analysis

The 23-foot segment of the Second Los Angeles Aqueduct within the Project area retains its physical and historical integrity from its period of significance, 1970, the date construction was completed. The Second Los Angeles Aqueduct is in its original location and has

[21] W. E. Thompson, *Review of California's Regional Water Supply Systems and Possible Applications of Desalting* (Washington, D.C.: U.S. Department of Commerce, 1972), 63.
[22] Valerie J. Nelson "DWP Chief Helped L.A. Manage Oil Embargo," *Los Angeles Times*, July 9, 2008.

never been moved. With no known alterations to this segment since its 1970 construction, it retains integrity of design, materials, workmanship, and feeling. The character, topography, land uses, and spatial relationships with surrounding features within the setting of this aqueduct segment remain intact and have not noticeably changed since 1970. Finally, the Second Los Angeles Aqueduct retains its original use and sufficient physical integrity to convey its associated significance under Criterion A/1 and, as a result, retains integrity of association with the history and development of Los Angeles' water supply system.

Outside the scope of work for this report, the integrity of the entire 137-mile-long aqueduct system was not analyzed. Such an effort was not necessary given the large size of the resource and, especially, the limited potential for effects beyond the 23-foot segment that intersects the Project area. However, research indicates that the Second Los Angeles Aqueduct has not been substantially altered beyond regular maintenance activities, like repair and replacement of individual features in kind.

Recommendation

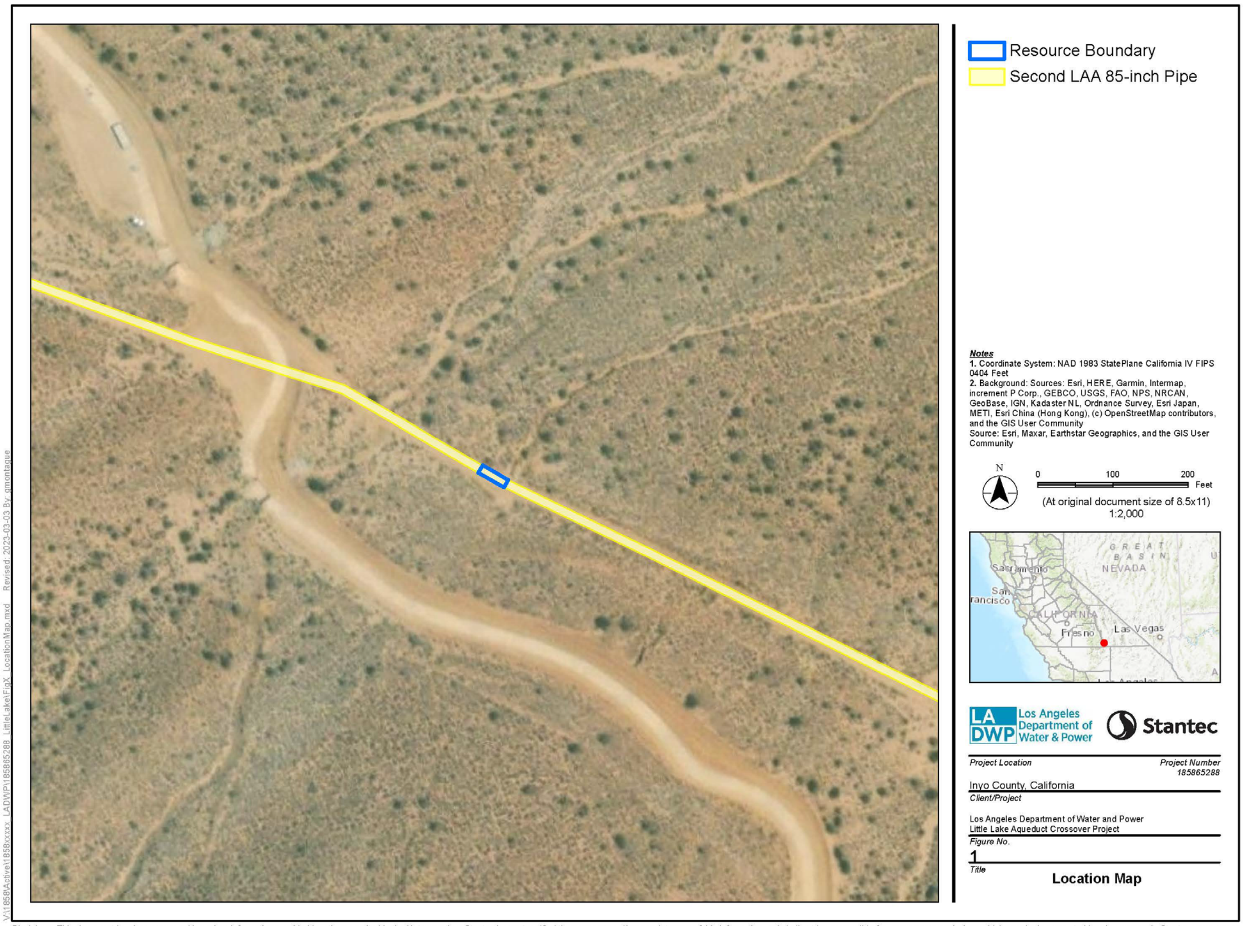
The Second Los Angeles Aqueduct is recommended eligible for the NRHP and the CRHR under Criterion A/1 at a local level for its association with the history and development of Los Angeles' water supply system. The segment of the resource within the Project site retains its physical and historical integrity from its period of significance, 1970. It therefore appears to be a historical resource for the purposes of CEQA, pursuant to Title 14 CCR §15064.5. The recommended status codes are 3S and 3SC, which is defined as appearing individually eligible for the NRHP and the CRHR through survey evaluation.

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

 ***Resource Name or #** (Assigned by recorder) Second Los Angeles Aqueduct

***Map Name:** Resource Location Map ***Scale:** 1:2,000 ***Date of map:** 3/3/2023



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Appendix D
Little Lake Crossover Project
Paleontological Resources Assessment

Los Angeles Department of Water and Power

PALEONTOLOGICAL RESOURCES ASSESSMENT FOR THE LITTLE LAKE AQUEDUCT CROSSOVER PROJECT, INYO COUNTY, CALIFORNIA

An analysis of existing data in support of CEQA review

October 24, 2023

Prepared for:
Los Angeles Department of Water and Power

Prepared by:
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Principal Paleontologist
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Paleontologist

Stantec Consulting Services Inc.

Stantec Project Number:
185865288

The conclusions in the Report titled Paleontological Resources Assessment for the Little Lake Aqueduct Crossover Project, Inyo County, California are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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Table of Contents

Executive Summary

Stantec Consulting Services Inc. (Stantec) conducted a paleontological resources assessment on behalf of the Los Angeles Department of Water and Power (LADWP) for the Little Lake Aqueduct Crossover Project (the Project) on portions of an approximately 0.11 acres of land located in Inyo County, California. This paleontological study was conducted in support of the proposed installation of the 60-inch diameter Little Lake Aqueduct Crossover pipe to allow water to be diverted from the First Los Angeles Aqueduct to the Second Los Angeles Aqueduct.

The proposed Project is subject to compliance with the California Environmental Quality Act (CEQA) requirements regarding the Project's potential impacts on paleontological resources. The lead agency for this Project is LADWP. As part of CEQA compliance, a paleontological resources assessment was conducted to assess potential impacts of the proposed Project on paleontological resources.

This paleontological resource assessment consisted of an analysis of existing data including a museum records search from the Natural History Museum of Los Angeles County and a review of the most recent geologic mapping, relevant scientific literature, a geotechnical study of the Project area, and the online collections of the University of California Museum of Paleontology. This research was used to assign paleontological potential rankings of the Society of Vertebrate Paleontology (2010) to the geologic units present in the Project area, either at the surface or in the subsurface. Following this, Project plans were reviewed to identify any potential impacts to paleontological resources and develop appropriate mitigation recommendations to reduce potential impacts to less than significant.

The results of this study indicate that the Project area consists of artificial fill overlying young alluvium, which is assessed as having low-paleontological potential. These sediments are underlain by older alluvial sediments with high paleontological potential at depths of over 13 feet below ground surface. To avoid impacts to paleontological resources and satisfy CEQA requirements, Stantec recommends a qualified paleontologist meeting professional standards as defined by Murphey et al. (2019) be retained as the designated Project Paleontologist to oversee all aspects of paleontological mitigation. Stantec recommends the following mitigation activities for the Project:

- The Project Paleontologist should develop and oversee the implementation of a Paleontological Monitoring and Mitigation Plan tailored to the Project plans that provides for paleontological monitoring of earthwork and ground disturbing activities into undisturbed geologic units with high paleontological potential anticipated to be present at depths of greater than 13 feet, to be conducted by a paleontological monitor meeting industry standards (Murphey et al. 2019). Monitoring recommendations are as follows:
    - Paleontological spot checks will be conducted by a qualified paleontological monitor for initial ground disturbance over 13 feet in depth. Should older alluvial sediments with high paleontological potential be identified during spot checks, full time monitoring will be implemented.

  - The Project Paleontologist may alter the frequency of monitoring or spot checks, based on subsurface conditions.

- The Project Paleontologist should develop a Worker's Environmental Awareness Program training that communicates requirements and procedures for the inadvertent discovery of paleontological resources during construction, to be delivered by the paleontological monitor to the construction crew prior to the onset of ground disturbance.

- In the event that paleontological resources are encountered during construction activities, all work must stop in the immediate vicinity of the finds while the paleontological monitor documents the find. The Project Paleontologist shall assess the find. Should the Project Paleontologist assess the find as significant, the find shall be collected and curated in an accredited repository along with all necessary associated data and curation fees.

Based on the findings in this study and the implementation of the above mitigation recommendations, the proposed Project should not cause an adverse impact to paleontological resources. Therefore, no additional paleontological resource studies are recommended or required at this time. Changes to the Project plans or Project area from those assessed in this study will require additional assessment for impacts to paleontological resources.

Acronyms / Abbreviations

bgs	Below ground surface
CEQA	California Environmental Quality Act
GIS	Geographic Information System
LAA	Los Angeles Aqueduct
LAA1	First Los Angeles Aqueduct
LAA2	Second Los Angeles Aqueduct
LACM	Natural History Museum of Los Angeles County
LADWP	Los Angeles Department of Water and Power
PRC	Public Resources Code
PRPA	Paleontological Resources Preservation Act
Stantec	Stantec Consulting Services Inc.
SVP	Society of Vertebrate Paleontology
UCMP	University of California Museum of Paleontology

Glossary

Paleontological Monitor	An individual who has academic training (B.S., B.A., M.A., or M.S.) with an emphasis in paleontology or demonstrated equivalent experience (a minimum of two years of cumulative professional or nonprofessional work in laboratory preparation, curation, or field work related to paleontology, as well as documented self-taught knowledge of the discipline of paleontology). [Murphey et al. 2019]
Paleontological Monitoring	Full-time observation of construction activities in high potential geologic units by a paleontological monitor, under supervision of the project paleontologist.
Paleontological Resource	Fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years) [Society of Vertebrate Paleontology 2010]
Project Paleontologist	Someone with an advanced academic degree (M.A., M.S. or Ph.D.) with an emphasis in paleontology or demonstrated equivalent professional experience (e.g., minimum of 3 years [or 75 projects] of project experience with paleontological mitigation is considered equivalent to a graduate degree), in combination with 2 years (or 50 projects) of demonstrated professional experience and competency with paleontological resource mitigation projects at the level of field supervisor. [Murphey et al. 2019]
Spot check	A short inspection of excavations and subsurface conditions conducted by the paleontological monitor in order to confirm excavations are impacting low potential geologic units.

1 Introduction

Stantec Consulting Services Inc. (Stantec) conducted a paleontological resources assessment on behalf of the Los Angeles Department of Water and Power (LADWP) for the Little Lake Aqueduct Crossover Project (the Project) on portions of an approximately 0.1145 acres of land located in Rose Valley, west of Little Lake Reservoir, approximately 25 miles south of Olancha, Inyo County, California. This paleontological study was conducted in support of the proposed installation of a 60-inch diameter crossover pipe between the First Los Angeles Aqueduct (LAA1) and the Second Los Angeles Aqueduct (LAA2).

The proposed Project is subject to compliance with the California Environmental Quality Act (CEQA) requirements regarding the Project's potential impacts on paleontological resources. The lead agency for the Project is the LADWP. As part of CEQA compliance, a paleontological resources assessment was conducted to assess potential impacts of the proposed Project on paleontological resources.

1.1 Project Description

The proposed Project would connect the LAA1 (concrete conduit) and LAA2 (riveted steel pipeline) through installation of approximately 183 feet of 60-inch diameter pipe. The proposed pipeline and associated structures will range in depth from 5 to 20 feet below ground surface (bgs). The Project includes:

- Pipe material will be determined during design based on factors including pressure, constructability, operational requirements, seismic requirements, installation, cost and procurement durations. Welded-steel pipe will be considered.
- An isolation structure will be installed on the LAA1 downstream of the Los Angeles Aqueduct (LAA) Crossover connection. This structure will include two sets of stop logs and reinforcement of the LAA1 required for installation of the stop logs.
- Two 60-inch diameter butterfly valves will be installed on the Crossover pipeline to prevent back flow into the LAA1 when the LAA2 is in service.
- The LAA Crossover will connect to the existing LAA1 upstream of the LAA1-LAA2 intersection point. A new connection structure will be installed to allow for the connection of the LAA Crossover pipeline to the LAA1 concrete channel.
- The LAA Crossover connection to LAA2 may be located upstream or downstream of the LAA1-LAA2 intersection. The LAA2 connection will be a pipe-to-pipe connection.
- Galvanic cathodic protection system will be installed for corrosion control.

Construction for the proposed project will include excavation, demolition of select sections of the existing LAA, and installation of new facilities. In general, the construction sequence would be as follows:

- Excavation and removal of 23-foot section of LAA2
- Installation of new section with outlet to 60-inch crossover pipe
- Installation of crossover pipe to two butterfly values
- Use butterfly valves as double block and continue excavation for installation of 60-inch crossover pipe to just before LAA1
- Excavation and demolition of section of LAA1, formwork and concrete placement for new LAA1 section to include slide gates and outlet to crossover pipe
- Connect LAA1 structure to 60-inch crossover pipe
- Backfill and close out

All construction work, including vehicle and equipment staging, would be conducted within the existing Bureau of Land Management Rights-of-Way. Excavated soils would be used as backfill; soil export offsite is not anticipated. The equipment for construction will consist of a boom truck crane, a crane, pile boring equipment, a roller compactor, hand compactor, an excavator, a backhoe, a water truck, an auger, a vibratory hammer, one to two dump trucks, one to two concrete trucks, a wheel loader, a concrete pump, one to two generators, two to four light plants, a welding machine, a weld truck with trailer, a forklift, four utility pick-up trucks, one to two air blowers, a skid steer, and up to 10 tractors (i.e., delivery trucks) over the construction period.

1.2 Project Location

The crossover pipeline will be installed in the Rose Valley of Inyo County, California, east of the Sierra Nevada and west of the Coso Range (Figure 1). Located approximately 25 miles south of Olancha and 25 miles northwest of Ridgecrest, the Project area is west of Little Lake Reservoir. Little Lake is a perennial manmade lake sustained by springs, approximately 90 acres in surface area and 3 to 5 feet deep. Accessed via Highway 395, the Project is located on the Little Lake, California (1983) United States Geological Survey 7.5-minute quadrangle map. The site is in Township 23 South, Range 37 East, Section 1 (Figure 2). The Project area is generally coincident with the area previously disturbed for the installation of LAA1 and LAA2.

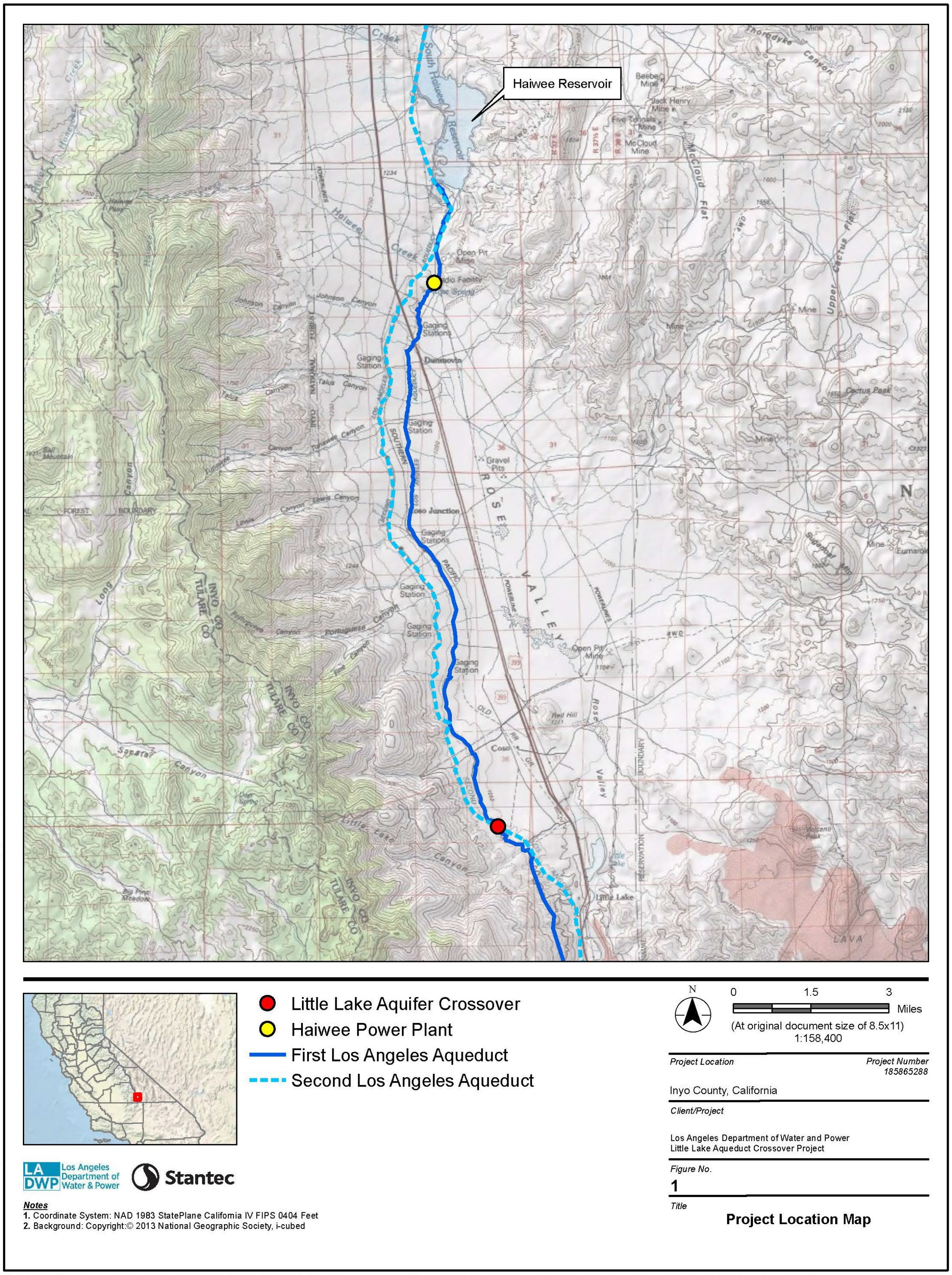

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Figure 1. Project Location Map

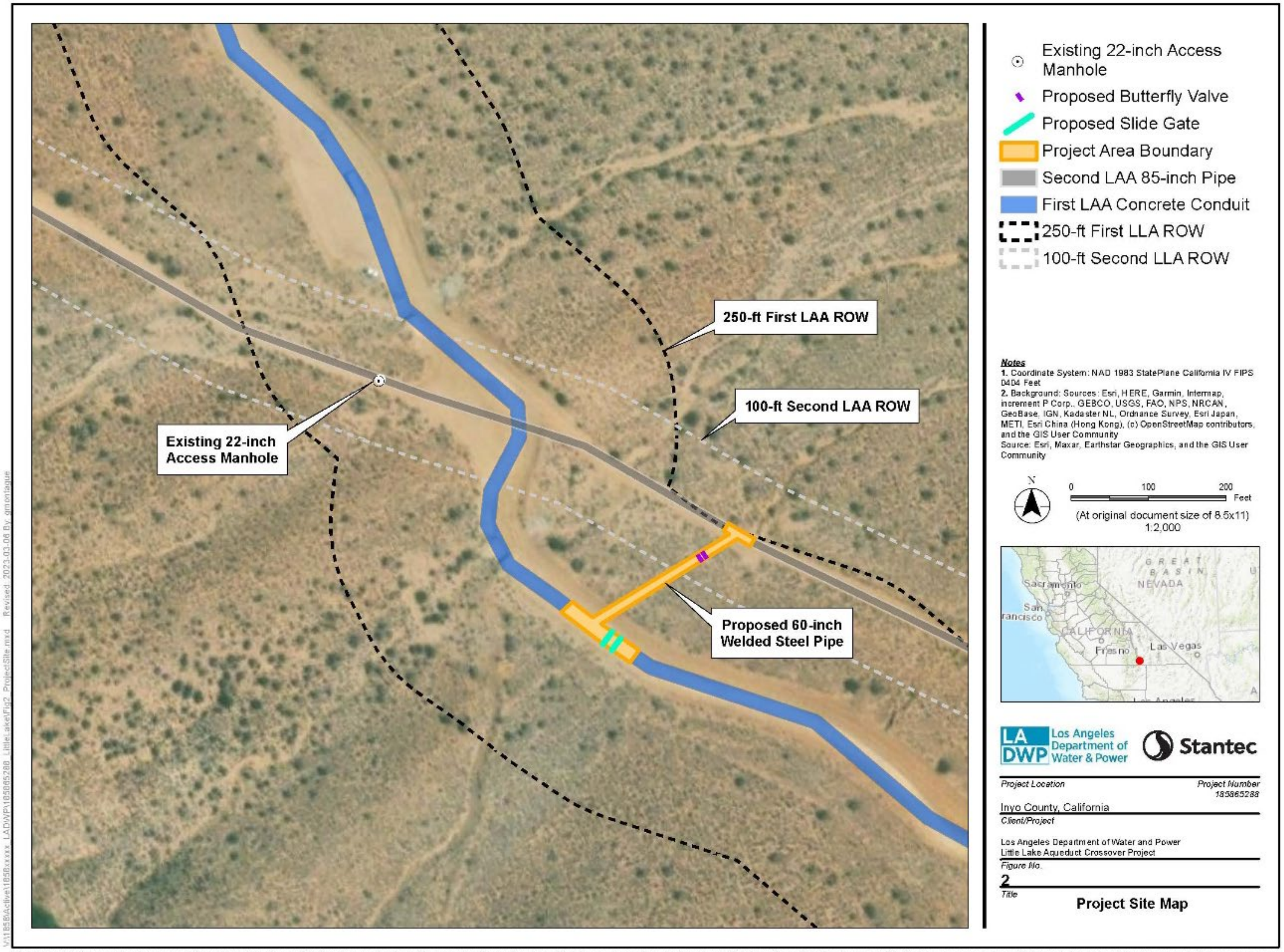

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Figure 2. Project site map

1.3 Paleontological Resources

Fossils are any evidence of ancient life. This includes the remains of the body of an organism, such as bones, skin impressions, shell, or leaves, as well as traces of an organism's activity, such as footprints or burrows, called trace fossils. In addition to the fossils themselves, geologic context is an important component of paleontological resources, and includes the stratigraphic placement of the fossil as well as the lithology of the rock in order to assess paleoecologic setting, depositional environment, and taphonomy. Fossils are protected by federal, state, and local regulations as nonrenewable natural resources.

While CEQA does not define a significance threshold for paleontological resources, the standards of the Society of Vertebrate Paleontology (SVP) are often used in the absence of a legal definition of significance. The SVP defines significant paleontological resources as:

> identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years). [SVP 2010: 11].

Using this definition, the concept of scientific importance, or significance, is included in the definition of paleontological resources; thus, not all fossils are considered to be paleontological resources.

It should be noted that the threshold for significance varies with factors including geologic unit, geographic area, and the current state of scientific research, and may also vary between different agencies (Murphey et al. 2019). Numerous paleontological studies have developed criteria for the assessment of significance for fossil discoveries (e.g., Eisentraut and Cooper 2002, Murphey et al. 2019, Murphey and Daitch 2007, Scott and Springer 2003). In general, these studies assess fossils as significant if one or more of the following criteria apply:

- The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct.
- The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events, through biochronology or biostratigraphy and the correlation with isotopic dating.
- The fossils provide ecological data, such as the development of biological communities, the interaction between paleobotanical and paleozoological biotas, or the biogeography of lineages.
- The fossils demonstrate unusual or spectacular circumstances in the history of life.

- The fossils provide information on the preservational pathways of paleontological resources, including taphonomy, diagenesis, or preservational biases in the fossil record.
- The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.
- The fossils inform our understanding of anthropogenic affects to global environments or climate.

A geologic unit known to contain significant paleontological resources is considered sensitive to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains directly or indirectly. This definition of sensitivity differs fundamentally from the definition for archaeological resources as follows:

> It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontological sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontological potential in each case. [SVP 2010: 2].

Many archaeological sites contain features that are visually detectable on the surface. In contrast, fossils are often contained within surficial sediments or bedrock and are therefore not observable or detectable unless exposed by erosion or human activity.

In summary, in the absence of observable paleontological resources on the surface, paleontologists must assess the potential of geologic units as a whole to yield paleontological resources based on their known potential to produce significant fossils elsewhere. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken to prevent adverse impacts to these resources.

2.0 Regulatory Framework

California has enacted multiple laws and regulations that provide for the protection of paleontological resources. This investigation was conducted to meet these requirements regarding paleontological resources on the lands proposed for development.

2.1 State of California

2.1.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA (Public Resources Code [PRC] Sections 21000 et seq) requires that before approving most discretionary projects, the Lead Agency must identify and examine any significant adverse environmental effects that may result from activities associated with such projects. As updated in 2016, CEQA separates the consideration of paleontological resources from cultural resources (PRC Section 21083.09). The Appendix G checklist (Title 14, Division 6, Chapter 3, California Code of Regulations 15000 et seq.) requires an answer to the question, "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" Under these requirements, Stantec has conducted a paleontological resources assessment to determine impacts of the proposed project on paleontological resources within the Project area.

2.1.2 PUBLIC RESOURCES CODE

The California PRC (Chapter 1.7, Sections 5097 and 30244) includes additional state-level requirements for the assessment and management of paleontological resources. These statutes require reasonable mitigation of adverse impacts to paleontological resources resulting from development on state lands, define the removal of paleontological sites or features from state lands as a misdemeanor, and prohibit the removal of any paleontological site or feature from state land without permission of the applicable jurisdictional agency.

3.0 Professional Standards

The SVP (2010), the Bureau of Land Management (2016), and a number of scientific studies (Eisentraut and Cooper 2002; Murphey et al. 2019; Scott and Springer 2003) have developed guidelines for professional qualifications, conducting paleontological assessments, and developing mitigation measures for the protection of paleontological resources. These guidelines are broadly similar, and include the use of museum records searches, scientific literature reviews, and, in some cases, field surveys to assess the potential of an area to preserve paleontological resources. Should that potential be high, accepted mitigation measures include paleontological monitoring, data recordation of all fossils encountered, collection and curation of significant fossils and associated data, and in some cases screening of sediment for microfossils.

This study has been conducted in accordance with these guidelines and the recommendations provided herein meet these standards.

4.0 Geologic Setting

The Project area is located in the far southwestern edge of the Basin and Range geomorphic province (California Geologic Survey 2002). This province has been undergoing west-northwest directed extension since its initiation approximately 16 to19 million years ago (Harden 2004). This extension created a vast terrain of structurally complex basins infilled with thick stacks of alluvial sediments eroded from the surrounding mountain ranges with superposed lacustrine and fluvial deposits (Parsons 2006). The Basin and Range province is dominated by mountains, valleys, and normal faults that trend north-south or northwest-southeast. It is characterized by high geographic relief, with steep mountain ranges separated by deep valleys, such as Death Valley, Owens Valley, Saline Valley, and Rose Valley, where the Project area resides. These valleys are characterized by primarily right-lateral strike slip faults that trend northwest.

Locally, the Project is in the southern end of Rose Valley, a roughly north-south trending valley that feeds into Owens Valley in the north and is bound by the Sierra Nevada Mountains to the west and the Coso Range to the east and south. Rose Valley is typical of the basins in the Basin and Range province, with a thick stack of alluvial sediments collecting on the valley floor. The valley has been volcanically active throughout the Quaternary, with volcanoes of the Coso Range east of the valley active up to the late Pleistocene (Yang et al. 2011).

Rose Valley is currently dry, with lakes limited to Little Lake in the south and the Haiwee Reservoir in the north; however, during the Pleistocene and into the early Holocene Rose Valley and Owens Valley to the north were part of a closed drainage system and a chain of large lakes extending from Mono Lake in the north (which during the Pleistocene was a much larger body of water called Lake Russell) to Searles Lake in the south, with overflow continuing into Panamint and then Manly lakes in the east (Bacon et al. 2006). The Pleistocene highstand of Owens Lake was substantially larger than the current extent of the playa, extending 80 km to the east, with a shoreline at 3,881 ft during the Tahoe glaciation, 65,000 years ago (Beanland and Clark 1994, Smith et al. 2009). The last Pleistocene overflow event extended as far north as Independence, California, indicating that lacustrine sediments of the valley floor in the southern Owens Valley date from this time (Beanland and Clark 1994), with overflow events extending into the early Holocene (Bacon et al. 2020). During these high stands, Rose Valley would have been flooded as part of the chain of lakes. As the end Pleistocene climate shifted to a drier regime, these lakes shrank in size, with the last pulses of glaciation and deep lake levels occurring 12 – 10 thousand years ago (Beanland and Clark 1982). Introduction of agriculture and irrigation in the late 1800s and early 1900s lowered lake levels further, such that the historic Owens Lake covered approximately 280 square kilometers with a maximum depth of 14 – 15 feet (Bacon et al. 2020).

5.0 Methodology

To assess if paleontological resources are likely to be encountered in any given area, the paleontological potential of the geologic units present in the area is assessed. Paleontological potential of a geologic unit consists of both (a) the potential for yielding abundant vertebrate fossils or for yielding significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data (SVP 2010). Unlike archaeological resources that often have a limited aerial extent, paleontological resources may occur throughout a geologic unit, and so paleontological potential is assessed for the unit as a whole. Provided below is the methodology used during the current study to assess the potential of the Project to impact paleontological resources.

The paleontological assessment presented here was conducted by Stantec Principal Paleontologist Alyssa Bell, Ph.D. Geographic Information System (GIS) maps and figures were drafted by GIS Technician Grace Montague. This report was authored by Dr. Bell with the assistance of Paleontologist Matthew H. Benoit, Ph.D. and peer reviewed by Senior Principal Cara Corsetti, M.S. Stantec's work in support of the Project was managed by Senior Principal Sarah Garber, who coordinated all work and provided quality assurance and control.

5.1 Analysis of Existing Data

In order to assess the paleontological potential of the Project area, the most recent geologic mapping of the Project area and vicinity was consulted to identify all geologic units present at the surface or likely present in the subsurface. A records search was obtained from the LACM (Appendix A) and a review of the scientific literature and the online database of the University of California Museum of Paleontology (UCMP). The UCMP's database does not provide specific geographic locations beyond the county the fossils were recovered from but does include locality names that can sometimes be used to infer the general area of the locality. Additionally, LADWP (2022) conducted a geotechnical study of the Project area consisting of two test pits. These data were used to assess the history of each of the geologic units mapped as present at the surface or likely present in the subsurface of the Project area for preserving paleontological resources.

5.2 Paleontological Resources Assessment

The results of the analysis of existing data were used to assign the paleontological potential rankings of the SVP (2010) to the geologic units likely present in the Project area. These rankings are designed to inform the development of appropriate mitigation measures for the protection of paleontological resources and are widely accepted as industry standards in paleontological mitigation (Murphey et al. 2019; Scott and Springer 2003). These rankings are as follows:

High Potential. Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rock units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations that are temporally or lithologically suitable for the preservation of fossils (e. g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.), some volcaniclastic formations (e. g., ashes or tephras), and some low-grade metamorphic rocks.

Undetermined Potential. Rock units for which little information is available in the literature or museum records concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study and field work is necessary to determine if these rock units have high or low potential to contain significant paleontological resources.

Low Potential. Rock units that are poorly represented by fossil specimens in institutional collections or, based on general scientific consensus, only preserve fossils in rare circumstances (e. g., basalt flows or Recent colluvium) have low paleontological potential.

No Potential. Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites).

5.3 Paleontological Impacts Assessment

Following the assessment of paleontological potential, an impacts assessment was conducted comparing planned Project activities in terms of locations, depths, and ground disturbance methods with mapped geologic units. Where potential adverse impacts from Project activities were identified, mitigation recommendations were developed to reduce those impacts to less than significant.

Impacts to paleontological resources can be classified as direct, indirect, or cumulative. Impacts can also be considered as adverse impacts or as positive impacts. Direct adverse impacts on paleontological resources are the result of damage or destruction of these nonrenewable resources by surface disturbing actions including construction excavations. Therefore, in areas that contain paleontologically sensitive geologic units, ground disturbance has the potential to adversely impact paleontological resources, by damaging or destroying them and rendering them permanently unavailable to science and society. Positive direct impacts, however, may result when paleontological resources are identified during construction and the appropriately documented and salvaged, thus ensuring the specimens are protected for future study and education.

Indirect impacts typically include those effects which result from the continuing implementation of management decisions and resulting activities, including normal ongoing operations of facilities constructed within a given project area. They also occur as the result of the construction of new roads and trails in areas that were previously less accessible. This increases public access and therefore increases the likelihood of the loss of paleontological resources through vandalism and unlawful collecting, thus constituting an adverse indirect impact. Human activities that increase erosion also cause indirect impacts to surface and subsurface fossils as the result of exposure, transport, weathering, and reburial.

Cumulative adverse impacts can result from incrementally minor but collectively significant actions taking place over time. The incremental loss of paleontological resources over time from construction-related surface disturbance or vandalism and unlawful collection would represent a significant cumulative adverse impact, because it would result in the destruction of non-renewable paleontological resources and the associated irretrievable loss of scientific information.

The impact assessment conducted here takes into consideration all planned project activities in terms of aerial and subsurface extents, including the possibility of subsurface geologic units having a different paleontological potential than surficial units. For example, younger surficial sediments (alluvium, lacustrine, eolian, etc.) have low potential to preserve paleontological resources due to their age; yet sediments increase in age with depth and so these surficial deposits often overly older units that have high paleontological potential. In areas with this underlying geologic setting surficial work may be of low risk for impacting paleontological resources while activities that require excavations below the depth of the surficial deposits would be at greater risk of impacting paleontological resources. For this reason, the impact assessment takes into consideration both the surface and subsurface geology and is tailored to Project activities.

6.0 RESULTS

6.1 Project Area Geology and Paleontology

Geologic mapping of the Project area show the Project is located near a Pleistocene-aged alluvial fan coming off the Sierra Nevada at Little Lake Canyon (Dibblee and Minch 2008; Whitmarsh 1998). The extent of this older fan varies in mapping, with Dibblee and Minch (2008) showing it ending to the west of the Project area, while Whitmarsh (1998) shows the fan extending past the Project area. The geotechnical assessment conducted for the Project by LADWP (2022) found sediments consistent with younger alluvial deposits present in the Project area, thus supporting the mapping of Dibblee and Minch (2008), as shown in Figure 3. Additionally, the geotechnical study documented artificial fill present at the surface of the Project area (LADWP 2022).

Artificial Fill. LADWP (2022) described the fill material as brown silty sand with trace to few gravel, cobbles, and boulders up to 4 feet in diameter. Sporadic trash, including concrete fragments and a tire, was encountered in the fill in one test pit (LADWP 2022). This fill is variable in depth, absent in some places and from 2 feet deep to thicker than 12 feet deep in the test pits (LADWP 2022). The artificial fill is likely associated with the construction of the aqueducts and derived from the underlying alluvial fan deposits (LADWP 2022).

Younger alluvium (Qa in Figure 3). Alluvial sediments are found at the surface and below the artificial fill across the Project area. These sediments consist of brown, fine to coarse grained, silty sand with few to little fines, few fine to coarse gravel, and trace granitic cobbles and boulders to approximately 4 feet in diameter (LADWP 2022). Local crossbedding and laminations dipping approximately 5 degrees east were visible in the test-pit walls (LADWP 2022). LADWP (2022) assessed these sediments as corresponding to the young alluvial unit of Dibblee and Minch (2008) which dates from the Holocene to the Recent. This unit is formed of sediment shed off the Sierra Nevada to the west and deposited as a result of alluvial processes. This has been ongoing throughout the Quaternary, and so these younger alluvial sediments are likely underlain by older alluvial deposits (see below) at undetermined depths. Given their relatively recent age, younger alluvium is not known to preserve paleontological resources.

Older alluvial fan deposits (Qof in Figure 3). Older alluvial fan deposits are mapped to the west and south of the Project area by Dibblee and Minch (2008) and are likely present in the Project area at depth. While the exact depth at which older alluvial fan deposits are present in the Project area is unknown, the test pits excavated as part of the geotechnical assessment did not identify these sediments in the pits, which were excavated to depths of 13 feet belowground surface (bgs). These sediments consist of boulders, gravels, sands, and breccia that has been cemented with calcified tuffaceous cement (Dibblee and Minch 2008). These deposits represent the accumulation of sediments in the Rose Valley basin due to erosion and runoff from the Sierra Nevada mountains to the west. This unit is separated from the overlying younger alluvium by an angular unconformity. Older dissected alluvial fan deposits date from

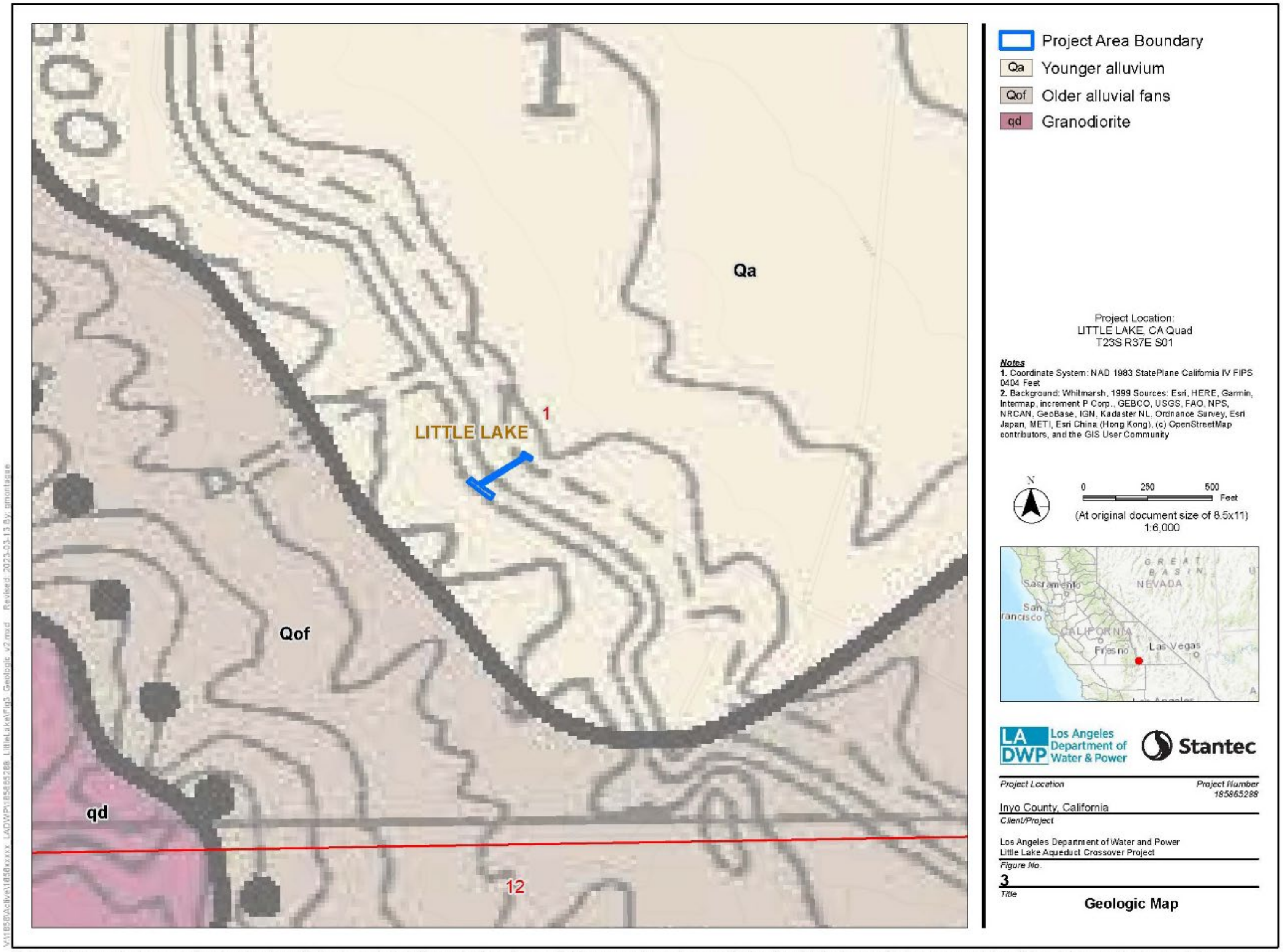

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Figure 3. Geologic map

the Pleistocene, which ranges from 11,700 to 2.58 million years ago, making this unit old enough to preserve paleontological resources. Older alluvial sediments are well known to preserve paleontological resources in southern and central California, including in the vicinity of the Project area.

The closest documented fossil locality to the Project area is from the north end of Haiwee Reservoir, where a mammoth fossil was collected (LACM 2023). Other localities are known from the vicinity of Owens Lake, further north of the Project area, preserving mammoth, birds, a carnivore, and an artiodactyl (LACM 2023). The UCMP (2023) has records of four fossil localities from Inyo County, two of which are from lacustrine sediments, but more precise locality data is not available. The fossils from these localities were largely not identified but did include a primitive horse as well as other vertebrates and invertebrates.

A review of the scientific literature reveals additional fossil localities in the vicinity of Rose Valley. A variety of terrestrial vertebrates have been reported from Owens Valley, including records of birds (meadowlark, scaup, rail, pelican, wigeon, and other unidentified birds), gopher, rabbit, wolf, antelope, deer, horse, camel, bison, mammoth, a member of the order Proboscidea (which includes modern elephants), and a member of the family Felidae (cats), similar in size to a modern-day lion (Jefferson 1989, 1991; Jessey and Reynolds 2009; Cogstone 2003; Environmental Science Associates 2020). Some of these are the same as reported in the results of the LACM (2023). This diverse fauna represents a sample of the last Ice Age. These fossils are important for recreating the history of Southern California, in particular studying climate change (e.g., Roy et al. 1996), extinction (e.g., Barnosky et al. 2004, Jones et al. 2008, Sandom et al. 2014, Scott 2010), and paleoecology (e.g., Connin et al. 1998).

Table 1 Summary of the records searches

Locality Number	Geologic Unit	Age	Taxa	Approximate Location
LACM IP 42862, 42863	Unknown formation	Pleistocene	Invertebrates	Owens Lake
LACM VP 4691	?Owens Lake bed deposits (green & tan mudstones & sandy mudstones)	Pleistocene	Elephant clade (Proboscidea); carnivore (Carnivora)	In breaks of the Owens River about 2.5 miles southeast of Lone Pine
LACM VP 7716 - 7718; LACM IP 6111	Unknown formation (light to dark brown-gray silty clay)	Pleistocene	Bird (Aves), artiodactyla, rabbit (Lagomorpha); invertebrates	northeastern side of Owens Lake south of Dolomite & just west of Highway 136 & Swansea
LACM VP 3514*	Unknown formation	Pleistocene	Mammoth (*Mammuthus*)	North end of Haiwee Reservoir
LACM VP 4538*	Unknown formation	Pleistocene	Mammoth (*Mammuthus*)	North end of Haiwee Reservoir
UCMP 1764	Unknown formation (lacustrine)	Pleistocene	Vertebrates (uncatalogued)	Inyo County
UCMP 1765	Unknown formation (lacustrine)	Pleistocene	Invertebrates (uncatalogued)	Inyo County
UCMP V3725	Unknown formation	Pleistocene	Vertebrates (uncatalogued)	Inyo County

Locality Number	Geologic Unit	Age	Taxa	Approximate Location
UCMP 67136	Unknown formation	Pleistocene	Horse (*Pliohippus*)	Inyo County

6.2 Paleontological Potential of Geologic Units in the Project Area

In order to assess the potential of the geologic units present at the surface or in the subsurface to preserve paleontological resources, Stantec conducted an analysis of existing data, as described above. These investigations were used to assign the paleontological potential rankings of the SVP (2010) to the geologic units present at the Project area, both at the surface and in the subsurface. The results of this assessment are described below for each of the geologic units in the Project area (Table 4).

Artificial Fill. Artificial fill is a manmade deposit that is unlikely to preserve significant fossils. Any fossils or fragments thereof found in artificial fill would have most likely lost important contextual information necessary for significance. Therefore, artificial fill is assessed here as having low paleontological potential.

Younger alluvium. Young alluvium is mapped at the surface and below the artificial fill across the Project area. Younger alluvium dates to the Holocene, and as such is too young to preserve paleontological resources. They are here assessed as having low paleontological potential.

Older alluvial fan deposits. Older alluvial fan deposits are likely present in the subsurface of the Project area underlying the younger alluvial sediments, at depths of more than 13 feet bgs. Older alluvium has a documented history of fossil preservation, and so is here assessed as having high paleontological potential.

Table 2 Paleontological potential of geologic units within the Project area

Geologic Unit	Age	Occurrence within Project area	Paleontological Potential*
Artificial fill	Recent	Surface and subsurface, variable thickness from 0 to over 12 feet bgs	Low
Younger alluvium	Holocene	Surface and subsurface underlying fill	Low
Older alluvium	Pleistocene	Subsurface at depths of over 13 feet bgs	High

**ranking based on the SVP (2010) classifications*

6.3 Potential impacts to paleontological resources from Project Activities

The Project plans to install approximately 183 feet of 60-inch diameter welded steel pile and two 60-inch butterfly valves between LAA1 and LAA2. This will entail ground disturbance consisting of excavation of soil and rock between the two existing aqueducts to depths between 5 feet and 20 feet.

Within the Project area, these activities have the potential to encounter paleontological resources if they extend into older alluvial sediments present at an unknown depth of greater than 13 feet bgs. If this were to occur, adverse impacts could result from the damage or destruction of paleontological resources. Excavations under 13 feet deep are unlikely to pose impacts to paleontological resources.

Stantec has developed recommendations for mitigation that will avoid damage or destruction of paleontological resources in the Project area, thus reducing direct adverse impacts to less than significant. It is not anticipated that the Project will pose indirect or cumulative adverse impacts to paleontological resources, as the final Project will not entail increased exposure or erosion of native sediments beyond the duration of the ground disturbance described above.

7.0 Recommendations and Management Considerations

The paleontological resources assessment described herein conducted an analysis of existing data, consisting of a records search from the LACM and a review of geologic mapping, the scientific literature, and the online collections of the UCMP, to assess the potential of the geologic units in the Project area to preserve paleontological resources. The results of this assessment show that geologic units with low paleontological potential are present at the surface in the Project area, while sediments with high paleontological potential are present at unknown depths of greater than 13 feet bgs.

As Project activities are anticipated to exceed the depths of the geotechnical excavation (13 feet bgs) and it is not known where older alluvial sediments begin in the subsurface, the Project may pose impacts to paleontological resources, if older alluvial sediments are encountered in the subsurface. In order to avoid impacts to paleontological resources, Stantec recommends a qualified paleontologist meeting professional standards as defined by Murphey et al. (2019) be retained as the designated Project Paleontologist to oversee all aspects of paleontological mitigation. Stantec recommends the following mitigation activities for the Project:

- The Project Paleontologist should develop and oversee the implementation of a Paleontological Monitoring and Mitigation Plan tailored to the Project plans that provides for paleontological monitoring of earthwork and ground disturbing activities into undisturbed geologic units with high paleontological potential, anticipated to be present at depths of greater than 13 feet bgs to be conducted by a paleontological monitor meeting industry standards (Murphey et al. 2019). Monitoring recommendations are as follows:
    - Paleontological spot checks will be conducted by a qualified paleontological monitor for initial ground disturbance over 13 feet in depth. Should older alluvial sediments with high paleontological potential be identified during spot checks, full time monitoring will be implemented.
    - The Project Paleontologist may alter the frequency of monitoring or spot checks, based on subsurface conditions.

- The Project Paleontologist should develop a Worker's Environmental Awareness Program training that communicates requirements and procedures for the inadvertent discovery of paleontological resources during construction, to be delivered by the paleontological monitor to the construction crew prior to the onset of ground disturbance.
- In the event that paleontological resources are encountered during construction activities, all work must stop in the immediate vicinity of the finds while the paleontological monitor documents the find. The Project Paleontologist shall assess the find. Should the Project Paleontologist assess the find as significant, the find shall be collected and curated in an accredited repository along with all necessary associated data and curation fees.

Based on the findings in this study and the implementation of the above mitigation recommendations, the proposed Project should not cause an adverse impact to paleontological resources. Therefore, no additional paleontological resource studies are recommended or required at this time. Changes to the Project plans or Project area from those assessed in this study will require additional assessment for impacts to paleontological resources.

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APPENDIX A

Records Search Results from the Natural History Museum of Los Angeles County

Natural History Museum
of Los Angeles County
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March 12, 2023

Stantec Consulting Services, Inc.
Attn: Matthew H. Benoit

re: Paleontological resources for the Little Lake Aquifer Crossover project (185865288)

Dear Matthew:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at the Little Lake Aquifer Crossover project area as outlined on the portion of the Little Lake USGS topographic quadrangles map that you sent to me via e-mail on March 12, 2023.

We do not have fossil localities directly within the proposed project area, but we have fossil localities nearby from the same sedimentary deposits that occur in the proposed project area, either at the surface or at depth. The following table shows the closest known localities in the collection of the Natural History Museum of Los Angeles County (NHMLA).

Locality Number	Location	Formation	Taxa	Depth
LACM IP 42862, 42863	Owens Lake	Unknown formation (Pleistocene)	Invertebrates (uncatalogued)	Unknown
LACM VP 4691	In breaks of the Owens River about 2.5 miles southeast of Lone Pine	?Owens Lake bed deposits (green & tan mudstones & sandy mudstones; Pleistocene)	Elephant clade (Proboscidea); carnivore (Carnivora)	Unknown
LACM VP 7716 - 7718; LACM IP 6111	north eastern side of Owens Lake south of Dolomite & just west of Highway 136 & Swansea	Unknown formation (light to dark brown-gray silty clay, Pleistocene)	Bird (Aves), artiodactyla, rabbit (Lagomorpha); invertebrates	Unknown, recovered during grading
LACM VP 3514*	North end of Haiwee Reservoir	Unknown formation (Pleistocene, clay)	Mammoth (*Mammuthus*)	12 feet bgs
LACM VP 4538*	North end of Haiwee Reservoir	Unknown formation (Pleistocene, clay)	Mammoth (*Mammuthus*)	Unrecorded

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology; bgs, below ground surface
**3514 and 4538 may be the same locality*

This records search covers only the records of the NHMLA. It is not intended as a paleontological assessment of the project area for the purposes of CEQA or NEPA. Potentially fossil-bearing units are present in the project area, either at the surface or in the subsurface. As such, NHMLA recommends that a full paleontological assessment of the project area be conducted by a paleontologist meeting Bureau of Land Management or Society of Vertebrate Paleontology standards.

Sincerely,

Alyssa Bell, Ph.D.
Natural History Museum of Los Angeles County

enclosure: invoice