Appendix A:
Air Quality/Greenhouse Gas Modeling Data

1000 Palms Channel Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	1000 Palms Channel
Construction Start Date	1/8/2024
Operational Year	2024
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.00
Precipitation (days)	7.60
Location	33.74243813618459, -116.25110628353755
County	Riverside-Salton Sea
City	Indio
Air District	South Coast AQMD
Air Basin	Salton Sea
TAZ	5657
EDFZ	19
Electric Utility	Imperial Irrigation District
Gas Utility	Southern California Gas
App Version	2022.1.1.13

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

Other Non-Asphalt Surfaces	81.0	Acre	81.0	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-5	Use Advanced Engine Tiers

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	8.09	6.42	127	62.6	0.56	3.35	30.1	33.4	3.19	8.69	11.9	—	80,212	80,212	1.04	11.2	152	83,715
Mit.	3.49	2.69	87.6	73.2	0.56	1.62	30.1	31.7	1.61	8.69	10.3	—	80,503	80,503	1.06	11.2	152	84,007
% Reduced	57%	58%	31%	-17%	> -0.5%	52%	—	5%	49%	—	13%	—	> -0.5%	> -0.5%	-1%	> -0.5%	—	> -0.5%
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	7.93	6.25	132	61.8	0.56	3.35	30.1	33.4	3.19	8.69	11.9	—	80,212	80,212	1.05	11.2	3.94	83,574
Mit.	3.33	2.52	93.3	72.4	0.56	1.62	30.1	31.7	1.61	8.69	10.3	—	80,503	80,503	1.06	11.2	3.94	83,866
% Reduced	58%	60%	30%	-17%	> -0.5%	52%	—	5%	49%	—	13%	—	> -0.5%	> -0.5%	-1%	> -0.5%	—	> -0.5%
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.62	2.13	32.4	21.1	0.12	0.98	6.00	6.99	0.92	1.84	2.76	—	16,345	16,345	0.27	2.01	11.7	16,962

Mit.	0.96	0.79	18.7	23.5	0.12	0.37	6.00	6.37	0.36	1.84	2.20	—	16,100	16,100	0.26	2.01	11.7	16,716
% Reduced	63%	63%	42%	-11%	2%	63%	—	9%	61%	—	20%	—	1%	1%	4%	< 0.5%	—	1%
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.48	0.39	5.91	3.85	0.02	0.18	1.10	1.28	0.17	0.34	0.50	—	2,706	2,706	0.04	0.33	1.94	2,808
Mit.	0.18	0.14	3.41	4.28	0.02	0.07	1.10	1.16	0.07	0.34	0.40	—	2,666	2,666	0.04	0.33	1.94	2,768
% Reduced	63%	63%	42%	-11%	2%	63%	—	9%	61%	—	20%	—	1%	1%	4%	< 0.5%	—	1%
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	Yes	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	8.09	6.42	127	62.6	0.56	3.35	30.1	33.4	3.19	8.69	11.9	—	80,212	80,212	1.04	11.2	152	83,715

Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	7.93	6.25	132	61.8	0.56	3.35	30.1	33.4	3.19	8.69	11.9	—	80,212	80,212	1.05	11.2	3.94	83,574
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	2.62	2.13	32.4	21.1	0.12	0.98	6.00	6.99	0.92	1.84	2.76	—	16,345	16,345	0.27	2.01	11.7	16,962
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.48	0.39	5.91	3.85	0.02	0.18	1.10	1.28	0.17	0.34	0.50	—	2,706	2,706	0.04	0.33	1.94	2,808

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	3.49	2.69	87.6	73.2	0.56	1.62	30.1	31.7	1.61	8.69	10.3	—	80,503	80,503	1.06	11.2	152	84,007
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	3.33	2.52	93.3	72.4	0.56	1.62	30.1	31.7	1.61	8.69	10.3	—	80,503	80,503	1.06	11.2	3.94	83,866
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.96	0.79	18.7	23.5	0.12	0.37	6.00	6.37	0.36	1.84	2.20	—	16,100	16,100	0.26	2.01	11.7	16,716
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.18	0.14	3.41	4.28	0.02	0.07	1.10	1.16	0.07	0.34	0.40	—	2,666	2,666	0.04	0.33	1.94	2,768

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,000
Unmit.	—	—	No	—	—	—	—	—	—	—	—	—	—	—	—	—	—	No

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3. Construction Emissions Details

3.1. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	4.92	4.14	40.8	34.3	0.08	1.71	—	1.71	1.57	—	1.57	—	8,209	8,209	0.33	0.07	—	8,237
Dust From Material Movement	—	—	—	—	—	—	8.14	8.14	—	3.54	3.54	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.17	1.68	1.41	< 0.005	0.07	—	0.07	0.06	—	0.06	—	337	337	0.01	< 0.005	—	339
Dust From Material Movement	—	—	—	—	—	—	0.33	0.33	—	0.15	0.15	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.31	0.26	< 0.005	0.01	—	0.01	0.01	—	0.01	—	55.9	55.9	< 0.005	< 0.005	—	56.0
Dust From Material Movement	—	—	—	—	—	—	0.06	0.06	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.08	0.74	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	161	161	0.01	0.01	0.02	163

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.09	7.09	< 0.005	< 0.005	0.01	7.19
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.17	1.17	< 0.005	< 0.005	< 0.005	1.19
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.2. Site Preparation (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.42	0.42	2.17	24.1	0.04	0.08	—	0.08	0.08	—	0.08	—	4,421	4,421	0.18	0.04	—	4,436
Dust From Material Movement	—	—	—	—	—	—	8.14	8.14	—	3.54	3.54	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.09	0.99	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	182	182	0.01	< 0.005	—	182
Dust From Material Movement	—	—	—	—	—	—	0.33	0.33	—	0.15	0.15	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.18	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	30.1	30.1	< 0.005	< 0.005	—	30.2
Dust From Material Movement	—	—	—	—	—	—	0.06	0.06	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.08	0.74	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	161	161	0.01	0.01	0.02	163
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.09	7.09	< 0.005	< 0.005	0.01	7.19
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.17	1.17	< 0.005	< 0.005	< 0.005	1.19
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	6.49	5.46	45.0	43.2	0.11	1.84	—	1.84	1.69	—	1.69	—	11,996	11,996	0.49	0.10	—	12,037
Dust From Material Movement	—	—	—	—	—	—	7.08	7.08	—	3.42	3.42	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.27	0.22	1.85	1.77	< 0.005	0.08	—	0.08	0.07	—	0.07	—	493	493	0.02	< 0.005	—	495
Dust From Material Movement	—	—	—	—	—	—	0.29	0.29	—	0.14	0.14	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.34	0.32	< 0.005	0.01	—	0.01	0.01	—	0.01	—	81.6	81.6	< 0.005	< 0.005	—	81.9
Dust From Material Movement	—	—	—	—	—	—	0.05	0.05	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.10	0.15	1.47	0.00	0.00	0.33	0.33	0.00	0.08	0.08	—	323	323	0.02	0.01	0.04	327
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.01	0.08	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	14.2	14.2	< 0.005	< 0.005	0.03	14.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.35	2.35	< 0.005	< 0.005	< 0.005	2.38
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.4. Site Preparation (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.85	0.81	4.66	35.9	0.06	0.18	—	0.18	0.18	—	0.18	—	6,775	6,775	0.27	0.05	—	6,798
Dust From Material Movement	—	—	—	—	—	—	7.08	7.08	—	3.42	3.42	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.19	1.47	< 0.005	0.01	—	0.01	0.01	—	0.01	—	278	278	0.01	< 0.005	—	279
Dust From Material Movement	—	—	—	—	—	—	0.29	0.29	—	0.14	0.14	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.03	0.27	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	46.1	46.1	< 0.005	< 0.005	—	46.3

Dust From Material Movement	—	—	—	—	—	—	0.05	0.05	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.10	0.15	1.47	0.00	0.00	0.33	0.33	0.00	0.08	0.08	—	323	323	0.02	0.01	0.04	327
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.01	0.08	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	14.2	14.2	< 0.005	< 0.005	0.03	14.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.35	2.35	< 0.005	< 0.005	< 0.005	2.38
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	5.76	4.84	47.1	41.9	0.09	2.01	—	2.01	1.85	—	1.85	—	9,350	9,350	0.38	0.08	—	9,382
Dust From Material Movement	—	—	—	—	—	—	11.3	11.3	—	3.91	3.91	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	5.76	4.84	47.1	41.9	0.09	2.01	—	2.01	1.85	—	1.85	—	9,350	9,350	0.38	0.08	—	9,382
Dust From Material Movement	—	—	—	—	—	—	11.3	11.3	—	3.91	3.91	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.03	0.86	8.39	7.45	0.02	0.36	—	0.36	0.33	—	0.33	—	1,665	1,665	0.07	0.01	—	1,671
Dust From Material Movement	—	—	—	—	—	—	2.02	2.02	—	0.70	0.70	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.19	0.16	1.53	1.36	< 0.005	0.07	—	0.07	0.06	—	0.06	—	276	276	0.01	< 0.005	—	277

Dust From Material Movement	—	—	—	—	—	—	0.37	0.37	—	0.13	0.13	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	0.16	2.84	0.00	0.00	0.36	0.36	0.00	0.08	0.08	—	417	417	0.02	0.01	1.56	423
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.17	1.43	79.4	17.9	0.47	1.34	18.4	19.7	1.34	4.70	6.04	—	70,444	70,444	0.65	11.1	150	73,909
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.11	0.17	1.62	0.00	0.00	0.36	0.36	0.00	0.08	0.08	—	355	355	0.02	0.01	0.04	359
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.03	1.30	85.1	18.3	0.47	1.34	18.4	19.7	1.34	4.70	6.04	—	70,507	70,507	0.65	11.1	3.90	73,832
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.03	0.36	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	67.6	67.6	< 0.005	< 0.005	0.12	68.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.38	0.25	14.9	3.22	0.08	0.24	3.26	3.50	0.24	0.83	1.07	—	12,550	12,550	0.12	1.98	11.5	13,153
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.2	11.2	< 0.005	< 0.005	0.02	11.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.07	0.05	2.71	0.59	0.02	0.04	0.59	0.64	0.04	0.15	0.20	—	2,078	2,078	0.02	0.33	1.90	2,178

3.6. Grading (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.15	1.11	8.04	52.4	0.09	0.28	—	0.28	0.27	—	0.27	—	9,641	9,641	0.39	0.08	—	9,674
Dust From Material Movement	—	—	—	—	—	—	11.3	11.3	—	3.91	3.91	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.15	1.11	8.04	52.4	0.09	0.28	—	0.28	0.27	—	0.27	—	9,641	9,641	0.39	0.08	—	9,674
Dust From Material Movement	—	—	—	—	—	—	11.3	11.3	—	3.91	3.91	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	0.20	1.43	9.34	0.02	0.05	—	0.05	0.05	—	0.05	—	1,717	1,717	0.07	0.01	—	1,723
Dust From Material Movement	—	—	—	—	—	—	2.02	2.02	—	0.70	0.70	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.04	0.26	1.70	< 0.005	0.01	—	0.01	0.01	—	0.01	—	284	284	0.01	< 0.005	—	285
Dust From Material Movement	—	—	—	—	—	—	0.37	0.37	—	0.13	0.13	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	0.16	2.84	0.00	0.00	0.36	0.36	0.00	0.08	0.08	—	417	417	0.02	0.01	1.56	423
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.17	1.43	79.4	17.9	0.47	1.34	18.4	19.7	1.34	4.70	6.04	—	70,444	70,444	0.65	11.1	150	73,909
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.11	0.17	1.62	0.00	0.00	0.36	0.36	0.00	0.08	0.08	—	355	355	0.02	0.01	0.04	359
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.03	1.30	85.1	18.3	0.47	1.34	18.4	19.7	1.34	4.70	6.04	—	70,507	70,507	0.65	11.1	3.90	73,832
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.03	0.36	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	67.6	67.6	< 0.005	< 0.005	0.12	68.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.38	0.25	14.9	3.22	0.08	0.24	3.26	3.50	0.24	0.83	1.07	—	12,550	12,550	0.12	1.98	11.5	13,153
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.2	11.2	< 0.005	< 0.005	0.02	11.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.07	0.05	2.71	0.59	0.02	0.04	0.59	0.64	0.04	0.15	0.20	—	2,078	2,078	0.02	0.33	1.90	2,178

3.7. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.70	1.42	13.3	15.8	0.03	0.57	—	0.57	0.52	—	0.52	—	2,901	2,901	0.12	0.02	—	2,911
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.70	1.42	13.3	15.8	0.03	0.57	—	0.57	0.52	—	0.52	—	2,901	2,901	0.12	0.02	—	2,911
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.60	0.50	4.71	5.58	0.01	0.20	—	0.20	0.18	—	0.18	—	1,025	1,025	0.04	0.01	—	1,029
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.09	0.86	1.02	< 0.005	0.04	—	0.04	0.03	—	0.03	—	170	170	0.01	< 0.005	—	170
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.75	0.67	5.42	18.9	0.03	0.18	—	0.18	0.17	—	0.17	—	3,109	3,109	0.13	0.03	—	3,120
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.75	0.67	5.42	18.9	0.03	0.18	—	0.18	0.17	—	0.17	—	3,109	3,109	0.13	0.03	—	3,120
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.27	0.24	1.92	6.69	0.01	0.06	—	0.06	0.06	—	0.06	—	1,099	1,099	0.04	0.01	—	1,103
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.35	1.22	< 0.005	0.01	—	0.01	0.01	—	0.01	—	182	182	0.01	< 0.005	—	183
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Paving (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.84	0.70	6.89	9.02	0.01	0.34	—	0.34	0.32	—	0.32	—	1,370	1,370	0.06	0.01	—	1,375
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.84	0.70	6.89	9.02	0.01	0.34	—	0.34	0.32	—	0.32	—	1,370	1,370	0.06	0.01	—	1,375
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.08	0.83	1.09	< 0.005	0.04	—	0.04	0.04	—	0.04	—	165	165	0.01	< 0.005	—	166
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.15	0.20	< 0.005	0.01	—	0.01	0.01	—	0.01	—	27.3	27.3	< 0.005	< 0.005	—	27.4
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.29	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	190	190	0.01	0.01	0.71	192
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.08	0.74	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	161	161	0.01	0.01	0.02	163
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	20.8	20.8	< 0.005	< 0.005	0.04	21.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.44	3.44	< 0.005	< 0.005	0.01	3.49
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Paving (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.14	1.27	9.61	0.01	0.03	—	0.03	0.03	—	0.03	—	1,370	1,370	0.06	0.01	—	1,375
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	0.14	1.27	9.61	0.01	0.03	—	0.03	0.03	—	0.03	—	1,370	1,370	0.06	0.01	—	1,375
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.15	1.16	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	165	165	0.01	< 0.005	—	166
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	27.3	27.3	< 0.005	< 0.005	—	27.4
Paving	—	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.29	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	190	190	0.01	0.01	0.71	192
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.08	0.74	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	161	161	0.01	0.01	0.02	163
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	20.8	20.8	< 0.005	< 0.005	0.04	21.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.44	3.44	< 0.005	< 0.005	0.01	3.49
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.3. Area Emissions by Source

4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Consumer Products	—	0.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.3.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Consumer Products	—	0.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.4.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.5.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Remove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	1/8/2024	1/28/2024	5.00	15.0	—
Site Cleanup	Site Preparation	11/24/2024	12/13/2024	5.00	15.0	—

Grading	Grading	1/29/2024	4/27/2024	5.00	65.0	—
Channel Lining / Grade Control Structures	Building Construction	4/28/2024	10/24/2024	5.00	129	—
Paving	Paving	9/24/2024	11/23/2024	5.00	44.0	Roadway Paving

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Site Preparation	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Preparation	Scrapers	Diesel	Average	1.00	8.00	423	0.48
Site Cleanup	Excavators	Diesel	Average	1.00	8.00	367	0.40
Site Cleanup	Graders	Diesel	Average	1.00	8.00	84.0	0.37
Site Cleanup	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Site Cleanup	Signal Boards	Diesel	Average	2.00	8.00	6.00	0.82
Site Cleanup	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Site Cleanup	Off-Highway Trucks	Diesel	Average	2.00	8.00	376	0.38
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Graders	Diesel	Average	2.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Grading	Scrapers	Diesel	Average	3.00	8.00	423	0.48
Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Channel Lining / Grade Control Structures	Excavators	Diesel	Average	1.00	8.00	367	0.29

Channel Lining / Grade Control Structures	Graders	Diesel	Average	1.00	8.00	82.0	0.20
Channel Lining / Grade Control Structures	Off-Highway Trucks	Diesel	Average	2.00	8.00	14.0	0.74
Channel Lining / Grade Control Structures	Cement and Mortar Mixers	Diesel	Average	2.00	8.00	84.0	0.37
Channel Lining / Grade Control Structures	Forklifts	Diesel	Average	1.00	8.00	46.0	0.45
Channel Lining / Grade Control Structures	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Graders	Diesel	Average	1.00	8.00	81.0	0.42
Paving	Off-Highway Trucks	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	1.00	8.00	36.0	0.38
Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.00	8.00	84.0	0.37
Site Preparation	Graders	Diesel	Tier 4 Final	1.00	8.00	148	0.41
Site Preparation	Scrapers	Diesel	Tier 4 Final	1.00	8.00	423	0.48
Site Cleanup	Excavators	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Site Cleanup	Graders	Diesel	Tier 4 Final	1.00	8.00	84.0	0.37
Site Cleanup	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Site Cleanup	Signal Boards	Diesel	Average	2.00	8.00	6.00	0.82
Site Cleanup	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	8.00	84.0	0.37
Site Cleanup	Off-Highway Trucks	Diesel	Tier 4 Final	2.00	8.00	376	0.38
Grading	Excavators	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38

Grading	Graders	Diesel	Tier 4 Final	2.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Grading	Scrapers	Diesel	Tier 4 Final	3.00	8.00	423	0.48
Grading	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Grading	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.00	8.00	84.0	0.37
Channel Lining / Grade Control Structures	Excavators	Diesel	Tier 4 Final	1.00	8.00	367	0.29
Channel Lining / Grade Control Structures	Graders	Diesel	Tier 4 Final	1.00	8.00	82.0	0.20
Channel Lining / Grade Control Structures	Off-Highway Trucks	Diesel	Average	2.00	8.00	14.0	0.74
Channel Lining / Grade Control Structures	Cement and Mortar Mixers	Diesel	Tier 4 Final	2.00	8.00	84.0	0.37
Channel Lining / Grade Control Structures	Forklifts	Diesel	Tier 4 Final	1.00	8.00	46.0	0.45
Channel Lining / Grade Control Structures	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	7.00	84.0	0.37
Paving	Graders	Diesel	Tier 4 Final	1.00	8.00	81.0	0.42
Paving	Off-Highway Trucks	Diesel	Tier 4 Final	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Tier 4 Final	1.00	8.00	36.0	0.38
Paving	Pavers	Diesel	Tier 4 Final	1.00	8.00	81.0	0.42

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	12.5	18.5	LDA,LDT1,LDT2

Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	27.5	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	1,014	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Channel Lining / Grade Control Structures	—	—	—	—
Channel Lining / Grade Control Structures	Worker	0.00	18.5	LDA,LDT1,LDT2
Channel Lining / Grade Control Structures	Vendor	0.00	10.2	HHDT,MHDT
Channel Lining / Grade Control Structures	Hauling	0.00	20.0	HHDT
Channel Lining / Grade Control Structures	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	12.5	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Site Cleanup	—	—	—	—
Site Cleanup	Worker	25.0	18.5	LDA,LDT1,LDT2
Site Cleanup	Vendor	—	10.2	HHDT,MHDT
Site Cleanup	Hauling	0.00	20.0	HHDT
Site Cleanup	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	12.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	27.5	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	1,014	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Channel Lining / Grade Control Structures	—	—	—	—
Channel Lining / Grade Control Structures	Worker	0.00	18.5	LDA,LDT1,LDT2
Channel Lining / Grade Control Structures	Vendor	0.00	10.2	HHDT,MHDT
Channel Lining / Grade Control Structures	Hauling	0.00	20.0	HHDT
Channel Lining / Grade Control Structures	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	12.5	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Site Cleanup	—	—	—	—
Site Cleanup	Worker	25.0	18.5	LDA,LDT1,LDT2

Site Cleanup	Vendor	—	10.2	HHDT,MHDT
Site Cleanup	Hauling	0.00	20.0	HHDT
Site Cleanup	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	—	—	30.0	0.00	—
Site Cleanup	—	—	15.0	0.00	—
Grading	—	527,400	422	0.00	—
Paving	0.00	0.00	0.00	0.00	81.0

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Other Non-Asphalt Surfaces	81.0	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	457	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

0	0.00	0.00	0.00	211,702

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Other Non-Asphalt Surfaces	0.00	457	0.0330	0.0040	0.00

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Other Non-Asphalt Surfaces	0.00	457	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Other Non-Asphalt Surfaces	0.00	0.00

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Other Non-Asphalt Surfaces	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Other Non-Asphalt Surfaces	0.00	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Other Non-Asphalt Surfaces	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type
—	—

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	24.4	annual days of extreme heat

Extreme Precipitation	0.00	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	0.14	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider different increments of sea level rise coupled with extreme storm events. Users may select from four model simulations to view the range in potential inundation depth for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 50 meters (m) by 50 m, or about 164 feet (ft) by 164 ft.
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	91.1
AQ-PM	8.13
AQ-DPM	3.15
Drinking Water	49.2
Lead Risk Housing	1.27
Pesticides	77.4

Toxic Releases	2.60
Traffic	54.6
Effect Indicators	—
CleanUp Sites	0.00
Groundwater	0.00
Haz Waste Facilities/Generators	16.6
Impaired Water Bodies	77.3
Solid Waste	0.00
Sensitive Population	—
Asthma	22.6
Cardio-vascular	44.6
Low Birth Weights	—
Socioeconomic Factor Indicators	—
Education	5.86
Housing	61.3
Linguistic	42.8
Poverty	36.8
Unemployment	57.2

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	71.17926344
Employed	1.065058386
Median HI	51.90555627
Education	—

Bachelor's or higher	74.27178237
High school enrollment	100
Preschool enrollment	68.16373669
Transportation	—
Auto Access	86.34672142
Active commuting	1.039394328
Social	—
2-parent households	8.969588092
Voting	98.11369177
Neighborhood	—
Alcohol availability	97.0101373
Park access	16.00153984
Retail density	1.911972283
Supermarket access	2.399589375
Tree canopy	1.847812139
Housing	—
Homeownership	93.26318491
Housing habitability	65.25086616
Low-inc homeowner severe housing cost burden	19.53034775
Low-inc renter severe housing cost burden	21.50648017
Uncrowded housing	96.93314513
Health Outcomes	—
Insured adults	81.30373412
Arthritis	0.5
Asthma ER Admissions	73.5
High Blood Pressure	0.5
Cancer (excluding skin)	0.6

Asthma	61.7
Coronary Heart Disease	1.2
Chronic Obstructive Pulmonary Disease	7.1
Diagnosed Diabetes	11.3
Life Expectancy at Birth	26.1
Cognitively Disabled	48.3
Physically Disabled	13.7
Heart Attack ER Admissions	55.6
Mental Health Not Good	90.9
Chronic Kidney Disease	1.7
Obesity	44.9
Pedestrian Injuries	19.6
Physical Health Not Good	45.1
Stroke	5.6
Health Risk Behaviors	—
Binge Drinking	98.7
Current Smoker	92.2
No Leisure Time for Physical Activity	61.9
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	98.2
Elderly	0.3
English Speaking	72.1
Foreign-born	30.7
Outdoor Workers	65.5
Climate Change Adaptive Capacity	—

Impervious Surface Cover	56.4
Traffic Density	64.2
Traffic Access	23.0
Other Indices	—
Hardship	55.3
Other Decision Support	—
2016 Voting	98.4

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	24.0
Healthy Places Index Score for Project Location (b)	43.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification

Construction: Construction Phases	Construction Schedule
Construction: Off-Road Equipment	Construction Schedule
Construction: Dust From Material Movement	earthwork quantities

1000 Palms Maintenance Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	1000 Palms Maintenance
Construction Start Date	4/1/2026
Operational Year	2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.00
Precipitation (days)	7.60
Location	33.74333651115906, -116.25121989876223
County	Riverside-Salton Sea
City	Indio
Air District	South Coast AQMD
Air Basin	Salton Sea
TAZ	5657
EDFZ	19
Electric Utility	Imperial Irrigation District
Gas Utility	Southern California Gas
App Version	2022.1.1.10

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

Other Non-Asphalt Surfaces	81.0	Acre	81.0	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.44	2.06	15.6	17.9	0.04	0.62	0.69	1.31	0.57	0.10	0.66	—	4,808	4,808	0.19	0.04	0.58	4,827
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.29	0.25	1.88	2.12	0.01	0.07	0.08	0.16	0.07	0.01	0.08	—	578	578	0.02	0.01	0.03	580
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.05	0.05	0.34	0.39	< 0.005	0.01	0.02	0.03	0.01	< 0.005	0.01	—	95.6	95.6	< 0.005	< 0.005	0.01	96.0
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	Yes	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	Yes	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,000
Unmit.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	No

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	2.44	2.06	15.6	17.9	0.04	0.62	0.69	1.31	0.57	0.10	0.66	—	4,808	4,808	0.19	0.04	0.58	4,827
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.29	0.25	1.88	2.12	0.01	0.07	0.08	0.16	0.07	0.01	0.08	—	578	578	0.02	0.01	0.03	580
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.05	0.05	0.34	0.39	< 0.005	0.01	0.02	0.03	0.01	< 0.005	0.01	—	95.6	95.6	< 0.005	< 0.005	0.01	96.0

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	0.00	0.55	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	0.00	0.55	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	0.00	0.10	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3. Construction Emissions Details

3.1. Site Preparation (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.38	2.00	15.5	16.8	0.04	0.62	—	0.62	0.57	—	0.57	—	4,627	4,627	0.19	0.04	—	4,642
Dust From Material Movement	—	—	—	—	—	—	0.53	0.53	—	0.06	0.06	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.29	0.24	1.87	2.03	0.01	0.07	—	0.07	0.07	—	0.07	—	558	558	0.02	< 0.005	—	560
Dust From Material Movement	—	—	—	—	—	—	0.06	0.06	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.34	0.37	< 0.005	0.01	—	0.01	0.01	—	0.01	—	92.3	92.3	< 0.005	< 0.005	—	92.7
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.06	1.11	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	182	182	0.01	0.01	0.58	184
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	19.9	19.9	< 0.005	< 0.005	0.03	20.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.30	3.30	< 0.005	< 0.005	0.01	3.34
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.3. Area Emissions by Source

4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.55	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Architectural	—	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.10	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	4/1/2026	6/1/2026	5.00	44.0	2 maintenance events, each lasting 1 month

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Other Construction Equipment	Diesel	Average	1.00	8.00	367	0.40
Site Preparation	Graders	Diesel	Average	1.00	8.00	84.0	0.37
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Site Preparation	Off-Highway Trucks	Diesel	Average	2.00	8.00	376	0.38

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	12.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	—	—	22.0	0.00	—

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Other Non-Asphalt Surfaces	81.0	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	457	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	0.00	0.00	211,702

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO_2 and CH_4 and N_2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO_2	CH_4	N_2O	Natural Gas (kBTU/yr)
Other Non-Asphalt Surfaces	0.00	457	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Other Non-Asphalt Surfaces	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Other Non-Asphalt Surfaces	0.00	0.00

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type
—	—

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	24.4	annual days of extreme heat
Extreme Precipitation	0.00	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	0.14	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider different increments of sea level rise coupled with extreme storm events. Users may select from four model simulations to view the range in potential inundation depth for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 50 meters (m) by 50 m, or about 164 feet (ft) by 164 ft.

Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A

Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	91.1
AQ-PM	8.13
AQ-DPM	3.15
Drinking Water	49.2
Lead Risk Housing	1.27
Pesticides	77.4
Toxic Releases	2.60
Traffic	54.6
Effect Indicators	—
CleanUp Sites	0.00
Groundwater	0.00
Haz Waste Facilities/Generators	16.6
Impaired Water Bodies	77.3
Solid Waste	0.00

Sensitive Population	—
Asthma	22.6
Cardio-vascular	44.6
Low Birth Weights	—
Socioeconomic Factor Indicators	—
Education	5.86
Housing	61.3
Linguistic	42.8
Poverty	36.8
Unemployment	57.2

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	71.17926344
Employed	1.065058386
Median HI	51.90555627
Education	—
Bachelor's or higher	74.27178237
High school enrollment	100
Preschool enrollment	68.16373669
Transportation	—
Auto Access	86.34672142
Active commuting	1.039394328
Social	—
2-parent households	8.969588092

Voting	98.11369177
Neighborhood	—
Alcohol availability	97.0101373
Park access	16.00153984
Retail density	1.911972283
Supermarket access	2.399589375
Tree canopy	1.847812139
Housing	—
Homeownership	93.26318491
Housing habitability	65.25086616
Low-inc homeowner severe housing cost burden	19.53034775
Low-inc renter severe housing cost burden	21.50648017
Uncrowded housing	96.93314513
Health Outcomes	—
Insured adults	81.30373412
Arthritis	0.5
Asthma ER Admissions	73.5
High Blood Pressure	0.5
Cancer (excluding skin)	0.6
Asthma	61.7
Coronary Heart Disease	1.2
Chronic Obstructive Pulmonary Disease	7.1
Diagnosed Diabetes	11.3
Life Expectancy at Birth	26.1
Cognitively Disabled	48.3
Physically Disabled	13.7
Heart Attack ER Admissions	55.6

Mental Health Not Good	90.9
Chronic Kidney Disease	1.7
Obesity	44.9
Pedestrian Injuries	19.6
Physical Health Not Good	45.1
Stroke	5.6
Health Risk Behaviors	—
Binge Drinking	98.7
Current Smoker	92.2
No Leisure Time for Physical Activity	61.9
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	98.2
Elderly	0.3
English Speaking	72.1
Foreign-born	30.7
Outdoor Workers	65.5
Climate Change Adaptive Capacity	—
Impervious Surface Cover	56.4
Traffic Density	64.2
Traffic Access	23.0
Other Indices	—
Hardship	55.3
Other Decision Support	—
2016 Voting	98.4

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	24.0
Healthy Places Index Score for Project Location (b)	43.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	annual maintenance events for thousand palms channel, activities similar to site prep, clearing vegetation and doing minor repairs
Construction: Off-Road Equipment	maintenance equipment

Appendix B1:
Biological Resources Assessment

Biological Resources Assessment

Thousand Palms Channel Improvement Project

MAY 2023, REVISED JUNE 2024

PREPARED FOR

Coachella Valley Water District
51501 Tyler Street
Coachella, California 92236

PREPARED BY

SWCA Environmental Consultants
320 N. Halstead Street, Ste. 120
Pasadena, California 91107

BIOLOGICAL RESOURCES ASSESSMENT
FOR THE
THOUSAND PALMS CHANNEL IMPROVEMENT PROJECT

Prepared for

Coachella Valley Water District
51501 Tyler Street
Coachella, California 92236

Prepared by

Jacqueline Bowland Worden, Lead Biologist

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SWCA Project No. 71080

May 2023, Revised June 2024

EXECUTIVE SUMMARY

Kimley-Horn and Associates, Inc. retained SWCA Environmental Consultants (SWCA) to conduct a biological resources assessment in support of the Thousand Palms Channel Improvements Project (project), proposed by the Coachella Valley Water District (District). The project is located along the Thousand Palms Channel, generally between the Coachella Valley Stormwater Channel (CVSC) and the Coachella Canal near Sun City Shadow Hills in the city of Indio, Riverside County, California. The District proposes to improve the existing unlined Thousand Palms Channel to receive regional flood flows from the North Indio Hills and Thousand Palms areas and improve the channel's confluence with the CVSC.

This report provides the biological assessment of the approximately 80-acre Study Area centered along the Thousand Palms Channel, downstream of the Coachella Canal. The latter is a 122-mile aqueduct system that conveys water from the Colorado River and connects Lake Cahuilla and conveys water to agriculture.

The project site straddles two U.S. Geological Survey 7.5-minute quadrangle maps (quads), lying at the upper northeast corner of the *La Quinta* quad and the upper northwest corner of the *Indio* quad. The project is located at approximate coordinates 33.740115°N, -116.249893°W within Sections 9, 10, 15, and 16 of Township 5 South, Range 7 East.

This assessment was conducted to analyze potential impacts the project may have on biological resources in the study area and to facilitate compliance with the California Environmental Quality Act (CEQA).

ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
City	City of Indio
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDNPA	California Desert Native Plants Act
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CVAG	Coachella Valley Association of Governments
CVMSHCP	Coachella Valley Multi-Species Habitat Conservation Plan
CVSC	Coachella Valley Stormwater Channel
CWA	Clean Water Act
District	Coachella Valley Water District
ESA	Endangered Species Act
FESA	Federal Endangered Species Act
MCV2	A Manual of California Vegetation. Second edition
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NPPA	Native Plant Protection Act
NRCS	Natural Resource Conservation Service
Project	Thousand Palms Channel Improvements Project
PRC	Public Resources Code
SWCA	SWCA Environmental Consultants
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USC	United States Code

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Appendices

Figures

1 PROJECT DESCRIPTION & LOCATION

SWCA Environmental Consultants (SWCA) was retained by Kimley-Horn and Associates, Inc. to prepare a biological resource assessment of the Thousand Palms Channel Improvements Project (Project) proposed by the Coachella Valley Water District (District). The project is located along the Thousand Palms Channel, generally between the Coachella Valley Stormwater Channel (CVSC) and the Coachella Canal near Sun City Shadow Hills in the city of Indio, Riverside County, California. The District proposes to improve the existing unlined Thousand Palms Channel to receive regional flood flows from the North Indio Hills and Thousand Palms areas and improve the channel's confluence with the CVSC.

The Thousand Palms Channel (Channel) project includes constructing the last conveyance facility intended to receive regional flood flows from the North Indio Hills and Thousand Palms areas. To this point, the Project would improve the Thousand Palms Channel to the confluence with the Coachella Valley Stormwater Channel (CVSC).

In its existing condition, the Channel is in earthen bottom channel with earthen side slopes. In its existing condition, there are sections of the Channel that have been incised and other sections that have had berms constructed. These berms are not FEMA certified levees. Additionally, there are two at-grade roadway crossings at Madison Street and Avenue 42, as well as a bridge crossing under Interstate (I-) 10. In its existing conditions, the Channel is unable to accommodate the 100-year flow rate throughout the entirety of the Thousand Palms Channel along the project reach. The portion of the Channel north of the Avenue 42 crossing does not have the capacity to convey the 100-year flowrate of 16,836 cubic feet per second.

The project's preliminary design report evaluated four different alternatives and resulted in a preferred alternative consisting of an earthen channel with concrete side slopes. The proposed Thousand Palms Channel from Sun City Shadow Hills to the CVSC would cross Madison Street and Avenue 42, would include three concrete lined drop structures, and improve the confluence point with the CVSC. Currently, the Coachella Canal crosses under the Thousand Palms Channel via a reinforced concrete siphon, and a concrete drop structure is located within the Thousand Palms Channel alignment at the location of the siphon to protect the siphon from scour and erosion. As part of the current project, the Coachella Canal, siphon and drop structure are proposed to be protected in place. The drop structure will be extended further downstream and to a lower level to provide the necessary scour protection associated with the ultimate channel design. Concrete slope lining will be installed along the lower 16'- 6" limits of the existing structure to raise the top of walls to a constant elevation of 32.68 feet, NGVD29 (35.0 ft NAVD88).

1.1 Project Location

The project site is located in the Coachella Valley within the City of Indio (City) in Riverside County California (**Figure 1 and Figure 2**). Work will occur in the manufactured Thousand Palms Channel (Channel), generally between the Coachella Valley Stormwater Channel and the Coachella Canal at Sun City Shadow Hills. The Project encompasses eight parcels (Assessor Parcel Numbers [APNs] 610020006, 610020007, 610020015, 610020016, 610030014, 610030020, 691190007, and 691510010).

The following parcels are under the jurisdiction of the federal government: APNs 691510010, 610020016, 610020006 and 610030014, and the following parcels are under the District's jurisdiction: APNs 610020007, 610030020, 610020007, and 610020015 (ParcelQuest 2023).

The project site straddles two U.S. Geological Survey 7.5-minute quadrangle maps (quads), lying at the upper northeast corner of the *La Quinta* quad and the upper northwest corner of the *Indio* quad (Figure 3). The project is located at approximate coordinates 33.740115°N, -116.249893°W within Sections 9, 10, 15, and 16 of Township 5 South, Range 7 East. Parcel ownership for the property on which the project site is located includes parcels owned by CVWD and Bureau of Reclamation ('USA') (**Figure 4**).

1.2 Site Characteristics

The Channel is heavily disturbed by mechanized equipment, likely for erosion repairs, as well as sediment and vegetation removal. Changes in vegetation and vehicle and equipment tracks over time are visible throughout the Channel on aerial imagery (Google Earth 2023). Madison Street traverses the northwestern portion of the Channel in a north-south direction. Avenue 42, a paved east/west two-lane road, crosses through the Channel as a low water crossing. Madison Street, a paved north/south two-lane road, parallels the western side of the work area north of Interstate 10, crossing the Channel at grade in the northern portion of the site. General surrounding land uses include agriculture, vacant land, and development such as residential, Shadow Hills South Golf Course, and roads. Project elevation ranges from about 2 feet to 30 feet above mean sea level.

Figure 1. Regional location.

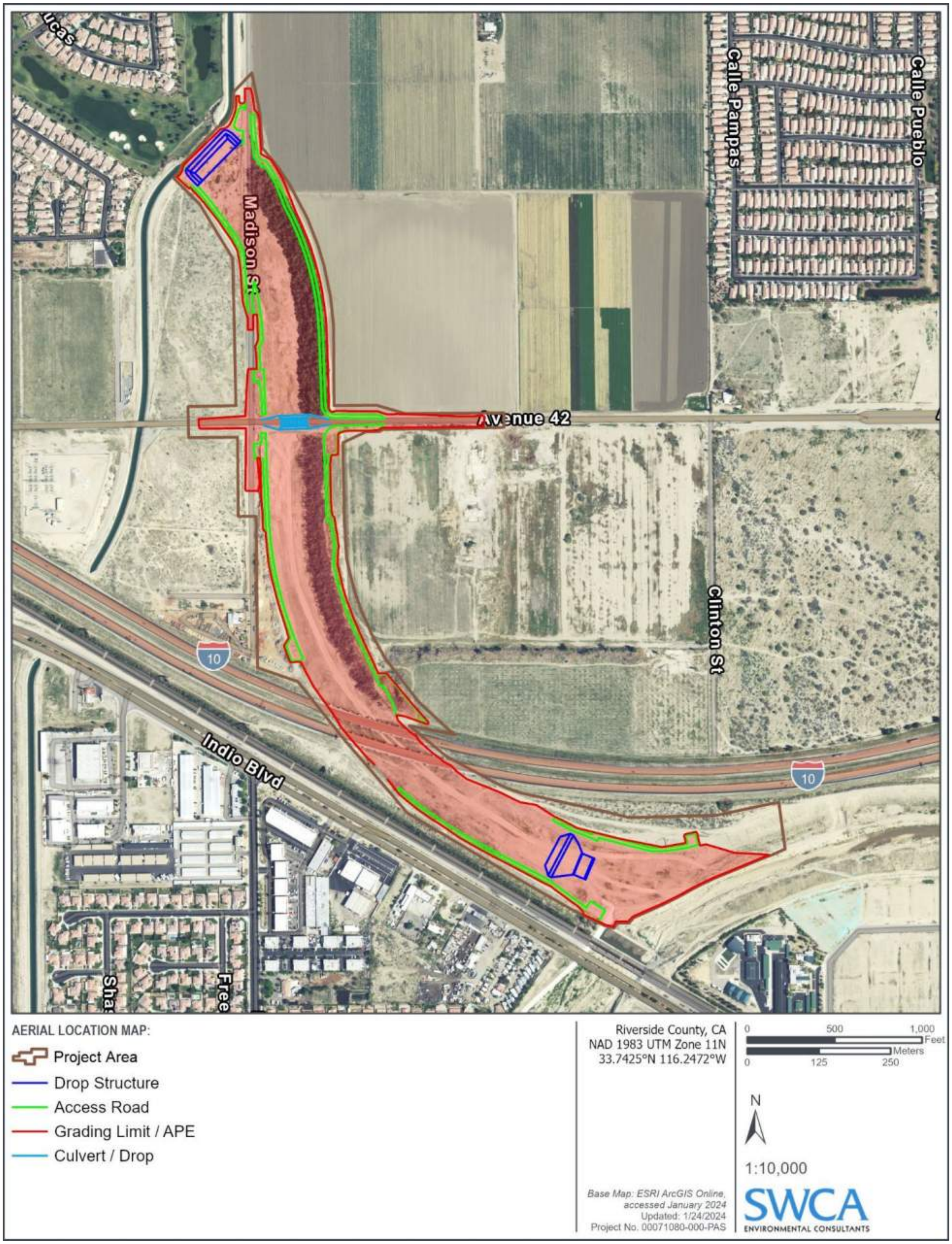

Figure 2. Vicinity location aerial.

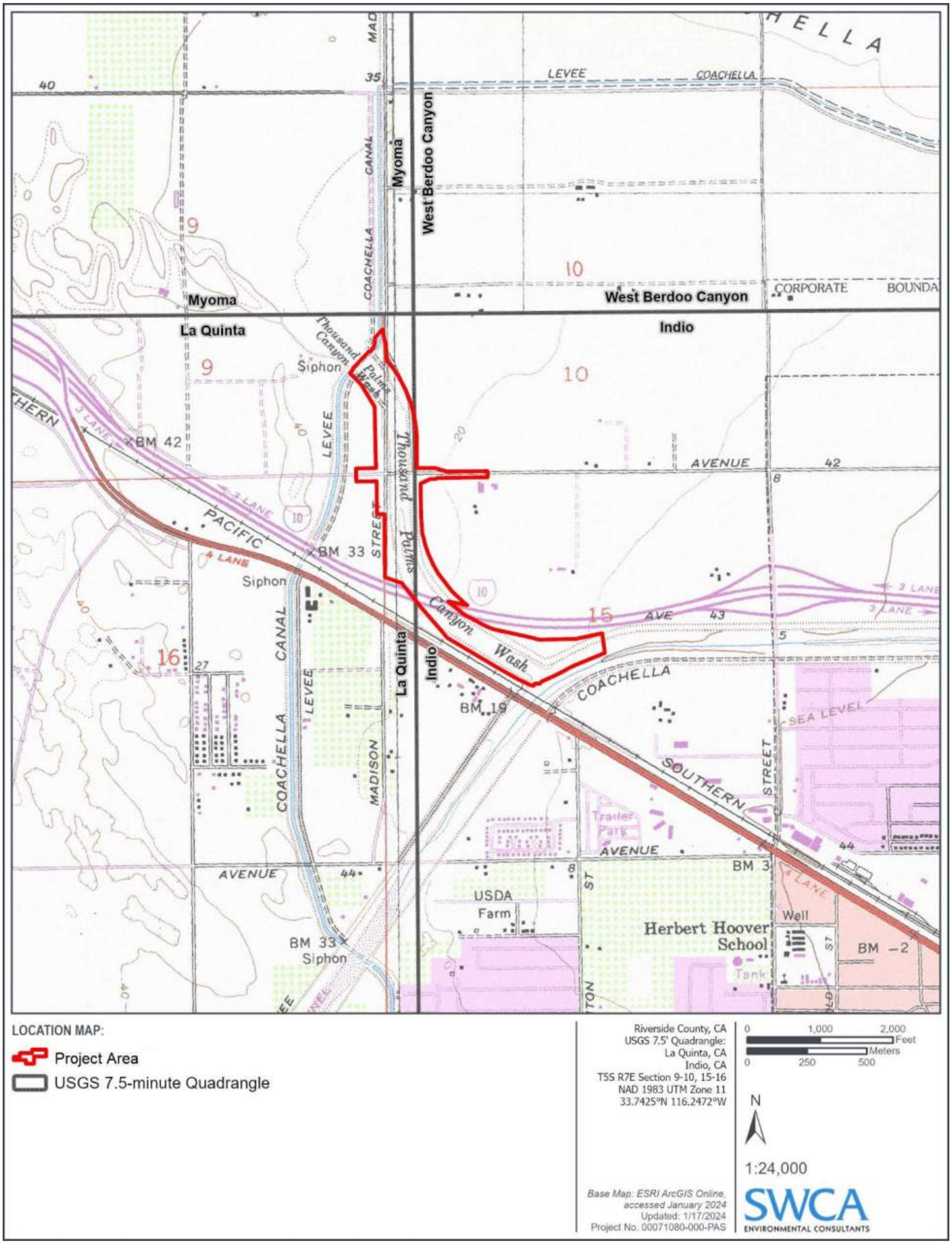

Figure 3. Vicinity topographic map.

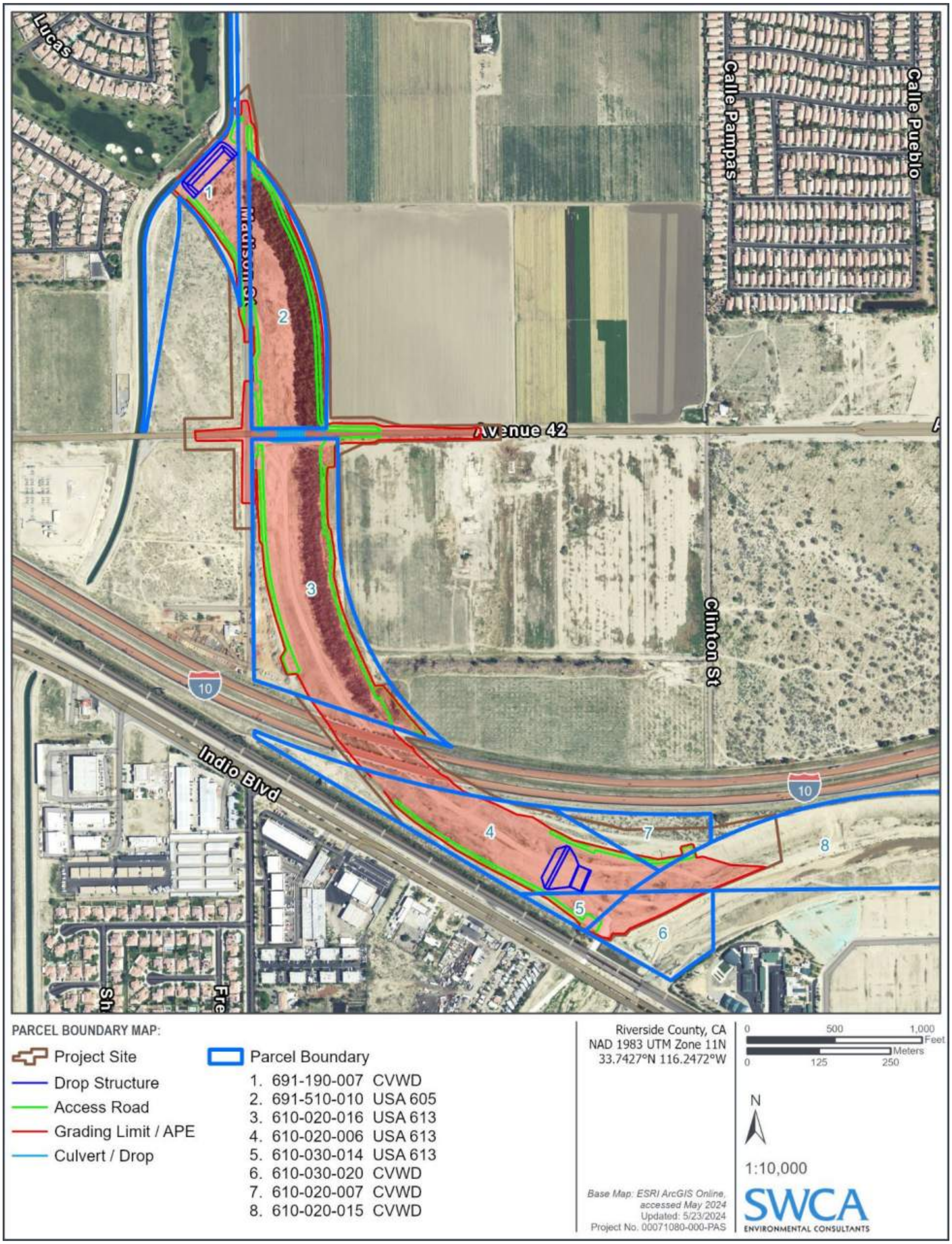

Figure 4. Parcel ownership map.

2 REGULATORY SETTING

2.1 Federal Regulations

2.1.1 Federal Endangered Species Act

The U.S. Congress passed the Endangered Species Act (ESA) in 1973 to protect endangered species and species threatened with extinction (federally listed species). The ESA operates in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend.

Section 9 of the ESA prohibits the "take" of endangered or threatened wildlife species. The legal definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 United States Code [USC] 1532 [19]). Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns (50 Code of Federal Regulations [CFR] 17.3). Harassment is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns (50 CFR 17.3). Actions that result in take can result in civil or criminal penalties. "Incidental take" is defined by the ESA as take that is incidental to, and not for the purpose of, carrying out an otherwise lawful activity.

The ESA authorizes the U.S. Fish and Wildlife Service (USFWS) to issue permits under Sections 7 and 10. Section 7 mandates that all federal agencies consult with the USFWS for terrestrial species and/or National Marine Fisheries Service for marine species to ensure that federal agency actions do not jeopardize the continued existence of a listed species or adversely modify critical habitat for listed species. Any anticipated adverse effects must be assessed to determine potential effects of the Project on listed species and critical habitat. If the Project may adversely affect a listed species or its habitat, the USFWS or National Marine Fisheries Service would need to prepare a Biological Opinion as part of the incidental take permit process. The Biological Opinion may recommend "reasonable and prudent alternatives" to the Project to avoid jeopardizing or adversely modifying habitat, including "take" limits.

Under Section 7, all federal agencies must ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its designated critical habitat. The ESA defines critical habitat as habitat deemed essential to the survival of a federally listed species and the federal government is required to designate "critical habitat" for any species it lists under the ESA regulations. A critical habitat designation does not set up a preserve or refuge, and applies only when federal funding, permits, or projects are involved. Critical habitat requirements do not apply to activities on private land and do not involve a federal agency.

Non-federal projects may still pursue Section 7 permitting when a federal nexus, such as federal funding or permitting (e.g., through the U.S. Army Corps of Engineers [USACE] under Section 404 of the federal Clean Water Act [CWA]), is available. When no nexus is available, Section 10(a)(1)(B) authorizes issuance of permits to allow "incidental take" of listed species. To obtain an incidental take permit, an applicant must submit a habitat conservation plan and conduct an assessment on the impacts of the action, outlining steps to minimize and mitigate permitted take impacts to listed species.

2.1.1.1 CRITICAL HABITAT

The Project is outside adopted or proposed designated critical habitat.

2.1.2 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA), first enacted in 1918, prohibits any person, unless permitted by regulations, to:

"…pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatsoever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention … for the protection of migratory birds ... or any part, nest, or egg of any such bird." (16 USC 703)

The list of migratory birds includes nearly all bird species native to the United States. The Migratory Bird Treaty Reform Act of 2004 further defined species protected under the act and excluded all non-native species. The statute was extended in 1974 to include parts of birds, as well as eggs and nests. Thus, it is illegal under the MBTA to directly kill, or destroy a nest of, nearly any native bird species, not just endangered species. Activities that result in removal or destruction of an active nest (a nest with eggs or young being attended by one or more adults) would violate the MBTA. Removal of unoccupied nests, and bird mortality resulting indirectly from disturbance activities, are not considered violations of the MBTA.

2.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668–668c), enacted in 1940, and amended several times since, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles (*Haliaeetus leucocephalus*), including their parts, nests, or eggs. In 1962, Congress amended the act to cover golden eagles (*Aquila chrysaetos*).

The act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

Under USFWS rules (16 USC § 22.3; 72 Federal Register 31,132, June 5, 2007), "disturb" means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

2.2 State Regulations

2.2.1 California Endangered Species Act

The California Department of Fish and Wildlife (CDFW; previously California Department of Fish and Game) administers the California Endangered Species Act (CESA), which prohibits the "taking" of listed species except as otherwise provided by state law. Section 86 of the Fish and Game Code defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." In addition to affording protections for species listed as threatened or endangered, the CESA applies these take prohibitions to species that have not yet been granted threatened or endangered status, but which are accepted as candidates for listing by the California Fish and Game Commission. Pursuant to the requirements of the CESA, State lead agencies (as defined under CEQA Public Resources Code [PRC] Section 21067) are required to consult with the CDFW to ensure that any action or project is not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of essential habitat. Additionally, the CDFW encourages informal consultation on any proposed project that may impact a candidate species. The CESA requires the CDFW to maintain a list of threatened and endangered species. The CDFW also maintains a list of candidates for listing under the CESA and a list of species of special concern (or watch list species).

2.2.2 Fully Protected Species

The California Department of Fish and Game (CDFG) Code provides protection from take for a variety of species, referred to as fully protected species. Section 5050 lists protected amphibians and reptiles, and Section 3515 prohibits take of fully protected fish species. Eggs and nests of fully protected birds are under Section 3511. Migratory nongame birds are protected under Section 3800, and mammals are protected under Section 4700. Except for take related to scientific research, all take of fully protected species is prohibited.

2.2.1 Nesting Birds and Raptors

Section 3503 of the CDFG Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 provides protection for all birds of prey, including their eggs and nests.

2.2.2 Migratory Bird Protection

Take or possession of any migratory non-game bird as designated in the MBTA is prohibited by Section 3513 of the CDFG Code.

2.2.3 Native Plant Protection Act

The Native Plant Protection Act (NPPA) of 1977 (CDFG Code Section 1900-1913) directed the CDFG (now CDFW) to carry out the Legislature's intent to "preserve, protect and enhance rare and endangered plants in this State." The NPPA gave the California Fish and Game Commission (under the CDFW) the power to designate native plants as "endangered" or "rare" and protect endangered and rare plants from take. The NPPA thus includes measures to preserve, protect, and enhance rare and endangered native plants.

CESA has largely superseded NPPA for all plants designated as endangered by the NPPA. The NPPA nevertheless provides limitations on take of rare and endangered species as follows: "...no person will import into this state, or take, possess, or sell within this State" any rare or endangered native plant, except in compliance with provisions of the CESA. Individual landowners are required to notify the CDFW at least 10 days in advance of changing land uses to allow the CDFW to salvage any rare or endangered native plant material.

2.2.4 California Desert Native Plants Act

The California Desert Native Plants Act (CDNPA) protects non-listed California desert native plants from unlawful harvesting on public and private lands in the counties of Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego (California Food and Agriculture Code, Sections 80001-80006, Division 23). A number of desert plants are protected under this act, including all species in the agave and cactus families.

2.2.5 California Environmental Quality Act

The CEQA was adopted in 1970 and applies to discretionary actions directly undertaken, financed, or permitted by State or local government lead agencies. CEQA requires that a project's effects on environmental resources must be analyzed and assessed using criteria determined by the lead agency. CEQA defines a rare species in a broader sense than the definitions of threatened, endangered, or California species of concern. Under this definition, the CDFW can request additional consideration of species not otherwise protected.

2.2.5.1 CEQA SIGNIFICANCE CRITERIA

Section 15064.7 of the CEQA guidelines encourages local agencies to develop and publish the thresholds that the agency will use in determining the significance of environmental effects caused by projects or actions under its review. Appendix G of the CEQA guidelines provides thresholds to evaluate impacts that would normally be considered significant. Based upon these guidelines, impacts to biological resources would normally be considered significant if the project:

a. Has a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS;

b. Has a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the CDFW or USFWS;

c. Has a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

d. Interferes substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites;

e. Conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or

f. Conflicts with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

An evaluation of whether an impact to biological resources would be significant must consider both the resource itself and how that resource fits into a regional or local context. Significant impacts would be those that would diminish, or result in the loss of, an important biological resource, or those that would obviously conflict with local, state, or federal resource conservation plans, goals, or regulations. The evaluation of impacts considers direct impacts, indirect impacts, cumulative impacts, as well as temporary and permanent impacts.

2.3 Local Polices, Plans and Ordinances

The project is not anticipated to conflict with City of Indio or County of Riverside policies, plans or ordinances.

2.4 Conservation Plans

2.4.1 Coachella Valley Multi-Species Habitat Conservation Plan

The Project is within the Coachella Valley Multi-Species Habitat Conservation Plan (CVMSHCP). This comprehensive multi-jurisdictional document focuses on conservation of species and their habitats in the Coachella Valley. The stated purposed of the CVMSHCP "…is to obtain Take Authorization (Take Permits) pursuant to FESA and the NCCP Act for Covered Activities in the Coachella Valley while balancing environmental protection with regional economic objectives and simplifying compliance with the State and Federal Endangered Species Acts and other applicable laws and regulations." (CVAG, August 2016).

The District is a participating entity. The Project is inside the boundaries of the CVMSHCP but outside its designated Conservation Areas and is not within an Area of Critical Environmental Concern (ACEC). At its closest point, the Project is approximately 1.2 miles southwest of the East Indio Hills Conservation Area, with dense residential development in between. Because the District is a permittee, the Project is a permittee-proposed activity outside a conservation area, and is a water management project, it is a "Covered Activity" per Section 7.1 of the CVMSHCP (Covered Activities Outside Conservation Areas).

3 METHODS

3.1 Literature Search

Existing databases and literature were reviewed to discover previously identified special status biological resources that could occur on or in the immediate vicinity of the project site. The data search centered on the two USGS 7.5-minute quadrangles (quads) where the project site is located, *La Quinta* quad to the west and the *Indio* quad to the east (refer to Figure 3). Additional quads in the search area were Myoma, Rockhouse Canyon, West Berdoo Canyon and Thermal Canyon.

The data search included occurrence records in the California Natural Diversity Database (CNDDB) RareFind 5, California Native Plant Society's (CNPS) Online Inventory of Rare and Endangered Plants (CDFW 2023, CNPS 2023, USFWS 2024a) and USFWS Information for Planning and Consultation (IPaC). This search was used to determine which special status plant and wildlife species required analysis within the survey area based on both previous reports and existing on-site conditions.

Additional resources queried included aerial imagery, USFWS species lists and critical habitat maps, vegetation and land-use mapping, and Natural Resource Conservation Service (NRCS) soils maps and vegetation mapping.

3.2 Biological Field Survey

SWCA biologist Danielle Parsons conducted a one-day reconnaissance-level field survey on March 28, 2023. Flora and fauna of the Project were recorded and representative photographs were collected.

4 RESULTS

Appendix A provides representative photographs of the Study Area. Appendix B lists flora and fauna observed during the March 2023 field survey.

4.1 Flora

The Study Area is highly disturbed with on-going vegetation management visible both during the field survey and on aerial imagery, the latter dating back to September 1996 (earliest Google Earth aerial imagery with sufficient resolution). The result is an overall lack of vegetation and highly disturbed soils. The 2019 City of Indio General Plan Update Environmental Impact Report maps the Project vicinity primarily as Urban and Rural Developed, with areas of Agricultural and Stabilized Desert Sand Fields. These land covertypes do not fit within defined vegetation communities typically used to characterize plant alliances, such as MCV2 or Holland.

The northwestern most portion of the Study Area between the Sun City Shadow Hills South Golf Course and Madison Street exhibited consistently dense vegetation from September 1996 through April 2014. Between April 2014 and March 2023 field survey, the area is consistently unvegetated. Until approximately December 2019, a windrow of Athel tamarisk (*Tamarix aphylla*) lined the berm along the eastern side of the Channel from Madison Street south to the Channel's intersection with Interstate 10. The trees were removed sometime between December 2019 to June 2021. Resprouting Athel tamarisk was observed in this location during the field survey.

Vegetation is absent in the Channel segment east of Madison Street and north of Avenue 42, likely due to vegetation management, and compact and saline soil. The segment of the Channel south of Avenue 42 has been consistently unvegetated since at least September 1996. A well-established dirt road providing access to the Coachella Valley Stormwater Channel is present within the Channel, accessed via a gate from the intersection of Madison Street and Avenue 42.

The Coachella Valley Stormwater Channel remains largely uniform from September 1996 through March 2023; however, signs of vegetation management and mechanized sediment movement can be seen within the Whitewater River on aerial imagery. Vegetation patterns visible in aerial imagery are consistent with the vegetation observed during the field survey. Vegetation along the Coachella Valley Stormwater Channel is largely disturbed and consists of salt cedar (*Tamarix ramosissima*), Bermuda grass (*Cynodon dactylon*), and London rocket (*Sisymbrium irio*).

4.2 Fauna

The lack of vegetation and highly disturbed condition of the Study Area resulted in few species of wildlife being identified during the field survey. Birds typical of open areas and urban-rural interfaces were observed, including Anna's hummingbird (*Calypte anna*), killdeer (*Charadrius vociferus*), rock pigeon (*Columba livia*) and American crow (*Corvus brachyrhynchos*). No insects, amphibians, reptiles, or mammals nor evidence of site usage (e.g., burrows, dens, tracks, nests) were detected.

Nesting bird habitat on-site is limited to ground-nesting birds which may find suitable substrate on the bare soil of the Study Area. Species such as killdeer and lesser nighthawk (*Chordeiles acutipennis*) are known to nest in similar areas. However, the high levels of apparently continuous ground disturbance likely renders the site unsuitable. Nesting habitat may be present in shrubs, trees, and ground cover present in adjacent areas outside the Project site.

4.3 Wildlife Movement Corridors and Habitat Linkages

Wildlife corridors and habitat linkages are features that promote habitat connectivity. Wildlife corridors are typically discrete linear features within a landscape that are constrained by development or other non-habitat areas. Habitat linkages are networks of corridors through and between larger natural open space that facilitate movement of wildlife, thus providing long-term resilience of ecosystems against the detrimental effects of habitat fragmentation. Regional connection between high-quality open space habitats is critical to ongoing interchange of genetic material between populations, wildlife movement to escape natural disasters (fires, floods), colonization and expansion of populations, and plant propagation.

The Project is not within defined regional movement corridors or habitat linkages. Local wildlife movement may occur in the vicinity; however, the highly disturbed condition and lack of cover vegetation of the site greatly reduces its value to wildlife for safe movement across open areas.

4.4 Special-status Flora and Fauna

The Study Area straddles the *La Quinta* quad to the west and the *Indio* quad to the east. The surrounding quads included in the special-status species search area were Myoma, Rockhouse Canyon, West Berdoo Canyon and Thermal Canyon. Appendix C lists the special-status plant and wildlife species previously reported as occurring (refer to Figure 3).

The relative occurrence potential shown in Appendix C is based on habitat suitability, current natural resource conditions of the Study Area, general knowledge of the region, distance to known CNDDB and CNPS observation records, and the age of the records. Each occurrence potential rating is defined as follows:

- Present: Species has recently been documented on-site.
- High: Species has been documented on-site or adjacent to the project boundaries, habitat is suitable in the project area, and records are recent (within 20 years).
- Moderate: Project area is within known range of the species, habitat is suitable in the project area, and records are non-historic (within 40 years).
- Low: Project area is within known range of the species, habitat is marginal, records are distant, or known records are older (within 75 years).
- Not expected: Project area is outside of known range of the species, records are distant, and/or there is no suitable habitat in the project area.
- Absent: Species has been extirpated; records are historic (greater than 75 years), no suitable habitat.

4.4.1 Special-Status Flora

The literature search identified 26 special-status plant species in the search area. No special-status plant species were identified during the 2023 field survey, and none are expected to occur due to the highly disturbed condition of the Study Area.

4.4.2 Special-Status Fauna

Thirty special-status species of fauna were reported in the literature as occurring within search area. No special-status wildlife species were found on-site during the survey, and none have higher than a low potential for occurrence in the Study Area because of on-going disturbance and lack of vegetative habitat.

4.4.2.1 NESTING BIRDS

The field survey did not include nesting bird surveys and no nesting bird activity was incidentally detected. Marginal habitat for ground-nesting birds is present but its value is greatly diminished by on-going disturbance. Vegetation-based nesting, such as in grasslands, shrubs and/or trees, is not expected on the Project site due to lack of habitat. Suitable nesting areas may be present on adjacent properties, such as the Shadow Hills South golf course located northwest of the Project and along Indio Blvd. and 43rd Avenue in the southeast.

4.5 Aquatic Resources Delineation Report

SWCA completed a separate Aquatic Resources Delineation Report (SWCA, May 2023; revised January 2024). That work included a desktop data review and field survey within the Review Area, identified as approximately 80-acres surrounding the Project footprint.

Briefly, that work identified two distinct non-wetland waters within the Review Area totaling 2.73 acres, including the Coachella Canal (0.2 acre) and the Coachella Valley Stormwater Channel (2.53 acres). No wetland (marsh, vernal pool, coastal) waters or riparian habitats were identified.

5 ENVIRONMENTAL EVALUATION AND MITIGATION MEASURES

This section addresses the Section 7 Consultation requirements and the questions posed in Appendix G of the State CEQA Guidelines, Section IV Biological Resources. Mitigation measures are also provided where necessary.

5.1 Section 7 Consultation

Eleven federally listed or candidate species of fauna were reported in the literature (CNDDB, CNPS, and IPaC) as occurring within the search area. No listed or candidate species were determined to have potential to occur due to frequent disturbance and lack of vegetative suitable habitat. In addition, no mapped designated critical habitat is present in the Study Area. As a result, the Project is likely to result in no effect to federally listed species or critical habitat. However, the ESA Section 7 lead agency, the Bureau of Reclamation, will make recommendations and a final Section 7 determination regarding potential effects to federally listed species and their critical habitat.

5.2 Environmental Evaluation

The following Environmental Evaluation is based on the literature search and one-day field survey described above.

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

No Impact. No special-status species were identified during the one-day field survey, nor are they expected to occur based on lack of habitat and high disturbance levels.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?

No impact. No riparian habitat or other sensitive natural communities were found on the proposed project site during the field survey or have been reported in the literature. Therefore, there would be no impact.

c) Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less than Significant with Mitigation Incorporated. An aquatic resources delineation and report was prepared by SWCA (May 2023) which found non-wetland waters within the survey area. No wetland (marsh, vernal pool, coastal) waters were identified. Per MM BIO-1, the District would avoid, minimize and/or mitigate impacts to regulated aquatic resources and submit necessary permit applications and documentation to each pertinent regulatory agency.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less than Significant with Mitigation Incorporated. Potentially suitable nesting bird habitat is present on-site and within 300 feet of the project site. Nesting birds are protected by the California Fish and Game Code and by the Migratory Bird Treaty Act, which prohibit take of all birds and their active nests including raptors and other migratory nongame birds. The nesting season is generally defined as 1 January to 15 September. Construction conducted during this period could result in adverse impacts to nesting birds. This potential impact would be reduced to less than significant levels with pre-construction surveys to identify and avoid active nests. Refer to MM BIO-2.

The project area is not within an established migratory wildlife corridor habitat linkage (SC Wildlands Conservancy, 2012) and does not contain suitable habitat migratory fish movement. No impact would result to such resources from project implementation.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No impact. There are no biological resources present on the project area that are protected by City of Indio or Riverside County policies and/or ordinances, and no impact would occur.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No impact. The Project is within the Coachella Valley Multi-Species Habitat Conservation Plan (CV MSHCP) but outside designated Conservation. Because the District is a permittee, the Project is a permittee-proposed activity outside a conservation area, and is a water management project, it is a "Covered Activity" per Section 7.1 of the CVMSHCP (Covered Activities Outside Conservation Areas). Therefore, the Project would not conflict with the CVMSHCP.

5.3 Mitigation Measures

MM BIO-1: Jurisdictional Waters Permitting: The District would avoid, minimize and/or mitigate impacts to regulated aquatic resources and submit necessary permit applications and documentation to each applicable regulatory agency.

Potential permits required include a U.S. Army Corps of Engineers (USACE) Department of the Army permit, a California State Water Board Section 401 water quality certification, and a CDFW 1600 Lake and Streambed Alteration notification.

MM BIO 2: Nesting Bird Surveys: If construction (including ground-disturbing activities and vegetation trimming and/or removal) would occur during the nesting bird season (1 January to 15 September), a qualified biologist shall conduct preconstruction nesting bird surveys within 30 days of construction start-up and continuing weekly up to three days before start-up. The survey area shall include the project area (disturbance footprint) and a surrounding 300-foot buffer area. The Biologist shall ensure an adequate buffer is identifiable and maintained to ensure no disturbance to nesting activity. Buffer size may be reduced or increased based on the bird species present and on the advice of the qualified biologist (e.g., smaller buffer for songbirds, larger buffer for raptors). No construction work, equipment, or personnel shall enter the buffer area. Protective buffers shall remain in place until the biologist determines that the nest(s) are no longer active, and the chicks have permanently fledged (left the nest) and a second nesting attempt has not begun.

If construction is to occur during 1 February to 15 September, burrowing owl (*Athene cunicularia)* surveys will be conducted. Burrowing owl surveys will be completed following the CDFW 2012 *Staff Report on Burrowing Owl Mitigation.* Any located burrowing owls or potential burrows (burrows with openings > 4 inches) will be reported to CDFW via CNDDB online reporting system.

6 REFERENCES/LITERATURE CITED

Baldwin B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken (eds.). 2012. *The Jepson Manual: Vascular Plants of California*, 2nd ed. Berkeley: University of California Press.

CalFlora. 2023. *The CalFlora Database*. Available at: http://www.calflora.org/. Accessed March 2023.

California Native Plant Society (CNPS). 2021. *Inventory of Rare, Threatened, and Endangered Plants of California*. Online database: www.rareplants.cnps.org/. Accessed March 2023.

———. 2021b. A Manual of California Vegetation, Online Edition. California Native Plant Society, Sacramento, CA. Available at: http://www.cnps.org/cnps/vegetation/. Accessed March 2023.

California Birds Record Committee (CBRC). 2021. *Official California Checklist*. https://www.californiabirds.org/checklist.asp. Accessed March 2023.

California Department of Fish and Wildlife (CDFW). 2023. *California Natural Diversity Database* RAREFIND 5 database ver.5.2.14. Sacramento: CDFW. www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data. Accessed March 2023.

———. January 2023 *Special Animals*. California State of California, Natural Resources Agency, Department of Fish and Wildlife, Biogeographic Data Branch, California Natural Diversity Data Base. Accessed March 2023.

———January 2023. *Special Vascular Plants, Bryophytes, and Lichens List*. State of California, Natural Resources Agency, Department of Fish and Wildlife, Biogeographic Data Branch, California Natural Diversity Data Base. Accessed March 2023.

———.April 2023. *Special Animals*. California State of California, Natural Resources Agency, Department of Fish and Wildlife, Biogeographic Data Branch, California Natural Diversity Data Base. Accessed March 2023.

———.April 2023. *Special Vascular Plants, Bryophytes, and Lichens List*. State of California, Natural Resources Agency, Department of Fish and Wildlife, Biogeographic Data Branch, California Natural Diversity Data Base. Accessed March 2023.

California Native Plant Society (CNPS) Rare Plant Program. 2023. *Inventory of Rare and Endangered Plants of California.* www.rareplants.cnps.org. Accessed March 2023.

California Native Plant Society (CNPS). 2023. *A Manual of California Vegetation*. Online Edition. CNPS, Sacramento, California. http://vegetation.cnps.org/. Accessed March 2023.

Coachella Valley Association of Governments (CVAG). 2007. Coachella Valley Multiple Species Habitat Conservation Plan. Online at: http://www.CVMSHCP/NCCP.org/. Accessed April 2023.

———.August 2016. *Final Major Amendment to the CV MSHCP*. Accessed April 2023.

Consortium of California Herbaria. 2023. *The Consortium of California Herbaria. Berkeley*: University of California. http://ucjeps.berkeley.edu/consortium/. Accessed March 2023.

Holland, Robert F. 1986. *Preliminary Descriptions of the Terrestrial Natural* Communities *of California*. State of California, The Resources Agency, Department of Fish and Game.

Google Earth. 2023. Source: Crested Butte, Colorado. Available at: https://www.google.com/earth/. Accessed March 2023.

ParcelQuest. 2023. Parcel information search. Available at: https://pqweb.parcelquest.com/#home. Accessed September 15, 2023.

Rincon Consultants, Inc. June 2019. *Final Environmental Impact Report for the City of Indio General Plan Update Indio, California. SCH# 2015081021*. Prepared for the City of Indio.

Sawyer, J.T. Keeler-Wolf, and J. Evens. 2009. *A Manual of California Vegetation.* Second edition. (MCV2) California Native Plant Society, Sacramento, CA.

SC Wildlands. March 2012. *California Desert Connectivity Project*. *A Linkage Network of the California Deserts*.

U.S. Fish and Wildlife Service (USFWS) .2023. Critical Habitat Mapper. U.S. Fish and Wildlife Service Ecological Services. Available at: https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77. Accessed April 2023.

———.2024. Information for Planning and Consultation (IPaC). Available at: http://ecos.fws.gov/ipac/. Accessed May 2024.

APPENDIX A

Photographs

Photo 1. Whitewater River, viewing northeast. Interstate 10 parallels berm above channel (upper photo; note green road sign).

Photo 2. Whitewater River disturbed streambed, viewing west (railroad bridge along Indio Blvd. in upper left).

Photo 3. Berm east of Thousand Palms Channel, viewing south. Madison Street to photo right, Avenue 42 in mid-photo along telephone poles.

Photo 4. Avenue 42 low water crossing of Thousand Palms Channel, viewing south.

Photo 5. Berm along west side of Thousand Palms Channel, north of Interstate 10 and south of Avenue 42, viewing west.

Photo 6. Northern extent of Study Area, viewing south along Madison Street (photo right).

Photo 7. Northern extent of Study Area, viewing south from Coachella Canal overpass.

APPENDIX B

Observed Flora and Fauna

Flora & Fauna Observed March 28, 2023

FLORA

Vernacular Name	**Scientific Name**	**Origin**
Desert sand verbena	*Abronia villosa*	N
Cheesebush	*Ambrosia salsola*	N
Fourwing saltbush	*Atriplex canescens*	N
Cattle saltbush	*Atriplex polycarpa*	N
Nettle leaf goosefoot	*Chenopodiastrum murale*	I
Desert willow	*Chilopsis linearis*	N
Browneyes	*Chylismia claviformis*	N
Bermuda grass	*Cynodon dactylon*	I
Desert thorn apple	*Datura discolor*	N
Hairy desert sunflower	*Geraea canescens*	N
False barley	*Hordeum murinum*	I
Narrow-leaved cryptantha	*Johnstonella angustifolia*	N
Small melilot	*Melilotus indicus*	I
Spanish arida	*Palafoxia arida*	N
Arrowweed	*Pluchea sericea*	N
Castor bean	*Ricinus communis*	I
Tumbleweed	*Salsola tragus*	I
Common Mediterranean grass	*Schismus barbatus*	I
London rocket	*Sisymbrium irio*	I
Athel tamarisk	*Tamarix aphylla*	I
Saltcedar	*Tamarix ramosissima*	I
Fan-leaved crinklemat	*Tiquilia plicata*	N

N = Native; I = Introduced/Non-native

FAUNA

Vernacular Name	**Scientific Name**
Anna’s hummingbird	*Calypte anna*
Killdeer	*Charadrius vociferus*
Rock pigeon	*Columba livia*
American crow	*Corvus brachyrhynchos*
Greater roadrunner	*Geococcyx californianus*
Black phoebe	*Sayornis nigricans*
Say’s phoebe	*Sayornis saya*

APPENDIX C

Special-Status Flora & Fauna

SPECIAL-STATUS SPECIES OF FLORA AND FAUNA REPORTED IN THE PROJECT AREA*

Common Name (*Scientific Name*)	Status Federal / State*	Range or Habitat Requirements	Potential to Occur in the Project Area
Plants			
Abrams' spurge (*Euphorbia abramsiana*)	CRPR 2B.2	This annual herb is found in sandy soils within Mojave Desert scrub and Sonoran Desert scrub. Elevation range: -15–4,300 feet. Blooming period: (August) September–November.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Arizona spurge (*Euphorbia arizonica*)	CRPR 2B.3	This perennial herb is found in Sonoran Desert scrub. Elevation range: 165–985 feet. Blooming period: March–April.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Booth's evening-primrose (*Eremothera boothii* ssp. *boothii*)	CRPR 2B.3	This annual herb is found in sandy soils within Joshua tree "woodland", Pinyon, and juniper woodland. Elevation range: 2,675–7,875 feet. Blooming period: April–September.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
California ditaxis (*Ditaxis serrata* var. *californica*)	CRPR 3.2	This perennial herb is found in Sonoran Desert scrub. Elevation range: 100–3,280 feet. Blooming Period: March–December.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
California marina (*Marina orcuttii* var. *orcuttii*)	CRPR 1B.3	This perennial herb is found in Chaparral, Pinyon and juniper woodland, Sonoran desert scrub. Elevation range: 3,445–3,805 feet. Blooming Period: May–October.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Chaparral sand-verbena (*Abronia villosa* var. *aurita*)	CRPR 1B.1, BLM_S	This annual herb is found in sandy soils within chaparral, coastal scrub, and desert dunes. Elevation range: 245–5,250 feet. Blooming Period: (January) March–September.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*)	FE, CRPR 1B.2	This annual/perennial herb is found in desert dunes and Sonoran Desert scrub. Elevation range: 130–2,150 feet. Blooming period: February–May.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Deep Canyon snapdragon (*Pseudorontium cyathiferum*)	CRPR 2B.3	This annual herb is found in Sonoran Desert scrub. Elevation range: 0–2,625 feet. Blooming period: February–April.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Desert spike-moss (*Selaginella eremophila*)	CRPR 2B.2	This perennial rhizomatous herb is found in chaparral and Sonoran Desert scrub. Elevation range: 655–4,250 feet. Blooming period: (May) June (July).	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Flat-seeded spurge (*Euphorbia platysperma*)	CRPR 1B.2	This annual herb is found in sandy soils within Desert dunes and Sonoran Desert scrub. Elevation range: 215–330 feet. Blooming period: February–September.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Glandular ditaxis (*Ditaxis claryana*)	CRPR 2B.2	This perennial herb is found in sandy soils within Mojavean desert scrub and Sonoran Desert scrub. Elevation range: 0–1,525 feet. Blooming Period: October–March.	**Not expected.** The project area is within the known range of this species. However, suitable habitat is absent within the project site.
Gravel milk-vetch (*Astragalus sabulonum*)	CRPR 2B.2	This annual/perennial herb is found in flats, gravelly (sometimes) roadsides, sandy (usually) washes within desert dunes, Mojavean desert scrub, Sonoran Desert scrub. Elevation range: -195–3,050 feet. Blooming period: February–June.	**Not expected.** The project area is within the known range of this species. However, suitable habitat is absent within the project site.
Horn's milk-vetch (*Astragalus hornii* var. *hornii*)	CRPR 1B.1, BLM_S	This annual herb is found in alkaline soils and lake margins within meadows, seeps, and playas. Elevation range: 195–2,790 feet. Blooming period: May–October.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.

Common Name (*Scientific Name*)	Status Federal / State*	Range or Habitat Requirements	Potential to Occur in the Project Area
Lancaster milk-vetch (*Astragalus preussii* var. *laxiflorus*)	CRPR 1B.1	This perennial herb is found in sandy soils within Chenopod scrub. Elevation range: 2,295–2,295 feet. Blooming period: March–May	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Lassics lupine (*Lupinus constancei*)	FE, SE, CRPR 1B.1	Lower montane coniferous forest. Serpentine barrens. Elevation range: 4,920–6,560 feet. Blooming period: July	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Latimer's woodland-gilia (*Saltugilia latimeri*)	1B.2, BLM_S	This annual herb is typically found in granitic soils and sometimes on rocky soils, sandy soil or in washes within Chaparral, Mojavean desert scrub, Pinyon, and juniper woodland. Elevation range: 1,310–6,235 feet. Blooming period: March–June.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Mecca-aster (*Xylorhiza cognata*)	CRPR 1B.2, BLM_S	This perennial herb is found in Sonoran Desert scrub. Elevation range: 65–1,310 feet. Blooming Period: January–June.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Narrow-leaf sandpaper-plant (*Petalonyx linearis*)	CRPR 2B.3	This perennial herb is found in rocky or sandy soils within Mojavean desert scrub and Sonoran Desert scrub. Elevation range: -80–3,660 feet. Blooming Period: (January–February) March–May (June–December).	**Not expected.** The project area is within the known range of this species. However, suitable habitat is absent within the project site.
Purple stemodia (*Stemodia durantifolia*)	CRPR 2B.1	This perennial herb is found in Sonoran Desert scrub. Elevation range: 590–985 feet. Blooming period: (January) April–December.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
San Bernardino milk-vetch (*Astragalus bernardinus*)	CRPR 1B.2, BLM_S	This perennial herb is found in carbonate or granitic soils within Joshua tree woodland, Pinyon and juniper woodland. Elevation range: 2,955-6,560 feet. Blooming period: April–June.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Slender cottonheads (*Nemacaulis denudata* var. *gracilis*)	CRPR 2B.2	This annual herb is found in coastal dunes, desert dunes, Sonoran Desert scrub. Elevation range: -165–1,310 feet. Blooming period: (March) April–May.	**Not expected.** The project area is within the known range of this species. However, suitable habitat is absent within the project site.
Spear-leaf matelea (*Matelea parvifolia*)	CRPR 2B.3	This perennial herb is found in rocky soils within Mojavean desert scrub, Sonoran Desert scrub. Elevation range: 1,445–3,595 feet. Blooming period: March–May (July).	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
triple-ribbed milk-vetch (*Astragalus tricarinatus*)	FE, CRPR 1B.2	This perennial herb is found in rocky (sometimes), sandy (sometimes) soils within Joshua tree woodland, Sonoran Desert scrub. Elevation range: 1,475–3,905 feet. Blooming period: February–May.	**Not expected.** The project area does not fall within the known range of this species and lacks suitable habitat.
Invertebrates			
Monarch - California overwintering population (*Danaus plexippus plexippus* pop. 1)	FC	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	**Absent.** No suitable roost sites present in the project site. The species, however, may be observed during migration.
Casey's June beetle (*Dinacoma caseyi*)	FE	This beetle prefers fine silts and sands on the southwest side of the Coachella Valley. Casey's June beetles are restricted to only two populations in the southern part of Palm Springs, California. Remaining habitat is roughly 600 acres in approximately nine fragments and actively declining. The species is not known to migrate.	**Not expected.** The highly disturbed condition of the project site does not provide suitable habitat.
Reptiles			

Common Name (*Scientific Name*)	Status Federal / State*	Range or Habitat Requirements	Potential to Occur in the Project Area
Coachella Valley fringe-toed lizard (*Uma inornata*)	FT, SE	The distribution of this species is heavily affected by sand characteristics (such as grain size and compaction), and is only found in areas of windblown sand (versus compacted sand dunes). Various studies have confirmed that *Uma inornata* requires sand grains with diameters of between 0.1 mm and 1 mm, and that the lizard heavily favors areas with deep, loose sand. Due to the need for windblown sand, *Uma inornata* tends to avoid areas of high plant density, instead preferring a habitat with sparse, shrub-like vegetation—primarily *Larrea divaricate*, *Franseria dumosa*, *Dalea emoryi, Dicoria canescens,* and *Astragalus lentiginosus*.	**Absent.** The project lacks suitable habitat and is likely too highly and continuously disturbed.
Desert tortoise (*Gopherus agassizii)*	FT, ST, SCE	Mojave population of desert tortoise lives in a variety of habitats from sandy flats to rocky foothills, including alluvial fans, washes, and canyons. Arid land with usually sparse vegetation.	**Not expected.** The highly disturbed & unvegetated condition of the project site does not provide suitable habitat.
Flat-tailed horned lizard (*Phrynosoma mcallii*)	SSC, BLM_S	Typical habitat is sandy desert hardpan or gravel flats with scattered sparse vegetation of low species diversity. Most common in areas with a high density of harvester ants and fine windblown sand, but occurs rarely on dunes.	**Not expected.** The highly disturbed & unvegetated condition of the project site does not provide suitable habitat.
Red-diamond rattlesnake (*Crotalus ruber*)	SSC	Found in a variety of habitats from the coast to the deserts, from San Bernardino County into Baja California, Mexico (below 5,000 feet in elevation). It commonly occurs in rocky areas within coastal sage scrub, chaparral, juniper woodlands, and desert habitats, but can also be found in areas devoid of rocks.	**Not expected.** The highly disturbed & unvegetated condition of the project site does not provide suitable habitat.
Mammals			
American badger (*Taxidea taxus*)	SSC	Badgers are generally associated with dry, open, treeless regions, prairies and grasslands, low-intensity agriculture (e.g., pasture, dryland crops), drier open scrublands and forest, parklands, and cold desert areas.	**Absent.** The project area does lacks suitable habitat for this species.
Pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*)	SSC	This species prefers sandy, herbaceous areas, usually in association with rocks or coarse gravel. This subspecies occurs in desert border areas in eastern San Diego County in desert wash, desert scrub, desert succulent scrub, pinyon-juniper, etc.	**Not expected.** The project area does not contain suitable habitat for this species.
Palm Springs pocket mouse (*Perognathus longimembris bangsi*)	SSC, BLM_S	This species is known from various vegetation communities, including creosote scrub, desert scrub, and grasslands, generally occurring on loosely packed or sandy soils with sparse to moderately dense vegetative cover. The populations within Coachella Valley are abundant in creosote-dominated desert scrub on flat to gentle slopes with sandy soils. The most common plant species where this species was abundant *are Larrea tridentata, Encelia farinosa, Ambrosia dumosa,* and *Ephedra californica*. Palm Springs pocket mice are typically absent or present in low numbers in areas with compacted, stony, and cobbly soils, in saltbush (*Atriplex* sp.)–dominated communities, in areas disturbed by human habitation, and on wind-formed dunes devoid of vegetation.	**Not expected.** The project area lacks suitable habitat for this species.
Palm Springs round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*)	SSC, BLM_S	This species inhabits sandy arid regions of the Lower Sonoran Life Zone. It often occupies dunes and shrubs in lower flatter areas. Its burrows have been found among shrubs, and in sand of dunes, especially in areas with dense sand. Its habitats are normally characterized by extreme temperatures with low humidity.	**Not expected.** The highly disturbed & unvegetated condition of the project site does not provide suitable habitat.

Common Name (*Scientific Name*)	Status Federal / State*	Range or Habitat Requirements	Potential to Occur in the Project Area
Peninsular bighorn sheep DPS (*Ovis canadensis nelsoni* pop. 2)	FE, ST, FP, BLM_S	The distribution of bighorn sheep is determined by topography, visibility, water availability, and forage quality and quantity. Throughout North America, bighorn sheep distribution is associated with steep, rugged mountainous terrain. Bighorn sheep typically do not outrun their predators but, rather, use their climbing abilities to escape their enemies. The predator evasion behavior of bighorn sheep is also dependent on the ability to visually detect danger at a distance. Bighorn sheep therefore prefer areas with high visibility and avoid habitat with dense vegetation, such as chaparral, which is found at the higher elevational extent of their habitat in the Peninsular Ranges.	**Not expected.** The project area lacks suitable habitat for this species.
San Diego desert woodrat (*Neotoma lepida intermedia*)	SSC	Desert woodrats are found in a variety of shrub and desert habitats and are primarily associated with rock outcroppings, boulders, cacti, or areas of dense undergrowth. Moderate to dense canopies preferred. They are particularly abundant in rock outcrops, rocky cliffs, and slopes.	**Absent.** The highly disturbed & unvegetated condition of the project site does not provide suitable habitat.
Pocketed free-tailed bat (*Nyctinomops femorosaccus*)	SSC	The pocketed free-tailed bat is colonial and roosts primarily in crevices of rugged cliffs, high rocky outcrops, and slopes. It has been found in a variety of plant associations, including desert shrub and pine-oak forests. The species may also roost in buildings, caves, and under roof tiles.	**Absent.** The project area lacks suitable roosting habitat for this species.
Western mastiff bat (*Eumops perotis californicus*)	SSC, BLM_S	This species requires tall ledges and cliffs for roosting. The cliffs must be 20 feet tall, at minimum. They feed on moths primarily, as well as other insects. They can forage in chaparral, desert, forest, shrubland, as well as developed suburban habitat.	**Absent.** The project area lacks suitable roosting habitat for this species.
Western yellow bat (*Lasiurus xanthinus*)	SSC	Western yellow bats are most commonly found in riparian woodland habitats that include an abundance of trees, including Fremont cottonwood (*Populus fremontii*), Arizona sycamore tree (*Platanus wrightii*), and Arizona white oak (*Quercus arizonica*). The bats are associated with desert regions in the southwest United States where they occupy thorny, dry environments. They tend to be found in dry tropical forests but can occupy semi-tropical wet forests as well.	**Absent.** The project area lacks suitable roosting habitat for this species.
Fish			
Desert pupfish (*Cyprinodon macularius*)	FE, SE	The desert pupfish is found in shallow waters of desert springs, small streams, and marshes below 1,524 m (5,000 feet) in elevation. The species can tolerate high salinities, water temperatures, and lower oxygen content than most fish, and will occupy habitats inhospitable to invasive fish.	**Absent.** The project site lacks aquatic habitat.
Birds			
Black-tailed gnatcatcher (*Polioptila melanura*)	WL	In Mojave, Great Basin, Colorado, and Sonoran Desert communities, prefers nesting and foraging in densely lined arroyos and washes dominated by creosote bush (*Larrea tridentata*, *L. divaricata*), salt bush (*Atriplex* sp.)	**Not expected.** The project area lacks suitable habitat for this species.
Burrowing owl (*Athene cunicularia*)	SSC, BLM_S; burrow sites; some wintering sites	Found in open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably the California ground squirrel.	**Not expected.** The highly & continually disturbed condition of the project site does not provide suitable habitat.
Crissal thrasher (*Toxostoma crissale*)	SSC, BLM_S	Crissal thrashers live in deserts and dry, scrubby, or brushy habitats, especially along dry creek beds (arroyos) or in canyons and foothills. They show a strong preference for mesquite thickets, brushy riparian corridors (including those with invasive saltcedar), and chaparral-like scrub in canyons. They tend to avoid very open, low desert with yucca and cholla (habitat favored by LeConte's thrasher).	**Not expected.** The project lacks suitable habitat for this species.

Common Name (*Scientific Name*)	Status Federal / State*	Range or Habitat Requirements	Potential to Occur in the Project Area
Ferruginous hawk (*Buteo regalis*)	WL; wintering	Breeds in flat and rolling terrain in grassland or shrub steppe regions. Avoids high elevation, forest interior, and narrow canyons. Occurs in grassland, sagebrush (*Artemisia*), saltbush–greasewood (*Atriplex–Sarcobatus*) shrubland, and the periphery of pinyon–juniper (*Pinus–Juniperus*) and other forest types	**Not expected.** The project lacks suitable habitat for this species.
Le Conte's thrasher (*Toxostoma lecontei*)	SSC, BLM_S	The typical desert habitat consists of dunes, alluvial fans, and flat to gently rolling hills with shallow washes with sparse vegetation. The vegetation it may utilize includes low vegetation such as saltbush, creosote, cholla cacti, and Mojave yucca. It does not generally coexist with other thrashers due to its habitat but does overlap breeding ranges and general habitat with the California thrasher in the higher desert regions of its range. Nest building can begin as early as late December and early January.	**Not expected.** The highly & continually disturbed condition of the project site does not provide suitable habitat.
Prairie falcon (*Falco mexicanus*)	WL; nesting	Breeding habitats include grasslands, shrub-steppe desert, areas of mixed shrubs and grasslands, or alpine tundra that supports abundant ground squirrel or pika populations. Breeding birds sometimes forage in agricultural fields. The majority of prairie falcons spend the winter in the Great Plains and Great Basin, in habitat that supports the horned larks and western meadowlarks that make up much of their wintertime diet. This includes grasslands, sage scrub, dry-farmed wheat fields, irrigated cropland, and cattle feedlots, where the falcons also prey on European starlings.	**Absent.** The project lacks suitable nesting habitat for this species.
Southwestern willow flycatcher (*Empidonax traillii extimus*)	FE, SE; nesting	Prefers to nest in low shrubby/brushy riparian habitats including early successional growth, riparian scrub, coast live oak, and tamarisk. Will only nest in areas where ground is saturated. Will nest in most *Salix* spp., tamarisk species, coyote willow, and coast live oaks.	**Absent.** The project area does not contain suitable nesting habitat for this species.
Vermilion flycatcher (*Pyrocephalus rubinus*)	SSC; nesting	Found in any open country in the American Southwest, including arid scrublands, farmlands, deserts, parks, and canyon mouths. They are especially reliant on stream corridors within the scrub ecosystem, in areas where willow, sycamore, cottonwood, mesquite, and other bottomland trees grow.	**Absent.** The project area does not contain suitable nesting habitat for this species.
Least Bell's vireo (*Vireo bellii pusillus*)	FE, SE, nesting	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2,000 feet. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	**Absent.** The project area does not contain suitable nesting habitat for this species.
*Project area queried consisted of Indio & La Quinta (project location straddles both quads), Myoma, Rockhouse Canyon, West Berdoo Canyon and Thermal Canyon.			

Records

Source: Listing status is based on CNPS (2023) &CDFW (2023). Habitat associations are based on the California Wildlife Habitat Relationships (CWHR) USFWS (2023), and CNPS (2023). Plant species descriptions are based on Jepson Online Interchange for California Floristics, and CNPS (2023).

***Status Codes:**

Federal Status for fish and wildlife:

FE = Federally Listed Endangered

FT = Federally Listed Threatened

FC = Federal Candidate for Listing

BGEPA = Bald and Golden Eagle Protection Act

BLM_S = Bureau of Land Management: Sensitive

California Rare Plant Ranking (CRPR):

1B = Plants rare, threatened, or endangered in California and elsewhere

2B = Plants rare, threatened, or endangered in California, but more common elsewhere

3 = Plants about which more information is needed

4 = Plants of limited distribution

CRPR Threat Ranks:

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% of 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)

California state status for fish and wildlife:

SE = California State-Listed Endangered

ST = California State-Listed Threatened

SCE = California Candidate Endangered

FP = CDFW Fully Protected

SSC = CDFW Species of Special Concern

WL = CDFW Watch List

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

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Location

Riverside County, California

Local office

Carlsbad Fish And Wildlife Office

(760) 431-9440
(760) 431-5901

2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

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2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Peninsular Bighorn Sheep *Ovis canadensis nelsoni* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/4970	Endangered

Birds

NAME	STATUS
Least Bell's Vireo *Vireo bellii pusillus* Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5945	Endangered
Southwestern Willow Flycatcher *Empidonax traillii extimus* Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6749	Endangered

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Reptiles

NAME	STATUS
Coachella Valley Fringe-toed Lizard *Uma inornata* Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2069	Threatened
Desert Tortoise *Gopherus agassizii* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/4481	Threatened

Fishes

NAME	STATUS
Desert Pupfish Cyprinodon macularius Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7003	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Coachella Valley Milk-vetch Astragalus lentiginosus var. coachellae Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7426	Endangered
Lassics Lupine Lupinus constancei There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7976	Endangered

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Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read

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"Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

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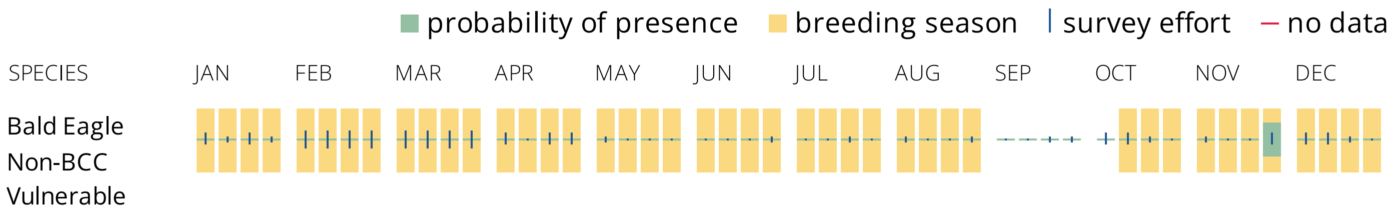
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

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Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Avocet Recurvirostra americana This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 21 to Aug 10

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Bald Eagle Haliaeetus leucocephalus — Breeds Oct 15 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Costa's Hummingbird Calypte costae — Breeds Jan 15 to Jun 10
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9470

Lawrence's Goldfinch Spinus lawrencei — Breeds Mar 20 to Sep 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9464

Leconte''s Thrasher Toxostoma lecontei — Breeds Feb 15 to Jun 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8969

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Western Grebe aechmophorus occidentalis — Breeds Jun 1 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6743

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Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence ( )

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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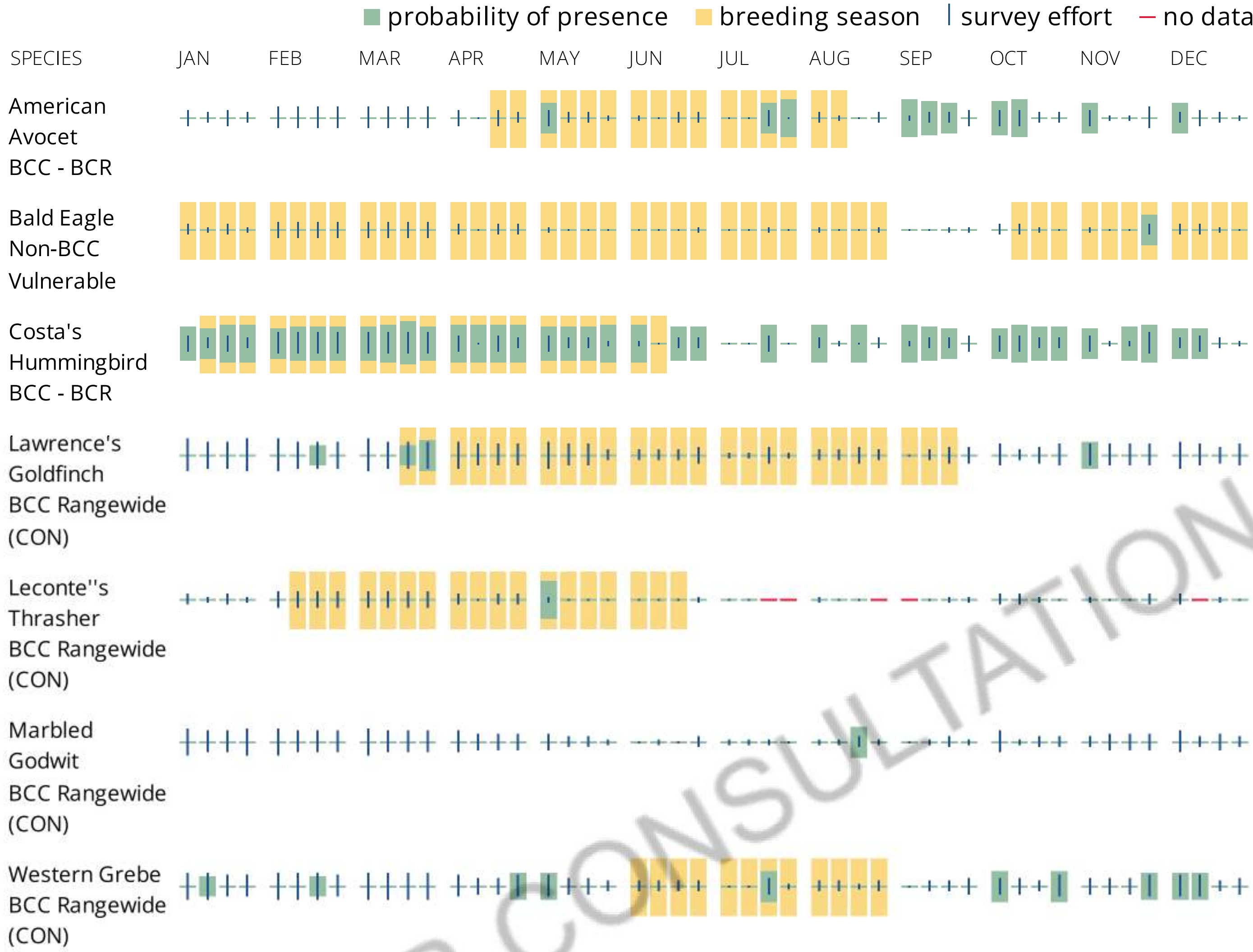

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Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

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For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

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Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE
- R4SBAx

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

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The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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Appendix B2:
Aquatic Resources Delineation Report

Aquatic Resources Delineation Report for the

Thousand Palms Channel Improvement Project from Sun City Shadow Hills to the SVSC

MAY 2023 (REVISED JUNE 2024)

PREPARED FOR

Coachella Valley Water District
75-515 Hovley Lane East,
Palm Desert, California 92211

PREPARED BY

SWCA Environmental Consultants
320 N. Halstead Street, Ste. 120
Pasadena, California 91107

AQUATIC RESOURCES DELINEATION REPORT FOR THE THOUSAND PALMS CHANNEL IMPROVEMENT PROJECT FROM SUN CITY SHADOW HILLS TO THE SVSC

Prepared for

Coachella Valley Water District
75-515 Hovley Lane East,
Palm Desert, California 92211
Attn: Megan Karadimos, Kimley-Horn

Prepared by

Bonnie Rogers, PWS, Principal Wetland Scientist

SWCA Environmental Consultants
320 N. Halstead Street, Ste. 120
Pasadena, California 91107
www.swca.com

SWCA Project No. 71080

May 2023 (Revised June 2024)

EXECUTIVE SUMMARY

This Aquatic Resources Delineation Report has been prepared in accordance with the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (USACE 1987) and regional supplements, including *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008a), and *Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008b). Jurisdiction was assessed under Section 401 and 404 of the Clean Water Act under the 2023 Clean Water Act post-Sackett *Conforming Rule* (USACE 2023), the Porter Cologne Water Quality Control Act, and Section 1600 of the California Fish and Game Code.

The project is located at approximate coordinates 33.740115°N, 116.249893°W within Sections 9, 10, 15, and 16 of Township 5 South, Range 7 East of the U.S. Geological Survey *La Quinta* and *Indio*, CA 7.5-minute quadrangle maps. The project includes constructing a new flood control facility, which will consist of the last conveyance facility intended to receive floodwaters from the upstream planned Thousand Palms and North Indio Flood Control Projects. The Thousand Palms Channel will provide for a new confluence with the Coachella Valley Stormwater Channel which conveys flow from the Whitewater River to the Salton Sea.

An approximately 80-acre Review Area located within the city of Indio in Riverside County, California was assessed for potential regulated aquatic resources. The Review Area is centered along the Thousand Palms Channel (TPC), which is south of a golf course and south and perpendicular to the Coachella Canal, a 122-mile aqueduct system that delivers water from the Colorado River. The Thousand Palms Channel feature is upslope of and connected to the Whitewater River which is synonymous with Coachella Valley Stormwater Channel (CVSC) along the project segment.

The aquatic resource findings of this report are summarized below:

Total acreage of the Review Area: 80 acres.

Number and total area of aquatic resources within the Review Area: One distinct aquatic resource, the Whitewater River (2.53 acres) occurs outside but adjacent to the Project Area.

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1 INTRODUCTION

1.1 Contact Information

Applicant: Coachella Valley Water District, 75-515 Hovley Lane East, Palm Desert, CA 92211, cvwd@cvwd.org, (760) 398-2651.

Property Owner(s):

Parcels 691190007, 610020007, 610030020, and 610020015 – Coachella Valley Water District, 51501 Tyler St, Coachella, CA 92236, cvwd@cvwd.org, (760) 398-2651.

Parcels 691510010, 610020016, 610020006, and 610030014 – United States Government

Agent(s): Bonnie Rogers, PWS, Senior Wetland Scientist, SWCA Environmental Consultants, 320 N. Halstead Street, Ste. 120, Pasadena, California 91107, Bonnie.Rogers@swca.com, (626) 240-0587.

1.2 Regulatory Background

The purpose of this report is to identify and describe aquatic resources in the Review Area and facilitate efforts to:

1. Provide background information about the site and conditions.
2. Document aquatic resource boundary data for review by regulatory authorities.
3. Provide early information about potential regulated aquatic resources.
4. Avoid or minimize impacts to aquatic resources during the planning and design process.

The purpose of the delineation is to record the extent of aquatic resources and make a preliminary determination of state and federal jurisdiction potentially subject to regulation by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA), State or Regional Water Quality Control Board (Water Boards) under Section 401 of the CWA and Porter Cologne Water Quality Control Act ('Porter Cologne'), and California Department of Fish and Wildlife (CDFW) under Section 1600 of the California Fish and Game Code.

Under the CWA, state and federal non-wetland waters of the United States (WOUS) are delineated by the ordinary high water mark (OHWM) and depending on connectivity to downstream regulated aquatic resources, may be considered jurisdictional by the USACE and the Water Boards. Features lacking connectivity to downstream regulated aquatic resources may not be jurisdictional by the USACE. Features lacking connectivity to downstream resources, however, may still be considered jurisdictional by the Water Boards under Porter Cologne. Under Section 1602 of the California Fish and Game Code, watercourses include streambeds that have a bed and bank supporting fish, other aquatic life, and riparian vegetation by either surface or subsurface flows, are considered regulated aquatic resources by CDFW. The watercourse is generally defined as the outermost bounds of the streambed or floodplain including any riparian vegetation.

Waters of the United States include traditional navigable waters, the territorial seas, and interstate waters; impoundments of "waters of the United States"; tributaries to traditional navigable waters, the territorial seas, interstate waters, or impoundments when the tributaries are relatively permanent, standing, or continuously flowing bodies of water; wetlands adjacent to and with a continuous surface connection to relatively permanent impoundments or jurisdictional tributaries; and intrastate lakes and ponds, streams, or wetlands that are relatively permanent. These Waters of the United States can be further divided into wetland waters of the United States and non-wetland waters of the United States whereby wetlands are characterized as meeting indicators of dominant hydrophytic vegetation, hydric soils, and wetland hydrology, and non-wetland waters of the United States delineated by the OHWM. An area must meet the following three parameters to be considered a federal wetland WOUS: 1) the presence of wetland hydrology (inundation or saturation near the ground surface during the growing season); 2) a dominance of hydrophytic vegetation (adapted to aquatic environments); and 3) hydric soils (displaying indicators of biological activity as a result of prolonged inundation).

The California State Water Resources Control Board's (SWRCB) regulate waters of State which include all waters of the United States as well as isolated waters such as streams or lakes. Waters of the State can also be divided into wetland waters of the State and non-wetland waters of the State. Wetland waters of the State include all wetland waters of the United States, as well as waters supporting wetland hydrology and hydric soils even if vegetation cover is less than 5% in the growing season. All other waters of the State are non-wetland waters of the State. Under the SWRCB Further, the Implementation Guidance for the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* ('Procedures') (SWRCB 2020), an area must include the following parameters to be considered a wetland: 1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; 2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and 3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation (more than 5% areal coverage of plants at the peak of the growing season).

1.3 Project Setting and Review Area

The project includes constructing a new flood control facility within the Thousand Palms Channel (TPC) which will consist of the last conveyance facility intended to receive floodwaters from the planned Thousand Palms and North Indio Flood Control Projects. The TPC will provide for a downstream connection supporting a 100-year flood discharge to the Coachella Valley Stormwater Channel (CVSC). In its current condition, the unlined TPC does not have capacity to convey a 100-year flow rate (estimated at 16,836 cubic feet per second). The total length of the TPC is approximately 5,700 feet. Existing berms located between the TPC and adjacent agricultural fields are not certified by the Federal Emergency Management Agency (FEMA), and there is no scour protection along the reach. To receive new future flows the TPC will be enhanced with constructed armor to accommodate flows and reduce scour or deterioration of the earthen berms and banks.

The Review Area is the area surveyed for indicators and presence of aquatic resources (Figures 1 and 2) and is within the 'City of Indio-Whitewater River Watershed' (Hydrologic Unit Code 12; 181002010802). The City of Indio-Whitewater River Watershed partially includes the cities of Indio, Coachella, and La Quinta, as well as unincorporated sections of Riverside County. Flow within the watershed is conveyed to the CVSC, which ultimately conveys flow southward to its terminus, the Salton Sea, a USACE determined (January 2001) Navigable Water. Soils within the Review Area are within the Riverside County, Coachella Valley Area, California (CA680) and are mapped as Coachella fine sand, 0 to 2 percent slopes (CpA), Fluvents (Fe), Gilman fine sandy loam, 0 to 2 percent slopes (GbA), Indio very fine sand, 0 to 5 percent slopes (Is), and Mayoma fine sand, 0 to 5 percent slopes (MaB) (Natural Resources Conservation Service [NRCS] 2023) (see Appendix A, A-1 Soils Map).

The Review Area is centered along the TPC, which is directly southeast of the Coachella Canal, a 122-mile aqueduct system that delivers water from the Colorado River and connects downslope to the CVSC. The TPC does not appear to convey natural or artificial flows and is heavily disturbed by mechanized equipment likely for sediment movement and vegetation removal. Changes in vegetation and vehicle and equipment tracks can be observed within the TPC on aerial imagery (Google Earth 2023). Madison Street traverses the northwestern portion of the TPC in a north-south direction. General surrounding land uses include agriculture, vacant space, and developed spaces (residential golf courses and roads). The project is not located within or near designated Critical Habitat under the Endangered Species Act (USFWS 2023a).

2 LOCATION

The Project is located in Riverside County within the city of Indio, within Sections 9, 10, 15, and 16 of Township 5 South, Range 7 East as shown on the U.S. Geological Survey (USGS) 7.5-minute *La Quinta* and *Indio* quadrangle maps (**Figure 1**). The project is centered at approximately 33.740115° N latitude, 116.249893° W longitude (**Figure 2**).

The Project may be reached from Indio, California, by traveling northwest toward Indio Boulevard for approximately 259 feet, turning right onto Indio Boulevard and continuing for 1.1 miles, turning left onto Fred Waring Drive and traveling 443 feet, turning right onto Monroe Street and continuing 1.1 miles, turning left onto Avenue 42 and traveling 1.0 mile, and turning left onto Madison Street before reaching the Review Area.

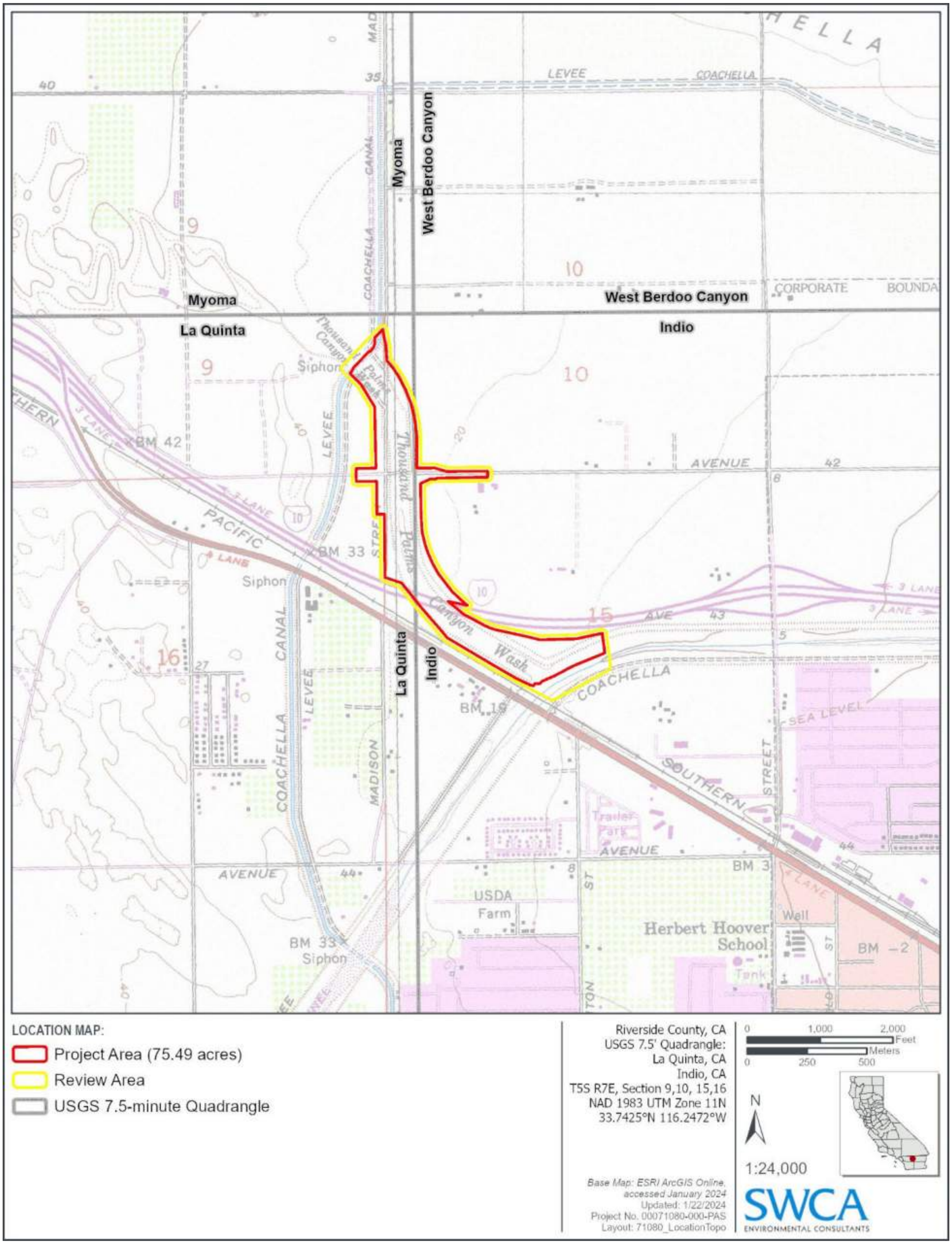


Figure 1. Project Boundary on USGS 7.5-minute quadrangle base map.

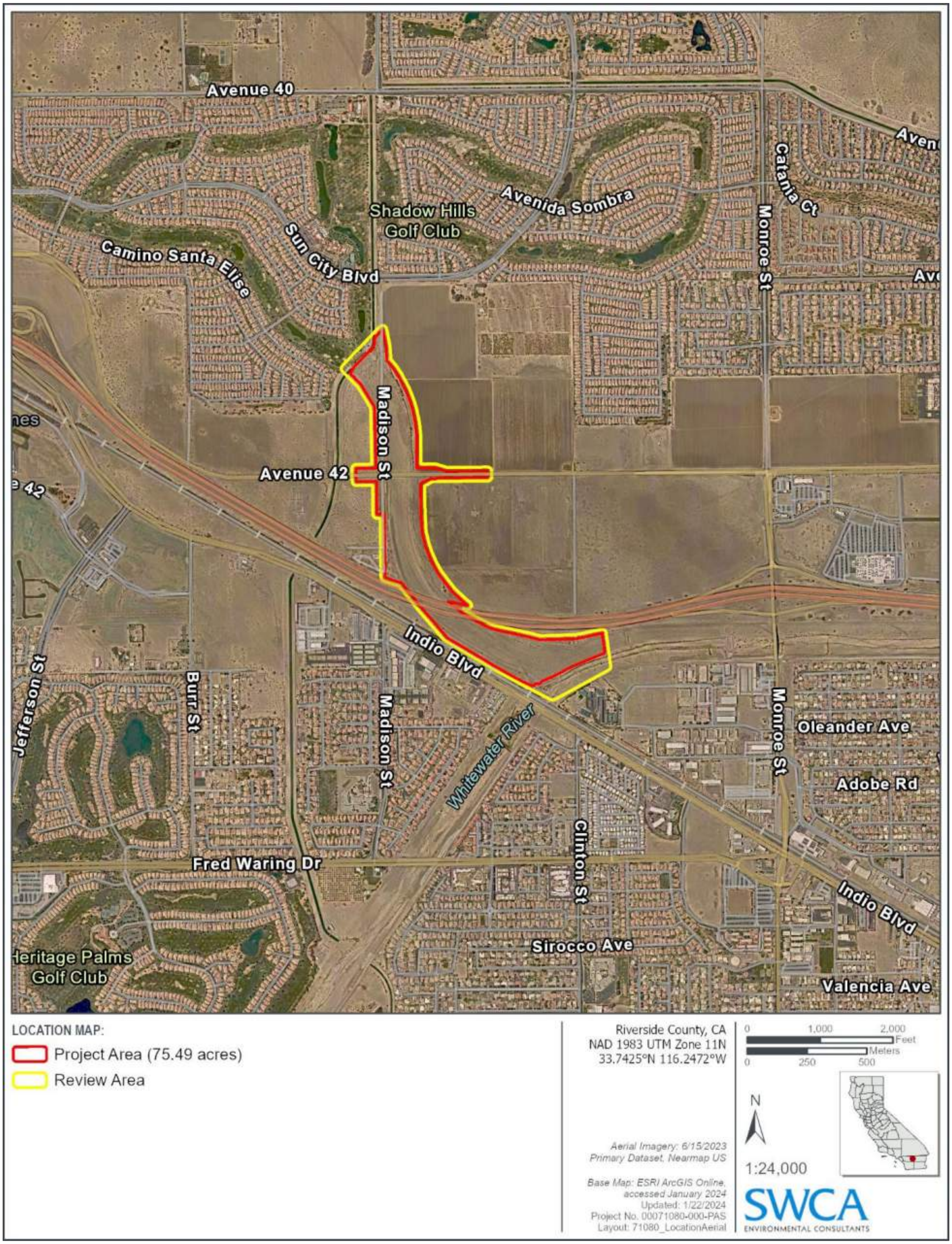


Figure 2. Vicinity map. Project Area (red polygon) on aerial base map.

3 METHODS

3.1 Existing Desktop Data Review and Synthesis

The USACE Wetland Delineation Manual (USACE 1987) and Arid West supplemental guidance was used to conduct preliminary data gathering of existing information and select sources of information helpful in assessing site conditions, extracting pertinent data, and synthesizing the data in advance to conducting field work. The following data sources were selected and reviewed:

- USGS quadrangle maps review streams, topographic details, wet areas, drainage patterns, and general land uses.
- National Wetlands Inventory (NWI) maps to review the potential location and classification of resources that design the regime modifier and flooding or soil saturation characteristics.
- U.S. Department of Agriculture (USDA) NRCS Web Soil Survey to review general climate information, wetness characteristics of soils, soil properties (frequency, duration, and timing of inundation), and soil classification (soil series and phases).
- Google Earth historic and current aerial imagery to review potential wet areas, streams, stream connectivity, and other physical features potentially affecting flow.
- CalFlora plant database to review recorded plants found within or near the Review Area.

After synthesis of the preliminary data, the routine delineation and on-site inspection method was selected. An assessment of whether an atypical/difficult situation exists was estimated based on the presence and proximity of human-induced alteration or natural events that could significantly alter the site's vegetation, soils, and/or hydrology. An assessment of whether a problematic wetland situation exists was based on normal seasonal or annual variability and nature of the site. Based on the preliminary desktop data gathering and synthesis, a field approach was selected including the estimated location of aquatic features for field evaluation.

3.2 Field Survey

An aquatic resources delineation field survey was conducted by SWCA Environmental Consultants (SWCA) delineators on March 28, 2023, using the methods presented in this report. USACE 'Wetland Determination Data Form – Arid West Region' datasheets were completed to document the findings at selected wetland and upland sampling plots. Photographs were documented, including their location and heading (**Figure 3**). All data was recorded using the ESRI ArcGIS Field Maps collector application paired to a Juniper Systems Geode set for sub-meter accuracy. Following the collection of field data, data was reviewed and processed for mapping.

4 RESULTS

4.1 Desktop Data Review

Existing datasets and desktop information were reviewed in advance to field delineation. The desktop review included a search of the NWI (USFWS 2023b) and National Hydrography Dataset (USGS 2023) to identify mapped aquatic resources within the Review Area. In addition, current and historic aerial imagery (Google Earth 2020) was reviewed to identify vegetation types, topographic changes, and visible drainage patterns that may exhibit an OHWM or the presence of wetlands within the Review Area. In addition, SoilWeb data (USDA 2023) and U.S. Fish and Wildlife Service (2023a) designated critical habitat maps were reviewed.

The TPC is within a Federal Emergency Management Agency (FEMA) Zone A, an area with a 1% annual chance of flooding (FEMA 2020) (see Appendix A, A-2 FEMA map). The TPC is not mapped in the NWI, but the Coachella Canal and the CVSC are mapped by NWI as riverine. The Coachella Canal is estimated by NWI as having a perennial hydrologic regime while the CVSC is mapped as intermittent (see Appendix A, A-3 NWI map). The TPC is partially mapped as a wash by NHD (starting approximately 1,000 feet south of Avenue 42 to the CVSC) (see Appendix A, A-4 NHD map). The Coachella Canal and the CVSC are both mapped as Canal/Ditches by NHD (USGS 2020).

Disturbance and vegetation management within the Review Area can be observed on aerial imagery dating back to September 1996, which is the earliest Google Earth aerial imagery with sufficient resolution to distinguish potential hydrological and vegetation patterns. Different sections of the Review Area appear to be subjected to differing levels and types of disturbance over time.

The northwestern most portion of the Review Area between the Sun City Shadow Hills Community golf course and Madison Street exhibits consistent dense vegetation visible from September 1996 through April 2014. Whereas between April 2014 and the survey date (March 2023), the area is consistently unvegetated. Visible signs of surface hydrology in the TPC, such as soil saturation and drainage patterns, are absent on the aerial images through this period.

Historic Google Earth aerial imagery shows a linear stand of what appears to be Athel tamarisk (*Tamarix aphylla*) lines the berm along the eastern side of the TPC from Madison Street south to the TPC's intersection with Interstate 10. Resprouting Athel tamarisk was observed in this location during the survey, suggesting that the mature stand consisted of Athel tamarisk prior to removal. As evidenced by the substantial vegetative debris on the berm and within the TPC, the Athel tamarisk was chipped and spread in the immediate vicinity on-site. The Athel tamarisk may have originally been intentionally planted as a windbreak in support of the adjacent agricultural parcels. Tamarisk is documented as being available for sale for ornamental or windbreak use since the 1850s (Horton 1964). While Athel tamarisk is designated as a facultative (FAC[1]) species in the 2020 USACE National Wetland Plant List (USACE 2020), the linear and uniform pattern, along with its spatial context adjacent to agricultural land, suggests the stand was planted as a windbreak and is not indicative of or occurring as a result of wetland conditions. The stand of tamarisk was removed sometime between December 2019 to June 2021 as illustrated in Google Earth imagery.

Google Earth imagery shows the TPC segment east of Madison Street and north of Avenue 42 does not support vegetation, likely due to vegetation management. Aerial imagery illustrates a consistent stand of shrubs with a similar spatial signature including density and composition as the stand of *Atriplex* sp. (saltbush) west of Madison Street. This vegetation was cleared sometime between March 2013 and April 2014 as depicted in Google Earth aerial imagery. No surface hydrology indicators were observed during the field survey in the TPC, and no drainage patterns or saturation are evident in this area in aerial imagery.

[1] Wetland Hydrology Indicators are values assigned to individual species by the USACE to determine whether a species is a hydrophyte (OBL, FACW, FAC) or a non-hydrophyte (FACU, UPL). Obligate Wetland Plants (OBL) are species that have a greater than a 99% probability of occurring in a wetland. Facultative Wetland Plants (FACW) are species that have a 67 – 99% probability of occurring in a wetland. Facultative Plants (FAC) are species that have a 34 – 66% probability of occurring in a wetland. Facultative Upland Plants (FACU) are species that have a 1 – 33% probability of occurring in a wetland. Upland Plants (UPL) are species that have a less than 1% probability of occurring in a wetland.

The segment of the TPC south of Avenue 42 has been consistently unvegetated since at least September 1996. A well-established access road is present within the TPC. The road can be accessed via a gate from the intersection of Madison Street and Avenue 42 and provides access to CVSC. No vegetation or signs of drainage patterns or saturation were observed on-site during the field survey or on aerial images.

As shown on aerial imagery, the CVSC remains largely uniform in its extent and condition from September 1996 through March 2023; however, signs of vegetation management and mechanized sediment movement are evident. Drainage patterns and saturation are visible in aerial imagery. Vegetation patterns visible in aerial imagery are consistent with the vegetation observed during the field survey. Vegetation along the CVSC is largely disturbed and consists of saltcedar (*Tamarix ramosissima*), Bermuda grass (*Cynodon dactylon*), and London rocket (*Sisymbrium irio*).

4.2 Field Data Collected

The Review Area was evaluated in the field, data and photographs were collected, data was processed, and resource position and areas were calculated to estimate the extent of aquatic resources. Data are summarized below, and photographs and USACE Wetland Determination Data Forms are provided in Appendix B and Appendix C, respectively.

SWCA conducted an aquatic delineation survey on March 28, 2023. One named non-wetland feature was observed within the Review Area, totaling 1.1 acres (1,000 linear feet)

Two wetland determination sampling plots were examined within the Review Area. Of the two wetland determination sampling plots placed in the field to determine the boundaries of wetlands and uplands, both plots (SP01 and SP02) did not exhibit all three wetland parameters needed to determine presence of a three-parameter wetland (see Table 1 and Figure 4). See Table 2 below for a description of each aquatic feature observed within the Review Area.

Table 1. Sampling Points

Plot point	Result	Relative location
SP01	Non-wetland	Southeastern-most corner of the Review Area within the CVSC's OHWM.
SP02	Non-wetland	Southwestern-most corner of the Review Area within the CSCV's OHWM.

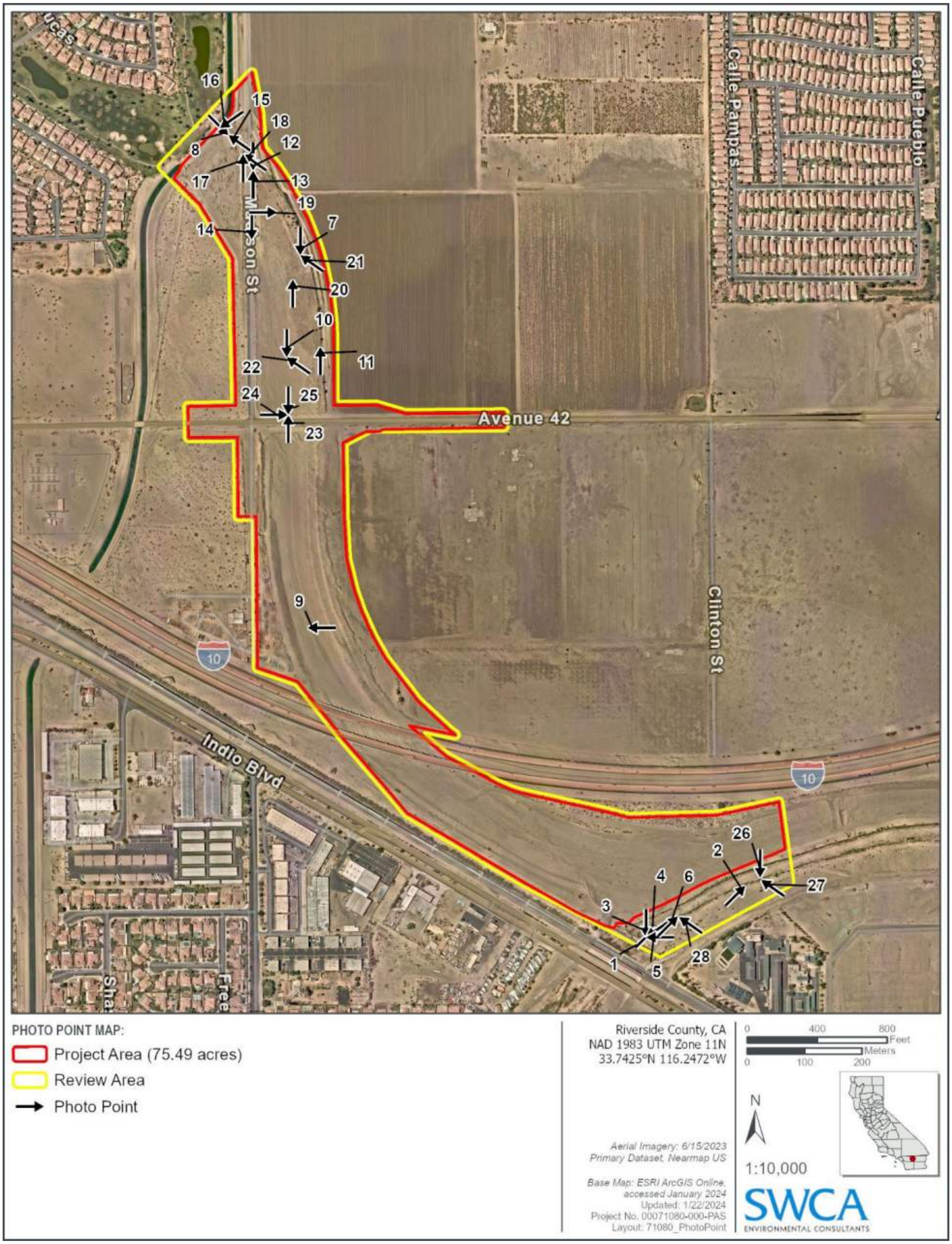


Figure 3. Photo-point map showing the location and direction of photographs (1 – 28).

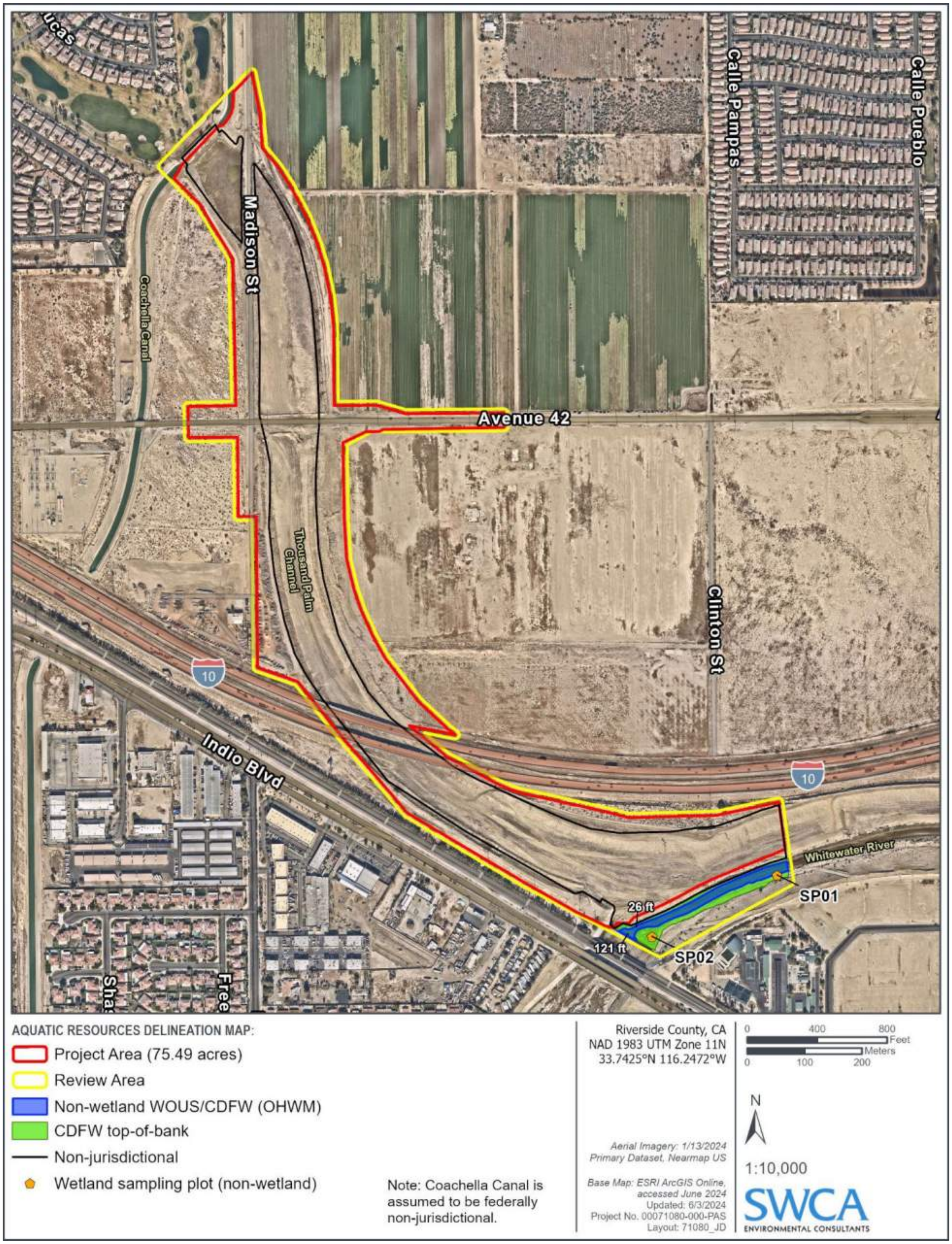


Figure 4. Aquatic resources inventory within Review Area and Project Area, and wetland sampling plots.

4.3 Aquatic Resources Inventory

Aquatic resources mapped within the Review Area include the Whitewater River (F1) (see Table 2 and Figure 4). An Approved Jurisdictional Determination has not been requested or received for these features.

Table 2. Aquatic Resources within the Review Area

Aquatic resource feature	NWI mapped type	Description of aquatic resource	Approximate location (latitude / longitude)
F1 (Coachella Valley Stormwater Channel)	Riverine	A river with headwaters in the San Bernardino National Forest largely conveying flow via an artificial path in a southeasterly direction with a final terminus at the Salton Sea.	33.736443°, -116.242923°
Total			

Feature 1 (Whitewater River):

The Whitewater River headwaters start in the San Bernardino National Forest. Flow is conveyed in a southerly direction in a natural state for approximately 15 miles, at which point flow is channelized to become the Coachella Valley Stormwater Channel. Flow is then conveyed in a generally southeasterly direction for approximately 30 miles before reaching the Review Area. From the Review Area, the Whitewater River conveys flow southeast for approximately 22 miles before reaching the Salton Sea.

Within the Review Area, the Whitewater River exhibits a tapered OHWM with an approximate width of 26 feet in the southwestern-most portion of the Review Area. Within 120 feet of the taper, the OHWM broadens to approximately 95 feet and remains consistent downstream through the duration of the Whitewater River within the Review Area. The OHWM is unvegetated and the river was observed conveying surface water flow during the field survey. Observed hydrologic indicators included flowing water within the low-flow channel and soil saturation and surface soil cracking along the adjacent terraces. Vegetation along the OHWM is sparse, likely due to vegetation management (removal or treatment). Vegetation along the OHWM consists of desert willow (*Chilopsis linearis* [FAC]), saltcedar (No Indicator, assumed FAC per known ecology and previous listing [USACE 2007]), and Bermuda grass (FACU[1]). Soils were determined to vary between a silty clay loam to a silty loam texture. Soils were not determined to be hydric. It was determined that the Whitewater River does not support any federal wetlands within the Review Area.

Other Features excluded from inventory:

Thousand Palms Channel (TPC)

The TPC lacks aquatic resource characteristics such as stream morphology, bed and bank, evidence of flow, OHWM indicators, wetland indicators, or riparian vegetation. Therefore, the TPC is not a potential aquatic resource and is therefore excluded from the inventory. By deduction the TPC also does not carry a relatively permanent flow of water and does not have a continuous surface connection to another WOUS or Traditional Navigable Water.

Coachella Canal

The Coachella Canal is a constructed concrete aqueduct with a width of approximately 40 feet. It consists of a concrete channel conveying flow from the Colorado River to various locations, including the Whitewater River, within the Coachella Valley. The aqueduct conveys flow from the Colorado River to various sources including the Whitewater River, with a terminus at Lake Cahuilla. The Coachella Canal was constructed in the uplands and is considered a ditch that conveys water. Through direct coordination with Los Angeles District (LAD) USACE, Regulatory Division, Orange and Riverside Counties Section, staff were not able to find any past Approved Jurisdictional Determinations for Coachella Canal and agreed with our findings that the feature is likely not a federal WOUS because it was constructed in the uplands; however, only an Approved Jurisdictional Determination can confirm Coachella Canal's federal jurisdictional status under the Conforming Rule.

4.4 Potentially Jurisdictional Aquatic Resources

Aquatic resources and data collected in the field were evaluated to determine the extent of potentially regulated aquatic resources. See Table 3 below for a list of observed aquatic resources assessed as potentially jurisdictional.

Table 3. Potentially Jurisdictional Aquatic Resources within the Review Area

Aquatic resource feature	Description	WOUS / Water Board (acre(s) / linear feet)	CDFW Streambed* (acre(s)/linear feet)
F1 (Coachella Valley Stormwater Channel)	Non-wetland	1.1 (1,000)	2.53 (1,000)
Total		**1.1 (1,000)**	**2.53 (1,000)**

*CDFW Streambed overlaps with WOUS/Water Board features.

The Review Area contains a total of 1.1 acres of non-wetland WOUS/waters of the State (WOS) and 2.53 acres of CDFW streambed and riparian habitat.

4.5 Potential Impacts to Resources

The project has been designed to avoid impacts to the CVSC (F1) which occurs adjacent but outside the project area.

5 SUMMARY AND RECOMMENDATIONS

5.1 Summary

The Review Area includes one jurisdictional aquatic resource: the CVSC (F1), totaling 1.1 acres (1,000 linear feet) non-wetland WOUS/WOS and a total of 2.53 acres (1,000 linear feet) CDFW Streambed, which occurs outside the Project Area. The assessed non-aquatic status of the TPC and non-jurisdictional status of the Coachella Canal may require verification from the resource agencies (USACE, Water Boards, and CDFW) to confirm the area does not contain potential jurisdictional aquatic resources.

5.2 Recommendations

No impacts to regulated aquatic resources would occur. To receive confirmation that areas within the project are not federal waters of the United States, we recommend requesting either a USACE No Permit Required letter and/or an Approved Jurisdictional Determination from the LAD USACE.

If elements of the project were to change, and state or federal aquatic resources would be impacted, permits required may include a USACE Department of the Army permit, a California State Water Board Section 401 water quality certification, and submittal of a CDFW 1600 Lake and Streambed Alteration notification.

6 LITERATURE CITED

California State Water Resources Control Board . 2020. Implementation Guidance for the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. Available at: https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/dredge_fill/revised_guidance.pdf. Accessed April 2023.

Federal Emergency Management Agency (FEMA). 2020. National Flood Hazard Layer. Available at: https://www.fema.gov/national-flood-hazard-layer-nfhl. Accessed April 2023.

Google Earth. 2020. Source: Crested Butte, Colorado. Available at: https://www.google.com/earth/. Accessed April 2023.

Horton, Jerome. 1964. Notes on the introduction of deciduous tamarisk. Res. Note RM-16. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 7 p. [6222]

Natural Resources Conservation Service (NRCS). 2023. Natural Resources Conservation Service, National Lists of Hydric Soils (December 2015). Available at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/. Accessed April 2023.

U.S. Army Corps of Engineers (USACE). 1987. *Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1.* Vicksburg, Mississippi: U.S. Army Engineers Waterways Experiment Station.

———. 2007. *Wetland Plants of Specialized Habitats in the Arid West.* ERDC/CRREL TR-07-8.

———. 2008a. *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West (Version 2.0),* U.S. Army Engineer Research and Development Center. ERDC/EL TR-08-28.

———. 2008b. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. A Delineation Manual.* ERDC/CRREL TR-08-12.

———. 2008c. Clean Water Act Jurisdiction following the U.S. Supreme Court's decision in *Rapanos v. United States & Carbell v. United* States. Available at: https://www.epa.gov/sites/default/files/2016-02/documents/cwa_jurisdiction_following_rapanos120208.pdf. Accessed April 2023.

———2020. National Wetland Plant List, version 3.5. U.S. Army Corps of Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH. Available at: http//wetland-plants.uasce.army.mil/. Accessed: April 2023.

———2023. *Revised Definition of "Waters of the United States." Final Rule*. Available at: https://www.epa.gov/system/files/documents/2023-01/Revised%20Definition%20of%20Waters%20of%20the%20United%20States%20FRN%20January%202023.pdf. Accessed: April 2023.

U.S. Department of Agriculture. Soil Survey Staff, Natural Resources Conservation Service. Web Soil Survey. Available online at the following link: http://websoilsurvey.sc.egov.usda.gov/. Accessed April 2023.

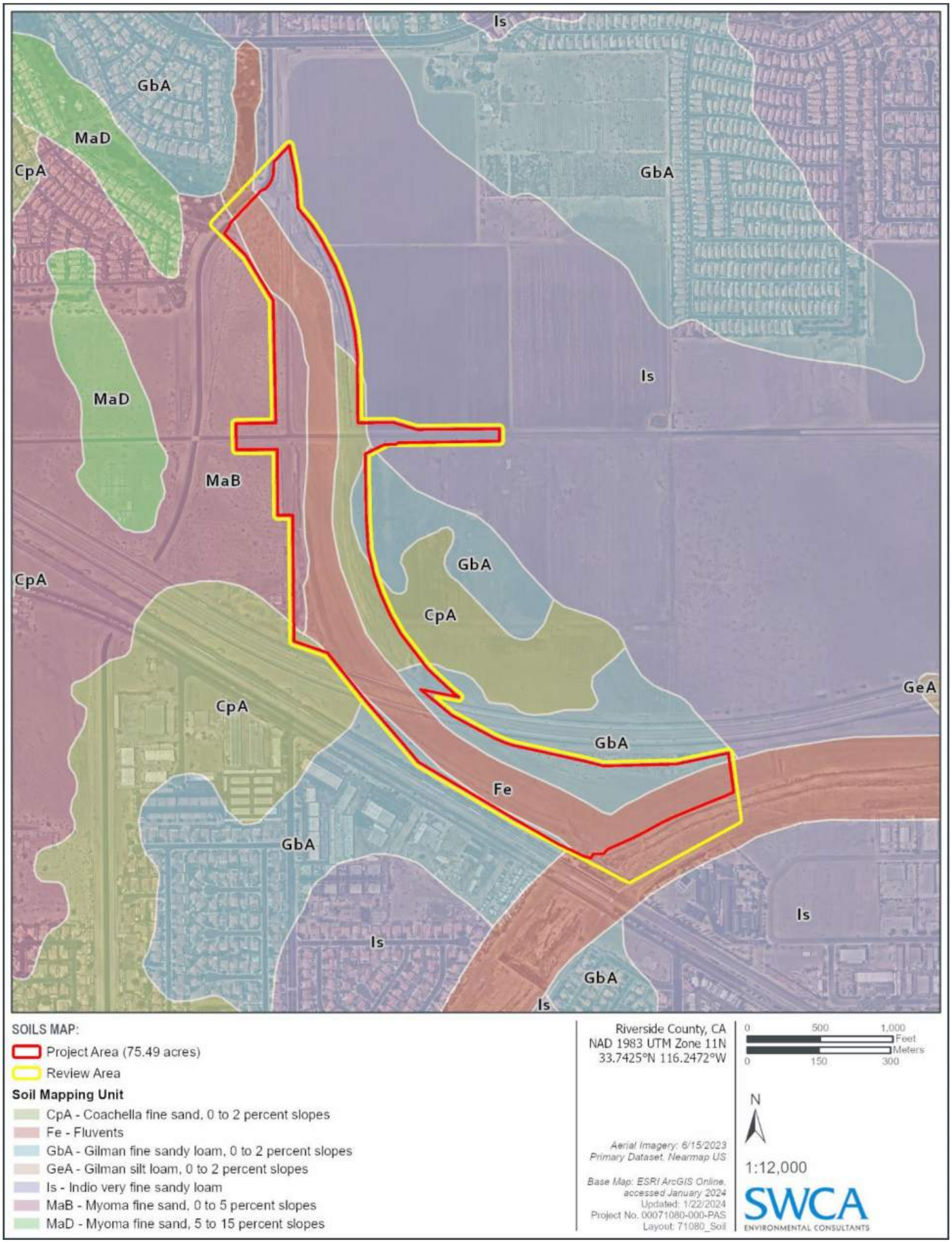
U.S. Fish and Wildlife Service (USFWS). 2023a. Critical Habitat Mapper. U.S. Fish and Wildlife Service Ecological Services. Available at: https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77. Accessed April 2023.

———. 2023b. National Wetlands Inventory. U.S. Fish and Wildlife Service Ecological Services. Available at: http://www.fws.gov/wetlands/Data/State-Downloads.html. Accessed April 2023.

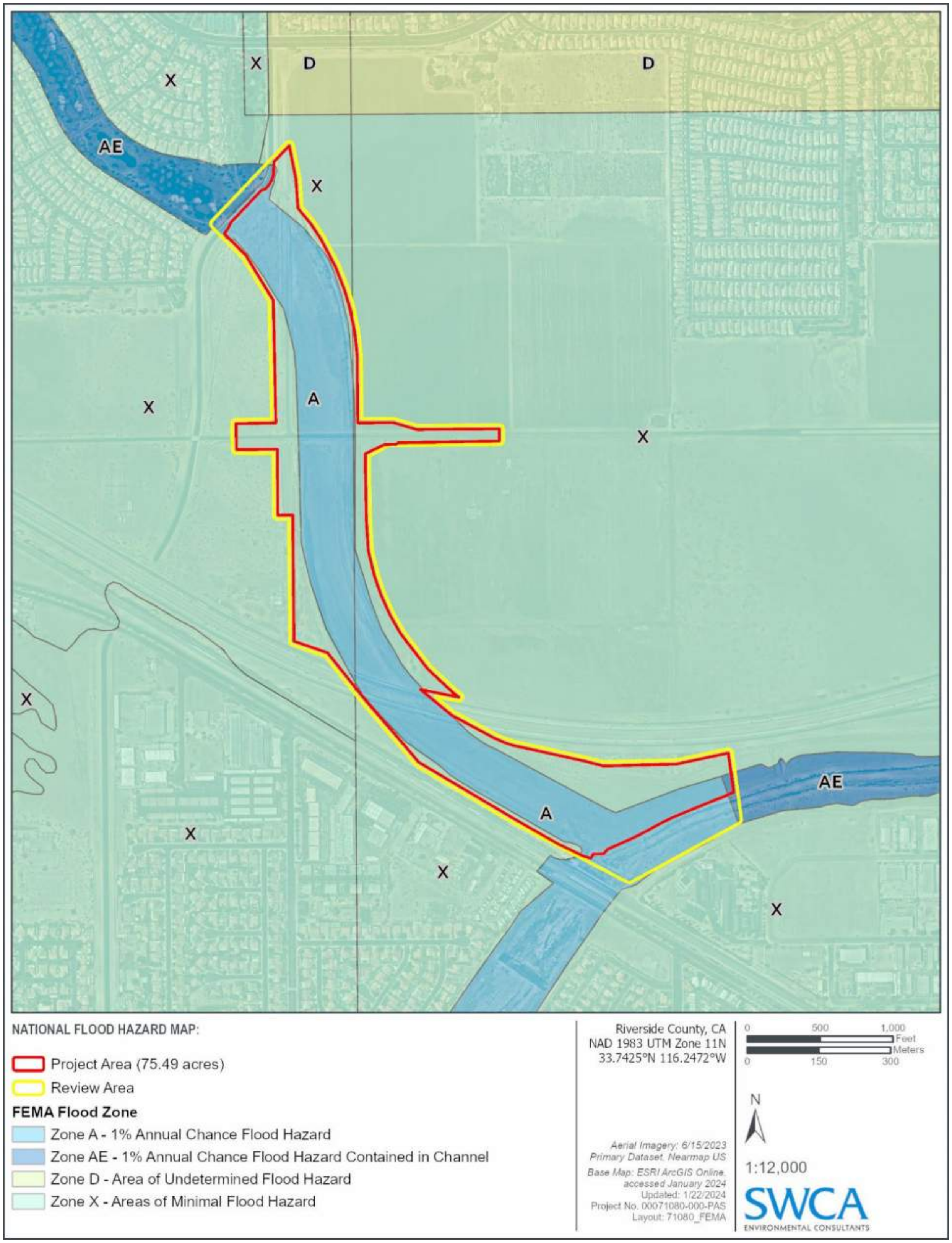
U.S. Geological Survey (USGS). 2020. National Hydrography Dataset. Available at: http://nhd.usgs.gov/index.html. Accessed April 2023.

APPENDIX A

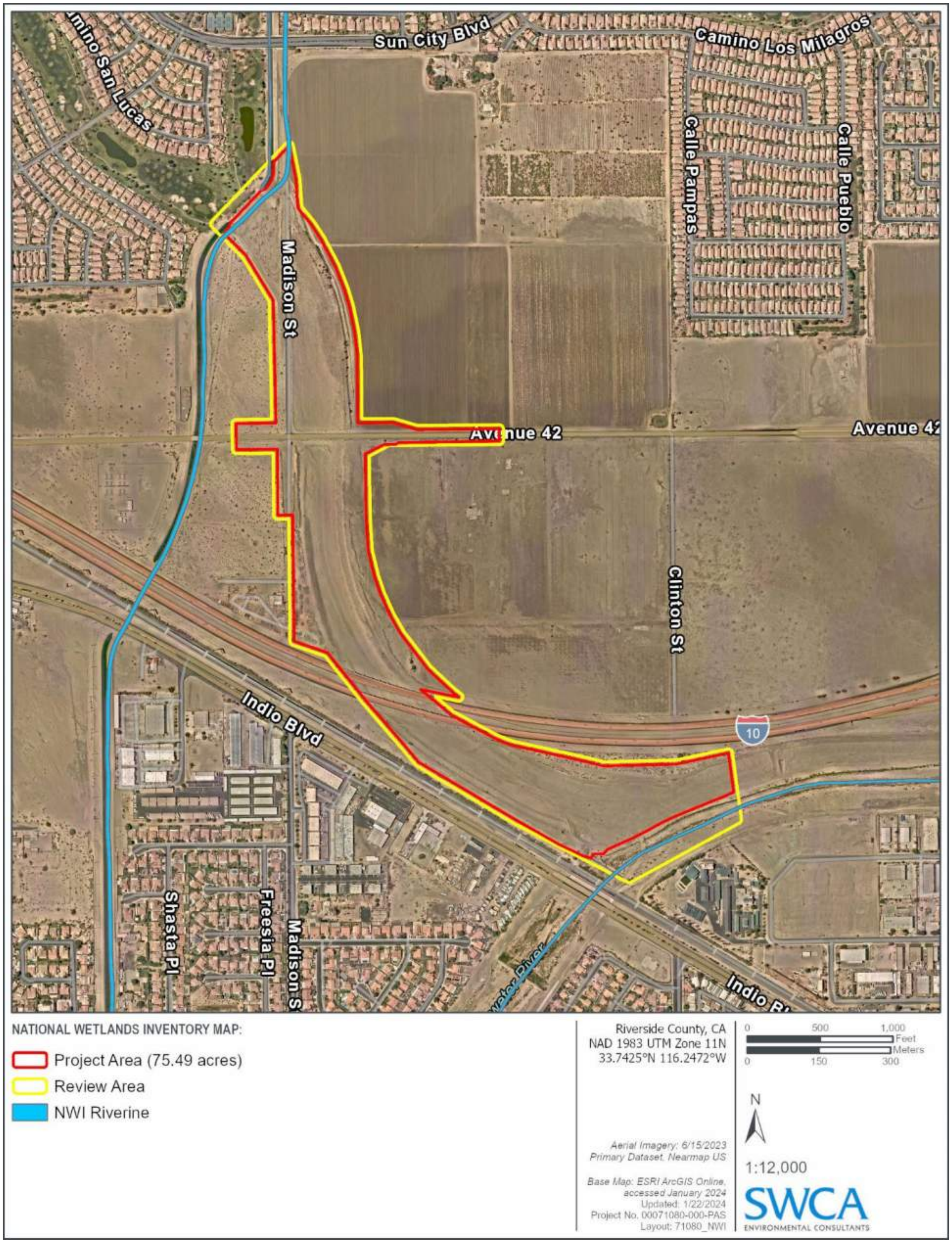
Supporting Maps



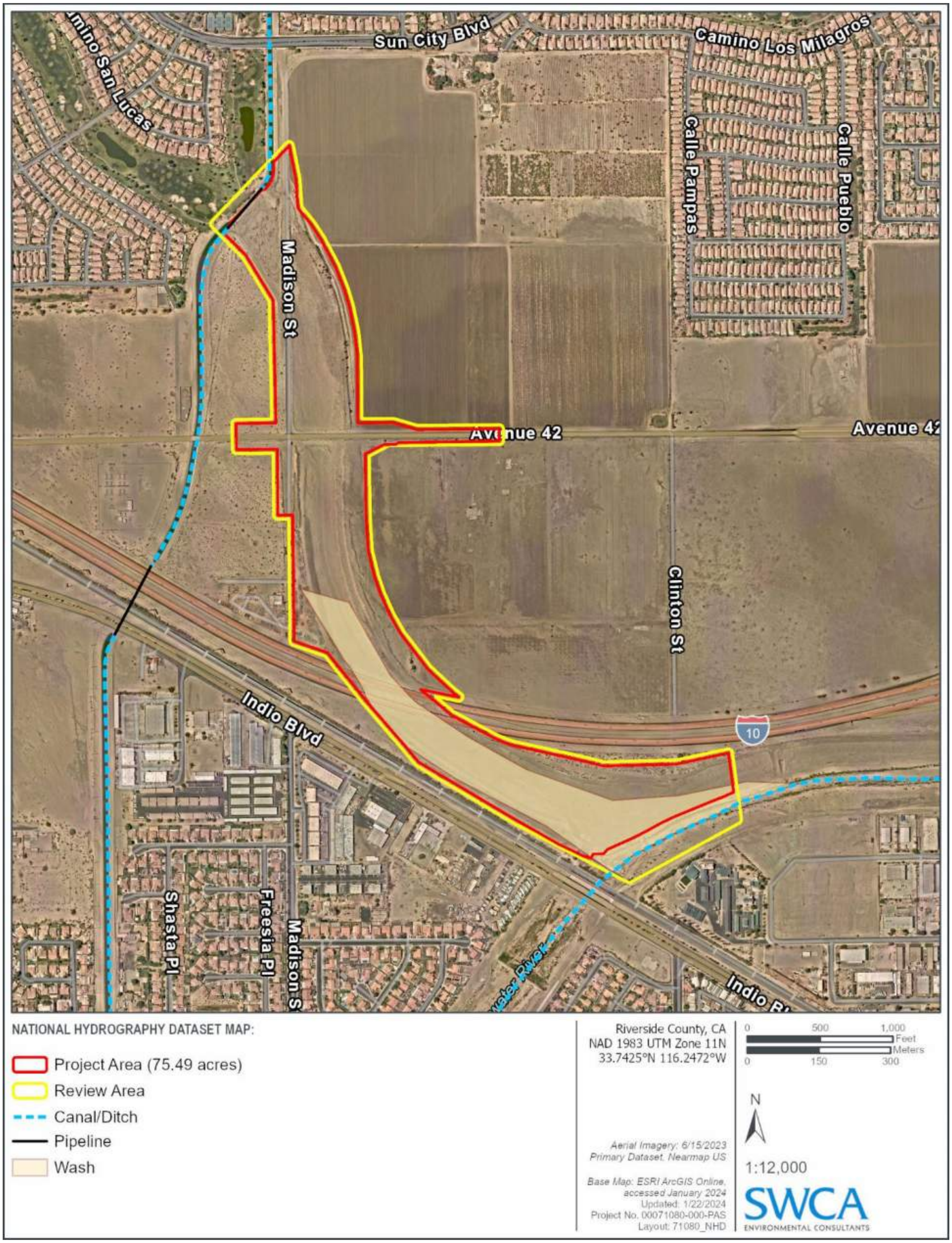
A-1 Mapped Soils, NRCS, USDA



A-2 Web Soils Survey, National Wetlands Inventory, FEMA



A-3 National Wetlands Inventory, USFWS



A-4 National Hydrography Dataset, USGS

APPENDIX B

Photographs

Photo 1. CVSC OHWM, view facing northeast.

Photo 2. CVSC OHWM, view facing northeast.

Photo 3. CVSC disturbed streambed, view facing south.

Photo 4. CVSC disturbed streambed, view facing southwest towards railroad bridge.

Photo 5. CVSC disturbed streambed, view facing west.

Photo 6. CVSC OHWM, view facing east-northeast.

Photo 7. Berm east of Thousand Palms Channel. Athel tamarisk was chipped and spread and left in place on the berm and the TPC, view facing south.

Photo 8. Coachella Canal overpass, view facing northwest towards adjacent golf course.

Photo 9. Berm west of Thousand Palms Channel, view facing west.

Photo 10. Thousand Palms Channel, view facing south.

Photo 11. Berm east of Thousand Palms Channel with resprouting Athel tamarisk, view facing north.

Photo 12. End of berm, view facing north.

Photo 13. End of berm, view facing south.

Photo 14. Road adjacent to Thousand Palms Channel, view facing south.

Photo 15. Overview of disturbance within the Thousand Palms Channel, view facing southeast.

Photo 16. Overpass above the Coachella Canal, view facing southwest.

Photo 17. Looking towards golf course across the Thousand Palms Channel, view facing northwest.


Photo 18. Berm along Art Road creating a perpendicular barrier to the Thousand Palms Channel, view facing north.

Photo 19. Chipped Athel tamarisk debris on the berm east of Thousand Palms Channel, view facing east.

Photo 20. Chipped Athel tamarisk within the Thousand Palms Channel, view facing north.

Photo 21. Berm east of the Thousand Palms Channel, view facing northwest.

Photo 22. Thousand Palms Channel overview, facing northwest.


Photo 23. Thousand Palms Channel overview, facing north.

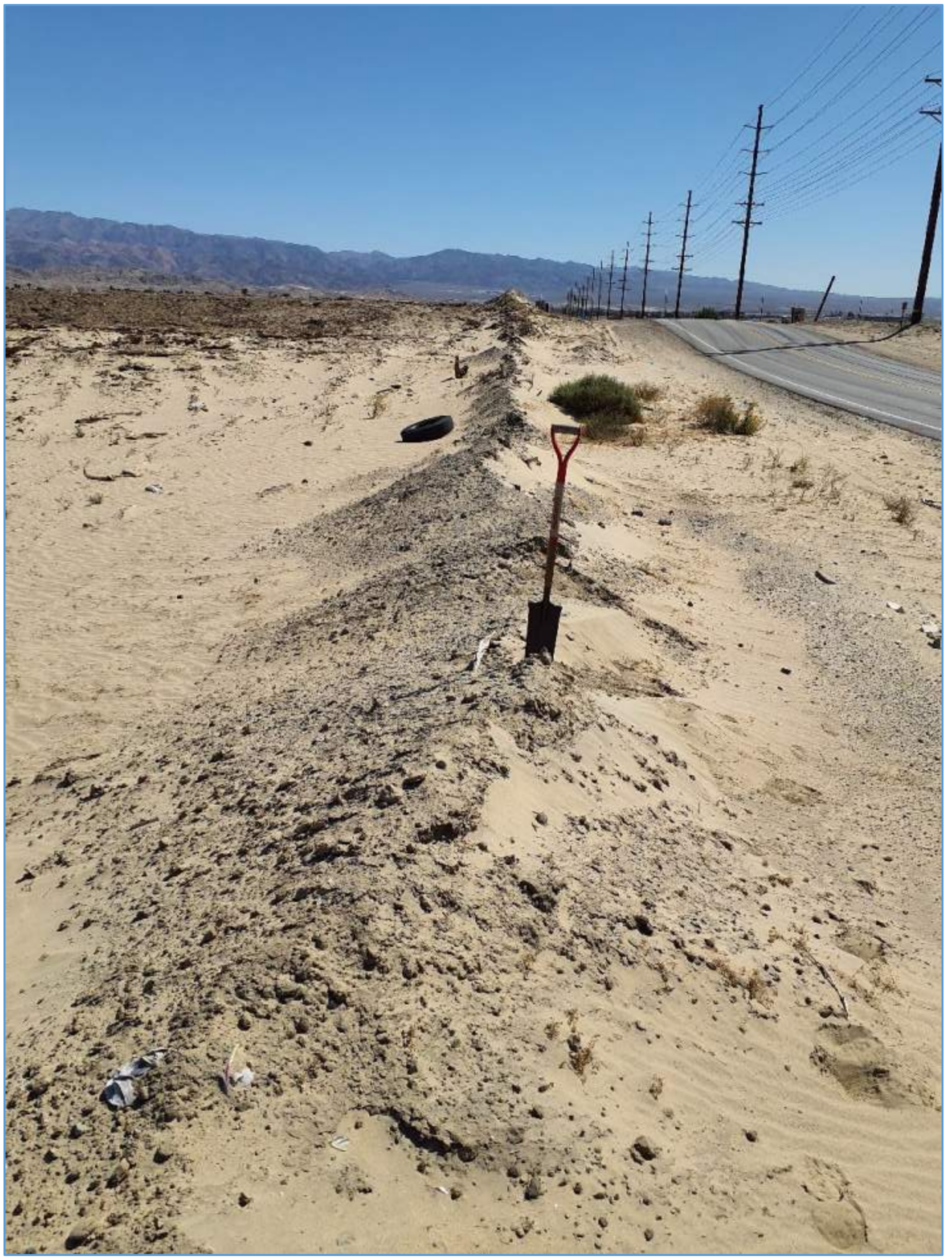


Photo 24. Berm perpendicular to the Thousand Palms Channel along Avenue 42, view facing east.

Photo 25. Thousand Palms Channel overview, facing south across Avenue 42.

Photo 26. Salt crust at SP01 plot, view facing southeast.

Photo 27. SP01 soil test pit overview, facing northwest.


Photo 28. SP02 soil test pit overview, facing northwest.

APPENDIX C

Datasheets (Wetland Forms)

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Thousand Palms City/County: Riverside Sampling Date: 03/28/2023

Applicant/Owner: Kimley-Horn State: CA Sampling Point: SP01

Investigator(s): Bonnie Rogers and Danielle Parsons Section, Township, Range: 15 T5S R7E

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR): D Lat: 33.7368 Long: -116.242 Datum: WGS 84

Soil Map Unit Name: Fe - Fluvents NWI classification: No

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ✓, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____ No ✓	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

Disturbed site and vegetation. In prolonged duration, in a wet year.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30-ft)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1. Chilopsis linearis	20	Y	FAC
2. Tamarix ramosissima	12	Y	FAC*
3.			
4.			
5.			
= Total Cover	32		
Herb Stratum (Plot size: 5-ft)			
1. Cynodon dactylon	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	10		
Woody Vine Stratum (Plot size: 15-ft)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

*Not listed in 2020 NWPL. Assumed FAC based on plant's ecology and previous AW FAC listing in 2007 "Wetland Plants of Specialized Habitats in the Arid West."

SOIL

Sampling Point: SP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-9	2.5Y 4/2	100		0	NA		SiL	
9-18	25Y 4/3	50	10YR 4/6	50	C	M	SiCL	Consentration soft masses

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Stratified Layers (A5) (**LRR C**)
- __ 1 cm Muck (A9) (**LRR D**)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)
- __ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- __ 1 cm Muck (A9) (**LRR C**)
- __ 2 cm Muck (A10) (**LRR B**)
- __ Reduced Vertic (F18)
- __ Red Parent Material (TF2)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1) (**Nonriverine**)
- __ Sediment Deposits (B2) (**Nonriverine**)
- __ Drift Deposits (B3) (**Nonriverine**)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Water-Stained Leaves (B9)
- ✓ Salt Crust (B11)
- __ Biotic Crust (B12)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- __ Water Marks (B1) (**Riverine**)
- __ Sediment Deposits (B2) (**Riverine**)
- __ Drift Deposits (B3) (**Riverine**)
- __ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Thousand Palms City/County: Riverside Sampling Date: 03/28/2023

Applicant/Owner: Kimley-Horn State: CA Sampling Point: SP02

Investigator(s): Bonnie Rogers and Danielle Parsons Section, Township, Range: 15 T5S R7E

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR): D Lat: 33.7359 Long: -116.244 Datum: WGS 84

Soil Map Unit Name: Fe - Fluvents NWI classification: No

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ___, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No ✓

Are Vegetation ✓, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ✓	Is the Sampled Area within a Wetland? Yes ___ No ✓
Hydric Soil Present?	Yes ___ No ✓	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

Area including vegetation and soil is disturbed. In prolonged drought conditions, during wet year.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30-ft)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15-ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5-ft)			
1. Cynodon dactylon	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10 = Total Cover		
Woody Vine Stratum (Plot size: 15-ft)			
1.			
2.			
	___ = Total Cover		
% Bare Ground in Herb Stratum 80	% Cover of Biotic Crust 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

*Not listed in 2020 NWPL. Assumed FAC based on plant's ecology and previous AW FAC listing in 2007 "Wetland Plants of Specialized Habitats in the Arid West."

SOIL

Sampling Point: SP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	2.5Y 4/3	100					SiL	
9-18	2.5Y 3/2	100					L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✓ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix B3:
CVWD Shoofly Biological Survey Notes

Date: 12/19/24 Observer: S. Watts Location: Thousand Palms Channel & 42nd Project: TPC Shoofly

Weather: ~80°F (26°F), Slight Haze, Calm

Start Time: 10:20

End Time: 11:12

Reason for Visit:
Thousand Palms Channel Shoofly, Make sure consistent w/ MM in MMND for TPC Slope lining

Area Description:
Highly disturbed next to roadway, Mixture of Blowsand, trash, cable & concrete, but mostly native plants

Survey Findings:
Findings Seem that current MM will cover impacts to the area but will review later.

GIS Recorded: YES/NO GIS Name(s): TPC Shoofly

Active Burrowing Owls: YES/NO Location(s):

Active MBTA Nest: YES/NO Location(s):

CNDDB Needed: YES/NO Location(s):

Animal Species Seen:
None seen. Tracks: CORA, Uta sp, Coyote,

Plant Species Seen:
Atriplex polycarpa, Atriplex canescens, Palafoxia arida, Salsola tragus

Site Visit Photos: YES/NO

LINK: TPC Shoofly

Appendix C:
Cultural Resources Assessment

Cultural Resources Assessment for the Thousand Palms Channel Improvement Project, City of Indio, Riverside County, California

JUNE 2024

PREPARED FOR

Kimley-Horn and Associates, Inc. and
Coachella Valley Water District

PREPARED BY

SWCA Environmental Consultants

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Cultural Resources Assessment for the Thousand Palms Channel Improvement Project, City of Indio, Riverside County, California

Prepared for

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Attn: Meghan D. Karadimos

and

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SWCA Project No. 71080

SWCA Cultural Resources Report No. 23-270

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Keywords: Indio; La Quinta Quadrangle; Indio Quadrangle; Township 5 South, Range 7 East, Sections 9, 10, 15 and 16; Coachella Valley Water District; Thousand Palms Channel

EXECUTIVE SUMMARY

Purpose and Scope: Kimley-Horn and Associates, Inc. (Kimley-Horn) retained SWCA Environmental Consultants (SWCA) to conduct a cultural resources assessment in support of the Thousand Palms Channel Improvements Project (project), proposed by the Coachella Valley Water District (CVWD or District). The project area is located along the Thousand Palms Channel generally between the Coachella Valley Stormwater Channel (CVSC) and the Coachella Canal near Sun City Shadow Hills in the city of Indio, California (project area). CVWD proposes to improve the existing unlined Thousand Palms Channel to receive regional flood flows from the North Indio Hills and Thousand Palms areas, and improve the channel's confluence with the CVSC. The Thousand Palms Channel has not been previously evaluated for potential historical significance.

This study was conducted to analyze potential impacts the project may have on cultural resources in the project area to facilitate compliance with the California Environmental Quality Act (CEQA). This study included the following: 1) California Historical Resources Information System (CHRIS) records search; 2) Sacred Lands File (SLF) search; 3) literature, map, and aerial photograph review; 3) intensive-level archaeological and built environment surveys; and 4) an evaluation to determine whether the Thousand Palms Channel and the portion of site P-33-007425/CA-RIV-005799 within the project area are eligible for the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR), and would therefore constitute a historical resource for the purposes of CEQA. The methodology for this assessment complies with best professional practices and CEQA Guidelines, Sections 5024.1, 21083.2, and 21084.1 of the Public Resources Code (PRC), and Title 14 California Code of Regulations (CCR) Section 15064.5.

Dates of Investigation: At SWCA's request, on May 13, 2022, staff at the Eastern Information Center (EIC) at the University of California, Riverside conducted a CHRIS records search for the project area plus a 1-mile radius. The SLF search was conducted by Andrew Green, Cultural Resource Analyst with the Native American Heritage Commission (NAHC) at the request of SWCA, and results of the SLF search were received on March 20, 2023. SWCA staff conducted intensive-level archaeological and built environment surveys of the project area on April 13 and 14, 2023. Subsequently, the project engineering and boundaries were revised. The current project footprint is smaller than the original footprint and is completely inside the original project boundaries. Accordingly, the project area and report were revised in May 2024.

Summary of Findings: Two previously recorded built environment resources were identified within the project area: the Coachella Canal (P-33-005705/CA-RIV-012999) and the CVSC (P-33-017259/CA-RIV-10847). The Coachella Canal was previously determined eligible for the NRHP with State Historic Preservation Office (SHPO) concurrence. It is eligible at the local and state levels of significance under Criterion A, and its period of significance was identified as 1938 to 1954. The Coachella Canal qualifies as a historical resource for the purposes of CEQA. The segment of the CVSC within the project area was previously recommended ineligible for the NRHP and CRHR.

SWCA identified one previously unrecorded built environment resource within the project area: the Thousand Palms Channel. The channel was surveyed, recorded on California Department of Parks and Recreation (DPR) 523 series forms, and evaluated for eligibility for listing in the NRHP and the CRHR. As described in this study, the Thousand Palms Channel originates from a natural feature, a wash, and is currently an unlined channel with earthen bed and banks, and minimal human-made features such as a concrete drop structure, baffle blocks, and riprap. The Thousand Palms Channel is recommended ineligible for listing in the NRHP and CRHR under all criteria as it lacks association with significant events and individuals (Criteria A/1 and B/2); does not embody the distinctive characteristics of a type, period, or method of construction, or represents the work of a master architect or engineer (Criteria C/3);

and does not appear to have the potential to yield information important to prehistory or history (Criteria D/4). Therefore, the Thousand Palms Channel is not a historical resource for the purposes of CEQA.

One previously recorded prehistoric archaeological resource (P-33-007425/CA-RIV-005799) was identified within the original boundary overlapping a small section of the northern portion of the project area's disturbance footprint. The site was recorded in 1995 as consisting of a light scatter of ceramics, groundstone fragments, fire-affected rock, broken river cobble, various types of shell, three hearth areas, eight structured depressions, and an intrusive historic trash component along the northern edge adjacent to the project area. Also noted were faunal remains, burned clay fragments, unfired clay balls/nodules, and many depressed areas with associated ceramics and burned bone.

During the archaeological field survey, a total of nine prehistoric ceramic fragments were recorded within push berms at six locations in the northern portion of the project area. Of the nine artifacts, seven are outside of the established construction grading limits while the remaining two artifacts are within the grading limits. Artifact 5 is also within a proposed access road alignment. While the artifacts were outside of the previously recorded boundary of P-33-0007425/CA-RIV-005799, the boundary was updated to include all nine artifacts. As a result of the site boundary update, the site overlaps the northwestern portion of the project area.

While site P-33-0007425/CA-RIV-005799 has not been evaluated in its entirety and a recommendation of eligibility cannot be made for the site as a whole, the portion of P-33-0007425/CA-RIV-005799 located within the current project area is heavily disturbed with the artifacts displaced from their original context by agricultural and road grading activities. As such, the portion of site P-33-0007425/CA-RIV-005799 within the project area is recommended to be a non-contributing element to the site's eligibility for the CRHR, were it to be formally evaluated for listing. Therefore, the portion of the site in the project area is not considered to be a historical resource or a unique archaeological resource for the purposes of CEQA.

Recommendations: The portion of P-33-0007425/CA-RIV-005799 located within the current project area is recommended to be a non-contributing element to the site's eligibility for the CRHR, were it to be formally evaluated for listing. The primary components of the site, however, are located immediately west of the project area. As a result, SWCA recommends: 1) the preparation of a Cultural Resources Monitoring and Treatment Plan (CRMTP) in consultation with the agency and all consulting Native American tribal groups, 2) artifact collection within the APE, and 3) tribal and archaeological monitoring of all ground-disturbing construction work north of Avenue 42. The archaeological monitor should be overseen by a Qualified Archaeologist, defined as one who meets the Secretary of the Interior's Professional Qualification Standards in archeology. The CRMTP will include, at a minimum, the qualifications of key staff, monitoring protocols, provisions for evaluating and treating cultural materials, and reporting requirements. Prior to any construction activities, it is recommended that the nine artifacts within the project area be collected and treated in accordance with the approved CRMTP. In the event that human remains are encountered during construction, the Riverside County Coroner should be contacted in compliance with State of California Health and Safety Code Section 7050.5 and PRC Section 5097.98.

SWCA finds the project would have a ***less-than-significant impact to archaeological resources***.

As mentioned above, the Coachella Canal is a historical resource for the purposes of CEQA. As the proposed project would protect in place the Coachella Canal and its siphon which allows the canal to flow underneath the Thousand Palms Channel, the project would not have a significant direct adverse impact on the historical resource. There are no other built environment historical resources adjacent to the project area that would be indirectly impacted. Therefore, the proposed project would result in a ***less-than-significant impact to built environment historical resources***.

Disposition of Data: The final cultural resources survey report and any subsequent related reports will be filed with CVWD; the EIC at the University of California, Riverside; and with SWCA's Pasadena, California, office. All field notes, photographs, and records related to the current study are on file at the SWCA Pasadena office.

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CHAPTER 1. INTRODUCTION

Kimley-Horn and Associates, Inc. (Kimley-Horn) retained SWCA Environmental Consultants (SWCA) to prepare a cultural resources assessment in support of the Thousand Palms Channel Improvements Project (project), proposed by the Coachella Valley Water District (CVWD or District). The project area is located along the Thousand Palms Channel generally between the Coachella Valley Stormwater Channel (CVSC) and the Coachella Canal at Sun City Shadow Hills in the city of Indio, California (project area). CVWD proposes to improve the existing unlined Thousand Palms Channel to receive regional flood flows from the North Indio Hills and Thousand Palms areas, and improve the channel's confluence with the CVSC. The Thousand Palms Channel has not been previously evaluated for potential historical significance.

This report documents the results of a cultural resources study conducted by SWCA. The purpose of the study is to identify whether any cultural resources have been previously documented, record and evaluate the Thousand Palms Channel for potential historical significance, assess whether previously unrecorded resources are likely to occur in the project area, and provide recommendations for avoiding adverse impacts to those resources consistent with cultural resources reviews under the California Environmental Quality Act (CEQA). The study included the following tasks: 1) California Historical Resources Information System (CHRIS) records search; 2) Sacred Lands File (SLF) search; 3) literature, map, and aerial photograph review; 4) intensive-level archaeological and built environment surveys; and 5) evaluation to determine whether the Thousand Palms Channel and the portion of site P-33-007425/CA-RIV-005799 within the project area are eligible for the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR), and would therefore constitute a historical resource for the purposes of the CEQA. The methodology for this assessment complies with best professional practices and CEQA Guidelines, Sections 5024.1, 21083.2, and 21084.1 of the Public Resources Code (PRC), and 14 California Code of Regulations (CCR) 15064.5.

SWCA Architectural Historian Susan Zamudio-Gurrola, M.H.P., conducted the built environment evaluation and served as co-author of this report. Debi Howell-Ardila, M.H.P., Senior Team Lead for Architectural History, provided senior oversight for the built environment assessment. SWCA Archaeologists Omar Rice, B.A., and Alec McKinney, B.S., completed the cultural resources pedestrian survey. Senior Cultural Resources Team Lead Liz Dennison, M.A., Registered Professional Archaeologist (RPA), oversaw the archaeological assessment and served as co-author of this report. Michael Bever, Ph.D., RPA, provided technical review for the archaeological assessment.

1.1 PROJECT DESCRIPTION

The Thousand Palms Channel project includes constructing the last conveyance facility intended to receive regional flood flows from the North Indio Hills and Thousand Palms areas. To this point, the project would improve the Thousand Palms Channel to the confluence with the CVSC.

In its existing condition, the Thousand Palms Channel is an earthen bottom channel with earthen side slopes. There are sections of the Channel that have been incised and other sections that have had berms constructed. These berms are not Federal Emergency Management Agency (FEMA) certified levees. Additionally, there are two at-grade roadway crossings at Madison Street and Avenue 42, as well as a bridge crossing under Interstate (I-) 10. In its existing conditions, the Thousand Palms Channel is unable to accommodate the 100-year flow rate throughout the entirety of the channel along the project reach. The portion of the channel north of the Avenue 42 crossing does not have the capacity to convey the 100-year flowrate of 16,836 cubic feet per second.

The project's preliminary design report evaluated four different alternatives and resulted in a preferred alternative consisting of an earthen channel with concrete side slopes (Figure 3). The proposed Thousand

Palms Channel from Sun City Shadow Hills to the CVSC would cross Madison Street and Avenue 42, would include three concrete lined drop structures, and improve the confluence point with the CVSC.

Currently, the Coachella Canal crosses under the Thousand Palms Channel via a reinforced concrete siphon, and a concrete drop structure is located within the Thousand Palms Channel alignment at the location of the siphon to protect the siphon from scour and erosion. As part of the current project, the Coachella Canal, siphon and drop structure are proposed to be protected in place. The drop structure will be extended further downstream and to a lower level to provide the necessary scour protection associated with the ultimate channel design. Concrete slope lining will be installed along the lower 16’- 6” limits of the existing structure to raise the top of walls to a constant elevation of 32.68 feet, NGVD29 (35.0 ft NAVD88).

1.2 PROJECT LOCATION

The project area is located near central Indio, California (Figure 1). The project area is plotted on Sections 9, 10, 15, and 16, Township 5 South, Range 7 East, and can be found on the 1966 U.S. Geological Survey (USGS) La Quinta, California and Indio, California, 7.5-minute quadrangles (Figure 2). The project area spans from one of the southeastern edges of the Sun City Shadow Hills community to the CVSC, just south of I-10 (Figure 3).

The project area encompasses the direct project footprint (e.g., areas of construction, staging and access) and an additional surrounding buffer area, established by the project designers, to allow for construction impacts and potential changes in the project limits (see Figure 3). The vertical extent of ground disturbance is 50 feet below ground to account for excavation related to the channel construction. The majority of the grading will occur within the areas that have been previously disturbed by existing paved and dirt roads currently used for access to the existing Thousand Palms Channel. The exception is along the eastern side of the channel, where existing roads will be expanded to the west into the existing area of disturbance.

Figure 1. Project vicinity.

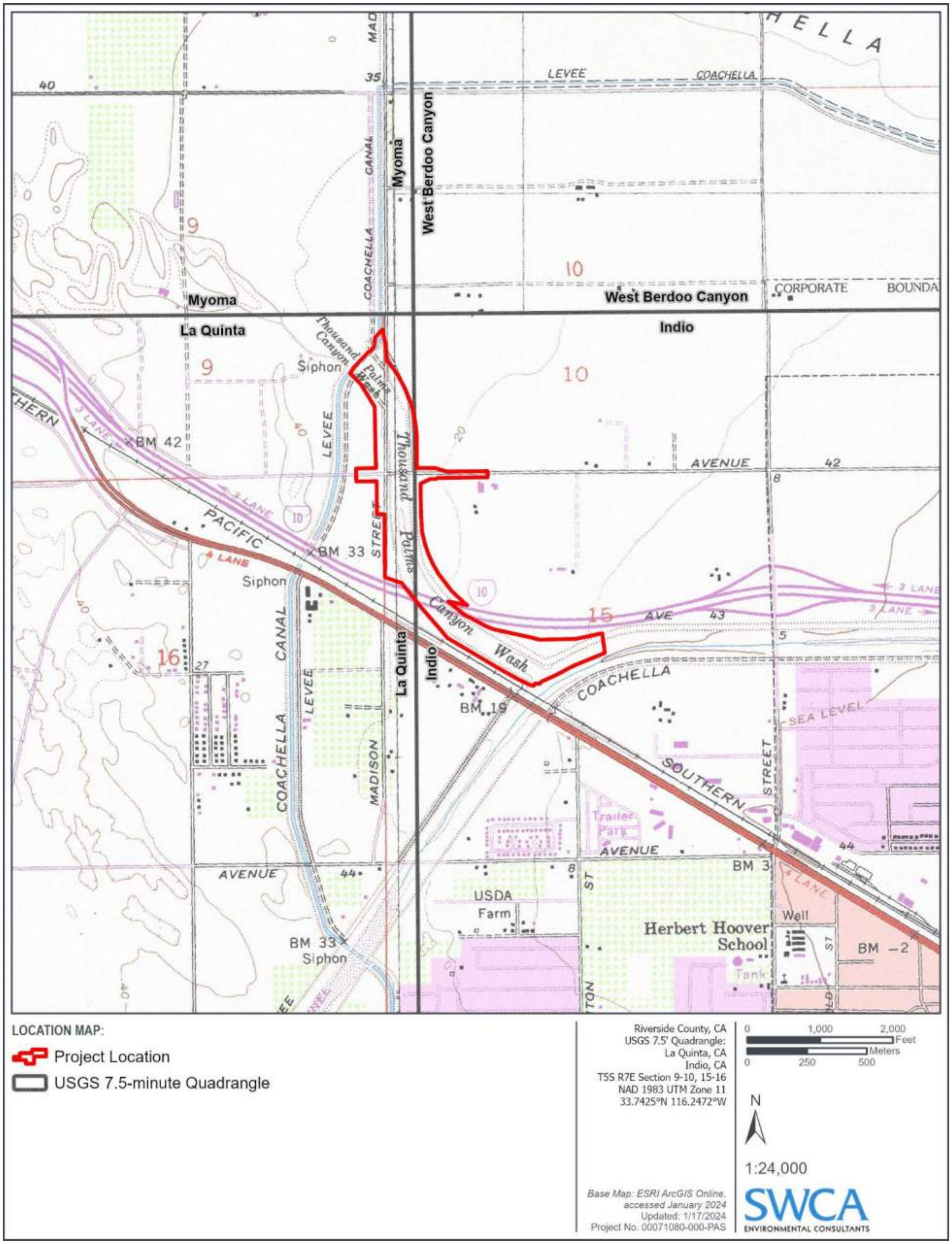

Figure 2. Project location depicted on USGS quadrangles.

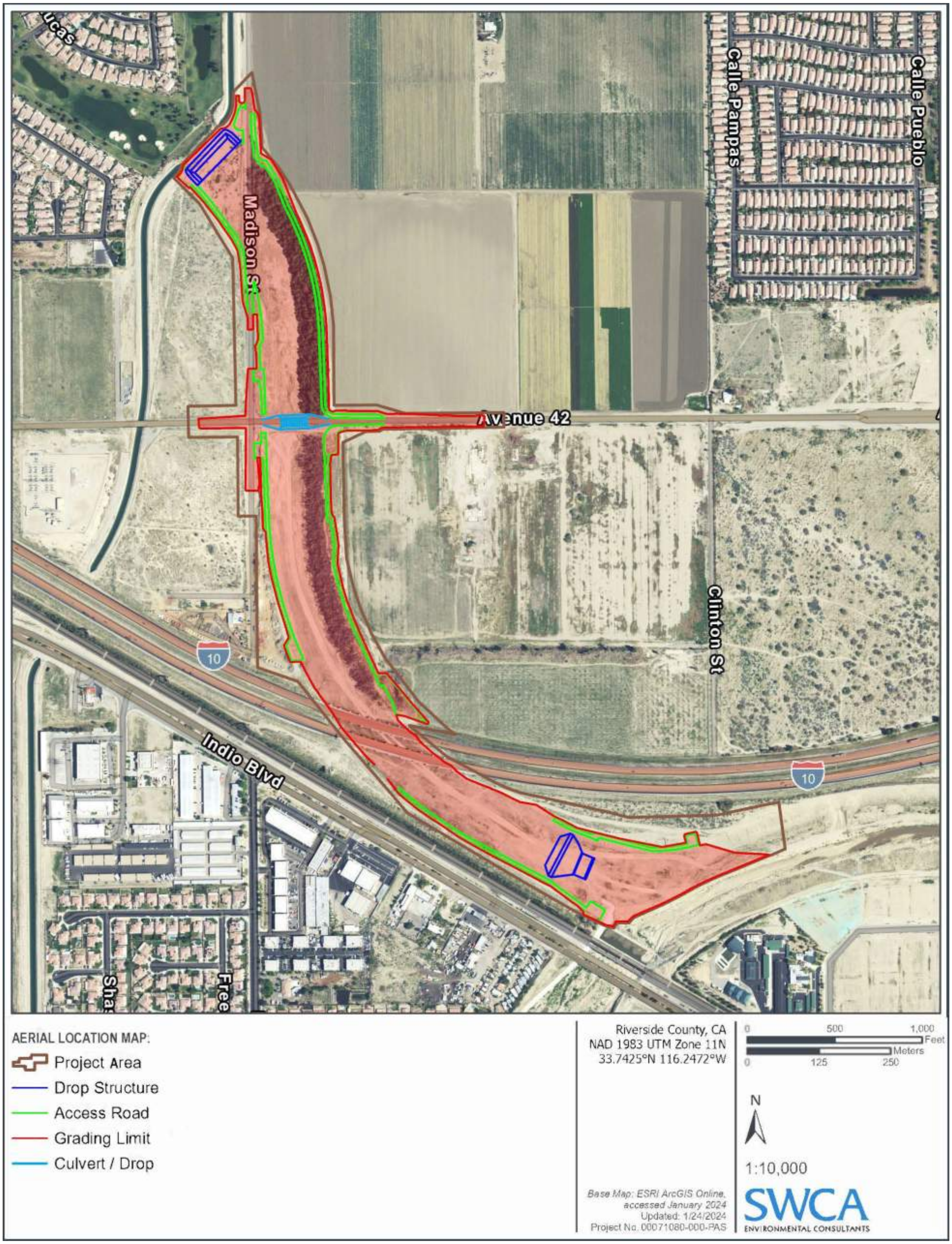

Figure 3. Project area depicted on a street map and aerial photograph.

CHAPTER 2. REGULATORY FRAMEWORK

This section includes a discussion of the applicable federal, state, and local laws, ordinances, regulations, and standards informing the identification of eligible historic resources.

2.1 FEDERAL REGULATIONS

2.1.1 National Register of Historic Places

The NRHP was established by the National Historic Preservation Act of 1966 as "an authoritative guide to be used by Federal, State, and local governments, private groups and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment" (36 Code of Federal Regulations [CFR] 60.2). The NRHP recognizes properties that are significant at the national, state, and local levels. To be eligible for the NRHP, a property must be significant in American history, architecture, archaeology, engineering, or culture under one or more of the following criteria (36 CFR 60.4):

- **Criterion A:** It is associated with events that have made a significant contribution to the broad patterns of our history;
- **Criterion B:** It is associated with the lives of persons who are significant in our past;
- **Criterion C:** 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 represents a significant and distinguishable entity whose components may lack individual distinction; and/or
- **Criterion D:** It has yielded, or may be likely to yield, information important in prehistory or history.

Ordinarily cemeteries, birthplaces, or graves of historic figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, and properties that are primarily commemorative in nature are not considered eligible for the NRHP, unless they satisfy certain conditions. In general, a resource must be 50 years of age to be considered for the NRHP, unless it satisfies a standard of exceptional importance.

In addition to meeting these criteria, a property must also retain historic integrity, which is defined in National Register Bulletin 15 as the ability of a property to convey its significance (National Park Service 1995). To assess integrity, the National Park Service recognizes seven aspects or qualities that, considered together, define historic integrity. To retain integrity, a property must possess several, if not all, of these seven qualities:

1. Location – the place where the historic property was constructed or the place where the historic event occurred;
2. Design – the combination of elements that create the form, plan, space, structure, and style of a property;
3. Setting – the physical environment of a historic property;

4. Materials – the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.

5. Workmanship – the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;

6. Feeling – a property's expression of the aesthetic or historic sense of a particular period of time; and

7. Association – the direct link between an important historic event or person and a historic property.

2.2 STATE REGULATIONS

The California Office of Historic Preservation (OHP), a division of the California Department of Parks and Recreation, is responsible for carrying out the duties described in the California PRC and for maintaining the California Historic Resources Inventory and CRHR. The state-level regulatory framework also includes CEQA.

2.2.1 California Environmental Quality Act

CEQA requires a lead agency to consider project effects on historical resources (which is understood to include significant archaeological resources). Under CEQA, a "project that may cause a substantial adverse change in the significance of a historic resource is a project that may have a significant effect on the environment" (PRC 21084.1). Analysis is a two-part process: first, the determination must be made whether historical resources are present in the project area. Second, if such resources are present, the proposed project must be analyzed for its potential to cause a "substantial adverse change in the significance" of the resource.

2.2.1.1 Historical Resources

According to Section 15064.5 of the CEQA Guidelines, for the purposes of CEQA, historical resources are:

1. A resource listed in, or formally determined eligible . . . for listing in the CRHR (PRC Section 5024.1, 14 CCR 4850 et seq.).

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

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

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

According to CEQA, the fact that a resource is not listed in or determined eligible for the CRHR or is not included in a local register or survey shall not preclude the lead agency from determining that the resource may be a historical resource (PRC 5024.1).

2.2.1.1.1 SUBSTANTIAL ADVERSE CHANGE AND INDIRECT IMPACTS TO HISTORICAL RESOURCES

CEQA Guidelines (14 CCR 15064.5) define a "substantial adverse change in the significance of an historical resource" as "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". Material impairment occurs when a project alters in an adverse manner or demolishes "those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion" in or eligibility for the NRHP, CRHR, or local register. In addition, pursuant to Section 15126.2 of the CEQA Guidelines, the "direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects."

The following guides and requirements are of particular relevance to this study's analysis of indirect impacts to historic resources. Pursuant to CEQA Guidelines (Section 15378), study of a project under CEQA requires consideration of "the whole of an action, which has the potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." CEQA Guidelines (14 CCR 15064[d]) further define direct and indirect impacts:

1. A direct physical change in the environment is a physical change in the environment which is caused by and immediately related to the project.
2. An indirect physical change in the environment is a physical change in the environment which is not immediately related to the project, but which is caused indirectly by the project. If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect physical change in the environment.
3. An indirect physical change is to be considered only if that change is a reasonably foreseeable impact which may be caused by the project.

2.2.1.2 Archaeological Resources

In terms of archaeological resources, Section 21083.2(g) of the PRC defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If it can be demonstrated that a proposed project will cause damage to a unique archaeological resource, the lead agency may require that reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (PRC 21083.2[a]–[c]). CEQA notes that if an archaeological resource is neither a unique archaeological resource nor a historical resource, the effects of the project on those resources shall not be considered to be a significant effect on the environment (CEQA Guidelines, 14 CCR 15064.5[c][4]).

2.2.1.2.1 CALIFORNIA STATE ASSEMBLY BILL 52

Assembly Bill 52 of 2014 (AB 52) amended PRC Section 5097.94 and added PRC Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3. Section 4 of AB 52 adds Section 21074(a)(b)(c) to the PRC, which address Tribal cultural resources, cultural landscapes, and historical resources.

PRC Section 21074(a) defines Tribal cultural resources as one of the following:

(1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

   A. Included or determined to be eligible for inclusion in the California Register of Historical Resources.

   B. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

(2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

Additionally, PRC Section 21074(b) and (c) include in the definition of a Tribal cultural resource the following:

(3) A cultural landscape that meets the criteria of subdivision (s)…to the extent that the landscape is geographically defined in terms of the size and scope of the landscape (PRC Section 21074 [b])

(4) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of Section 21083.2…if it conforms with the criteria of subdivision (a) (PRC Section 21074 [c]).

Impacts to Tribal cultural resources should be considered under CEQA. PRC Section 21080.3.2 states that parties may propose mitigation measures "capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource." Further, if a California Native American tribe requests consultation regarding project alternatives, mitigation measures, or significant effects to Tribal cultural resources, the consultation shall include those topics (PRC Section 21080.3.2[a]). The environmental document and the mitigation monitoring and reporting program (where applicable) shall include any mitigation measures that are adopted (PRC Section 21082.3[a]).

2.2.1.2.2 CONSULTATION WITH NATIVE AMERICAN TRIBES

California Native American tribes are defined in AB 52 as any Native American tribe located in California that is on the contact list maintained by the NAHC, whether or not they are federally recognized. AB 52 specifies that California Native American tribes traditionally and culturally affiliated with a geographic area may have expertise concerning their Tribal cultural resources. Once an application for a project is completed or a public agency makes a decision to undertake a project, the lead agency has 14 days to send formal notification to Native American tribes designated by the NAHC as having traditional and cultural affiliation with a given project area and that had previously requested in writing to be notified by the lead agency (PRC Section 21082.3.1[b][d]). The notification shall include a brief description of the proposed project, the location, contract information for the agency contact, and notice that the Tribe has 30 days to request, in writing, consultation (PRC Section 21082.3.1[d]). Consultation must be initiated by the lead agency within 30 days of receiving any California Native American tribe's request for consultation. Furthermore, consultation must be initiated prior to the release of a negative declaration, mitigated negative declaration, or EIR for a project (PRC Section 21082.3.1[b][e]).

Consultation may include discussion concerning the type of environmental review necessary, the significance of the project's impacts on the Tribal cultural resources, and, if necessary, project alternatives or the appropriate measures for preservation and mitigation that the California Native American tribe may recommend to the lead agency. The consultation shall be considered concluded when either the parties agree to measures to mitigate or avoid a significant effect, if one exists, on a Tribal cultural resource; or a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached (PRC Section 21082.3.2[b]).

Pursuant to Government Code Sections 6254 and 6254.10, and PRC Section 21082.3(c), information submitted by a California Native American tribe during consultation under AB 52 shall not be included in the environmental document or otherwise disclosed to the public by the lead agency, project applicant, or the project applicant's agent, unless written permission is given. Exemptions to the confidentiality provisions include any information already publicly available, in lawful possession of the project applicant before being provided by the Tribe, independently developed by the project applicant or the applicant's public agent, or lawfully obtained by a third party (PRC Section 21082.3[c]).

2.2.2 California Register of Historical Resources

Created in 1992 and implemented in 1998, the CRHR is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC 21083.2 and 21084.1). Certain properties, including those listed in or formally determined eligible for the NRHP and California Historical Landmarks numbered 770 and higher, are automatically included in the CRHR. Other properties recognized under the California Points of Historical Interest program, identified as significant in historical resources surveys, or designated by local landmarks programs may be nominated for listing in the CRHR. According to Section 5024.1(c) of the PRC, a resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on NRHP criteria:

- **Criterion 1:** It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- **Criterion 2:** It is associated with the lives of persons important in our past.
- **Criterion 3:** It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

- **Criterion 4:** It has yielded, or may be likely to yield, information important in history or prehistory.

Resources nominated to the CRHR must retain enough of their historic character or appearance to convey the reasons for their significance. Resources whose historic integrity does not meet NRHP criteria may still be eligible for the CRHR.

2.2.3 Treatment of Human Remains

The disposition of burials falls first under the general prohibition on disturbing or removing human remains under Section 7050.5 of the California Health and Safety Code (CHSC). More specifically, remains suspected to be Native American are treated under CEQA (14 CCR 15064.5); Section 5097.98 of the PRC illustrates the process to be followed if remains are discovered. If human remains are discovered during construction, no further disturbance to the site shall occur, and the county coroner must be notified (14 CCR 15064.5; PRC 5097.98).

2.3 LOCAL REGULATIONS

2.3.1 City of Indio

The City of Indio's General Plan discusses goals, policies, and implementation actions related to cultural and tribal cultural resources. Those relevant to cultural resources are:

CE-8.1 Site plan review. Ensure adequate site plan review and mitigation measures are implemented for the development of sites with the potential to contain historic, archaeological, and paleontological resources.

CE-8.2 Avoidance of impacts to historic resources. For projects that could affect historic resources, ensure adequate study to identify eligible resources and project-level review to avoid or lessen negative impacts through conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

CE-8.3 Incentivize retention of historic landmarks. Explore opportunities to provide economic and regulatory incentives for the retention and sensitive upgrades and changes to historic landmarks and contributors to designated historic districts.

CE-8.4 Monitoring. Require monitoring on sites where grading has the potential to impact subsurface cultural and paleontological resources during excavation and construction activities.

CE-8.5 Public Education. Support opportunities to promote public awareness of the history and prehistory of the area as the oldest Valley City and the cultural center of the Coachella Valley.

CE-8.6 Coordination with local tribes. Periodically meet with representatives from local tribes to:

- Obtain input prior to making decisions, taking actions, or implementing programs/projects that may impact cultural resources;
- Discuss methods to preserve and protect highly sensitive cultural resources; and
- Ensure that there is agreement regarding the protocol to be followed when cultural resources are discovered (City of Indio 2019)

The City does not appear to have published significance criteria for the designation of local historical resources.

CHAPTER 3. SETTING

3.1 ENVIRONMENTAL SETTING

The project area is located near central Indio in the central portion of the Coachella Valley. The Coachella Valley is considered the westernmost extension of the Colorado Desert, located south of the Mojave Desert in Imperial, Riverside, and San Diego Counties. The Colorado Desert is bordered by the Peninsular Range and the Pacific Coastal Plain on the west and the Colorado River on the east. Coachella Valley is bordered on the north and east by the Little San Bernardino, Cottonwood, and Orocopia Mountains, and bordered on the west by the Santa Rosa and San Jacinto Mountains. The Colorado Desert is an arid region, though the remains of Lake Cahuilla indicate episodic freshwater coverage of the desert during the Holocene. Sediments within the project area's natural channel are floodplain fluvents (Fe) and the surrounding area soils are Quaternary alluvium (CpA, GbA, Is, and MaB,) deposited as large alluvial fans formed through erosion of the San Gabriel Mountains (Dibblee and Minch 2008; SoilWeb 2023). The project area has a gradual southeastern slope and its elevation ranges from approximately 6.7 meters (m) (22 feet) above mean sea level to approximately 2.1 m (7 feet) below mean sea level. The closest major water sources are the Whitewater River which traverses the project area, and the Salton Sea, located 32 kilometers (20 miles) southeast of the project area.

The Coachella Valley climate is semi-arid with seasonal temperature extremes. Summer temperatures can reach 125 degrees Fahrenheit (52 degrees Celsius), with frost in the winter months and snow in the early spring in the surrounding mountains. Elevations on the valley floor range from 488 m (1,600 feet) above sea level at the western end of the valley near Palms Springs to 76 m (250 feet) below sea level at the Salton Sea. The highest peak in the surrounding mountain range is at Mt. San Gorgonio with an elevation of 3,505 m (11,499 feet) (Coachella Valley Resource Conservation District 2022).

The annual average rainfall is 7.6 centimeters (3 inches) and occurs primarily in the winter. In mid-summer months, occasional intense rainfall can result in flash floods and produce severe erosion (Coachella Valley Resource Conservation District 2022).

The predominant plant community in the Coachella Valley and the project area is Creosote Bush Scrub. This plant community occurs on well-drained upland slopes and alluvial fans within the Colorado Desert, and is a dry, mixed evergreen deciduous habitat dominated by shrubs and sparse groundcover. The dominant species are the creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Other species within this community include saltbush (*Atriplex* spp.), brittlebush (*Encelia farinosa*), and ocotillo (*Fouquieria splendens*) (Calflora.org 2023; Sawyer and Keeler-Wolf 1995).

Within Coachella Valley, there are a number of mammal, bird, reptile and amphibian species that reside in this harsh arid environment. Large mammal species include desert bighorn sheep (*Ovis canadensis nelsoni*), mountain lion (*Puma concolor*), coyote (*Canis latrans*), and bobcat (*Lynx rufus*). Among the medium to small size class mammals, the species present include the desert kit fox (*Vulpes macrotis arsipus*), black-tailed jackrabbit (*Lepus californicus*), the desert cottontail rabbit (*Sylvilagus audubonii*), and Palm Springs ground squirrel (*Spermophilus tereticaudus chlorus*). Large-bodied birds that may occur include golden eagle (*Aquila chrysaetos*), turkey vulture (*Cathartes aura*), common raven (*Corvus corax*), and greater roadrunner (*Geococcyx californianus*). Numerous small bird species may be present, such as cactus wren (*Campylorhynchus brunneicapillus*) and sagebrush (sage) sparrow (*Artemisiospiza* *belli*) (Cornell Lab of Ornithology 2023). Many species of reptiles can occur, including Western diamond-backed rattlesnake (*Crotalus atrox*), Great Basin whiptail (*Aspidoscelis tigris tigris*), desert tortoise (*Gopherus agassizii*), and Coachella fringe-toed lizard (*Uma inornata*).

3.2 CULTURAL SETTING

3.2.1 Prehistoric Period

California's southeastern desert region has a long history of human occupation, with dates at the start of the early Holocene stretching back to ca. 10,000 years B.C. (Moratto 1984:96–97; Schaefer 1994:62; Sutton et al. 2007:233–237). This now-arid region includes the Colorado and Mojave Deserts, located east of the Sierra Nevada, Peninsular, and Transverse ranges. Prehistoric material culture in this region has been categorized according to periods or patterns that define technological, economic, social, and ideological elements. Within these periods, archaeologists have defined cultural patterns or complexes specific to prehistory within the desert region, including the current project area.

Table 1 illustrates the chronological framework developed for the Colorado Desert region. This framework is divided into three major periods: the Paleoindian period (ca. 10,000–6000 B.C.), Archaic period (6000 B.C.–A.D. 870), and Late Prehistoric period (A.D. 870–Historic Contact). The timescales referenced in the following discussion are presented either in radiocarbon years before present (B.P.) (where the "present" is 1950) or calendar dates (years B.C./A.D.), as well as geologic era. Some dates referenced in the text have been calibrated (cal) in order to convert raw radiocarbon years to calendrical dates. Use of the term "cultural complex" instead of "period" denotes a cultural manifestation rather than a temporal one.

Table 1. Cultural Chronology for the Colorado Desert

Period	Subperiod	Cultural Complex	Date Range
Paleoindian period / Western Pluvial Lakes Tradition		Lake Mojave and San Dieguito Complexes	10,000–6000 B.C.
Archaic	Early Archaic period	Pinto Complex	6000–2000 B.C.
	Late Archaic period	Gypsum Complex	2000 B.C.–A.D. 870
Late Prehistoric period		Patayan I–III	A.D. 870–Historic Contact

3.2.1.1 Paleoindian period (CA. 10,000–6000 B.C. [12,000–8000 B.P.])

The precise timing and nature of human migration to North America continues to be a matter of considerable debate (e.g., Adovasio 2002; Dillehay 1997; Jablonski 2002; Swedlund and Anderson 1999), with the first occupation of the continent occurring at the end of the Pleistocene (e.g., Antevs 1955; Major 1988). The environment was cooler and moist, and megafauna such as mammoths, camels, and ground sloths were abundant and exploited by the earliest human migrants. The artifact assemblage typically associated with this period consists of Clovis and Folsom fluted projectile points, and other lanceolate, leaf-shaped, and stemmed points, including the Lake Mojave and Silver Lake projectile points. Fluted projectile points believed to be Clovis occur in several locales throughout California, including

Pleistocene China and Thompson Lakes in the Mojave Desert, though lingering contextual questions prevent affirmation of Clovis technology (Rondeau et al. 2007:66).

Evidence of human occupation in California prior to 6000 B.C. (8,000 B.P.) is relatively sparse and scattered. The earliest accepted dates in southern California come from coastal sites in the Northern Channel Islands, specifically San Miguel and Santa Rosa Islands, which date between 11,500 B.P. and 8,600 B.P. (Erlandson 1991:105; Erlandson et al. 2007:57; Johnson et al. 2002). Evidence for human occupation of the Colorado Desert during the Pleistocene and early Holocene is sparse, though this scarcity could reflect adaptation of highly mobile groups to sparse resources as well as a potential result of unstable landforms during the Holocene. At the onset of the Holocene ca. 10,000 years ago, there was significant warming and drying in the Colorado Desert, and hunter-gatherer groups adapted their subsistence to the changing environment, with lakes and streams in the desert interior gradually drying up.

3.2.1.2 *Archaic period (ca. 6000 B.C.–A.D. 870 [8000–1200 B.P.])*

Around 6000 B.C., subsistence patterns shifted along with the changing environment, and greater emphasis was placed on plant resources and smaller animal species. Subsistence patterns became more diversified, focusing on gathering in the interior and maritime resources in the coastal regions (Erlandson 1997:4). The Archaic period is characterized by this shift to gathering, which resulted in the increased number of ground stone implements in the artifact assemblage, including metates, manos, and mullers. Within the Colorado Desert, the Archaic period is divided into two subperiods: the Early Archaic period or Pinto complex (6000–2000 B.C.) and the Late Archaic period or Gypsum complex (2000 B.C.–A.D. 870) (Warren 1984; also see Schaefer 1994; Schaefer and Laylander 2007).

During the Pinto complex, occupation sites within the Colorado Desert were most likely temporary, seasonal camps of small, highly mobile groups (Schaefer 1994:64; Warren 1984:414). As with the Paleoindian period, the archaeological record during this time period is sparse, and it has been suggested that populations withdrew to the margins of the desert and/or concentrated around the few oases still present (Warren 1984:413–414). There is greater evidence from the Mojave Desert, with the artifact assemblages for this period characterized by Pinto series projectile points and shaped scrapers, as well as slab metates and manos. The presence of ground stone is the greatest difference from the Paleoindian period. Recent dates indicate that intensive plant processing began as early as ca. 7000 cal. B.C. within the Mojave Desert region, and faunal remains suggest an increase in the reliance on small animals and a decrease in the reliance in artiodactyl species such as pronghorn and deer (Sutton et al. 2007:238).

The Late Archaic/Gypsum period coincides with a period of moist climate called the Little Pluvial, with arid conditions returning in the latter half of the period. The archaeology of this period is characterized by caves sites with a wide range of diagnostic projectile points such as the Gypsum and Elko types, and split-twig figurines (Warren 1984:416–417). Mortars and pestles appear during this period in addition to the continued use of manos and metates. The bow and arrow was introduced at the end of this period, and there was an increase in trade goods such as shell ornaments from the Pacific Coast. Recent excavations within Coachella Valley indicate that occupation of the Colorado Desert was limited to temporary specialized camps around the Holocene Lake Cahuilla (Love and Dahdul 2002:81). These shoreline sites contain the remains of fish, shellfish, and waterfowl. Sites farther away from the shoreline suggest a permanent or semi-permanent occupation (CA-RIV-2936), with the artifact assemblage consisting of multiple occupation layers of hearths and milling implements, as well as Coso obsidian and shell beads from the Gulf of California. The obsidian and shell beads indicate exchange networks during this period. The overall reduction of size in projectile points indicates a shift from the atlatl and dart to the bow and arrow, the use of which continued into the Late Prehistoric period.

3.2.1.3 Late Prehistoric Period (A.D. 870–Historic Contact [1200 B.P.–Historic Contact])

The Late Prehistoric period within southern California is characterized by a shift in subsistence patterns to what is known among Native American groups during the Historic period. The changes in subsistence, foraging, and land use patterns most likely reflect cultural adaptations in response to shifts in environmental conditions and influences from outside Native American groups. The greatest indicator of this period is the presence of ceramics in the archaeological record beginning ca. A.D. 870 within the Colorado Desert (Love and Dahdul 2002; Rogers 1945; Schaefer and Laylander 2007:252). Brownware manufactured from upland clay sources and buffware from lowland sedimentary clays become increasingly common, with artifacts including clay figurines and pipes. Other indicators of the Late Prehistoric period are Cottonwood Triangular and Desert Side-Notched projectile points, a shift from extended inhumations to cremations, networks of trail systems with pot-drops and trailside shrines, and the introduction of small-scale agriculture.

The networks of trails are evidence of the importance of trade, travel, and exchange throughout southern California deserts. Trail systems with the Colorado Desert are associated with trailside shrines, ceramic pot-drops, and rock art (Schaefer 1994:66). Pot-drops near springs and tanks were essential for water access during dry seasons or long distance travel across the desert (Schaefer and Laylander 2007:254–255). Rock art complexes near water sources and pot-drops may indicate a spiritual value placed on these water sources, and mark some trails as representing routes between sacred places. The trail networks facilitated the trade of items such as shell beads and steatite from the Pacific Coast and Gulf of California, wonderstone from Rainbow Rock, and obsidian from Obsidian Butte at the southern end of the Salton Sea; these networks appear to have extended as far as the Great Basin and American Southwest.

The subsistence and settlement patterns in the Colorado Desert were influenced by episodes of infilling and recession of the Holocene Lake Cahuilla, with the final recession around A.D. 1580 (Buckles and Krantz 2023; Laylander 1995; Waters 1983). Native populations followed the receding shoreline and continued to exploit the dwindling resources. Near the end of the Late Prehistoric period and into the Historic period, permanent villages were established on the valley floor and were supported by large walk-in wells and extensive mesquite groves.

3.2.2 Ethnographic Overview

As depicted in Figure 4 the project area is situated within the traditional territory of the Cahuilla (Bean 1978; Kroeber 1925). Evidence suggests the Cahuilla migrated to southern California about 2,000 to 3,000 years ago, most likely from the southern Sierra Nevada ranges of east-central California with other related socio-linguistic (Takic speaking) groups (Moratto 1984:559). The Cahuilla settled in a territory that extended west to east from the present-day city of Riverside to the central portion of the Salton Sea in the Colorado Desert, and south to north from the San Jacinto Valley to the San Bernardino Mountains. Though 60 percent of Cahuilla territory was in the Lower Sonoran Desert environment, 75 percent of their diet came from plant resources acquired in Upper Sonoran and Transition environmental zones (Bean 1978:576).

Cahuilla socio-political organization included three primary levels (Bean 1978:580). The highest level was the cultural nationality, encompassing everyone speaking a common language. Next were two patrimoieties called the Wildcats (*tuktum*) and the Coyotes (*‘istam*); every clan of the Cahuilla belonged to one or the other. The third basic level of socio-political organization was the many political-ritual-corporate units called *sibs*, or patrilineal clans (Bean 1978:580). Lineages within a clan cooperated in many ways, including defense, communal subsistence activities, and religious ceremonies. Each lineage maintained ownership rights to various resource collecting locations, “including food collecting, hunting, and other areas. The Cahuilla lived in a productive environment well suited to a sophisticated hunting and gathering economy. Studies suggest that aboriginal people in southern California improved the structure and productivity of the environment through controlled burning, selective harvesting and pruning, replanting, seed re-broadcast, and possibly limited irrigation (Bean and Lawton 1993). Limited agricultural practices for growing beans, squash, and corn had been adopted by the Cahuilla prior to Euro-American contact. Bean (1978:578) suggests that their “proto-agricultural techniques and a marginal agriculture” were adopted from the Colorado River groups to the east.

Figure 4. Traditional tribal territorial boundaries based on ethnographic and tribal sources.

Asistencias were established near Cahuilla territory at San Bernardino and San Jacinto by 1819. Interaction with Europeans was less intense in the Cahuilla region than for coastal groups because the topography and paucity of water rendered the inland area inhabited by the Cahuilla unattractive to colonists. By the 1820s, however, the Pass Cahuilla experienced consistent contact with the ranchos of Mission San Gabriel, whereas the Mountain Cahuilla frequently received employment from private rancheros and were recruited to Mission San Luis Rey.

Mexican ranchos were located near Cahuilla territory along the upper Santa Ana and San Jacinto rivers by the 1830s, providing the opportunity for the Cahuilla to earn money ranching and to learn new agricultural techniques. The expansion of immigrants into the region introduced the Cahuilla to European diseases. The single worst recorded event was a smallpox epidemic in 1862–1863. By 1891, only 1,160 Cahuilla remained within what was left of their territory, down from an aboriginal population estimated at 6,000 to 10,000 (Bean 1978:583–584). By 1974, approximately 900 people claimed Cahuilla descent; most resided on reservations.

Between 1875 and 1891, the United States established 10 reservations for the Cahuilla within their territory: Agua Caliente, Augustine, Cabazon, Cahuilla, Los Coyotes, Morongo, Ramona, Santa Rosa, Soboba, and Torres-Martinez (Bean 1978:585). Four of these reservations are shared with other Native American groups, including the Chemehuevi, Cupeño, and Serrano. The Cahuilla on the Morongo Reservation established the Malki Museum in 1965, which today is a respected repository for artifacts and ethnographic knowledge. The museum publishes books on Native American lifeways as well as the *Journal of California* and *Great Basin Anthropology*.

3.2.3 Historic Overview

California's historic period is generally divided into three time spans: the Spanish period (1769–1822), the Mexican period (1822–1848), and the American period (1848–present). These are briefly described below.

3.2.3.1 Spanish Period (1769–1822)

Spanish explorer Juan Rodríquez Cabrillo led the first European expedition in the southern California region in 1542, and subsequently, Sebastián Vizcaíno mapped much of the present California and Oregon coastline. The Spanish crown laid claim to California based on the surveys conducted by Cabrillo and Vizcaíno (Bancroft 1885:96–99; Gumprecht 2001:35).

The 1769 overland expedition by Captain Gaspar de Portolá marks the beginning of California's Spanish period. A major emphasis during this period was the construction of missions and associated presidios (military forts) to integrate the Native American population into Christianity and communal enterprise. Incentives were also provided to bring settlers to pueblos or towns, but just three pueblos were established during the Spanish period, only two of which were successful and remain as California cities (San José and Los Angeles). In 1769, Portolá established the San Diego presidio as the first Spanish settlement in Alta California, and Franciscan Friar Junípero Serra founded Mission San Diego de Alcalá, the first of 21 missions established in Alta California. During this period, Spain also deeded ranchos to prominent citizens and soldiers (though very few compared with those deeded in the Mexican period).

In 1819, several *asistencias*, or mission outposts, were developed by the Spaniards in Cahuilla territory. The Cahuilla developed new economic and political strategies to contend with the new immigrants to the region (City of Indio et al. 2019).

3.2.3.2 Mexican Period (1822–1848)

After the end of the Mexican Revolution against the Spain (1810–1821), and the failure of a short-lived Mexican Empire, all former Spanish holdings in North America (including both Alta and Baja California) became part of the newly formed Mexican Republic. The Mexican legislative body in California ended isolationist policies designed to protect the Spanish monopoly on trade, and decreed California ports open to foreign merchants (Dallas 1955:14). Additionally, the missions were secularized which resulted in the subdivision of former mission lands. Governor Pío Pico and his predecessors made more than 600 rancho grants between 1833 and 1846, putting most of the state's lands into private ownership for the first time (Gumprecht 2001).

Extensive land grants were established in the interior during the Mexican period, in part to increase the population inland from the more settled coastal areas where the Spanish had first concentrated their colonization efforts. During the supremacy of the ranchos (1834–1848), landowners largely focused on the cattle industry and devoted large tracts to grazing. Cattle hides became a primary Southern California export, providing a commodity to trade for goods from the east and other areas in the United States and Mexico.

The project area is located in present-day Indio, California, in the central portion of Riverside County. No rancho land grants were made in the vicinity of Indio, or in the eastern portion of Riverside County (Figure 5).

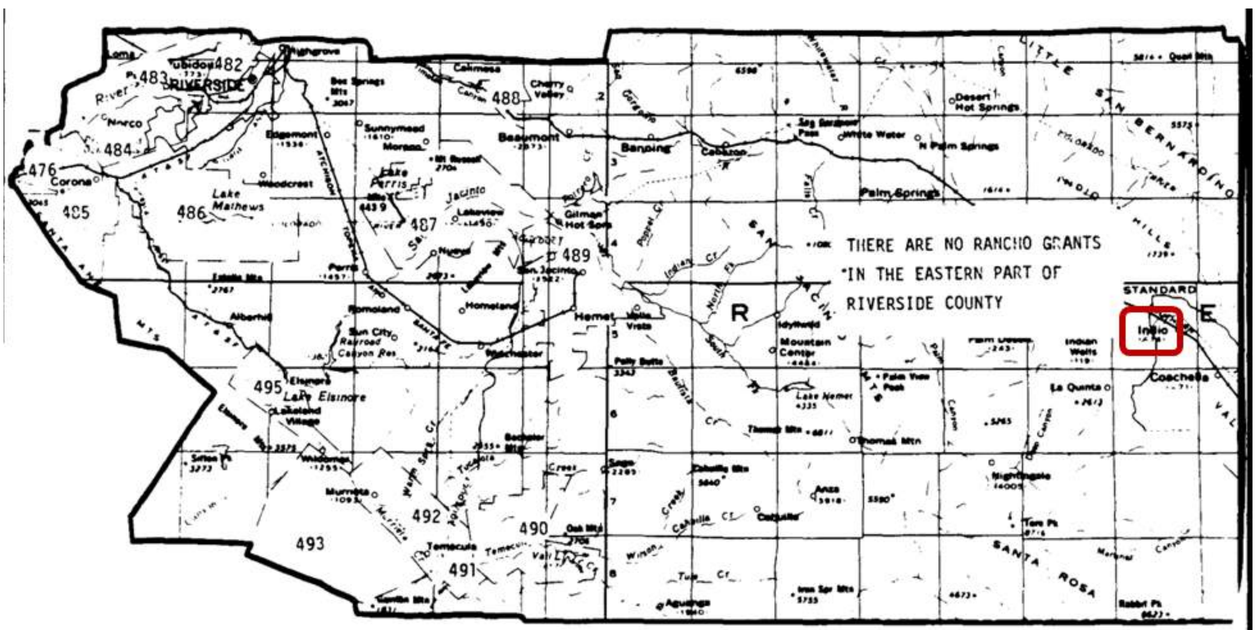

Figure 5. Land grants in Riverside County; Indio circled in red (State Lands Commission, n.d.).

The number of non-Native inhabitants increased with an influx of explorers, trappers, and ranchers during this period. By the 1840s, as part of their strategy to contend with the large number of non-Native settlers, the Cahuilla people formed confederations of clans and remnants of clans (City of Indio et al. 2019). The rising California population contributed to the introduction and rise of diseases foreign to the Native American population, who had no associated immunities.

3.2.3.3 American Period (1848–present)

The 1846–1848 Mexican-American War precipitated several battles in Southern California. On January 13, 1847, the Treaty of Cahuenga effectively ended the war in California, though fierce fighting continued in Mexico, and the war officially ended with the Treaty of Guadalupe Hidalgo in 1848. California became a state with the Compromise of 1850, which also designated Utah and New Mexico (with present-day Arizona) as U.S. territories (Waugh 2003). Horticulture and livestock continued to dominate the Southern California economy through 1850s. The Gold Rush began in 1848, and with the influx of people seeking gold, cattle were no longer desired mainly for their hides but also as a source of meat and other goods. During the 1850s cattle boom, large herds were driven from southern to northern California to feed that region's burgeoning population of miners and merchants. The cattle boom ended for Southern California as neighboring states and territories drove herds to northern California at reduced prices. Operation of the huge ranchos became increasingly difficult, and droughts severely reduced their productivity (Cleland 2005:102–103).

Euro-Americans in the Coachella Valley area were outnumbered by the Cahuilla until approximately 1860, but the situation was reversed by continuously increasing migration and the effects of an 1863 smallpox epidemic on the Native population. The arrival of the railroad led to permanent American settlements in the area by the 1870s, which in turn resulted in the taking of further Native American lands. Reservations were formed in the area by 1877, including the Agua Caliente, Cabazon, Torres, and Martinez reservations (City of Indio et al. 2019; Torres-Martinez Desert Cahuilla Indians n.d.).

3.2.3.4 Regional History

3.2.3.4.1 INDIO

Indio's development history is closely tied to the construction of the transcontinental railroad. In 1876, the Southern Pacific Railroad (SPRR) conducted its first trip through Indio as part of the route to Los Angeles. The first major building in town was reported to be the combination train depot and hotel, constructed ca. 1887. Indio was one of countless towns in Southern California to develop along a railroad route (City of Indio et al. 2019).

Although government surveys were conducted in the Indio area in the mid-1850s, the town's formal survey map was not filed until 1888—it was carved from a 160-acre parcel owned by Albert G. Tingman. Albert arrived in Indio in 1877 to work as a railroad construction boss. Settling there with his wife Hattie, by the mid-1880s, Albert had become Indio's station agent and resident telegrapher. He also opened the town's first store and livery, and served as postmaster (City of Indio et al. 2019).

The Indio General Plan Update EIR describes Indio's early townsite and economy:

> "The original path of the Southern Pacific…is seen in the diagonal swath of the local/business line of I-10. Oriented toward that corridor, the original grid and parcels fanned out southward from the railway line…When the town was first platted, the size and orientation of the parcels were primarily designed for residential use…The town spanned roughly 24 blocks…In the center of the original townsite, in a reflection of the focus on new settlement and tourism, was a "Hotel Block"…By 1896, with a population of 50 residents, Indio was no more than a village…by 1901, that number had grown to 200. In addition to the…Southern Pacific Depot and hotel, the railroad company also constructed bungalows to serve as employee housing. In the early twentieth century, Southern Pacific was one of the town's principal employers." (City of Indio et al. 2019).

Similar to other Coachella Valley communities, agriculture was Indio's primary industry in the course of its development and expansion. Farmers explored different crops and found dates, grapes and melons to be successful. Various sources of water were tapped over the years to support the development of the valley, and the availability of a reliable water supply made the town sustainable. The CVWD was formed in 1918 and took the lead on advocating for water rights for area residents (City of Indio et al. 2019).

Across the United States, automobile use increased during the 1920s and 1930s, prompting road and highway improvements and construction. Some of these projects benefitted Indio, supporting tourism and settlement in the area. Community growth included residential, commercial, and institutional development and services. The City formally incorporated in 1930. During the early 1940s, Indio saw a large influx of transitory inhabitants when it served as a supply center and a recreation destination for soldiers stationed at Camp Young, headquarters for the U.S. military's Desert Training Center. Many military members returned to settle in the Coachella Valley after World War II (City of Indio et al. 2019).

Similar to many Southern California communities, Indio's population dramatically increased in the years following World War II. The resulting construction boom consumed agricultural land and open space in order to develop additional residential and commercial properties, and new roads and highways. As accessibility improved, tourism flourished in the Coachella Valley, and new golf courses, country clubs and hotels were built. Many new buildings were constructed in Mid-Century Modern architectural styles popular during that period. The rate of expansion continued through the twentieth century, as much of the remaining agricultural land gave way to development, and the era of redevelopment impacted and diminished the city's older building stock (City of Indio et al. 2019).

3.2.3.4.2 COACHELLA VALLEY WATER DISTRICT

The CVWD was originally called the Coachella Valley County Water District (CVCWD) before dropping the word "County" in 1980. It was established in 1918 following a vote of valley citizens which was largely in favor of organizing the district. Strong support for the formation of an independent water agency was mainly owing to local residents' concern about others' attempts to capture and divert water from the Whitewater River. Various water companies and entrepreneurs had attempted to divert river water to Banning and the Imperial Valley. Additionally, in the prior decade, the growth of the agriculture industry and increased water well drilling had resulted in a decline in groundwater supply, causing concern and the drive to develop methods to correct the problem (CVWD 2018).

Soon after its formation, the CVCWD filed for the rights to all unclaimed water from the Whitewater River, as well as to obtain land west of Palms Springs to use for groundwater replenishment. The CVCWD also began aggressive lobbying that continued into the 1920s, and resulted in presidents Woodrow Wilson, Warren Harding, and Calvin Coolidge signing orders that enabled the CVCWD to obtain public lands near the Whitewater River to be used for groundwater recharge. In addition, the CVCWD began efforts to obtain water from the Colorado River through the planned All-American Canal. Surveys for possible routes for the canal began about 1920, but it was not until 1928 that the U.S. Congress authorized financing mechanisms for its construction. Following disputes and delays, construction on the Coachella Branch of the All-American Canal finally began in 1938 and was completed in segments. As described by historian and author Remi Nadeau, the Coachella Branch began at a point 14 miles west of Pilot Knob, traversed the upper edge the East Mesa and along the prehistoric shoreline of the Imperial Valley, passed the Salton Sea, and circled around the upper limits of the Coachella Valley. Work on the branch was interrupted for four years during World War II. The final segment was completed in 1948, and the Coachella Valley began receiving water from the Colorado River in March 1949 (CVWD 2018; Nadeau 1997). Figure 6 shows the route of the Coachella Branch of the All-American Canal.

In order to deliver water to valley farms, an underground distribution system was built between 1948 and 1954 consisting of 500 miles of concrete pipelines. Nearly 80,000 acres were reached through a system of 80 distribution laterals. The system was "the first of its type and magnitude constructed by the Bureau of Reclamation" (CVWD 2018). Agriculture continued to grow in the Coachella Valley during the time the All-American Canal and distribution system were being constructed, but in the years immediately after the canal's completion, the amount of irrigated acreage dramatically increased. Area farmers also benefitted from a drainage system developed in the 1950s and 1960s which carried away salts found in shallow groundwater; too much salt buildup would make the soil unusable. This drainage system consisted of a network of pipelines which, as of 2018, totaled approximately 2,500 miles in length (CVWD 2018).

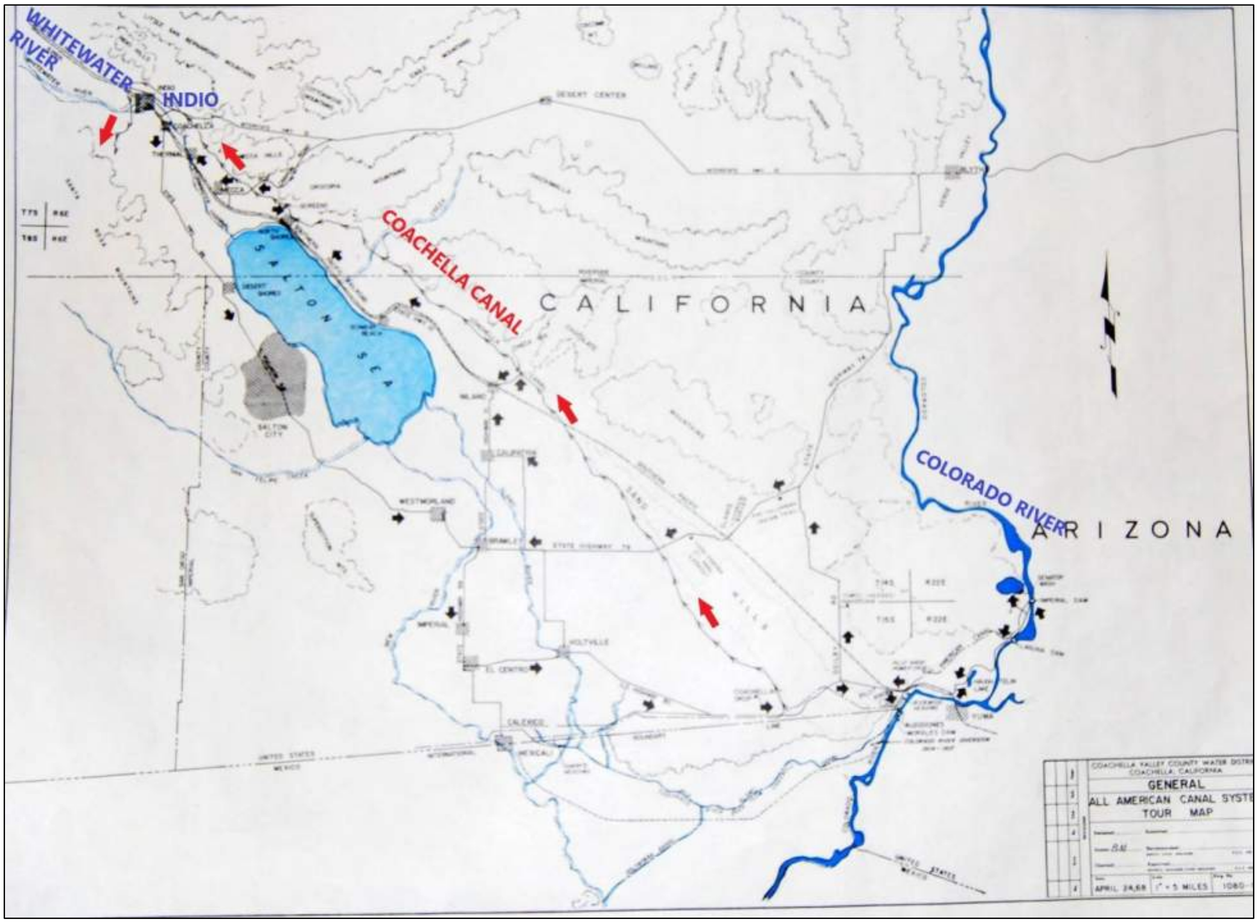

Figure 6. All-American Canal System Map dated 1968. Red arrows depict the Coachella Canal traveling to Indio and then curving toward southwest (Source: CVCWD 1968).

Offering hotels, golf courses and resorts in a unique desert setting, the tourism industry in the Coachella Valley flourished with a variety of clientele ranging from presidents and movie stars to families from area cities seeking a nearby weekend getaway. Major hotels opened as early as the 1920s, and the decades of the 1950s and 1980s were recognized for golf course development (CVWD 2018).

In addition to importing water, groundwater replenishment, and agricultural irrigation and drainage services, CVWD also provides stormwater protection and flood control services. Major floods affecting the Coachella Valley have been recorded as early as 1862, and at least 10 were documented through 1916. Indio was severely affected by the 1916 flood which reportedly left a mile-wide sheet of water across the community, halting train traffic and leaving passengers stranded in Indio for days. Other notable destructive floods occurred in the valley in 1938, 1965 and 1969. Flooding events are usually the result of storms, runoff from canyons in the surrounding mountains, and flooding of the Whitewater River (CVWD 2018). Although the Coachella Valley Stormwater District was formed in 1915, it was too small and underfunded to develop effective flood control infrastructure for the valley. By 1937, the stormwater district merged with the CVCWD. However, no major flood control efforts were begun until the 1960s (CVWD 2018).

Population growth and increased development in the Coachella Valley catalyzed efforts to improve stormwater protection and flood control services. In the 1950s, developers created several golf courses and luxury residential properties, but by the late 1960s and 1970s, developers were building more affordable homes to appeal to residents in the region who sought a weekend getaway property. Additionally, the completion of I-10 in 1960 improved access to the area, and supported a marked population growth in the valley. Between approximately 1975 and 1990, the Coachella Valley "went crazy" with golf courses (CVWD 2018). Approximately 34 golf courses opened in the 1980s. Real estate developers developed large tracts in the communities of Rancho Mirage, Palms Desert, Indian Wells, and La Quinta, at a lesser expense than property around the Palms Springs area. During the 1980s, the tourism industry surpassed agriculture as the valley's leading industry (CVWD 2018).

The small, independent water companies that had been providing water to residential and non-agricultural businesses were overwhelmed with the rising demand for water services. Consequently, CVWD expanded its services to provide flood control, and water and sewer to residential customers. A stormwater master plan was adopted around this time that included rebuilding the Whitewater River/Coachella Valley Stormwater Channel to bring it up to current standards. Although the goal to complete the 50-mile-long project was set for 1970, heavy flooding in the late 1960s damaged the CVWD's stormwater channels, delaying completion (CVWD 2018). Ultimately, stormwater protection and flood control in the Coachella Valley was accomplished through infrastructure developed by various agencies over the decades including the U.S. Bureau of Reclamation (Reclamation), CVWD, and the U.S. Army Corps of Engineers (CVWD 2018).

As of 2022, the stormwater/flood protection system includes "approximately 135 miles of channels built along the natural alignment of dry creeks that naturally flow from the surrounding mountains into the Whitewater River" (CVWD n.d.). This includes 16 stormwater protection channels, and dikes and levees that collect flood waters on the valley floor. Lastly, the 50-mile-long Whitewater River/Coachella Valley Stormwater Channel, touted as the "backbone" of the stormwater/flood protection system, conveys storm/flood waters to the Salton Sea. The section between Palms Springs and Point Happy (near present-day Miles Ave and Washington Street) is part of a naturally occurring wash that has been improved to carry storm flows, and is referred to as the Whitewater River Storm Channel or WWRSC. Because the riverbed naturally flattened out in areas to the east, the section east of Washington Street continuing downstream to the Salton Sea is engineered and is called the Coachella Valley Storm Channel or CVSC (California Water Boards 2020; Coachella Valley Regional Water Management Group 2010; CVWD n.d.).

CHAPTER 4. BACKGROUND AND ARCHIVAL RESEARCH

At SWCA's request, on May 13, 2022, the Eastern Information Center (EIC) at the University of California, Riverside conducted a confidential search of the CHRIS records to identify previously recorded cultural resources and previous studies completed within a 1-mile radius of the project area. The EIC maintains cultural resources records for Riverside County. The search also included a review of the

NRHP, CRHR, California Points of Historical Interest list, California Historical Landmarks list, Archaeological Resources Directory, and California Inventory of Historic Resources.

In addition to reviewing prior investigations and previously recorded cultural resources, SWCA reviewed the California OHP's Built Environment Resources Directory (BERD), the City of Indio's list of Historic/U.R.M. Buildings, and the map of Previously Identified and Potential Historic Resources prepared for its General Plan Update (City of Indio et al. 2019). SWCA also examined historical maps, aerial photographs, newspaper articles, and other archival documents obtained through various public sources, including the USGS, Environmental Data Resources, Los Angeles Public Library, Huntington Library, University of California, Santa Barbara Library, and Newspapers.com. In addition, the Coachella Valley History Museum was consulted, and records and data on file with the CVWD were reviewed.

4.1 CHRIS RECORDS SEARCH

4.1.1 Previously Conducted Cultural Resources Studies

The CHRIS records search identified 97 cultural resource investigations that have been previously conducted within a 1-mile radius of the project area, 14 of which intersect the project area (Table 2). Of the 14 studies that intersect the project area, one is an overview study (RI-03245), one is a sensitivity model (RI-10406), one is a history and evaluation of the Coachella Canal (RI-06061), one is a summary Historic Property Survey Report for the California Department of Transportation (RI-10811), and the remaining 10 included field investigations. Additional details of the records search are included in Appendix A.

Table 2. Previously Conducted Investigations within a 1.0-Mile Radius of the Project Area

Report Number	Title of Study	Author and Affiliation	Year	Proximity to Project Area
RI-00652	Cultural Resources Reconnaissance (Stage II) of Flood Control Alternatives Proposed for the Whitewater River Basin, Riverside County, California	Lando, R., and P.J. Wilke	1979	**Within**
RI-00942	Phase I Cultural Resources Assessment of a 9-Acre Property on Indio Boulevard, Cit [sic]	Brock, J.	2000	Outside (within 1 mile)
RI-00998	Environmental Impact Evaluation: An Archaeological Assessment of an Unnumbered Tract on the West Side of Indio, Riverside County, California	Davis, A., and S. Bouscaren	1980	Outside (within 1 mile)
RI-01220	Letter Report: Inspection of Pipeline Relocation Area in Union Pacific Railroad Corridor, Line Section, Riverside, California	Self, W.	2000	Outside (within 1 mile)
RI-01408	Archaeological Data Recovery at the Myoma Dunes (Tentative Parcel 15590) Riverside County, California	Wilke, P.J.	1983	Outside (within 1 mile)
RI-01409	An Archaeological Assessment of Parcel 15590, Near Myoma in Riverside County	Bowles, L.L., and J. Salpas	1980	Outside (within 1 mile)
RI-01441	Archaeological Survey Report on Tt 16789 Located Near the City of Indio, Riverside County California	Scientific Resource Surveys, Inc.	1981	Outside (within 1 mile)
RI-01442	Archaeological Surface Collection at Two Locations on Tract 23317 Bermuda Dunes, Riverside County, California	Scientific Resource Surveys	1989	Outside (within 1 mile)

Report Number	Title of Study	Author and Affiliation	Year	Proximity to Project Area
RI-02044	An Archaeological Assessment of Tentative Parcel 20568, Near Indio In Riverside County, California	Parr, R.E.	1986	Outside (within 1 mile)
RI-02210	Preliminary Cultural Resources Survey Report for the US Telecom Fiber Optic Cable Project from San Timoteo Canyon, California to Socorro, Texas. The California Segment.	Underwood, J., J. Cleland, C.M. Woods and R. Apple	1986	**Within**
RI-02236	An Archaeological Assessment of Approximately 5 Acres Of Land Located In The Coachella Valley, Riverside County, California	Barry, N.	1988	Outside (within 1 mile)
RI-02350	MCI Rialto to El Paso Fiber Optics Project - Intensive Cultural Resource Survey - San Bernardino and Riverside Counties, California	McCorkle Apple, R., and J.E. Wooley	1988	Outside (within 1 mile)
RI-02424	An Archaeological Assessment of Assessor's Parcel Nos. 609-201-011, 609-201-012, and 609-201-013, Located In The Bermuda Dunes Area Of Riverside County, California	Mccarthy, D.F.	1989	Outside (within 1 mile)
RI-02765	Environmental Impact Evaluation: An Archaeological Assessment of the Proposed Mid-Valley Stormwater Channel Located in the Coachella Valley of Central Riverside County, California	Arkush, B.S.	1990	**Within**
RI-02797	An Archaeological Assessment of Tentative Tract Map 25421 Indio, California	Keller, J.A.	1990	Outside (within 1 mile)
RI-02998	Archaeological Assessment Form Riverside County Planning Department Tentative Parcel Map #26196	Baldwin, J.	1990	Outside (within 1 mile)
RI-03245	Cultural Resources Sensitivity Overview for the Coachella Valley Enterprise Zone	Van Horn, D.M., L.S. White, and R.S. White	1990	**Within**
RI-03379	Archaeological Resource Survey of The Country Club Drive To Jefferson Street, Indio, California	TMI Environmental Services	1991	Outside (within 1 mile)
RI-03380	Archaeological Significance Test Excavation of The Country Club Drive To Jefferson Street Alignment, Indio, California	TMI Environmental Service	1991	Outside (within 1 mile)
RI-03752	Cultural Resources Evaluation: Fred Waring Bridge Project, Indio, Riverside County	Love, B.	1994	Outside (within 1 mile)
RI-03815	Cultural Resources Report: U.S. Home Project, Indio, Riverside County	Love, B., S. Moffitt, and B. Tang	1994	Outside (within 1 mile)
RI-03816	Preliminary Report of Findings: Cultural Resources, U.S. Home Project, Indio, Riverside County, California	Love, B.	1994	Outside (within 1 mile)
RI-03817	Archaeology on the North Shoreline of Ancient Lake Cahuilla: Final Results From Survey, Testing, and Mitigation-Monitoring	Love, B.	1996	Outside (within 1 mile)
RI-03838	Identification and Evaluation of Historic Properties: Indio Boulevard/Clinton Street Intersection Stoplight Project, Indio, Riverside County, California	Love, Bruce	1994	Outside (within 1 mile)
RI-03928	Cultural Resource Survey and Assessment of the Indio 230 kV Transmission Loop Alternate Route #1	Collins, G. Edward, and Jay Von Werlhof	1996	Outside (within 1 mile)

Report Number	Title of Study	Author and Affiliation	Year	Proximity to Project Area
RI-04072	Cultural Resources Report: Rv Showcase Specific Plan, City of Indio, Riverside County, California	Love, Bruce, and Bai "Tom" Tang	1998	Outside (within 1 mile)
RI-04409	Historical/Archaeological Resources Survey Report, Tentative Tract Map No. 29706, City of Indio, Riverside County, California	Love, Bruce, Bai "Tom" Tang, Daniel Ballester, Adrian Sanchez Moreno, and Mariam Duhdul	2000	Outside (within 1 mile)
RI-04430	Cultural Resources Inventory Report for Williams Communications, Inc. Fiber Optic Cable System Installation Project, Riverside, CA to the CA/AZ Border, Riverside, San Bernardino, & Imperial Counties, CA, Vol I-III	Jones and Stokes Associates, Inc.	2000	Outside (within 1 mile)
RI-04567	Archaeological Investigation of CA-Riv-6349, Tentative Tract 29323, Northwest Corner of Fred Waring Drive and Jefferson Street, City of La Quinta	Brock, James	2001	Outside (within 1 mile)
RI-04579	A Cultural Resources Assessment of Tentative Tract 30413, A 36-Acres Parcel Located Northeast of the Intersection of Madison Street and Fred Waring Drive, City of Indio, Riverside County, California	White, Robert S., and Laura S. White	2002	Outside (within 1 mile)
RI-04590	Phase I Cultural Resources Assessment for a 126-Acre Property in the City of Indio, Riverside County, California (APN 605-290-02)	Brock, James	2002	Outside (within 1 mile)
RI-04752	Phase I Cultural Resources Assessment for Tentative Tract Map No. 31987, Indio Area of Unincorporated Riverside County, California	Brock, James, and Christine L. Di Ioro	2004	Outside (within 1 mile)
RI-05030	A Phase I Cultural Resources Investigation for the Jefferson Street Commercial Plaza Project Area, Approximately 30 Acres Located in the City of Indio, Riverside County, California	Mckenna et al.	2004	Outside (within 1 mile)
RI-05031	A Phase I Cultural Resources Investigation of the Madison Development Property (Approximately 83 Acres) in the City of Indio, Riverside County, California	Mckenna et al.	2004	Outside (within 1 mile)
RI-05063	A Phase I Cultural Resources Investigation of Approximately 1000 Acres Located in the City of Indio, Riverside County, California	McKenna, Jeanette A., and R. Charles Ferguson	2002	**Within**
RI-05081	Cultural Resources Construction Monitoring of the Desert Trace Project, A 160 Acre Parcel Located in Indio, California	Taylor, Dennis C., and Vanessa A. Mirro	2005	Outside (within 1 mile)
RI-05114	Extended Phase I Survey, Phase II Excavations and Evaluations, and Mitigation Monitoring Program at CA-Riv-6896, A Prehistoric Site in the City of Indio, Riverside County, California	Mckenna et al.	2003	Outside (within 1 mile)
RI-05616	A Cultural Resources Assessment of Tentative Tract 30412, a 51.2 Acre Parcel Located West of Madison Street, City of Indio, Riverside County, CA	White, Robert S., and Laura S. White	2002	Outside (within 1 mile)
RI-05645	Report of Phase I (Survey Level) Archaeological Assessment for 40 Acre Parcel in City of Indio, Riverside County, CA	Demcak, Carol R.	2005	Outside (within 1 mile)

Report Number	Title of Study	Author and Affiliation	Year	Proximity to Project Area
RI-05647	Final Report of Phase II (Test Level) Archaeological Investigations at CA-Riv-7846, City of Indio, Riverside County, CA	Demcak, Carol R.	2005	Outside (within 1 mile)
RI-05666	Letter Report: Historic Consultation for Nextel of California Wireless Telecommunications, Project East Indio / CA-8857B, in Indio, Riverside County, California	Thal, Erika	2005	Outside (within 1 mile)
RI-05699	Letter Report: Proposed Cellular Tower Project(s) in Riverside County, California, Site Name/Number: CA-8855B/ North Indio & CA-8857-B/ East Indio	Thal, Erika	2005	Outside (within 1 mile)
RI-05771	Archaeological Monitoring Report: Sites Ca-Riv-6618, -6682, -7011, and -7012, Tentative Tract No. 29706, City of Indio, Riverside County, California	Dahdul, Mariam, Harry Quinn, and Adrian Sanchez Moreno	2003	Outside (within 1 mile)
RI-05911	Historical/Archaeological Resources Survey Report, Assessor's Parcel No. 606-080-008, the Ice Empire Project, City of Indio, Riverside County, CA	Tang, Bai, Michael Hogan, Mariam Dahdul, Harry Quinn, and Teresa Woodard	2002	Outside (within 1 mile)
RI-05912	Archaeological Testing and Mitigation, Sites CA-Riv-6618, and -6822, Tentative Tract Map No. 29706, City of Indio, Riverside County, CA	Love, Bruce, Harry Quinn, and Mariam Dahdul	2002	Outside (within 1 mile)
RI-05940	Cultural Resources Report, Archaeological Survey and Testing at Tentative Tract Map No. 31358, Monticello III Project, City of Indio, Riverside County, CA	Hogan, Michael, Bai Tang, Harry Quinn, Mariam Dahdul, Josh Smallwood, Adrian Sanchez Moreno, and Daniel Ballester	2003	Outside (within 1 mile)
RI-06061	A History and Evaluation of the Coachella Canal, Riverside and Imperial Counties, California	Schaefer, Jerry, and Sinead Ni Ghabhlain	2003	**Within**
RI-06119	Letter Report: Records Search Results and Site Visit Results for Sprint Telecommunications Facility Candidate Rv59xc005c (Date Palm Hotel), 81909 Indio Boulevard, Indio, Riverside County, CA	Dice, Michael	2003	Outside (within 1 mile)
RI-06200	Historical/Archaeology Resources Survey Report: Assessor's Parcel Numbers 608-020-007 and -012, in the City of Indio, Riverside County, California	Tang, Bai, Michael Hogan, Casey Tibbet, and Daniel Ballester	2004	Outside (within 1 mile)
RI-06206	Historical/Archaeological Resources Survey Report, Assessor Parcel Number 606-070-003, the Ferguson Project, City of Indio, California	Tang, Bai, Michael Hogan, Casey Tibbet, and Daniel Ballester	2004	Outside (within 1 mile)
RI-06208	Letter Report: Archaeological/Paleontological Monitoring of the Earth-Moving Activities, Monticello III Project, City of Indio, Riverside County, California	Hogan, Michael	2004	Outside (within 1 mile)
RI-06222	Historic Building Evaluation: 80783 Indio Boulevard in the City of Indio, Riverside County, California	Tang, Bai, Michael Hogan, and Casey Tibbet	2004	Outside (within 1 mile)
RI-06259	Cultural Resources Survey Report, Union Pacific Railroad, Fingal-Thermal Phase Iii Expansion, Riverside County, California	Chambers Group, Inc.	2006	Outside (within 1 mile)
RI-06390	Letter Report: Addendum to Historical/Archaeological Resources Survey, the Ferguson Project, Avenue 43 and Burr Street, Assessor's Parcel Number (APN) 606-070-015, in the City of Indio, Riverside County, California	Tang, Bai, and Michael Hogan	2005	Outside (within 1 mile)

Report Number	Title of Study	Author and Affiliation	Year	Proximity to Project Area
RI-06413	Archaeological Test and Evaluation Report: Site CA-RIV-7561 (33-13834), Tentative Tract No. 30412, City of Indio, Riverside County, California	Hogan, Michael	2005	Outside (within 1 mile)
RI-06435	Historical/Archaeological Resources Survey Report, the Savannah Project, City of Indio, Riverside County, California	Bai Tang, Michael Hogan, Deirdre Encarnacion, and Daniel Ballester	2004	**Within**
RI-06447	Historical/Archaeological Resources Survey Report: the Avante Project, in the City of Indio, Riverside County, California	Tang, Bai, Michael Hogan, Matthew Wetherbee, and Daniel Ballester	2004	Outside (within 1 mile)
RI-07360	Archaeological Evaluation Report 33-011573 (CA-RIV-6896) and 33-011574 (CA-RIV-6897): I-10/Jefferson Street Interchange Improvement Project Indio, Riverside County, California	Moratto, Michael J., Melinda C. Horne, Robert J. Lichtenstein, Dennis McDougall, Michael J. Mirro, and Marilyn J. Wyss	2007	Outside (within 1 mile)
RI-07464	Historical / Archaeological Resources Survey Report: Assessor's Parcel Nos. 60-070-001, -004, and -006 City of Indio, Riverside County, California	Hogan, Michael, and Tang, Bai "Tom"	2007	Outside (within 1 mile)
RI-07673	Cultural Resources Report: Archaeological Survey and Testing at the Jefferson Street Business Park Project, Sites CA-RIV-6382 and -8403, Assessor's Parcel Nos. 606-060-002, 606-080-005, and 691-190-027, City of Indio, Riverside County, California	Dahdul, Miriam, Clarence Bodmer, and Daniel Ballester	2008	Outside (within 1 mile)
RI-07894	Historical/Archaeological Resources Survey Report, Madison Hills Plaza Project, A Portion of Assessor's Parcel No. 691-110-001, City of Indio, Riverside County, California	Tang, Bai, Clarence Bodmer, Lisa Hunt, and Laura Shaker	2008	Outside (within 1 mile)
RI-07933	Letter Report: Proposed Cellular Tower Project in Riverside County, California, Site Number/Name: CA-8857/ East Indio	Thal, Erika	2004	Outside (within 1 mile)
RI-08105	Summary of Findings, Citywide Historic Resources Survey Update, City of La Quinta, Riverside County, California	Tang, Bai "Tom", and Michael Hogan	2006	Outside (within 1 mile)
RI-08106	Archaeological & Paleontological Evaluation Report and Mitigation Plan Indio-78 Parcel, City of Indio, Riverside County, California	Scott, Kim, Steve McCormick, and Sherri Gust	2004	Outside (within 1 mile)
RI-08112	Archaeological Literature Study for the Village at Indio Project, Riverside County, California	Gust, Sherri	2004	Outside (within 1 mile)
RI-08158	A Class III Cultural Resources Investigation for the Proposed Land Transfer Between the Bureau of Reclamation and the Coachella Valley Water District, Riverside County, California	McKenna, Jeanette A.	2004	**Within**
RI-08320	Letter Report: Cultural Resources Search and Site Visit Results for T-Mobile USA Candidate IE04846J (Desert Storage Masters), 42925 Madison Street, Indio, Riverside County, California.	Bonner, Wayne H., and Sarah A. Williams	2009	Outside (within 1 mile)

Report Number	Title of Study	Author and Affiliation	Year	Proximity to Project Area
RI-08369	A Phase II Cultural Resources Investigation of CA-RIV-1637, a Prehistoric Archaeological Site Located within the Northgate Development in the City of Indio, Riverside County, California.	McKenna, Jeanette A.	2009	Outside (within 1 mile)
RI-08455	Letter Report: Archaeological Monitoring Program, Northgate Crossing, Indio, Riverside County, CA.	McKenna, Jeanette A.	2009	Outside (within 1 mile)
RI-08540	Identification and Evaluation of Historic Properties, Indio Water Authority Wastewater Treatment Project, Cities of Indio and La Quinta, Riverside County, California	Tang, Bai “Tom”, and Michael Hogan	2010	**Within**
RI-08581	Letter Report: Cultural Resources Search and Site Visit Results for T-Mobile USA Candidate IE25962-A (Siesta Grill), 81929 Indio Boulevard, Indio, Riverside County, California	Bonner, Wayne H.	2010	Outside (within 1 mile)
RI-08731	Letter Report: Proposed Cellular Tower Project(s) in Riverside County, California, Site Number(s)/Name(s): CA-2814/North Indio TCNS# 67733	Allred, Carla	2010	Outside (within 1 mile)
RI-08733	Supplemental Historic Property Survey Report	Moratto, Michael J., , Dicken Everson, and Gabrielle Duff	2011	Outside (within 1 mile)
RI-08762	Archeological Investigations (2002-2010) at Site CA-RIV-6897 Varner Road Improvement Project	Moratto, Michael J., Denis McDougall, Michael Mirro, Douglas R. Harro, Kholood Abdo-Hintzman, Rebecca L. McKim, and Melinda Horne	2011	Outside (within 1 mile)
RI-08845	AT&T Wireless Telecommunications Site RS0231 (Heritage Palms) 80761 Fred Waring Drive, Indio, California 92201	Villacorta, Estella	2010	Outside (within 1 mile)
RI-08853	Letter Report: Cultural Resources Records Search and Site Visit Results for T-Mobile USA Candidate IE25961-A (Siesta Grill)	Bonner, Wayne H., and Sarah Williams	2010	Outside (within 1 mile)
RI-08857	Negative Mitigation Monitoring Report Desert Meadows, APN 608-340-032, City of Indio, California	Loren-Webb, Barbara Ann, and Darryl J. Dang	2012	Outside (within 1 mile)
RI-09190	Cultural Resources Summary for the Proposed Verizon Wireless, Inc., Property at the Anchovy Site, 40655 Jefferson Street, Indio, Riverside County, California 92203	Puckett, Heather R.	2013	Outside (within 1 mile)
RI-09245	Cultural Resources Inventory Within the Proposed Mid-Valley Pipeline Project Area Riverside County, California	Glenn, Brian K.	2006	Outside (within 1 mile)
RI-09269	Phase I Cultural Resources Assessment for the Coachella Valley Water District’s Irrigation Lateral 114.3 Replacement Project, City of Indio, Riverside County, California	McDougall, Dennis, Joan George, and Vanessa Mirro	2014	**Within**
RI-09897	Cultural Resources Regulatory Compliance Analysis Bermuda Dunes Country Club Non-potable Water Pipeline Extension Project Bermuda Dunes Area, Riverside County, California CRM TECH Contract No. 3151	Tang, Bai "Tom"	2016	Outside (within 1 mile)

Report Number	Title of Study	Author and Affiliation	Year	Proximity to Project Area
RI-09974	Data Recovery at Prehistoric Site CA-RIV-6896/6897 (33-011573/33-011574)	Moratto, Michael J., and Dennis McDougall	2017	Outside (within 1 mile)
RI-10005	Re: Cultural Resource Monitoring for the Varner Road Pipeline Improvement Project, City of Indio, Riverside County, California	Lichtenstein, Robert J.	2014	Outside (within 1 mile)
RI-10101	Proposed Wireless Device Monopole and Equipment Cabinet; Dune Site, 80975 Indio Blvd., Indio, California, 92201.	Knox Mellon	2002	Outside (within 1 mile)
RI-10207	A Cultural Resources Assessment of The Jefferson Street Improvement Project, Avenue 54 To Indio Boulevard, Coachella Valley, Riverside County	White, Robert S., Laura S. White, and David M. Van Horn	1999	Outside (within 1 mile)
RI-10231	Palm Desert Groundwater Replenishment Project.	Haas, H., and B. Vargas	2017	Outside (within 1 mile)
RI-10296	Section 106 Review Tcns #85459 Proposed 195-Foot Self Supporting Lattice Telecommunications Structure (199-Foot Overall Height With Appurtenances) 52 Eighty, Llc-Ca-030 (Indio) 43549 Wheel Road Indio, Riverside County, California Eca Project #N-564	Bazzill, Dina M., and Autumn DuBois	2012	Outside (within 1 mile)
RI-10325	Supplemental Cultural Resource Assessment for the Coachella Valley Water District's Bermuda Dunes Country Club Non-Potable Water Connection Project, City Of Indio, Riverside County, California	George, Joan, and Vanessa Mirro	2017	Outside (within 1 mile)
RI-10342	Cultural Resources Technical Report City of La Quinta General Plan (2010 Update)	Tang, Bai "Tom", and Deirdre Encarnacion	2010	Outside (within 1 mile)
RI-10374	Phase I Cultural Resources Assessment for the Coachella Valley Water District's Whitewater River – Coachella Valley Stormwater Channel Project, Riverside County, California	Stowe, Luke	2013	**Within**
RI-10406	Archaeological Sensitivity Model for the Whitewater River Stormwater Channel, Riverside County, California	Mirro, Michael	2012	**Within**
RI-10461	Archaeological Investigations and Monitoring for the Construction of the Devers-Palo Verde No. 2 Transmission Line Project, Riverside County, California	Eckhardt, William T., Matthew M. DeCarlo, Doug Mengers, Sherri Andrews, Don Laylander, and Tony Quach	2015	Outside (within 1 mile)
RI-10569	Identification and Evaluation of Historic Properties: Non-Potable Water Connection to Bermuda Dunes Country Club, City of Indio, Riverside County, California	Tang, Bai, Ben Kerridge, Daniel Ballester, Harry M. Quinn, and Nina Gallardo	2016	Outside (within 1 mile)
RI-10727	Cultural Resource Records Search and Site Survey	Denardo, Carole	2019	Outside (within 1 mile)
RI-10762	"Historic Property Survey Report for the Herbert Hoover Elementary School Pedestrian	Mills, Evan	2019	Outside (within 1 mile)
RI-10811	Historic Property Survey Report - Interstate 10 / Monroe Street Interchange Improvement Project, 08-EA 0K730, Riverside County, California	George, Joan, Applied EarthWorks	2019	**Within**

Report Number	Title of Study	Author and Affiliation	Year	Proximity to Project Area
RI-10812	Archaeological Survey Report for the Interstate 10 / Monroe Street Interchange Improvement Project, City of Indio, Riverside County, California E-FIS 0800-00368 (EA 08-0K730)	George, Joan,, Applied EarthWorks	2019	**Within**

4.1.2 Previously Recorded Cultural Resources

The CHRIS records search identified 84 previously recorded cultural resources within a 1-mile radius of the project area (Table 3), three of which intersect the project area. One is an archaeological site (P-33-007425/CA-RIV-005799), and the other two are built environment resources: the Coachella Canal (P-33-005705/CA-RIV-012999 and the CVSC (P-33-017259/CA-RIV-010847). Additionally, one archaeological resource, a multicomponent site (P-33-001768/CA-RIV-001768) is immediately adjacent to the west of the project area. These resources are discussed in further detail below.

Table 3. Previously Recorded Cultural Resources within a 1.0-Mile Radius of the Project Area

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-001634 CA-RIV-001634	Prehistoric site; historic	Prehistoric – pot sherds, mano fragments, clay fragments, flaked stone tools, ground stone, fire-affected rock, corn cobs Historic – trash scatter, ceramics, glass, beverage cans, and crown caps	Not evaluated	P.J. Wilke, San Bernardino County Museum, 1972; J. Underwood, J. Cleland, C.M. Woods and R. Apple, Dames & Moore, 1987; R.S. White, Archaeological Associates Ltd., 1990	Outside (within 1 mile)
P-33-001637 CA-RIV-001637	Prehistoric site	Lithics, ceramics, projectile points, ground stone, beads, shell, bone, fire-affected rock, carbon	Not evaluated	S. McWilliams, 1970; S. McWilliams, 1979; R.S. White, Archaeological Associates Ltd., 1990; G. Alcock, EIC, Department of Anthropology, UC Riverside, 1991); J. Baldwin, 1991); G. Alcock, EIC, Department of Anthropology, UC Riverside, 1991; G. Alcock, EIC, Department of Anthropology, UC Riverside, 1991; J. Baldwin, 1991; J.A. McKenna, McKenna et al., 2004; K. White, EIC, Department of Anthropology, UC Riverside, 2007; J.A. McKenna, McKenna et al., 2009	Outside (within 1 mile)

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-001638 CA-RIV-001638	Prehistoric site	Manos and metate fragments, pottery, flake waste, midden, sherds, lithic scatter, stone and bone material	Not evaluated	Mc William, 1970 Mc William, 1979 M. Desautels, Scientific Resource Surveys, Inc., 1982	Outside (within 1 mile)
P-33-001766 CA-RIV-001766	Prehistoric site	Sherds, human coprolite, bone, flakes, fire-affected rock, hearths, burned house remains, points, shell beads, fish remains	Not evaluated	P. Wilke and MW, 1980	Outside (within 1 mile)
P-33-001767 CA-RIV-001767	Prehistoric site	Hearths, burned rock, ceramics, fish and bird bone, projectile points	Not evaluated	P. Wilke and MW, 1980; J. Underwood, J. Cleland, C.M. Woods and R. Apple, Dames & Moore, 1987; J. McKenna and C. Ferguson, 2002; Mc Kenna et al., 2004	Outside (within 1 mile)
P-33-001768 CA-RIV-001768	Multicomponent site	Sherds, fire-affected rock, fish, bird, and mammal bone, flakes, historic and modern trash	Not evaluated	P. Wilke, 1980; J. Underwood, J. Cleland, C. Woods and R. Apple, Dames & Moore, 1987.	Adjacent
P-33-001970 CA-RIV-001970	Prehistoric site	Sherd scatter, burned bone, burned ceramic sherds, mano and metate fragments, cranial fragments, lithic debitage, and bird, fish and mammal bone	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, 1994 A. Davis and S. Bouscaren, 1980	Outside (within 1 mile)
P-33-001974 CA-RIV-001974	Prehistoric site	Sherd scatter, metate and mano fragments, schist, fire-affected rock, and fish, bird and mammal bone, lithic debitage, possible human cremations	Status Code 7: Not evaluated or needs re-evaluation	A. Davis and S. Bouscaren, 1980; B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-002789 CA-RIV-002789	Prehistoric site	Sherd scatter, obsidian flake	Status Code 7: Not evaluated or needs re-evaluation	T.T. Taylor, 1984; B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-003867 CA-RIV-003867	Prehistoric site	Sherds, mano fragments, quartz flakes, fire-affected rock, and fish and small mammal bone	Not evaluated	B.S. Arkush, Archaeological Research Unit, UC Riverside, 1990	Outside (within 1 mile)
P-33-005330 CA-RIV-005330	Prehistoric site	Ceramic sherds	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM Tech, 1994	Outside (within 1 mile)
P-33-005331 CA-RIV-005331	Prehistoric site	Sherds, quartzite flakes, quartz debitage, mano and metate fragments, fish bone	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM Tech, 1994	Outside (within 1 mile)

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-005334 CA-RIV-005334	Prehistoric site	Jasper flake, sherd scatter, chert flake	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM Tech, 1994	Outside (within 1 mile)
P-33-005335 CA-RIV-005335	Prehistoric site	Sherd scatter and quartz core	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM Tech, 1994	Outside (within 1 mile)
P-33-005336 CA-RIV-005336	Historic site	Trash scatter, cans, glass fragments, automobile tires, appliances	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005337 CA-RIV-005337	Prehistoric site	Sherd scatter, bone fragments, mano fragments, lithic debitage	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005339 CA-RIV-005339	Prehistoric site	Ceramic sherds, quartz debitage, metate fragments	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005340 CA-RIV-005340	Prehistoric site	Sherds, fire-affected rock, mano fragments, medium-size mammal bone fragments	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005341 CA-RIV-005341	Prehistoric site	Sherds, fire-affected rock, mano fragments, mammal bone fragments, lithic debitage	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005342 CA-RIV-005342	Prehistoric site	Sherds, lithic debitage, fire-affected rock, mano and metate fragments	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005343 CA-RIV-005343	Prehistoric site	Sherds, lithic debitage, a burn area, fire-affected rock, burned and unburned clay, dark soil discoloration	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005344 CA-RIV-005344	Prehistoric site	Sherds, lithic debitage, fire-affected rock, schist pieces	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005345 CA-RIV-005345	Prehistoric site	Bone fragments, lithic debitage	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005346 CA-RIV-005346	Prehistoric site	Several concentrations of bone fragments, ceramic and rim sherds, fire-affected rock, metate fragments, rock cobbles, clay chunks and fragments, schist	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-005347 CA-RIV-005347	Prehistoric site	Sherds, mano fragments, small cobbles, quartz debitage, hammerstone	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005348 CA-RIV-005348	Prehistoric site	Ceramic sherds	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005349 CA-RIV-005349	Prehistoric site	Ceramic sherds	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005350 CA-RIV-005350	Prehistoric site	Sherd scatter and fire-affected rock	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005353 CA-RIV-005353	Prehistoric site	Sherd scatter, obsidian flake, chalcedony flake	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005354 CA-RIV-005354	Historic site	Agricultural complex – well, berms, irrigation and stand pipes, abandoned date palm grove	Status Code 7: Not evaluated or needs re-evaluation	B. Love and S. Moffit, CRM TECH, 1994	Outside (within 1 mile)
P-33-005554	Prehistoric isolate	Single pot sherd	Not evaluated	B. Neiditch, 1988	Outside (within 1 mile)
P-33-005555	Prehistoric isolate	Single pot sherd	Not evaluated	B. Neiditch, 1988	Outside (within 1 mile)
P-33-005556	Prehistoric isolate	Single pot sherd	Not evaluated	B. Neiditch, 1988	Outside (within 1 mile)
P-33-005560	Prehistoric isolate	Single pot sherd	Not evaluated	Brooke S. Arkush, 1990	Outside (within 1 mile)

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-005705 CA-RIV-012999	Historic-era structure	Coachella Canal and distribution system	Eligible for NRHP	C. Folkes, Riverside County Historical Comm., 1983; S. Ni Ghabhlain, ASM Affiliates, Inc., 2003; S. Ni Ghabhlain and S. Stringer-Bowsher, Applied EarthWorks, 2007; R. Jones and D. Brockmann, 2013; J. Smallwood, Applied EarthWorks, Inc., 2013; J. Smallwood, Applied EarthWorks, Inc., and S. Schafer, 2013; T. Baurley and J.M. Sanka, L&L Environmental, 2015; J. Smallwood, Applied EarthWorks, Inc., 2015; J. Smallwood, Applied EarthWorks, Inc., 2015; J. George, Applied EarthWorks, Inc., 2016; J. Castells, Applied EarthWorks, Inc., 2017	**Within**
P-33-007425 CA-RIV-005799	Prehistoric site	Ceramic scatter, milling fragments, fire-affected rock, river cobble, shell, hearth areas, structured depressions, burned small mammal and bird bone, burned tortoise shell, fish vertebra, small teeth, burned clay, metate and mano fragments, broken granite and quartz fragments, unfired clay balls, depressed areas Historic trash component – rugs, dishes, jars, auto parts, rusty nails	Not evaluated	G.E. Collins, Imperial Irrigation District, 1995	**Within**

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-009498 CA-RIV-006381	Historic structure	Union Pacific/Southern Pacific Railroad	Unknown	S. Ashkar, Jones & Stokes, 1966; C. Chasteen, Myra L. Frank & Associates, 2003; C. Taniguchi, Galvin & Associates, 2005; S. Wilson and K. Chimel, ICF Jones & Stokes, 2009; S. Kremkau, SRI, 2012; T. Baurley and J.M. Sanka, L&L Environmental, Inc., 2015; D. Leonard, HDR, 2016; P. Moloney, R. Elder, W. Blodgett, Applied EarthWorks, Inc., 2017	Outside (within 1 mile)
P-33-009499 CA-RIV-006382	Prehistoric site	Sparse surface scatter of brown ware fragments (1999) No artifacts were found in 2007 through either survey or excavations	Not eligible for NRHP or CRHR	M. Avina, Jones and Stokes Associates, Inc., 1999; D. Ballester, CRM Tech, 2007	Outside (within 1 mile)
P-33-010795 CA-RIV-006514H	Historic site	Mid-twentieth century refuse deposit, glass, metal, ceramics, granite boulders	Not evaluated	J. Brock, Archaeological Advisory Group, 2000	Outside (within 1 mile)
P-33-010905 CA-RIV-006618	Prehistoric site	Ceramic sherds, animal bone fragments, chipped stone, fire-affected clay, ground stone fragment	Found to not qualify as a historical resource under CEQA	D. Ballester and A. Sanchez Moreno, CRM Tech, 2000; D. Ballester, CRM Tech, 2002	Outside (within 1 mile)
P-33-011437 CA-RIV-006822	Prehistoric site	Pot sherds, shell beads, animal bone fragments, ground stone fragment, chipped stone debitage, lithic biface fragment	Eligible for CRHR under Criterion 4	J.J. Eddy, CRM TECH, 2005	Outside (within 1 mile)
P-33-011476	Historic-era building	La Hacienda Nursery, 80-900 Miles Ave, Indio	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011477	Historic-era building	Single-family residence, 81-492 Francis Ave, Indio	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011478	Historic-era building	Single-family residence, 81-493 Francis Ave	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, CRM TECH, 2002	Outside (within 1 mile)

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-011479	Historic-era district	Grouping of eight single-family residences	6Y, ineligible for NRHP by consensus through Section 106 process; not evaluated for CRHR or local	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011480	Historic-era building	Single-family residence, 81-351 Miles Ave	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011481	Historic-era building	Multi-family residence, 81-363, 81-365 Miles Ave	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011482	Historic-era building	Multi-family residence, 81-367-81-369 Miles Ave	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011483	Historic-era building	Multi-family residence, 81-381 Miles Ave	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011484	Historic-era building	Multi-family residence, 81-395, 81-395 ½ Miles Ave	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011485	Historic-era building	Single-family residence, 81-413 Miles Ave	6Y, ineligible for NRHP by consensus through Section 106 process; not evaluated for CRHR or local	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011486	Historic-era building	Single-family residence, 45-045 Ash Ave	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011487	Historic-era building	Multi-family residence, 81-465, 81-465 ½ Miles Ave	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, CRM TECH, 2002	Outside (within 1 mile)
P-33-011488	Historic-era site	Date Palm Trailer Park and A.J. Shamblin Home	No longer extant	B. Tang, CRM TECH, 2002; B. Loren-Webb, L&L Environmental Inc., 2009	Outside (within 1 mile) but no longer extant

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-011571	Historic-era building	Single-family residence, 45-040 Birch Ave	6Y, ineligible for NRHP by consensus through Section 106 process; not evaluated for CRHR or local	B. Tang, CRM TECH, 2002	Outside (within 1 mile) but no longer extant
P-33-011572	Historic-era building	Single-family residence, 81-411 Miles Ave	6Y, ineligible for NRHP by consensus through Section 106 process; not evaluated for CRHR or local	B. Tang, CRM TECH, 2002	Outside (within 1 mile) but no longer extant
P-33-011573 CA-RIV-006896	Prehistoric site	Five loci; ceramic sherds, dispersed hearth feature, shell bead, lithic tools and debitage, faunal material, human cremation	Eligible for NRHP under Criterion D; historically significant cultural resource pursuant to CEQA.	D. Ballester, CRM Tech, 2002; D. McDougall, C. Inoway, D. Bircheff, M. Horne, Applied EarthWorks, Inc., 2003; R. J. Lichtenstein, Applied EarthWorks, Inc., 2006; R. Lichtenstein, T. Everette. S. Wadsworth, D. Largo, D. McDougall, K. Mclean, L. Burgos, Applied EarthWorks, Inc., 2011	Outside (within 1 mile)
P-33-011574 CA-RIV-006897	Prehistoric site	Organic material, charcoal, fire-affected rock, faunal material, hearth feature, sherds, lithic debitage, ground stone pieces, shell	Eligible for NRHP under Criterion D	D. Ballester, CRM TECH, Inc, 2002; D. McDougall, C. Inoway, D. Bircheff, M. Horne, Applied Earthworks, Inc, 2003; R. Lichtenstein, T. Everette. S. Wadsworth, D. Largo, D. McDougall, K. Mclean, L. Burgos, Applied Earthworks, Inc., 2006	Outside (within 1 mile)
P-33-011636 CA-RIV-006915	Prehistoric site	Ceramic sherds, quartz flake, fire-affected rock	Not evaluated	B. Love, B. Tang, H.M. Quinn, M. Dahdul, CRM Tech, 2002	Outside (within 1 mile)
P-33-012280 CA-RIV-007011	Prehistoric site	Ceramic sherds	6Z, ineligible for NRHP, CRHR and local designation	M. Dahdul, CRM TECH, 2002	Outside (within 1 mile)
P-33-012281 CA-RIV-007012	Prehistoric site	Sherds fire-affected rocks and clay, animal bones	6Z, ineligible for NRHP, CRHR and local designation	D. Ballester, CRM TECH, 2002	Outside (within 1 mile)

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-012526 CA-RIV-007126/H	Prehistoric site; Historic site	Prehistoric – sherds, ground stone fragments, chipped stone pieces, animal bone fragments, rocks Historic – glass fragments, ceramic kitchenware	Eligible for CRHR	D. Ballester and L.H. Shaker, CRM TECH, 2003	Outside (within 1 mile)
P-33-012527	Prehistoric isolate	Fragment of a biface mano	Not evaluated	D. Ballester, CRM TECH, 2002	Outside (within 1 mile)
P-33-012528	Prehistoric isolate	Ceramic sherds	Not evaluated	D. Ballester, CRM TECH, 2002	Outside (within 1 mile)
P-33-012529	Prehistoric isolate	Ceramic sherds	Not evaluated	D. Ballester, CRM TECH, 2002	Outside (within 1 mile)
P-33-013295	Historic-era building	Swingle Ranch House, 44566 Swingle Ave	4S2, May become eligible for NRHP with more research	J. Brock and C. di Iorio, Archaeological Advisory Group, 2004	Outside (1 mile)
P-33-013795 CA-RIV-007553	Prehistoric site	Bifacial mano, metate fragments, mano/pestle fragments, possible tarring pebble, burned bone, charcoal, clay	Not evaluated	C. Demcak, ARMC, 2004	Outside (within 1 mile)
P-33-013826	Historic-era building	Carrillo Residence, 43541 Madison Street	6Z1, Found ineligible for NRHP with no potential for any listing	L.S. White, Archaeological Associates, 2002	Outside (within 1 mile)
P-33-013834 CA-RIV-007561	Prehistoric site	Ceramic sherds, chipped stone debitage, ground stone fragments, animal bone, fire-affected clay, rock	One component of site is eligible for CRHR under Criterion 4	L.S. White, Archaeological Associates, 2002; John J Eddy, CRM TECH, 2003	Outside (within 1 mile)
P-33-013940	Historic-era site	Scatter of domestic refuse, structural debris, concrete septic tank	Not evaluated	R.P. Easter Nixon and J. George, Applied EarthWorks, Inc., 2004	Outside (within 1 mile)
P-33-014376	Historic-era building	Single-family residence, 80783 Indio Boulevard	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, M. Hogan, C. Tibbet, CRM TECH, 2004	Outside (within 1 mile)
P-33-014377	Historic-era building	Date packinghouse, 80783 Indio Boulevard	6Z, ineligible for NRHP, CRHR and local designation	B. Tang, M. Hogan, C. Tibbet, CRM TECH, 2004	Outside (within 1 mile)
P-33-014398 CA-RIV-007829	Prehistoric site	Ceramic sherds, chert tool, possible test core of red jasper	Status Code 7: Not evaluated or needs re-evaluation	J. Smallwood, CRM TECH, 2005	Outside (within 1 mile)

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-014740 CA-RIV-007846	Prehistoric site	Mano, mano fragment, cores, hammerstone, pestle fragment, pot sherds	Not evaluated	C. Demcak, ARMC, 2005	Outside (within 1 mile)
P-33-016252 CA-RIV-008403	Prehistoric site	Cremated bone fragments (human), ceramic sherds, chipped stone pieces, projectile points, shell beads, scraper, schist	Ineligible for NRHP and CRHR	D. Ballester, CRM Tech, 2007; D. Ballester, CRM Tech, 2007	Outside (within 1 mile)
P-33-016672 CA-RIV-008729	Prehistoric site	Ceramic sherds, mano fragment, fire-affected rock, faunal remains	Status Code 7: Not evaluated or needs re-evaluation	D. Ballester, CRM Tech, 2007	Outside (within 1 mile)
P-33-016785	Historic-era site	Group of four utility poles	Not evaluated	J. M. Sanka, Michael Brandman Associates, 2007	Outside (within 1 mile)
P-33-016786	Historic-era building	Single-family residence, 80999 Fred Waring Drive	Not evaluated	J. M. Sanka, Michael Brandman Associates, 2007	Outside (within 1 mile)
P-33-016787	Historic-era building	Single-family residence, directly west of 80999 Fred Waring Drive	Not evaluated	J. M. Sanka, Michael Brandman Associates, 2007	Outside (within 1 mile)
P-33-017111 CA-RIV-008908	Prehistoric site	Ceramic sherds, lithic flakes, fire-affected clay fragments, shells	Not evaluated	L. Hunt, CRM TECH, 2008	Outside (within 1 mile)
P-33-017259 CA-RIV-010847	Historic-era structure	Coachella Valley Stormwater Channel	6Z, ineligible for NRHP, CRHR and local designation	D. Ballester, CRM TECH, 2008; D. McDougall, Applied Earthworks, 2009; P. Stanton, Statistical Research, Inc., 2012; C. Inoway, Applied Earthworks, 2012; J. Smallwood, Applied EarthWorks, Inc., 2016; D. Ballester, CRM TECH, 2016	**Within**
P-33-017348	Historic-era building	Multi-family residence, 42801 Burr Street	6Z, ineligible for NRHP, CRHR and local designation	J. Smallwood, CRM TECH, 2005; B. Tang, CRM TECH, 2005	Outside (within 1 mile)
P-33-017349	Historic-era building	Single-family residence, 42803 Burr Street	6Z, ineligible for NRHP, CRHR and local designation	J. Smallwood, CRM TECH, 2005; B. Tang, CRM TECH, 2005	Outside (within 1 mile)

Primary Number/ Trinomial	Resource Type	Resource Description	Eligibility Status	Recorder, Affiliation, Year	Proximity to Project Area
P-33-028059 CA-RIV-012669	Prehistoric site	Multiple loci, flaked and ground stone artifacts, ceramics, baked clay fragments, shell ornaments, modified bone, lithic material, burned and unburned faunal remains, burned human bone, macrobotanical remains	2S2, Determined eligible for NRHP and CRHR by State Historic Preservation Office (SHPO)	D. McDougall and M. Moratto, Applied Earthworks, Inc., 2016	Outside (within 1 mile)

4.1.2.1 P-33-001768/CA-RIV-001768 – Multicomponent site

While not within the project area, site P-33-001768/CA-RIV-001768 is recorded immediately west of the project area. This resource consists of an archaeological site originally recorded by Wilke in 1980 and relocated by Underwood et al. in 1987. Wilke described the site as being located east of the Coachella Canal, west of Madison Street, south of Avenue 42, and north of I-10. He described the site as a scatter of prehistoric and historic materials including burned rock clusters, ceramics, and fish, bird, and mammal bone. Wilke noted the site was badly disturbed with much historic and modern trash. In 1987, Underwood et al. relocated the site and described it as consisting of fire-affected rock, a dense concentration of Tizon Brown Ware and Lower Colorado Buff Ware covering an area of about 10 m^2; a few flakes of black metavolcanic and red/brown jasper; and large amounts of fish, bird, and mammal bone. Underwood et al. also noted the site was largely disturbed. The site has not been previously evaluated for the NRHP or CRHR.

4.1.2.2 P-33-005705/CA-RIV-012999 – Coachella Canal

This resource consists of the Coachella Canal, which was constructed between 1938 and 1948, and its distribution system, which was completed in 1954. The canal was constructed to deliver water to the Coachella Valley and a portion of Imperial County. In its entirety, the canal is 123.5 miles long between the diversion from the All-American Canal and the terminal reservoir, Lake Cahuilla (Ní Ghabhláin and Stringer-Bowsher 2009; Schaefer and Ní Ghabhláin 2003). Various segments of the canal have been recorded over the years as part of different projects. As summarized in 2015 by Josh Smallwood of Applied EarthWorks: subsequent to an evaluation report completed by ASM Affiliates, Inc., in 2003, the U.S. Bureau of Reclamation "formally determined the portions of the Canal between Siphons 7 and 14, and Siphons 15 and 32 to be eligible for the NRHP under Criteria A and C." However, the State Historic Preservation Office (SHPO) concurred only with its eligibility under Criterion A. The resource's (local and state) significance under Criterion A stems from its role in the development of the Imperial and Coachella Valleys: it provided a reliable water supply from the Colorado River and All-American Canal and laid the foundation for growth in the Coachella Valley's desert terrain. The resource's period of significance is 1938 to 1954 (Smallwood 2015).

Between 2007 to 2009, ASM Affiliates, Inc., recorded and evaluated the segment of the Coachella Canal between Siphon 32 and its terminus at Lake Cahuilla (which includes the canal segment within the current project area), and recommended the Coachella Canal and its distribution system eligible for the NRHP under Criteria A and C. There had been no concurrence from SHPO on that eligibility finding as of the date of Smallwood's DPR forms (Ní Ghabhláin and Stringer-Bowsher 2009; Smallwood 2015).

4.1.2.3 P-33-007425/CA-RIV-005799 – Prehistoric site

Site P-33-0007425/CA-RIV-005799 is located to the west of the northern portion of the project area, with a very small portion of the original boundary overlapping the project area, but outside of the grading limits. This resource consists of an archaeological site recorded by G.E. Collins in 1995. Its boundaries were established as the dirt road along the western edge of the grading footprint on the east, Avenue 42 on the south, the Coachella Canal on the west, and a wash and road on the north. The site consisted of a light scatter of ceramics, milling fragments, fire-affected rock, broken river cobble, various types of shell, three hearth areas, eight structured depressions, and an intrusive historic trash component. Ceramics included Colorado Buff, Tizon, and Salton Buff. Also noted were burned bird and small mammal bone, burned tortoise shell, fish vertebra, small faunal teeth, burned clay fragments, metate and mano fragments, broken granite and quartz fragments, unfired clay balls/nodules, and many depressed areas with associated ceramics and burned bone. Collins noted the body of the site was in good condition although trash dumping and previous road and agricultural disturbances had occurred at the north end of the site. Trash was also observed to be scattered throughout the site. The site has not been previously evaluated for the NRHP or CRHR.

4.1.2.4 P-33-017259/CA-RIV-010847 – Coachella Valley Stormwater Channel (CVSC)

This resource consists of the Coachella Valley Stormwater Channel or CVSC. The CVSC generally follows the natural course of the Whitewater River from Point Happy (near present-day Miles Avenue and Washington Street southwest of the current project area) to the Salton Sea. The CVSC functions as part of the area’s stormwater/flood protection system in conjunction with the WWRSC, the name given to the northern section of the Whitewater River between Palms Springs and Point Happy. Together, the CVSC and WWRSC are approximately 50 miles long and convey storm/flood waters to the Salton Sea. Various segments of the CVSC have been recorded as part of different projects, including the segment within the current project area (Ballester 2016). In 2016, Ballester recommended the segment of the CVSC from Point Happy to the community of Thermal (southeast of Indio) ineligible for listing in the NRHP and CRHR (Ballester 2016). An approximately 1,300-foot-long segment of the CVSC is located at the southeast end of the current project area.

4.2 THOUSAND PALMS CHANNEL

4.2.1 Historical Resource Status

Based on background research, and a review of records search results and the BERD, the Thousand Palms Channel is not listed in the NRHP or the CRHR, nor has the structure been identified as a contributor to a historic district. It appears the channel has not been previously evaluated for potential historic significance.

4.2.2 Development History

The Thousand Palms Channel is an earthen channel that conveys flood flows from the nearby mountains to the WWRSC/CVSC, the "backbone" of CVWD's stormwater protection system. As of 2022, there are 16 stormwater protection channels within CVWD's boundaries, totaling approximately 135 miles of channels developed along the natural alignment of dry creeks that flow from the surrounding mountains to the Whitewater River. Along with the Thousand Palms Channel, other CVWD tributary stormwater facilities include the West Magnesia Channel, Palm Valley Channel, Wasteways 2 and 3, La Quinta Evacuation Channel, Deep Canyon Channel, and Avenue 64 Evacuation Channel. CVWD also operates stormwater systems that intercept regional floods and convey them to tributary stormwater facilities; examples include the East Side Dike, Dike No. 4, and the Bear Creek Detention System. In addition, CVWD operates stormwater facilities or systems that discharge directly to the Salton Sea, such as Wasteway No. 1 (CVWD 2022).

Flowing through the Coachella Valley to the Salton Sea, the Whitewater River's course is channelized downstream of the city of Palm Springs. The section between Palms Springs and Point Happy (near present-day Miles Ave and Washington Street southwest of the project area) is part of a naturally occurring wash that has been improved to carry storm flows and is referred to as the Whitewater River Storm Channel or WWRSC. Because the riverbed naturally flattened out in areas to the east, the section east of Washington Street continuing downstream to the Salton Sea has more human-made elements and is called the Coachella Valley Storm Channel or CVSC (Coachella Valley Regional Water Management Group 2010; CVWD n.d.). As a whole, the WWRSC/CVSC is approximately 50 miles long (CVWD 2022).

Near central Indio, the Thousand Palms Channel begins at one of the southern edges of the Sun City Shadow Hills community, which was developed in the early 2000s. The unlined channel's flows travel over the Coachella Canal, Madison Street, and Avenue 42 in a southeast direction, then under I-10 to meet the CVSC near Indio Boulevard (USGS 1963, 1968).

The Thousand Palms Channel has also been referred to as the Thousand Palms Canyon Wash Channel, indicative of its origin as a natural landform, a wash. As the largest drainage from the Indio Hills to the north, the Thousand Palms Wash formed an alluvial fan spanning toward the southwest and draining toward the southeast (Shvidchenko et al. 2006) (Figure 7). Aerial photographs show that in 1939, the area where the channel is presently located was still predominantly undeveloped land and the wash was a natural topographic feature (Figure 8). Agricultural fields were situated to the south and southeast, near the Whitewater River (U.C. Santa Barbara Library 1939).

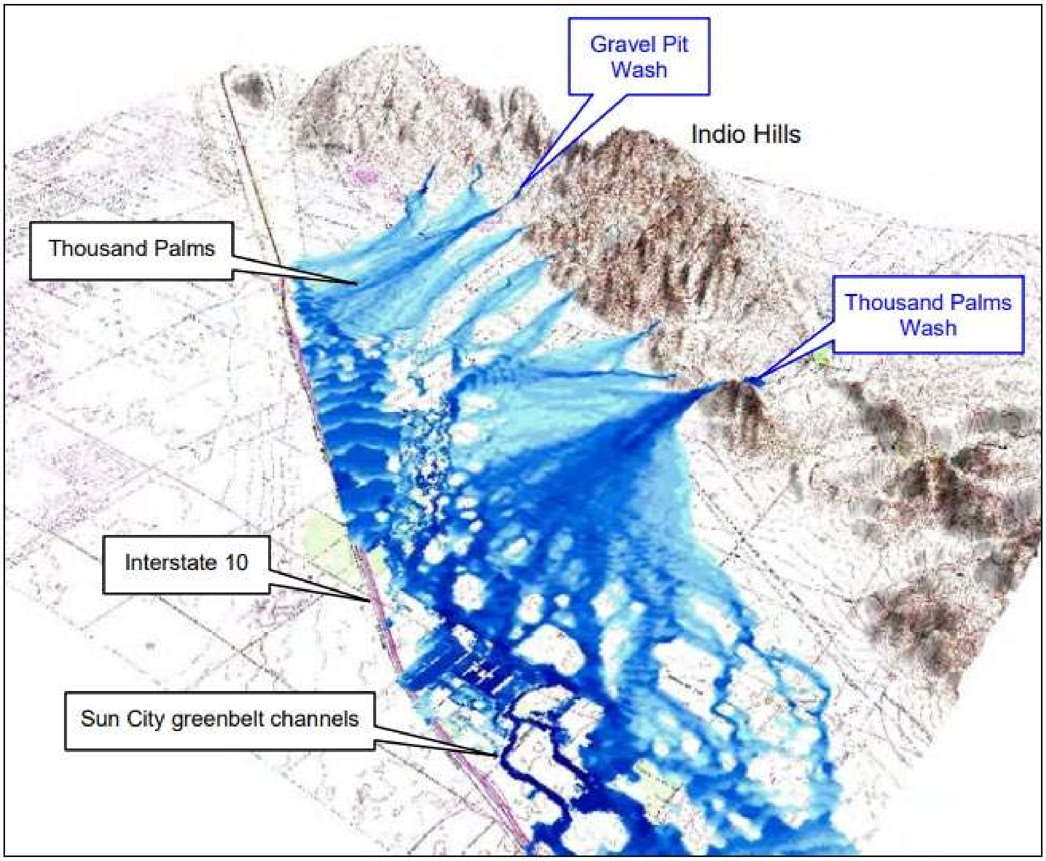

Figure 7. Thousand Palms Wash (far right) between the Indio Hills and I-10, shown in a simulation of 100-year flood event inundation limits (Source: Shvidchenko et al. 2006).

Figure 8. In 1939, the Thousand Palms Wash (northwest of the CVSC/WWRSC, railroad and highway) is seen as a natural topographic feature (Source: U.C. Santa Barbara Library 1939).

As evidenced by Reclamation records, the subject segment of the wash was modified to better serve as a drainage channel by 1946. Dikes were created and riprap installed along the channel edges to channelize the wash to better contain and direct drainage flows (U.S. Bureau of Reclamation 1946a) (Figure 9). A siphon and drop structure were constructed where the Coachella Canal intersects the north end of the wash/Thousand Palms Channel. The siphon's function is to allow water in the Coachella Canal to flow underneath the wash/Thousand Palms Channel, and the drop structure's function is to control the velocity of flows in the wash/Thousand Palms Channel as they travel over the Coachella Canal to continue southbound. This minimizes erosion and deposition of debris in the canal by flash-flood flows (Schaefer and Ní Ghabhláin 2003).

It appears the features constructed in the wash/Thousand Palms Channel itself were relatively minor. The wash was graded and riprap was installed on the north side of the siphon. Energy-dissipating concrete blocks (baffle) were installed on the south side of the siphon (Camacho 2022; U.S. Bureau of Reclamation 1946a, 1946b) (Figure 10). Aerial photographs show other human-made features present on the channel bottom by 1949, likely earthen energy-dissipating dikes (Environmental Data Resources [EDR] 2022) (Figure 11). It appears the dikes wore down over the years; they are barely discernible amidst vegetation growth in the channel on a 1965 aerial photograph. Subsequently, maintenance completed by the early 1970s cleared the vegetation from the channel bottom (EDR 2022). In 1985, the channel's outlet to the CVSC was modified; it appears the curve of the outlet was angled farther north and new dikes were created along the channel edges (CVWD 1985).

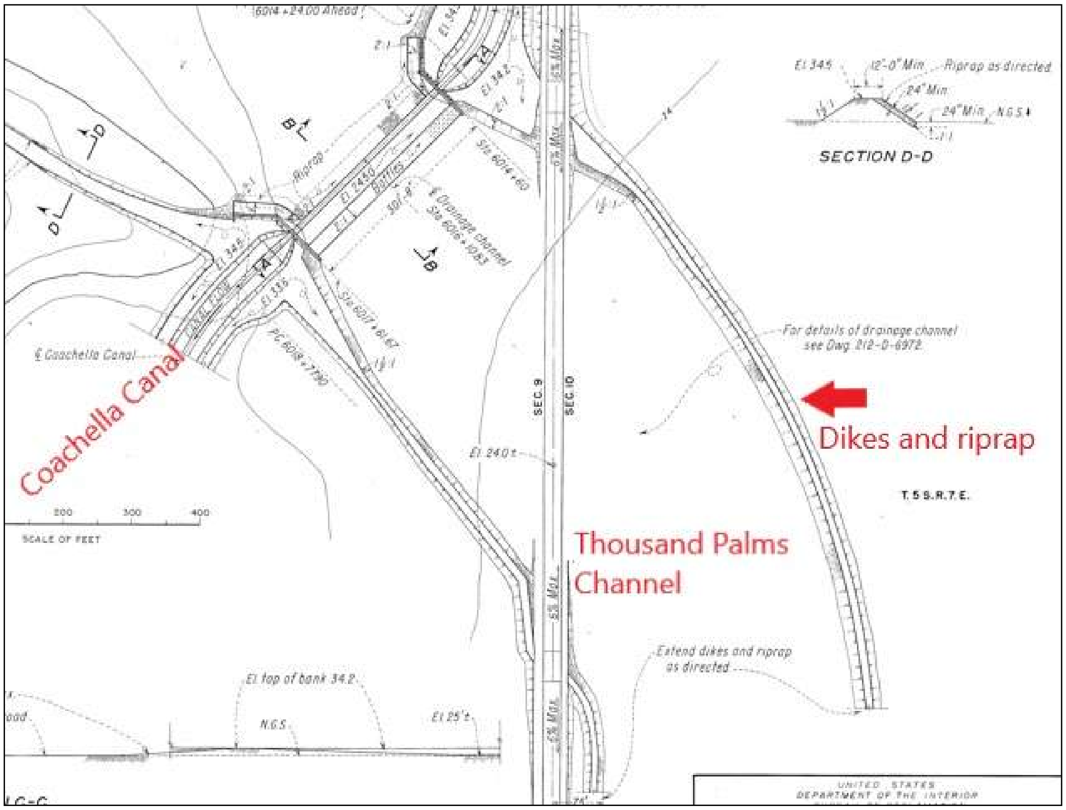

Figure 9. A 1946 design drawing for the Coachella Canal siphon shows modifications to the Thousand Palms Channel (generally called a drainage channel), included extending dikes and riprap along the channel edges (Source: Reclamation 1946a).

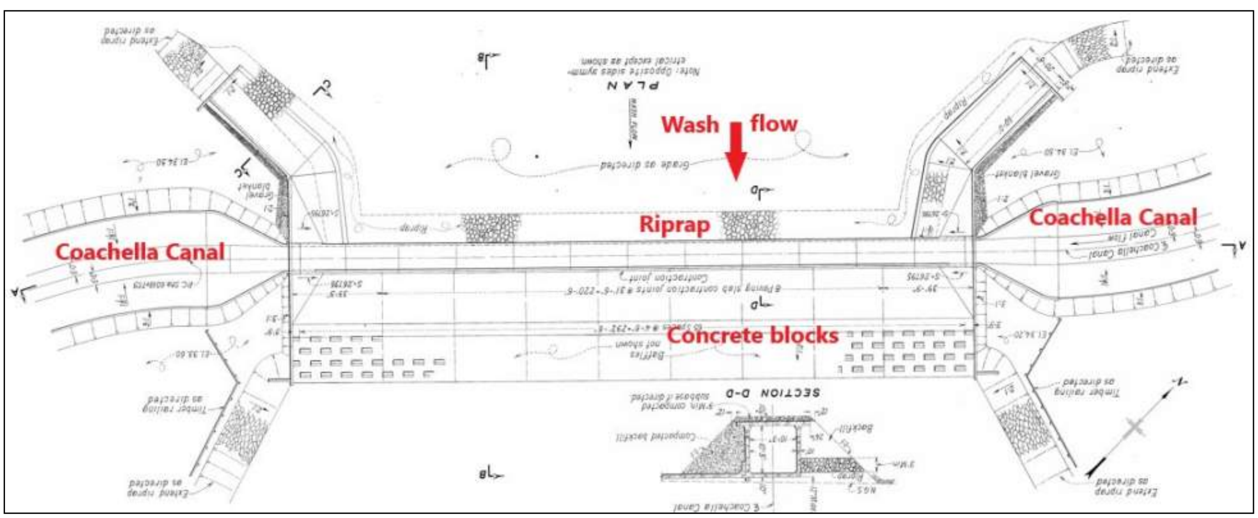

Figure 10. Another 1946 design drawing for the Coachella Canal siphon shows modifications to the Thousand Palms Channel (called a wash here) included grading, and installation of riprap and baffle/concrete blocks (Source: Reclamation 1946b).

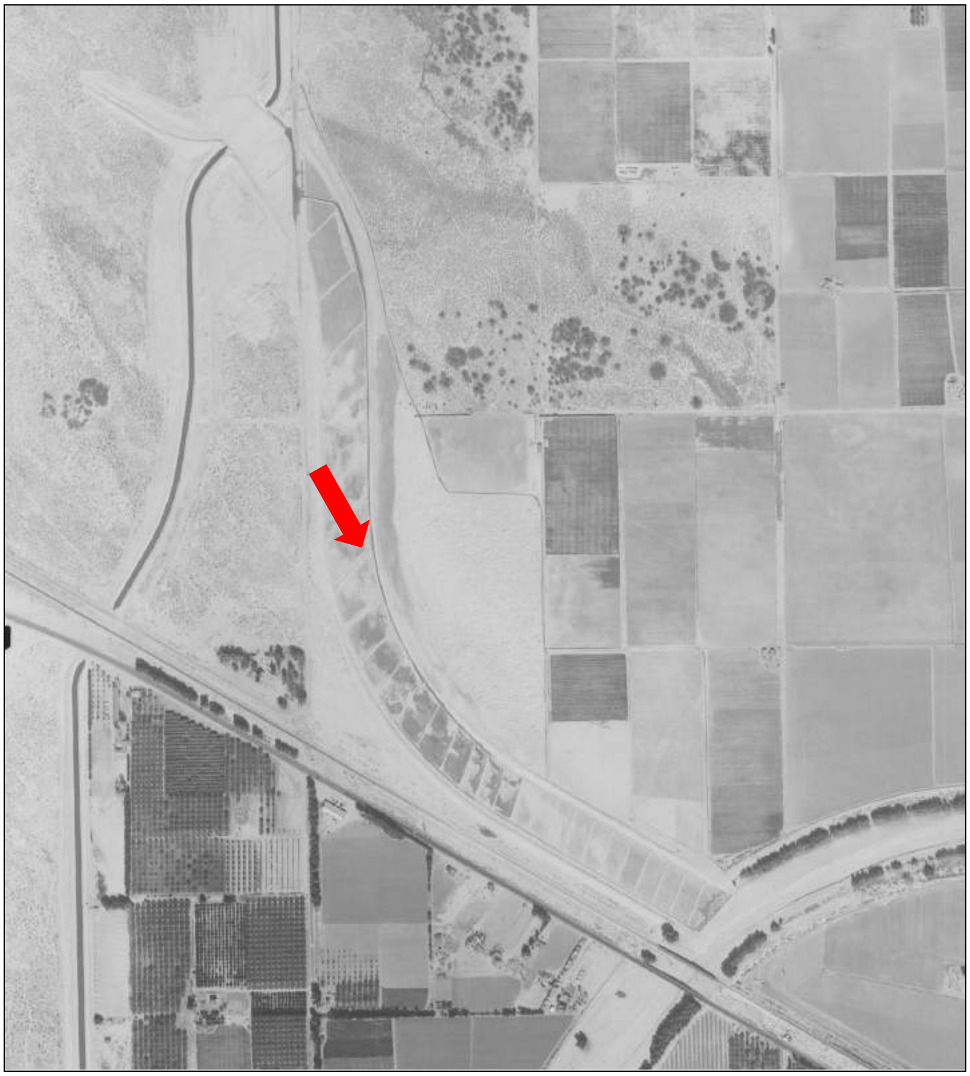

Figure 11. A 1949 aerial photograph shows what appear to be energy-dissipating dikes along the Thousand Palms Channel bottom, indicated by red arrow (Source: EDR 2022).

Research to date and available CVWD data did not reveal when CVWD assumed the operation and maintenance of the Thousand Palms Channel, and CVWD records do not provide a comprehensive history of maintenance or modifications beyond what is described above (Camacho 2022). In addition, consultation with the Coachella Valley Historical Society did not uncover any consequential information about the channel. Available data indicate the U.S. Bureau of Reclamation completed the early improvements to channelize the segment of the wash ca. 1946, and sometime before 1985 transferred operation of the Thousand Palms Channel to CVWD. It is possible the transfer occurred ca. 1954, when the Bureau of Reclamation transferred to CVWD the underground water distribution system constructed in the Coachella Valley as part of the All-American Canal system, or ca. 1981, when operation of the Coachella Canal was transferred to CVWD.

CHAPTER 5. ARCHAEOLOGICAL ASSESSMENT

5.1 SACRED LANDS FILE SEARCH

At SWCA's request, the NAHC conducted a SLF search for the project area. The NAHC provided negative SLF search results on March 20, 2023. The NAHC also noted that the absence of specific site information in the SLF does not indicate the absence of cultural resources in the project area, and recommended contacting Native American tribes who may have knowledge of cultural resources in the project area. The NAHC provided a list of contacts whom it recommended contacting (see Appendix B). SWCA provided the SLF search results and contact list to Kimley-Horn on March 23, 2023. Consultation with Native American tribes will be completed by the CVWD.

5.2 FIELD METHODS

On April 13 and 14, 2023, SWCA archaeologists Omar Rice and Alec McKinney conducted a cultural resources survey for the project. The survey consisted of walking the project area using parallel transects spaced no more than 15 meters (m) apart. A Samsung computer tablet paired with a Geode GPS antenna was used to locate the project area and maintain transect accuracy. The ground surface was examined for the presence of prehistoric artifacts (e.g., flaked stone tools, tool-making debris, or stone milling tools), ecofacts (e.g., shell, fire-affected rock, or bone), historic-era artifacts (e.g., metal, glass, or ceramics), sediment discoloration that might indicate the presence of a cultural midden, depressions, and other features that might indicate the former presence of structures or buildings (e.g., post holes or foundations) or occupations (e.g., hearths or bedrock milling features).

5.3 FIELD RESULTS

Ground surface visibility was excellent throughout most of the project area, except for the northeastern portion, which was covered in a layer of woody detritus (Figure 12 and Figure 13). Extensive ground disturbance was noted throughout the project area as the result of agricultural, road grading, and construction activities, as well as from the natural erosion caused by the earthen channel (Figure 14 through Figure 17).

Figure 12. Project area overview, from Avenue 42 facing north.

Figure 13. Project area overview, from northeastern extent facing south.

Figure 14. Project area overview, along Avenue 42 facing east.

Figure 15. Project area overview, central portion facing southeast.

Figure 16. Project area overview, southern portion facing east.

Figure 17. Project area overview, freeway overpass facing west.

During the archaeological field survey, a total of nine prehistoric ceramic fragments (Artifacts 1 through 9) were recorded within push berms at six locations in the northern portion of the project area (CONFIDENTIAL Figure 18). The ceramic fragments consisted of three grayware body sherds (Artifacts 1, 2, and 4), three redware body sherds (Artifacts 5, 6, and 7), one redware rim sherd (Artifact 3), and two brownware body sherds (Artifacts 8 and 9) (Figure 19 through Figure 27). All nine artifacts are outside of the previously recorded boundary of P-33-0007425/CA-RIV-005799. Of the nine artifacts, seven are outside of the established construction grading limits (Artifacts 1, 2, 3, 4, 6, 7 and 8), while the remaining two artifacts (Artifact 5 and Artifact 9) are within the grading limits. Artifact 5 is also within a proposed access road alignment.

Due to their likely association with P-33-0007425/CA-RIV-005799, the site boundary was updated to include the nine artifacts (see Appendix C). As a result of the site boundary update, the site overlaps the northwestern portion of the APE. While site P-33-0007425/CA-RIV-005799 has not been evaluated in its entirety and a recommendation of eligibility cannot be made for the site as a whole, the portion of P-33-0007425/CA-RIV-005799 located within the current project area is heavily disturbed with the artifacts displaced from their original context by agricultural and road grading activities. No evidence of site P-33-001768/CA-RIV-001768 was observed within the project area.

CONFIDENTIAL Figure 18. Results of the archaeological survey showing the updated boundary of P-33-0007425/CA-RIV-005799.

Figure 19. Artifact 1 - Grayware body sherd, detail.

Figure 20. Artifact 2 - Grayware body sherd, detail.

Figure 21. Artifact 3 - Redware rim sherd, detail.

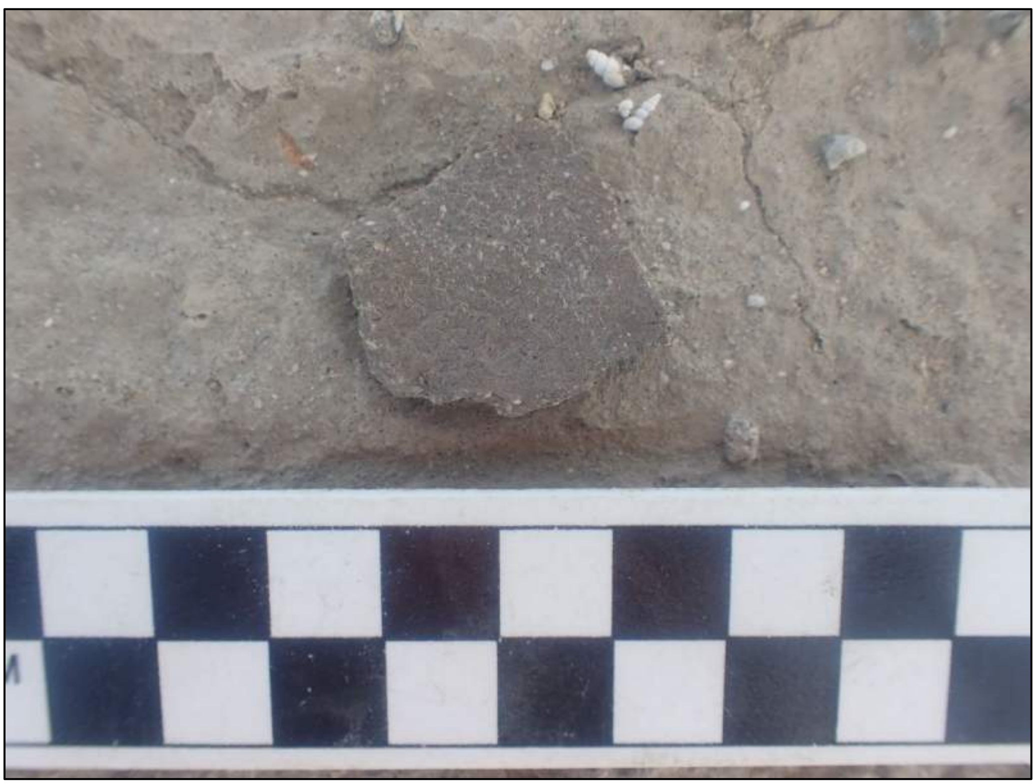

Figure 22. Artifact 4 - Greyware body sherd, detail.

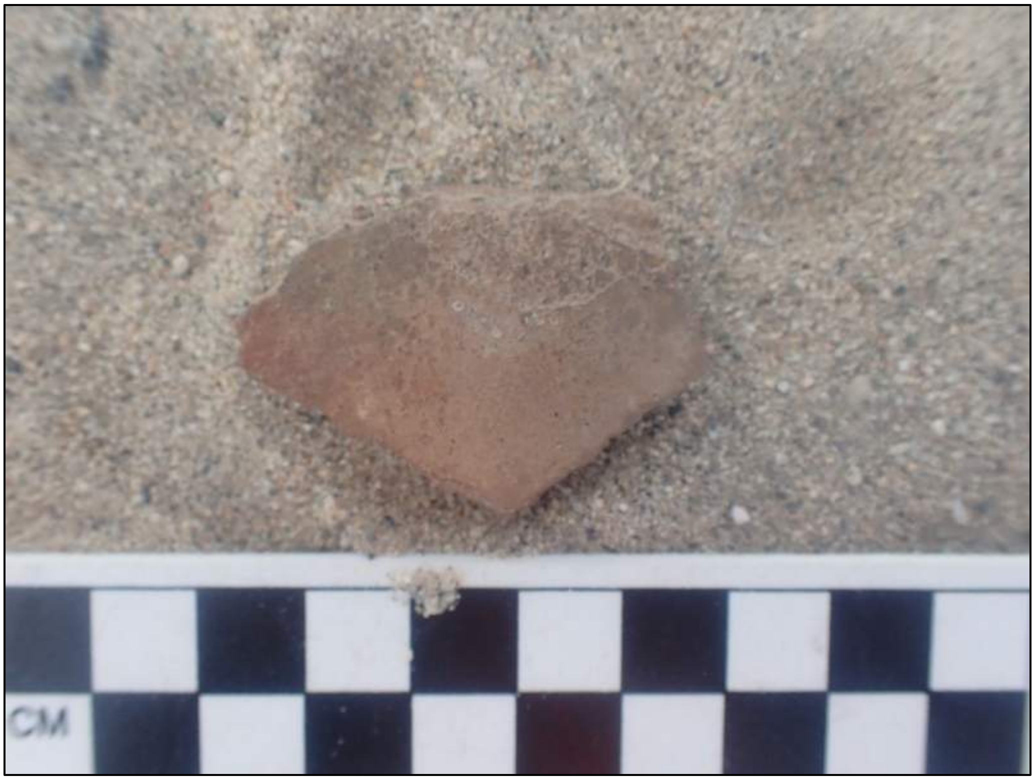

Figure 23. Artifact 5 - Redware body sherd, detail.

Figure 24. Artifact 6 - Redware body sherd, detail.

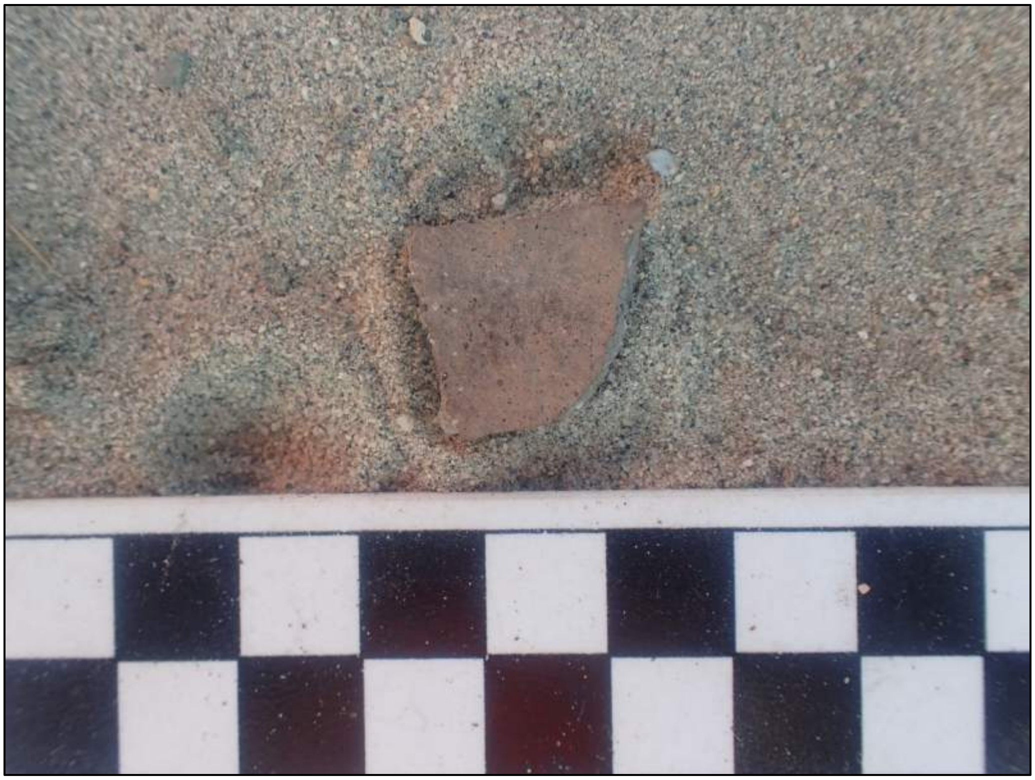

Figure 25. Artifact 7 - Redware body sherd, detail.

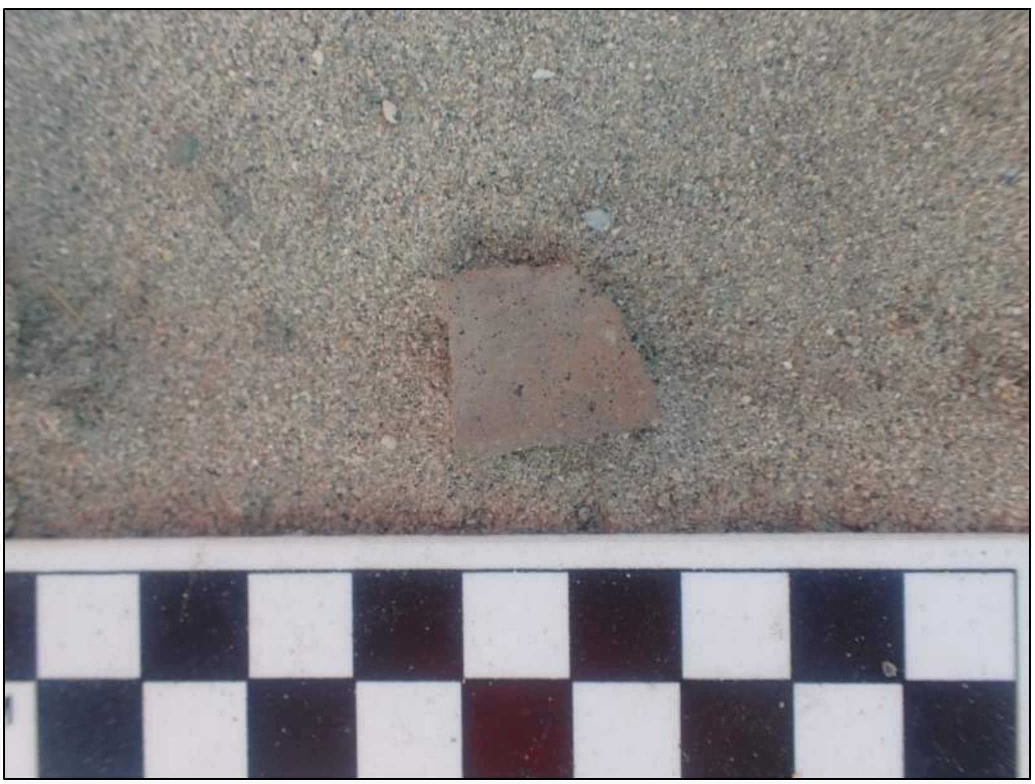

Figure 26. Artifact 8 - Brownware body sherd, detail.

Figure 27. Artifact 9 - Brownware body sherd, detail.

5.4 EVALUATION OF P-33-0007425/CA-RIV-005799

Site P-33-0007425/CA-RIV-005799 was described as a light scatter of ceramics, ground stone tools, shell, faunal bone, evidence of hearth areas, and eight structured depressions. It was noted that while the central portion of the site was in good condition, intrusive historic trash was observed at the north end of the site.

As detailed in Section 5.3 above, a total of nine prehistoric ceramic fragments (Artifacts 1 through 9) were recorded at six locations in the northern portion of the project area during the field survey. Of the nine artifacts, two artifacts (Artifact 5 and Artifact 9) are within the grading limits and Artifact 5 is also within a proposed access road alignment. While the prehistoric ceramic fragments were located east of the existing boundary of P-33-0007425/CA-RIV-005799, their description indicates they are likely associated with the site and the site boundary was updated to include the nine artifacts. While site P-33-0007425/CA-RIV-005799 has not been evaluated in its entirety and a recommendation of eligibility cannot be made for the site as a whole, the portion of P-33-0007425/CA-RIV-005799 located within the current project area is heavily disturbed with the artifacts displaced from their original context by agricultural and road grading activities.

All prehistoric ceramic fragments were recorded within the push berms along the unpaved unnamed road through the northern-most portion of the project area, and paved Madison Street. There were no indications of intact features such as hearths, dwellings, or other site cultural constituents associated with site P-33-0007425/CA-RIV-005799 within the project area. The following sections provide a research design and evaluation of the portion of the site P-33-0007425/CA-RIV-005799 within the project area. It should be stressed that this evaluation does not pertain to the entire site, the majority of which occurs outside the project area and will not be impacted by the project.

5.4.1 Research Design

The purpose of this research design is to provide a framework to assess whether a known prehistoric resource is likely to contain important information and thus meet the thresholds of significance (i.e., eligible for inclusion in the CRHR under Criteria A/1, B/2, C/3, and/or D/4 and exhibits integrity). Prehistoric research themes pertinent to the project include site formation processes, age and probable cultural affiliation, subsistence and settlement strategies, and trade/exchange patterns.

5.4.1.1 Prehistoric Research Domains

5.4.1.1.1 SITE FORMATION PROCESSES

To assess the research potential and significant of a site, three components of archaeological deposits are important; namely, horizontal extent, vertical depth, and integrity. Integrity of archaeological deposits is a key factor in determining CRHR eligibility, and a variety of cultural and natural post-depositional processes potentially affect the character and condition of an archaeological site. The integrity of a site can be seriously affected by natural (e.g., burrowing rodents, erosion) or cultural (e.g., historic plowing, trenching or discing, or prehistoric site-maintenance activities) transformations, or both. During these processes artifacts potentially move horizontally or vertically out of their original context, and differences between stratigraphic layers may become blurred. Understanding these processes is important because much of the information learned from archaeological sites is not contained solely by the artifacts themselves, but by their context and relationship to other artifacts recovered from the site.

Rodents, insects, and other burrowing mammals (e.g., bears) are known bioturbative agents that move artifacts horizontally and vertically. Research demonstrates that each species of burrowing animal has a characteristic behavior pattern, relating to the animal’s size, burrow depth, rate of burrowing, density of the underlying sediments, and the material each brings into their burrows.

Site structure also varies among geomorphic settings and should be considered in any evaluation of site integrity. A bedrock milling site, for example, presents an entirely different set of research questions than shell midden deposits. Steep ridgelines are usually nondepositional environments that tend to be erosional areas where weathering and gravity force sediments or artifacts down slope. Hillsides represent colluvial environments. The steepness of the slope affects the degree of deposition: steep hill sides may be in a net loss situation where erosion and limited (if any) deposition occur; flatter areas near the toe of a slope often represent net gain situations where deposition and buried deposits may occur; and in midslope areas a sort of equilibrium is achieved between erosion and deposition. Drainages can act as collectors of sediment and thus buried deposits, or when active can transport archaeological assemblages to completely new settings or erode sites from their present site context.

Data Requirements

An assessment of the integrity of a site must be made to determine if it has been seriously affected by disturbance due to natural (e.g., burrowing rodents, erosion) or cultural (e.g., construction, discing) processes. Assessment would include determination of the horizontal and vertical extent of the site, evidence of any post-depositional processes, and the integrity of subsurface deposits. The identification of intact features such as middens, hearths or fire-affected rock (FAR) clusters, storage pits, earth ovens, burials or cremations, the remains of structures, or discrete activity areas (e.g., lithic reduction) would make important contributions to this research issue.

5.4.1.1.2 CHRONOLOGY AND DATING

Chronology is of basic importance to any archaeological research endeavor because it provides a context for addressing many other research issues. Thus, the precision and accuracy of dates are critical since they form the baseline for the other research topics. For example, chronological data could potentially contribute to our understanding of the nature and timing of population movements in the area, and to other sites in the local or broader region. Chronological determinations may also assist in refining regional or local cultural historical sequences.

Absolute dating techniques are preferable to relative dating of diagnostic artifacts, since absolute dating (e.g., radiocarbon) is an independent assessment of the age of the site. Obsidian hydration is an alternative means of dating that can provide relatively reliable results provided the source of the material is known and multiple samples are submitted in order to omit any outliers. Ideally, relative dating results from the site would support absolute dating results.

If there is no material appropriate for radiocarbon dating (e.g., charcoal, wood, burned floral remains, bone, shell, organic-rich soil) recovered at a site, a relative chronology may be established by linking temporally diagnostic artifact types (e.g., projectile points, shell beads, etc.) present at the site to the regional cultural resources chronology. This latter relative dating method would be much less precise, however. The presence of suitable materials for radiocarbon and relative dating is preferable; if present, the obtained ages could be used in conjunction with diagnostic time-marker artifacts to assess the overall age of a site.

Data Requirements

The presence of organic materials suitable for radiocarbon dating (e.g., charcoal, wood, burned floral remains, faunal bone, marine shell, organic-rich soil), temporally diagnostic artifacts (e.g., projectile points, shell beads), and obsidian artifacts for sourcing and hydration analysis would make important contributions to this research issue.

5.4.1.1.3 SUBSISTENCE AND SETTLEMENT STRATEGIES

The content of an archaeological site provides information regarding its cultural affiliations, temporal periods of use, its functionality, and other aspects of its occupation history. Generally, the range and variability of artifacts present in a site may permit reconstruction of various aspects of prehistoric culture, including, among other topics, ethnic affiliation, diet, and social structure, as well as the role of the site within the broader regional landscape pattern. Site function (e.g., habitation, temporary camp, task-specific procurement or processing site, etc.) is integral to evaluating the role of the site within a broader regional landscape pattern.

Beyond the depositional and cultural historical considerations, the recording and excavation of sites potentially provides valuable information regarding prehistoric behaviors. Here the focus is on elucidating aspects of the subsistence economy and settlement strategies on a seasonal basis. Such analyses provide a context to better understand the diet of the prehistoric inhabitants at a site, as well how they positioned themselves in relation to the biotic resource structure (plants, animals) on a seasonal basis. Understanding the season during which, for example, plant resources were ripe and available for processing can shed valuable information on settlement strategies. Such analyses provide clues to which resources were available, when the project area likely had the most food resources seasonally available, and can provide an estimate as to where sites might fall in the overall settlement pattern or seasonal round.

The project area may only take in part of a prehistoric population’s territory and the sites within the project area may only represent a portion of a much larger settlement system. Understanding settlement patterns would require chronological control to ascertain which sites were occupied during the same periods. In addition to preservation of faunal and botanical material (e.g., pollen, macrobotanical remains) that would help identify the local resource base, specialized studies of certain tool types provide important information useful for expanding on the subsistence strategies employed at a site. Ground stone, for example, can be analyzed for the presence and variety of starches, phytoliths, pollen, and protein residues. These analyses potentially indicate whether ground stone tools (e.g., mano, metate, mortar) were used to process plants (seeds, roots, tubers) or animals, and to provide insights about the past climate. Protein residue analysis conducted on chipped stone tools provides insights into the types of animals (usually identified to the family level, sometimes to the species level) a tool was used to process. In addition, the presence of local or non-local chipped stone artifacts may be evidence of intra-regional interaction (e.g., exchange/trade, long distance travel).

Data Requirements

The identification of features such as a midden, hearths or FAR clusters, storage pits, house floors, burials or cremations, the remains of structures, temporally diagnostic artifacts, non-local artifacts (obsidian, marine shell beads), faunal and fish bone, worked bone tools, or landscape-site associations would make important contributions to this dual research issue regarding site function and settlement pattern. Recovery of material from stratigraphically intact and temporally controlled contexts for laboratory analyses, such as artifact use-wear analysis, identification of macrobotanicals and pollen, or protein and blood residue analysis of stone tools or milling stones, would be required to address this research issue. Functional differences in recovered ground and chipped stone tools may provide additional evidence of diet since ground stone tools were generally used for grinding seeds and acorns and processing small mammals, whereas chipped stone tools (scrapers, choppers, projectile points, etc.) were used for plant and faunal procurement and processing.

5.4.1.1.4 TRADE AND EXCHANGE

For the hunter-gatherers who once lived in the vicinity of the project, trade was an important adaptive strategy that allowed acquisition of raw materials and goods not otherwise available in their home territory. Trade and exchange has been documented throughout California during the prehistoric and ethnohistoric periods, including between the coast and the desert region.

During the latter part of the Archaic period, for example, here is an increased presence of exotic trade goods, including shell beads/ornaments from the Pacific coast and the Gulf of California, obsidian from the Coso volcanic field, and wonderstone from Rainbow Rock. During the Late Prehistoric period, the trade/exchange in shell beads from the coast and Gulf of California and wonderstone from Rainbow Rock continues. Steatite from the coast and obsidian from the Obsidian Butte source at the southern end of today’s Salton Sea, previously covered by the waters of Holocene Lake Cahuilla, is introduced during this period. The extensive network of trail systems, with trailside shrines, ceramic pot-drops, and rock art, attests to the importance of trade, travel, and exchange networks during the Late Prehistoric period. During the Ethnohistoric period, the Cahuilla continued to trade with neighboring groups for a variety of items. Trade of plant and animal materials may have mitigated food shortages, although except for durable items like lithics, evidence is not readily preserved in the archaeological record.

The goal of an analysis of trade and exchange would be to understand the nature of resource procurement and distribution networks operating in the overall economic system of the region during the Prehistoric period.

Data Requirements

The presence of non-local cultural material, such as obsidian, steatite items, marine shell (shell beads and ornaments), and ceramics, would be required to address this research issue. Recovery of material for laboratory analyses (e.g., x-ray fluorescence sourcing of obsidian) would be beneficial, preferably from stratigraphically intact and temporally controlled contexts.

5.4.2 Results

5.4.2.1 Criteria A/1

The portion of site archaeological site P-33-0007425/CA-RIV-005799 within the project area does not have a strong association with events or patterns that have made a significant contribution to the broad patterns of national, state, or local history. While the site is possibly linked in a general way to the prehistoric-era themes discussed, the link is not strong, the site has been heavily affected by previous construction activity, and the site does not provide any insight into these themes. As such, the site is not able to convey a significant period or pattern of development. Therefore, the portion of the resource within the project area does not appear to be eligible under NRHP Criterion A or CRHR Criterion 1.

5.4.2.2 Criteria B/2

Research to date did not reveal the project area to have an association with the lives of significant persons in our past. No individuals associated with the property have been found to be historically significant in national, state, or local history. Therefore, the portion of P-33-0007425/CA-RIV-005799 within the project area does not appear to be eligible under NRHP Criterion B or CRHR Criterion 2.

5.4.2.3 Criteria C/3

The portion of site P-33-0007425/CA-RIV-005799 within the project area consists of an unstructured shell and artifact scatter in a disturbed context with no intact features. As a result, the site does not maintain any integrity and does not appear to be eligible under NRHP Criterion C or CRHR Criterion 3.

5.4.2.4 Criteria D/4

The portion of site P-33-0007425/CA-RIV-005799 has not yielded, nor does it appear to possess potential to yield, information important in history or prehistory. The majority of the site within the immediate vicinity of the project area occurs within disturbed, heavily impacted sediments in a secondary (i.e., displaced) context. Two of the artifacts are within the grading limits of the project area, but within the disturbed paved road berm. Lacking in archaeological meaningful associations, the portion of the site within the project area has little potential to provide data that would further an understanding of the history of the project area. Therefore, the portion of the site within the project area does not appear to be eligible under NRHP Criterion D or CRHR Criterion 4.

5.4.3 Evaluation Results

While site P-33-0007425/CA-RIV-005799 has not been evaluated in its entirety and a recommendation of eligibility cannot be made for the site as a whole, the portion of P-33-0007425/CA-RIV-005799 located within the current project area is heavily disturbed and likely displaced from its original context by agricultural activity and the construction of one dirt and one paved road. As such, it is recommended to be a non-contributing element to the site's eligibility for the NRHP and CRHR, were it to be formally evaluated for listing. Therefore, the portion of the site in the project area is not considered to be a historical resource or a unique archaeological resource for purposes of CEQA.

CHAPTER 6. BUILT ENVIRONMENT ASSESSMENT

6.1 FIELD METHODS

As part of the field survey, built environment features in the project area were inspected and documented. This included two previously recorded built environment resources identified in the project area—the Coachella Canal (P-33-005705/CA-RIV-012999), and the CVSC/WWRSC (P-33-017259/CA-RIV-010847)—and one previously unrecorded built environment resource (the Thousand Palms Channel), which was surveyed and recorded on California DPR 523 series forms (Appendix C). Digital photographs and field notes were collected to document the existing conditions and record any observable changes. As previously noted, the project boundaries were revised after the survey was completed; however, the current project footprint is smaller than the original footprint and is completely inside the original project boundaries.

6.2 FIELD RESULTS

6.2.1 Coachella Canal (P-33-005705/CA-RIV-012999)

An approximately 600-foot segment of the Coachella Canal is located in the project area. This segment is located at the northern end of the project area where the Coachella Canal crosses under the Thousand Palms Channel via a concrete siphon. The top width of the Coachella Canal segment in the project area spans from approximately 35 feet wide (Figure 28) to approximately 15 feet wide at the location of the siphon (Figure 29 and Figure 30). The sloped channel walls are lined with concrete, and a concrete wall is located at each edge of the Thousand Palms Channel where the siphon funnels the water underground (Figure 31).

Figure 28. Coachella Canal intersecting Thousand Palms Channel on the northeast side where water flows in; view facing southwest (Sun City is seen in the background on the right).

Figure 29. Coachella Canal intersecting Thousand Palms Channel on the southwest side where water flows out; view facing south.

Figure 30. Coachella Canal where its siphon intersects the Thousand Palms Channel.

Figure 31. Closeup of concrete wall at edge of Thousand Palms Channel where siphon travels underground, and security fence.

6.2.2 CVSC/WWRSC (P-33-017259/CA-RIV-010847)

An approximately 1,300-foot-long segment of the CVSC/WWRSC is located in the project area between I-10 to the north, and Indio Boulevard and 43rd Avenue to the south. Oriented in a southwest-northeast direction, the segment of the CVSC in the project area is characterized by an earthen channel with sloped sides that are primarily hard earth with some rock, a channel bottom incised by running water, a small amount of vegetation, and unpaved service roads (Figure 32).

Figure 32. CVSC/WWRSC at the southeast end of the project area; view facing northeast.

6.2.3 Thousand Palms Channel

The Thousand Palms Channel spans between one of the southern edges of the Sun City Shadow Hills community to the CVSC (Figure 33 through Figure 39). The alignment of the Thousand Palms Channel generally curves from northwest to southeast. As an unlined or "soft-bottom" channel, it has an earthen bed and banks, and berms and levees which do not have scour protection. The Thousand Palms Channel is relatively shallow. Its total length is approximately 5,700 feet, and its width varies from roughly 350 to 650 feet wide (CVWD 2021; Google Earth).

The northern end of the Thousand Palms Channel travels over the Coachella Canal's reinforced concrete siphon. A drop structure was created in the Thousand Palms Channel at this location to stabilize the channel and protect the siphon from scour and erosion. The drop structure is a USBR Type IX Baffled Block Structure. Figure 36 shows examples of the concrete baffle blocks.

The alignment of the wash/channel directs flows over Madison Street and Avenue 42 (Figure 37), then travels beneath I-10 (see Figure 38). In the area of the channel south of I-10, some rock was observed along the edge of the channel (see Figure 39). Open space and agricultural land flank the channel on the east and west sides.

Figure 33. North end of the Thousand Palms Channel, view facing northeast toward Sun City (the intersection of the Coachella Canal is seen at right).

Figure 34. North end of the Thousand Palms Channel, view facing northwest toward Sun City (the intersection of the Coachella Canal is seen at right).

Figure 35. North end of the Thousand Palms Channel, view facing east (Sun City property is seen at left).

Figure 36. Closeup of concrete blocks or baffles of the drop structure.

Figure 37. The Thousand Palms Channel alignment crosses Avenue 42, view facing east.

Figure 38. Thousand Palms Channel, view facing southeast toward I-10.

Figure 39. Thousand Palms Channel, area south of I-10, view facing southeast.

6.3 EVALUATION

6.3.1 Thousand Palms Channel

6.3.1.1 Criteria A/1

The Thousand Palms Channel does not appear to be eligible for listing in the NRHP or CRHR under Criteria A/1. While it is associated with a larger regional flood control system supporting the area's development, the Thousand Palms Channel is a relatively small, secondary element to the larger system that, in and of itself, is not eligible. Originating from a natural landform—a wash—the Thousand Palms Channel is presently an approximately 1-mile-long unlined, earthen channel with minimal human-made elements that conveys storm/flood waters to the CVSC/WWRSC. The CVWD's stormwater facilities include 16 stormwater protection channels, and the Thousand Palms Channel is one short segment of many miles of system components. The subject channel does not individually play a significant role in the flood control system, nor is it critical to the overall system's function or operation. Lastly, research to date has not indicated the channel is directly associated with any events significant in our history. Therefore, the Thousand Palms Channel does not appear individually eligible for listing in the NRHP under Criterion A, or the CRHR under Criterion 1.

6.3.1.2 Criteria B/2

Research conducted to date has not indicated that the Thousand Palms Channel has direct associations with any persons important to local, state, or national history. Therefore, the channel does not appear eligible for listing in the NRHP under Criterion B or the CRHR under Criterion 2.

6.3.1.3 Criteria C/3

The Thousand Palms Channel does not appear to be eligible for the NRHP or CRHR under Criteria C/3. As previously discussed, the channel originates from a natural landform that was incorporated into the CVWD's flood control system. The approximately 1-mile-long unlined channel has an earthen bed and banks, and minimal human-made features such as a concrete drop structure, baffles, and riprap. Available data indicates the improvements to channelize the segment of the Thousand Palms Wash were constructed by the Bureau of Reclamation ca. 1946, and modifications were completed in 1985 by CVWD. The channel does not exhibit distinctive characteristics of a type, period, or method of construction, nor does it represent a significant and distinguishable entity whose components lack individual distinction. Research to date does not indicate the channel's human-made features are the work of a notable engineer, designer or architect. Therefore, the Thousand Palms Channel is recommended not eligible under NRHP Criterion C and CRHR Criterion 3.

6.3.1.4 Criteria D/4

The potential to yield information important to prehistory or history is typically applied to archaeological resources; however, built environment resources can be historically significant if they are a source of important information on construction techniques, materials, engineering or similar historical themes. The Thousand Palms Channel is a natural landform, a wash, with minimal human-made features as described above. The type of channel and its construction materials and techniques are well documented in the historic record and would not be deemed significant under NRHP Criterion D or CRHR Criterion 4.

CHAPTER 7. SUMMARY AND RECOMMENDATIONS

One previously recorded archaeological resource (P-33-007425/CA-RIV-005799) was identified overlapping a small section of the northern portion of the project area disturbance footprint. Additionally, one previously recorded multicomponent resource (P-33-001768/CA-RIV-001768) was identified immediately adjacent to the west of the project area. Previous recordings of the resources noted extensive disturbance and the presence of historic-age and modern refuse. During the archaeological field survey, a total of nine prehistoric ceramic fragments were recorded at six locations in the northern portion of the project area. All nine artifacts are outside of the previously recorded boundary of P-33-0007425/CA-RIV-005799 but within the boundary of the proposed access road. No artifacts were observed within the portion of the previously recorded site boundary that overlaps the project area's direct footprint. There was no evidence of P-33-001768/CA-RIV-001768 within the project area.

Archaeological resource P-33-007425/CA-RIV-005799 was recorded and partially evaluated as part of the current study. While the resource has not been evaluated as a whole, the portion within the project area is recommended ineligible for listing in the NRHP and CRHR under all criteria. It does not qualify as a historical resource pursuant to CEQA.

Two previously recorded and one newly recorded built environment resources were identified in the project area. Of the two previously recorded resources, one was found eligible for the NRHP with SHPO concurrence: the Coachella Canal (P-33-005705/CA-RIV-012999), which was recommended eligible for the NRHP under Criteria A and C. However, the SHPO concurred only with its eligibility under Criterion A. The Coachella Canal's significance stems from its role in the development of the Imperial and Coachella Valleys through the establishment of a reliable water supply. The 123.5-mile-long canal laid the foundation for growth in the Coachella Valley's desert terrain allowing for the development of a highly productive agricultural economy. The canal's period of significance is 1938 to 1954 (Castells

2017; Schaefer and Ní Ghabhláin 2003; Smallwood 2015). Therefore, the Coachella Canal is a historical resource pursuant to CEQA. An assessment of impacts to the historical resource is provided below.

The CVSC/WWRSC (P-33-017259/CA-RIV-010847) was previously evaluated and recommended ineligible for the NRHP and CRHR; therefore, it is not a historical resource pursuant to CEQA.

The Thousand Palms Channel was recorded and evaluated as part of the current study, and is recommended ineligible for the NRHP and CRHR under all criteria. It does not qualify as a historical resource pursuant to CEQA.

7.1 IMPACTS ANALYSIS

7.1.1 CEQA Guidelines

According to Section 15064.5(b) of the CEQA Guidelines, a project involves a "substantial adverse change" in the significance of a historic resource when one or more of the following occurs:

- Substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired.
- The significance of a historical resource is materially impaired when a Project:

  a. Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the California Register of Historical Resources; or

  b. Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the PRC or its identification in a historical resources survey meeting the requirements of Section 5024.1(g) of the PRC, unless the public agency reviewing the effects of the Project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

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

Under CEQA, a proposed development must be evaluated to determine how it may impact the potential eligibility of a structure or a site for designation as a historic resource.

7.1.2 Analysis of Direct Impacts

While site P-33-0007425/CA-RIV-005799 has not been evaluated in its entirety and a recommendation of eligibility cannot be made for the site as a whole, the portion of P-33-0007425/CA-RIV-005799 located within the current project area is recommended not eligible for listing in the NRHP/CRHR and, therefore, not considered to be a historical resource or a unique archaeological resource under the NRHP or CRHR. As a result, the proposed project would not cause a significant direct adverse impact to a historical resource.

As discussed above, the Coachella Canal is a historical resource pursuant to CEQA. While previous documentation for the canal did not identify character-defining features of the resource, noted features of the canal segment in the current project area include its alignment, width and depth, concrete lining, and concrete siphon traveling beneath the Thousand Palms Channel.

As part of the proposed project, the existing Coachella Canal and siphon would be protected in place (see Figure 40), maintaining its current alignment, dimensions, concrete lining, and concrete siphon as is. The Thousand Palms Channel drop structure at this location would be extended farther downstream and to a lower level to provide scour protection associated with the Thousand Palms Channel design.

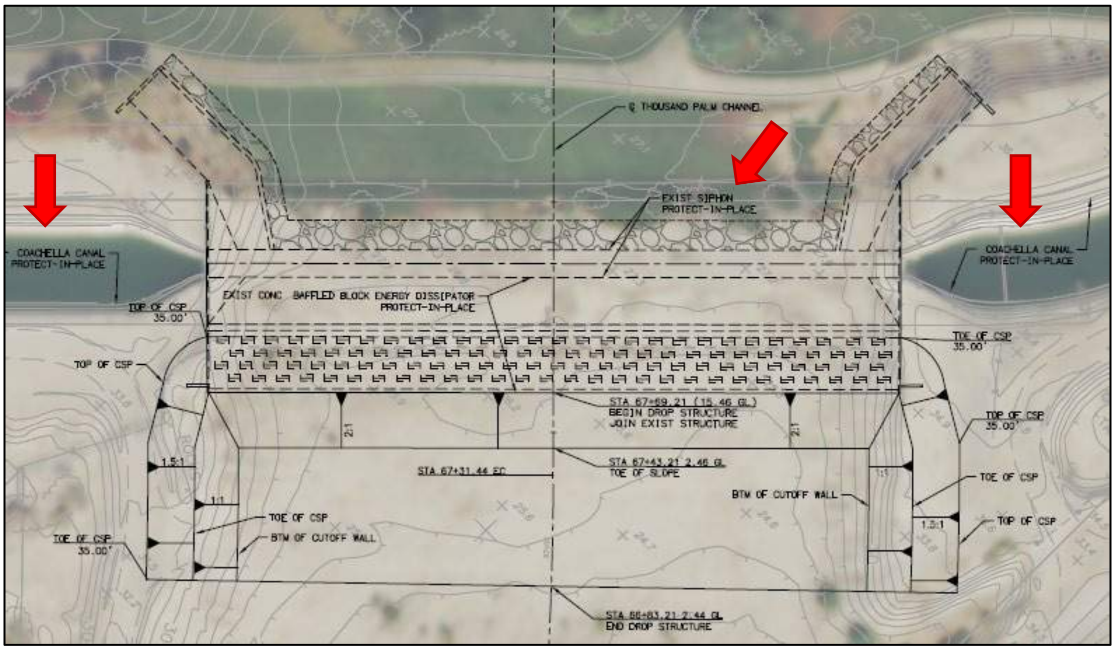

Figure 40. Proposed design of Thousand Palms Stormwater Channel Drop Structure over the Coachella Canal siphon which will be protected in place (red arrows). Source: Q3 Consulting.

The proposed project would protect in place the existing features of the Coachella Canal, would expand the existing Thousand Palms Channel drop structure over the canal, and would channelize the Thousand Palms Channel with concrete side slopes. While this would create a slight change in the setting of the Coachella Canal, the proposed improvements to the drop structure are similar in design and materials to what is existing. This would not result in material impairment of the historical resource. The Coachella Canal would maintain the physical characteristics that convey its historical significance, and would remain eligible for the NRHP under Criterion A. The proposed project would not cause a significant direct adverse impact to the historical resource.

7.1.3 Analysis of Indirect Impacts, Adjacent Historical Resources

No other built environment historical resources are located adjacent to the project area. Therefore, the proposed project would not result in an adverse indirect impact.

CHAPTER 8. CONCLUSION

The CHRIS records search identified one archaeological resource overlapping a small section of the northern portion of the project area (P-33-007425/CA-RIV-005799) and one a multicomponent resource immediately adjacent to the west of the central portion of the project area site (P-33-001768/CA-RIV-001768). Previous recordings of the resources noted extensive disturbance and the presence of historic-age and modern refuse. The SLF search completed by the NAHC did not identify any recorded Sacred Lands within, or within the vicinity of, the project area.

Due to heavy disturbance and displacement of artifacts, the portion of P-33-0007425/CA-RIV-005799 located within the current project area is recommended to be a non-contributing element to the site's eligibility for the NRHP and CRHR, were it to be formally evaluated for listing. Therefore, the portion of the site in the project area is not considered to be a historical resource or a unique archaeological resource for the purposes of CEQA.

Because the primary components of the site are located immediately west of the APE, however, SWCA recommends: 1) the preparation of a Cultural Resources Monitoring and Treatment Plan (CRMTP) in consultation with the agency and any consulting Native American tribal groups, 2) artifact collection within the APE, and 3) tribal and archaeological monitoring of all ground-disturbing construction work north of Avenue 42. The archaeological monitor should be overseen by a Qualified Archaeologist, defined as one who meets the Secretary of the Interior's Professional Qualification Standards in archeology.

The CRMTP will include the qualifications of key staff, monitoring protocols, provisions for evaluating and treating cultural materials, and reporting requirements. Prior to any construction activities, it is recommended that the nine artifacts within the project area be collected and treated in accordance with the CRMTP. The implementation of these recommendations will ensure that any adverse effects to historic properties are avoided.

Based on the preceding analysis, SWCA finds that the project will result in ***less-than-significant impacts to archaeological resources***.

If archaeological resources are exposed during construction, work in the immediate vicinity of the find must stop until a qualified archaeologist can evaluate the significance of the find. Construction activities may continue in other areas. If the discovery proves significant under CEQA (14 CCR 15064.5[f]; PRC 21082), additional work such as testing or data recovery may be warranted. While it is considered to be very unlikely, the discovery of human remains is a possibility during ground disturbances. Section 7050.5 of the State of California Health and Safety Code states that no further disturbance shall occur until the Riverside County Coroner has made a determination of origin and disposition pursuant to Section 5097.98 of the PRC. The Riverside County Coroner must be notified of the find immediately. If the human remains are determined to be prehistoric, the Coroner will notify the NAHC, which will determine and notify a most likely descendant (MLD). The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

The Thousand Palms Channel is not eligible for the NRHP or CRHR; thus, it is not a historical resource for the purposes of CEQA. As discussed above, the Coachella Canal is considered a historical resource for the purposes of CEQA. As the proposed project would protect in place the Coachella Canal and siphon, the project would not have a significant direct adverse impact on the historical resource. There are no other built environment historical resources adjacent to the project area that would be indirectly impacted. Therefore, the proposed project would result in ***less-than-significant impacts to built environment historical resources***.

CHAPTER 9. REFERENCES CITED

Adovasio, James M. (with Jake Page)
2002 *The First Americans*. Random House, New York, New York.

Antevs, Ernest
1955 Geologic-Climatic Dating in the West. *American Antiquity* 20:317–335.

Ballester, Daniel
2016 DPR forms for the Coachella Valley Stormwater Channel (P-33-017259/CA-RIV-70847). Recorded July 9, 2016. On file with the EIC.

Bancroft, Hubert Howe
1885 *History of California, Volume III: 1825-1840*. A. L. Bancroft, San Francisco, California.

Bean, Lowell J.
1978 Cahuilla. In *California*, edited by Robert F. Heizer, pp. 575–587. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Bean, Lowell J., and Harry W. Lawton
1993 Some Explanations for the Rise of Cultural Complexity in Native California with Comments on Proto-Agriculture. In *Before the Wilderness: Environmental Management by Native Californians*, edited by Thomas C. Blackburn and Kat Anderson, pp. 27–54. Ballena Press, Menlo Park, California.

Buckles, Joseph E., and Timothy Krantz
2005 *Reconstruction of Prehistoric Shorelines for Cultural Restraints using GIS.* Salton Sea Database Program, University of Redlands. Available at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/iid_sdcwa/pcl/exhibits/pcl_nas_08.pdf. Accessed April 2023. Accessed April 2023.

Calflora
2023 The Calflora Database: Information on California plants for education, research and conservation [web application]. Berkeley, California. Available at: http://www.calflora.org/. Accessed May 2023.

California Water Boards
2020 Water Quality Report Card, Legacy Compounds in the Coachella Valley Stormwater Channel. Available at: https://www.waterboards.ca.gov/about_us/performance_report_2021/plan_assess/docs/fy2021/legacy_compounds_cvsc_legal.pdf.

Camacho, Mario
2022 Email communication to Frank Hoffman, John McCarthy, Meghan Karadimos, and William Patterson re: Question for CVWD, Thousand Palms Channel project.

Castells, Justin (Applied EarthWorks, Inc.)
2017 DPR forms for the Coachella Canal, September 2017. On file with the EIC as P-33-005705 (Update).

City of Indio
2019 General Plan. Adopted September 18, 2019. Available at: https://www.indio.org/home/showpublisheddocument/3321/638053330127130000. Accessed April 2023.

City of Indio and Rincon Consultants, Inc.
2019 *Final Environmental Impact Report for the City of Indio General Plan Update, Chapter 4.5, Cultural Resources and Tribal Cultural Resources*. Available at: https://www.indio.org/home/showpublisheddocument/3681/638174340014770000. Accessed June 2022.

Cleland, Robert Glass
2005 *The Cattle on a Thousand Hills: Southern California, 1850-80.* 2nd ed. Huntington Library, San Marino, California.

Coachella Valley County Water District
1968 All American Canal System Tour Map. April 24, 1968. Available at: https://hdl.huntington.org/digital/collection/p15150coll4/id/3655. Accessed June 2022.

Coachella Valley Regional Water Management Group
2010 *Final Coachella Valley Integrated Regional Water Management Plan*. Prepared in collaboration with Planning Partners. December 2010, pgs. 2-19, 2-23.

Coachella Valley Resource Conservation District
2022 Coachella Valley. Available at: https://www.cvrcd.com/coachella-valley. Accessed June 2022.

Coachella Valley Water District
n.d. Stormwater Protection & Flood Control. Available at: http://www.cvwd.org/165/Stormwater-Protection-Flood-Control. Accessed May 2022.

1985 Thousand Palms Stormwater Channel Outlet Modifications, Portion of Section 15, T5S, R7E, S.B.M. November 4. On file with CVWD.

2018 *The Story of the Coachella Valley Water District*. Coachella, California. Available at: http://www.cvwd.org/DocumentCenter/View/3909/The-Story-of-the-Coachella-Valley-Water-District-PDF. Accessed June 2022.

2021 Request for Proposals for Thousand Palms Channel Improvement Project from Sun City Shadow Hills To The CVSC. November 2021.

2022 *Development Design Manual*, pp. 8-1 through 8-9. Available at: http://www.cvwd.org/DocumentCenter/View/4206/Development-Design-Manual-PDF?bidId=. Accessed May 2022.

Cornell Lab of Ornithology
2023 Bird Guide. Available at: https://www.allaboutbirds.org/guide. Accessed May 2023.

Dallas, S. F.
1955 The Hide and Tallow Trade in Alta California 1822–1848. Ph.D. dissertation, Indiana University, Bloomington.

Dibblee, Thomas W., Jr. and John A. Minch (editor)
2008 Geologic Map of the Palm Desert & Coachella 15 Minute Quadrangles, Riverside County, California. Santa Barbara Museum of Natural History, Santa Barbara, California.

Dillehay, Tom D.
1997 *Monte Verde, a Late Pleistocene Settlement in Chile: Paleoenvironment and Site Context.* Vol. 1. Smithsonian Institution Press, Washington, D.C.

Environmental Data Resources (EDR)

2022 The EDR Aerial Photo Decade Package for Thousand Palms Channel. May 20, 2022. On file with SWCA Environmental Consultants, Pasadena, California.

Erlandson, Jon M.

1991 Early Maritime Adaptations on the Northern Channel Islands. In *Hunter-Gatherers of Early Holocene Coastal California*, edited by J. M. Erlandson and R. Colten, pp. 101–112. Perspectives in California Archaeology, Vol. 1. Institute of Archaeology, University of California, Los Angeles.

1997 The Middle Holocene along the California Coast. In *Archaeology of the California Coast during the Middle Holocene*, edited by Jon M. Erlandson and Michael A. Glassow, pp. 1–10. Perspectives in California Archaeology, Vol. 4. Institute of Archaeology, University of California, Los Angeles.

Erlandson, Jon M., Torben C. Rick, Terry L. Jones, and Judith F. Porcasi

2007 One if by Land, Two if by Sea: Who Were the First Californians? In *California Prehistory: Colonization, Culture, and Complexity,* edited by Terry L. Jones and Kathryn A. Klar, pp. 53–62. Altamira Press, Lanham, Maryland.

Google Earth

Var. Aerial imagery depicting the project area and surrounding vicinity.

Gumprecht, Blake

2001 *The Los Angeles River: Its Life, Death, and Possible Rebirth*. Johns Hopkins University Press, Baltimore, Maryland.

Jablonski, Nina G. (editor)

2002 *The First Americans: The Pleistocene Colonization of the New World*. Memoirs of the California Academy of Sciences No. 27, San Francisco.

Johnson, J. R., T. W. Stafford, Jr., H. O. Ajie, and D. P. Morris

2002 Arlington Springs Revisited. In *Proceedings of the Fifth California Islands Symposium*, edited by D. R. Brown, K. C. Mitchell, and H. W. Chaney, pp. 541–545. Santa Barbara Museum of Natural History, Santa Barbara, California.

Kroeber, Alfred L.

1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Dover Publications, Inc. New York. Originally published 1925, Smithsonian Printing Office, Washington, D.C.

Laylander, Don

1995 The Chronology of Lake Cahuilla's Final Stand. *Proceedings of the Society for California Archaeology* 8:69–78.

Love, Bruce, and Mariam Dahdul

2002 Desert Chronologies and the Archaic Period in the Coachella Valley. *Pacific Coast Archaeological Society Quarterly* 38:65–86.

Major, J.

1988 California Climate in Relation to Vegetation. In *Terrestrial Vegetation of California*, edited by M. Barbour and J. Major, pp. 11–74. Special Publication No. 9. California Native Plant Society, Sacramento.

Moratto, M. J.
1984 *California Archaeology*. Academic Press, New York, New York.

Nadeau, Remi
1997 *The Water Seekers.* 4th ed. Crest Publishers, Santa Barbara, California.

National Park Service
1995 *How to Apply the National Register Criteria for Evaluation*. National Register Bulletin 15. U.S. Department of the Interior, National Park Service, Cultural Resources.

Ní Ghabhláin, Sinead, and Sarah Stringer-Bowsher
2007-2009 DPR forms for Coachella Canal and distribution system from Siphon 32 to Lake Cahuilla. Recorded June 11-12, 2007; DPR forms prepared August 17, 2009. On file with the EIC as P-33-5705 Update.

Rogers, Malcom J.
1945 An Outline of Yuman Prehistory. *Southwestern Journal of Anthropology* 1(2):167–198.

Rondeau, Michael F., Jim Cassidy, and Terry L. Jones
2007 Colonization Technologies: Fluted Projectile Points and the San Clemente Island Woodworking/Microblade Complex. In Ca*lifornia Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 63–70. AltaMira Press, New York, New York.

Sawyer, J. O., and T. Keeler-Wolf
1995 *A Manual of California Vegetation*. California Native Plant Society, Sacramento.

Schaefer, Jerry
1994 The Challenge of Archaeological Research in the Colorado Desert: Recent Approaches and Discoveries. *Journal of California and Great Basin Anthropology* 16(1):60–80.

Schaefer, Jerry, and Don Laylander
2007 The Colorado Desert: Ancient Adaptations to Wetlands and Wastelands. In *California Prehistory: Colonization, Culture, and Complexity,* edited by Terry L. Jones and Kathryn A. Klar, pp. 247–257. AltaMira Press, New York.

Schaefer, Jerry, and Sinead Ní Ghabhláin
2003 *A History and Evaluation of the Coachella Canal, Riverside and Imperial Counties, California*. Prepared by ASM Affiliates, Inc. for CVWD.

Shvidchenko, Andrey, Joseph Howard, Rene Vermeeren, and Cuong Ly
2006 Simulation of Flood Flow and Sediment Transport on Alluvial Fans of Coachella Valley, California. Proceedings of the Eighth Federal Interagency Sedimentation Conference (8th FISC), April 2-6, 2006, Reno, Nevada. Available at: https://pubs.usgs.gov/misc/FISC_1947-2006/pdf/1st-7thFISCs-CD/8thFISC/Session%202A-4_Shvidchenko.pdf. Accessed June 2022.

Smallwood, Josh
2015 DPR forms for Irrigation lateral 99.8-0.51. Recorded August 5, 2015. One file with the EIC as P-33-005705.

SoilWeb
2023 Online Soil Survey Browser. Available at: https://casoilresource.lawr.ucdavis.edu/gmap/. Accessed May 2023.

State Lands Commission

n.d. Grants of Land in California Made by Spanish or Mexican Authorities. Available at: https://www.slc.ca.gov/wp-content/uploads/2018/11/1982-GrantsSpanishMexican.pdf. Accessed June 2022.

Sutton, Mark Q., Mark E. Basgall, Jill K. Gardner, and Mark W. Allen

2007 Advances in Understanding Mojave Desert Prehistory. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 229–245. AltaMira Press, New York, New York.

Swedlund, A., and D. Anderson

1999 Gordon Creek Woman Meets Kennewick Man: New Interpretations and Protocols Regarding the Peopling of the Americas. *American Antiquity* 64:569–576.

Torres-Martinez Desert Cahuilla Indians

n.d. The History of the Torres Martinez Reservation. Available at: http://torresmartinez.org/about/. Accessed July 2022.

U.C. Santa Barbara Library

1939 Aerial photograph. Flight C-5561, Frame 7. Available at: https://mil.library.ucsb.edu/ap_indexes/FrameFinder/. Accessed 2022.

U.S. Bureau of Reclamation (Reclamation)

n.d. "BCP – Coachella Canal Rehabilitation and Betterment." Available at: https://www.usbr.gov/projects/index.php?id=503#:~:text=The%20distribution%20system%20was%20transferred,was%20made%20in%20July%201954. Accessed June 2022.

1946a Coachella Canal – STA. 6014 + 24, Siphon, General Plan – Topography – Road Crossing. February 7, 1946. On file with U.S. Bureau of Reclamation.

1946b Coachella Canal – STA. 6014 + 24, Siphon, Plan and Sections. February 4, 1946. On file with U.S. Bureau of Reclamation.

U.S. Geological Survey (USGS)

1963 Indio, CA. 7.5-minute topographic quadrangle. Available at: https://ngmdb.usgs.gov/topoview/viewer/#4/40.00/-100.00. Accessed May 2022.

1968 La Quinta, CA. 7.5-minute topographic quadrangle. Available at: https://ngmdb.usgs.gov/topoview/viewer/#4/40.00/-100.00. Accessed May 2022.

Warren, Claude N.

1984 The Desert Region. In *California Archaeology*, edited by Michael J. Moratto, with contributions by David A. Fredrickson, Christopher Raven, and Claude N. Warren, pp. 339–430. Academic Press, New York, New York.

Waters, Michael R.

1983 Late Holocene Lacustrine Chronology and Archaeology of Ancient Lake Cahuilla, California. *Quaternary Research* 19:373–387.

Waugh, John C.

2003 *On the Brink of Civil War: The Compromise of 1850 and How It Changed the Course of American History*. Scholarly Resources Inc., Wilmington, Delaware.

APPENDIX A

CHRIS Records Search Results

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APPENDIX B

Native American Heritage Commission Sacred Lands File Search Results

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APPENDIX C

California Department of Parks and Recreation 523-Series Forms

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Appendix D:
Geotechnical Investigation

GEOCON
WEST, INC.

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

GEOTECHNICAL INVESTIGATION

THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

PREPARED FOR

Q3 CONSULTING
FOOTHILL RANCH, CALIFORNIA

PROJECT NO. T2581-22-05
JUNE 7, 2022

Project No. T2581-22-05
June 7, 2022

Q3 Consulting
27042 Towne Centre Drive, Suite 110
Foothill Ranch, California 92610

Attention: Mr. John McCarthy

Subject: GEOTECHNICAL INVESTIGATION
THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

Dear Mr. McCarthy:

In accordance with your authorization of our Proposal IE-2900, dated December 9, 2021, we have performed a geotechnical investigation for the proposed Thousand Palms Channel improvements that are part of the greater North Indio Regional Flood Control Channel system. The accompanying report presents the findings of our study and our preliminary conclusions and recommendations pertaining to the geotechnical aspects of the existing conditions.

If you have any questions regarding this report, or if we may be of further service, please contact the undersigned.

Very truly yours,

GEOCON WEST, INC.

Lisa A. Battiato
CEG 2316

Andrew Shoashekan
PE 93940

Joseph J. Vettel
GE 2401

LAB:ATS:JJV:hd

Distribution: Addressee (via email)

TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of a geotechnical investigation for the proposed Thousand Palms Channel improvements. The Thousand Palms Channel is part of the greater North Indio Regional Flood Control Channel system, located in the City of Indio, California (see *Vicinity Map*, Figure 1). The purpose of the investigation was to evaluate subsurface soil and geologic conditions underlying the channel and expected locations of proposed structures, and to provide conclusions and recommendations to aid in project design.

The scope of this investigation included a site reconnaissance, a field exploration program, laboratory testing, engineering analyses, and the preparation of this report. A previous site exploration was performed on October 5, 2020 and included drilling four small-diameter borings, and we recently drilled 11 additional borings on March 22 and 23, 2022. The borings were drilled utilizing a limited access track-mounted CME-75 hollow-stem auger drilling rig and were advanced to depths between approximately 31½ and 51 feet below the existing ground surface. The approximate locations of the borings are shown on the *Geologic Map*, Figure 2. A detailed discussion of the field investigations, including logs of borings, is presented in *Appendix A*.

Laboratory tests were performed on selected soil samples obtained during the investigation to evaluate pertinent physical and chemical soil properties. *Appendix B* presents the results of our laboratory testing program.

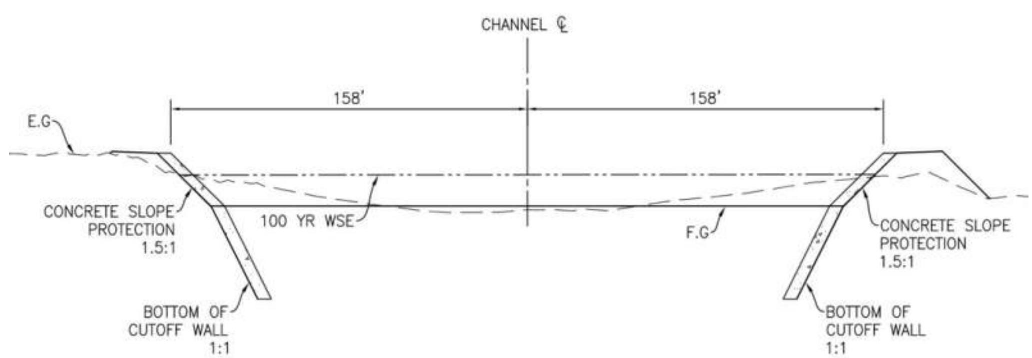
The recommendations presented herein are based on analyses of the data obtained during the geotechnical investigation and our experience with similar soil and geologic conditions. References reviewed to prepare this report are provided in the *List of References* section. If project details vary significantly from those described herein, Geocon should be contacted to determine the necessity for review and possible revision of this report.

2. PROJECT DESCRIPTION

The existing channel alignment begins on the west side of Madison Street at Sun City Shadow Hills senior living community (approximately 1,500 feet north of the intersection of Madison Street and Avenue 42), crosses and aligns parallel to the east side of Madison Street, where it then crosses Avenue 42 and begins curving to the southeast as it approaches Interstate 10 (I-10). The existing channel then crosses under the westbound and eastbound I-10 freeway bridges, and ties into the existing Coachella Valley Stormwater Channel (approximately 3,000 feet west of the intersection of Monroe Street and 43rd Avenue). The coordinates near the midpoint of the channel improvements are 33.7419 (latitude) and -116.2508 (longitude). The general alignment of the channel is depicted on the *Geologic Map*, Figure 2.

Based on project information provided by Q_3, major planned improvements (discussed in order from north to south) that are currently in design include the following:

- At the northern Sun City Shadow Hills senior living community, a 5-foot reinforced concrete drop structure is proposed that will tie into the existing channel at the Coachella Canal Siphon, and the existing concrete grade control structure will be extended for the new, lower profile channel.
- At Madison Avenue a concrete Arizona type crossing will be constructed.
- At Avenue 42, a 14-foot wide by 7-foot-high double culvert will be constructed resulting in the roadway being 2 feet above the channel bottom on the north side and 10 feet above the channel bottom on the south side. The channel improvements will be tied into the roadway improvements.
- Between I-10 and Indio Boulevard, a 20-foot drop structure will be constructed within the channel before the channel joins the Coachella Valley Storm Channel.
- Earthen channel levees are proposed upstream of Avenue 42, along the eastern channel boundary.
- Along the channel alignment, inside channel slopes are proposed to be concrete lined and constructed at slope ratios of 1.5:1 (horizontal to vertical) above the channel bottom, and at 1:1 (horizontal to vertical) below the channel bottom as a cut-off wall. Channel slopes above the cut-off wall are expected to be up to approximately 36 feet in height. The channel bottom will remain an earthen bottom. A depiction of a typical channel cross-section is shown below.



Typical Channel Cross-Section

Cuts and fills to achieve the new channel bottom elevations are expected to be up to approximately 35 and 5 feet, respectively. The approximate depths provided are exclusive of remedial grading.

Google Earth Pro (Google, 2022) and Historic Aerials (NETROnline, 2022) images indicate improvements to the channel area from 1953 to 1972 have included grading along various sections of the channel (what appears to be generally the channel boundaries), the construction of the westbound and eastbound I-10 bridge crossings, and the construction of the Avenue 42 crossing. The channel appears to have experienced heavy vegetative growth consisting of trees and shrubs along the eastern boundary beginning sometime prior to 1953, which have since been cleared between 2019 and 2021. The removal of vegetation appears to have left a high degree of organic debris in the undocumented fill along the eastern boundary. There are no indications of other channel improvements since the clearing of vegetation, as depicted by the latest available aerial photograph of the site taken in 2021.

The Thousand Palms Channel transmits water generally from the northwest to the southeast. Existing elevations along the planned improvement area at the northernmost end range between 22 and 24 feet above mean sea level (MSL), and elevations on the southernmost end range between 0 and 6 feet above MSL. Existing elevations range from 0 to 10 feet above MSL at the location where the channel ties into the Coachella Valley Stormwater Channel.

Although structural plans and loading information have not yet been provided for our review, we expect the concrete cut-off walls supporting channel liners and the channel drop structures will be supported on conventional shallow foundations.

3. GEOLOGIC SETTING

The site is approximately 19 miles north of the Salton Sea, within the Coachella Valley, a pull apart basin formed by extensional faulting and step-overs along the San Andreas fault zone. More than 3,000 feet of sediment have accumulated within the Coachella Valley in the last 0.5 million years since the extension began (Brothers, Et. Al, 2009). Quaternary age alluvial valley deposits underlie the site. The sediments consist of clays, silts, and sands which are derived from the Santa Rosa Mountains to the west and the Little San Bernardino Mountains to the northeast. The Coachella Valley is considered to be part of the Colorado Desert geomorphic province which is bounded on the west by the Santa Rosa Mountains and the Peninsular Ranges province, and the north by the Transverse Ranges. The Colorado Desert extends beyond California to the east and south. The San Andreas fault is geologically mapped approximately 2 miles northeast of the site. Geothermal resources associated with the pull-apart basin are present near the southern area of the Salton Sea.

4. GEOLOGIC MATERIALS

Based on our field exploration and published geologic maps of the area, the subsurface conditions along the channel alignment generally consists of alluvial sediments within the bottom of the channel and undocumented artificial fill along the channel embankments. Geologic units are described below with geologic nomenclature following that of T. W. Dibblee (2008). Detailed stratigraphic profiles are provided in the boring logs in *Appendix A*.

4.1 Undocumented Artificial Fill (afu)

Undocumented artificial fill was encountered to depths of 6 to 20 feet along the existing channel embankments. The undocumented fill encountered consists of loose to medium dense, dry, brownish gray to olive brown, silty sand to poorly graded sand, and silt with pin-hole voids. We expect portions of the fill will be removed to achieve proposed grades. Due to its low moisture content and loose nature, we expect the fill has a high potential to collapse upon wetting.

4.2 Alluvium (Qa)

Quaternary-age alluvium was encountered within the channel bottom and below the undocumented artificial fill within the existing channel embankments to the maximum depth explored of approximately 51 feet. The alluvium generally consists of poorly-graded sand with silt, silty sand, sandy silt, and sandy silt with clay, with a lesser extent of well-graded and poorly-graded sand, and sandy to silty clay. The frequency and thickness of the fine-grained units increases to the southeast. The alluvium was generally observed to be very loose to very dense, dry to moist, and varying in shades of grays, olives, yellows, whites, and browns. Pin-hole voids were encountered to depths of 35 feet. Based on the results of laboratory testing, the in-situ moisture content of several portions of the alluvium encountered is significantly lower than the optimum moisture content. The results of laboratory consolidation tests indicate the alluvium tested has a high potential to collapse upon wetting.

5. GROUNDWATER

Groundwater was not encountered during our field investigation to the maximum depth explored of approximately 51 feet beneath the existing ground surface. Based on the California Department of Water Resources, *Water Data Library (WDL) Station Map*, historic shallow groundwater depths can range between approximately 74 feet and 125 feet below the existing ground surface in wells located within approximately 2 miles of the channel.

Water will likely be present within the channel during and following times of significant precipitation. Fluctuations in groundwater level may occur due to infiltration of water during and after precipitation events or due to irrigation, variations in ground surface topography, subsurface geologic conditions and structure, rainfall, irrigation, and other factors.

6. SCOUR EVALUATION

The Thousand Palms Channel experiences sediment transport (general scour) relative to the volume and velocity of water present in the channel. Where structural improvements or constrictions are proposed, local scour can occur in foundation areas. Foundations should be properly protected against potential scour or extended below the zone affected by scour. The project hydraulic/hydrologic report prepared by the project Civil Engineer should be referenced for a detailed evaluation of scour, when available.

We performed grain size distribution analyses on samples obtained at various depths to provide information for a future scour evaluation. The particle size at which 30, 50, and 90 percent is passing (D_{30}, D_{50}, D_{90}) is presented in Table 6 below. Geocon should be contacted for additional parameters if needed.

TABLE 6
SOIL GRAIN SIZE DISTRIBUTION TEST RESULTS

Sample ID (Boring Number & Sample Depth)	D_{90} (mm)	D_{50} (mm)	D_{30} (mm)
B-1 @ 2.5’	0.21	0.082	~ 0.06
B-1 @ 10’	0.30	0.0037	< 0.001
B-2 @ 2.5’	0.46	0.16	0.12
B-2 @ 5’	0.13	0.074	0.051
B-3 @ 2.5’	0.29	0.13	0.083
B-3 @ 5’	0.22	0.087	0.032
B-4 @ 2.5’	0.28	~ 0.07	~ 0.05
B-4 @ 10’	0.11	0.017	0.0068
B-5 @ 5’	0.34	< 0.08	< 0.08
B-9 @ 25’	0.18	< 0.08	< 0.08
B-9 @ 35’	0.30	0.10	< 0.08
B-13 @ 40’	0.18	< 0.08	< 0.08

7. GEOLOGIC HAZARDS

A detailed summary of our evaluation of the geologic hazards that may affect the site is presented below.

7.1 Surface Fault Rupture

The numerous faults in southern California include active, potentially active, and inactive faults. The criteria for these major groups are based on criteria developed by the California Geological Survey (formerly known as California Division of Mines and Geology (CDMG) for the Alquist-Priolo Earthquake Fault Zone Program (Hart, 1999). By definition, an active fault is one that has had surface displacement within Holocene time (about the last 11,000 years). A potentially active fault has demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years), but has had no known Holocene movement. Faults that have not moved in the last 1.6 million years are considered inactive.

There are no State of California or County of Riverside Fault Hazard Zones mapped within or projecting toward the site. The San Andreas fault zone is located in the Indio Hills, approximately 2 miles northeast of the site. Based on these considerations, the risk of surface ground rupture occurring at the subject site is relatively low. The site is located in the seismically active southern California region and could be subjected to moderate to strong ground shaking in the event of an earthquake on one of the many active southern California faults.

7.2 Liquefaction Potential and Seismic Settlement

Liquefaction is a phenomenon in which loose, saturated, relatively cohesionless soil deposits lose shear strength during strong ground motions. Primary factors controlling liquefaction include intensity and duration of ground motion, gradation characteristics of the subsurface soils, in-situ stress conditions, and the depth to groundwater. Additionally, seismically induced “dry-sand” settlement may occur whether the potential for liquefaction exists or not.

The current standard of practice as outlined in the *Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California* (SCEC, 1999) requires a liquefaction analysis to a depth of 50 feet below the lowest portion of the proposed structure. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be enough to induce liquefaction.

According to the *Map My County* GIS system (RCIT), the channel is located within an area mapped as having a “low” to “moderate” potential for liquefaction.

Due to the lack of a permanent shallow groundwater table, it is our opinion that the potential for liquefaction at the site is negligible and is not a design consideration for the project. However, due to the dry and loose nature of the underlying fills and alluvium, and the site's proximity to the San Andreas Fault zone, we expect the potential for seismically induced "dry-sand" settlement at the site is high.

7.3 Subsidence

According to the Riverside County Information Technology public web data (2020) and the USGS (2013), the site is located within a region where subsidence is known to be occurring. The USGS began monitoring subsidence within Coachella Valley in the 1990's (USGS, 2013). They identified three areas of significant subsidence located in neighboring cities near the Santa Rosa Mountains; Palm Desert, Indian Wells, and La Quinta. The Coachella Valley Water District (CVWD) has embarked on a groundwater replenishment program which has slowed the rate of subsidence in the region. The settlement due to subsidence is expected to be on a regional scale at the subject site and occurs over a relatively large geographic area. Subsidence is not expected to cause differential settlement across the site; therefore, subsidence would not be a design consideration.

7.3 Expansive Soil

Based on laboratory testing of select soil samples collected during our field exploration, site soils along the channel have the potential to be expansive (Expansion Index [EI] of 21 to 50), as defined by the 2019 CBC Section 1803.5.3. Expansion Indexes ranged between 1 and 34 for the samples tested, which are classified as "very low" (EI between 0 and 20) to "low" (EI between 21 and 50), in accordance with ASTM D4829.

7.4 Hydrocompression

Hydrocompression is the tendency of unsaturated soil structure to collapse upon wetting resulting in the overall settlement of the affected soil and overlying foundations or improvements supported thereon. Potentially compressible soils underlying the site are typically removed and compacted during remedial site grading. However, if compressible soil is left in-place, a potential for settlement due to hydrocompression of the soil exists. The potential for hydrocompression can be mitigated by remedial grading or can accommodated with the use of stiffer foundation systems.

We performed three laboratory consolidation tests on samples of dry alluvium below the bottom of the existing channel within the upper 5 feet. The test results indicate the potential for hydrocomoression is up to approximately 3 percent when loaded to a pressure of 2,000 pounds per square foot (psf) and up to approximately 6.5 percent when loaded to a pressure of 4,000 psf. We expect the potential for hydrocompression extends to depths greater than 50 feet below grade due to the dry nature of the underlying alluvium. However, we do not anticipate the existing soils will be subjected to additional loads after construction of the channel. The existing underlying soils have also been subjected to wetting due to previous rain events, and we do not anticipate the wetting of the underlying the soils will increase subsequent to construction of the new channel. In addition, remedial grading will reduce the collapse/swell potential of near-surface soils. Therefore, we do not expect hydrocompression to be a design consideration for the project.

7.5 Slope Stability

We understand planned concrete-lined slopes with heights up to approximately 36 feet will be constructed along the sides of the channel alignment. Slope stability analyses for the proposed slopes with inclinations as steep as 1½:1 (horizontal:vertical) indicate a calculated factor of safety of at least 1.5 under static conditions for both deep-seated and surficial failure. Table 7.5.1 presents the slope stability analysis for the proposed sloping conditions.

TABLE 7.5.1
SLOPE STABILITY EVALUATION

Parameter	Value
Slope Height, H	36 Feet
Slope Inclination, I (Horizontal to Vertical)	1½:1
Total Soil Unit Weight, γ	125 pcf
Friction Angle, ϕ	32 Degrees
Cohesion, C	175 psf
Slope Factor $\gamma_{C\phi} = (\gamma H \tan\phi)/C$	16.1
N_{Cf} (From Chart)	37.5
Factor of Safety = $(N_{Cf}C)/(\gamma H)$	1.5

Table 7.5.2 presents the surficial slope stability analysis for the proposed sloping conditions.

TABLE 7.5.2
SURFICIAL SLOPE STABILITY EVALUATION

Parameter	Value
Slope Height, H	∞
Vertical Depth of Saturation, Z	3 Feet
Slope Inclination, I (Horizontal to Vertical)	1½:1 (26.6 Degrees)
Total Soil Unit Weight, γ	125 pcf
Water Unit Weight, γ_W	62.4 pcf
Friction Angle, ϕ	32 Degrees
Cohesion, C	175 psf
Factor of Safety = $(C+(\gamma+\gamma_W)Z\cos^2 I \tan\phi)/(\gamma Z \sin I \cos I)$	1.5

7.6 Dam Inundation / Seismic-Induced Flooding

Seismic-induced flooding is inundation caused by failure of dams or other water-retaining structures located upstream of the site due to a seismic event. There are no water retaining structures upstream of the site, therefore, seismic-induced flooding is not a design consideration for this project.

7.7 Tsunamis, Seiches and Flooding

The Coachella Valley is located more than 50 miles from the Pacific Ocean. The alignment is not downstream of any large bodies of water. Therefore, tsunamis and seiches are not a design consideration for this project.

According to the *Map My County* GIS system (RCIT), the Thousand Palms Channel is located in an area prone to flooding. The entire length of the channel and its embankments within the scope of the project are in a mapped flood zone.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 General

8.1.1 We opine that neither soil nor geologic conditions at the site would preclude the construction of channel improvements that are proposed. Additional geotechnical analyses may be required once improvement plans are near completion.

8.1.2 Potential geologic hazards at the site include moderate to strong seismic shaking, regional subsidence, and seismically-induced “dry-sand” settlement.

8.1.3 Based on our investigation and available geologic information, active, potentially active, or inactive faults are not present on or trending toward the site.

8.1.4 The undocumented fill and upper portions of alluvium are not considered suitable for the support of engineered fill or settlement-sensitive improvements. Remedial grading of the surficial soil will be required as discussed herein. The site soils are suitable for re-use as engineered fill provided the recommendations in the *Grading* section of this report are followed.

8.1.5 Although groundwater was not encountered during our subsurface investigation, it is possible that perched water may be encountered during grading, particularly during the wet-weather season. Additionally, we expect water to be present within the channel during times of significant precipitation.

8.1.6 Soil samples of underlying alluvium tested for hydrocompression exhibit a collapse potential ranging from 2 to 6½ percent when subjected to loads of 2,000 or 4,000 psf, and we expect soils to depths below 51 feet may be prone to hydrocompression. However, we do not anticipate the existing soils will be subjected to additional loads after construction of the channel. The existing underlying soils have also been subjected to wetting due to previous rain events, and we do not anticipate the wetting of the underlying the soils will increase subsequent to construction of the new channel. In addition, remedial grading will reduce the collapse/swell potential of near-surface soils. Therefore, we opine settlement due to wetting is not a design consideration for the project.

8.1.7 During grading operations, undocumented fill and/or alluvium will be exposed at grade across the slope face of the proposed channel and cut-off wall. Prior to construction of the channel and cut-off wall, the undocumented fill and loose or soft alluvium should be over-excavated to expose competent alluvium prior to the placement of engineered fill.

8.1.8 Site soils should be considered to have a “very low” to “low” expansion potential. If moderate to highly expansive soils are encountered at the site, they should be exported from the site or selectively graded and placed in the deeper fill areas to allow for the placement of less expansive material at the finish pad grade.

8.1.9 Our slope stability evaluation indicates proposed concrete lined channel slopes are expected to have adequate factors of safety for global static (1.5 or greater) under typical dry conditions. The engineer responsible for the project’s hydraulic analysis should evaluate the duration of the design high water conditions to determine whether soils behind the liner will become saturated and if the need for a slope stability analysis under a rapid drawdown condition is warranted. For the purposes of this report, we have assumed that the soils behind the channel liner will not become saturated and therefore, hydrostatic pressures on the liner and rapid drawdown analysis will not be necessary. If, however, the hydraulic engineer anticipates the soils behind the channel liner will become saturated, Geocon should be contacted to evaluate slope stability of the concrete channel liner under a rapid drawdown condition.

8.1.10 Depending on the acceptable temporary slope inclination, a significant portion of the slope will have to be excavated to construct the proposed concrete cut-off wall. Therefore, consideration should be given to utilizing sheet pile as an alternative to a concrete cut-off wall.

8.1.11 Based on our experience, distress in concrete channel liners may occur as a result of soil loss through joints in the channel liner. Consideration should be given to the use of filter fabric between the soil slope and the channel liner at joint locations. The coefficient of friction in these areas will be lower than where concrete and soil are in contact.

8.1.12 In general, the in-situ moisture content of the channel soils are significantly lower than the laboratory tested optimum moisture content, with in-situ moisture content within 10 feet of the ground surface ranging between 1.3 and 8.2 percent, which could be as low as 4 to 12 percent below optimum moisture content. Significant moisture conditioning of the soils should be expected before they can be used as engineered fill.

8.1.13 Some of the site soils consist of sands with little or no cohesion that may be subject to caving in un-shored excavations. Preliminary excavation recommendations are provided in the *Temporary Excavations* section of this report.

8.1.14 Geocon should review the civil and structural plans with respect to this geotechnical report when they become available.

8.2 Soil and Excavation Characteristics

8.2.1 The undocumented fill and alluvium can be excavated with moderate effort using conventional earth-moving equipment in proper functioning order. Caving should be expected in unshored vertical excavations, especially where loose or cohesionless granular soils are encountered. Some possible construction methods may include pre-wetting of the soils to increase the apparent cohesion and allow for steeper excavations; utilizing localized sheet piles to protect utility poles or other structures within influence of the excavation; performing slot cutting excavation method; performing excavation and construction in rapid succession to reduce the amount of time the excavation is open; providing shoring or bracing against the excavated soil rather than leaving it exposed; and performing flash coating (thin application of shotcrete to prevent the excavated surface from raveling).

8.2.2 It is the responsibility of the contractor to ensure that excavations and trenches are properly shored and maintained in accordance with applicable OSHA rules and regulations in order to maintain safety and maintain the stability of existing adjacent/nearby improvements.

8.2.3 Onsite excavations must be conducted in such a manner that potential surcharges from existing structures, construction equipment, and vehicle loads are resisted. The surcharge area may be defined by a 1:1 projection down and away from the bottom of an existing foundation or vehicle load. Penetrations below this 1:1 projection will require special excavation measures such as sloping or shoring. Preliminary excavation recommendations are provided in the *Temporary Excavations* section of this report.

8.2.4 Based on the material classifications and laboratory testing performed, site material within the channel generally possess a “very low” (expansion index (EI) of 20 or less) to “low” (EI of 21 to 50) expansion potential, and are considered “non-expansive” and “expansive” as defined by 2019 CBC Section 1803.5.3. Table 8.2.4 presents material classifications based on the EI.

TABLE 8.2.4
SOIL CLASSIFICATION BASED ON EXPANSION INDEX

<table>
<tr><th>Expansion Index (EI)</th><th>Expansion Classification</th><th>2019 CBC Expansion Classification</th></tr>
<tr><td>0 – 20</td><td>Very Low</td><td>Non-Expansive</td></tr>
<tr><td>21 – 50</td><td>Low</td><td rowspan="4">Expansive</td></tr>
<tr><td>51 – 90</td><td>Medium</td></tr>
<tr><td>91 – 130</td><td>High</td></tr>
<tr><td>Greater Than 130</td><td>Very High</td></tr>
</table>

8.3 Grading

8.3.1 Earthwork should be observed, and compacted fill tested by representatives of Geocon. The existing soils encountered during current and prior exploration are considered suitable for re-use as an engineered fill, provided oversize material (greater than 6 inches) trash, concrete, and deleterious debris are removed.

8.3.2 A preconstruction conference should be held at the site prior to the beginning of grading operations with a representative of CVWD, Contractor, Civil Engineer, and a representative of Geocon in attendance. Special soil handling requirements can be discussed at that time.

8.3.3 The recommendations in this report have been provided to assist the contractor in evaluating the appropriate means and methods needed to perform earthwork for the channel. Stability of the excavations and influence of the earthwork on the adjacent roadways and structures will depend on the contractor's procedures and the materials encountered during construction. Consideration should be given to performing the initial earthwork for the channel in an area relatively distant from existing improvements. This will allow the contractor to demonstrate that their means and methods in performing earthwork adequately address the existing geologic conditions.

8.3.4 Grading should commence with the removal of all existing vegetation and existing improvements from the area to be excavated. Once a clean excavation bottom has been established it must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon). Deleterious debris such as trash, wood, roots, and concrete should not be mixed with the fill soils. Existing underground improvements planned for removal should be excavated and the resulting depressions properly backfilled in accordance with the procedures described herein.

8.3.5 Undocumented fill and loose, soft, unsuitable alluvium should be removed until a competent alluvium bottom is exposed or stabilized as necessary as approved by Geocon's representative. Where channel improvements are planned, remedial removals are expected to range between 5 and 10 feet below existing grades, with lateral removals equal to the depth of the removal.

8.3.6 Excavation bottoms should be observed and approved in writing by a representative of Geocon, prior to the placement of engineered fill, stabilization materials, formwork, or construction materials.

8.3.7 Following removals, the bottom of excavations should be scarified at least 12 inches, moisture conditioned and compacted. Scarified excavation bottoms should be moisture conditioned at or slightly above optimum moisture content and compacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557. Due to the relatively dry in-situ soil conditions at the time of this investigation, significant moisture conditioning will likely be required.

8.3.8 Fill soils should be thoroughly mixed, moisture conditioned, placed in horizontal loose layers not exceeding 8 inches thick, and properly compacted. Fill soils should be moisture conditioned at or slightly above optimum moisture content. Fill should be compacted to a minimum 90 percent of the maximum dry density as determined by ASTM D1557.

8.3.9 Remedial removals may be required adjacent to existing improvements, where large excavations may not be possible without damage to the improvements. Slot cutting may be necessary to perform the required removals. Where these areas are identified, Geocon should be contacted to review these excavation constraints and provide additional recommendations as needed.

8.3.10 Where relatively loose, soft, or wet soils are encountered in the site excavations, subgrade stabilization will be required prior to placing fill or installing utilities. Where required, subgrade stabilization can be achieved by various method selected by the contractor such as overexcavating the loose or soft materials and replacing with compacted fill; placing a reinforcing geogrid at the bottom of the excavation; placing 3-inch diameter rock in the soft bottom and working the rock into soil until it is stabilized; placing gravel wrapped in filter fabric at the bottom of the excavation; or other method approved by the engineering geologist or geotechnical engineer based on the conditions encountered. Recommendations for stabilizing excavation bottoms should be based on an evaluation in the field by a representative of Geocon at the time of construction.

8.3.11 The contractor should take precautionary measures not to cause damage to existing structures such as roadways, utility lines, residences, power poles, etc. The contractor may need to use localized sheet piles, slot cutting methods, and/or shoring/bracing against the excavated soil to protect the existing structures. The contractor should provide monitoring of the existing structures on the adjoining properties before, during, and after earthwork activities. If significant movement is observed, the earthwork procedures should be re-evaluated to reduce the potential for movement.

8.3.12 Excavations performed on a slope face that is at an inclination of 5:1 (horizontal to vertical) or steeper should be benched in accordance with *Section 4.4* of the *Recommended Grading Specifications.*

8.3.13 Where new paving is to be constructed (if planned), the upper twelve inches of fill or backfill should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557.

8.4 Earthwork Grading Factors

8.4.1 Estimates of shrinkage factors are based on empirical judgments comparing the material in its existing or natural state as encountered in the exploratory excavations to a compacted state. Variations in natural soil density and in compacted fill density render shrinkage value estimates highly approximate. As an example, the contractor can compact the fill to a dry density of 90 percent or higher of the laboratory maximum dry density. Thus, the contractor has an approximate 10 percent range of control over the fill volume. Due to the variations in the actual shrinkage/bulking factors, a balance area should be provided to accommodate variations.

8.5 Seismic Design Criteria

8.5.1 Table 8.5.1 summarizes summarizes site-specific design criteria obtained from the 2019 California Building Code (CBC; Based on the 2018 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. We used the computer program *U.S. Seismic Design Maps*, provided by the Structural Engineers Association (SEA) to calculate the seismic design parameters. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2019 CBC and Table 20.3-1 of ASCE 7-16. The values presented herein are for the risk-targeted maximum considered earthquake (MCE_R). Sites designated as Site Class D, E and F may require additional analyses if requested by the project structural engineer and client.

TABLE 8.5.1
2019 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2019 CBC Reference
Site Class	D	Section 1613.2.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	2.177g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.882g	Figure 1613.2.1(2)
Site Coefficient, F_A	1.000	Table 1613.2.3(1)
Site Coefficient, F_V	1.7*	Table 1613.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	2.177g	Section 1613.2.3 (Eqn 16-36)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	1.5g*	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	1.451g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	1.0g*	Section 1613.2.4 (Eqn 16-39)

*See following paragraph.

8.5.2 Using the code-based values presented in this Table 8.5.1, in lieu of a performing a ground motion hazard analysis, requires the exceptions outlined in ASCE 7-16 Section 11.4.8 be followed by the project structural engineer. Per Section 11.4.8 of ASCE/SEI 7-16, a ground motion hazard analysis should be performed for projects for Site Class "E" sites with Ss greater than or equal to 1.0g and for Site Class "D" and "E" sites with S1 greater than 0.2g. Section 11.4.8 also provides exceptions which indicates that the ground motion hazard analysis may be waived provided the exceptions are followed.

8.5.3 Table 8.5.3 presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

TABLE 8.5.3
ASCE 7-16 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-16 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.906g	Figure 22-9
Site Coefficient, F_{PGA}	1.100	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.997g	Section 11.8.3 (Eqn 11.8-1)

8.5.4 Conformance to the criteria in Tables 8.5.1 and 8.5.3 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

8.5.5 The project structural engineer and architect should evaluate the appropriate Risk Category and Seismic Design Category for the planned structures. The values presented herein assume a Risk Category of IV and resulting in a Seismic Design Category D. Table 8.5.5 presents a summary of the risk categories in accordance with ASCE 7-16.

TABLE 8.5.5
ASCE 7-16 RISK CATEGORIES

Risk Category	Building Use	Examples
I	Low risk to Human Life at Failure	Barn, Storage Shelter
II	Nominal Risk to Human Life at Failure (Buildings Not Designated as I, III or IV)	Residential, Commercial and Industrial Buildings
III	Substantial Risk to Human Life at Failure	Theaters, Lecture Halls, Dining Halls, Schools, Prisons, Small Healthcare Facilities, Infrastructure Plants, Storage for Explosives/Toxins
IV	Essential Facilities	Hazardous Material Facilities, Hospitals, Fire and Rescue, Emergency Shelters, Police Stations, Power Stations, Aviation Control Facilities, National Defense, Water Storage

8.5.6 The Maximum Considered Earthquake Ground Motion (MCE) is the level of ground motion that has a 2 percent chance of exceedance in 50 years, with a statistical return period of 2,475 years. According to the 2019 California Building Code and ASCE 7-16, the MCE is to be utilized for the evaluation of liquefaction, lateral spreading, seismic settlements, and it is our understanding that the intent of the Building code is to maintain "Life Safety" during a MCE event. The Design Earthquake Ground Motion (DE) is the level of ground motion that has a 10 percent chance of exceedance in 50 years, with a statistical return period of 475 years.

8.5.7 Deaggregation of the MCE peak ground acceleration was performed using the USGS online Unified Hazard Tool, 2014 Conterminous U.S. Dynamic edition. The result of the deaggregation analysis indicates that the predominant earthquake contributing to the MCE peak ground acceleration is characterized as a 7.34 magnitude event occurring at a hypo central distance of 4.06 kilometers from the site.

8.5.8 Deaggregation was also performed for the Design Earthquake (DE) peak ground acceleration, and the result of the analysis indicates that the predominant earthquake contributing to the DE peak ground acceleration is characterized as a 7.34 magnitude occurring at a hypocentral distance of 4.11 kilometers from the site.

8.6 Cut-Off Wall/Channel Protection Bearing Capacity and Settlement

8.6.1 Based on the results of our investigation, it appears that site soils will provide adequate bearing capacity to support the proposed cut-off wall and channel slope protection. For design purposes, an allowable bearing capacity of 1,500 pounds per square foot may be utilized for design of the improvements.

8.6.2 If compressive loads from the channel liner will be imposed on a sheet pile, the portion of the sheet pile below scour elevation can be used to provide skin friction. An allowable skin friction of 300 pounds per square foot on both sides of the sheet pile can be used.

8.6.3 The pressure imposed by the proposed channel protection is expected to be about equal to the existing soils overburden pressure at the proposed channel invert depths. Therefore, static settlement is not a design consideration. Post-construction settlement in trench or channel access road areas should not affect proposed pavement improvements, provided the backfill is placed and compacted in accordance with the recommendations of this report.

8.7 Hydrostatic Uplift Pressure

8.7.1 For the purposes of this report, we have assumed that the soils behind the cut-off wall will become saturated but that soils behind the channel liner will not be saturated during and shortly after a rain event when water is present within the channel. Therefore, we have considered a high groundwater elevation of approximately the channel invert elevation.

8.7.2 Based on this consideration, we recommend that the portions of the proposed improvements (cut-off wall) which will be constructed below channel invert should be designed to resist hydrostatic pressure. In addition, the upward pressure of water on the cutoff wall footing should be taken as the full hydrostatic pressure on the base of the footing.

8.7.3 No hydrostatic pressures are assumed on the channel liner. If the hydraulic engineer determines that saturation will occur above the channel invert, Geocon should be contacted to provide additional recommendations.

8.8 Lateral Earth Pressures for Cutoff Walls and Channel Wall Lining

8.8.1 Cutoff walls and channel wall linings may be designed in accordance with the following recommendations. The recommendations presented below are based on the current proposed cutoff wall and channel wall lining design, and are applicable to a maximum height of 45 feet; from bottom of cutoff wall to the top of channel wall lining. In the event that walls/liners higher than 45 feet are planned, Geocon should be contacted for additional recommendations.

8.8.2 Cutoff walls at the toe of the channel linings should be designed utilizing the recommended parameters in the following table. The parameters presented in the following table include the active coefficient for level and 1½:1 (horizontal to vertical) backfill above the cutoff wall.

TABLE 8.8.2
RECOMMENDED LATERAL EARTH PRESSURE DESIGN PARAMETERS

Condition/Section	Retaining Wall Design Parameters			
	Soil Density (pcf)	**Active Equiv Fluid Pressure - Level (psf/ft)**	**Active Equiv. Fluid Pressure – 1½:1 (psf/ft)**	**Passive Equiv. Fluid Pressure (psf/ft)**
Hydrostatic Conditions	48	80*	112*	182*
No Groundwater	110	35	50	365

*Includes unit weight of water due to hydrostatic forces

8.8.3 Additional active pressure should be added for a surcharge condition due to vehicular traffic or adjacent structures and should be designed for each condition along the project alignment.

8.8.4 Lateral earth pressures are not assumed for the channel line since the planned 1½:1 slopes have adequate factors of safety for global slope stability.

8.8.5 A coefficient of friction between concrete and on-site soils can be taken as 0.35. If a geotextile fabric is used along joints to reduce loss of soil from behind the channel liner, a coefficient of friction between the geotextile and soil or concrete can be taken as 0.15 or as directed by the fabric manufacturer.

8.9 Dynamic (Seismic) Lateral Forces for Channel Slope Protection

8.9.1 Seismic lateral forces presented below should be incorporated into the design as necessary. The structural engineer should determine the seismic design category for the project in accordance with Section 1613.3.5 of the 2019 CBC or Section 11.6 of ASCE 7-10. If the project possesses a seismic design category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 1803.5.12 of the 2019 CBC. A seismic pressure of 25H psf is recommended. The seismic load is dependent on the retained height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall. We used the mean peak ground acceleration adjusted for Site Class effects (PGA_M) from ASCE 7-10 Section 11.8.3.

8.10 Exterior Concrete Flatwork

8.10.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations presented in Table 8.10.1. The recommended reinforcing steel would help reduce the potential for crack displacements.

TABLE 8.10.1
MINIMUM CONCRETE FLATWORK RECOMMENDATIONS

Expansion Index, EI	Minimum Concrete Reinforcement* Options	Minimum Thickness
EI $\leq$ 90	6x6-W2.9/W2.9 (6x6-6/6) welded wire mesh	4 Inches
	No. 3 Bars 18 inches on center, Both Directions	

*In excess of 8 feet square.

8.10.2 The subgrade soil should be properly moisturized and compacted prior to the placement of steel and concrete. The subgrade soil should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content in accordance with ASTM D 1557.

8.10.3 Even with the incorporation of the recommendations of this report, the exterior concrete flatwork has a potential to experience some uplift due to expansive soil beneath grade. The reinforcing steel should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork. Additionally, flatwork should be structurally connected to the curbs, where possible, to reduce the potential for offsets between the curbs and the flatwork.

8.10.4 Concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be verified prior to placing concrete. Base materials will not be required below concrete improvements.

8.10.5 The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

8.11 Temporary Excavations

8.11.1 Excavations of up to 36 feet below the existing ground surface may be required for the construction of channel improvements.

8.11.2 Excavations are expected to expose alluvial soils that are suitable for vertical excavations of up to 5 feet where loose soils or caving sands are not present, and where not surcharged by adjacent traffic or structures.

8.11.3 Vertical excavations greater than 5 feet will require sloping measures in order to provide a stable excavation. Where sufficient space is available, temporary unsurcharged embankments should be designed by the contractor's competent person in accordance with OSHA regulations.

8.11.4 Where there is insufficient space for sloped excavations, shoring or trench shields should be used to support excavations. Shoring may also be necessary where sloped excavation could remove vertical or lateral support of existing improvements, including existing utilities and adjacent/nearby structures. Recommendations for temporary shoring are provided in the following section.

8.11.5 Where sloped embankments are utilized, the top of the slope should be barricaded to prevent vehicles and storage loads at the top of the slope within a horizontal distance equal to the height of the slope. If the temporary construction embankments are to be maintained during the rainy season, berms are suggested along the tops of the slopes where necessary to prevent runoff water from entering the excavation and eroding the slope faces. The contractor's competent person should inspect the soils exposed in the cut slopes during excavation in accordance with OSHA regulations so that modifications of the slopes can be made if variations in the soil conditions occur.

8.12 Temporary Shoring

8.12.1 Where there is insufficient space to safely perform sloped excavations, shoring should be implemented. We expect that braced shoring, such as conventionally braced shields or cross-braced hydraulic shoring, will be utilized; however, the selection of the shoring system is the responsibility of the contractor. Shoring systems should be designed by a California licensed civil or structural engineer with experience in designing shoring systems.

8.12.2 We recommend that an equivalent fluid pressure shown in Table 8.12.2 below be utilized for design of temporary shoring. These pressures are based on the assumption that there are no hydrostatic pressures above the bottom of the excavation.

TABLE 8.12.2
PRELIMINARY RECOMMENDED SHORING PRESSURES

HEIGHT OF SHORED EXCAVATION (FEET)	EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot) (Active Pressure)	EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot) (Active Pressure with 2:1 Slope)	EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot) (AT-REST PRESSURE)
≤ 35	33	52	59

8.12.3 Active pressures can only be achieved when movement in the soil (earth wall) occurs. If movement in the soil is not acceptable, such as adjacent to an existing structure or where braced shoring will be utilized the at-rest pressure should be considered for design purposes.

8.12.4 Additional active pressure should be added for a surcharge condition due to sloping ground, construction equipment, vehicular traffic, or adjacent structures and should be designed for each condition as the project progresses.

8.12.5 In addition to the recommended earth pressure, shoring adjacent to roadways or driveway areas should be designed to resist a uniform lateral pressure of 100 psf, acting as a result of an assumed 300 psf surcharge behind the shoring due to normal street traffic. If the traffic is kept back at least 20 feet from the shoring, the traffic surcharge may be neglected. Higher surcharge loads may be required to account for construction equipment.

8.12.6 It is difficult to accurately predict the amount of deflection of a shored embankment, but some deflection will occur. We recommend that the deflection be minimized to prevent damage to existing structures and adjacent improvements. Where public right-of-ways are present or adjacent offsite structures do not surcharge the shoring excavation, the shoring deflection should be limited to less than 1 inch at the top of the shored embankment. Where offsite structures are within the shoring surcharge area it is recommended that the beam deflection be limited to less than ½ inch at the elevation of the adjacent offsite foundation, and no deflection at all if deflections will damage existing structures. The allowable deflection is dependent on many factors, such as the presence of structures and utilities near the top of the embankment and will be assessed and designed by the project shoring engineer.

8.13 Lateral Design

8.13.1 Table 8.13.1 should be used to help design the proposed structures and improvements to resist lateral loads for the design of footings or shear keys. The allowable passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

TABLE 8.13.1
SUMMARY OF LATERAL LOAD DESIGN RECOMMENDATIONS

Parameter	Value
Passive Pressure Fluid Density	365 pcf
Coefficient of Friction (Concrete and Soil)	0.35
Coefficient of Friction (Along Vapor Barrier)	0.2 to 0.25*

*Per manufacturer's recommendations.

8.13.2 The passive and frictional resistant loads can be combined for design purposes. The lateral passive pressures may be increased by one-third when considering transient loads due to wind or seismic forces.

8.14 Plan Review

8.14.1 Plans should be reviewed by the Geotechnical Engineer (a representative of Geocon), prior to finalization to verify that the plans have been prepared in substantial conformance with the recommendations of this report and to provide additional analyses or recommendations.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous materials was not part of the scope of services provided by Geocon.

This report is issued with the understanding that it is the responsibility of the owner, or of their representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

The findings of this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project Geotechnical Engineer of Record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

LIST OF REFERENCES

1. *2019 California Building Code, California Code of Regulations, Title 24, Part 2, based on the 2018 International Building Code*, prepared by California Building Standards Commission, dated July 2019.

2. American Society of Civil Engineers (ASCE), *ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, 2017.

3. California Building Standards Commission, 2019, *California Building Code (CBC)*, California Code of Regulations Title 24, Part 2.

4. California Department of Water Resources (DWR), *Water Data Library (WDL) Station Map*, online database, www.water.ca.gov/waterdatalibrary/, accessed April 2022.

5. Coachella Valley Water District, 2020, Well Data Provided via Personal Communication.

6. Dibblee, T. W., Jr., 2008, *Geologic Map of the Palm Desert & Coachella 15 Minute Quadrangles*, Palm Desert and Coachella Map (DF-373).

7. Legg, M. R., J. C. Borrero, and C. E. Synolakis, *Evaluation of Tsunami Risk to Southern California Coastal Cities*, 2002 NEHRP Professional Fellowship Report, dated January 2003.

8. OSHPD Seismic Design Maps Web Application, https://seismicmaps.org/, accessed April 2022.

9. Public Works Standards, Inc., 2021, *Standard Specifications for Public Works Construction Greenbook,* Published by BNi Building News.

10. Riverside County Information System, *Map My County*, accessed April 2022.

11. US Geological Survey, 2013, *Detection and Measurement of Land Subsidence Using Global Positioning System Surveying and Interferometric Synthetic Aperture Radar, Coachella Valley, California 1996-2005*, Scientific Investigations Report 2007-5251, Version 2.0, dated month of June.

SOURCE: Google Earth Pro, 2022

SCALE: 1" = 2,000'

VICINITY MAP

GEOCON
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GEOTECHNICAL CONSULTANTS
41571 CORNING PLACE SUITE 101 MURRIETA, CA 92562-7065
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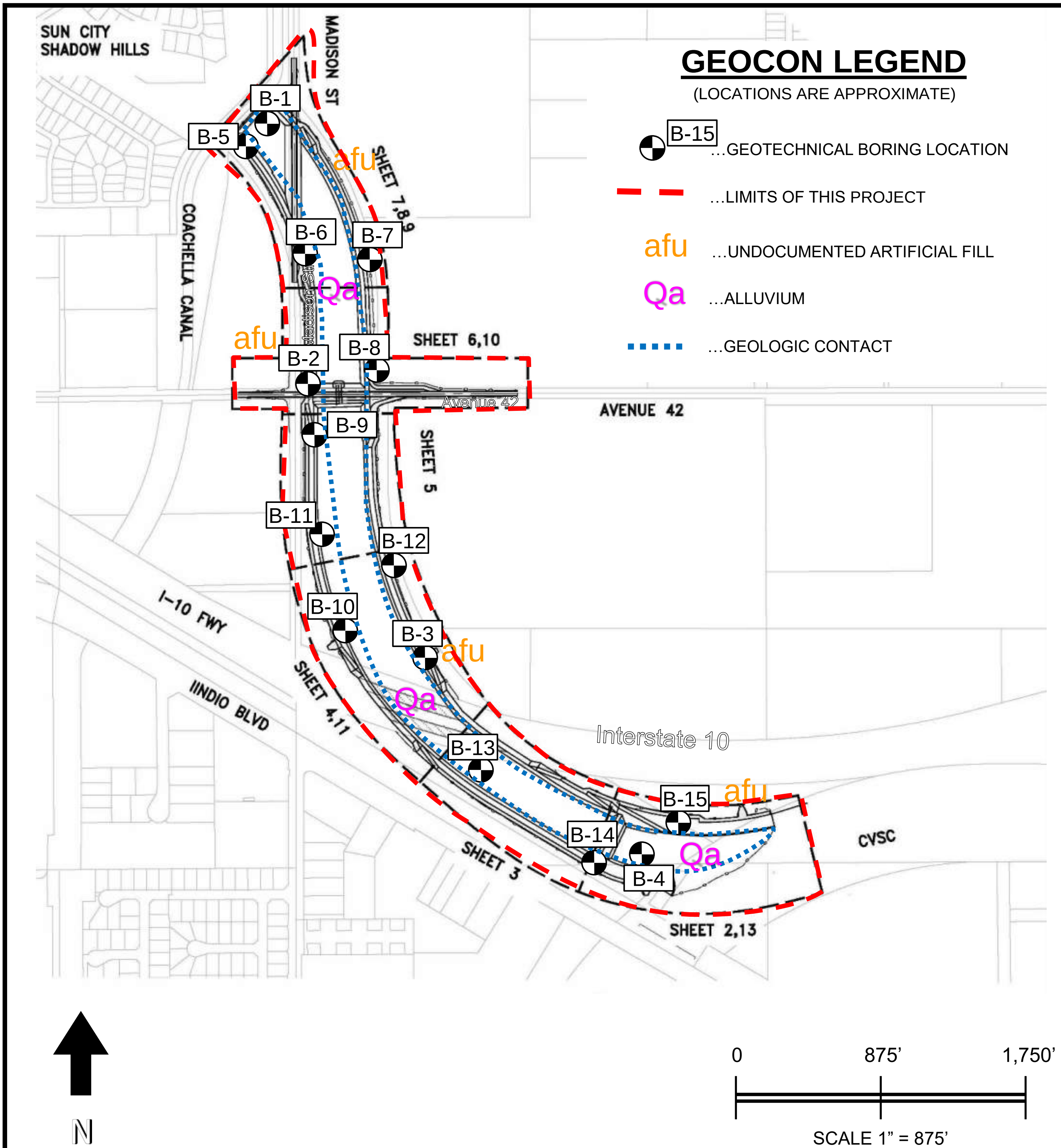
THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

ATS			JUNE 2022	PROJECT NO. T2581-22-05	FIG. 1



SOURCE: Albert A. Webb Associates, Thousand Palms Stormwater Channel, Sheet No. 1, July 2021 DRAFT

GEOLOGIC MAP

GEOCON
WEST, INC.
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THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

HD			JUNE 2022	PROJECT NO. T2581-22-05	FIG. 2

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

Geocon performed a preliminary field investigation on October 5, 2020, where we drilled Borings B-1 through B-4. Geocon performed an additional field investigation for this study on March 22 and 23, 2022 which included drilling Borings B-5 through B-15. In total, our work included drilling 15 8-inch diameter geotechnical borings (B-1 through B-15) to depths of up to approximately 51 feet below existing grades. The investigation was performed to observe the subsurface geological conditions at the site, collect relatively undisturbed in-situ and disturbed bulk samples for laboratory testing, and evaluate the depth to groundwater. The borings were drilled with a limited access track-mounted CME-75 drill rig equipped with hollow stem auger.

We collected disturbed bulk and relatively undisturbed soil samples from the borings by driving a 3-inch O. D., California Modified Sampler into the "undisturbed" soil mass with blows from a 140-pound hammer falling 30 inches. The California Modified Sampler was equipped with 1-inch high by 2$^{3}/_{8}$-inch inside diameter brass sampler rings to facilitate removal and testing. Relatively undisturbed samples and bulk samples of disturbed soils were transported to our laboratory for testing.

The soil conditions encountered in the borings were visually examined, classified and logged in general accordance with the Unified Soil Classification System (USCS). Logs of the borings are presented on Figures A-1 through A-15. The logs depict the soil and geologic conditions encountered and the depth at which samples were obtained. The approximate locations of the borings are depicted on the *Geologic Map*, Figure 2.

BORING B-1

ELEV. (MSL.) **17 ft** DATE COMPLETED **10/05/2020**

EQUIPMENT **CME-75** BY: **ATS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B-1@0-5'			ML	**ALLUVIUM (Qa)** Sandy SILT, stiff, dry, light olive gray; fine sand			
	B-1@2.5'			SM	Silty SAND, dense, damp, light olive gray; fine to medium sand; trace pores; shells	64	97.5	3.2
	B-1@5'			SP-SM	Poorly-graded SAND with silt, dense, moist, light olive gray; fine to medium sand; micaceous; trace calcium carbonate deposits	58	101.9	4.8
10	B-1@10'			CL-ML	Sandy silty CLAY, very stiff, damp, light olive gray; fine sand; porous; calcium carbonate deposits	81		
	B-1@15'			SP-SM	Poorly-graded SAND with silt, very dense, damp, light olive gray; fine to medium sand; trace mica	80-11"	99.9	4.9
				ML	Sandy SILT, very stiff, damp, light gray, white; fine sand			
20	B-1@20'			SP	Poorly-graded SAND, very dense, damp, light grayish brown; fine sand	81	109.0	1.2
	B-1@25'					80	101.4	2.8
				ML	SILT, very stiff, damp, light grayish brown; calcium carbonate deposits; trace pores			

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28

Figure A-1,
Log of Boring B-1, Page 1 of 2

T2581-22-04 BORING LOGS.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-1 ELEV. (MSL.) 17 ft DATE COMPLETED 10/05/2020 EQUIPMENT CME-75 BY: ATS	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30	B-1@30'			SP-SM	Poorly-graded SAND with silt, dense, damp, light grayish brown; fine sand; trace mica	70	98.7	1.6
					Total Depth = 31'-6" Groundwater not encountered Backfilled with cuttings on 10/05/2020			

Figure A-1,
Log of Boring B-1, Page 2 of 2

T2581-22-04 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2581-22-04

BORING B-2

ELEV. (MSL.) 19 ft DATE COMPLETED 10/05/2020

EQUIPMENT CME-75 BY: ATS

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**ALLUVIUM (Qa)** Poorly-graded SAND with silt, very loose, dry, light yellowish brown - becomes loose			
2	B-2@2.5'				- becomes medium dense, moist, light grayish brown; fine to medium sand; trace mica	41		
4								
6	B-2@5-10' B-2@5'			SM	Silty SAND, very dense, damp, light olive brown; fine sand; trace mica	81	102.4	2.2
8								
10	B-2@10'				- becomes moist	50-6"	103.4	17.1
12				ML	Sandy SILT, hard, moist, light grayish brown; fine sand			
14								
16	B-2@15'				- becomes damp, very stiff, light yellowish brown	66	96.2	5.7
18								
20	B-2@20'			SP-SM	Poorly-graded SAND with silt, dense, damp, light grayish brown; fine sand	71	103.6	2.2
22								
24								
26	B-2@25'			ML	Sandy SILT, hard, moist, light olive gray; fine sand; trace pores	50-6"	94.6	7.4
28								

Figure A-2,
Log of Boring B-2, Page 1 of 2

T2581-22-04 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B-2

ELEV. (MSL.) **19 ft** DATE COMPLETED **10/05/2020**

EQUIPMENT **CME-75** BY: **ATS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-2@30'			SP-SM	Poorly-graded SAND with silt, dense, damp, light gray; fine to medium sand; trace mica; silt lense	70		
					Total Depth = 31'-6" Groundwater not encountered Backfilled with cuttings on 10/05/2020			

Figure A-2,
Log of Boring B-2, Page 2 of 2

T2581-22-04 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

BORING B-3

ELEV. (MSL.) **12 ft** DATE COMPLETED **10/05/2020**

EQUIPMENT **CME-75** BY: **ATS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM (Qa)** Silty SAND, very loose, dry, light olive gray; fine to medium sand; trace mica			
2	B-3@2.5'				- becomes medium dense	39	106.9	1.3
4	B-3@5-10' B-3@5'				- becomes dense, damp, light gray; porous	70	87.3	2.7
6								
8								
10	B-3@10'			ML	Sandy SILT, hard, moist, light olive gray; fine sand	50-6"	104.6	8.6
12								
14	B-3@15'				- becomes dry	50-4"	100.6	1.8
16								
18								
20	B-3@20'				- becomes very stiff, damp, light olive gray, white	57	88.0	4.0
22								
24	B-3@25'				- becomse hard; fine to medium poorly-graded sand lense	50-5"		
26								
28								

Figure A-3,
Log of Boring B-3, Page 1 of 2

T2581-22-04 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. T2581-22-04

BORING B-3

ELEV. (MSL.) **12 ft** DATE COMPLETED **10/05/2020**

EQUIPMENT **CME-75** BY: **ATS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-3@30'			SP-SM	Poorly-graded SAND with silt, very dense, moist, light gray; fine to medium sand; trace mica	50-6"	98.0	4.0
32								
34								
	B-3@35'			SM	Silty SAND, very dense, moist, light gray; fine sand; trace mica	85		
36								
38								
40	B-3@40'				- becomes damp, gray	50-6"	96.1	2.6
42								
44								
	B-3@45'			SW	Well-graded SAND, very dense, damp, yellowish brown; fine to coarse sand	50-5"		
46								
48								
50	B-3@50'			SP	Poorly-graded SAND, very dense, damp, light gray; medium sand	50-6"	103.8	1.4

Total Depth = 51'
Groundwater not encountered
Backfilled with cuttings on 10/05/2020

Figure A-3,
Log of Boring B-3, Page 2 of 2

T2581-22-04 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. T2581-22-04

BORING B-4

ELEV. (MSL.) **7 ft** DATE COMPLETED **10/05/2020**

EQUIPMENT **CME-75** BY: **ATS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM (Qa)** Silty SAND, loose, moist, brown; fine to medium sand			
2								
	B-4@2.5'			ML	Sandy SILT with clay, very stiff, moist, light gray, white; fine sand	64	103.5	8.2
4					- trace pores; shells			
	B-4@5'					61	88.2	6.1
6	B-4@0-5'				- becomes grayish brown; calcium carbonate stringers			
8								
10	B-4@10'				- becomes pale yellow	60	95.6	6.3
12								
14								
	B-4@15'				- becomes damp	60	96.6	3.1
16								
18								
20	B-4@20'				- becomes moist	59	85.6	16.0
22								
24								
	B-4@25'				- becomes hard; fine silty sand lense	50-6"		
26								
28								

Figure A-4,
Log of Boring B-4, Page 1 of 2

T2581-22-04 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B-4

ELEV. (MSL.) **7 ft** DATE COMPLETED **10/05/2020**

EQUIPMENT **CME-75** BY: **ATS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-4@30'			ML	Sandy SILT with clay, very stiff, damp, light gray, white; fine sand; trace pores; shells	55	86.5	3.7
					Total Depth = 31'-6" Groundwater not encountered Backfilled with cuttings on 10/05/2020			

Figure A-4,
Log of Boring B-4, Page 2 of 2

T2581-22-04 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2581-22-05

BORING B-5

ELEV. (MSL.) **23** DATE COMPLETED **3/22/2022**

EQUIPMENT **CME 75** BY: **A. Shoashekan**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		ML	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Sandy SILT, stiff, slightly moist, light olive brown; fine sand			
5	B-5@5'		-Becomes dry; trace pores	18	97.8	1.8
7			-Becomes olive brown			
10	B-5@10'		-Becomes very stiff; porous	64	96.9	5.0
15	B-5@15'	SP	**ALLUVIUM (Qa)** Poorly-graded SAND, dense, slightly moist, olive brown to light yellow brown; fine sand	62	109.2	1.0
20	B-5@20'			54	100.6	5.3
20.5		ML	Sandy SILT, very stiff, dry, olive brown; fine sand; calcium carbonate deposits; porous			
25	B-5@25'	SP	Poory-graded SAND, dense, slightly moist, light olive brown; fine sand -Becomes yellowish brown; medium to coarse sand; SP lense; trace mottling	55	100.6	1.7

Figure A-5,
Log of Boring B-5, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B-5

ELEV. (MSL.) 23 DATE COMPLETED 3/22/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-5@30'					73	108.0	
32								
34								
	B-5@35'			MH	Elastic SILT, stiff, moist, olive to olive brown; trace pores	34	90.4	
36								
38								
40	B-5@40'			SP	Poorly-graded SAND, dense, moist, olive brown; fine sand	58	101.0	
42								
44								
	B-5@45'					53		
46								

Total Depth = 46.5' feet
No Groundwater encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings 3/22/2022

Figure A-5,
Log of Boring B-5, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

BORING B-6

ELEV. (MSL.) 24 DATE COMPLETED 3/22/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		SP	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Poorly-graded SAND, loose, moist, olive brown; fine sand			
5	B-6@5'			16		
6		ML	**ALLUVIUM (Qa)** Sandy SILT, stiff, slightly moist, light olive brown; fine sand			
10	B-6@10'		-Becomes dry	27	88.9	3.0
15	B-6@15'	SP	Poorly-graded SAND, slightly dense, moist, olive brown; fine sand; trace mica	49	96.5	1.7
20	B-6@20'	ML	Sandy SILT, very stiff, dry, olive brown; fine sand; trace mica	47	100.3	3.6
25	B-6@25'		-Becomes light olive brown; olive; fine sand; SP lense	60	107.5	2.9

Figure A-6,
Log of Boring B-6, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2581-22-05

BORING B-6

ELEV. (MSL.) 24 DATE COMPLETED 3/22/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-6@30'	SP	Poorly-graded SAND, dense, slightly moist, light yellowish brown; trace mica	57	100.6	1.4
35	B-6@35'	MH	Elastic SILT, very stiff, slightly moist, light olive to yellowish brown; trace pores	61	88.7	9.6
38.5		SP	Poorly-graded SAND, very dense, slightly moist, light olive brown; fine sand; trace mica			
40	B-6@40'			85-12"	104.1	1.4
45	B-6@45'	ML	Sandy SILT, very stiff, slightly moist, light olive to yellowish brown	68		

Total Depth = 46.5' feet
No Groundwater encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings 3/22/2022

Figure A-6,
Log of Boring B-6, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B-7

ELEV. (MSL.) 29 DATE COMPLETED 3/22/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		SM	**UNDOCUMENTED ARTIFICIAL FILL (afu)** SiltySAND, medium dense, moist, brown; fine sand; wood waste at surface			
5	B-7@5'			21	101.5	7.2
5.5		SP	Poorly-graded SAND, medium dense, moist, light yellowish brown; fine sand; wood waste			
10	B-7@10'	SM	Silty SAND, medium dense, slightly moist, light olive brown; fine sand	17	108.0	2.7
15	B-7@15'	ML	**ALLUVIUM (Qa)** Sandy SILT, very stiff, slightly moist, light olive brown; fine sand; trace calcuim carbonate stringers	54	108.4	5.2
20	B-7@20'		-Increase calcium carbonate deposits	44	103.0	6.1
24		SP	Poorly-graded SAND, dense, moist, olive to yellowish brown; fine sand; trace mica			
25	B-7@25'			63	93.3	5.7
28		MH	Elastic SILT, very stiff, dry, light olive brown; fine sand; calcuim carbonate stringers			

Figure A-7,
Log of Boring B-7, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2581-22-05

BORING B-7

ELEV. (MSL.) 29 DATE COMPLETED 3/22/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-7@30'	SP	Poorly-graded SAND, dense, moist, light olive brown; fine sand	74	93.9	3.2
35	B-7@35'		-Becomes light yellowish brown	74	97.9	1.8
		ML	Sandy SILT, very stiff, dry, light yellowish brown; fine sand			
40	B-7@40'		-Becomes slightly moist; trace calcium carbonate deposits	63-11"	86.8	11.1
45	B-7@45'			62	101.8	7.4

Total Depth = 46.5' feet
No Groundwater encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings 3/22/2022

Figure A-7,
Log of Boring B-7, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2581-22-05

BORING B-8

ELEV. (MSL.) 28 DATE COMPLETED 3/22/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		SP	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Poorly-graded SAND, loose, moist, brown; fine sand; trace mica; wood wast at surface			
5	B-8@5' B-8@5-10'		-Becomes slightly moist; wood waste	16	103.0	2.6
10	B-8@10'		-Becomes medium dense, dry	32	104.9	0.8
15	B-8@15'	SP	**ALLUVIUM (Qa)** Poorly-graded SAND, dense, dry, olive to yellowish brown; fine sand; trace mica; yellowish brown ML lense	50	104.7	0.8
20	B-8@20'	ML	Sandy SILT, very stiff, slightly moist, light olive brown; fine sand; trace pores; calcium carbonate deposits	62	103.2	5.0
25	B-8@25'			78		

Figure A-8, Log of Boring B-8, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B-8

ELEV. (MSL.) 28 DATE COMPLETED 3/22/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-8@30'			SP	Poorly-graded SAND, dense, slightly moist, light yellowish brown; fine sand; trace mica	61	106.0	1.0
32								
34								
36	B-8@35'				-Yellowish brown ML lense with calcium carbonate stringers	75	99.8	1.3
38								
40	B-8@40'				-Yellowish brown ML lense	58	96.2	1.5
42								
44								
46	B-8@45'					57	95.9	1.6

Total Depth = 46.5' feet
No Groundwater encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings 3/22/2022

Figure A-8,
Log of Boring B-8, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2581-22-05

BORING B-9

ELEV. (MSL.) 19 DATE COMPLETED 3/22/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		SP	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Poorly-graded SAND, medium dense, moist, olive brown; fine sand; trace mica			
5	B-9@5'		-Becomes slightly moist	40	99.8	2.4
10	B-9@10'		-Becomes dense	50	91.8	15.9
		MH	**ALLUVIUM (Qa)** Elastic SILT, very stiff, moist, olive to yellowish brown; calcium carbonate deposits; trace pores			
15	B-9@15'		-Becomes dry; porous	41	97.7	3.4
20	B-9@20'	ML	Sandy SILT, very stiff, dry, light olive brown; fine sand; micaceous	47	97.5	2.5
25	B-9@25'		-Becomes light yellowish brown	60	95.0	2.6

Figure A-9,
Log of Boring B-9, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... DISTURBED OR BAG SAMPLE
- ... STANDARD PENETRATION TEST
- ... CHUNK SAMPLE
- ... DRIVE SAMPLE (UNDISTURBED)
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B-9

ELEV. (MSL.) 19 DATE COMPLETED 3/22/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-9@30'			SP	Poorly-graded SAND, dense, slightly moist, light yellow to olive brown; fine sand; micaceous; yellowish brown ML lense	74	101.6	1.6
32								
34								
	B-9@35'					63	100.7	3.4
36					-Becomes moist			
38								
40	B-9@40'					67	86.8	15.3
				ML	Sandy SILT, very stiff, moist, light olive to yellowish brown; fine sand; trace pores; calcium carbonate stringers			
42								
44								
	B-9@45'				-Becomes hard	77-11"	86.7	13.1
46								

Total Depth = 46.5' feet
No Groundwater encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings 3/22/2022

Figure A-9,
Log of Boring B-9, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2581-22-05

BORING B-10

ELEV. (MSL.) 25 DATE COMPLETED 3/23/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Poorly-graded SAND with Silt, medium dense, dry, light olive brown; fine sand; micaceous; boulder encountered			
5	B-10@5'				-Cobbles encountered. NO RECOVERY	27		
7					-Cobbles encountered			
10	B-10@10'				-Becomes slightly moist	28	106.0	1.0
15	B-10@15'				-Becomes dense, dry	55	100.9	0.9
20	B-10@20'			SP	**ALLUVIUM (Qa)** Poorly-graded SAND with Silt, dense, slightly moist, olive brown; fine sand; micaceous	75	105.6	3.0
25	B-10@25'			ML	Sandy SILT, stiff, dry, olive brown; yellowish brown to olive brown MH in shoe	37	100.9	3.6

Figure A-10,
Log of Boring B-10, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B-10

ELEV. (MSL.) **25** DATE COMPLETED **3/23/2022**

EQUIPMENT **CME 75** BY: **A. Shoashekan**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-10@30'				-Becomes very stiff, yellowish to olive brown; calcium carbonate deposits; trace mica	54	103.0	2.4
32								
34								
	B-10@35'				-Becomes slightly moist, light olive brown	73	91.4	10.8
36								
38								
40	B-10@40'				-Becomes dry; increase sand content	48	93.0	4.4
42								
44								
	B-10@45'					64		
46								

Total Depth = 46.5' feet
No Groundwater encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings 3/23/2022

Figure A-10,
Log of Boring B-10, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2581-22-05

BORING B-11

ELEV. (MSL.) 19 DATE COMPLETED 3/23/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Poorly-graded SAND, medium dense, dry, light yellowish brown; fine sand with few medium and coarse sand; trace mica			
5	B-11@5'				-Becomes slightly moist	11	95.9	1.0
6				SP	**ALLUVIUM (Qa)** Poorly-graded SAND, medium dense, slightly moist, light yellow to olive brown; fine sand; micaceous			
10	B-11@10'			SP	Poorly-graded SAND with Silt, slightly moist, light olive brown; fine sand; micaceous	30	100.2	1.1
15	B-11@15'					34	91.6	2.0
20	B-11@20'			ML	Sandy SILT, very stiff, dry, olive; fine sand; trace mica; trace pores; trace calcium carbonate deposits	57	99.7	3.0
25	B-11@25'				-Decrease pores and sand	68	97.2	3.0

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28. Sample columns: BULK, DR/SPT.

Figure A-11,
Log of Boring B-11, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B-11

ELEV. (MSL.) **19** DATE COMPLETED **3/23/2022**

EQUIPMENT **CME 75** BY: **A. Shoashekan**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-11@30'					72	98.5	4.2
35	B-11@35'				-Becomes hard; trace pores	83-11"	100.3	4.6
40	B-11@40'			SP	Poorly-graded SAND, very dense, slightly moist, light olive brown; fine sand	79-11"	107.2	1.0
45	B-11@45'			ML	Sandy SILT, hard, dry, light olive brown; fine sand	50-6"	87.0	2.9

Total Depth = 46.5' feet
No Groundwater encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings 3/23/2022

Figure A-11,
Log of Boring B-11, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS: ... SAMPLING UNSUCCESSFUL; ... DISTURBED OR BAG SAMPLE; ... STANDARD PENETRATION TEST; ... CHUNK SAMPLE; ... DRIVE SAMPLE (UNDISTURBED); ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

BORING B-12

ELEV. (MSL.) 15 DATE COMPLETED 3/23/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		SM	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Silty SAND, loose, moist, brown; fine sand; trace mica; wood waste at surface			
4		SP	Poorly-graded SAND, meidium dense, moist, light olive brown; fine sand			
5	B-12@5'			29	100.2	1.6
6			-Becomes slightly moist			
10	B-12@10'	ML	Sandy SILT, stiff, slightly moist, light olive brown; fine sand; micaceous; porous	38	94.7	2.4
15	B-12@15'	ML	**ALLUVIUM (Qa)** Sandy SILT, very stiff, dry, olive brown; fine sand	66	101.5	2.8
20	B-12@20'			57	111.5	1.8
25	B-12@25'		-Becomes slightly moist	58	87.0	7.3

Figure A-12,
Log of Boring B-12, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS: ... SAMPLING UNSUCCESSFUL; ... STANDARD PENETRATION TEST; ... DRIVE SAMPLE (UNDISTURBED); ... DISTURBED OR BAG SAMPLE; ... CHUNK SAMPLE; ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-12 ELEV. (MSL.) 15 DATE COMPLETED 3/23/2022 EQUIPMENT CME 75 BY: A. Shoashekan	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30	B-12@30'				-Becomes dry	57	95.0	4.9
32								
34								
	B-12@35'					85-11"	96.1	2.1
36				SP	Poorly-graded SAND, very dense, slightly moist, light yellow to olive brown; fine sand			
38								
40	B-12@40'			ML	Sandy SILT, very stiff, dry, light olive brown; fine sand; trace mica	74	99.2	2.5
42								
44								
	B-12@45'				-Becomes light olive gray	62	97.8	1.5
46								
					Total Depth = 46.5' feet No Groundwater encountered Penetration resistance for 140-lb hammer falling 30 inches by auto hammer Backfilled with cuttings 3/23/2022			

Figure A-12,
Log of Boring B-12, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2581-22-05

BORING B-13

ELEV. (MSL.) 10 DATE COMPLETED 3/23/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP	**ALLUVIUM (Qa)** Poorly-graded SAND, meidium dense, dry, light olive brown; fine sand; trace mica			
5	B-13@5'			ML	Sandy SILT, very stiff, slightly moist, light yellow brown to olive brown; fine sand; calcium carbonate stringers	51	105.6	6.7
10	B-13@10'				-Becomes micaceous; trace oxidized staining	51		
15	B-13@15'					55	94.6	6.5
20	B-13@20'				-Becomes hard	62-11"		
25	B-13@25'			SP	Poorly-graded SAND, dense, dry, light yellow brown; fine sand	69	107.0	0.9

Figure A-13,
Log of Boring B-13, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2581-22-05

BORING B-13

ELEV. (MSL.) **10** DATE COMPLETED **3/23/2022**

EQUIPMENT **CME 75** BY: **A. Shoashekan**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-13@30'					65		
35	B-13@35'			ML	Sandy SILT, hard, slightly moist, light olive brown; fine sand	77-12"	90.6	6.0
40	B-13@40'					73-11"	93.6	6.9
45	B-13@45'					68		
					Total Depth = 46.5' feet No Groundwater encountered Penetration resistance for 140-lb hammer falling 30 inches by auto hammer Backfilled with cuttings 3/23/2022			

Figure A-13,
Log of Boring B-13, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B-14

ELEV. (MSL.) 18 DATE COMPLETED 3/23/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				ML	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Silty SAND, stiff, dry, light olive brown; fine sand			
5	B-14@5' B-14@5-10'			SP	Poorly-graded SAND with Silt, meidium dense, slightly moist, light olive brown; fine sand; trace mica	47	103.0	1.0
10	B-14@10'				-Becomes dense	52	98.1	12.8
11				SP	**ALLUVIUM (Qa)** Poorly-graded SAND with Silt, dense, moist, light olive brown; fine sand; micaceous			
15	B-14@15'				-Becomes medium dense, slightly moist	46	97.8	2.6
20	B-14@20'			ML	Sandy SILT, stiff, dry, light yellow brown; fine sand; trace mica	47	101.7	1.8
25	B-14@25'			SP	Poorly-graded SAND, dense, slightly moist, light yellow to olive brown; fine sand	56	98.9	1.2

Figure A-14,
Log of Boring B-14, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... DISTURBED OR BAG SAMPLE
- ... STANDARD PENETRATION TEST
- ... CHUNK SAMPLE
- ... DRIVE SAMPLE (UNDISTURBED)
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

BORING B-14

ELEV. (MSL.) 18 DATE COMPLETED 3/23/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-14@30'			MH	Elastic SILT, hard, dry, light yellow to olive brown; trace pores	82-11"	91.6	4.6
32								
34								
36	B-14@35'			SP	Poorly-graded SAND, dense, slightly moist, light yellow to olive brown; fine sand	70	97.8	1.1
38								
40	B-14@40'			SP	Poorly-graded SAND with silt, dense, slightly moist, light olive brown; fine sand	65	97.7	1.7
42								
44								
46	B-14@45'			ML	Sandy SILT, very stiff, slightly moist, yellow brown; fine sand	66		

Total Depth = 46.5' feet
No Groundwater encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings 3/23/2022

Figure A-14,
Log of Boring B-14, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2581-22-05

BORING B-15

ELEV. (MSL.) 21 DATE COMPLETED 3/23/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Poorly-graded SAND with Silt, medium dense, dry, light olive brown; fine sand			
2								
4								
	B-15@5'				-Becomes slightly moist; trace mica	23	101.3	1.8
6								
8								
10	B-15@10'					18	99.4	1.2
12								
14								
	B-15@15'			SP	Poorly-graded SAND, medium dense, slightly moist, light olive to grayish brown; fine sand; trace mica	37	103.9	1.0
16								
18								
20	B-15@20'			ML	**ALLUVIUM (Qa)** Sandy SILT, stiff, slightly moist, light yellow to olive brown; fine sand; trace mica; trace calcium deposits	30	87.1	9.4
22								
24								
	B-15@25'				-Becomes moist; porous; decrease sand content	35	102.5	17.5
26								
28								

Figure A-15,
Log of Boring B-15, Page 1 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... DISTURBED OR BAG SAMPLE
- ... STANDARD PENETRATION TEST
- ... CHUNK SAMPLE
- ... DRIVE SAMPLE (UNDISTURBED)
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

BORING B-15

ELEV. (MSL.) 21 DATE COMPLETED 3/23/2022

EQUIPMENT CME 75 BY: A. Shoashekan

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-15@30'				-Becomes light olive to grayish brown	36		
32								
34								
	B-15@35'				-Becomes slightly moist	30	91.5	11.6
36								
38								
40	B-15@40'				-Becomes moist, olive brown	39	85.1	16.3
42								
44								
	B-15@45'					37		
46								

Total Depth = 46.5' feet
No Groundwater encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings 3/23/2022

Figure A-15,
Log of Boring B-15, Page 2 of 2

T2581-22-05 BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

APPENDIX B

APPENDIX B

LABORATORY TESTING

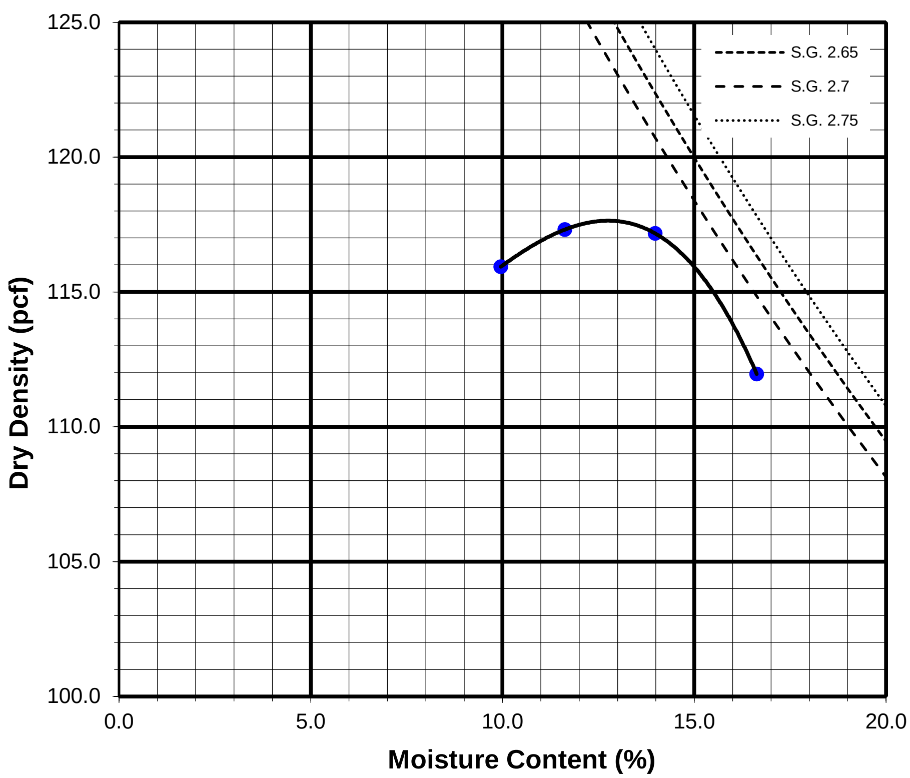
We performed laboratory testing in accordance with current, generally accepted test methods of ASTM International (ASTM) or other suggested procedures. We analyzed selected soil samples for in-situ density and moisture content, maximum dry density and optimum moisture content, expansion index, grain size distribution, consolidation characteristics, direct shear strength, and hydraulic conductivity. The results of the laboratory tests are presented on Figures B-1 through B-46. The in-place dry density and moisture content of the samples tested are presented on the boring logs in *Appendix A*.

Sample No:

B1@0-5'	Silty SAND (SM), olive gray

TEST NO.		1	2	3	4	5	6
Wt. Compacted Soil + Mold	(g)	6246	6200	6252	6291		
Weight of Mold	(g)	4274	4274	4274	4274		
Net Weight of Soil	(g)	1972	1926	1978	2017		
Wet Weight of Soil + Cont.	(g)	597.8	602.2	636.2	597.8		1257.5
Dry Weight of Soil + Cont.	(g)	549.1	570.8	596.7	556.3		1236.7
Weight of Container	(g)	256.2	255.5	257.0	259.4		254.5
Moisture Content	(%)	16.6	10.0	11.6	14.0		2.1
Wet Density	(pcf)	130.6	127.5	131.0	133.5		
Dry Density	(pcf)	112.0	115.9	117.3	117.2		0.0

Maximum Dry Density (pcf)	**119.5**	**Optimum Moisture Content (%)**	**13.0**



Preparation Method: A

GEOCON

MODIFIED COMPACTION TEST OF SOILS

ASTM D-1557

Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

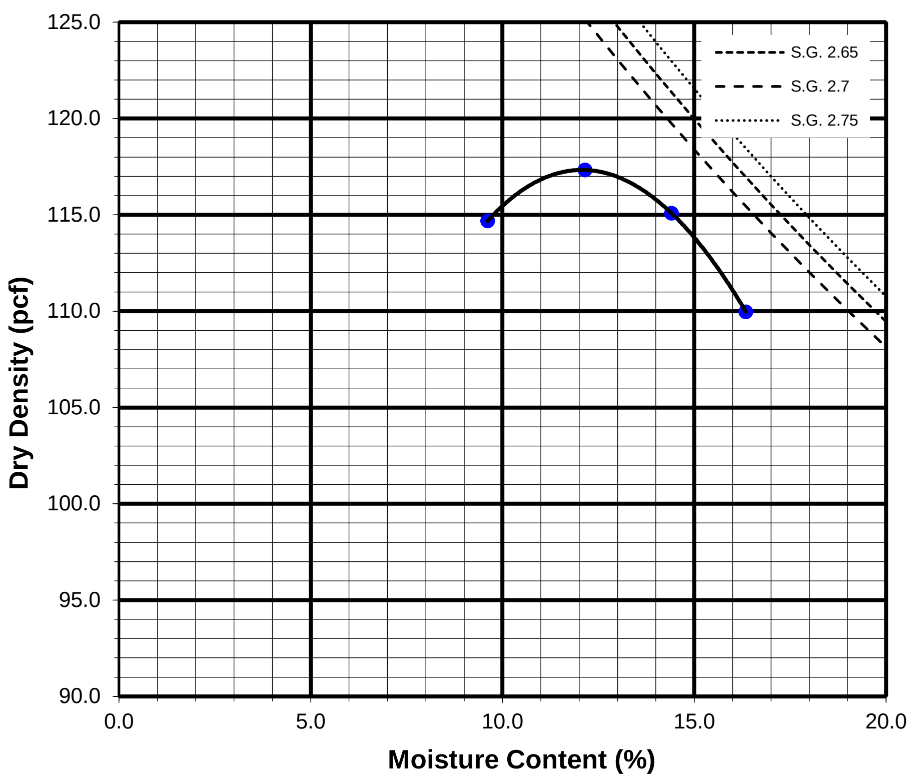
Figure B-1

Sample No:

B3@5-10'	Silty SAND (SM), gray

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	6207	6173	6263	6262		
Weight of Mold (g)	4274	4274	4274	4274		
Net Weight of Soil (g)	1933	1899	1989	1988		
Wet Weight of Soil + Cont. (g)	620.0	585.7	642.9	651.1		1333.5
Dry Weight of Soil + Cont. (g)	569.1	557.0	594.5	608.5		1310.7
Weight of Container (g)	257.7	258.4	258.6	258.0		257.8
Moisture Content (%)	16.3	9.6	14.4	12.2		2.2
Wet Density (pcf)	127.9	125.7	131.7	131.6		
Dry Density (pcf)	110.0	114.7	115.1	117.3		0.0

Maximum Dry Density (pcf)	118.0	Optimum Moisture Content (%)	13.0



Preparation Method: A

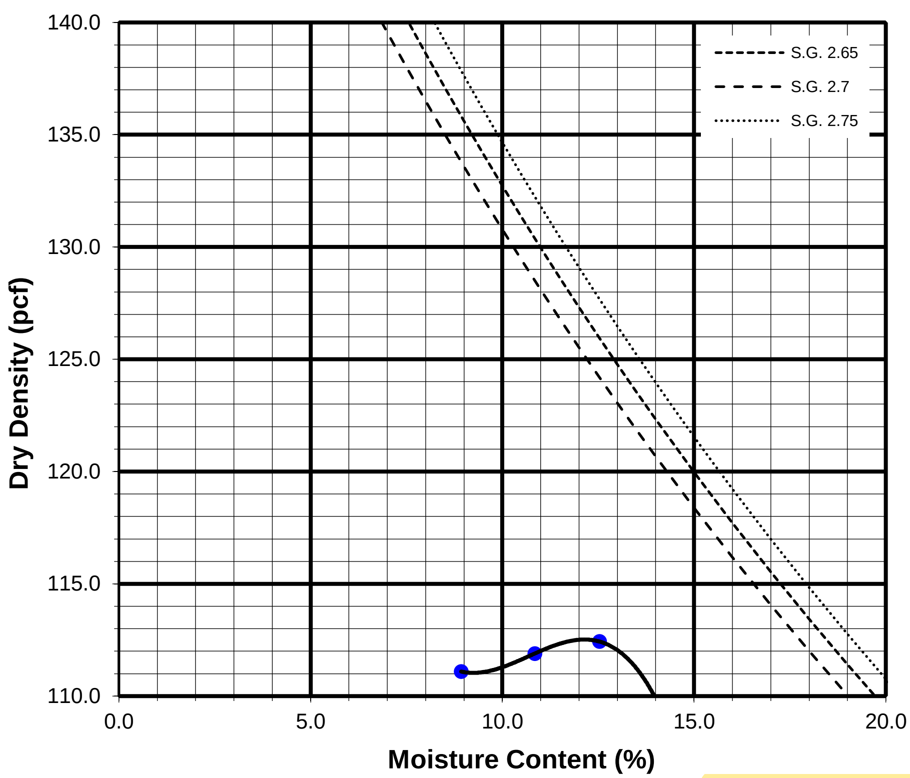
GEOCON	**MODIFIED COMPACTION TEST OF SOILS** ASTM D-1557 Checked by: ATS	Project No.: T2581-22-04 Thousand Palms Channel Coachella Valley Water District Indio, California November 2020 Figure B-2

Sample No:

B-8@5-10	Poorly Graded SAND (SP), light yellowish brown

TEST NO.		1	2	3	4	5	6
Wt. Compacted Soil + Mold	(g)	6130	6095	6141	6178		
Weight of Mold	(g)	4267	4267	4267	4267		
Net Weight of Soil	(g)	1863	1828	1874	1911		
Wet Weight of Soil + Cont.	(g)	699.0	708.4	702.4	704.0		1318.5
Dry Weight of Soil + Cont.	(g)	642.2	671.3	658.8	654.2		1308.2
Weight of Container	(g)	252.4	255.6	256.8	256.9		257.9
Moisture Content	(%)	14.6	8.9	10.8	12.5		1.0
Wet Density	(pcf)	123.3	121.0	124.0	126.5		
Dry Density	(pcf)	107.6	111.1	111.9	112.4		0.0

Maximum Dry Density (pcf)	113.0	Optimum Moisture Content (%)	12.0



NEED AXIS ADJUSTED

Preparation Method: A

GEOCON

COMPACTION CHARACTERISTICS USING MODIFIED EFFORT TEST RESULTS

ASTM D-1557

Checked by:

Project No.: T2581-22-05

Thousand Palms Channel
Coachella Valley Water District
Indio, California

JUNE 2022

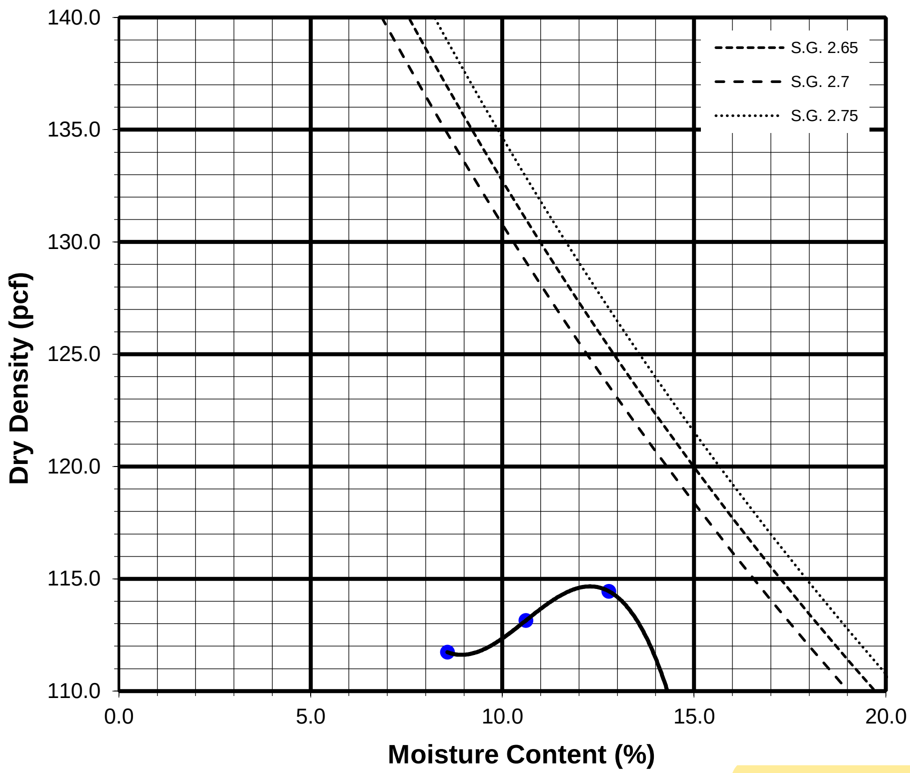
Figure B-3

Sample No:

B-14@5-10	Poorly Graded SAND with Silt (SP-SM), light gray

TEST NO.		1	2	3	4	5	6
Wt. Compacted Soil + Mold	(g)	6158	6217	6149	6100		
Weight of Mold	(g)	4267	4267	4267	4267		
Net Weight of Soil	(g)	1891	1950	1882	1832		
Wet Weight of Soil + Cont.	(g)	716.8	718.9	715.7	710.8		1278.0
Dry Weight of Soil + Cont.	(g)	672.8	666.7	657.3	674.8		1268.2
Weight of Container	(g)	258.3	258.1	255.2	254.5		258.3
Moisture Content	(%)	10.6	12.8	14.5	8.6		1.0
Wet Density	(pcf)	125.2	129.1	124.6	121.3		
Dry Density	(pcf)	113.1	114.4	108.8	111.7		0.0

Maximum Dry Density (pcf)	**114.5**	**Optimum Moisture Content (%)**	**12.5**



NEED AXIS ADJUSTED

Preparation Method: A

COMPACTION CHARACTERISTICS USING MODIFIED EFFORT TEST RESULTS

ASTM D-1557

Checked by:

GEOCON

Project No.: T2581-22-05

Thousand Palms Channel
Coachella Valley Water District
Indio, California

JUNE 2022

Figure B-4

B1@0-5'

MOLDED SPECIMEN		BEFORE TEST	AFTER TEST
Specimen Diameter	(in.)	4.0	4.0
Specimen Height	(in.)	1.0	1.0
Wt. Comp. Soil + Mold	(gm)	564.0	611.5
Wt. of Mold	(gm)	198.3	198.3
Specific Gravity	(Assumed)	2.7	2.7
Wet Wt. of Soil + Cont.	(gm)	554.5	611.5
Dry Wt. of Soil + Cont.	(gm)	520.0	323.6
Wt. of Container	(gm)	254.5	198.3
Moisture Content	(%)	13.0	27.7
Wet Density	(pcf)	110.3	124.5
Dry Density	(pcf)	97.6	97.5
Void Ratio		0.7	0.8
Total Porosity		0.4	0.4
Pore Volume	(cc)	87.1	94.1
Degree of Saturation	(%) [S_{meas}]	48.7	95.2

Date	Time	Pressure (psi)	Elapsed Time (min)	Dial Readings (in.)
10/12/2020	10:00	1.0	0	0.3376
10/12/2020	10:10	1.0	10	0.3365
Add Distilled Water to the Specimen				
10/13/2020	10:00	1.0	1430	0.3703
10/13/2020	11:00	1.0	1490	0.3703

Expansion Index (EI meas) =	33.8
Expansion Index (Report) =	**34**

Expansion Index, EI_{50}	CBC CLASSIFICATION *	UBC CLASSIFICATION **
0-20	Non-Expansive	Very Low
21-50	Expansive	Low
51-90	Expansive	Medium
91-130	Expansive	High
>130	Expansive	Very High

* Reference: 2019 California Building Code, Section 1803.5.3

** Reference: 1997 Uniform Building Code, Table 18-I-B.

GEOCON

EXPANSION INDEX TEST RESULTS

ASTM D-4829

Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-5

B2@5-10'

MOLDED SPECIMEN		BEFORE TEST	AFTER TEST
Specimen Diameter	(in.)	4.0	4.0
Specimen Height	(in.)	1.0	1.0
Wt. Comp. Soil + Mold	(gm)	583.8	612.7
Wt. of Mold	(gm)	195.2	195.2
Specific Gravity	(Assumed)	2.7	2.7
Wet Wt. of Soil + Cont.	(gm)	558.6	612.7
Dry Wt. of Soil + Cont.	(gm)	528.9	350.1
Wt. of Container	(gm)	258.6	195.2
Moisture Content	(%)	11.0	19.3
Wet Density	(pcf)	117.2	125.8
Dry Density	(pcf)	105.6	105.5
Void Ratio		0.6	0.6
Total Porosity		0.4	0.4
Pore Volume	(cc)	77.3	77.6
Degree of Saturation	(%) [S_{meas}]	50.2	86.9

Date	Time	Pressure (psi)	Elapsed Time (min)	Dial Readings (in.)
10/12/2020	10:00	1.0	0	0.343
10/12/2020	10:10	1.0	10	0.3429
Add Distilled Water to the Specimen				
10/13/2020	10:00	1.0	1430	0.344
10/13/2020	11:00	1.0	1490	0.344

Expansion Index (EI meas) =	1.1
Expansion Index (Report) =	**1**

Expansion Index, EI_{50}	CBC CLASSIFICATION *	UBC CLASSIFICATION **
0-20	Non-Expansive	Very Low
21-50	Expansive	Low
51-90	Expansive	Medium
91-130	Expansive	High
>130	Expansive	Very High

* Reference: 2019 California Building Code, Section 1803.5.3

** Reference: 1997 Uniform Building Code, Table 18-I-B.

GEOCON

EXPANSION INDEX TEST RESULTS

ASTM D-4829

Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-6

B3@5-10'

MOLDED SPECIMEN		BEFORE TEST	AFTER TEST
Specimen Diameter	(in.)	4.0	4.0
Specimen Height	(in.)	1.0	1.0
Wt. Comp. Soil + Mold	(gm)	579.7	611.9
Wt. of Mold	(gm)	196.7	196.7
Specific Gravity	(Assumed)	2.7	2.7
Wet Wt. of Soil + Cont.	(gm)	557.8	611.9
Dry Wt. of Soil + Cont.	(gm)	528.1	345.0
Wt. of Container	(gm)	257.8	196.7
Moisture Content	(%)	11.0	20.3
Wet Density	(pcf)	115.5	125.1
Dry Density	(pcf)	104.1	103.9
Void Ratio		0.6	0.6
Total Porosity		0.4	0.4
Pore Volume	(cc)	79.2	79.9
Degree of Saturation	(%) [S_{meas}]	48.3	87.8

Date	Time	Pressure (psi)	Elapsed Time (min)	Dial Readings (in.)
10/12/2020	10:00	1.0	0	0.3643
10/12/2020	10:10	1.0	10	0.3642
Add Distilled Water to the Specimen				
10/13/2020	10:00	1.0	1430	0.3675
10/13/2020	11:00	1.0	1490	0.3675

Expansion Index (EI meas) =	3.3
Expansion Index (Report) =	**3**

Expansion Index, EI_{50}	CBC CLASSIFICATION *	UBC CLASSIFICATION **
0-20	Non-Expansive	Very Low
21-50	Expansive	Low
51-90	Expansive	Medium
91-130	Expansive	High
>130	Expansive	Very High

* Reference: 2019 California Building Code, Section 1803.5.3

** Reference: 1997 Uniform Building Code, Table 18-I-B.

GEOCON

EXPANSION INDEX TEST RESULTS

ASTM D-4829

Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-7

B4@0-5'

MOLDED SPECIMEN		BEFORE TEST	AFTER TEST
Specimen Diameter	(in.)	4.0	4.0
Specimen Height	(in.)	1.0	1.0
Wt. Comp. Soil + Mold	(gm)	579.7	607.2
Wt. of Mold	(gm)	196.7	196.7
Specific Gravity	(Assumed)	2.7	2.7
Wet Wt. of Soil + Cont.	(gm)	557.6	607.2
Dry Wt. of Soil + Cont.	(gm)	527.9	345.0
Wt. of Container	(gm)	257.6	196.7
Moisture Content	(%)	11.0	19.0
Wet Density	(pcf)	115.5	123.7
Dry Density	(pcf)	104.1	103.9
Void Ratio		0.6	0.6
Total Porosity		0.4	0.4
Pore Volume	(cc)	79.2	80.6
Degree of Saturation	(%) [S_{meas}]	48.3	81.2

Date	Time	Pressure (psi)	Elapsed Time (min)	Dial Readings (in.)
10/12/2020	10:00	1.0	0	0.3651
10/12/2020	10:10	1.0	10	0.365
Add Distilled Water to the Specimen				
10/13/2020	10:00	1.0	1430	0.3719
10/13/2020	11:00	1.0	1490	0.3719

Expansion Index (EI meas) =	6.9
Expansion Index (Report) =	**7**

Expansion Index, EI_{50}	CBC CLASSIFICATION *	UBC CLASSIFICATION **
0-20	Non-Expansive	Very Low
21-50	Expansive	Low
51-90	Expansive	Medium
91-130	Expansive	High
>130	Expansive	Very High

* Reference: 2019 California Building Code, Section 1803.5.3

** Reference: 1997 Uniform Building Code, Table 18-I-B.

GEOCON

EXPANSION INDEX TEST RESULTS

ASTM D-4829

Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-8

B5@5-10

MOLDED SPECIMEN		BEFORE TEST	AFTER TEST
Specimen Diameter	(in.)	4.0	4.0
Specimen Height	(in.)	1.0	1.0
Wt. Comp. Soil + Mold	(gm)	566.6	603.8
Wt. of Mold	(gm)	196.5	196.5
Specific Gravity	(Assumed)	2.7	2.7
Wet Wt. of Soil + Cont.	(gm)	556.9	603.8
Dry Wt. of Soil + Cont.	(gm)	522.4	327.5
Wt. of Container	(gm)	256.9	196.5
Moisture Content	(%)	13.0	24.4
Wet Density	(pcf)	111.6	122.7
Dry Density	(pcf)	98.8	98.7
Void Ratio		0.7	0.8
Total Porosity		0.4	0.4
Pore Volume	(cc)	85.7	91.4
Degree of Saturation	(%) [S_{meas}]	50.1	87.3

Date	Time	Pressure (psi)	Elapsed Time (min)	Dial Readings (in.)
4/13/2022	10:00	1.0	0	0.3531
4/13/2022	10:10	1.0	10	0.3524
Add Distilled Water to the Specimen				
4/14/2022	10:00	1.0	1430	0.3798
4/14/2022	11:00	1.0	1490	0.3798

Expansion Index (EI meas) =	27.4
Expansion Index (Report) =	**27**

Expansion Index, EI_{50}	CBC CLASSIFICATION *	UBC CLASSIFICATION **
0-20	Non-Expansive	Very Low
21-50	Expansive	Low
51-90	Expansive	Medium
91-130	Expansive	High
>130	Expansive	Very High

* Reference: 2019 California Building Code, Section 1803.5.3
** Reference: 1997 Uniform Building Code, Table 18-I-B.

GEOCON

EXPANSION INDEX TEST RESULTS

ASTM D-4829

Checked by:

Project No.: T2581-22-05

Thousand Palms Channel
Coachella Valley Water District
Indio, California

JUNE 2022

Figure B-9

B13@5-10

MOLDED SPECIMEN		BEFORE TEST	AFTER TEST
Specimen Diameter	(in.)	4.0	4.0
Specimen Height	(in.)	1.0	1.0
Wt. Comp. Soil + Mold	(gm)	579.6	616.0
Wt. of Mold	(gm)	195.1	195.1
Specific Gravity	(Assumed)	2.7	2.7
Wet Wt. of Soil + Cont.	(gm)	557.9	616.0
Dry Wt. of Soil + Cont.	(gm)	525.8	343.3
Wt. of Container	(gm)	257.9	195.1
Moisture Content	(%)	12.0	22.6
Wet Density	(pcf)	116.0	126.8
Dry Density	(pcf)	103.6	103.4
Void Ratio		0.6	0.7
Total Porosity		0.4	0.4
Pore Volume	(cc)	79.8	84.5
Degree of Saturation	(%) [S_{meas}]	52.0	91.9

Date	Time	Pressure (psi)	Elapsed Time (min)	Dial Readings (in.)
4/13/2022	10:00	1.0	0	0.3431
4/13/2022	10:10	1.0	10	0.3429
Add Distilled Water to the Specimen				
4/14/2022	10:00	1.0	1430	0.3652
4/14/2022	11:00	1.0	1490	0.3652

Expansion Index (EI meas) =	22.3
Expansion Index (Report) =	**22**

Expansion Index, EI_{50}	CBC CLASSIFICATION *	UBC CLASSIFICATION **
0-20	Non-Expansive	Very Low
21-50	Expansive	Low
51-90	Expansive	Medium
91-130	Expansive	High
>130	Expansive	Very High

* Reference: 2019 California Building Code, Section 1803.5.3
** Reference: 1997 Uniform Building Code, Table 18-I-B.

GEOCON

EXPANSION INDEX TEST RESULTS

ASTM D-4829

Checked by:

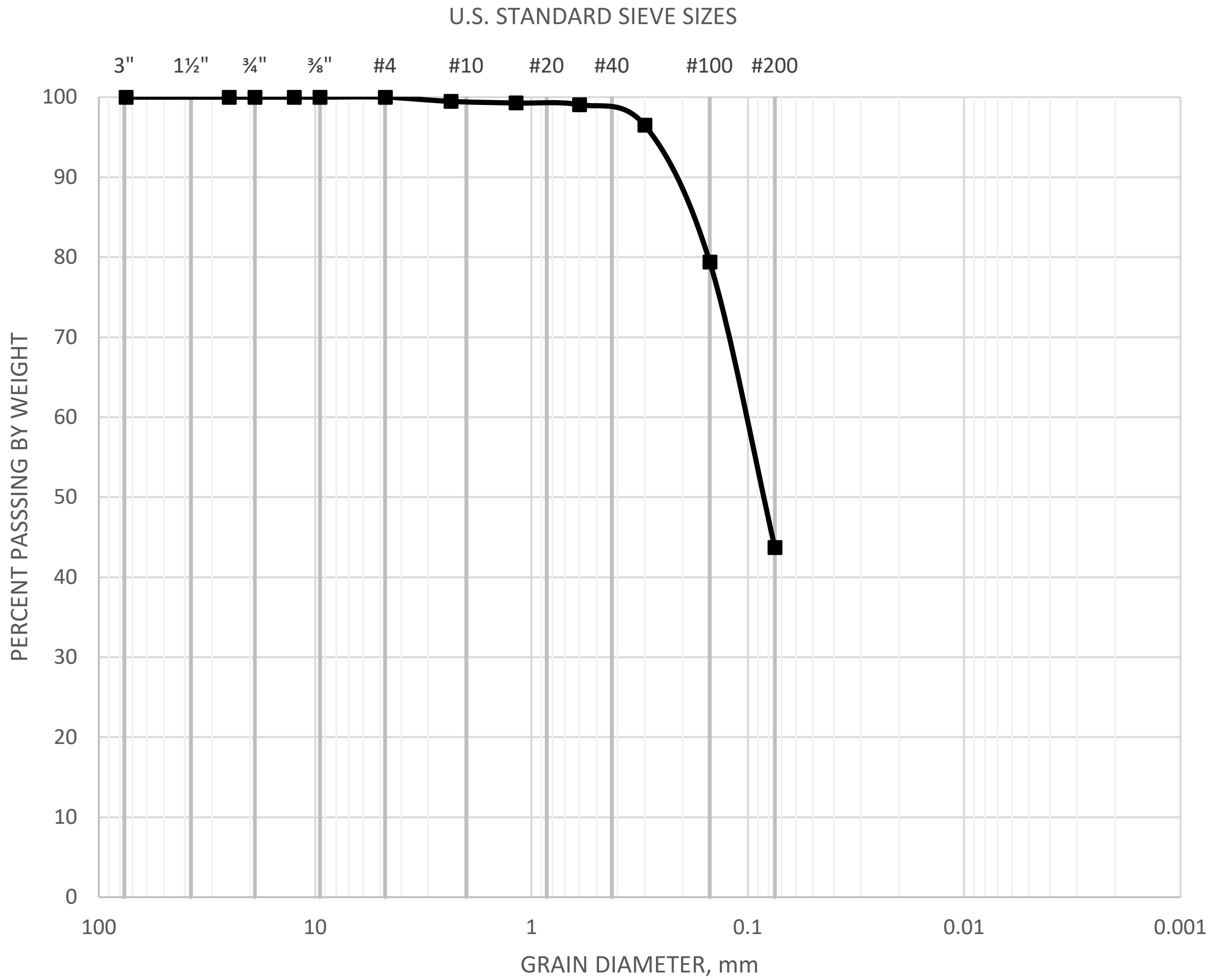
Project No.: T2581-22-05

Thousand Palms Channel
Coachella Valley Water District
Indio, California

JUNE 2022

Figure B-10

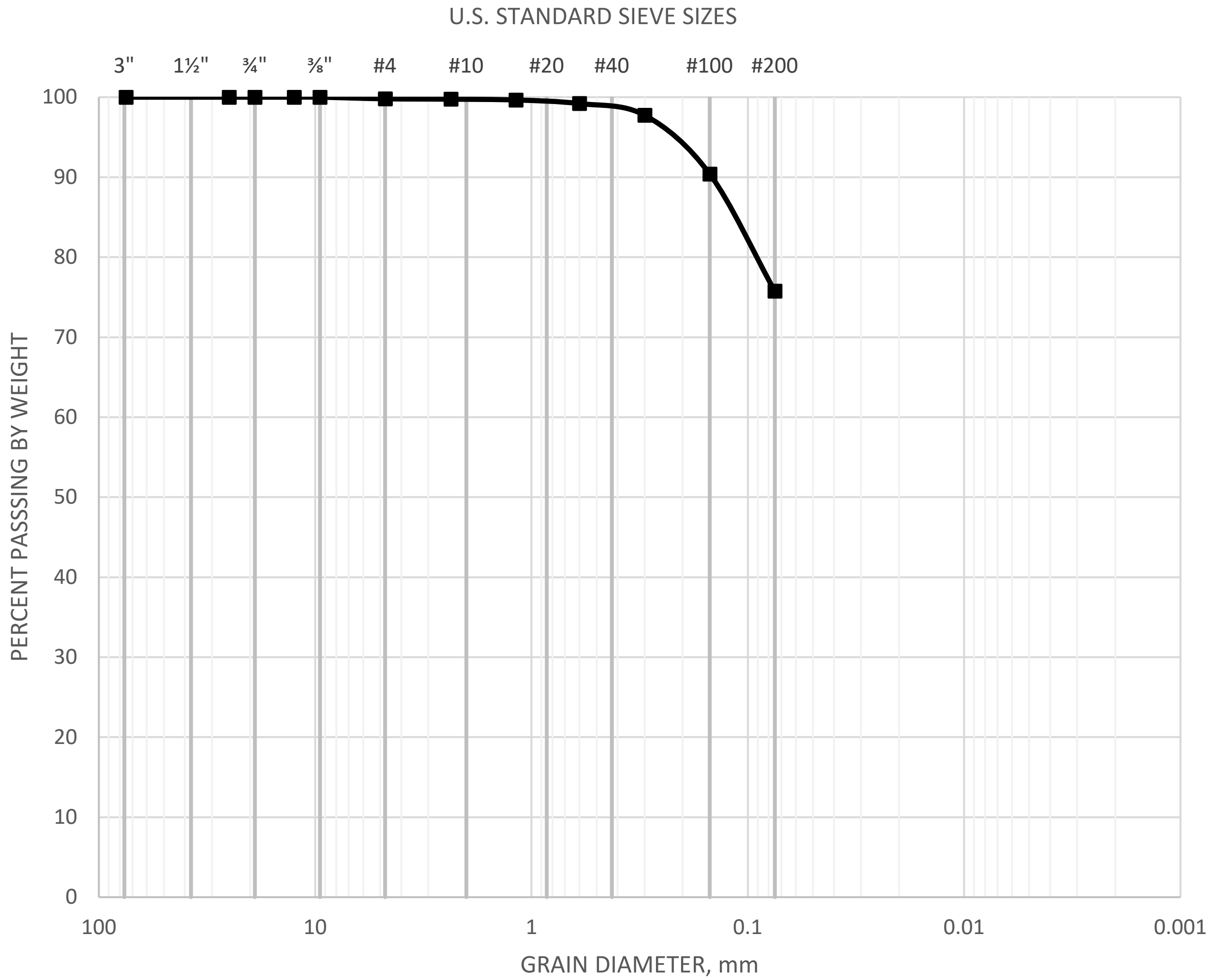
GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B1@2.5'	silty SAND (SM), olive gray			

GEOCON	GRAIN SIZE DISTRIBUTION ASTM D-422 Checked by: ATS	Project No.: T2581-22-04 Thousand Palms Channel Coachella Valley Water District Indio, California November 2020 Figure B-11

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B1@10'	Sandy SILT (ML), olive gray			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

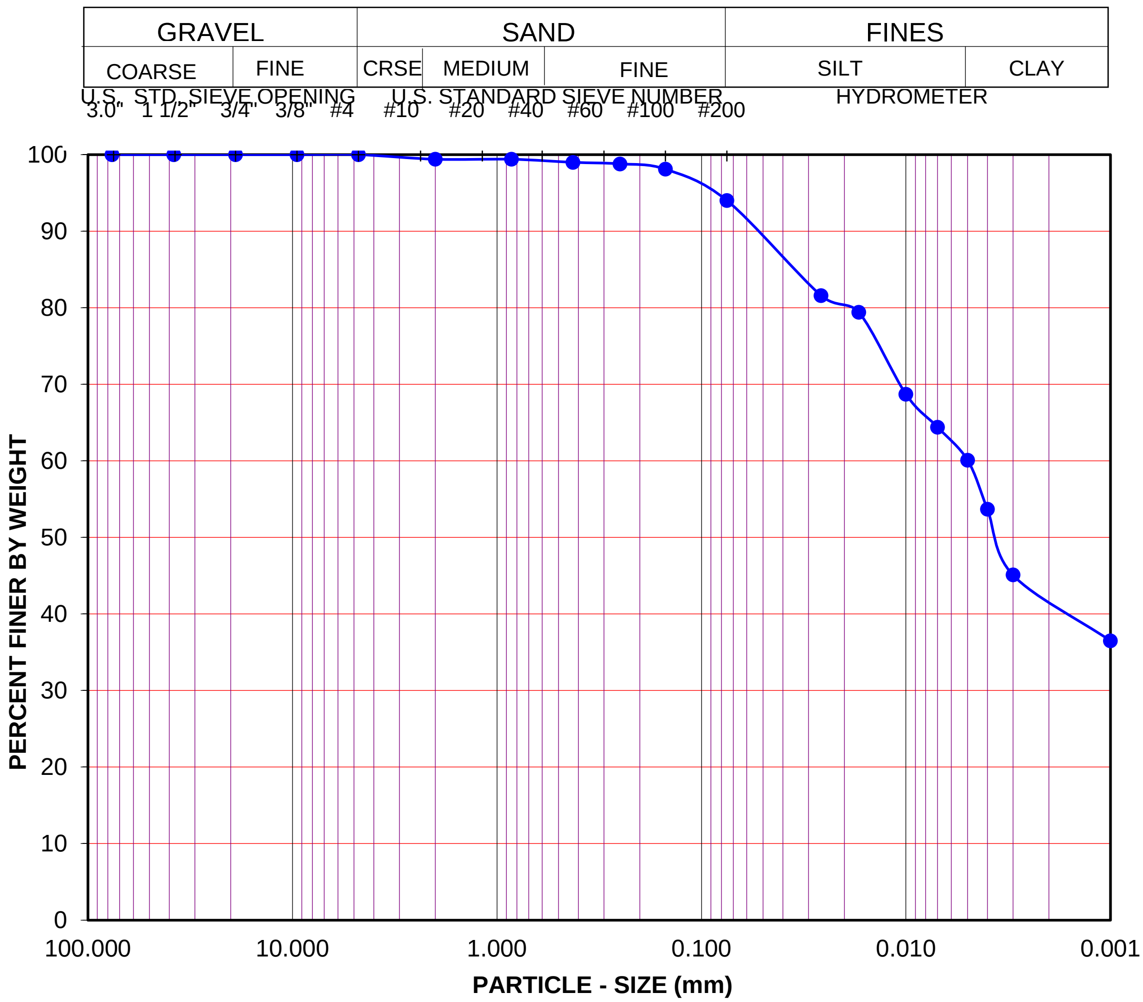
Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-12



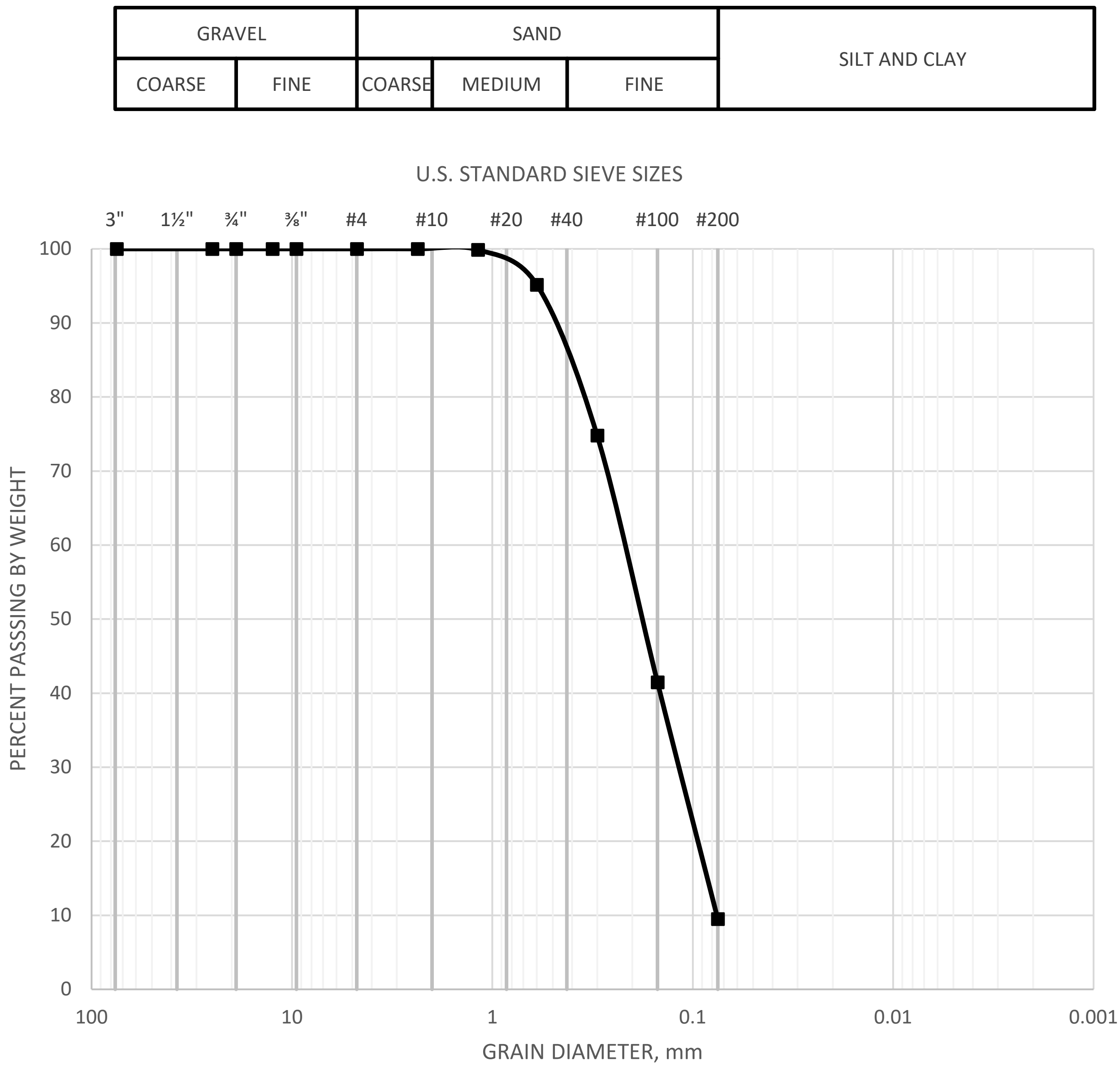
Boring No.	Sample No.	Depth (ft.)	Soil Type		
B1	B1@10'	10	CL-ML		

Sample Description:
Silty CLAY (CL-ML)

Project No.: T2581-22-04
Thousand Palms Channel
Coachella Valley Water District
Indio, California

PARTICLE-SIZE CURVE (HYDROMETER)
ASTM D 4318, D 422

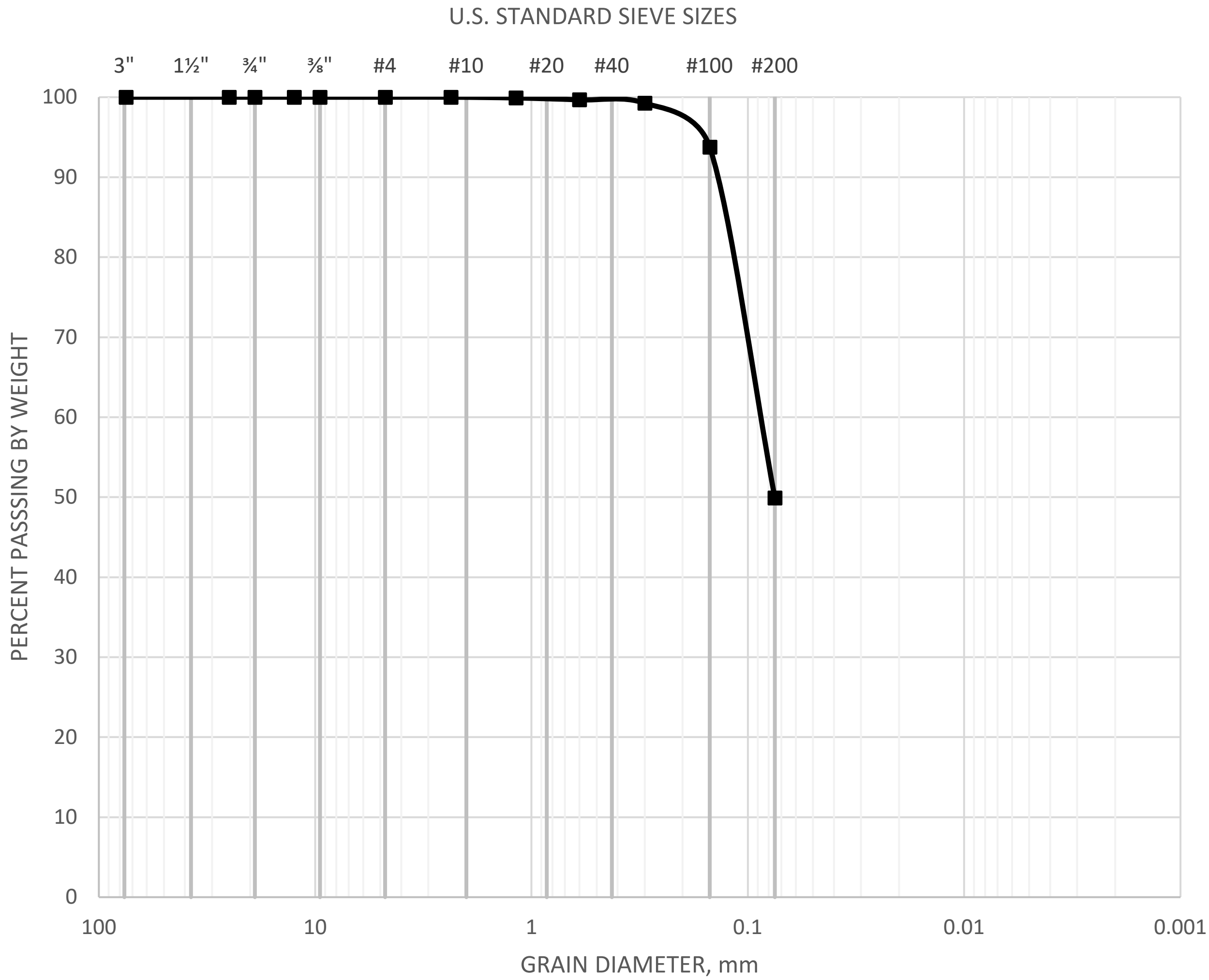
Figure B-13



SAMPLE	CLASSIFICATION	D60	D30	D10
B2@2.5'	poorly-graded SAND with silt (SP-SM), grayish brown	0.22	0.12	0.075

GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D-422	Project No.: T2581-22-04 Thousand Palms Channel Coachella Valley Water District Indio, California
	Checked by: ATS	November 2020 Figure B-14

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B2@5'	Silty SAND (SM), olive gray	0.09		

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

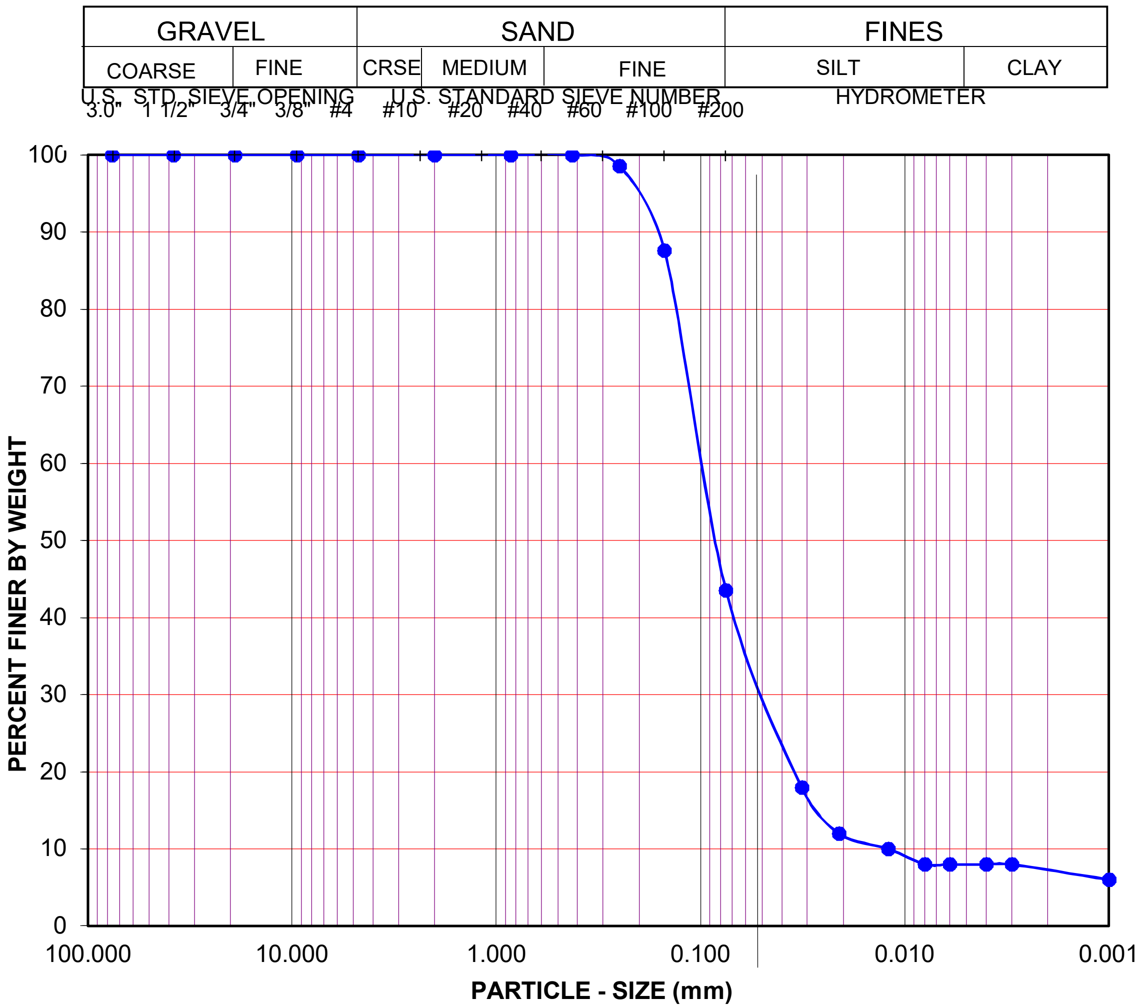
Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-15



Boring No.	Sample No.	Depth (ft.)	Soil Type		
B2	B2@5'	5'	SM		

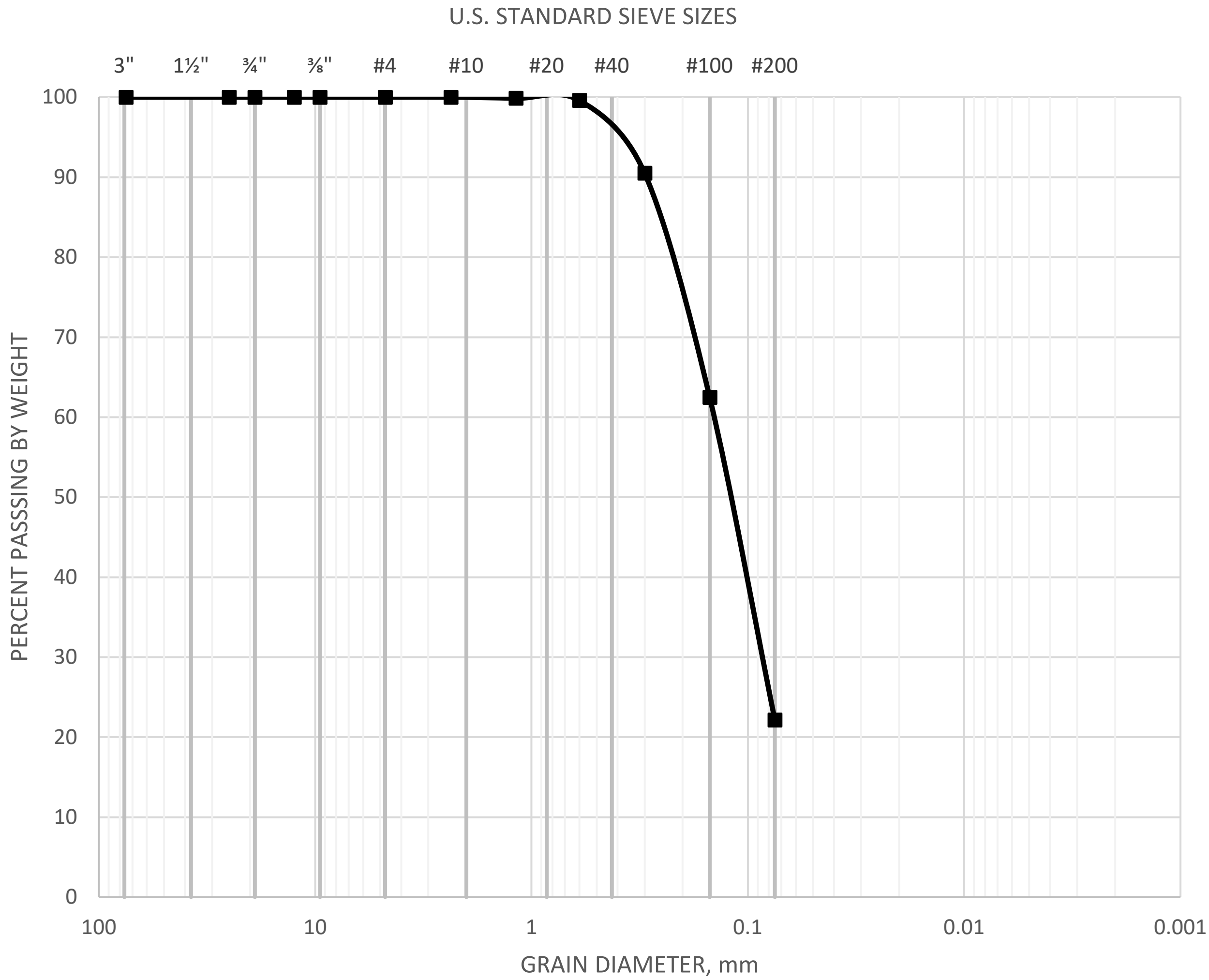
Sample Description:
Silty SAND (SM)

Project No.: T2581-22-04
Thousand Palms Channel
Coachella Valley Water District
Indio, California

PARTICLE-SIZE CURVE (HYDROMETER)
ASTM D 4318, D 422

Figure B-16

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B3@2.5'	Silty SAND (SM), olive gray	0.13	0.083	

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

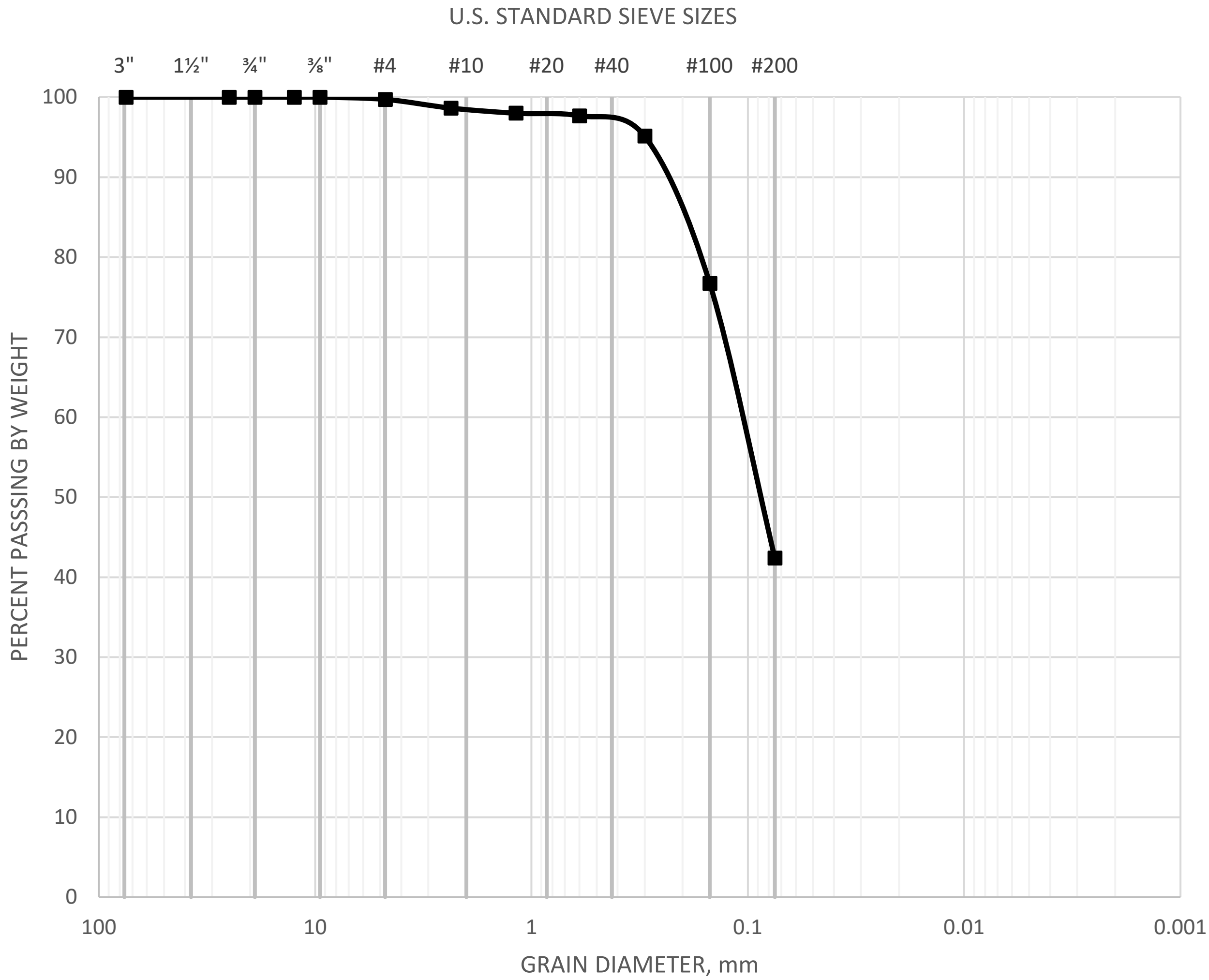
Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

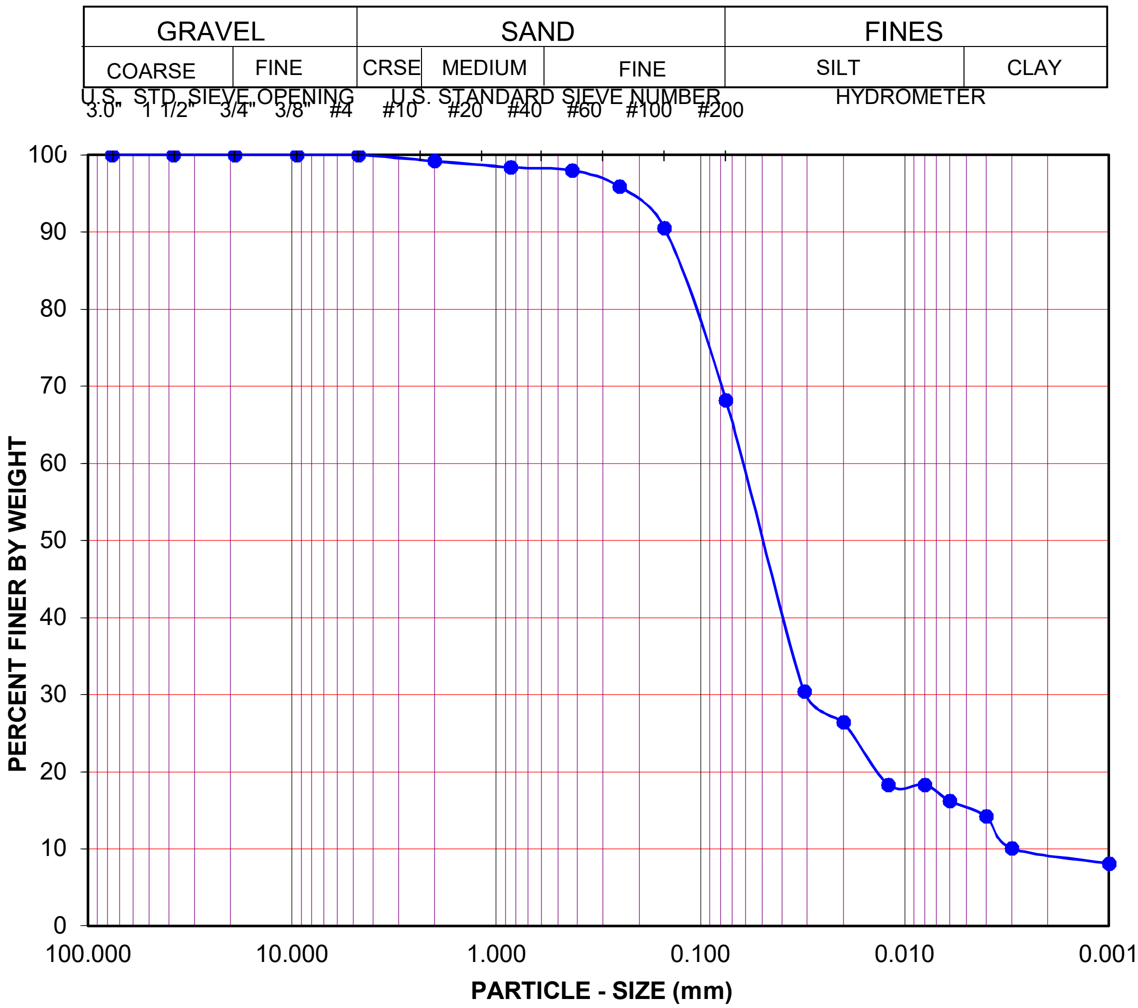
November 2020 Figure B-17

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B3@5'	silty SAND (SM), gray	0.1		

GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D-422	Project No.: T2581-22-04 Thousand Palms Channel Coachella Valley Water District Indio, California
	Checked by: ATS	November 2020 Figure B-18



Boring No.	Sample No.	Depth (ft.)	Soil Type		
B3	B3@5'	5'	ML		

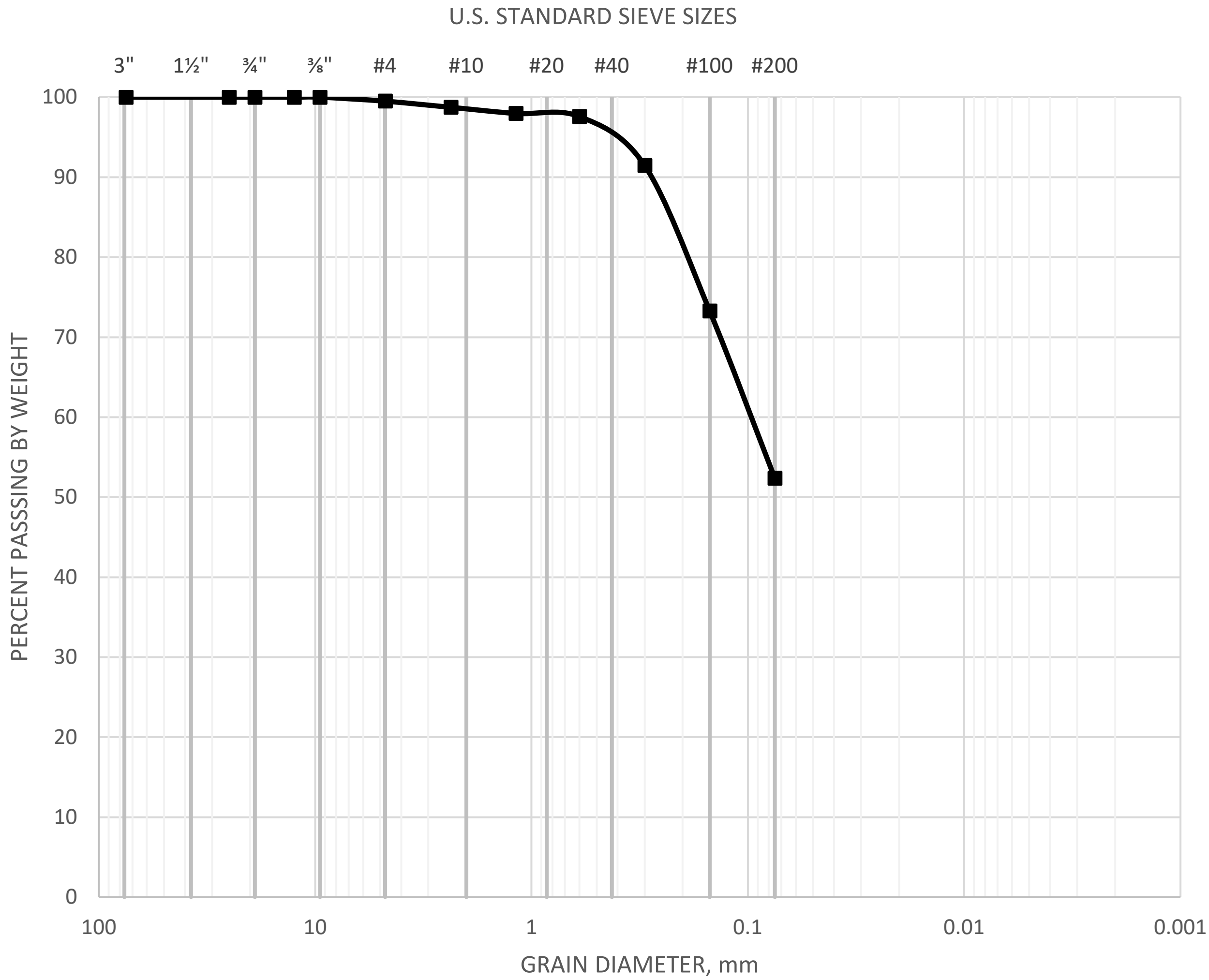
Sample Description:
Sandy SILT (ML)

Project No.: T2581-22-04
Thousand Palms Channel
Coachella Valley Water District
Indio, California

PARTICLE-SIZE CURVE (HYDROMETER)
ASTM D 4318, D 422

Figure B-19

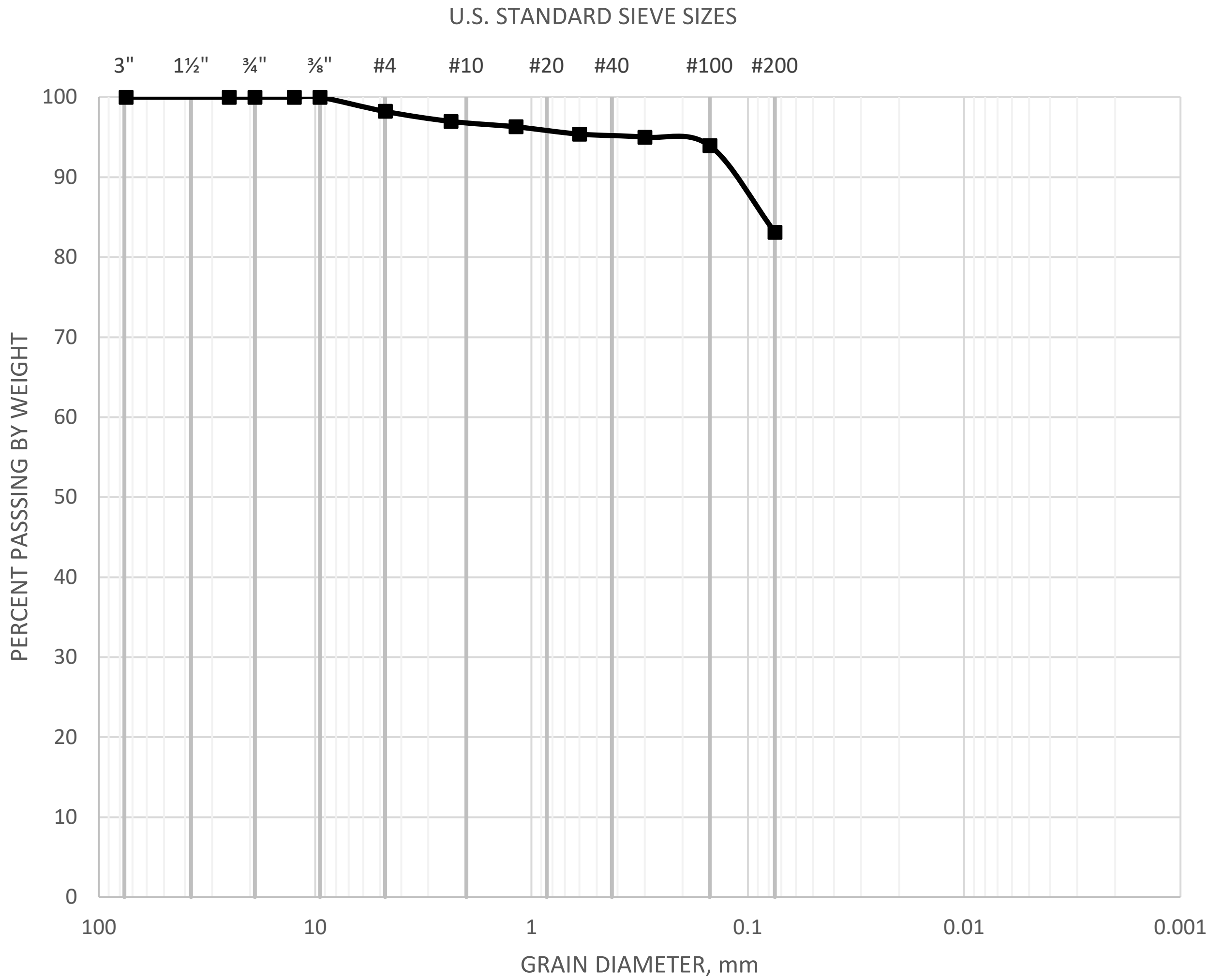
GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B4@2.5'	Sandy SILT (ML), gray	0.1		

GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D-422 Checked by: ATS	Project No.: T2581-22-04 Thousand Palms Channel Coachella Valley Water District Indio, California November 2020 Figure B-20

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B4@10	Sandy SILT (ML), pale yellow			

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D-422

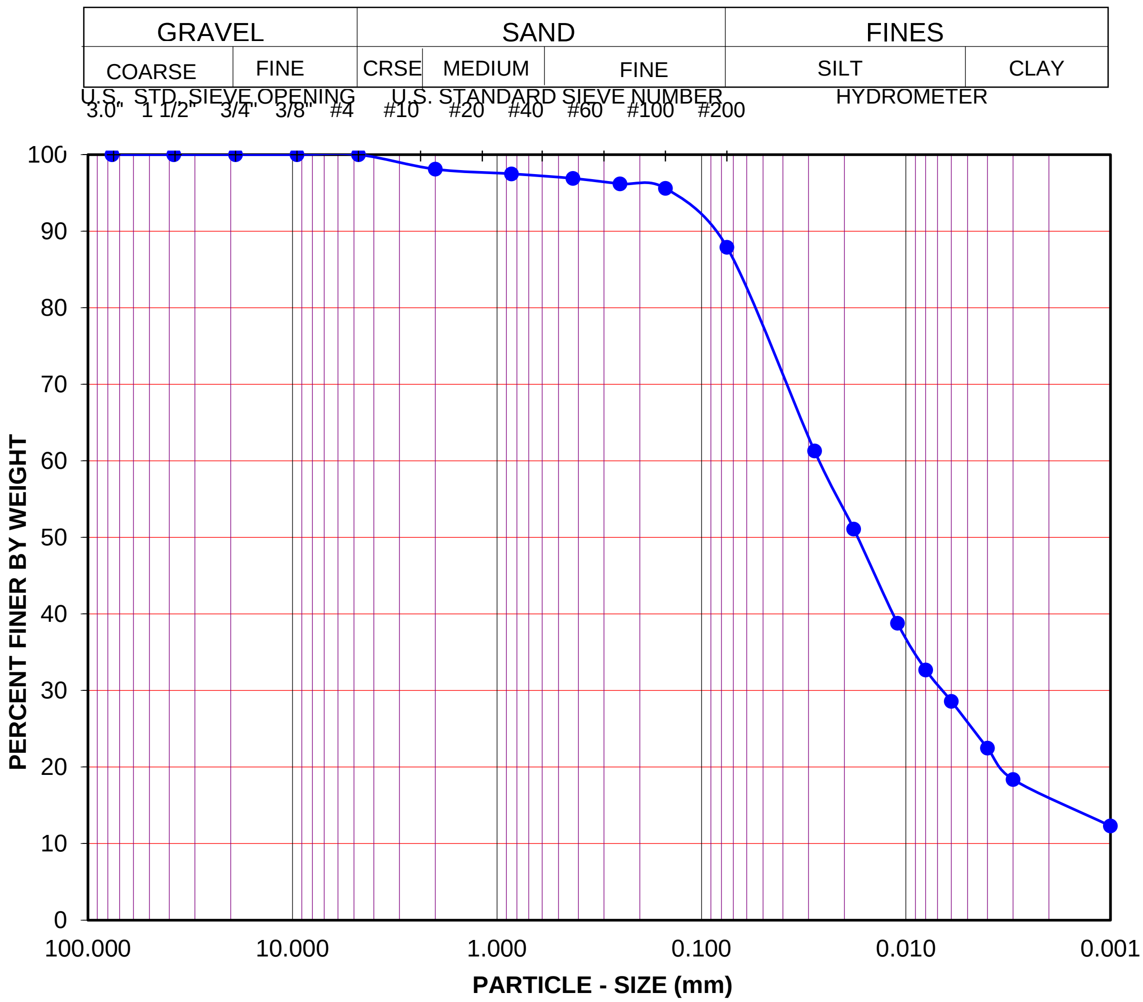
Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-21



Boring No.	Sample No.	Depth (ft.)	Soil Type		
B4	B4@10	10	ML		

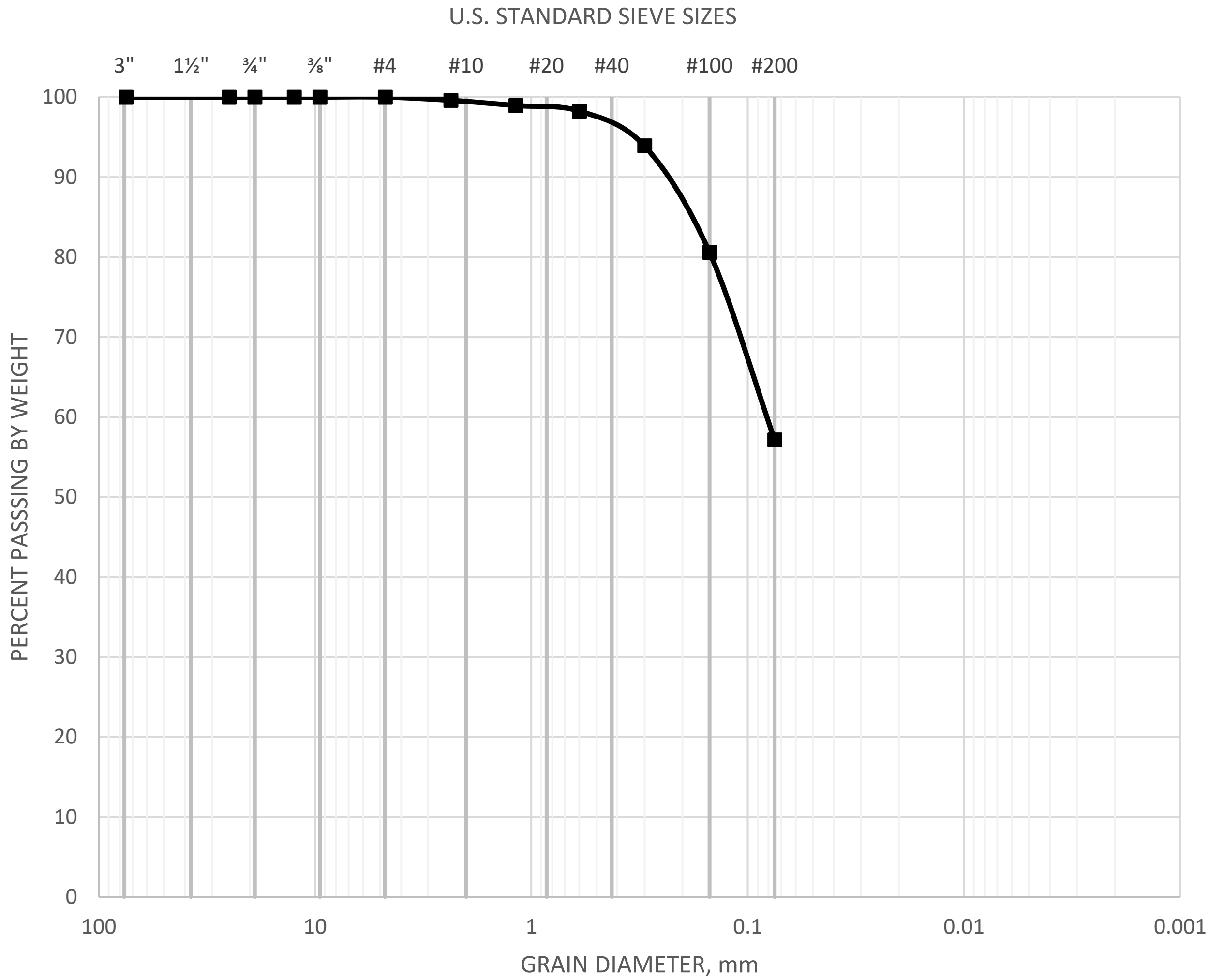
Sample Description:
SILT with clay (ML)

Project No.: T2581-22-04
Thousand Palms Channel
Coachella Valley Water District
Indio, California

PARTICLE-SIZE CURVE (HYDROMETER)
ASTM D 4318, D 422

Figure B-22

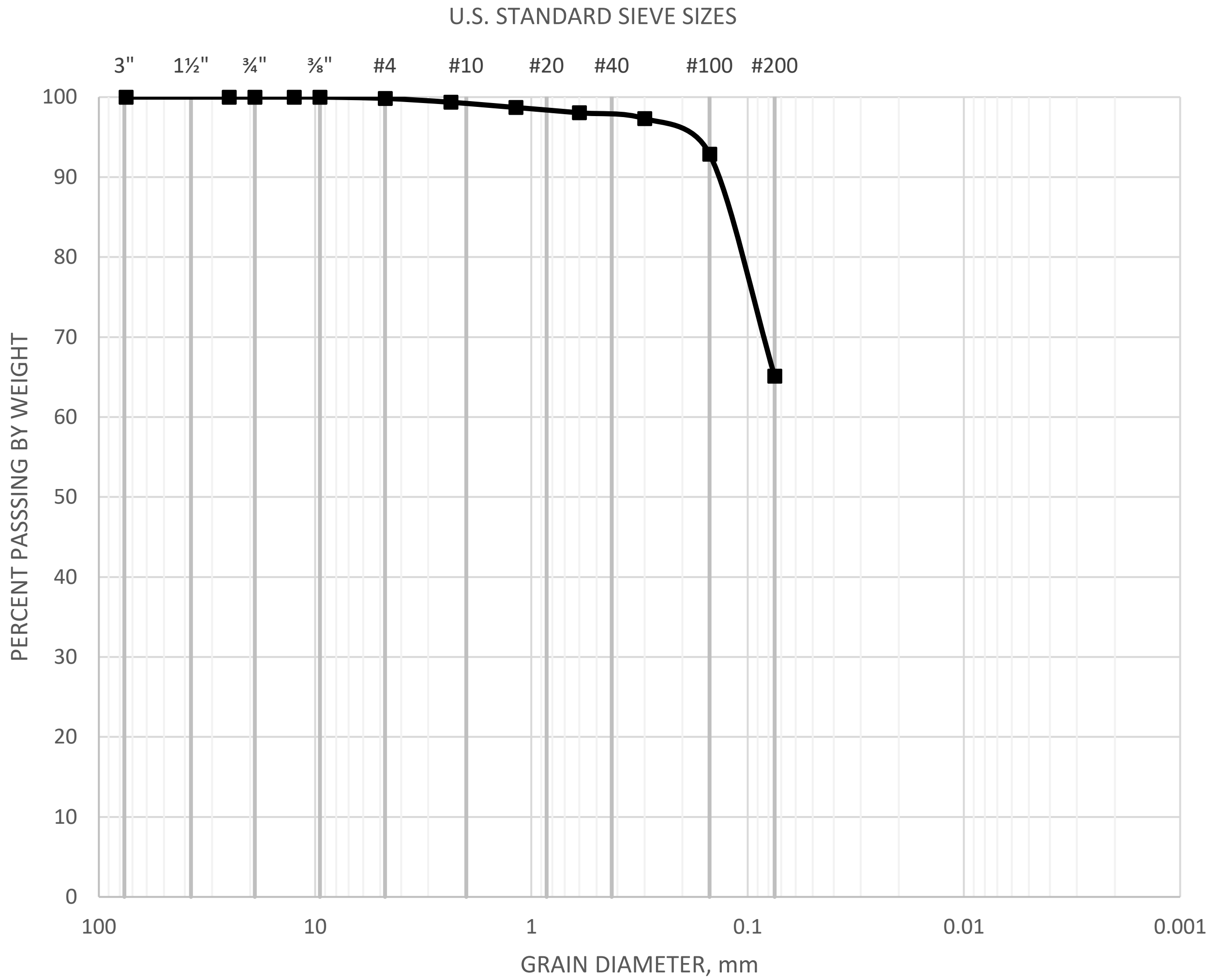
GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B5@5'	SILT with Clay (CL-ML), gray	0.08	0.073	0.073

GEOCON	GRAIN SIZE DISTRIBUTION ASTM D-422	Project No.: T2581-22-05
		Thousand Palms Channel Coachella Valley Water District Indio, California
	Checked by:	JUNE 2022 Figure B-23

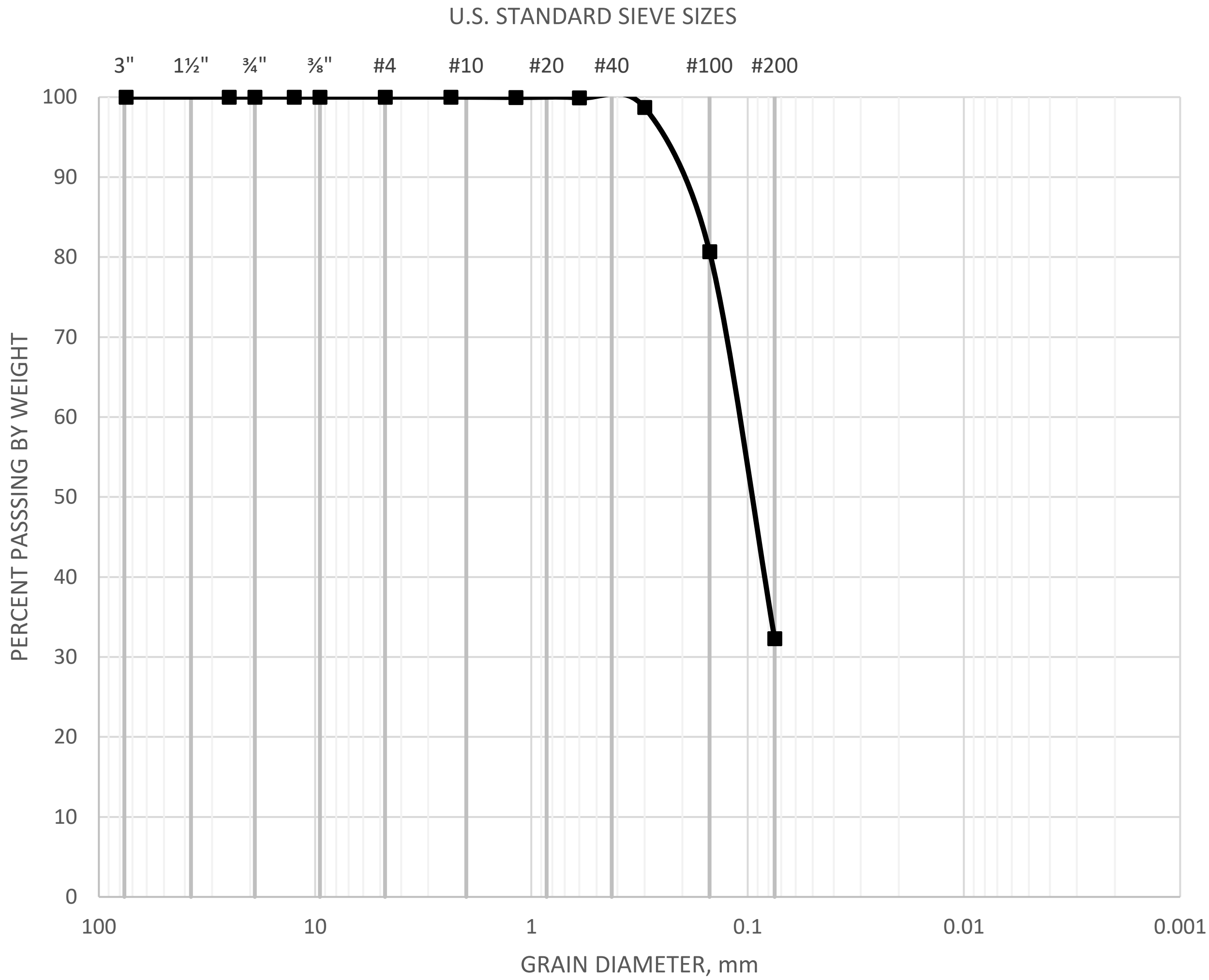
GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B9@25'	SILT with Clay (CL-ML), gray	0.075	0.075	0.075

GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D-422 Checked by:	Project No.: T2581-22-05 Thousand Palms Channel Coachella Valley Water District Indio, California JUNE 2022 Figure B-24

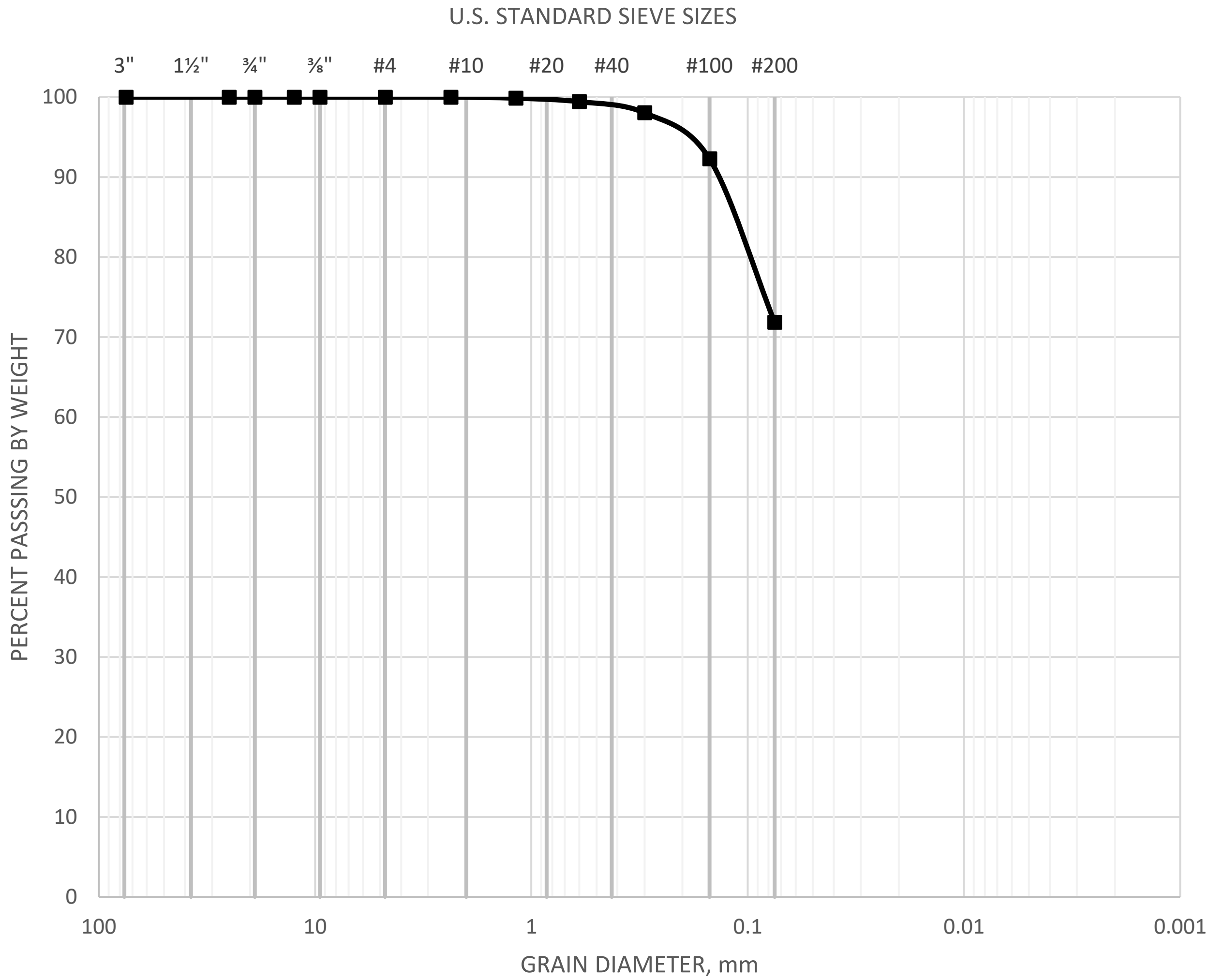
GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B9@35'	SILT with Clay (CL-ML), gray	0.11	0.075	0.075

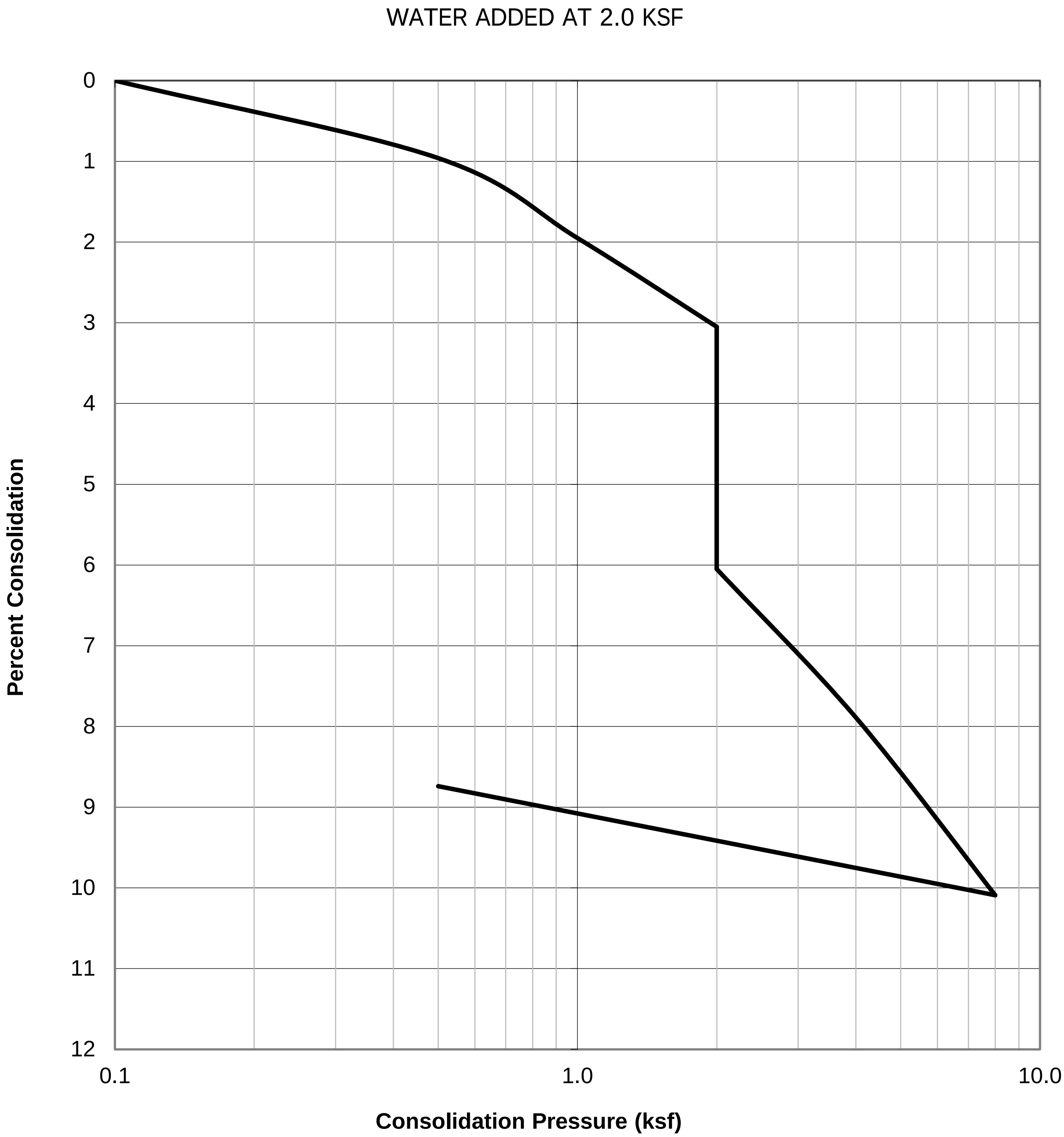
GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D-422 Checked by:	Project No.: T2581-22-05 Thousand Palms Channel Coachella Valley Water District Indio, California JUNE 2022 Figure B-25

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
B13@40'	SILT with Clay (CL-ML), gray	0.075	0.075	0.075

GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D-422	Project No.: T2581-22-05
		Thousand Palms Channel Coachella Valley Water District Indio, California
	Checked by:	JUNE 2022 Figure B-26



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B1@2.5	Silty SAND (SM), olive gray	97.5	3.2	23.3

GEOCON

CONSOLIDATION TEST RESULTS

ASTM D-2435

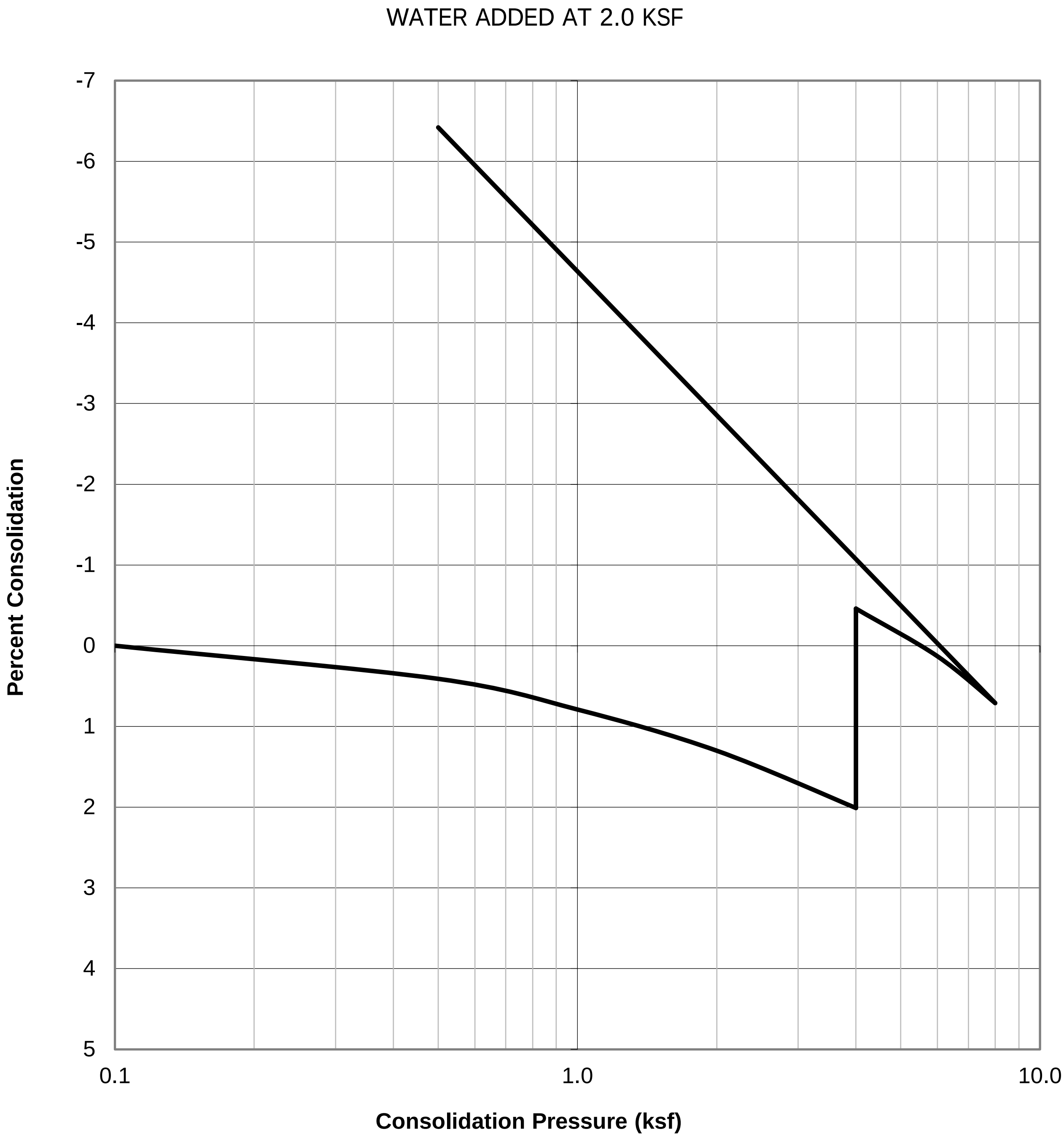
Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-27



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B2@10	Sandy SILT (ML), grayish brown	103.4	17.1	30.1

GEOCON

CONSOLIDATION TEST RESULTS

ASTM D-2435

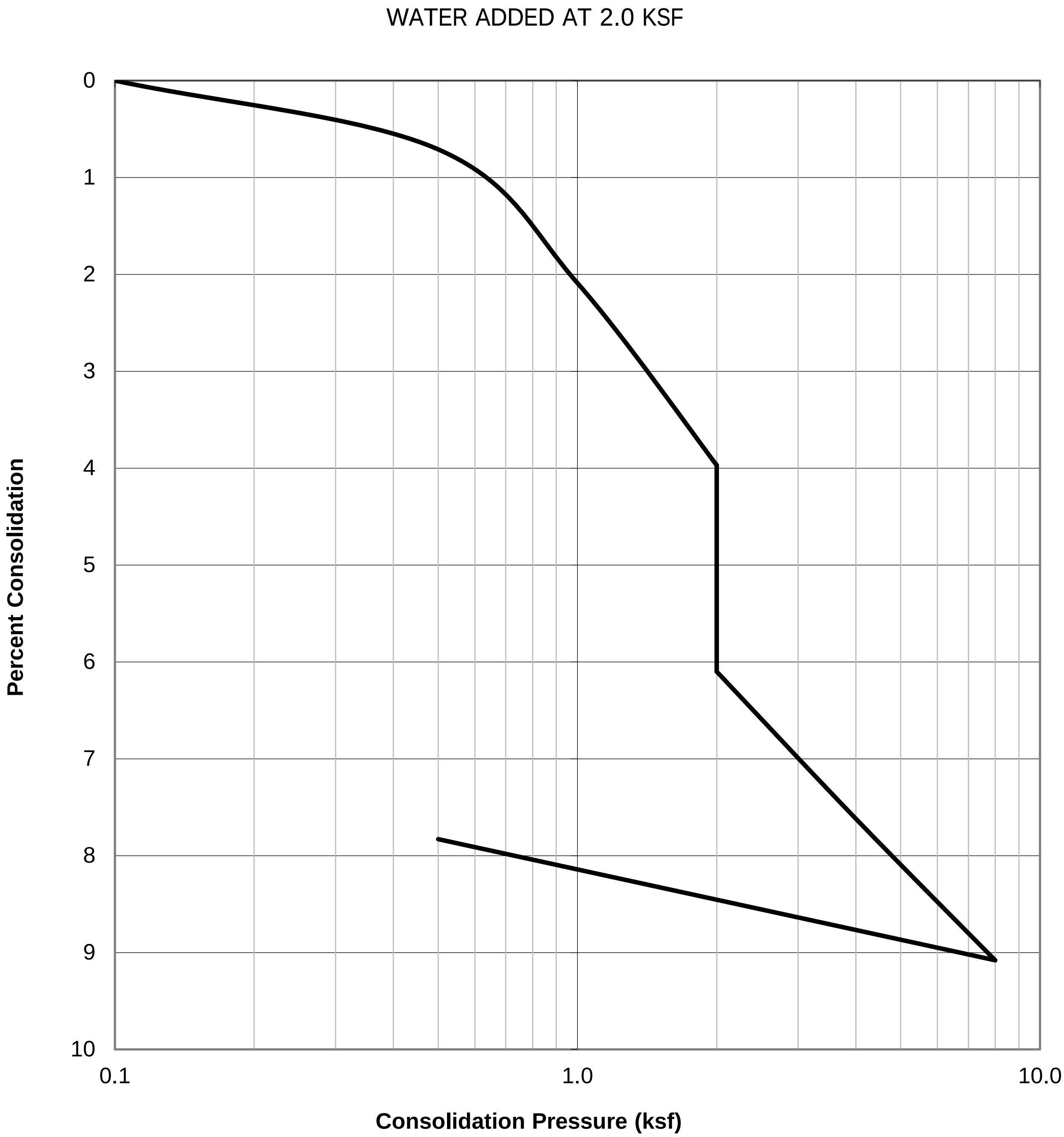
Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-28



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B3@5	Silty SAND (SP), gray	87.3	2.7	26.2

GEOCON

CONSOLIDATION TEST RESULTS

ASTM D-2435

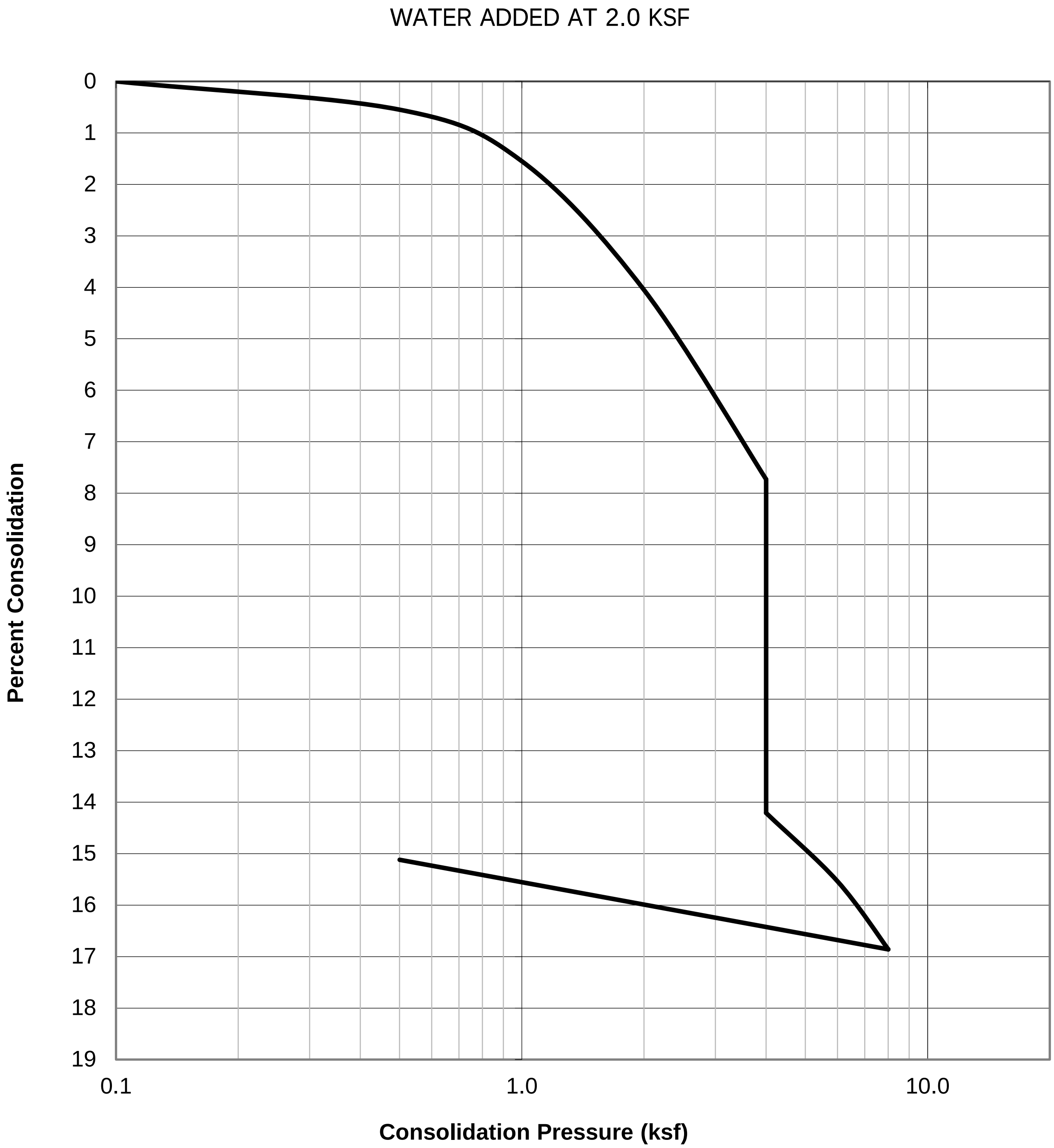
Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-29



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B4@5	Sandy SILT (ML), grayish brown	88.2	6.1	25.8

GEOCON

CONSOLIDATION TEST RESULTS

ASTM D-2435

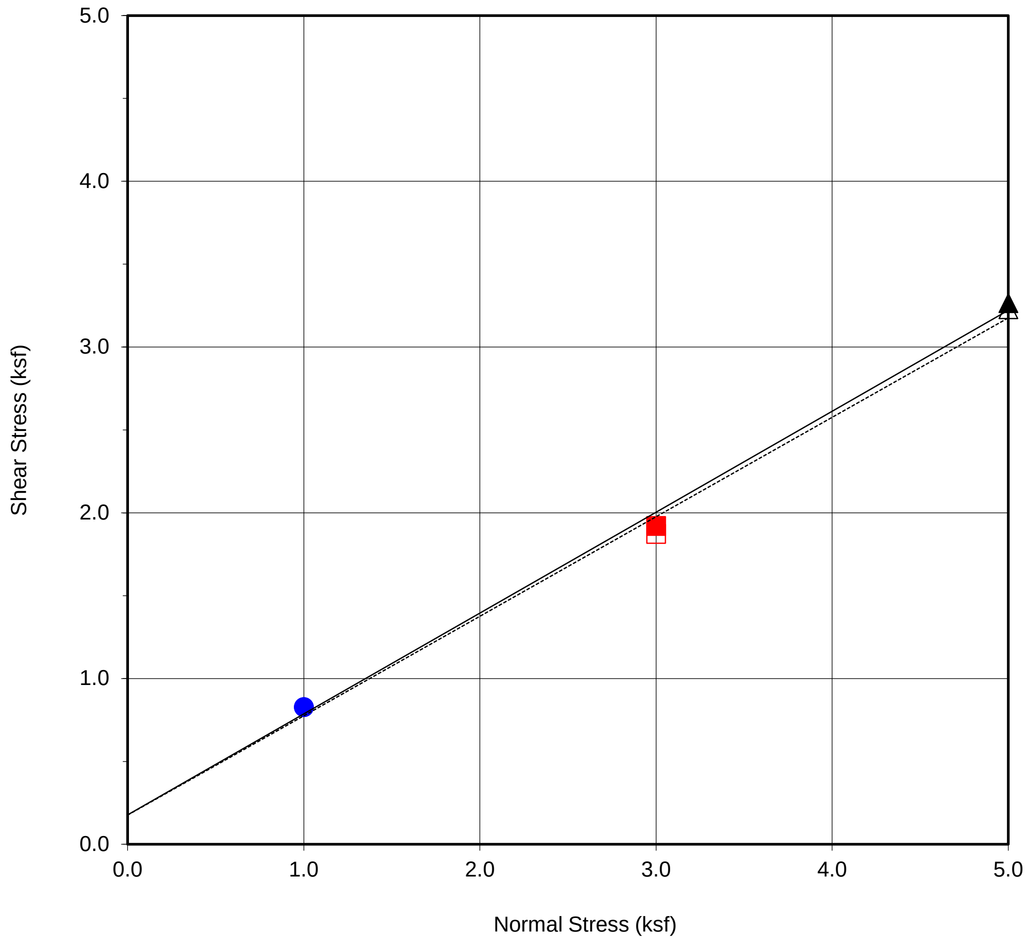
Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-30



Boring No.	**B1**
Sample No.	**B1@0-5'**
Depth (ft)	**0-5**
Sample Type:	Ring

Soil Identification:		
Silty SAND (SM), olive gray		
Strength Parameters		
	C (psf)	ϕ (^{o})
Peak	177	31.3
Ultimate	176	31.0

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.83	■ 1.92	▲ 3.26
Shear Stress @ End of Test (ksf)	○ 0.83	□ 1.87	△ 3.23
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	13.1	13.1	13.1
Initial Dry Density (pcf)	108.0	108.1	108.0
Initial Degree of Saturation (%)	62.9	63.3	63.0
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	9.6	15.4	11.0

GEOCON

DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

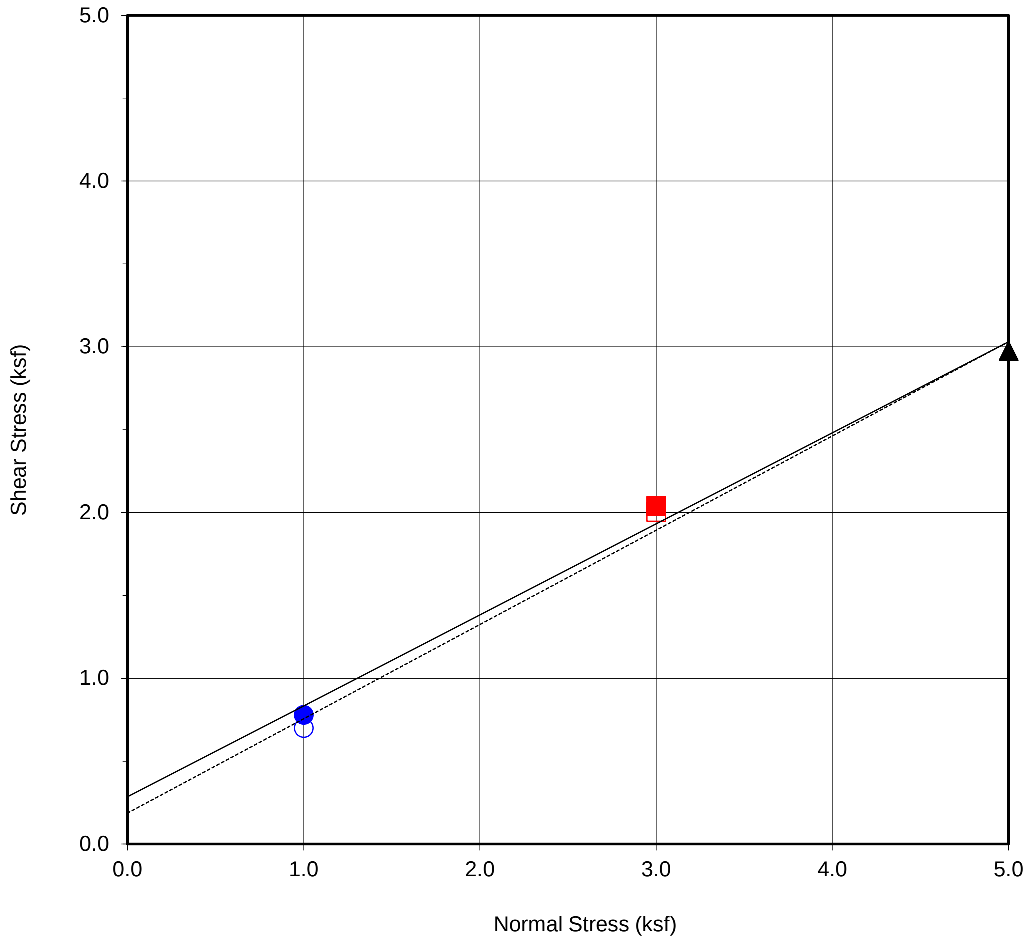
Checked by: ATS

Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-31



Boring No.	**B3**
Sample No.	**B3@5-10'**
Depth (ft)	**5-10'**
Sample Type:	Ring

Soil Identification:		
Silty SAND (SM), gray		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	285	28.8
Ultimate	186	29.6

Normal Strest (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.78	■ 2.04	▲ 2.98
Shear Stress @ End of Test (ksf)	○ 0.70	□ 2.00	△ 2.98
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	12.9	13.0	13.0
Initial Dry Density (pcf)	106.0	105.9	106.0
Initial Degree of Saturation (%)	59.2	59.5	59.5
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	13.2	16.5	8.1

GEOCON

DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

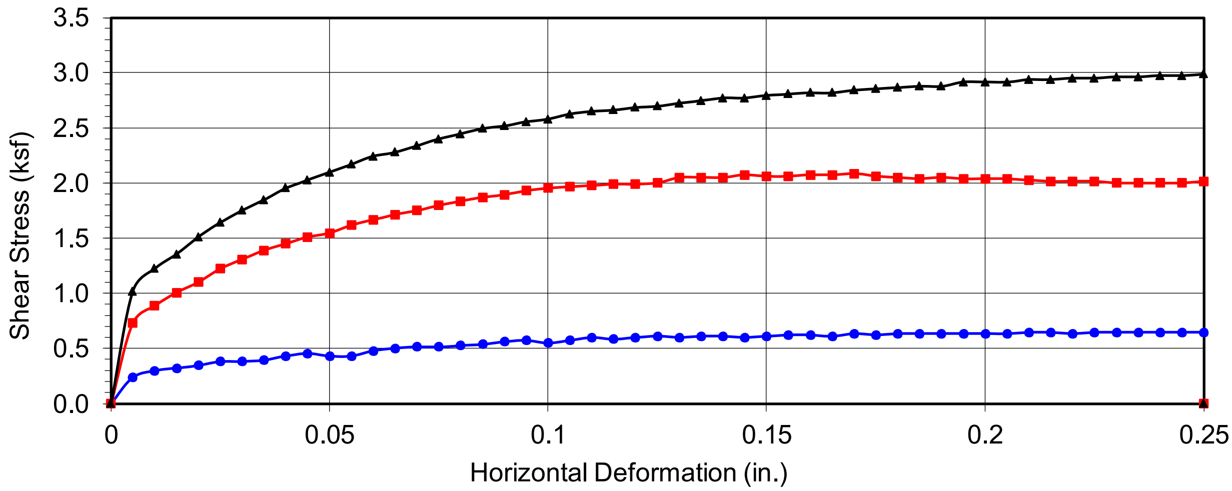
Checked by: ATS

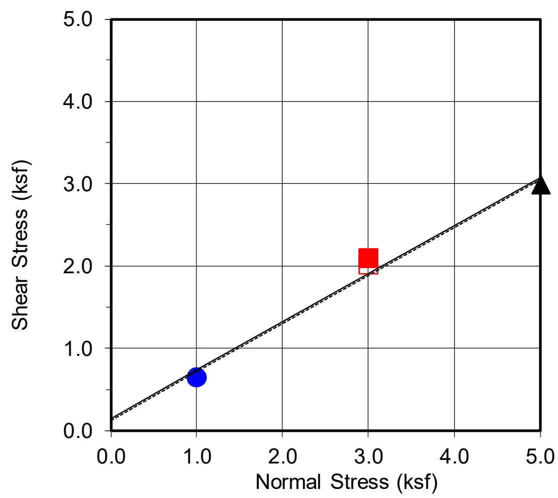
Project No.: T2581-22-04

Thousand Palms Channel
Coachella Valley Water District
Indio, California

November 2020

Figure B-32





Boring No.	**B5**
Sample No.	**B5@10**
Depth (ft)	**10**
Sample Type:	Ring

Soil Identification:		
SILT (ML), light gray		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	153	30.3
Ultimate	129	30.3

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.65	■ 2.09	▲ 2.99
Shear Stress @ End of Test (ksf)	○ 0.65	□ 2.02	△ 2.99
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	8.1	8.0	8.8
Initial Dry Density (pcf)	80.7	101.7	84.0
Initial Degree of Saturation (%)	20.0	33.0	23.6
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	32.5	23.6	20.4

GEOCON

DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

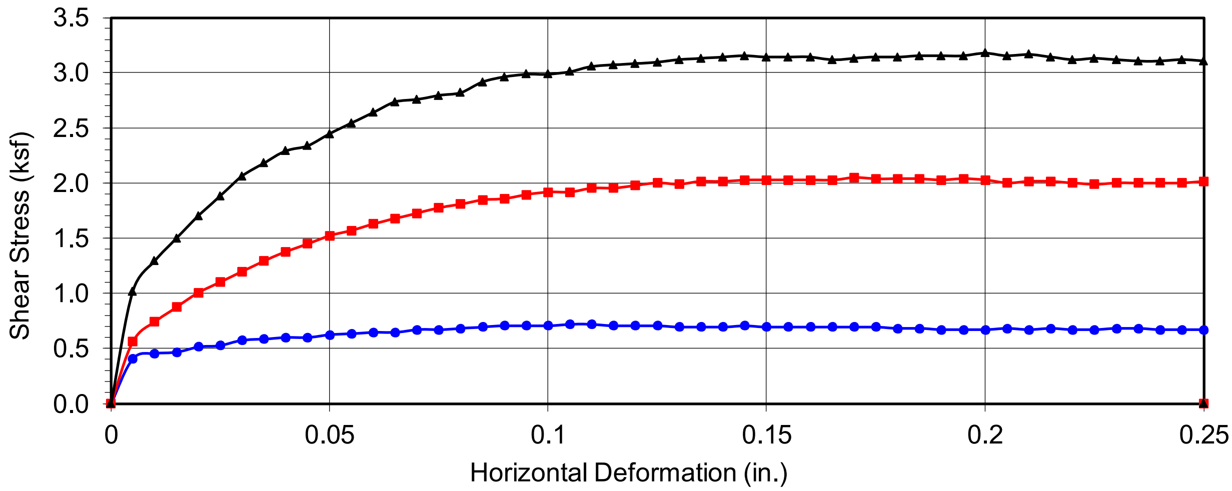
Checked by:

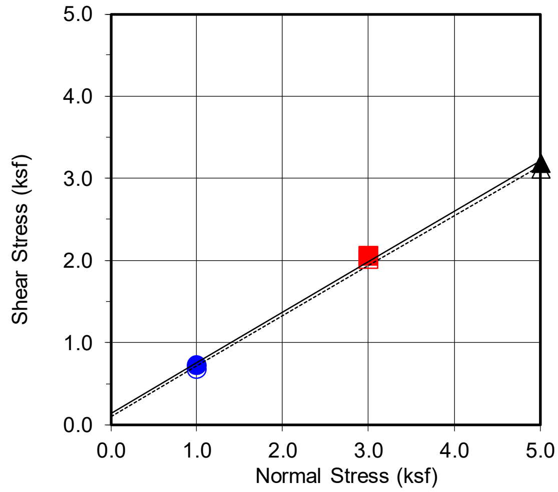
Project No.: T2581-22-05

THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

JUNE 2022

Figure B33





Boring No.	**B8**
Sample No.	**B8@5-10**
Depth (ft)	**5-10**
Sample Type:	Bulk

Soil Identification:		
Poorly Graded SAND (SP), light yellowish brown		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	139	31.6
Ultimate	105	31.3

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.72	■ 2.05	▲ 3.18
Shear Stress @ End of Test (ksf)	○ 0.67	□ 2.02	△ 3.11
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	12.1	12.0	12.1
Initial Dry Density (pcf)	102.1	102.0	101.9
Initial Degree of Saturation (%)	50.1	49.8	50.0
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	18.9	16.5	18.8

GEOCON

DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

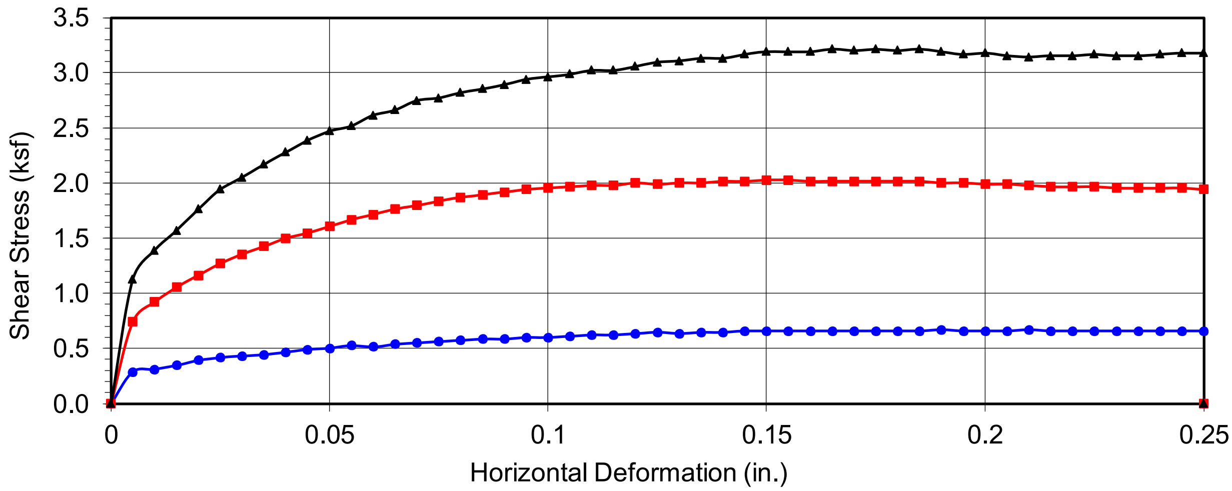
Checked by:

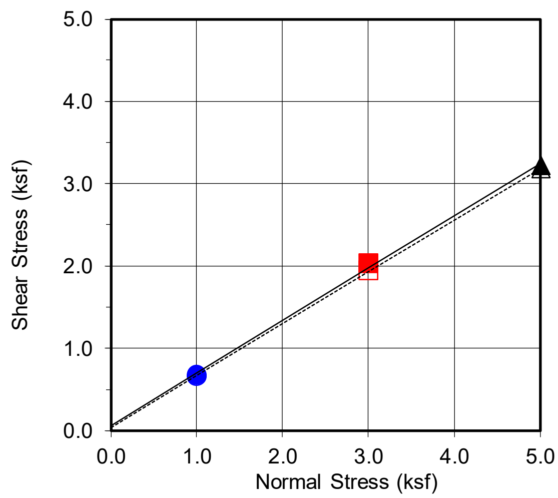
Project No.: T2581-22-05

THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

JUNE 2022

Figure B34





Boring No.	**B9**
Sample No.	**B9@15**
Depth (ft)	**15**
Sample Type:	Ring

Soil Identification:		
Silty SAND (SM), very light yellowish brown		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	64	32.5
Ultimate	38	32.2

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.67	■ 2.03	▲ 3.22
Shear Stress @ End of Test (ksf)	○ 0.66	□ 1.94	△ 3.18
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	14.0	13.4	13.9
Initial Dry Density (pcf)	78.0	89.6	84.4
Initial Degree of Saturation (%)	32.6	41.1	37.6
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	34.7	30.3	31.2

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DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

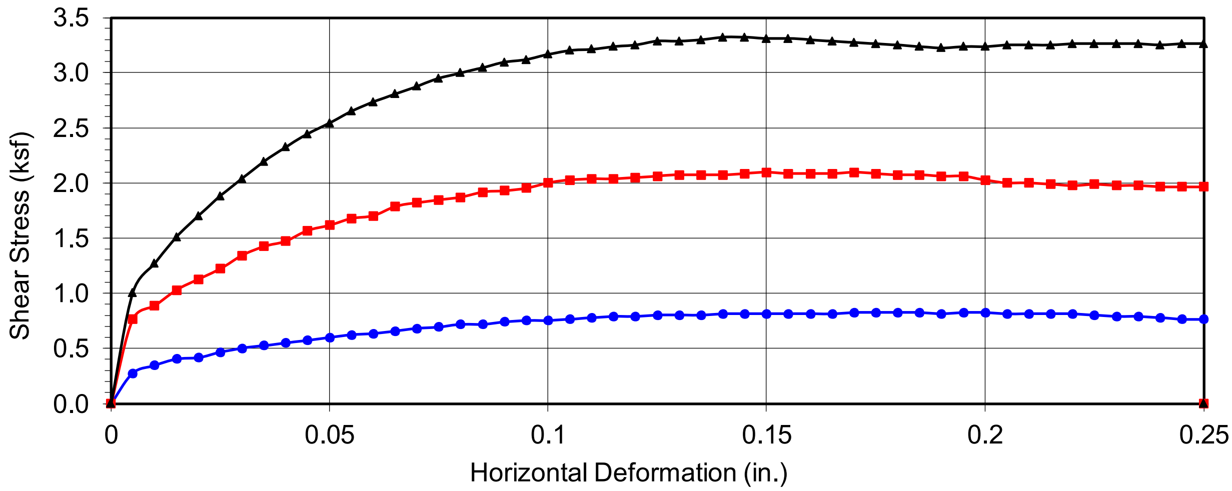
Checked by:

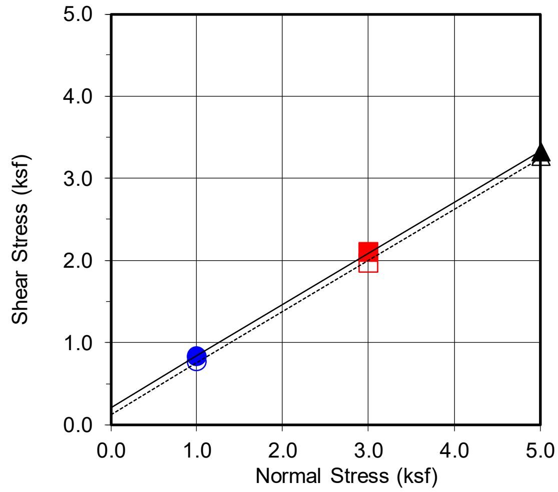
Project No.: T2581-22-05

THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

JUNE 2022

Figure B35





Boring No.	**B10**
Sample No.	**B10@10**
Depth (ft)	**10**
Sample Type:	Ring

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.83	■ 2.10	▲ 3.32
Shear Stress @ End of Test (ksf)	○ 0.77	□ 1.97	△ 3.26
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	8.9	8.9	9.0
Initial Dry Density (pcf)	92.7	93.9	91.4
Initial Degree of Saturation (%)	29.3	30.2	28.9
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	28.5	27.0	25.2

Soil Identification:

Poorly Graded SAND (SP), light yellowish brown

Strength Parameters

	C (psf)	ϕ (°)
Peak	212	32.0
Ultimate	128	32.0

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DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

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Project No.: T2581-22-05

THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

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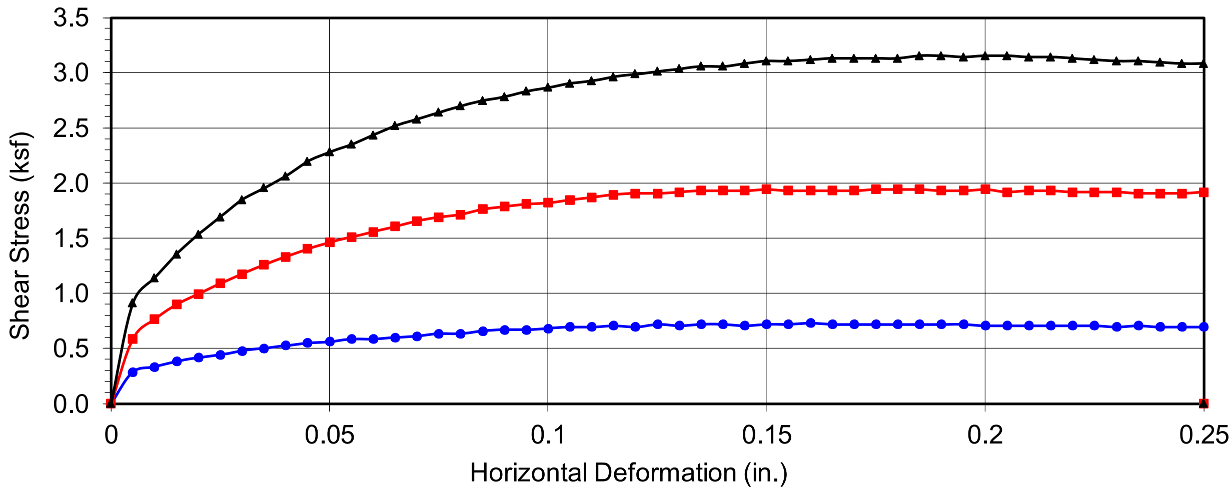
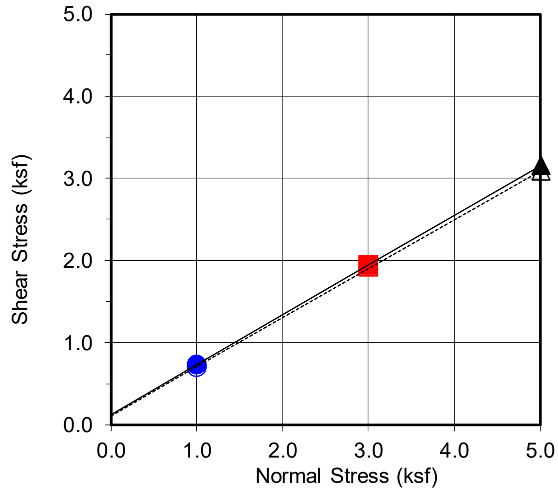
Figure B36





Boring No.	**B12**
Sample No.	**B12@10**
Depth (ft)	**10**
Sample Type:	Ring

Soil Identification:		
Poorly Graded SAND (SP), light yellowish brown		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	126	31.2
Ultimate	109	30.8

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.73	■ 1.94	▲ 3.16
Shear Stress @ End of Test (ksf)	○ 0.70	□ 1.92	△ 3.08
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	8.6	11.6	12.7
Initial Dry Density (pcf)	82.4	85.3	88.1
Initial Degree of Saturation (%)	22.3	32.2	37.5
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	36.9	33.4	33.0

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DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

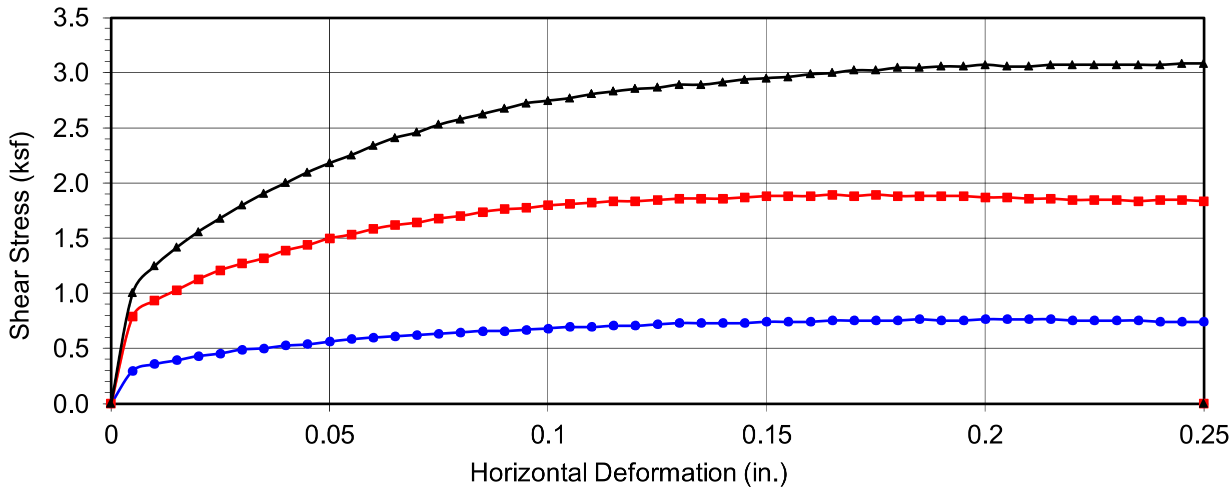
Checked by:

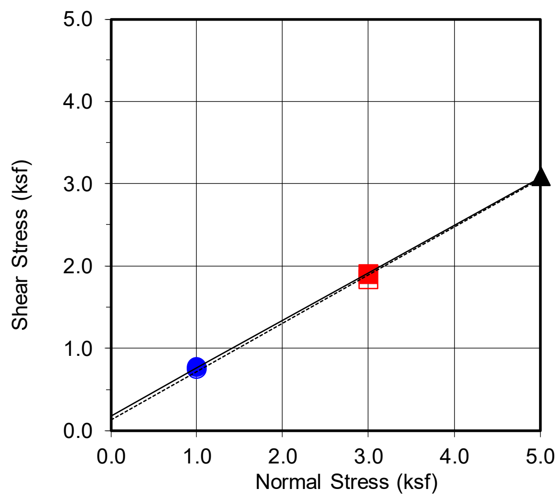
Project No.: T2581-22-05

THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

JUNE 2022

Figure B37





Boring No.	**B13**
Sample No.	**B13@5**
Depth (ft)	**5**
Sample Type:	Ring

Soil Identification:		
Silty SAND (SM), light olive brown		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	179	30.1
Ultimate	133	30.3

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.77	■ 1.90	▲ 3.08
Shear Stress @ End of Test (ksf)	○ 0.74	□ 1.84	△ 3.08
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	10.6	6.1	8.3
Initial Dry Density (pcf)	104.6	102.7	100.5
Initial Degree of Saturation (%)	46.7	25.8	33.0
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	18.9	27.1	16.1

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DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

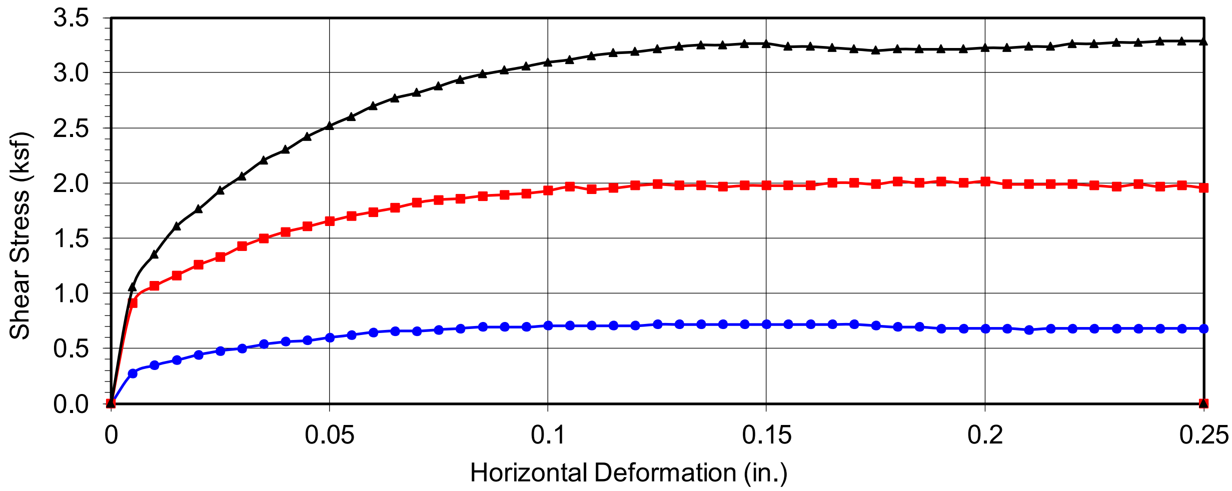
Checked by:

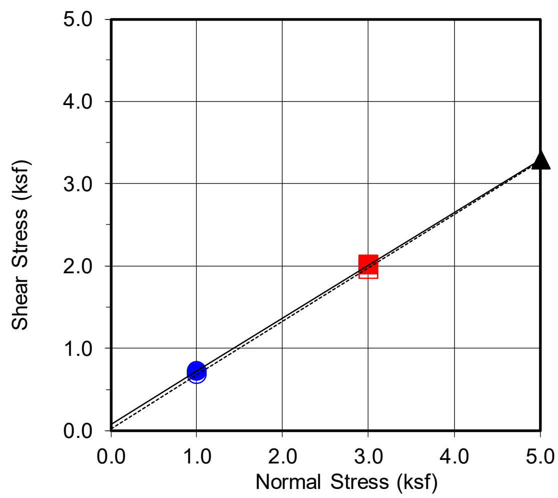
Project No.: T2581-22-05

THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

JUNE 2022

Figure B38





Boring No.	**B14**
Sample No.	**B14@5-10**
Depth (ft)	**5-10**
Sample Type:	Bulk

Soil Identification:		
Poorly Graded SAND with Silt (SP-SM), light gray		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	82	32.7
Ultimate	23	33.1

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.72	■ 2.02	▲ 3.29
Shear Stress @ End of Test (ksf)	○ 0.68	□ 1.96	△ 3.29
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	12.5	12.4	12.5
Initial Dry Density (pcf)	103.1	102.9	103.1
Initial Degree of Saturation (%)	53.1	52.5	53.2
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	18.7	18.3	17.9

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DIRECT SHEAR TEST RESULTS

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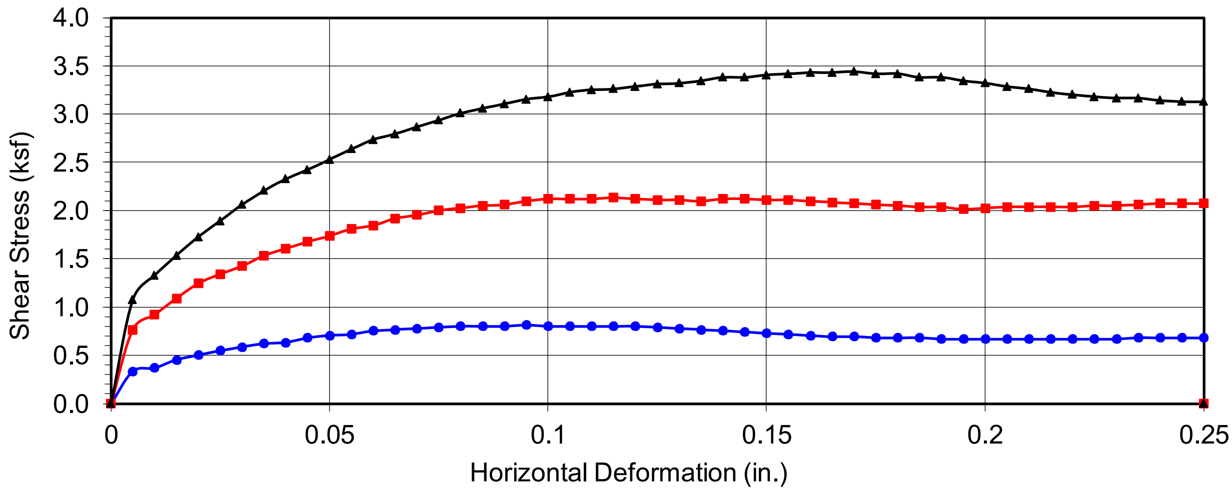
Checked by:

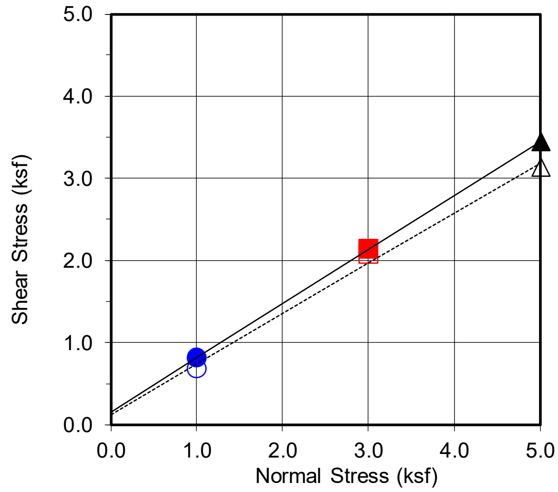
Project No.: T2581-22-05

THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

JUNE 2022

Figure B39





Boring No.	**B15**
Sample No.	**B15@10**
Depth (ft)	**10**
Sample Type:	Ring

Soil Identification:		
Poorly graded SAND (SP), light yellowish brown		
Strength Parameters		
	C (psf)	ϕ (°)
Peak	161	33.3
Ultimate	128	31.5

Normal Stress (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.82	■ 2.14	▲ 3.44
Shear Stress @ End of Test (ksf)	○ 0.68	□ 2.08	△ 3.13
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	7.2	5.6	6.6
Initial Dry Density (pcf)	94.3	94.4	92.3
Initial Degree of Saturation (%)	24.6	19.4	21.6
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	26.4	26.3	25.8

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DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

Checked by:

Project No.: T2581-22-05

THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

JUNE 2022

Figure B40

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Hydraulic Conductivity
(ASTM D5084)

Project Name:	CVWD Thousand Palms Channel		
Project Number:	T2581-22-05	Cell Pressure (psi)	89
Beginning Test Date:	4/14/2022	In Pressure (psi)	80
Ending Test Date:	4/22/2022	Out Pressure (psi)	80
Sample ID:	B9-10	Burette area (cm^2)	0.872
Sample Description:	Brown Fat CLAY	Burette Correction (cm/ml)	1.147
Estimated Specific Gravity:	2.85		

	1	2	3	AVG (inches)	AVG (cm)
Initial Height (in.)	1.949	1.947	1.948	1.95	4.95
Final Height (in.)	2.100	2.090	2.090	2.09	5.32
Initial Diameter (in.)	2.369	2.368	2.377	2.37	6.02
Final Diameter (in.)	2.487	2.450	2.437	2.46	6.24
Initial Area				4.42	28.49
Initial Volume (ft^3)	0.00498	Final Volume (ft^3)		0.00575	
Initial Volume (cm^3)	141.0	Final Volume (cm^3)		162.8	

	Weight (grams)	Moisture Content (%)	Wet Density (pcf)	Dry Density (pcf)	Void Ratio	Saturation (%)
Initial	267.38	**15.8**	118.4	**102.3**	0.739	60.8
Final	311.65	34.9	119.5	88.6	1.008	98.8
Dry	230.94					

Beginning Date & Time	End Date & Time	Elapsed Time (sec.)	Burette Out (ml)	Burette In (ml)	Pressure Head (cm)	Gradient	H1 (cm)	H2 (cm)	Outflow (ml)	Inflow (ml)	Outflow to Inflow Ratio	Permeability (cm/s)
4/20/22 8:24 AM			23.95	1.20	-	5.3	26.1					
	4/20/22 3:17 PM	24,780	23.80	1.40	-	5.2		25.7	0.15	0.20	0.75	4.74E-08
4/20/22 3:17 PM		24,780	23.80	1.40	-	5.2	25.7					
	4/21/22 8:51 AM	63,240	23.40	1.80	-	5.0		24.8	0.40	0.40	1.00	4.35E-08
4/21/22 8:51 AM		88,020	23.40	1.80	-	5.0	24.8					
	4/21/22 1:20 PM	16,140	23.30	1.90	-	5.0		24.5	0.10	0.10	1.00	4.36E-08
4/21/22 1:20 PM		104,160	23.30	1.90	-	5.0	24.5					
	4/21/22 3:36 PM	8,160	23.25	1.95	-	4.9		24.4	0.05	0.05	1.00	4.35E-08
4/21/22 3:36 PM		112,320	23.25	1.95	-	4.9	24.4					
	4/22/22 9:56 AM	66,000	22.90	2.40	-	4.8		23.5	0.35	0.45	0.78	4.39E-08
		178,320										

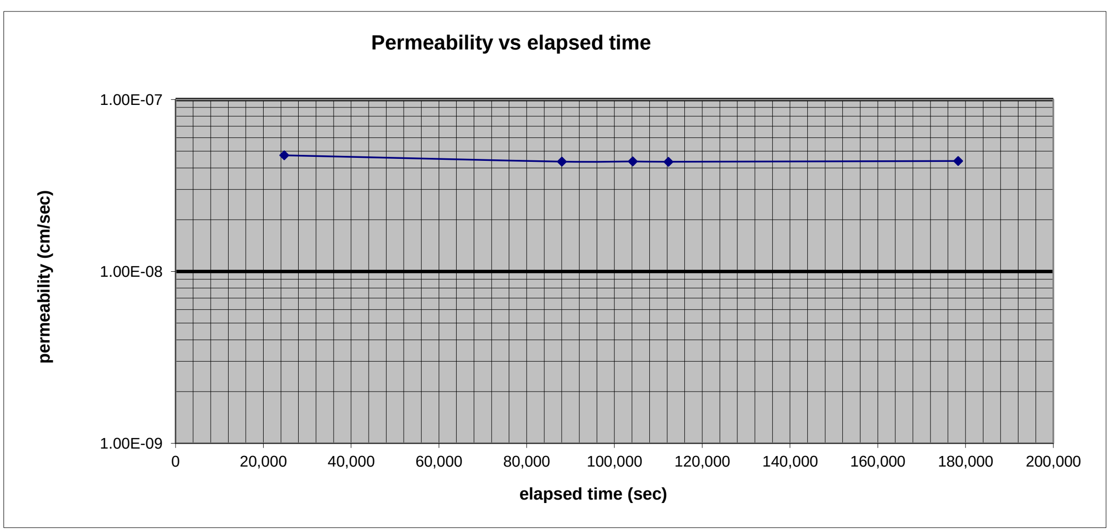
Average Permeability (cm/s):	**4.36E-08**
Average Permeability @ 20°C (in/hr):	**0.000**
Permeability @ 20°C (cm/s)	**4.14E-08**

Notes: Insitu Soil Sample

Average temperature during test °C = 22.2

Tap water utlized as permeant

Tested By: M. Repking   Calculated By: MR   Reviewed By: JZ



GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Hydraulic Conductivity
(ASTM D5084)

Project Name:	CVWD Thousand Palms Channel		
Project Number:	T2581-22-05	Cell Pressure (psi)	88.1
Beginning Test Date:	4/14/2022	In Pressure (psi)	70
Ending Test Date:	4/21/2022	Out Pressure (psi)	70
Sample ID:	B9-20	Burette area (cm^2)	0.872
Sample Description:	Olive Brown Silty Clayey SAND	Burette Correction (cm/ml)	1.147
Estimated Specific Gravity:	2.85		

	1	2	3	AVG (inches)	AVG (cm)
Initial Height (in.)	2.000	2.000	2.000	2.00	5.08
Final Height (in.)	1.930	1.930	1.920	1.93	4.89
Initial Diameter (in.)	2.370	2.370	2.370	2.37	6.02
Final Diameter (in.)	2.350	2.350	2.350	2.35	5.97
Initial Area				4.41	28.46

Initial Volume (ft^3)	0.00511	Final Volume (ft^3)	0.00484
Initial Volume (cm^3)	144.6	Final Volume (cm^3)	136.9

	Weight (grams)	Moisture Content (%)	Wet Density (pcf)	Dry Density (pcf)	Void Ratio	Saturation (%)
Initial	211.77	**3.9**	91.4	**88.0**	1.021	10.9
Final	267.63	31.3	122.0	92.9	0.914	97.6
Dry	203.84					

Beginning Date & Time	End Date & Time	Elapsed Time (sec.)	Burette Out (ml)	Burette In (ml)	Pressure Head (cm)	Gradient	H1 (cm)	H2 (cm)	Outflow (ml)	Inflow (ml)	Outflow to Inflow Ratio	Permeability (cm/s)
4/20/22 3:58 PM			24.40	1.10	-	5.3	26.7					
	4/20/22 3:58 PM	30	24.00	1.50	-	5.1		25.8	0.40	0.40	1.00	9.06E-05
4/20/22 3:58 PM		30	24.00	1.50	-	5.1	25.8					
	4/20/22 3:59 PM	30	23.60	1.90	-	4.9		24.9	0.40	0.40	1.00	9.39E-05
4/20/22 3:59 PM		60	23.60	1.90	-	4.9	24.9					
	4/20/22 3:59 PM	30	23.20	2.20	-	4.7		24.1	0.40	0.30	1.33	8.51E-05
4/20/22 3:59 PM		90	23.20	2.20	-	4.7	24.1					
	4/20/22 4:00 PM	30	22.90	2.60	-	4.6		23.3	0.30	0.40	0.75	8.79E-05
4/20/22 4:00 PM		120	22.90	2.60	-	4.6	23.3					
	4/20/22 4:00 PM	30	22.55	2.90	-	4.4		22.5	0.35	0.30	1.17	8.44E-05
4/20/22 4:00 PM		150	22.55	2.90	-	4.4	22.5					
	4/20/22 4:01 PM	30	22.20	3.20	-	4.3		21.8	0.35	0.30	1.17	8.73E-05
		180										

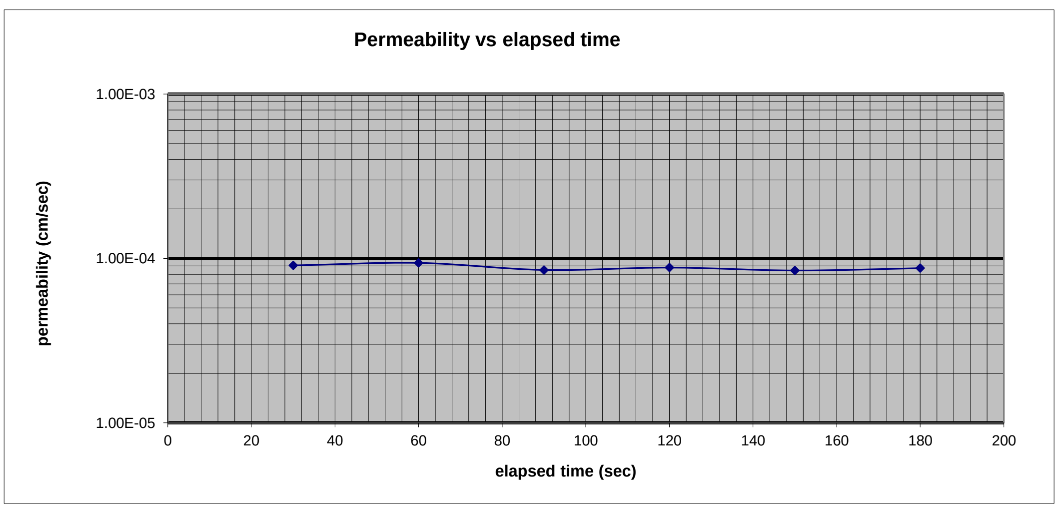
Average Permeability (cm/s):	**8.62E-05**
Average Permeability @ 20°C (in/hr):	**0.114**
Permeability @ 20°C (cm/s)	**8.02E-05**

Notes: Insitu Soil Sample

Average temperature during test °C = 23.0

Tap water utlized as permeant

Tested By: M. Repking Calculated By: MR Reviewed By: JZ



GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Hydraulic Conductivity
(ASTM D5084)

Project Name:	CVWD Thousand Palms Channel		
Project Number:	T2581-22-05	Cell Pressure (psi)	87.1
Beginning Test Date:	4/14/2022	In Pressure (psi)	60
Ending Test Date:	4/21/2022	Out Pressure (psi)	60
Sample ID:	B9-30	Burette area (cm^2)	0.872
Sample Description	Olive Brown Silty Clayey SAND	Burette Correction (cm/ml)	1.147
Estimated Specific Gravity:	2.85		

	1	2	3	AVG (inches)	AVG (cm)
Initial Height (in.)	2.000	2.000	2.000	2.00	5.08
Final Height (in.)	1.910	1.910	1.910	1.91	4.85
Initial Diameter (in.)	2.370	2.370	2.370	2.37	6.02
Final Diameter (in.)	2.380	2.390	2.385	2.39	6.06
Initial Area				4.41	28.46
Initial Volume (ft^3)	0.00511	Final Volume (ft^3)		0.00494	
Initial Volume (cm^3)	144.6	Final Volume (cm^3)		139.8	

	Weight (grams)	Moisture Content (%)	Wet Density (pcf)	Dry Density (pcf)	Void Ratio	Saturation (%)
Initial	253.7	**15.6**	109.5	**94.8**	0.877	50.7
Final	281.23	28.1	125.6	98.0	0.815	98.4
Dry	219.47					

Beginning Date & Time	End Date & Time	Elapsed Time (sec.)	Burette Out (ml)	Burette In (ml)	Pressure Head (cm)	Gradient	H1 (cm)	H2 (cm)	Outflow (ml)	Inflow (ml)	Outflow to Inflow Ratio	Permeability (cm/s)
4/20/22 3:53 PM			24.20	1.00	-	5.2	26.6					
	4/20/22 3:53 PM	30	23.80	1.50	-	5.0		25.6	0.40	0.50	0.80	1.03E-04
4/20/22 3:53 PM		30	23.80	1.50	-	5.0	25.6					
	4/20/22 3:54 PM	30	23.40	1.90	-	4.9		24.7	0.40	0.40	1.00	9.48E-05
4/20/22 3:54 PM		60	23.40	1.90	-	4.9	24.7					
	4/20/22 3:54 PM	30	23.00	2.30	-	4.7		23.7	0.40	0.40	1.00	9.84E-05
4/20/22 3:54 PM		90	23.00	2.30	-	4.7	23.7					
	4/20/22 3:55 PM	30	22.60	2.65	-	4.5		22.9	0.40	0.35	1.14	9.57E-05
4/20/22 3:55 PM		120	22.60	2.65	-	4.5	22.9					
	4/20/22 3:55 PM	30	22.20	3.00	-	4.3		22.0	0.40	0.35	1.14	9.94E-05
		150										

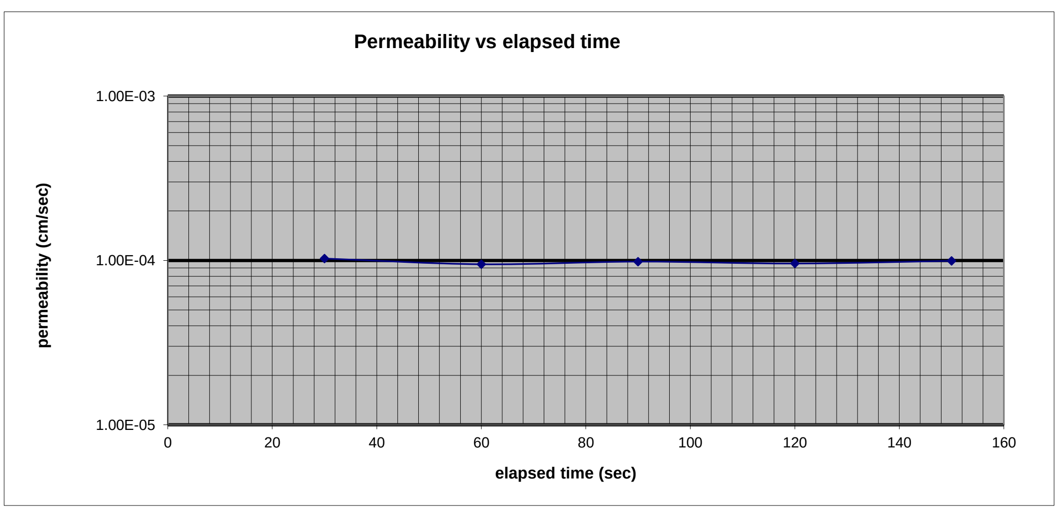
Average Permeability (cm/s):	**9.76E-05**
Average Permeability @ 20°C (in/hr):	**0.129**
Permeability @ 20°C (cm/s)	**9.08E-05**

Notes: Insitu Soil Sample

Average temperature during test °C = 23.0

Tap water utlized as permeant

Tested By: M. Repking | Calculated By: MR | Reviewed By: JZ



GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Hydraulic Conductivity
(ASTM D5084)

Project Name:	CVWD Thousand Palms Channel		
Project Number:	T2581-22-05	Cell Pressure (psi)	79
Beginning Test Date:	4/14/2022	In Pressure (psi)	70
Ending Test Date:	4/22/2022	Out Pressure (psi)	70
Sample ID:	B13-10	Burette area (cm^2)	0.872
Sample Description:	Olive Brown lean CLAY	Burette Correction (cm/ml)	1.147
Estimated Specific Gravity:	2.85		

	1	2	3	AVG (inches)	AVG (cm)
Initial Height (in.)	1.000	1.000	1.000	1.00	2.54
Final Height (in.)	0.950	0.975	0.970	0.97	2.45
Initial Diameter (in.)	2.370	2.370	2.370	2.37	6.02
Final Diameter (in.)	2.420	2.400	2.400	2.41	6.11
Initial Area				4.41	28.46
Initial Volume (ft^3)	0.00255	Final Volume (ft^3)		0.00254	
Initial Volume (cm^3)	72.3	Final Volume (cm^3)		71.9	

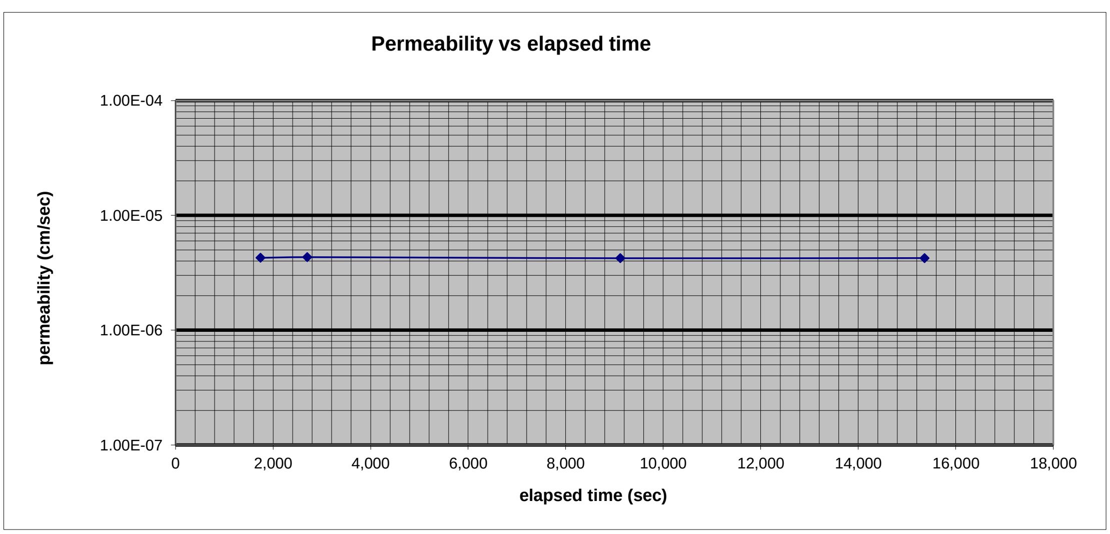
	Weight (grams)	Moisture Content (%)	Wet Density (pcf)	Dry Density (pcf)	Void Ratio	Saturation (%)
Initial	116.59	**8.6**	100.7	**92.7**	0.918	26.6
Final	141.6	31.9	122.9	93.2	0.908	100.0
Dry	107.39					

Beginning Date & Time	End Date & Time	Elapsed Time (sec.)	Burette Out (ml)	Burette In (ml)	Pressure Head (cm)	Gradient	H1 (cm)	H2 (cm)	Outflow (ml)	Inflow (ml)	Outflow to Inflow Ratio	Permeability (cm/s)
4/21/22 12:35 PM			24.00	0.70	-	10.5	26.7					
	4/21/22 1:04 PM	1,740	21.95	2.70	-	8.7		22.1	2.05	2.00	1.03	4.27E-06
4/21/22 1:04 PM		1,740	21.95	2.70	-	8.7	22.1					
	4/21/22 1:20 PM	960	20.95	3.65	-	7.8		19.8	1.00	0.95	1.05	4.33E-06
4/21/22 1:20 PM		2,700	20.95	3.65	-	7.8	19.8					
	4/21/22 3:07 PM	6,420	16.60	8.00	-	3.9		9.9	4.35	4.35	1.00	4.24E-06
4/21/22 3:07 PM		9,120	16.60	8.00	-	3.9	9.9					
	4/21/22 4:51 PM	6,240	14.45	10.10	-	2.0		5.0	2.15	2.10	1.02	4.25E-06
		15,360										

Average Permeability (cm/s): 4.27E-06
Average Permeability @ 20°C (in/hr): 0.006
Permeability @ 20°C (cm/s) 4.05E-06

Notes: Insitu Soil Sample
Average temperature during test °C = 22.2
Tap water utlized as permeant

Tested By: M. Repking | Calculated By: MR | Reviewed By: JZ



GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Hydraulic Conductivity
(ASTM D5084)

Project Name:	CVWD Thousand Palms Channel		
Project Number:	T2581-22-05	Cell Pressure (psi)	79
Beginning Test Date:	4/15/2022	In Pressure (psi)	70
Ending Test Date:	4/22/2022	Out Pressure (psi)	70
Sample ID:	B13-20	Burette area (cm^2)	0.872
Sample Description:	Olive Silty CLAY	Burette Correction (cm/ml)	1.147
Estimated Specific Gravity:	2.75		

	1	2	3	AVG (inches)	AVG (cm)
Initial Height (in.)	2.000	2.000	2.000	2.00	5.08
Final Height (in.)	1.970	1.960	1.985	1.97	5.01
Initial Diameter (in.)	2.386	2.382	2.377	2.38	6.05
Final Diameter (in.)	2.385	2.415	2.382	2.39	6.08
Initial Area				4.46	28.74
Initial Volume (ft^3)	0.00516	Final Volume (ft^3)		0.00514	
Initial Volume (cm^3)	146.0	Final Volume (cm^3)		145.4	

	Weight (grams)	Moisture Content (%)	Wet Density (pcf)	Dry Density (pcf)	Void Ratio	Saturation (%)
Initial	256.91	**11.6**	109.8	**98.4**	0.744	42.9
Final	292.1	26.9	125.4	98.8	0.737	100.4
Dry	230.2					

Beginning Date & Time	End Date & Time	Elapsed Time (sec.)	Burette Out (ml)	Burette In (ml)	Pressure Head (cm)	Gradient	H1 (cm)	H2 (cm)	Outflow (ml)	Inflow (ml)	Outflow to Inflow Ratio	Permeability (cm/s)
4/21/22 8:56 AM			24.50	1.40	-	5.2	26.5					
	4/21/22 10:00 AM	3,840	23.20	2.60	-	4.7		23.6	1.30	1.20	1.08	2.30E-06
4/21/22 10:00 AM		3,840	23.20	2.60	-	4.7	23.6					
	4/21/22 12:32 PM	9,120	20.70	5.10	-	3.5		17.9	2.50	2.50	1.00	2.35E-06
4/21/22 12:32 PM		12,960	20.70	5.10	-	3.5	17.9					
	4/21/22 1:05 PM	1,980	20.25	5.55	-	3.3		16.9	0.45	0.45	1.00	2.31E-06
4/21/22 1:05 PM		14,940	20.25	5.55	-	3.3	16.9					
	4/21/22 1:21 PM	960	20.05	5.75	-	3.2		16.4	0.20	0.20	1.00	2.21E-06
4/21/22 1:21 PM		15,900	20.05	5.75	-	3.2	16.4					
	4/21/22 3:08 PM	6,420	18.90	7.00	-	2.7		13.6	1.15	1.25	0.92	2.21E-06
		22,320										

Average Permeability (cm/s): **2.27E-06**

Average Permeability @ 20°C (in/hr): 0.003

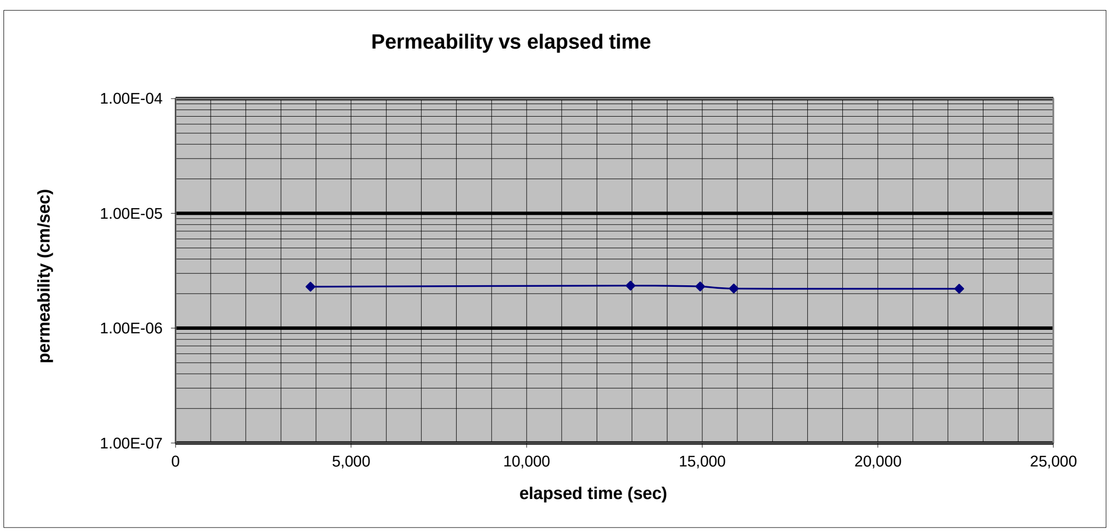
Permeability @ 20°C (cm/s): 2.10E-06

Notes: Insitu Soil Sample

Average temperature during test °C = 23.3

Tap water utlized as permeant

Tested By: M. Repking | Calculated By: MR | Reviewed By: MR



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Hydraulic Conductivity
(ASTM D5084)

Project Name:	CVWD Thousand Palms Channel		
Project Number:	T2581-22-05	Cell Pressure (psi)	87.1
Beginning Test Date:	4/15/2022	In Pressure (psi)	60
Ending Test Date:	4/21/2022	Out Pressure (psi)	60
Sample ID:	B13-30	Burette area (cm^2)	0.872
Sample Description:	Olive Silty SAND	Burette Correction (cm/ml)	1.147
Estimated Specific Gravity:	2.75		

	1	2	3	AVG (inches)	AVG (cm)
Initial Height (in.)	2.000	2.000	2.000	2.00	5.08
Final Height (in.)	1.950	1.950	1.950	1.95	4.95
Initial Diameter (in.)	2.370	2.370	2.370	2.37	6.02
Final Diameter (in.)	2.365	2.365	2.365	2.37	6.01
Initial Area				4.41	28.46

Initial Volume (ft^3)	0.00511	Final Volume (ft^3)	0.00496
Initial Volume (cm^3)	144.6	Final Volume (cm^3)	140.4

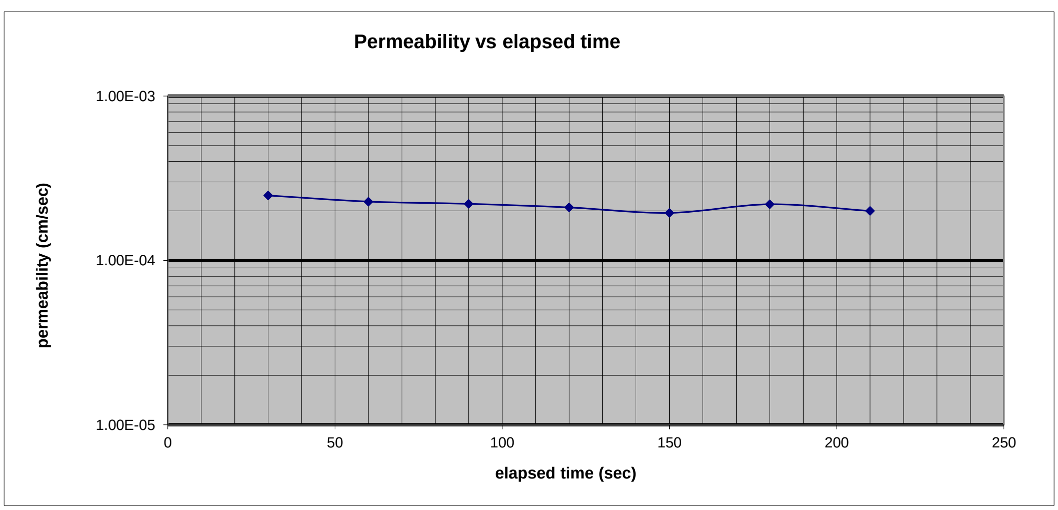
	Weight (grams)	Moisture Content (%)	Wet Density (pcf)	Dry Density (pcf)	Void Ratio	Saturation (%)
Initial	237.42	**2.8**	102.5	**99.7**	0.722	10.8
Final	285.97	23.9	127.2	102.7	0.671	97.8
Dry	230.86					

Beginning Date & Time	End Date & Time	Elapsed Time (sec.)	Burette Out (ml)	Burette In (ml)	Pressure Head (cm)	Gradient	H1 (cm)	H2 (cm)	Outflow (ml)	Inflow (ml)	Outflow to Inflow Ratio	Permeability (cm/s)
4/20/22 3:46 PM			24.00	0.45	-	5.3	27.0					
	4/20/22 3:46 PM	30	22.90	1.50	-	4.8		24.5	1.10	1.05	1.05	2.48E-04
4/20/22 3:46 PM		30	22.90	1.50	-	4.8	24.5					
	4/20/22 3:47 PM	30	22.00	2.40	-	4.4		22.5	0.90	0.90	1.00	2.28E-04
4/20/22 3:47 PM		60	22.00	2.40	-	4.4	22.5					
	4/20/22 3:47 PM	30	21.20	3.20	-	4.1		20.6	0.80	0.80	1.00	2.21E-04
4/20/22 3:47 PM		90	21.20	3.20	-	4.1	20.6					
	4/20/22 3:48 PM	30	20.50	3.90	-	3.7		19.0	0.70	0.70	1.00	2.10E-04
4/20/22 3:48 PM		120	20.50	3.90	-	3.7	19.0					
	4/20/22 3:48 PM	30	19.90	4.50	-	3.5		17.7	0.60	0.60	1.00	1.95E-04
4/20/22 3:48 PM		150	19.90	4.50	-	3.5	17.7					
	4/20/22 3:49 PM	30	19.25	5.10	-	3.2		16.2	0.65	0.60	1.08	2.20E-04
4/20/22 3:49 PM		180	19.25	5.10	-	3.2	16.2					
	4/20/22 3:49 PM	30	18.70	5.60	-	3.0		15.0	0.55	0.50	1.10	2.00E-04
		210										

Average Permeability (cm/s):	**2.06E-04**
Average Permeability @ 20°C (in/hr):	**0.277**
Permeability @ 20°C (cm/s)	**1.96E-04**

Notes: Insitu Soil Sample
Average temperature during test °C = 22.2
Tap water utlized as permeant

Tested By: M. Repking | Calculated By: MR | Reviewed By: JZ



APPENDIX C

APPENDIX C

RECOMMENDED GRADING SPECIFICATIONS

FOR

THOUSAND PALMS CHANNEL
COACHELLA VALLEY WATER DISTRICT
INDIO, CALIFORNIA

PROJECT NO. T2581-22-05

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9 and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

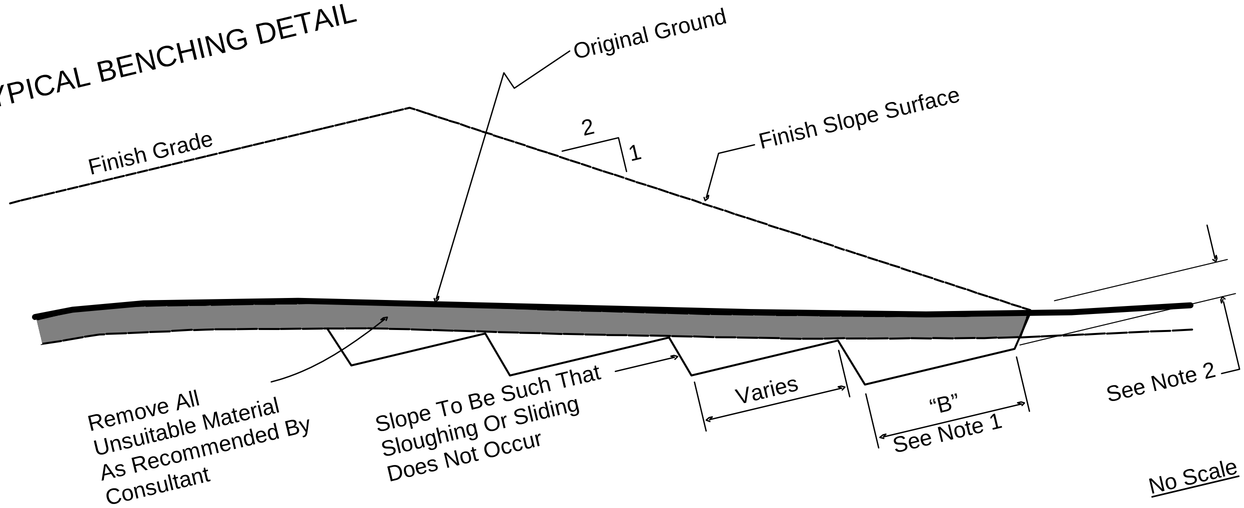
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

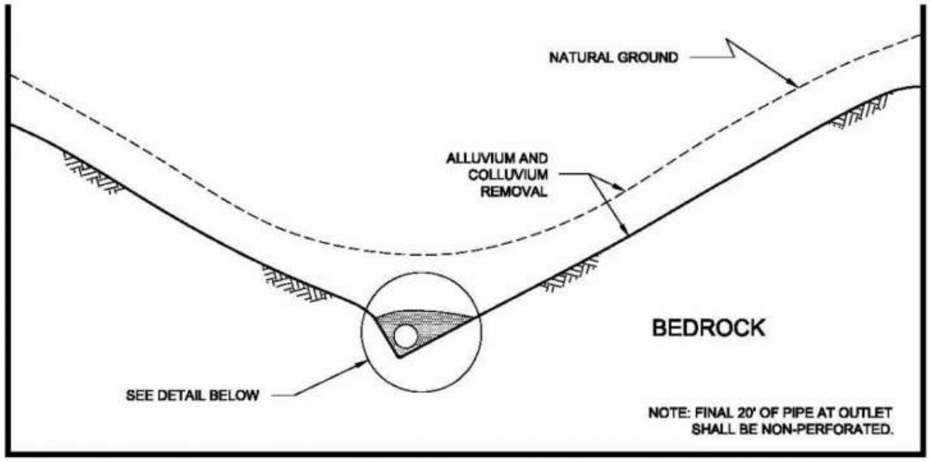
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

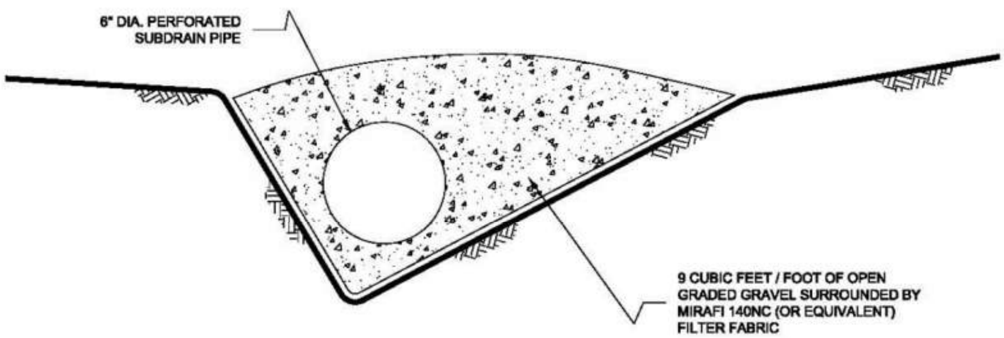
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

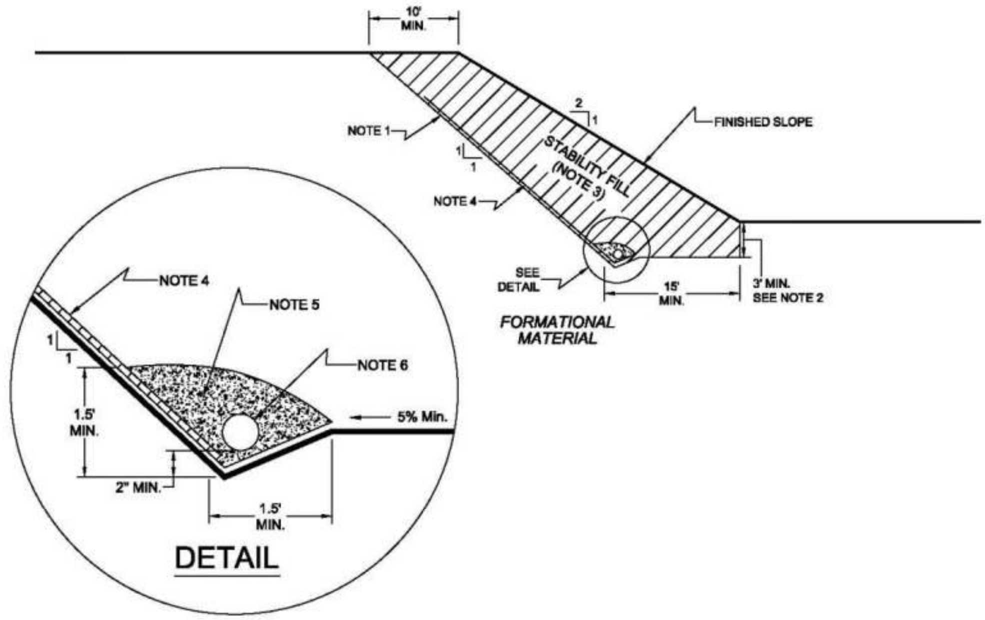
1......8-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2......6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

NO SCALE

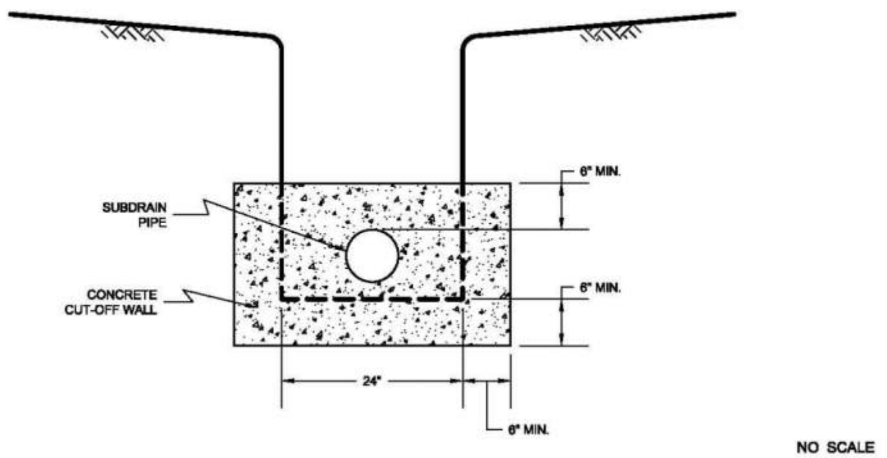
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

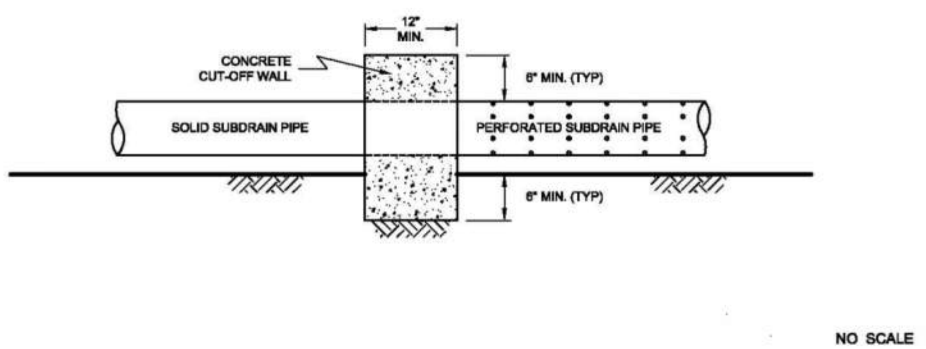
7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

TYPICAL CUT OFF WALL DETAIL

FRONT VIEW

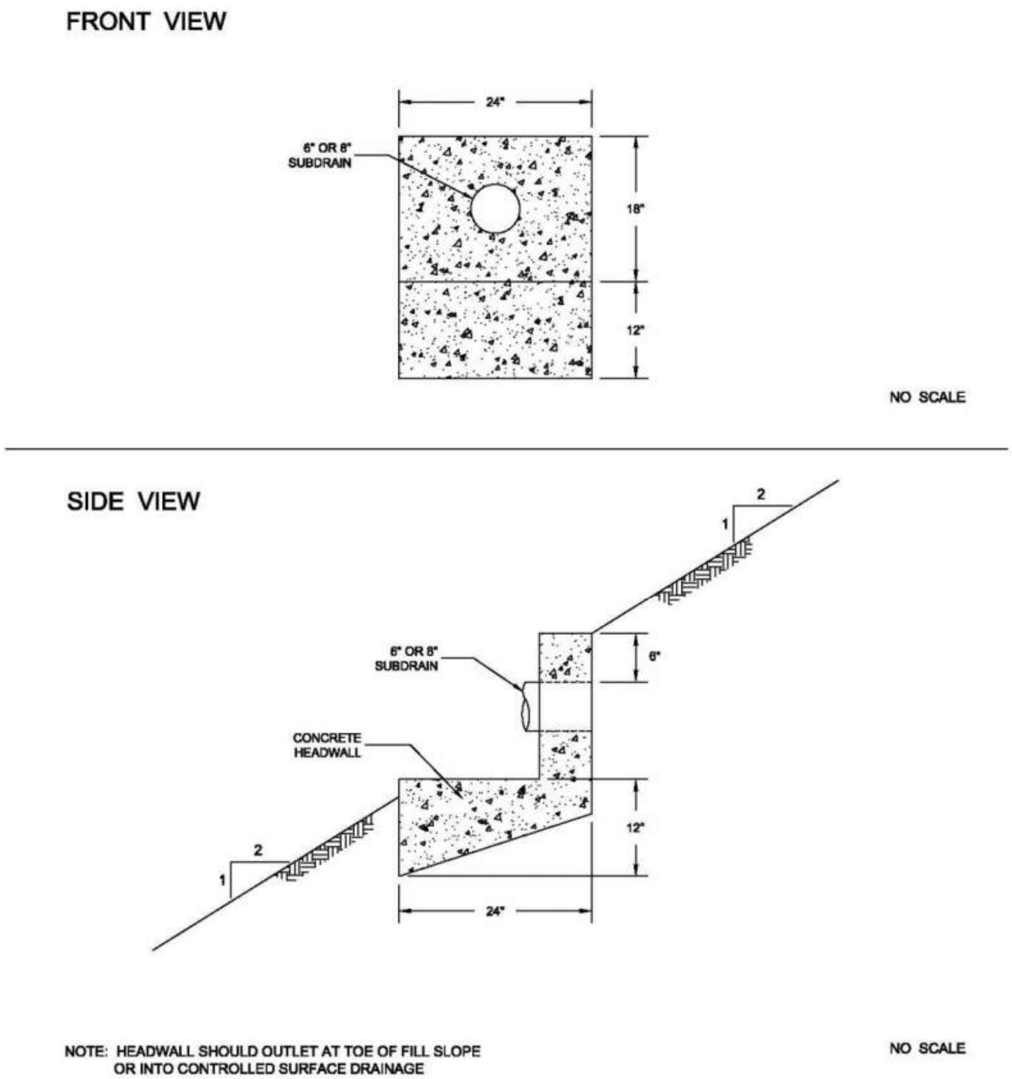


SIDE VIEW



7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

TYPICAL HEADWALL DETAIL



7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner’s representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)*.

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop*.

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

Appendix E:
Assembly Bill 52 – Tribal Consultation Letters

COACHELLA VALLEY WATER DISTRICT
Established in 1918 as a public agency

GENERAL MANAGER
Jim Barrett

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Robert Cheng

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. «CERTIFIED»

«FIRST_NAME» «LAST_NAME»
«TITLE»
«NAME»
«ADDRESS»
«CITY», «STATE» «ZIP»

Dear «TITLE» «LAST_NAME»:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

The Coachella Valley Water District (CVWD) is initiating environmental review under the California Environmental Quality Act (CEQA) for the proposed Thousand Palms Channel Improvement Project (Project). The Thousand Palms Channel (Channel) Project includes constructing the last conveyance facility intended to receive regional flood flows from the North Indio Hills and Thousand Palms areas. To this point, the Project would improve the Thousand Palms Channel from the Sun City Shadow Hills development located north of Madison Street to the confluence with the Coachella Valley Stormwater Channel (CVSC).

In its existing condition, the Channel is an earthen bottom channel with earthen side slopes. The reach of channel downstream of Madison Street is an incised section. Upstream of Madison Street the channel sections have had earthen berms constructed. These berms are not FEMA certified levees. Additionally, there are two at-grade roadway crossings at Madison Street and Avenue 42, as well as a bridge crossing under Interstate (I-) 10. In its existing conditions, the Channel is unable to accommodate the 100-year flow rate throughout the entirety of the Thousand Palms Channel along the Project reach. The portion of the Channel north of the Avenue 42 crossing does not have the capacity to convey the 100-year flowrate of 16,836 cubic feet per second.

The Project's preliminary design report evaluated four different alternatives and resulted in a preferred alternative consisting of an earthen channel with concrete side slopes. The proposed Thousand Palms Channel from Sun City Shadow Hills to the CVSC would cross Madison Street and Avenue 42, would include three concrete lined drop structures, and improve the confluence point with the CVSC.

Currently, the Coachella Canal crosses under the Thousand Palms Channel via a reinforced concrete siphon, and a concrete drop structure is located within the Thousand Palms Channel alignment at the location of the siphon to protect the siphon from scour and erosion. As part of the current Project, the Coachella Canal, siphon and drop structure are proposed to be protected in place. The drop structure will be extended further downstream to a lower level to provide the necessary scour protection associated with the ultimate channel design. Concrete slope lining will be installed along the lower 16'- 6" limits of the existing structure to raise the top of walls to a constant elevation of 32.68 feet, NGVD29 (35.0 ft NAVD88).

The Project is located along the Thousand Palms Channel generally between the CVSC and the Coachella Canal near Sun City Shadow Hills in the City of Indio, Riverside County, California. CVWD proposes to improve the existing unlined Channel to receive regional flood flows from the North Indio Hills and Thousand Palms areas and improve the channel's confluence with the CVSC (Figures 1 & 2). The Project encompasses 16 parcels (Assessor Parcel Numbers [APNs] 606-091-001, 610-020-001, 610-020-006, 610-020-007, 610-020-008, 610-020-012, 610-020-015, 610-020-016, 610-030-014, 610-030-020, 691-190-006, 691-190-007, 691-190-026, 691-510-001, 691-510-010, 691-510-011). The following parcels are under the jurisdiction of the federal government: APNs 610-020-006, 610-020-016, 610-030-014, 691-190-006, 691-510-010, and the following parcels are under the District's jurisdiction: APNs 610-020-007, 610-020-008, 610-020-015, 610-030-020, 691-190-007 (ParcelQuest 2024).

Assembly Bill 52 (AB 52) and Section 21080.3.1(d) of the California Public Resources Code (PRC) require that we respond to your prior written request to be notified of projects in our jurisdiction that will be reviewed under CEQA. Your name was provided to us as the point of contact for your tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the Project area, and if so, whether or not those resources will be significantly impacted by the development of this property. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts. CVWD understands that Tribal information submitted to our agency shall be kept confidential (PRC §21082.3(c)(1)). The purpose of AB 52 consultation is to obtain Tribal expertise on the subject Project area (PRC §21080.3.1(a)) via Tribal submittal of comments, information and/or project design measures.

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to either request or decline consultation in writing for this project. Please send your written response to Carlos Huerta's attention at the Coachella Valley Water District, 75-515 Hovley Lane East, Palm Desert, CA 92211 or by email to chuerta@cvwd.org. In your response, please reference the following project name: Coachella Valley Water District Thousand Palms Channel Improvements Project. If I do not receive a response within 30 days, then we will proceed. Thank you and we look forward to your response.

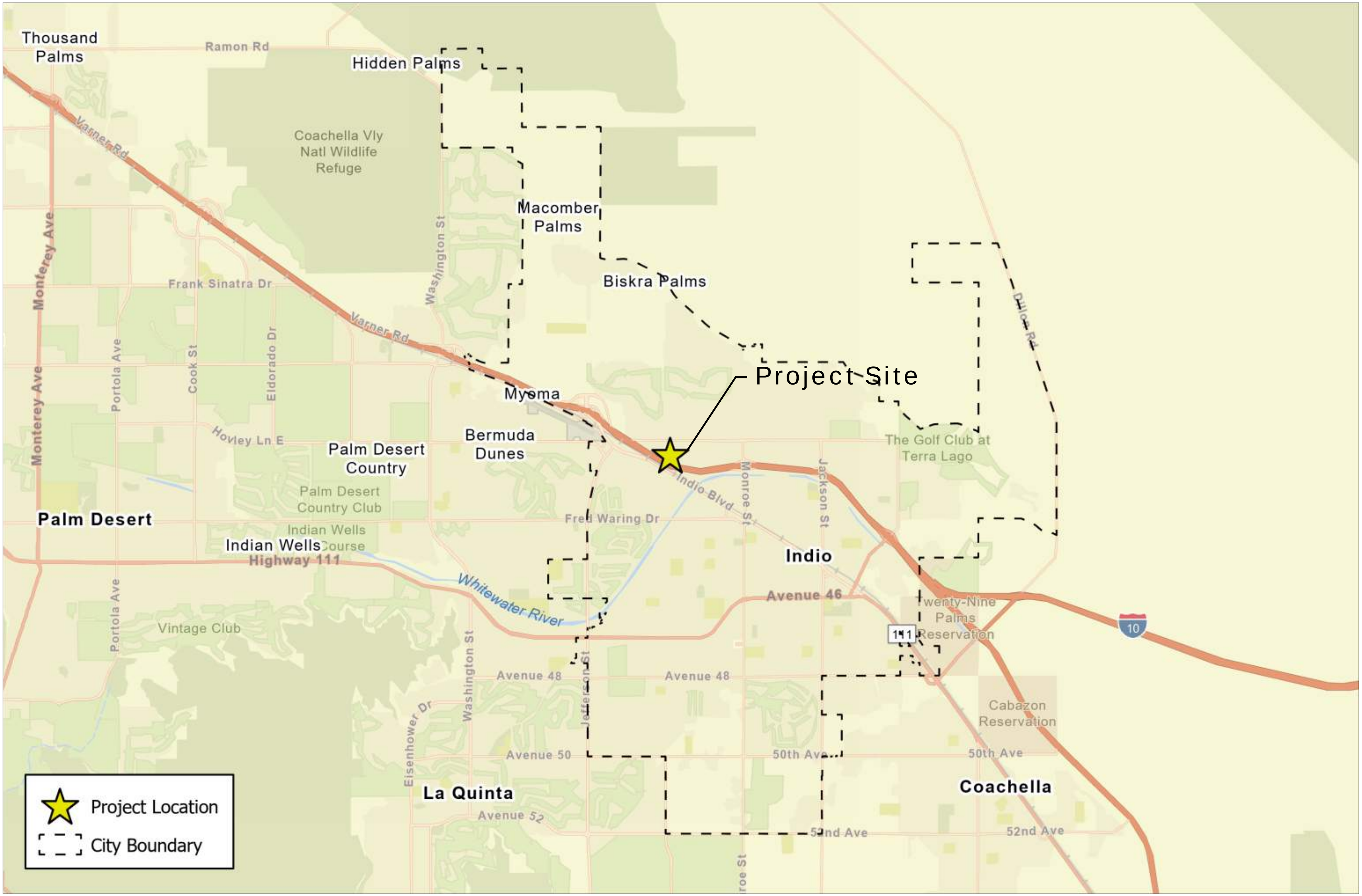
Respectfully,

William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

CH: al\WP\Env Srvs\2024\Feb\AB 52 Thousand Palms Channel.doc
File No. 0121.323

Coachella Valley Water District
P.O. Box 1058 Coachella, CA 92236
Phone (760) 398-2651 Fax (760) 398-3711
www.cvwd.org

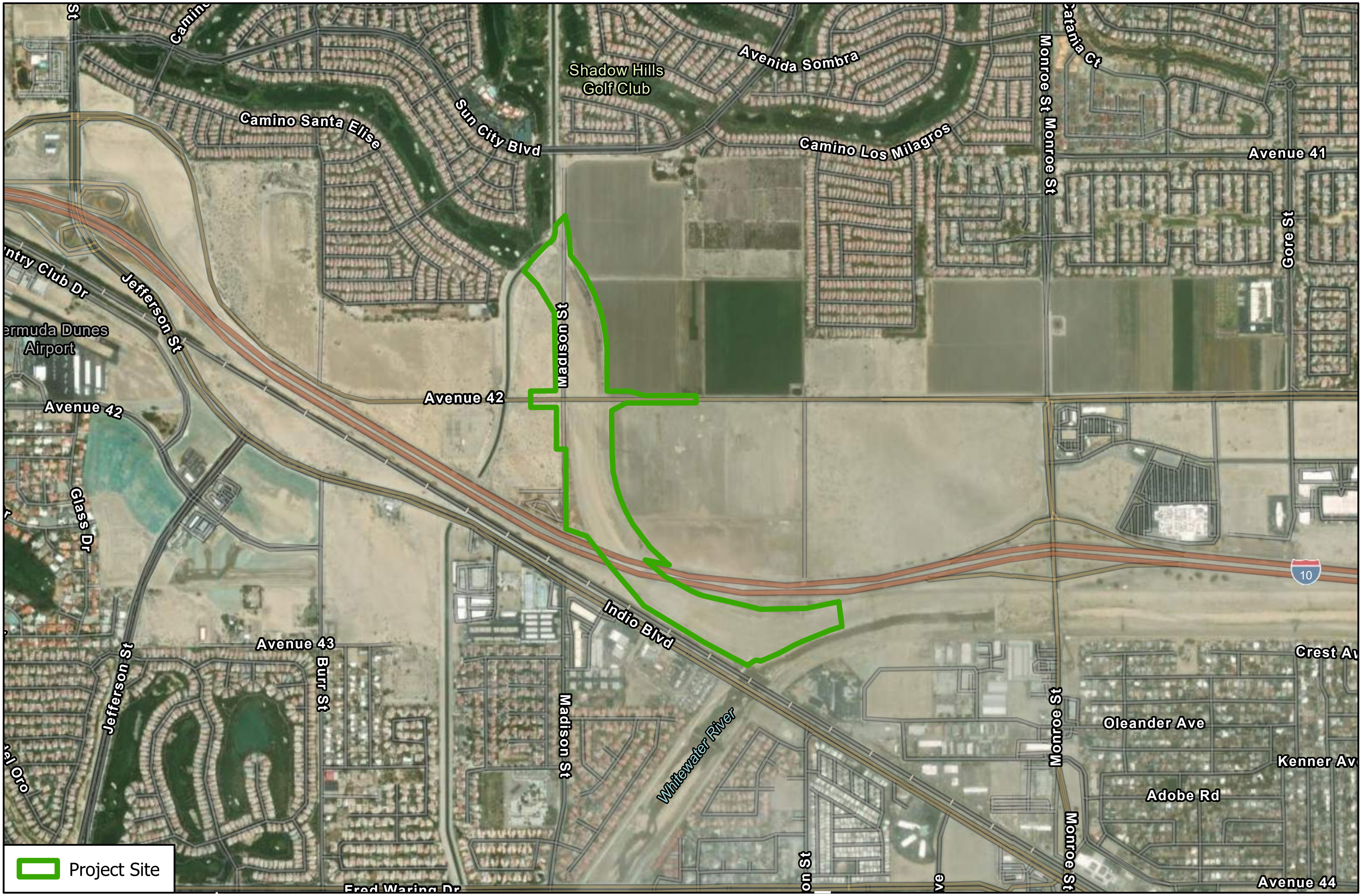


Source: ESRI, 2022

FIGURE 1: Regional Location Map
Thousand Palms Channel

Not to scale

Kimley»Horn



Source: ESRI

FIGURE 2: Project Vicinity Map
Thousand Palms Channel

Not to scale

Kimley»Horn

GENERAL MANAGER
Jim Barrett

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Robert Cheng

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2280 0000 0370 9318

Reid Milanovich
Chairman
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92264

Dear Chairman Milanovich:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

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William Patterson
Environmental Supervisor

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Project Vicinity Map

CH: al\WP\Env Srvs\2024\Feb\AB 52 Thousand Palms Channel.doc
File No. 0121.323

GENERAL MANAGER
Jim Barrett

ASSISTANT GENERAL MANAGER
Robert Cheng

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2318

Patricia Garcia
Tribal Historic Preservation Director
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92264

Dear Tribal Historic Preservation Director Garcia:

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William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

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File No. 0121.323

GENERAL MANAGER
Jim Barrett

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Robert Cheng

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2325

Amanda Agustine
Tribal Chairperson
Augustine Band of Cahuilla Indians
84481 Avenue 54
Coachella, CA 92236

Dear Tribal Chairperson Agustine:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

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Assembly Bill 52 (AB 52) and Section 21080.3.1(d) of the California Public Resources Code (PRC) require that we respond to your prior written request to be notified of projects in our jurisdiction that will be reviewed under CEQA. Your name was provided to us as the point of contact for your tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the Project area, and if so, whether or not those resources will be significantly impacted by the development of this property. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts. CVWD understands that Tribal information submitted to our agency shall be kept confidential (PRC §21082.3(c)(1)). The purpose of AB 52 consultation is to obtain Tribal expertise on the subject Project area (PRC §21080.3.1(a)) via Tribal submittal of comments, information and/or project design measures.

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Respectfully,

William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

CH: al\WP\Env Srvs\2024\Feb\AB 52 Thousand Palms Channel.doc
File No. 0121.323

GENERAL MANAGER
Jim Barrett

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Robert Cheng

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2332

Doug Welmas
Chairman
Cabazon Band of Mission Indians
84245 Indio Springs Drive
Indio, CA 92203

Dear Chairman Welmas:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

The Coachella Valley Water District (CVWD) is initiating environmental review under the California Environmental Quality Act (CEQA) for the proposed Thousand Palms Channel Improvement Project (Project). The Thousand Palms Channel (Channel) Project includes constructing the last conveyance facility intended to receive regional flood flows from the North Indio Hills and Thousand Palms areas. To this point, the Project would improve the Thousand Palms Channel from the Sun City Shadow Hills development located north of Madison Street to the confluence with the Coachella Valley Stormwater Channel (CVSC).

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Respectfully,

William Patterson

William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

CH: al\WP\Env Srvs\2024\Feb\AB 52 Thousand Palms Channel.doc
File No. 0121.323

GENERAL MANAGER
Jim Barrett

ASSISTANT GENERAL MANAGER
Robert Cheng

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2349

Charles Martin
Chairman
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220

Dear Chairman Martin:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

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William Patterson

William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

CH: al\WP\Env Srvs\2024\Feb\AB 52 Thousand Palms Channel.doc
File No. 0121.323

GENERAL MANAGER
Jim Barrett

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Robert Cheng

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2356

Laura Chatterton
Cultural Resource Specialist
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220

Dear Cultural Resource Specialist Chatterton:

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William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

CH: al\WP\Env Srvs\2024\Feb\AB 52 Thousand Palms Channel.doc
File No. 0121.323

GENERAL MANAGER
Jim Barrett

ASSISTANT GENERAL MANAGER
Robert Cheng

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2363

Jill McCormick
Historic Preservation Officer
Quechan Tribe of the Fort Yuma Reservation
PO Box 1899
Yuma, AZ 85366

Dear Historic Preservation Officer McCormick:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

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William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

CH: al\WP\Env Srvs\2024\Feb\AB 52 Thousand Palms Channel.doc
File No. 0121.323

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2370

Jordan Joaquin
Tribal President
Quechan Tribe of the Fort Yuma Reservation
PO Box 1899
Yuma, AZ 85366

Dear Tribal President Joaquin:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

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Enclosure: Regional Location Map
Project Vicinity Map

CH: al\WP\Env Srvs\2024\Feb\AB 52 Thousand Palms Channel.doc
File No. 0121.323

COACHELLA VALLEY WATER DISTRICT
Established in 1918 as a public agency

GENERAL MANAGER
Jim Barrett

ASSISTANT GENERAL MANAGER
Robert Cheng

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2387

Lovina Redner
Tribal Chair
Santa Rosa Band of Mission Indians
PO Box 391820
Anza, CA 92539

Dear Tribal Chair Redner:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

The Coachella Valley Water District (CVWD) is initiating environmental review under the California Environmental Quality Act (CEQA) for the proposed Thousand Palms Channel Improvement Project (Project). The Thousand Palms Channel (Channel) Project includes constructing the last conveyance facility intended to receive regional flood flows from the North Indio Hills and Thousand Palms areas. To this point, the Project would improve the Thousand Palms Channel from the Sun City Shadow Hills development located north of Madison Street to the confluence with the Coachella Valley Stormwater Channel (CVSC).

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The Project's preliminary design report evaluated four different alternatives and resulted in a preferred alternative consisting of an earthen channel with concrete side slopes. The proposed Thousand Palms Channel from Sun City Shadow Hills to the CVSC would cross Madison Street and Avenue 42, would include three concrete lined drop structures, and improve the confluence point with the CVSC.

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Assembly Bill 52 (AB 52) and Section 21080.3.1(d) of the California Public Resources Code (PRC) require that we respond to your prior written request to be notified of projects in our jurisdiction that will be reviewed under CEQA. Your name was provided to us as the point of contact for your tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the Project area, and if so, whether or not those resources will be significantly impacted by the development of this property. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts. CVWD understands that Tribal information submitted to our agency shall be kept confidential (PRC §21082.3(c)(1)). The purpose of AB 52 consultation is to obtain Tribal expertise on the subject Project area (PRC §21080.3.1(a)) via Tribal submittal of comments, information and/or project design measures.

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Respectfully,

William Patterson

William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

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File No. 0121.323

GENERAL MANAGER
Jim Barrett

ASSISTANT GENERAL MANAGER
Robert Cheng

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2394

Joseph Ontiveros
Cultural Resource Director
Soboba Band of Luiseno Indians
PO Box 487
San Jacinto, CA 92581

Dear Cultural Resource Director Ontiveros:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

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William Patterson

William Patterson
Environmental Supervisor

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Project Vicinity Map

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GENERAL MANAGER
Jim Barrett

ASSISTANT GENERAL MANAGER
Robert Cheng

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2400

Thomas Tortez, Jr.
Tribal Chairman
Torres Martinez Desert Cahuilla Indians
66725 Martinez Road
Thermal, CA 92274

Dear Tribal Chairman Tortez, Jr.:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the
Thousand Palms Channel Improvement Project, Riverside County

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William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

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File No. 0121.323

GENERAL MANAGER
Jim Barrett

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Robert Cheng

CLERK OF THE BOARD
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ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2417

Gary Resvaloso
Cultural Resource Coordinator
Torres Martinez Desert Cahuilla Indians
66725 Martinez Road
Thermal, CA 92274

Dear Cultural Resource Coordinator Resvaloso:

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William Patterson

William Patterson
Environmental Supervisor

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Project Vicinity Map

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February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2424

Darrell Mike
Tribal Chairman
Twenty-Nine Palms Band of Mission Indians
46200 Harrison Place
Coachella, CA 92236

Dear Tribal Chairman Mike:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

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February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2431

Anthony Madrigal, Jr.
Tribal Historic Preservation Officer
Twenty-Nine Palms Band of Mission Indians
46200 Harrison Place
Coachella, CA 92236

Dear Tribal Historic Preservation Officer Madrigal, Jr.:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

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Respectfully,

William Patterson

William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

CH: al\WP\Env Srvs\2024\Feb\AB 52 Thousand Palms Channel.doc
File No. 0121.323

GENERAL MANAGER
Jim Barrett

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Robert Cheng

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2448

John Gomez, Jr.
Cultural Resource Coordinator
Ramona Band of Cahuilla Indians
56310 Highway 371, Suite B
Anza, CA 92539

Dear Cultural Resource Coordinator Gomez, Jr.:

Subject Notice of Opportunity to Consult under Assembly Bill 52 for the Thousand Palms Channel Improvement Project, Riverside County

The Coachella Valley Water District (CVWD) is initiating environmental review under the California Environmental Quality Act (CEQA) for the proposed Thousand Palms Channel Improvement Project (Project). The Thousand Palms Channel (Channel) Project includes constructing the last conveyance facility intended to receive regional flood flows from the North Indio Hills and Thousand Palms areas. To this point, the Project would improve the Thousand Palms Channel from the Sun City Shadow Hills development located north of Madison Street to the confluence with the Coachella Valley Stormwater Channel (CVSC).

In its existing condition, the Channel is an earthen bottom channel with earthen side slopes. The reach of channel downstream of Madison Street is an incised section. Upstream of Madison Street the channel sections have had earthen berms constructed. These berms are not FEMA certified levees. Additionally, there are two at-grade roadway crossings at Madison Street and Avenue 42, as well as a bridge crossing under Interstate (I-) 10. In its existing conditions, the Channel is unable to accommodate the 100-year flow rate throughout the entirety of the Thousand Palms Channel along the Project reach. The portion of the Channel north of the Avenue 42 crossing does not have the capacity to convey the 100-year flowrate of 16,836 cubic feet per second.

The Project's preliminary design report evaluated four different alternatives and resulted in a preferred alternative consisting of an earthen channel with concrete side slopes. The proposed Thousand Palms Channel from Sun City Shadow Hills to the CVSC would cross Madison Street and Avenue 42, would include three concrete lined drop structures, and improve the confluence point with the CVSC.

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Respectfully,

William Patterson
Environmental Supervisor

Enclosure: Regional Location Map
Project Vicinity Map

CH: al\WP\Env Srvs\2024\Feb\AB 52 Thousand Palms Channel.doc
File No. 0121.323

GENERAL MANAGER
Jim Barrett

ASSISTANT GENERAL MANAGER
Robert Cheng

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2455

BobbyRay Esparza
Cultural Director
Cahuilla Band of Indians
52701 Highway 371
Anza, CA 92539

Dear Cultural Director Esparza:

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Thousand Palms Channel Improvement Project, Riverside County

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William Patterson

William Patterson
Environmental Supervisor

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Project Vicinity Map

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File No. 0121.323

GENERAL MANAGER
Jim Barrett

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Robert Cheng

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Dan Charlton

February 20, 2024

VIA CERITFIED MAIL – ARTICLE NO. 7019 2970 0000 9097 2462

Ray Chapparosa
Tribal Chairperson
Los Coyotes Band of Cahuilla and Cupeno Indians
2300 Camino San Ignacio Road
Warner Springs, CA 92086

Dear Tribal Chairperson Chapparosa:

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William Patterson

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Environmental Supervisor

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