Initial Study and Mitigated Negative Declaration Appendices
Judson Transmission Main Project

EASTERN MUNICIPAL WATER DISTRICT

March 2022




Woodard & Curran

APPENDIX A: CALEEMOD OUTPUT

Judson Perris Boulevard Transmission Main

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	107.20	1000sqft	2.46	107,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Judson Perris Boulevard Transmission Main - Riverside-South Coast County, Winter

Project Characteristics -

Land Use -

Construction Phase - Per project description.

Off-road Equipment - Phase accounts for on-road worker trips only, no construction.

Off-road Equipment - Per project description.

Off-road Equipment - Per project description.

Off-road Equipment - Phase accounts for on-road worker trips only, no construction.

Off-road Equipment - Per project description.

Grading -

Trips and VMT - On-road trip estimates for mobilization and demobilization.

Consumer Products - No net change.

Area Coating - No net change in reapplication rate.

Landscape Equipment - No landscaping.

Construction Off-road Equipment Mitigation - Per SCAQMD rules.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	ReapplicationRatePercent	10	0
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	88.00
tblConstructionPhase	NumDays	6.00	67.00
tblConstructionPhase	NumDays	10.00	67.00
tblConstructionPhase	NumDays	20.00	44.00
tblConstructionPhase	PhaseEndDate	1/11/2024	10/5/2023
tblConstructionPhase	PhaseEndDate	2/9/2023	6/5/2023
tblConstructionPhase	PhaseEndDate	12/28/2023	6/5/2023
tblConstructionPhase	PhaseEndDate	2/1/2023	3/2/2023

Judson Perris Boulevard Transmission Main - Riverside-South Coast County, Winter

tblConstructionPhase	PhaseStartDate	12/29/2023	6/6/2023
tblConstructionPhase	PhaseStartDate	2/2/2023	3/3/2023
tblConstructionPhase	PhaseStartDate	12/15/2023	3/3/2023
tblConstructionPhase	PhaseStartDate	1/28/2023	1/2/2023
tblGrading	MaterialExported	0.00	9,017.00
tblGrading	MaterialImported	0.00	8,578.00
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Sweepers/Scrubbers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Demobilization
tblOffRoadEquipment	PhaseName		Mobilization
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Mobilization
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	8.00	7.00
tblTripsAndVMT	WorkerTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	0.00	4.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.5072	37.1751	40.4373	0.1130	1.0879	1.4874	2.5754	0.2898	1.4180	1.7079	0.0000	11,054.0610	11,054.0610	2.0601	0.0000	11,105.5641
Maximum	**4.5072**	**37.1751**	**40.4373**	**0.1130**	**1.0879**	**1.4874**	**2.5754**	**0.2898**	**1.4180**	**1.7079**	**0.0000**	**11,054.0610**	**11,054.0610**	**2.0601**	**0.0000**	**11,105.5641**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.5072	37.1751	40.4373	0.1130	1.0270	1.4874	2.5145	0.2766	1.4180	1.6946	0.0000	11,054.0610	11,054.0610	2.0601	0.0000	11,105.5641
Maximum	**4.5072**	**37.1751**	**40.4373**	**0.1130**	**1.0270**	**1.4874**	**2.5145**	**0.2766**	**1.4180**	**1.6946**	**0.0000**	**11,054.0610**	**11,054.0610**	**2.0601**	**0.0000**	**11,105.5641**

Judson Perris Boulevard Transmission Main - Riverside-South Coast County, Winter

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**5.60**	**0.00**	**2.36**	**4.56**	**0.00**	**0.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0100e-003**	**1.0000e-004**	**0.0109**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**4.0000e-005**		**0.0235**	**0.0235**	**6.0000e-005**	**0.0000**	**0.0250**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0100e-003**	**1.0000e-004**	**0.0109**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**4.0000e-005**		**0.0235**	**0.0235**	**6.0000e-005**	**0.0000**	**0.0250**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mobilization	Demolition	1/2/2023	3/2/2023	5	44	
2	Grading	Grading	3/3/2023	6/5/2023	5	67	
3	Paving	Paving	3/3/2023	6/5/2023	5	67	
4	Demobilization	Demolition	6/6/2023	10/5/2023	5	88	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 2.46

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demobilization	Air Compressors	0	6.00	78	0.48
Paving	Cement and Mortar Mixers	0	8.00	9	0.56
Mobilization	Concrete/Industrial Saws	0	8.00	81	0.73
Demobilization	Concrete/Industrial Saws	0	8.00	81	0.73
Mobilization	Rubber Tired Dozers	0	8.00	247	0.40
Demobilization	Rubber Tired Dozers	0	8.00	247	0.40

Mobilization	Graders	0	8.00	187	0.41
Paving	Pavers	1	8.00	130	0.42
Paving	Rollers	0	8.00	80	0.38
Demobilization	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Concrete/Industrial Saws	2	7.00	81	0.73
Grading	Cranes	1	7.00	231	0.29
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Mobilization	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Grading	Graders	0	8.00	187	0.41
Paving	Paving Equipment	0	8.00	132	0.36
Mobilization	Scrapers	0	8.00	367	0.48
Grading	Dumpers/Tenders	2	7.00	16	0.38
Grading	Excavators	1	7.00	158	0.38
Grading	Off-Highway Trucks	3	7.00	402	0.38
Grading	Pumps	1	7.00	84	0.74
Grading	Welders	1	7.00	46	0.45
Paving	Air Compressors	1	7.00	78	0.48
Paving	Generator Sets	1	7.00	84	0.74
Paving	Sweepers/Scrubbers	1	7.00	64	0.46

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mobilization	0	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	13	33.00	0.00	2,199.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demobilization	0	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Mobilization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Mobilization - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0164	9.0600e-003	0.1013	3.6000e-004	0.0447	2.5000e-004	0.0450	0.0119	2.3000e-004	0.0121		35.4165	35.4165	7.1000e-004		35.4343
Total	**0.0164**	**9.0600e-003**	**0.1013**	**3.6000e-004**	**0.0447**	**2.5000e-004**	**0.0450**	**0.0119**	**2.3000e-004**	**0.0121**		**35.4165**	**35.4165**	**7.1000e-004**		**35.4343**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Mobilization - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0164	9.0600e-003	0.1013	3.6000e-004	0.0428	2.5000e-004	0.0430	0.0114	2.3000e-004	0.0116		35.4165	35.4165	7.1000e-004		35.4343
Total	**0.0164**	**9.0600e-003**	**0.1013**	**3.6000e-004**	**0.0428**	**2.5000e-004**	**0.0430**	**0.0114**	**2.3000e-004**	**0.0116**		**35.4165**	**35.4165**	**7.1000e-004**		**35.4343**

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0333	0.0000	0.0333	5.0400e-003	0.0000	5.0400e-003			0.0000			0.0000
Off-Road	3.2822	25.7339	28.5599	0.0700		1.0982	1.0982		1.0440	1.0440		6,684.5342	6,684.5342	1.6643		6,726.1404
Total	**3.2822**	**25.7339**	**28.5599**	**0.0700**	**0.0333**	**1.0982**	**1.1314**	**5.0400e-003**	**1.0440**	**1.0491**		**6,684.5342**	**6,684.5342**	**1.6643**		**6,726.1404**

3.3 Grading - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1099	4.0721	0.9028	0.0230	0.5740	7.9400e-003	0.5820	0.1573	7.6000e-003	0.1649		2,444.6666	2,444.6666	0.1277		2,447.8587
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1355	0.0747	0.8358	2.9300e-003	0.3689	2.0700e-003	0.3709	0.0978	1.9000e-003	0.0997		292.1860	292.1860	5.8900e-003		292.3332
Total	**0.2453**	**4.1468**	**1.7386**	**0.0259**	**0.9429**	**0.0100**	**0.9529**	**0.2552**	**9.5000e-003**	**0.2647**		**2,736.8525**	**2,736.8525**	**0.1336**		**2,740.1918**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0150	0.0000	0.0150	2.2700e-003	0.0000	2.2700e-003			0.0000			0.0000
Off-Road	3.2822	25.7339	28.5599	0.0700		1.0982	1.0982		1.0440	1.0440	0.0000	6,684.5342	6,684.5342	1.6643		6,726.1404
Total	**3.2822**	**25.7339**	**28.5599**	**0.0700**	**0.0150**	**1.0982**	**1.1131**	**2.2700e-003**	**1.0440**	**1.0463**	**0.0000**	**6,684.5342**	**6,684.5342**	**1.6643**		**6,726.1404**

3.3 Grading - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1099	4.0721	0.9028	0.0230	0.5523	7.9400e-003	0.5603	0.1520	7.6000e-003	0.1596		2,444.6666	2,444.6666	0.1277		2,447.8587
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1355	0.0747	0.8358	2.9300e-003	0.3528	2.0700e-003	0.3549	0.0939	1.9000e-003	0.0958		292.1860	292.1860	5.8900e-003		292.3332
Total	**0.2453**	**4.1468**	**1.7386**	**0.0259**	**0.9052**	**0.0100**	**0.9152**	**0.2459**	**9.5000e-003**	**0.2554**		**2,736.8525**	**2,736.8525**	**0.1336**		**2,740.1918**

3.4 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8425	7.2717	9.8855	0.0162		0.3786	0.3786		0.3639	0.3639		1,544.1330	1,544.1330	0.2605		1,550.6460
Paving	0.0962					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9387**	**7.2717**	**9.8855**	**0.0162**		**0.3786**	**0.3786**		**0.3639**	**0.3639**		**1,544.1330**	**1,544.1330**	**0.2605**		**1,550.6460**

3.4 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0411	0.0227	0.2533	8.9000e-004	0.1118	6.3000e-004	0.1124	0.0296	5.8000e-004	0.0302		88.5412	88.5412	1.7800e-003		88.5858
Total	**0.0411**	**0.0227**	**0.2533**	**8.9000e-004**	**0.1118**	**6.3000e-004**	**0.1124**	**0.0296**	**5.8000e-004**	**0.0302**		**88.5412**	**88.5412**	**1.7800e-003**		**88.5858**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8425	7.2717	9.8855	0.0162		0.3786	0.3786		0.3639	0.3639	0.0000	1,544.1330	1,544.1330	0.2605		1,550.6460
Paving	0.0962					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9387**	**7.2717**	**9.8855**	**0.0162**		**0.3786**	**0.3786**		**0.3639**	**0.3639**	**0.0000**	**1,544.1330**	**1,544.1330**	**0.2605**		**1,550.6460**

3.4 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0411	0.0227	0.2533	8.9000e-004	0.1069	6.3000e-004	0.1075	0.0285	5.8000e-004	0.0290		88.5412	88.5412	1.7800e-003		88.5858
Total	**0.0411**	**0.0227**	**0.2533**	**8.9000e-004**	**0.1069**	**6.3000e-004**	**0.1075**	**0.0285**	**5.8000e-004**	**0.0290**		**88.5412**	**88.5412**	**1.7800e-003**		**88.5858**

3.5 Demobilization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Demobilization - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0164	9.0600e-003	0.1013	3.6000e-004	0.0447	2.5000e-004	0.0450	0.0119	2.3000e-004	0.0121		35.4165	35.4165	7.1000e-004		35.4343
Total	**0.0164**	**9.0600e-003**	**0.1013**	**3.6000e-004**	**0.0447**	**2.5000e-004**	**0.0450**	**0.0119**	**2.3000e-004**	**0.0121**		**35.4165**	**35.4165**	**7.1000e-004**		**35.4343**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Demobilization - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0164	9.0600e-003	0.1013	3.6000e-004	0.0428	2.5000e-004	0.0430	0.0114	2.3000e-004	0.0116		35.4165	35.4165	7.1000e-004		35.4343
Total	**0.0164**	**9.0600e-003**	**0.1013**	**3.6000e-004**	**0.0428**	**2.5000e-004**	**0.0430**	**0.0114**	**2.3000e-004**	**0.0116**		**35.4165**	**35.4165**	**7.1000e-004**		**35.4343**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.551648	0.035769	0.187848	0.110184	0.013450	0.004660	0.017552	0.070120	0.001413	0.001134	0.004476	0.000905	0.000840

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250
Unmitigated	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250
Total	**1.0100e-003**	**1.0000e-004**	**0.0109**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.0235**	**0.0235**	**6.0000e-005**		**0.0250**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250
Total	**1.0100e-003**	**1.0000e-004**	**0.0109**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.0235**	**0.0235**	**6.0000e-005**		**0.0250**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Judson Perris Boulevard Transmission Main

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	107.20	1000sqft	2.46	107,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Per project description.

Off-road Equipment - Phase accounts for on-road worker trips only, no construction.

Off-road Equipment - Per project description.

Off-road Equipment - Per project description.

Off-road Equipment - Phase accounts for on-road worker trips only, no construction.

Off-road Equipment - Per project description.

Grading -

Trips and VMT - On-road trip estimates for mobilization and demobilization.

Consumer Products - No net change.

Area Coating - No net change in reapplication rate.

Landscape Equipment - No landscaping.

Construction Off-road Equipment Mitigation - Per SCAQMD rules.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	ReapplicationRatePercent	10	0
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	88.00
tblConstructionPhase	NumDays	6.00	67.00
tblConstructionPhase	NumDays	10.00	67.00
tblConstructionPhase	NumDays	20.00	44.00
tblConstructionPhase	PhaseEndDate	1/11/2024	10/5/2023
tblConstructionPhase	PhaseEndDate	2/9/2023	6/5/2023
tblConstructionPhase	PhaseEndDate	12/28/2023	6/5/2023
tblConstructionPhase	PhaseEndDate	2/1/2023	3/2/2023

tblConstructionPhase	PhaseStartDate	12/29/2023	6/6/2023
tblConstructionPhase	PhaseStartDate	2/2/2023	3/3/2023
tblConstructionPhase	PhaseStartDate	12/15/2023	3/3/2023
tblConstructionPhase	PhaseStartDate	1/28/2023	1/2/2023
tblGrading	MaterialExported	0.00	9,017.00
tblGrading	MaterialImported	0.00	8,578.00
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Sweepers/Scrubbers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Demobilization
tblOffRoadEquipment	PhaseName		Mobilization
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Mobilization
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	8.00	7.00
tblTripsAndVMT	WorkerTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	0.00	4.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.5040	37.1974	40.6013	0.1140	1.0879	1.4873	2.5752	0.2898	1.4179	1.7077	0.0000	11,160.6091	11,160.6091	2.0515	0.0000	11,211.8953
Maximum	**4.5040**	**37.1974**	**40.6013**	**0.1140**	**1.0879**	**1.4873**	**2.5752**	**0.2898**	**1.4179**	**1.7077**	**0.0000**	**11,160.6091**	**11,160.6091**	**2.0515**	**0.0000**	**11,211.8953**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	4.5040	37.1974	40.6013	0.1140	1.0270	1.4873	2.5143	0.2766	1.4179	1.6945	0.0000	11,160.6091	11,160.6091	2.0515	0.0000	11,211.8953
Maximum	**4.5040**	**37.1974**	**40.6013**	**0.1140**	**1.0270**	**1.4873**	**2.5143**	**0.2766**	**1.4179**	**1.6945**	**0.0000**	**11,160.6091**	**11,160.6091**	**2.0515**	**0.0000**	**11,211.8953**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**5.60**	**0.00**	**2.36**	**4.56**	**0.00**	**0.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0100e-003**	**1.0000e-004**	**0.0109**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**4.0000e-005**		**0.0235**	**0.0235**	**6.0000e-005**	**0.0000**	**0.0250**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0100e-003**	**1.0000e-004**	**0.0109**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**4.0000e-005**		**0.0235**	**0.0235**	**6.0000e-005**	**0.0000**	**0.0250**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mobilization	Demolition	1/2/2023	3/2/2023	5	44	
2	Grading	Grading	3/3/2023	6/5/2023	5	67	
3	Paving	Paving	3/3/2023	6/5/2023	5	67	
4	Demobilization	Demolition	6/6/2023	10/5/2023	5	88	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 2.46

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demobilization	Air Compressors	0	6.00	78	0.48
Paving	Cement and Mortar Mixers	0	8.00	9	0.56
Mobilization	Concrete/Industrial Saws	0	8.00	81	0.73
Demobilization	Concrete/Industrial Saws	0	8.00	81	0.73
Mobilization	Rubber Tired Dozers	0	8.00	247	0.40
Demobilization	Rubber Tired Dozers	0	8.00	247	0.40

Mobilization	Graders	0	8.00	187	0.41
Paving	Pavers	1	8.00	130	0.42
Paving	Rollers	0	8.00	80	0.38
Demobilization	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Concrete/Industrial Saws	2	7.00	81	0.73
Grading	Cranes	1	7.00	231	0.29
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Mobilization	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Grading	Graders	0	8.00	187	0.41
Paving	Paving Equipment	0	8.00	132	0.36
Mobilization	Scrapers	0	8.00	367	0.48
Grading	Dumpers/Tenders	2	7.00	16	0.38
Grading	Excavators	1	7.00	158	0.38
Grading	Off-Highway Trucks	3	7.00	402	0.38
Grading	Pumps	1	7.00	84	0.74
Grading	Welders	1	7.00	46	0.45
Paving	Air Compressors	1	7.00	78	0.48
Paving	Generator Sets	1	7.00	84	0.74
Paving	Sweepers/Scrubbers	1	7.00	64	0.46

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mobilization	0	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	13	33.00	0.00	2,199.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demobilization	0	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Mobilization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Mobilization - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0166	8.7700e-003	0.1259	4.0000e-004	0.0447	2.5000e-004	0.0450	0.0119	2.3000e-004	0.0121		39.4745	39.4745	8.2000e-004		39.4949
Total	**0.0166**	**8.7700e-003**	**0.1259**	**4.0000e-004**	**0.0447**	**2.5000e-004**	**0.0450**	**0.0119**	**2.3000e-004**	**0.0121**		**39.4745**	**39.4745**	**8.2000e-004**		**39.4949**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Mobilization - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0166	8.7700e-003	0.1259	4.0000e-004	0.0428	2.5000e-004	0.0430	0.0114	2.3000e-004	0.0116		39.4745	39.4745	8.2000e-004		39.4949
Total	**0.0166**	**8.7700e-003**	**0.1259**	**4.0000e-004**	**0.0428**	**2.5000e-004**	**0.0430**	**0.0114**	**2.3000e-004**	**0.0116**		**39.4745**	**39.4745**	**8.2000e-004**		**39.4949**

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0333	0.0000	0.0333	5.0400e-003	0.0000	5.0400e-003			0.0000			0.0000
Off-Road	3.2822	25.7339	28.5599	0.0700		1.0982	1.0982		1.0440	1.0440		6,684.5342	6,684.5342	1.6643		6,726.1404
Total	**3.2822**	**25.7339**	**28.5599**	**0.0700**	**0.0333**	**1.0982**	**1.1314**	**5.0400e-003**	**1.0440**	**1.0491**		**6,684.5342**	**6,684.5342**	**1.6643**		**6,726.1404**

3.3 Grading - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1044	4.0976	0.8026	0.0236	0.5740	7.8000e-003	0.5818	0.1573	7.4600e-003	0.1648		2,507.5916	2,507.5916	0.1179		2,510.5386
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1372	0.0723	1.0386	3.2700e-003	0.3689	2.0700e-003	0.3709	0.0978	1.9000e-003	0.0997		325.6642	325.6642	6.7500e-003		325.8331
Total	**0.2416**	**4.1699**	**1.8411**	**0.0269**	**0.9429**	**9.8700e-003**	**0.9528**	**0.2552**	**9.3600e-003**	**0.2645**		**2,833.2558**	**2,833.2558**	**0.1246**		**2,836.3716**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0150	0.0000	0.0150	2.2700e-003	0.0000	2.2700e-003			0.0000			0.0000
Off-Road	3.2822	25.7339	28.5599	0.0700		1.0982	1.0982		1.0440	1.0440	0.0000	6,684.5342	6,684.5342	1.6643		6,726.1404
Total	**3.2822**	**25.7339**	**28.5599**	**0.0700**	**0.0150**	**1.0982**	**1.1131**	**2.2700e-003**	**1.0440**	**1.0463**	**0.0000**	**6,684.5342**	**6,684.5342**	**1.6643**		**6,726.1404**

3.3 Grading - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1044	4.0976	0.8026	0.0236	0.5523	7.8000e-003	0.5601	0.1520	7.4600e-003	0.1595		2,507.5916	2,507.5916	0.1179		2,510.5386
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1372	0.0723	1.0386	3.2700e-003	0.3528	2.0700e-003	0.3549	0.0939	1.9000e-003	0.0958		325.6642	325.6642	6.7500e-003		325.8331
Total	**0.2416**	**4.1699**	**1.8411**	**0.0269**	**0.9052**	**9.8700e-003**	**0.9150**	**0.2459**	**9.3600e-003**	**0.2553**		**2,833.2558**	**2,833.2558**	**0.1246**		**2,836.3716**

3.4 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8425	7.2717	9.8855	0.0162		0.3786	0.3786		0.3639	0.3639		1,544.1330	1,544.1330	0.2605		1,550.6460
Paving	0.0962					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9387**	**7.2717**	**9.8855**	**0.0162**		**0.3786**	**0.3786**		**0.3639**	**0.3639**		**1,544.1330**	**1,544.1330**	**0.2605**		**1,550.6460**

3.4 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0416	0.0219	0.3147	9.9000e-004	0.1118	6.3000e-004	0.1124	0.0296	5.8000e-004	0.0302		98.6861	98.6861	2.0500e-003		98.7373
Total	**0.0416**	**0.0219**	**0.3147**	**9.9000e-004**	**0.1118**	**6.3000e-004**	**0.1124**	**0.0296**	**5.8000e-004**	**0.0302**		**98.6861**	**98.6861**	**2.0500e-003**		**98.7373**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8425	7.2717	9.8855	0.0162		0.3786	0.3786		0.3639	0.3639	0.0000	1,544.1330	1,544.1330	0.2605		1,550.6460
Paving	0.0962					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9387**	**7.2717**	**9.8855**	**0.0162**		**0.3786**	**0.3786**		**0.3639**	**0.3639**	**0.0000**	**1,544.1330**	**1,544.1330**	**0.2605**		**1,550.6460**

3.4 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0416	0.0219	0.3147	9.9000e-004	0.1069	6.3000e-004	0.1075	0.0285	5.8000e-004	0.0290		98.6861	98.6861	2.0500e-003		98.7373
Total	**0.0416**	**0.0219**	**0.3147**	**9.9000e-004**	**0.1069**	**6.3000e-004**	**0.1075**	**0.0285**	**5.8000e-004**	**0.0290**		**98.6861**	**98.6861**	**2.0500e-003**		**98.7373**

3.5 Demobilization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Demobilization - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0166	8.7700e-003	0.1259	4.0000e-004	0.0447	2.5000e-004	0.0450	0.0119	2.3000e-004	0.0121		39.4745	39.4745	8.2000e-004		39.4949
Total	**0.0166**	**8.7700e-003**	**0.1259**	**4.0000e-004**	**0.0447**	**2.5000e-004**	**0.0450**	**0.0119**	**2.3000e-004**	**0.0121**		**39.4745**	**39.4745**	**8.2000e-004**		**39.4949**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Demobilization - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0166	8.7700e-003	0.1259	4.0000e-004	0.0428	2.5000e-004	0.0430	0.0114	2.3000e-004	0.0116		39.4745	39.4745	8.2000e-004		39.4949
Total	**0.0166**	**8.7700e-003**	**0.1259**	**4.0000e-004**	**0.0428**	**2.5000e-004**	**0.0430**	**0.0114**	**2.3000e-004**	**0.0116**		**39.4745**	**39.4745**	**8.2000e-004**		**39.4949**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.551648	0.035769	0.187848	0.110184	0.013450	0.004660	0.017552	0.070120	0.001413	0.001134	0.004476	0.000905	0.000840

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250
Unmitigated	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250
Total	**1.0100e-003**	**1.0000e-004**	**0.0109**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.0235**	**0.0235**	**6.0000e-005**		**0.0250**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0100e-003	1.0000e-004	0.0109	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.0235	0.0235	6.0000e-005		0.0250
Total	**1.0100e-003**	**1.0000e-004**	**0.0109**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.0235**	**0.0235**	**6.0000e-005**		**0.0250**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Judson Perris Boulevard Transmission Main

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	107.20	1000sqft	2.46	107,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Judson Perris Boulevard Transmission Main - Riverside-South Coast County, Annual

Project Characteristics -

Land Use -

Construction Phase - Per project description.

Off-road Equipment - Phase accounts for on-road worker trips only, no construction.

Off-road Equipment - Per project description.

Off-road Equipment - Per project description.

Off-road Equipment - Phase accounts for on-road worker trips only, no construction.

Off-road Equipment - Per project description.

Grading -

Trips and VMT - On-road trip estimates for mobilization and demobilization.

Consumer Products - No net change.

Area Coating - No net change in reapplication rate.

Landscape Equipment - No landscaping.

Construction Off-road Equipment Mitigation - Per SCAQMD rules.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	ReapplicationRatePercent	10	0
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	88.00
tblConstructionPhase	NumDays	6.00	67.00
tblConstructionPhase	NumDays	10.00	67.00
tblConstructionPhase	NumDays	20.00	44.00
tblConstructionPhase	PhaseEndDate	1/11/2024	10/5/2023
tblConstructionPhase	PhaseEndDate	2/9/2023	6/5/2023
tblConstructionPhase	PhaseEndDate	12/28/2023	6/5/2023
tblConstructionPhase	PhaseEndDate	2/1/2023	3/2/2023

tblConstructionPhase	PhaseStartDate	12/29/2023	6/6/2023
tblConstructionPhase	PhaseStartDate	2/2/2023	3/3/2023
tblConstructionPhase	PhaseStartDate	12/15/2023	3/3/2023
tblConstructionPhase	PhaseStartDate	1/28/2023	1/2/2023
tblGrading	MaterialExported	0.00	9,017.00
tblGrading	MaterialImported	0.00	8,578.00
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Sweepers/Scrubbers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Demobilization
tblOffRoadEquipment	PhaseName		Mobilization
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Mobilization
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	8.00	7.00
tblTripsAndVMT	WorkerTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	0.00	4.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1514	1.2483	1.3618	3.8200e-003	0.0388	0.0498	0.0886	0.0104	0.0475	0.0579	0.0000	339.5226	339.5226	0.0625	0.0000	341.0849
Maximum	**0.1514**	**1.2483**	**1.3618**	**3.8200e-003**	**0.0388**	**0.0498**	**0.0886**	**0.0104**	**0.0475**	**0.0579**	**0.0000**	**339.5226**	**339.5226**	**0.0625**	**0.0000**	**341.0849**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1514	1.2483	1.3618	3.8200e-003	0.0367	0.0498	0.0865	9.8800e-003	0.0475	0.0574	0.0000	339.5223	339.5223	0.0625	0.0000	341.0846
Maximum	**0.1514**	**1.2483**	**1.3618**	**3.8200e-003**	**0.0367**	**0.0498**	**0.0865**	**9.8800e-003**	**0.0475**	**0.0574**	**0.0000**	**339.5223**	**339.5223**	**0.0625**	**0.0000**	**341.0846**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**5.52**	**0.00**	**2.41**	**4.54**	**0.00**	**0.81**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2023**	**3-31-2023**	0.4323	0.4323
2	**4-1-2023**	**6-30-2023**	0.9832	0.9832
3	**7-1-2023**	**9-30-2023**	0.0008	0.0008
		Highest	0.9832	0.9832

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mobilization	Demolition	1/2/2023	3/2/2023	5	44	
2	Grading	Grading	3/3/2023	6/5/2023	5	67	
3	Paving	Paving	3/3/2023	6/5/2023	5	67	
4	Demobilization	Demolition	6/6/2023	10/5/2023	5	88	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 2.46

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demobilization	Air Compressors	0	6.00	78	0.48
Paving	Cement and Mortar Mixers	0	8.00	9	0.56
Mobilization	Concrete/Industrial Saws	0	8.00	81	0.73
Demobilization	Concrete/Industrial Saws	0	8.00	81	0.73
Mobilization	Rubber Tired Dozers	0	8.00	247	0.40
Demobilization	Rubber Tired Dozers	0	8.00	247	0.40
Mobilization	Graders	0	8.00	187	0.41
Paving	Pavers	1	8.00	130	0.42
Paving	Rollers	0	8.00	80	0.38
Demobilization	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Concrete/Industrial Saws	2	7.00	81	0.73

Grading	Cranes	1	7.00	231	0.29
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Mobilization	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Grading	Graders	0	8.00	187	0.41
Paving	Paving Equipment	0	8.00	132	0.36
Mobilization	Scrapers	0	8.00	367	0.48
Grading	Dumpers/Tenders	2	7.00	16	0.38
Grading	Excavators	1	7.00	158	0.38
Grading	Off-Highway Trucks	3	7.00	402	0.38
Grading	Pumps	1	7.00	84	0.74
Grading	Welders	1	7.00	46	0.45
Paving	Air Compressors	1	7.00	78	0.48
Paving	Generator Sets	1	7.00	84	0.74
Paving	Sweepers/Scrubbers	1	7.00	64	0.46

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mobilization	0	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	13	33.00	0.00	2,199.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demobilization	0	4.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Mobilization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Mobilization - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.1000e-004	2.3500e-003	1.0000e-005	9.7000e-004	1.0000e-005	9.7000e-004	2.6000e-004	1.0000e-005	2.6000e-004	0.0000	0.7250	0.7250	1.0000e-005	0.0000	0.7254
Total	**3.3000e-004**	**2.1000e-004**	**2.3500e-003**	**1.0000e-005**	**9.7000e-004**	**1.0000e-005**	**9.7000e-004**	**2.6000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.7250**	**0.7250**	**1.0000e-005**	**0.0000**	**0.7254**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Mobilization - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.1000e-004	2.3500e-003	1.0000e-005	9.3000e-004	1.0000e-005	9.3000e-004	2.5000e-004	1.0000e-005	2.5000e-004	0.0000	0.7250	0.7250	1.0000e-005	0.0000	0.7254
Total	**3.3000e-004**	**2.1000e-004**	**2.3500e-003**	**1.0000e-005**	**9.3000e-004**	**1.0000e-005**	**9.3000e-004**	**2.5000e-004**	**1.0000e-005**	**2.5000e-004**	**0.0000**	**0.7250**	**0.7250**	**1.0000e-005**	**0.0000**	**0.7254**

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.1100e-003	0.0000	1.1100e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1100	0.8621	0.9568	2.3400e-003		0.0368	0.0368		0.0350	0.0350	0.0000	203.1476	203.1476	0.0506	0.0000	204.4120
Total	**0.1100**	**0.8621**	**0.9568**	**2.3400e-003**	**1.1100e-003**	**0.0368**	**0.0379**	**1.7000e-004**	**0.0350**	**0.0351**	**0.0000**	**203.1476**	**203.1476**	**0.0506**	**0.0000**	**204.4120**

3.3 Grading - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.5700e-003	0.1386	0.0284	7.8000e-004	0.0190	2.6000e-004	0.0192	5.2000e-003	2.5000e-004	5.4500e-003	0.0000	75.4043	75.4043	3.7100e-003	0.0000	75.4970
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1700e-003	2.5900e-003	0.0296	1.0000e-004	0.0122	7.0000e-005	0.0122	3.2300e-003	6.0000e-005	3.2900e-003	0.0000	9.1083	9.1083	1.8000e-004	0.0000	9.1129
Total	**7.7400e-003**	**0.1412**	**0.0579**	**8.8000e-004**	**0.0311**	**3.3000e-004**	**0.0314**	**8.4300e-003**	**3.1000e-004**	**8.7400e-003**	**0.0000**	**84.5126**	**84.5126**	**3.8900e-003**	**0.0000**	**84.6099**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.0000e-004	0.0000	5.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1100	0.8621	0.9568	2.3400e-003		0.0368	0.0368		0.0350	0.0350	0.0000	203.1474	203.1474	0.0506	0.0000	204.4118
Total	**0.1100**	**0.8621**	**0.9568**	**2.3400e-003**	**5.0000e-004**	**0.0368**	**0.0373**	**8.0000e-005**	**0.0350**	**0.0351**	**0.0000**	**203.1474**	**203.1474**	**0.0506**	**0.0000**	**204.4118**

3.3 Grading - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.5700e-003	0.1386	0.0284	7.8000e-004	0.0182	2.6000e-004	0.0185	5.0300e-003	2.5000e-004	5.2800e-003	0.0000	75.4043	75.4043	3.7100e-003	0.0000	75.4970
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1700e-003	2.5900e-003	0.0296	1.0000e-004	0.0116	7.0000e-005	0.0117	3.1000e-003	6.0000e-005	3.1600e-003	0.0000	9.1083	9.1083	1.8000e-004	0.0000	9.1129
Total	**7.7400e-003**	**0.1412**	**0.0579**	**8.8000e-004**	**0.0299**	**3.3000e-004**	**0.0302**	**8.1300e-003**	**3.1000e-004**	**8.4400e-003**	**0.0000**	**84.5126**	**84.5126**	**3.8900e-003**	**0.0000**	**84.6099**

3.4 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0282	0.2436	0.3312	5.4000e-004		0.0127	0.0127		0.0122	0.0122	0.0000	46.9273	46.9273	7.9200e-003	0.0000	47.1252
Paving	3.2200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0314**	**0.2436**	**0.3312**	**5.4000e-004**		**0.0127**	**0.0127**		**0.0122**	**0.0122**	**0.0000**	**46.9273**	**46.9273**	**7.9200e-003**	**0.0000**	**47.1252**

3.4 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2600e-003	7.8000e-004	8.9500e-003	3.0000e-005	3.6800e-003	2.0000e-005	3.7000e-003	9.8000e-004	2.0000e-005	1.0000e-003	0.0000	2.7601	2.7601	6.0000e-005	0.0000	2.7615
Total	**1.2600e-003**	**7.8000e-004**	**8.9500e-003**	**3.0000e-005**	**3.6800e-003**	**2.0000e-005**	**3.7000e-003**	**9.8000e-004**	**2.0000e-005**	**1.0000e-003**	**0.0000**	**2.7601**	**2.7601**	**6.0000e-005**	**0.0000**	**2.7615**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0282	0.2436	0.3312	5.4000e-004		0.0127	0.0127		0.0122	0.0122	0.0000	46.9272	46.9272	7.9200e-003	0.0000	47.1251
Paving	3.2200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0314**	**0.2436**	**0.3312**	**5.4000e-004**		**0.0127**	**0.0127**		**0.0122**	**0.0122**	**0.0000**	**46.9272**	**46.9272**	**7.9200e-003**	**0.0000**	**47.1251**

3.4 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2600e-003	7.8000e-004	8.9500e-003	3.0000e-005	3.5200e-003	2.0000e-005	3.5400e-003	9.4000e-004	2.0000e-005	9.6000e-004	0.0000	2.7601	2.7601	6.0000e-005	0.0000	2.7615
Total	**1.2600e-003**	**7.8000e-004**	**8.9500e-003**	**3.0000e-005**	**3.5200e-003**	**2.0000e-005**	**3.5400e-003**	**9.4000e-004**	**2.0000e-005**	**9.6000e-004**	**0.0000**	**2.7601**	**2.7601**	**6.0000e-005**	**0.0000**	**2.7615**

3.5 Demobilization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Demobilization - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.6000e-004	4.1000e-004	4.7000e-003	2.0000e-005	1.9300e-003	1.0000e-005	1.9500e-003	5.1000e-004	1.0000e-005	5.2000e-004	0.0000	1.4501	1.4501	3.0000e-005	0.0000	1.4508
Total	**6.6000e-004**	**4.1000e-004**	**4.7000e-003**	**2.0000e-005**	**1.9300e-003**	**1.0000e-005**	**1.9500e-003**	**5.1000e-004**	**1.0000e-005**	**5.2000e-004**	**0.0000**	**1.4501**	**1.4501**	**3.0000e-005**	**0.0000**	**1.4508**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Demobilization - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.6000e-004	4.1000e-004	4.7000e-003	2.0000e-005	1.8500e-003	1.0000e-005	1.8600e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.4501	1.4501	3.0000e-005	0.0000	1.4508
Total	**6.6000e-004**	**4.1000e-004**	**4.7000e-003**	**2.0000e-005**	**1.8500e-003**	**1.0000e-005**	**1.8600e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.4501**	**1.4501**	**3.0000e-005**	**0.0000**	**1.4508**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.551648	0.035769	0.187848	0.110184	0.013450	0.004660	0.017552	0.070120	0.001413	0.001134	0.004476	0.000905	0.000840

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**					**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**					**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX B: BIOLOGICAL TECHNICAL REPORT

Biological Technical Report
Judson Transmission Main Project

NOVEMBER 2021

PREPARED FOR

Woodard & Curran

PREPARED BY

SWCA Environmental Consultants

Biological Technical Report
Judson Transmission Main Project

Prepared for

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November 2021

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CONTENTS

Appendices

Figures

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1 Project Description and Location

The Judson Transmission Main Project (Project) is located in Riverside County in the City of Moreno Valley in western Riverside County, California (Figure 1). The site lies on the Holtville East U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 2). The Project entails construction of an 18-inch diameter potable water transmission pipeline within Perris Boulevard right-of-way, approximately from the intersection with Robin Lane in the south and north to Casey Court Tank Access Road located at 118 Perris Blvd., about 550 feet south of Heacock Street (Figure 3). The total pipeline length is about 6,700 linear feet and would be constructed using open cut trenching methods within paved roadway rights-of-way. Project construction is anticipated to be completed in approximately one year.

For purposes of this biological assessment, the pipeline construction footprint is assumed to be entirely within the existing paved right-of-way of Perris Blvd.

The Project includes staging areas which would be used for equipment, vehicle and material storage during project construction. Four potential staging areas have been identified, as illustrated on Figure 2. Access to the staging areas would be from Perris Blvd. and/or Heacock Street via temporary access roadways composed of crushed rock.

This report uses the term Study Area to include the pipeline corridor, a 100-foot survey area extending outward from that corridor, the four potential staging areas, and a 100-foot survey area surrounding them.

1.1 Site Characteristics

The Study Area is within the Riverside Lowlands bioregion, south of the Transverse Mountain Range. The region is characterized by arid conditions and high levels of habitat fragmentation, disturbance, and urbanization. Elevation in the Riverside Lowlands is generally below 2,000 feet above mean sea level. The Study Area ranges in elevation from about 1903 to 1957 feet above mean sea level. Surrounding land uses include residential, rural residential, and public facilities, with pockets of undeveloped open space. Appendix A provides representative photographs.

Figure 1. Project Vicinity.

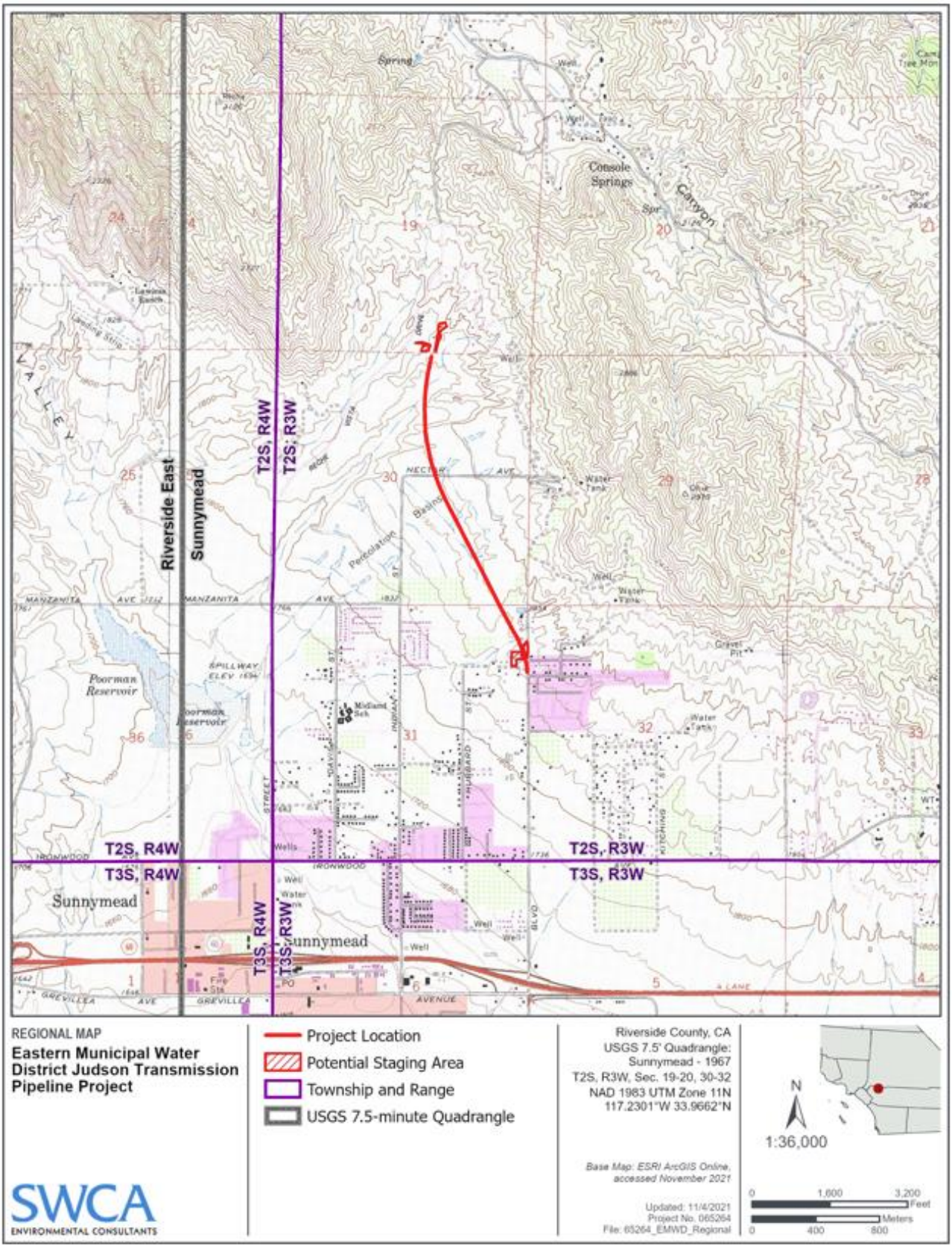

Figure 2. Regional Topographic Map

Figure 3. Project Location.

2 REGULATORY SETTING

The following discussion summarizes federal, state, and local laws, regulations, and policies relating to plants, wildlife, and special-status habitats. Only those regulations potentially applicable to the proposed project are included herein.

2.1 Federal Regulations

2.1.1 *Federal Endangered Species Act*

The federal Endangered Species Act (ESA) protects 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.

The U.S. Fish and Wildlife Service (USFWS) is authorized to issue permits under Sections 7 and 10 of the ESA. Section 7 mandates that all federal agencies consult with the USFWS for terrestrial species and/or National Marine Fisheries Service (NMFS) 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 require preparation of a biological assessment to determine potential effects of the project on listed species and critical habitat. If the project adversely affects a listed species or its habitat, the USFWS or NMFS prepares a Biological Opinion. The Biological Opinion may recommend "reasonable and prudent alternatives" to the project to avoid jeopardizing or adversely modifying habitat including "take" limits.

The ESA defines critical habitat as habitat deemed essential to the survival of a federally listed species. The ESA requires the federal government to designate "critical habitat" for any species it lists under the ESA. 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. These complementary requirements apply only to federal agency actions, and the latter apply only to specifically designated habitat. A critical habitat designation does not set up a preserve or refuge, and applies only when federal funding, permits, or projects are involved (i.e., a federal nexus). Critical habitat requirements do not apply to activities on private land that do not involve a federal nexus.

Section 10 of the ESA includes provisions to authorize take that is incidental to, but not the purpose of, activities that are otherwise lawful. Under Section 10(a)(1)(B), the USFWS may issue permits (incidental take permits) for take of ESA-listed species if the take is incidental and does not jeopardize the survival and recovery of the species. To obtain an incidental take permit, an applicant must submit a habitat conservation plan outlining steps to minimize and mitigate permitted take impacts to listed species.

2.1.2 *Migratory Bird Treaty Act*

The federal Migratory Bird Treaty Act (MBTA) 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, 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 statute was extended in 1974 to include parts of birds, as well as eggs and nests. The Migratory Bird Treaty Reform Act of 2004 further defined species protected under the MBTA and excluded all non-native species. Thus, it is illegal under the MBTA to directly kill or destroy a nest of nearly any native bird species.

2.1.3 *Bald and Golden Eagle Protection Act*

The Bald and Golden Eagle Protection Act (BGEPA) (16 USC 668–668c) prohibits anyone from "taking" bald eagles (*Haliaeetus leucocephalus*), including their parts, nests, or eggs, without a permit issued by the Secretary of the Interior. In 1962, Congress amended the act to cover golden eagles (*Aquila chrysaetos*). The BGEPA 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 BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The 1962 amendments included a specific exemption for possession of eagles for religious purposes of Native American tribes; however, an Indian Religious Permit is required.

On November 10, 2009, the USFWS implemented new rules under the existing BGEPA, requiring USFWS permits for all activities that may disturb or incidentally take an eagle or its nest as a result of an otherwise legal activity. 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 CDFW administers the CESA, which prohibits the "taking" of listed species except as otherwise provided in 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." Under certain circumstances, the CESA applies these take prohibitions to species petitioned for listing (state candidates). Pursuant to the requirements of the CESA, state lead agencies (as defined under CEQA Public Resources Code 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 of species of special concern (or watch list species).

2.2.2 *Fully Protected Species*

The California Fish and Game 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 protected under Section 3511. Migratory non-game 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.

2.2.3 *Nesting Birds and Raptors*

Section 3503 of the Fish and Game 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.

2.2.4 *Migratory Bird Protection*

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

2.2.5 *Bats*

Fish and Game Code Section 4150 prohibits the take of bats, regardless of their listing status.

2.2.6 *California Environmental Quality Act*

The CEQA 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.

2.2.7 *Native Plant Protection Act*

The Native Plant Protection Act (NPPA) of 1977 (Fish and Game Code Section 1900-1913) directed the 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 the power to designate native plants as "endangered" or "rare" and protected endangered and rare plants from take. The NPPA thus includes measures to preserve, protect, and enhance rare and endangered native plants.

The CESA has largely superseded the 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.

2.2.7.1 CALIFORNIA DESERT NATIVE PLANTS ACT

The California Desert Native Plants Act protects non-listed California desert native plants from unlawful harvesting on public and private lands in the counties of Riverside, San Bernardino, Imperial, Inyo, Kern, Los Angeles, Mono, and San Diego (California Food and Agriculture Code, Sections 80001-80006, Division 23). A wide range of desert plants is protected under this act, including all species in the agave and cactus families. Harvest, transport, sale, or possession of specific native desert plants is prohibited without a valid permit or wood receipt and the required tags and seals. Species listed as rare, endangered, or threatened under federal or state law or regulations are excluded from this provision.

2.3 Federal, Regional, and Local Conservation Plans

2.3.1 *Western Riverside County Multiple Species Habitat Conservation Plan*

The Project is located within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) plan area (County of Riverside 2003). This MSHCP was developed to address the conservation of 146 special-status plants and animals that occur in the 1,966-square-mile plan area, which includes all of unincorporated Riverside County west of the crest of the San Jacinto Mountains, as well as 14 incorporated cities: Banning, Beaumont, Calimesa, Canyon Lake, Corona, Hemet, Lake Elsinore, Moreno Valley, Murrieta, Norco, Perris, Riverside, San Jacinto, and Temecula. The MSHCP aims to maintain biological and ecological diversity in the plan area while allowing for Riverside County and local cities to support economic development.

The MSHCP functions as a Habitat Conservation Plan (HCP) pursuant to Section 10(a)(1)(B) of the federal ESA, and as a Natural Community Conservation Plan (NCCP) pursuant to California's Natural Communities Conservation Planning Act. The MSHCP provides a framework for the USFWS and CDFW to grant take authorization (i.e., incidental take permits) for species covered by the MSHCP which are ESA and/or CESA listed as threatened or endangered; take of these species without a permit would be unlawful. The MSHCP covers 146 species, not all of which are ESA or CESA listed. However, mitigation for impacts to both listed and non-listed species may be required pursuant to CEQA or other regulatory processes, and the MSHCP's Conservation Area provides an avenue for this mitigation. Furthermore, should any of the non-listed covered species be subsequently ESA- or CESA-listed, take authorization may be granted through the MSHCP framework.

Within the MSHCP plan area, areas that may be needed for fulfilling conservation goals are delineated as 0.5-mile by 0.5-mile Criteria Area cells (approximately 160 acres total). The cells have been identified because they may support habitats and/or species that can help the MSHCP reach its conservation goals, providing mitigation for take authorized under the MSHCP. For projects located in Criteria Area cells, Riverside County's Environmental Programs Department administers the Property Owner Initiated Habitat Evaluation and Acquisition Negotiation Strategy (HANS) and ensures that the project is consistent with the MSHCP.

No components of the Project are within existing or proposed criteria areas or reserves defined in the MSHCP. The potential staging area along Heacock Street is approximately 340 feet east of MSHCP Criteria Area Cell 553 at its closest point (an existing dirt roadway). Criteria Area Cell 553 is in the Reche Canyon Subunit of Reche Canyon/Badlands Area Plan.

Similarly, the Project is not within a Narrow Endemic Plant Species Survey Area (NEPSSA) nor a Criteria Area Species Survey Area (CASSA) of the MSHCP. Therefore, neither NEPSSA nor CASSA surveys were required.

2.3.2 *City of Moreno Valley Municipal Code*

Chapter 9.17 of the City of Moreno Valley Municipal Code protects heritage trees, including older palms and olive trees and/or any tree designated as such by official action. "Heritage trees" are defined by the city as those with a 15" diameter (measured at 24" above ground level), or those 15 feet of taller in height. Moreno Valley Municipal Code (9.17.030 Landscape and irrigation design standards) reads:

- No person shall remove, destroy, top, or disfigure a heritage tree within the city limits.
- Removal of a heritage tree is permitted if the tree poses a dangerous or hazardous condition to people, structures, property, or another heritage tree.
- Removal of a heritage tree is permitted if tree is diseased, dying, or dead, and if a reasonable undertaking to preserve the tree had occurred.
- Removal of a heritage tree in the public or future right-of-way is permitted with the approval of the community development director and if a reasonable undertaking to preserve the tree had occurred.
- Removal of a heritage tree designated historic and or culturally significant by official action shall require the review of the ecological historical preservation board.

3 METHODOLOGY

3.1 Literature Review

The literature review consisted of reviewing publicly available spatial data from a variety of public agencies, geospatial data warehouses, and previously written reports related to the project site and surrounding nine-quadrangle buffer area to ensure that current and accurate data were integrated into the review. The nine USGS 7.5' topographic quadrangles queried in this search were Lakeview; Perris; Steele Peak; El Casco; Sunnymead (site location); Riverside East; Yucaipa; Redlands; and San Bernardino South.

Pertinent sources reviewed included, but were not limited to, the following:

- CDFW California Natural Diversity Database (CNDDB) RAREFIND 5 (CDFW 2021)
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2021)
- Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP)
- National Wetlands Inventory (NWI) on-line wetlands mapper (USFWS 2021)
- eBird online database of bird distribution and abundance (eBird 2021)
- USFWS Critical Habitat Mapper and File Data (USFWS 2021)
- Google Earth aerial imagery (Google 2021)

3.2 Field Surveys

SWCA biologist Sharif Durzi conducted three reconnaissance-level flora and fauna surveys of the Study Area on February 17, August 30, and October 27, 2021. The Study Area included the pipeline corridor, a 100-foot survey area extending outward from that corridor to the east and west, and the potential staging areas, along with 100 feet around them. A 100-foot area between the northern-most potential staging area and the northern extent of the proposed pipeline was also surveyed, as was 100 feet along both sides of Heacock Street out to 100 feet beyond that potential staging area. Collectively these areas are referred to herein as the Study Area.

Survey goals were to characterize the existing biological conditions, search for special-status plants, animals, and habitats, and to map habitats and potentially jurisdictional aquatic resources. Existing biological conditions were noted and vegetation alliances were mapped based on *Manual of California Vegetation* (Sawyer et al 2009) and *A Manual of California Vegetation Online* (CNPS 2021b). Comprehensive lists of identified plant and wildlife species were compiled and photos were collected.

3.2.1 *Assessment of Special-Status Species Potential*

Special-status species are plants and animals within one or more of the following categories:

- Species listed or proposed for listing as threatened or endangered under the ESA
- Species listed or proposed for listing as threatened or endangered under the CESA (14 California Code of Regulations [CCR] 670.5).
- Species that meet the definitions of rare or endangered under the CEQA (State CEQA Guidelines Section 15380).
- Plants listed as rare under the California Native Plant Protection Act (California Department of Fish and Game Code Section 1900 et seq.).
- Plants considered by the CNPS to be "rare, threatened, or endangered in California" (Lists 1B and 2).
- Animals fully protected in California (California Fish and Game Code Sections 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]).
- Animals listed on the California Special Animals List such as Species of Special Concern, Fully Protected, Watch List, and for invertebrates, all species regardless of the reason for inclusion (CDFW July 2021).

4 FINDINGS

4.1 Soils

Eight soil types are designated as Sensitive in the MSHCP; Altamont, Auld, Bosanko, Claypit, Domino, Porterville, Traver and Willows. None of these are mapped for the Study Area. The eleven soil types mapped by the NRCS in the Study area are listed below (NRCS, 2021):

- TeG: Terrace escarpments
- HcC: Hanford coarse sandy loam, 2 to 8 percent slopes (458275)
- HcD2: Hanford coarse sandy loam, 8 to 15 percent slopes, eroded (458276)
- GyD2: Greenfield sandy loam, 8 to 15 percent slopes, eroded (458270)
- GyC2: Greenfield sandy loam, 2 to 8 percent slopes, eroded (458269)
- RaB2: Ramona sandy loam, 2 to 5 percent slopes, eroded (458340)
- RaC2: Ramona sandy loam, 5 to 8 slopes, eroded (458342)
- RaD3: Ramona sandy loam, 8 to 15 percent slopes, severely eroded (458345)
- MmB: Monserate sandy loam, 0 to 5 percent slopes (458308)
- MmD2: Monserate sandy loam, 8 to 15 percent slopes, eroded (458310)
- MnE3: Monserate sandy loam, shallow, 15 to 25 percent slopes, severely eroded (458313)

4.2 Vegetation

The proposed pipeline corridor lies entirely within the paved right-of-way of Perris Blvd and is therefore devoid of vegetation. Three of the four proposed staging areas are on disturbed unvegetated sites; the fourth contains mostly non-native ruderal vegetation and a narrow band of native cover.

Specific land covertypes are shown on Figure 2 & 5 and discussed below. Appendix B lists plants identified during the field surveys.

Eight land covertypes were found in the Study Area, only two of which are comprised of native plants. These are described in descending order of relative abundance below.

4.2.1 *Ornamental, Developed, Disturbed, Bare Ground*

The majority of the Study Area is occupied by ornamental plantings (landscaping), developed areas (residential, public infrastructure), and disturbed/ruderal vegetation or bare ground. Ornamental plantings include *Schinus* {*molle*, *terebinthifolius*} - *Myoporum laetum* (Pepper tree or Myoporum Groves Forest & Woodland Semi-Natural Alliance) dominated by Peruvian pepper tree (*Schinus molle*) and gum trees (*Eucalyputs* spp.).

Disturbed/ruderal communities are composed of mostly nonnative and invasive forbs and grasses included *Brassica nigra - Centaurea* {*solstitiali*s, *melitensis}* Upland Mustards or Star-Thistle Fields Herbaceous Semi-Natural Alliance. Dominants observed include shortpod mustard (*Hirschfeldia incana*), ripgut brome (*Bromus diandrus*), and soft brome (*Bromus hordeaceus*). Areas with a diverse array of non-native species did not fit the defined vegetation alliances and thus were classified as ornamental/disturbed.

All of the potential staging areas are sparsely vegetated and/or comprised of disturbed, barren ground.

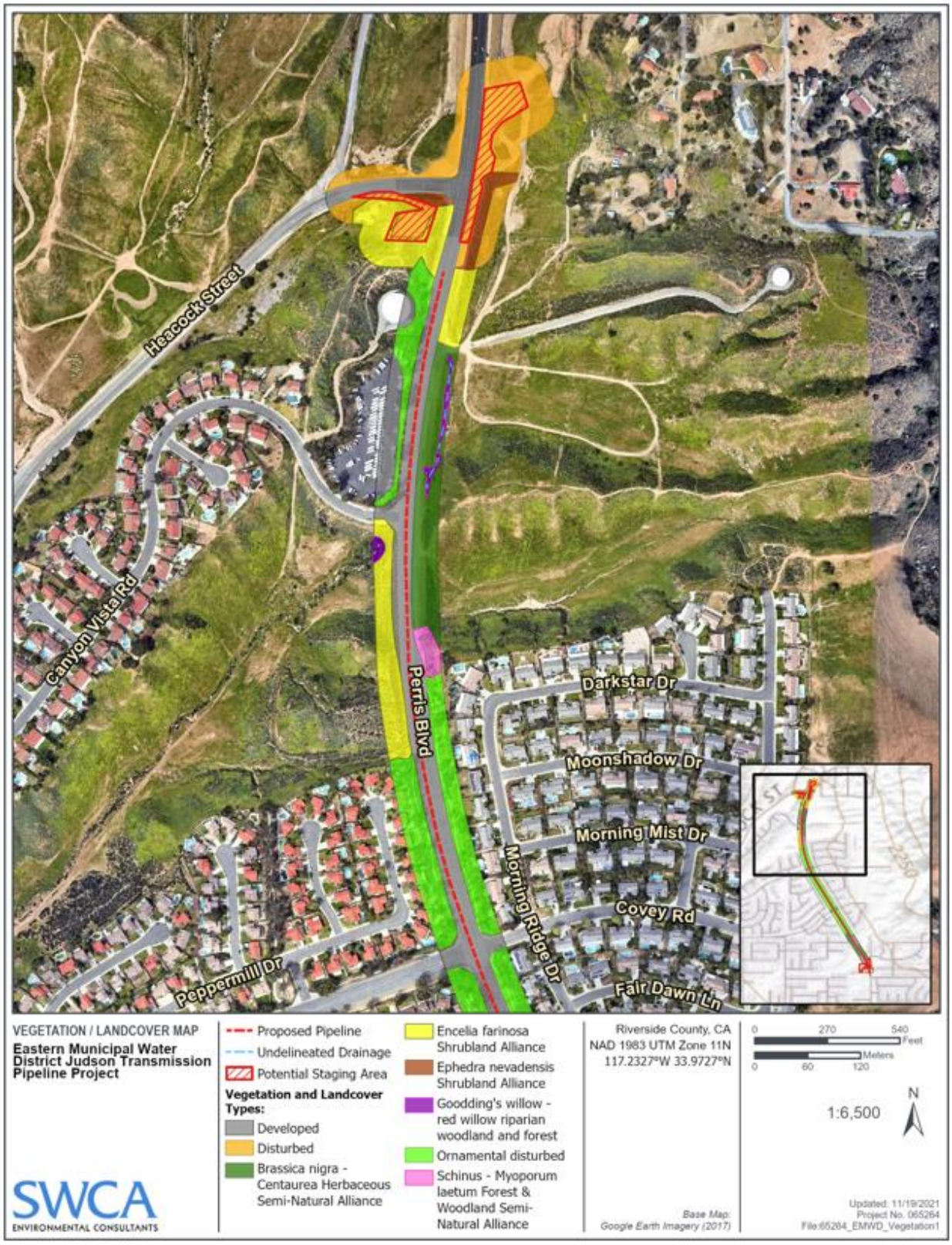

Figure 4. Vegetation Communities Map - North

Figure 5. Vegetation Communities Map - South

4.2.2 *Native Plant Covertypes*

Three native plant covertypes occur in the Study Area. *Encelia farinosa* Brittle Bush Scrub Shrubland Alliance was found in the northern portion, where brittle bush (*Encelia farinosa*) and California buckwheat (*Eriogonum fasciculatum*) are co-dominants. *Ephedra nevadensis* Nevada joint fir scrub Shrubland Alliance occupies two areas east and west of the intersection of Heacock Street and Perris Blvd. Goodding's willow - red willow riparian woodland and forest (*Salix gooddingii - Salix laevigata* Forest & Woodland Alliance) was found in two areas in the northwest and northeast of the Study Area, near the intersection of Canyon Vista Road and Perris Blvd. (refer to Figure 4). These areas are dominated by red willow (*Salix laevigata*), coyote bush (*Baccharis pilularis*), mulefat (*Baccharis salicifolia*), and common sunflower (*Helianthus annus*). This riparian community is associated with an unnamed intermittent stream feature that crosses underneath Perris Blvd via culverts and conveys flows in a southwesterly direction (labeled on Figure 4 as an Undelineated Drainage) . Plants within this community appear to be pruned back on a regular basis, kept to a height of about four feet or less. As such, the plants do not technically meet the definition of 'tree' required for this plant alliance but likely would if allowed to grow. Although a formal aquatic wetland) delineation was not conducted as part of this study, this covertype is indicative of regular soil moisture.

4.3 Wildlife

Several species of wildlife typically found in southern California urban-rural interfaces were observed during the field surveys. Mammals observed included desert cottontail (*Sylvilagus audubonii*) and Botta's pocket gopher (*Thomomys bottae*). Birds observed included California towhee (*Melozone crissalis*), wrentit, (*Chamaea fasciata*), red-tailed hawk (*Buteo jamaicensis*), and kingbird (*Tyrannus sp.*). Appendix C provides a list of wildlife detected during the field survey.

Other common wildlife are expected to utilize the areas within the Study Area where suitable habitat occurs, especially in the northern portion where substantial areas of contiguous undisturbed open space occurs. The native shrub and riparian habitats adjacent to the northern portion and landscaped areas provide ample suitable nesting habitat for a wide array of bird species.

4.4 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.

No components of the Project are within existing or proposed criteria areas or reserves defined in the MSHCP. The northern portion of the Project area provides connectivity to the Blue Mountains located to the west and Reche Canyon to the east. The wildlife connectivity extends southwest into the Badlands community and the Riverside lowlands which includes Mystic Lake and the San Jacinto Wildlife Area.

No impacts to wildlife movement corridors and habitat linkages are anticipated given the Project footprint within a developed roadway and the potential temporary staging areas in previously disturbed, barren unvegetated and/or sparsely vegetated areas.

4.5 Jurisdictional Waters

The National Wetlands Inventory (NWI) provides an on-line wetlands mapper showing wetland types and general locations, derived from aerial photos and not field checked (USFWS 2021). The NWI show a riverine feature crossing the northern portion of the Study Area. Although the NWI mapping is imprecise in this area, it can be assumed that the intended feature coincides with the drainage mapped herein as Goodding's Willow - Red Willow Riparian Forest & Woodland Alliance described previously (refer to Figure 4; indicated as undelineated drainage). The drainage crosses under Perris Blvd. through a culvert from the northeast and continues towards the southwest.

No components of the proposed Project intersect this drainage.

4.6 Special-status Flora and Fauna

Appendix D lists the special-status plant and wildlife species previously reported as occurring on the Holtville East USGS quadrangle where the Project is located and the eight quadrangles surrounding it: Lakeview, Perris, Steele Peak, El Casco, Sunnymead, Riverside East, Yucaipa, Redlands, and San Bernardino South. This is referred to herein as the Study Area.

The relative occurrence potential shown on these tables 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).
- Unlikely: 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.

4.6.1 *Special-Status Flora*

The literature search identified 37 special-status plant species and numerous trees meeting the City's definition of heritage trees were found in the Study Area.

No special-status plant species were identified during the 2021 field surveys; however, winter and late summer are not the optimal season for floristic surveys. Given the Project location in the paved Perris Blvd. right-of-way and the disturbed condition of the potential staging areas, impacts to special-status plants are not anticipated. No heritage trees would be removed or impacted.

4.6.2 *Special-Status Fauna*

Twenty-one 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 more than a low potential for occurrence in the Study Area.

4.6.2.1 NESTING BIRDS

The field surveys did not include nesting bird surveys and no nesting bird activity was incidentally detected. Potentially suitable nesting habitat is present in the Study Area within the trees, shrubs and low vegetation.

4.6.2.2 COASTAL CALIFORNIA GNATCATCHER

The coastal California gnatcatcher listed as threatened under the ESA and is a CDFW Species of Special Concern. Coastal California gnatcatcher is a small resident songbird that uses Diegan, Riversidean and Venturan sub-associations of coastal sage scrub habitat in California (Atwood 1993). Plant communities utilized by this bird are typically dominated by one or more of the following species: California sagebrush, buckwheat (*Eriogonum fasciculatum*, *E. cinereum*), encelia (*Encelia californica*, *E. farinosa*), and sage (*Salvia mellifera*, *S. apiana*, and *S. leucophylla*). Gnatcatchers also use chaparral, grassland, and riparian habitats where they occur in proximity to sage scrub. Non-sage scrub habitat usage may increase during nonbreeding season for dispersal and foraging (Campbell *et al.* 1998). During the breeding season, gnatcatchers show a pattern of using non-sage scrub habitat at the interface between coastal sage scrub and other habitats, being more abundant near the grassland interface than chaparral.

The nearest CNDDB record for coastal California gnatcatcher is from 2002, located approximately 0.3 miles to the east of the northern limits of the Study Area. Most recent occurrences in eBird are about 2.5 miles west/southwest (Box Spring Mtn trail). The report closest to the Study Area is from 2020 about 0.25 mile northeast; however this sighting was not verified to be the listed subspecies.

The northern portion of the Study Area consist of coastal sage scrub which could be utilized by coastal California gnatcatchers for nesting, however much of the habitat is at a severe angle (30-40 degrees) not preferred by gnatcatchers as nesting habitat. It is unlikely that coastal California gnatcatcher nest in the Study Area although individuals may pass through while foraging.

5 POTENTIAL IMPACTS AND RECOMMENDATIONS

This section describes the anticipated direct and indirect impacts to biological resources that may result from implementation of the proposed project. This analysis was based on the results of the biological resources surveys conducted at the site, information from literature, and database resources.

5.1 Direct Impacts

5.1.1 *Pipeline Construction*

Project implementation would not result in the direct removal of habitat within the construction corridor since it is entirely contained within an existing paved right-of-way of Perris Blvd. No mitigation measures are required.

5.1.2 *Potential Staging Areas*

No impacts to biological resources would result from use of any of the four potential staging areas due to their current disturbed condition. These sites are largely barren and unvegetated, or thinly vegetated with non-native, often invasive plant species.

5.1.3 *Nesting Birds*

There is no nesting habitat within the proposed pipeline corridor or the four potential staging areas.

5.1.4 *Coastal California Gnatcatcher*

Nesting coastal California gnatcatchers are not expected to occur in the Study Area or vicinity due to lack of suitable habitat. As such, adverse impacts are not anticipated.

5.2 Indirect Impacts

Indirect impacts to off-site biotic resources are possible during construction (noise, dust), which could temporarily alter the wildlife behavior. However, given that the majority of the Study Area is highly disturbed and transected by an active roadway (Perris Blvd.), indirect impacts to plants and wildlife would be minimal and no mitigation is needed

5.2.1 *Nesting Birds*

Nesting birds could occur anywhere in the Study Area where vegetation is present, and as such could be directly or indirectly impacted during construction. If activities associated with vegetation removal, construction, or grading are planned during the bird nesting/breeding season (generally February 1 through August 15; January 1 through August 15 for raptors), a qualified biologist shall conduct surveys for active nests. Preconstruction nesting bird surveys should be conducted no more than 3 days prior to the start of clearance/construction work. If ground-disturbing activities are delayed, additional preconstruction surveys should be conducted so that no more than 3 days have elapsed between the survey and ground-disturbing activities.

Active nests found within 100 feet of the construction zone shall be delineated with highly visible construction fencing or other exclusionary material that would inhibit entry by personnel or equipment into the buffer zone. Installation of the exclusionary material will be completed by construction personnel under the supervision of a qualified biologist prior to initiation of construction activities. The buffer zone shall remain intact and maintained while the nest is active (i.e., occupied or being constructed by at least one adult bird) and until young birds have fledged and no continued use of the nest is observed, as determined by a qualified biologist. The barrier shall be removed by construction personnel at the direction of the biologist.

5.2.2 *Coastal California Gnatcatcher*

Nesting coastal California gnatcatchers are not expected to occur in the Study Area or vicinity due to lack of suitable habitat. As such, adverse impacts are not anticipated.

5.2.3 *Aquatic Resources*

Potentially jurisdictional aquatic resources are located adjacent to Perris Blvd. where a drainage feature crossing under the road via culverts. Standard Best Management Practices (BMPs) should be implemented to control erosion and to prevent sediment and other debris from moving out of the construction zone and entering the drainage area.

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APPENDIX A

Site photos

Figure 1. Northeastern edge of Study Area with brittle bush scrub habitat.

Figure 2. Northern portion of Study Area showing disturbed/ruderal vegetation along eastern side and ornamentals west of Perris Blvd (viewing north).

Figure 3. Northeastern portion of Study Area with brittle bush scrub (viewing north).

Figure 4. Northwestern portion the Study Area with brittle bush scrub (viewing south).

Figure 5. Northwestern portion the Study Area, viewing north.

Figure 6. Center of Study Area, viewing north.

APPENDIX B

Flora Compendium

Judson Transmission Pipeline Project Site Flora
February & August 2021

	Latin Name & Taxonomic Reference	Vernacular Name
FAMILY		
DICOTS - Flowering Plants		
Aizoaceae	**Fig-marigold Family**	
	*Carpobrotus edulis**	Hottentot-fig, ice plant
Anacardiaceae	**Cashew or Sumac Family**	
	*Schinus molle**	Peruvian pepper tree
Asteraceae	**Sunflower Family**	
	Artemisia californica	California sagebrush
	Baccharis salicifolia	mulefat
	Baccharis pilularis	coyote brush
	Corethrogyne filaginifolia	sandaster
	Encelia farinosa	brittlebush
	*Gazania linearis**	treasure flower
	Helianthus annus	common sunflower
	Heterotheca grandiflora	telegraph weed
Brassicaceae	**Mustard Family**	
	*Hirschfeldia incana**	shortpod mustard
	*Sisymbrium irio**	London rocket
Chenopodiaceae	**Goosefoot Family**	
	*Salsola tragus**	Russian thistle, tumbleweed
Euphorbiaceae	**Spurge Family**	
	Croton setiger	turkey-mullein
Fabaceae	**Pea Family**	
	*Parkinsonia aculeata**	Jerusalem thorn
Fagaceae	**Oak Family**	
	Quercus agrifolia	coast live oak
Geraniaceae	**Geranium Family**	
	*Erodium cicutarium**	red stemmed filaree
Lamiaceae	**Mint Family**	
	*Marrubium vulgare**	horehound
Myrtaceae	**Myrtle Family**	
	Eucalyptus spp. *	Eucalyptus/gum tree
Onagraceae	**Evening Primrose Family**	
	Clarkia sp.	clarkia
Polygonaceae	**Smartweed- Buckwheat Family**	
	Eriogonum fasciculatum	California buckwheat
Rosaceae	**Rose Family**	
	Adenostoma fasciculatum	chamise
Salicaceae	**Willow Family**	
	Salix laevigata	red willow
Solanaceae	**Nightshade Family**	
	Nicotiana glauca	tree tobacco
MONOCOTS - Grasses and Allies		
Poaceae	**Grass Family**	
	*Bromus diandrus**	ripgut brome
	*Bromus hordeaceus**	soft brome

* Non-Native Species

APPENDIX C

Fauna Compendium

Fauna Observed or Detected on the Judson Pipeline Project Site
February & August 2021

SCIENTIFIC NAME	COMMON NAME
Insects	
Apies sp.	honeybee
Pogonomyrmex sp.	harvester ant
Reptiles	
Sceloporus occidentalis	western fence lizard
Birds	
Aphelocoma californica	California Scrub-jay
Buteo jamaicensis	red-tailed hawk
Calypte anna	Anna's hummingbird
Chamaea fasciata	wrentit
Corvus brachyrhynchos	American crow
Corvus corax	common raven
Melozone crissalis	California towhee
Passer domesticus	house sparrow
Pipilo maculatus	spotted towhee
Sayornis nigricans	black phoebe
Sturnus vulgaris	European starling
Tyrannus verticalis	kingbird
Zenaida macroura	mourning dove
Zonotrichia leucophrys	white-crowned sparrow

APPENDIX D

Special-Status Flora & Fauna Reported in the Project Vicinity

Special-Status Plant Species Reported as Occurring in the Vicinity of the Judson Transmission Main Project*

Common Name **Scientific Name**	**Status**	**Habitat Description**	**Elevation Range;** **Life Form;** **Flowering Period**	**Most Recent Record**	**Occurrence Potential** Note: “Project” includes the pipeline corridor and potential staging areas; “project buffer” includes 100-foot buffer outward from Project.
marsh sandwort Arenaria paludicola	FE; SE; 1B.1	Marshes and swamps.	3-170 m PH May-Aug	**1899**	**Absent.** Species extirpated in study area. Record is historic >75-year-old.
Nevin's barberry Berberis nevinii	FE; SE; 1B.1	Chaparral, cismontane woodland, coastal scrub, riparian scrub.	90-1590 m S March-June	**2009**	**Low.** Small area of marginal habitat in project buffer.
salt marsh bird's-beak Chloropyron maritimum ssp. maritimum	FE; SE; 1B.2	Marshes and swamps, coastal dunes.	0-10 m AH May-Oct	**1888**	**Absent.** No suitable habitat. Species extirpated. Record is historic >75-year-old.
slender-horned spineflower Dodecahema leptoceras	FE; SE; 1B.1	Chaparral, cismontane woodland, coastal scrub (alluvial fan sage scrub).	200-765 m AH April-June	**2010**	**Low.** Small area of marginal habitat in project buffer.
Santa Ana River woollystar Eriastrum densifolium ssp. sanctorum	FE; SE; 1B.1	Coastal scrub, chaparral.	180-705 m PH May-Sept	**2018**	**Low.** Small area of marginal habitat in project buffer.
Munz’s onion Allium munzii	FE; ST; 1B.1	Chaparral, cismontane woodland, coastal scrub (alluvial fan sage scrub).	200-765 m PH March-May	**2012**	**Unlikely.** Small areas of potentially suitable habitat in project buffer
thread-leaved brodiaea Brodiaea filifolia	FT; SE; 1B.1	Chaparral (openings), cismontane woodland, coastal scrub, playas, valley and foothill grassland, vernal pools.	15-1030 m PH March-June	**2017**	**Unlikely.** Suitable habitat is not present.
San Jacinto Valley crownscale Atriplex coronata var. notatior	FE; 1B.1	Playas, valley and foothill grassland, vernal pools.	35-460 m AH April-Aug	**2015**	**Unlikely.** Suitable habitat is not present.
spreading navarretia Navarretia fossalis	FT; 1B.1	Vernal pools, chenopod scrub, marshes and swamps, playas.	15-850 m AH April-June	**2014**	**Absent.** No suitable marsh and vernal pool habitat is present in study area.
Gambel's water cress Nasturtium gambelii	FE; ST; 1B.1	Marshes and swamps.	5-305 m PH April-Oct	**2014**	**Absent.** No suitable marsh and vernal pool habitat is present in study area.
Parish's checkerbloom Sidalcea hickmanii ssp. parishii	R; 1B.2	Chaparral, cismontane woodland, lower montane coniferous forest.	1095–2153 m PH May-July	**1909**	**Absent.** Species extirpated in study area. Record is historic >75-year-old.
smooth tarplant Centromadia pungens ssp. laevis	1B.1	Valley and foothill grassland, chenopod scrub, meadows and seeps, playas, riparian woodland.	5-1170 m AH April-Sept	**2018**	**Unlikely.** Small area of marginal habitat in project buffer.
chaparral sand-verbena Abronia villosa var. aurita	1B.1	Chaparral, coastal scrub, desert dunes.	60-1570 m AH Jan-Sept	**2014**	**Low.** Small area of marginal habitat in project buffer.
Horn's milk-vetch Astragalus hornii var. hornii	1B.1	Meadows and seeps, playas.	75-350 m AH May-Oct	**1900**	**Absent.** No suitable habitat; species extirpated in study area. Record is historic >75-year-old.
Jaeger's milk-vetch Astragalus pachypus var. jaegeri	1B.1	Coastal scrub, chaparral, valley and foothill grassland, cismontane woodland.	365-1040 m S Dec-June	**1922**	**Absent.** Species likely extirpated in study area. Record is historic >75-year-old.

Common Name **Scientific Name**	**Status**	**Habitat Description**	**Elevation Range;** **Life Form;** **Flowering Period**	**Most Recent Record**	**Occurrence Potential** Note: “Project” includes the pipeline corridor and potential staging areas; “project buffer” includes 100-foot buffer outward from Project.
Parish's brittlescale Atriplex parishii	1B.1	Vernal pools, chenopod scrub, playas.	4-1420 m AH June-Oct	**1974**	**Absent.** No suitable habitat; likely extirpated. Record is >45 years old.
Parry's spineflower Chorizanthe parryi var. parryi	1B.1	Coastal scrub, chaparral, cismontane woodland, valley and foothill grassland/sandy or rocky openings.	90-1220 m AH April-June	**2018**	**Low.** Some marginal habitat in project buffer.
mesa horkelia Horkelia cuneata var. puberula	1B.1	Chaparral, cismontane woodland, coastal scrub.	15-1645 m PH Feb-June	**1888**	**Absent.** Species likely extirpated. Record is historic >75 years old.
Coulter's goldfields Lasthenia glabrata ssp. coulteri	1B.1	Coastal salt marshes, playas, vernal pools.	1-1375 m AH Feb-June	**2017**	**Absent.** No suitable habitat.
Davidson's saltscale Atriplex serenana var. davidsonii	1B.2	Coastal bluff scrub, coastal scrub.	0-480 m AH April-Oct	**2015**	**Absent.** No suitable habitat.
long-spined spineflower Chorizanthe polygonoides var. longispina	1B.2	Chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools.	30-1630 m AH April-July	**2015**	**Low.** Marginal habitat in project buffer.
white-bracted spineflower Chorizanthe xanti var. leucotheca	1B.2	Mojavean desert scrub, pinyon and juniper woodland, coastal scrub (alluvial fans).	365-1830 m AH April-June	**2011**	**Unlikely.** Suitable desert scrub or alluvial fan habitat is not present.
Alvin Meadow bedstraw Galium californicum ssp. primum	1B.2	Chaparral, lower montane coniferous forest.	1460-1830 m PH March-July	**1967**	**Unlikely.** Small area of marginal habitat in project buffer. Record is >50 years old.
San Bernardino aster Symphyotrichum defoliatum	1B.2	Meadows and seeps, cismontane woodland, coastal scrub, lower montane coniferous forest, marshes and swamps, valley and foothill grassland.	3-2045 m PH July-Nov	**1951**	**Unlikely.** Small area of marginal habitat in project buffer. Record is >50 years old.
Hall's monardella Monardella macrantha ssp. hallii	1B.3	Broadleafed upland forest, chaparral, lower montane coniferous forest, cismontane woodland, valley and foothill grassland.	700-1800 m PH June-Oct	**2012**	**Low.** Small area of marginal habitat in project buffer.
southern jewelflower Streptanthus campestris	1B.3	Chaparral, lower montane coniferous forest, pinyon and juniper woodland.	605-2590 m PH May-July	**1955**	**Unlikely.** Small area of marginal habitat in project buffer. Record is historic >65 years old.
Wright's trichocoronis Trichocoronis wrightii var. wrightii	2B.1	Marshes and swamps, riparian forest, meadows and seeps, vernal pools.	5-435 m AH May-Sept	**2011**	**Unlikely.** Small area of marginal habitat in project buffer..
Peruvian dodder Cuscuta obtusiflora var. glandulosa	2B.2	Marshes and swamps (freshwater).	15-280 m AH July-Oct	**1890**	**Absent.** No aquatic habitat is present. Likely extirpated; record is historic >75 years old.
mud nama Nama stenocarpa	2B.2	Marshes and swamps.	15-815 m AH March-Oct	**2010**	**Absent.** No aquatic habitat is present.
chaparral ragwort Senecio aphanactis	2B.2	Chaparral, cismontane woodland, coastal scrub.	20-1020 m AH Jan-April	**2004**	**Low.** Small area of marginal habitat in project buffer.
Salt Spring checkerbloom Sidalcea neomexicana	2B.2	Playas, chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub.	3-2380 m PH March-June	**2011**	**Low.** Small area of marginal habitat in project buffer.

Common Name **Scientific Name**	**Status**	**Habitat Description**	**Elevation Range;** **Life Form;** **Flowering Period**	**Most Recent Record**	**Occurrence Potential** Note: "Project" includes the pipeline corridor and potential staging areas; "project buffer" includes 100-foot buffer outward from Project.
Parish's desert-thorn Lycium parishii	2B.3	Coastal scrub, Sonoran desert scrub.	3-570 m S March-April	**1885**	**Absent.** Species extirpated in study area. Record is historic >75 years old.
Payson's jewelflower Caulanthus simulans	4.2	Chaparral, coastal scrub.	90-2200 m AH March-May	**1982**	**Low.** Small area of marginal habitat in project buffer.
Palmer's grapplinghook Harpagonella palmeri	4.2	Chaparral, coastal scrub, valley and foothill grassland.	20-955 m AH March-May	**1990**	**Unlikely.** Species likely extirpated in study area. Small area of marginal habitat in project buffer. Record is >40 years old.
Robinson's pepper-grass Lepidium virginicum var. robinsonii	4.3	Chaparral, coastal scrub.	4-1435 m AH Jan-July	**2004**	**Low.** Small area of marginal habitat in project buffer.

*Nine-quad search area included Lakeview; Perris; Steele Peak; El Casco; Sunnymead (site location); Riverside East; Yucaipa; Redlands; and San Bernardino South.

E =: Endangered
T =: Threatened
PE =: Proposed Endangered
PT =: Proposed Threatened
C =: Candidate
R = Rare

CNPS Rare Plant Rank

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

Threat Rank

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

AH Annual Herb
AG Annual Grass
PG Perennial Grass
PH Perennial Herb
PC Perennial Cactus
S Shrub
Ss Subshrub
T Tree

Special-Status Wildlife Species Reported as Occurring in the Vicinity of the Judson Transmission Main Project*

Common Name Scientific Name	Status	Habitat Description	Most Recent Record	Occurrence Potential Note: "Project" includes the pipeline corridor and potential staging areas; "project buffer" includes 100-foot buffer outward from Project.
INVERTEBRATES				
Crotch bumble bee Bombus crotchii	SC	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include *Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia,* and *Eriogonum*.	2020	**Absent in Project; unlikely in project buffer**. No suitable habitat is present at either the pipeline route or any of the potential staging areas due to lack of vegetation. Areas with potentially suitable food plants may be present in study area (100-foot project buffer). Several recent occurrences within <3 miles from study area.
Delhi Sands flower-loving fly Rhaphiomidas terminatus abdominalis	FE	Found only in areas of the Delhi Sands formation in southwestern San Bernardino & northwestern Riverside counties.	2013	**Absent.** Suitable Delhi-sands habitat absent from study area.
Quino checkerspot butterfly Euphydryas editha quino	FE	Sunny openings within chaparral & coastal sage shrublands in parts of Riverside & San Diego counties. Adults may nectar on a variety of plant species, but native *Plantain* species are necessary, the primarily larval plant host.	1998	**Unlikely.** Small area of marginal habitat in project buffer but no *Plantain* was found. Closest occurrence >10 miles away.
Riverside fairy shrimp Streptocephalus woottoni	FE	Endemic to Western Riverside, Orange, and San Diego counties in areas of tectonic swales/earth slump basins in grassland and coastal sage scrub.	2009	**Absent.** Vernal pool habitat absent from study area.
AMPHIBIANS AND REPTILES				
southern mountain yellow-legged frog Rana muscosa	FE; SE	Federal listing refers to populations in the San Gabriel, San Jacinto and San Bernardino mountains (southern DPS). Northern DPS was determined to warrant listing as endangered, Apr 2014, effective Jun 30, 2014.	1905	**Absent.** Species extirpated from study area; no aquatic habitat. Record is historic >75 years old.
FISH				
Santa Ana sucker Catostomus santaanae	FT	Endemic to Los Angeles Basin south coastal streams.	2005	**Absent.** Suitable aquatic habitat absent from study area.
Steelhead trout Oncorhynchus mykiss irideus	FE	Federal listing refers to populations from Santa Maria River south to southern extent of range (San Mateo Creek in San Diego County).	2013	**Absent.** Suitable aquatic habitat absent from study area.
BIRDS				
southwestern willow flycatcher Empidonax traillii extimus	FE; SE	Riparian woodlands in Southern California.	2004	**Absent.** No suitable habitat is present.
least Bell's vireo Vireo bellii pusillus	FE; SE	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft.	2015	**Absent.** No suitable habitat.
western yellow-billed cuckoo Coccyzus americanus occidentalis	FT; SE	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems.	2001	**Absent.** No suitable habitat.
coastal California gnatcatcher Polioptila californica ssp. californica	FT; SSC	Obligate, permanent resident of coastal sage scrub below 2500 ft in Southern California.	2021	**Absent in Project; unlikely in project buffer.** Small area of marginal habitat is present in project buffer. Most recent occurrences in eBird are about 2.5 miles west/southwest (Box Spring Mtn trail); the closest report is from 2020 about 0.25 mile northeast of the Project; however this sighting was not verified as the listed subspecies.
bald eagle Haliaeetus leucocephalus	SE; FP	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mile of water.	1975	**Absent.** Likely Extirpated. Record is >45 years old.
tricolored blackbird Agelaius tricolor	ST; SSC	Highly colonial species, most numerous in Central Valley & vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	2015	**Absent.** No suitable habitat.
Swainson's hawk Buteo swainsoni	ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, & agricultural or ranch lands with groves or lines of trees.	1900	**Absent.** Suitable nesting habitat absent from study area but may forage over site. Record is historic >75 years old.
California black rail Laterallus jamaicensis coturniculus	ST; FP	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Requires water depth of about 1 inch that does not fluctuate during the year and dense vegetation for nesting habitat.	1919	**Absent.** No suitable habitat. Record is historic >75 years old.
burrowing owl Athene cunicularia	SSC	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation.	2017	**Unlikely.** Small area of marginal habitat in project buffer. CNDDB occurrence >4 miles away; no records in eBird for search area.
Bell's sage sparrow Artemisiospiza belli ssp. belli	WL	Nests in chaparral dominated by fairly dense stands of chamise. Found in coastal sage scrub in south of range.	2021	**Unlikely.** Small area of marginal habitat in project buffer. Habitat likely not dense enough to support habitation. Closest eBird record ~2.5 miles to SW.

MAMMALS				
San Bernardino kangaroo rat Dipodomys merriami parvus	FE; SC; SSC	Alluvial scrub vegetation on sandy loam substrates characteristic of alluvial fans and flood plains.	2017	**Unlikely.** No suitable habitat is present. Recent occurrence within 1.2 miles of study area.
Stephens' kangaroo rat Dipodomys stephensi	FE; ST	Primarily annual & perennial grasslands, but also occurs in coastal scrub & sagebrush with sparse canopy cover.	2011	**Unlikely.** Small area of marginal habitat in project buffer. Occurrence noted within study area >20 years ago.

*Nine-quad search area included: Lakeview; Perris; Steele Peak; El Casco; Sunnymead (site location); Riverside East; Yucaipa; Redlands; and San Bernardino South.

[1]Status Key

Federal (USFWS) Status

FE: Federally Endangered

FT: Federally Threatened

State (CDFW) Status

SE: State Endangered

ST: State Threatened

SC: State Candidate

FP: Fully Protected

SSC: Species of Special Concern

WL: Watch List

APPENDIX C: CULTURAL RESOURCES ASSESSMENT (CONFIDENTIAL)

APPENDIX D: GEOTECHNICAL INVESTIGATION REPORT

Converse Consultants
Geotechnical Engineering
Environmental & Groundwater Science
Inspection & Testing Services

GEOTECHNICAL INVESTIGATION REPORT

THE JUDSON TRANSMISSION MAIN AND JUDSON TANK OFF-SITE PIPELINE

City of Moreno Valley, Riverside County, CA

Converse Project No. 15-81-272-04

Prepared For:

EASTERN MUNICIPAL WATER DISTRICT
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April 21, 2021

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Geotechnical Engineering, Environmental & Groundwater Science, Inspection & Testing Services

April 21, 2021

Mr. Greg Kowalski, PE
Principal Engineer
Eastern Municipal Water District
2270 Trumble Road
Perris, CA 92572

Subject: **GEOTECHNICAL INVESTIGATION REPORT**
THE JUDSON TRANSMISSION MAIN AND JUDSON TANK OFF-SITE PIPELINE
City of Moreno Valley, Riverside County, California
Converse Project No. 15-81-272-04

Dear Mr. Kowalski:

Converse Consultants (Converse) is pleased to submit this Geotechnical Investigation Report for the Judson Transmission Main and Judson Tank Off-site Pipeline project, located in the City of Moreno Valley, Riverside County, California. This report was prepared in accordance with our revised proposal dated October 19, 2020 and your Purchase Order. 127883 dated December 23, 2020.

Based upon our field investigation, laboratory data, and analyses, the proposed project is considered feasible from a geotechnical standpoint, provided the recommendations presented in this report are incorporated into the design and construction of the project.

Two borings (BH-1 and BH-2) were drilled along Judson Street as part of Geotechnical Investigation for the MV 2060 Pressure Zone 3.0 MG Potable Water Storage Tank Project, City of Moreno Valley, CA (Converse, 2017). Information from these borings has been incorporated into this report. Therefore, no drilling was performed along Judson Street. Eight borings (BH-01 through BH-08) were drilled along Perris Boulevard for this study on January 27, 2021.

We appreciate the opportunity to be of service to Eastern Municipal Water District (District). Should you have any questions, please do not hesitate to contact us at 909-796-0544.

CONVERSE CONSULTANTS

Hashmi S. E. Quazi, PhD, PE, GE
Principal Engineer

Dist.: 4/Addressee
HSQ/RG/ZA/MS

PROFESSIONAL CERTIFICATION

This report has been prepared by the following professionals whose seals and signatures appear herein.

The findings, recommendations, specifications and professional opinions contained in this report were prepared in accordance with the generally accepted professional engineering and engineering geologic principle and practice in this area of Southern California. We make no other warranty, either expressed or implied.

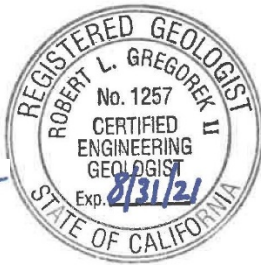

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TABLE OF CONTENTS

FIGURES

Following Page No.

TABLES

Page No.

APPENDICES

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation performed by Converse for the Judson Transmission Main and Judson Tank Off-site Pipeline project, located in the City of Moreno Valley, Riverside County, California. The pipeline alignments are shown in Figure No. 1, *Approximate Alignment Locations Map*.

The purposes of this investigation were to determine the nature and engineering properties of the subsurface soils, and to provide design and construction recommendations for the project.

Two borings (BH-1 and BH-2) were drilled along Judson Street as part of Geotechnical Investigation (Converse, 2017) for the MV 2060 Pressure Zone 3.0 MG Potable Water Storage Tank Project. Information from these borings has been incorporated into this report. Therefore, no drilling was performed along Judson Street.

This report is prepared for the project described herein and is intended for use solely by the Eastern Municipal Water District and their authorized agents for design purposes. It should not be used as a bidding document but may be made available to the potential contractors for information on factual data only. For bidding purposes, the contractors should be responsible for making their own interpretation of the data contained in this report.

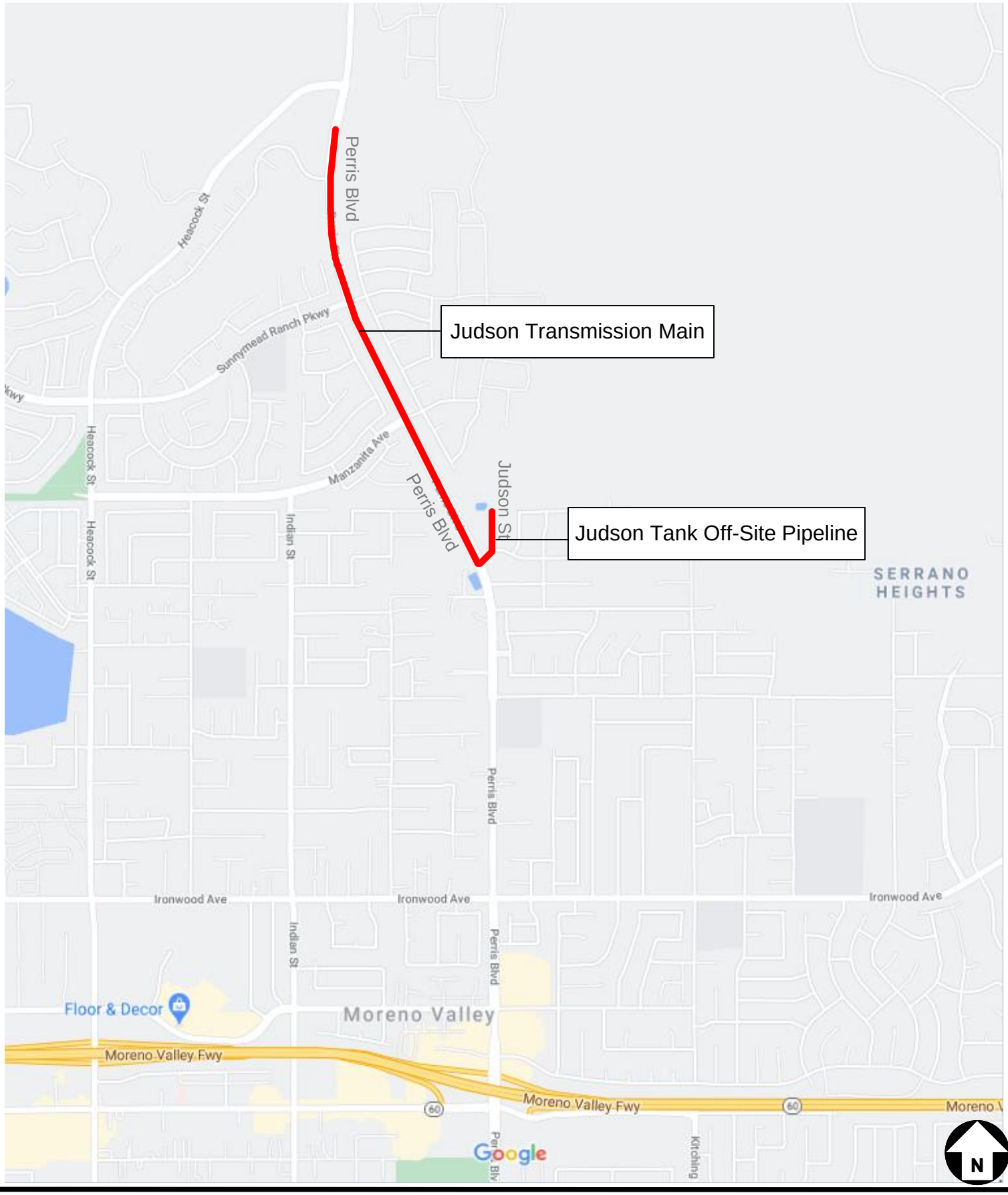
2.0 PROJECT DESCRIPTION

The project includes design and construction of an approximately 7,900 linear feet of water transmission pipelines within Judson Street and Perris Boulevard. A detailed project description is presented below.

Table No. 1, Summary of the Pipelines

Location	From	To	Approx. Length (feet)	Diameter (inch)
Judson Street	Judson Tank Site	Perris Blvd.	1,200	18
Perris Blvd.	Robin Lane	700 feet North of Canyon Vista	6,700	18

We anticipate the top of pipe will be between 4 feet and 8 feet below existing ground surface (bgs) and it is anticipated that the pipeline will be installed using open cut and cover technique. Currently, bore and jack method is unlikely. If needed, bore and jack recommendations will be provided in a separate letter.



Project: The Judson Transmission Main and Judson Tank Off-site Pipeline

Location: City of Moreno Valley, Riverside County, CA

For: Eastern Municipal Water District (EMWD)

Approximate Alignment Locations Map

Project No
15-81-272-04

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FIGURE NO.
1

3.0 SCOPE OF WORK

The scope of this investigation included project set-up, subsurface exploration, laboratory testing, engineering analysis, and preparation of this report, as described in the following sections.

3.1 Document Review

We reviewed geologic maps, aerial photographs, groundwater data, and other information pertaining to the project area to assist in the evaluation of geologic hazards that may be present. Besides, pertinent information (the documents cited in Section 12, *Reference*s) were used to understand the subsurface conditions and plan the investigation for this project.

3.2 Project Set-up

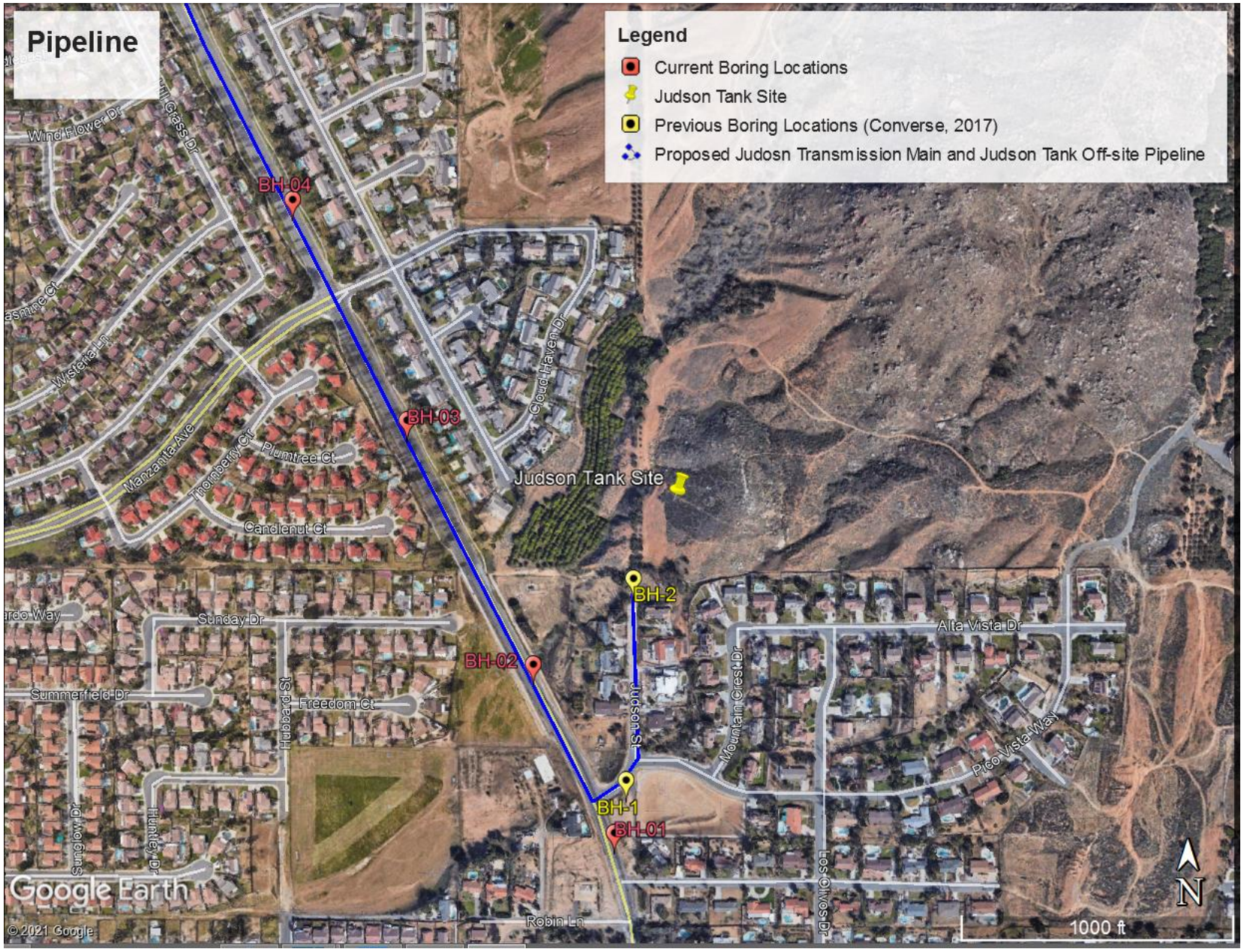
The project set-up consisted of the following tasks.

- Prepared a boring locations map and submitted to the District for review and approval.
- Conducted alignment(s) reconnaissance and marked the borings at locations approved by the District.
- Obtained permit from the Public Works Department, City of Moreno Valley.
- Prepared traffic control plans in accordance with WATCH manual.
- Notified Underground Service Alert (USA) at least 48 hours prior to drilling to clear the boring location of any conflict with existing underground utilities.
- Engaged a California-licensed driller to drill exploratory boring.

3.3 Subsurface Exploration

Eight exploratory borings (BH-01 through BH-08) were drilled on January 27, 2021 along Perris Boulevard to investigate subsurface conditions. The borings were drilled using a truck-mounted drill rig equipped with 8-inch diameter hollow-stem augers to depth of 16.5 feet below existing ground surface (bgs).

Approximate boring locations are indicated in Figure Nos. 2a and 2b, *Approximate Boring Locations Map*. For a description of the field exploration and sampling program, see Appendix A, *Field Exploration*. Filed investigation including boring locations map and boring logs from previous investigation (Converse, 2017) are included in Appendix A-1.



Project: The Judson Transmission Main and Judson Tank Off-site Pipeline

Location: City of Moreno Valley, Riverside County, CA

For: Eastern Municipal Water District (EMWD)

Approximate Boring Locations Map

Project No.
15-81-272-04

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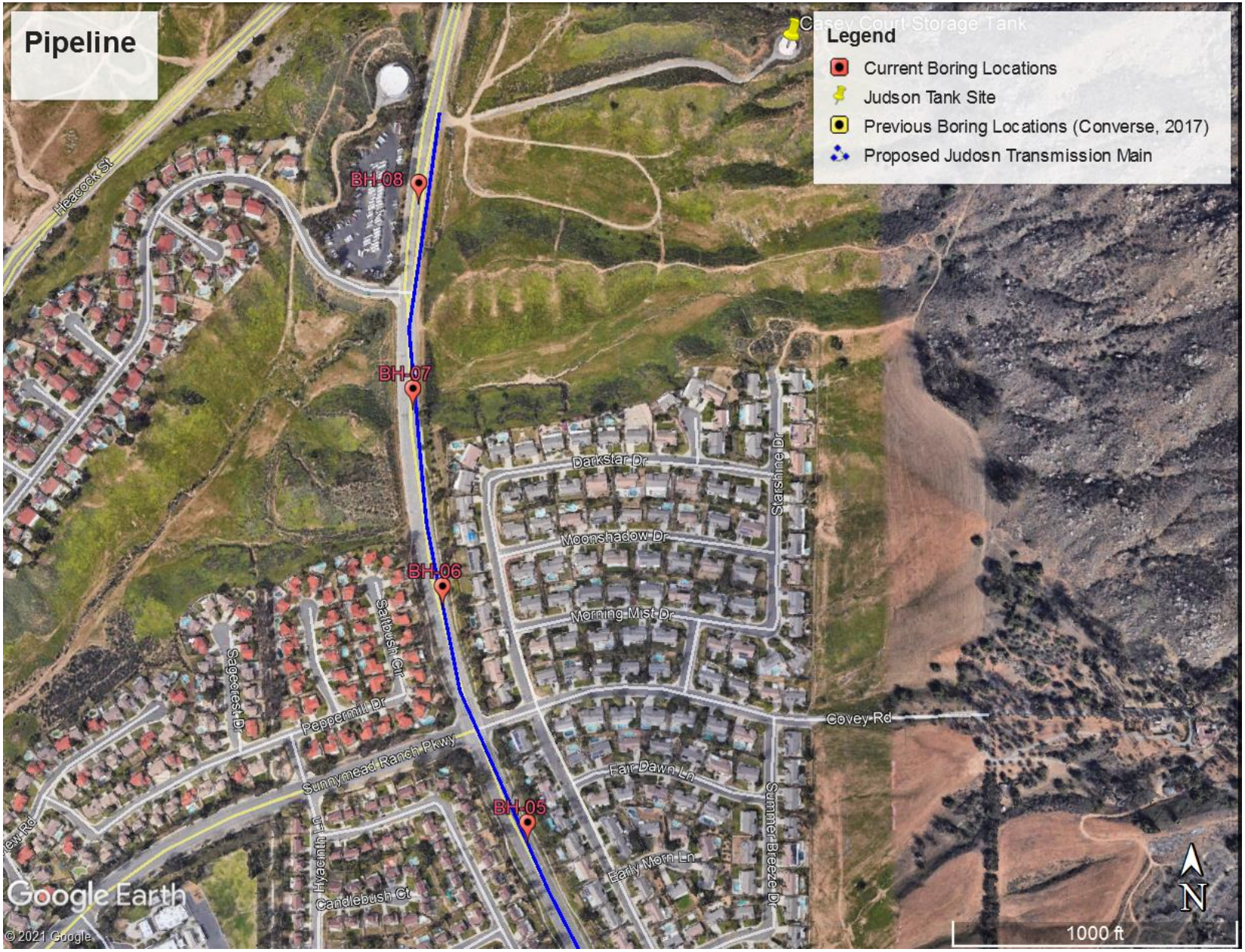
FIGURE NO.
2a



Project: The Judson Transmission Main and Judson Tank Off-site Pipeline

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Approximate Boring Locations Map

Project No.
15-81-272-04

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FIGURE NO.
2b

3.4 Laboratory Testing

Representative soil samples of the pipeline alignments were tested in the laboratory to aid in the soils classification and to evaluate the relevant engineering properties of the soils. These tests included the following.

- *In*-situ moisture contents and dry densities (ASTM D2216 and ASTM D2937)
- Sand Equivalent (ASTM D2419)
- R-value (California Test CT301)
- Soil corrosivity (California Tests 643, 422, and 417)
- Grain size distribution (ASTM D6913)
- Maximum dry density and optimum-moisture content (ASTM D1557)
- Direct shear (ASTM D3080)

For *in-situ* moisture and dry density data, see the Logs of Boring in Appendix A, *Field Exploration*. For a description of the laboratory test methods and test results, see Appendix B, *Laboratory Testing Program.* Laboratory test results from previous investigation (Converse, 2017) are included in Appendix B-1.

3.5 Analysis and Report Preparation

Data obtained from the field exploration and laboratory testing program was compiled and evaluated. Geotechnical analyses of the compiled data were performed, and this report was prepared to present our findings, conclusions, and recommendations for the project.

4.0 ALIGNMENT CONDITIONS

The condition of the street along the pipe alignments is discussed below.

Judson Street
Judson Street within the proposed pipeline alignment is asphalt concrete paved where the surface is in bad condition. Overhead utilities were observed on the west side of the street. The road is surrounded by residential houses. The approximate elevation is 1,935 to 1,973 feet above mean sea level (amsl). Photograph No. 1 and No. 2 depict current surface conditions along the alignment.

Photograph No. 1: Current street conditions at Judson St. towards Perris Blvd, facing south

Photograph No. 2: Current street conditions towards the close end of Judson St. towards Perris Blvd, facing north.

Perris Boulevard

Perris Boulevard within the proposed pipeline alignment is a paved road with 2 lanes in each direction. It has shoulders along each side and a median. The north bound lane on Perris Boulevard merges into one lane after crossing Covey Road. Moderate traffic was observed throughout the day. Trees, landscape, sidewalks, residential houses and empty lots were observed either side of the road. The approximate elevation is between 1,904 feet to 1,957 feet above mean sea level (amsl). Photograph No. 3 and No. 4 depict current surface conditions along the alignment.

Photograph No. 3: Current street conditions on Perris Blvd. towards Sunnymead Ranch Parkway/Covey Rd., facing south.

Photograph No. 4: Current street conditions on Perris Blvd. towards Canyon Vista Rd., facing south.

4.1 Existing Pavement Sections

The measured pavement thicknesses at each boring location are listed in the following table.

Table No. 2, Existing Pavement Sections

Boring No.	Street	Asphalt Concrete Thickness (in.)	Aggregate Base Thickness (in.)
BH-01	Perris Boulevard	7.0	10.0
BH-02		6.0	11.0
BH-03		4.0	7.0
BH-04		4.0	6.0
BH-05		4.0	4.0
BH-06		4.0	7.0
BH-07		4.0	7.0
BH-08		4.0	6.0

For a detailed description of the subsurface materials encountered in the exploratory borings, see Drawings No. A-2 through A-9, *Logs of Borings,* in Appendix A, *Field Exploration.*

4.2 Subsurface Profile

Based on the exploratory borings and laboratory test results, the subsurface soils consist primarily of a mixture of sand, silt and occasional gravel. Scattered to few gravel up to 1 inch in largest dimension was encountered in most borings. We did not encounter any cobbles or boulders during the field investigation; however, this may vary between the borings.

4.3 Groundwater

No groundwater was encountered during the investigation in the exploratory borings. Current and historical groundwater data was reviewed near the proposed alignments. Results from the searches are provided below.

The State Water Resources Control Board's GeoTracker Database (SWRCB, 2021) was accessed March 2021 to establish historic groundwater levels located within a one-mile radius of the generalized coordinates (33.9670, -117.2320) of the project, however no data was available.

The National Water Information System (USGS, 2021) was also accessed in March 2021 to establish historic groundwater levels within one-mile of the generalized coordinates (33.9670, -117.2320) of the project, however no data was available.

The California Department of Water Resources (DWR, 2021) was accessed in March 2021 to establish historic groundwater levels within one mile of the generalized coordinates (33.9670, -117.2320) of the project, however no data was available.

Historical high groundwater levels along the pipeline alignments are not known with certainty but they are anticipated to be deeper than approximately 16.5 feet bgs.

It should be noted that the groundwater levels could vary depending upon the seasonal precipitation and possible groundwater pumping activity in the vicinity of the alignments. Shallow perched groundwater may be present locally, particularly following precipitation.

4.4 Excavatability

The subsurface soil materials are expected to be excavatable by conventional heavy-duty earth moving and trenching equipment. Excavation will likely be difficult where concentration of gravel is encountered. Excavation will be difficult below 5 feet bgs in the vicinity of boring BH-2 (Converse, 2017) where bedrock was encountered.

The phrase “conventional heavy-duty excavation equipment” is intended to include commonly used equipment such as excavators and trenching machines. It does not include hydraulic hammers (“breakers”), jackhammers, blasting, or other specialized equipment and techniques used to excavate hard earth materials. Selection of an appropriate excavation equipment model should be done by an experienced earthwork contractor and may require test excavations in representative areas.

4.5 Subsurface Variations

Based on results of the subsurface exploration and our experience, some variations in the continuity and nature of subsurface conditions within the pipeline alignments should be anticipated. Because of the uncertainties involved in the nature and depositional characteristics of the earth material, care should be exercised in interpolating or extrapolating subsurface conditions between or beyond the boring locations.

5.0 ENGINEERING GEOLOGY

The regional and local geology within the proposed project area are discussed below.

5.1 Regional Geology

The pipeline alignments are located within the northern Peninsular Ranges Geomorphic Province of Southern California. The Peninsular Ranges Geomorphic Province consists of a series of northwest-trending mountain ranges and valleys bounded on the north by the San Bernardino and San Gabriel Mountains, on the west by the Los Angeles Basin, and on the southwest by the Pacific Ocean.

The province is a seismically active region characterized by a series of northwest-trending strike-slip faults. The most prominent of the nearby fault zones include the San Jacinto, Elsinore, and San Andreas fault zones (CGS, 2007), all of which have been known to be active during Quaternary time.

Topography within the province is generally characterized by broad alluvial valleys separated by linear mountain ranges. This northwest-trending linear fabric is created by the regional faulting within the granitic basement rock of the Southern California Batholith. Broad, linear, alluvial valleys have been formed by erosion of these principally granitic mountain ranges.

The pipeline alignments are located within the north-central portion of the Perris Block region of the Peninsular Ranges province. The Perris Block is a relatively stable structural block bounded by the active Elsinore and San Jacinto fault zones to the west and east, and the Chino and Temecula basins to the north and south, respectively. The Perris Block has low relief and is roughly rectangular in shape.

The surrounding local geology are shown on Figure No. 3, *Geological Reference Map* on the following page.

5.2 Local Geology

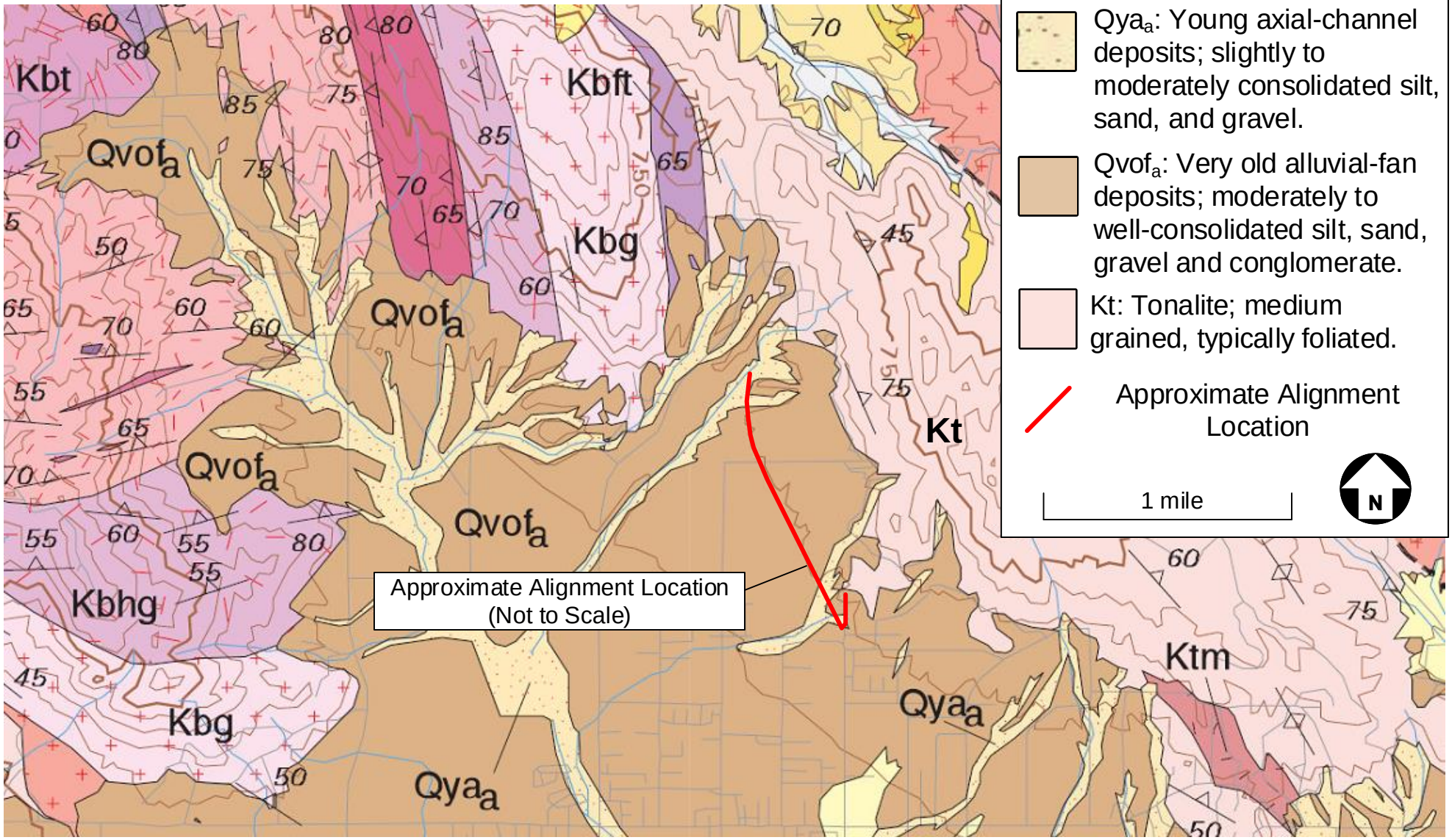
The majority of the pipeline alignments are primarily underlain by very old (early to middle Pleistocene) alluvial fan deposits ($Qvof_a$) of moderately to well-consolidated silt, sand, gravel, and conglomerate.

The northern and southern portions of the pipeline alignments are underlain by young (late Pleistocene to Holocene) alluvial fan deposits (Qyf_a) of unconsolidated to moderately consolidated silt, sand, pebbly cobbly sand, and boulders. Portions of the young Holocene alluvial fan deposits may be subject to collapse/hydro-consolidation when saturated.

The northern most of the off-site pipeline alignment may be underlain by bedrock (Kt) consisting of medium-grained Tonalite at certain depths.

6.0 FAULTING AND SEISMICITY

The approximate distance and seismic characteristics of nearby faults as well as seismic design coefficients are presented in the following subsections. Surrounding local geology are shown on Figure No. 4, *Fault Zone Map* on the following page.



Map Credit: Portion of Morton, D.M., and Miller, F.K., 2006, Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California: U.S. Geological Survey, Open-File Report OF-2006-1217, scale 1:100,000.

Project: The Judson Transmission Main and Judson Tank Off-Site Pipeline

Location: City of Moreno Valley, Riverside County, California

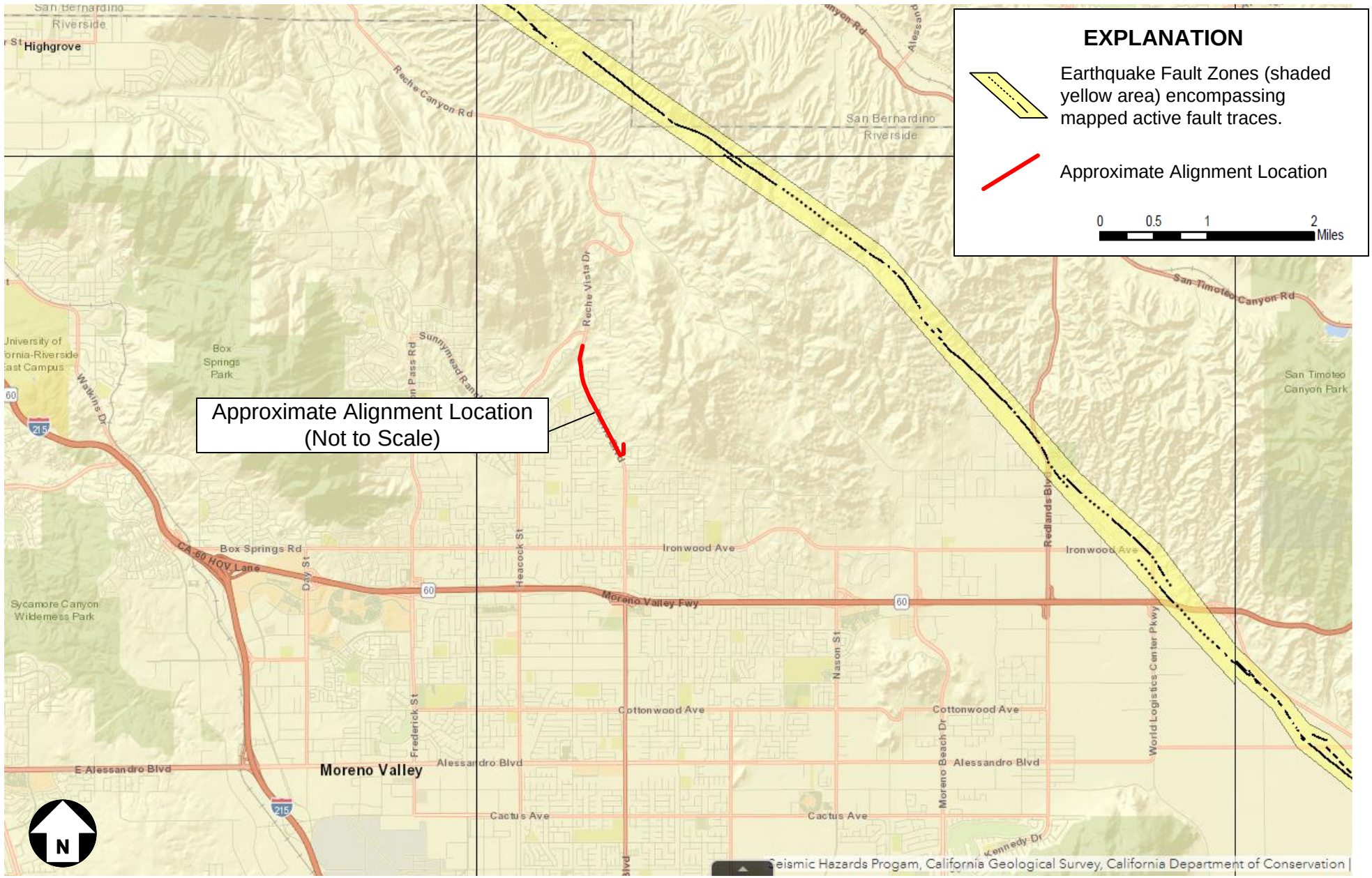
For: Eastern Municipal Water District (EMWD)

Geological Reference Map

Project No.
15-81-272-04

Converse Consultants

Figure No.
3



Project: The Judson Transmission Main and Judson Tank Off-Site Pipeline

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Fault Zone Map

Project No.
15-81-272-04

Converse Consultants

Figure No.
4

6.1 Faulting

The proposed alignments are situated in a seismically active region. As is the case for most areas of Southern California, ground-shaking resulting from earthquakes associated with nearby and more distant faults may occur at the project sites. During the life of the project, seismic activity associated with active faults can be expected to generate moderate to strong ground shaking at the sites. Review of recent seismological and geophysical publications indicates that the seismic hazard for the project is high.

The proposed alignments are not located within a currently mapped State of California Earthquake Fault Zone for surface fault rupture. Table No. 3, *Summary of Regional Faults,* summarizes selected data of known faults capable of seismic activity within 100 kilometers of the sites. The data presented below was calculated using the National Seismic Hazard Maps Database (USGS, 2008) and other published geologic data.

Table No. 3, Summary of Regional Faults

Fault Name and Section	Closest Distance (km)	Slip Sense	Length (km)	Slip Rate (mm/year)	Maximum Magnitude
San Jacinto	3.81	strike slip	241	n/a	7.88
S. San Andreas	18.90	strike slip	548	n/a	8.18
Cucamonga	30.62	thrust	28	5.0	6.70
Elsinore	32.63	strike slip	241	n/a	7.85
Cleghorn	34.20	strike slip	25	3.0	6.80
Chino, alt 2	34.75	strike slip	29	1.0	6.80
Chino, alt 1	36.16	strike slip	24	1.0	6.70
North Frontal (West)	38.99	reverse	50	1.0	7.20
San Jose	45.41	strike slip	20	0.5	6.70
Pinto Mtn	48.18	strike slip	74	2.5	7.30
Sierra Madre Connected	50.08	reverse	76	2.0	7.30
Helendale-So Lockhart	55.22	strike slip	114	0.6	7.40
North Frontal (East)	57.15	thrust	27	0.5	7.00
San Joaquin Hills	58.02	thrust	27	0.5	7.10
Puente Hills (Coyote Hills)	59.32	thrust	17	0.7	6.90
Clamshell-Sawpit	64.30	reverse	16	0.5	6.70
Lenwood-Lockhart-Old Woman Springs	68.89	strike slip	145	0.9	7.50
Puente Hills (Santa Fe Springs)	72.83	thrust	11	0.7	6.70
Newport Inglewood Connected alt 2	73.20	strike slip	208	1.3	7.50

Fault Name and Section	Closest Distance (km)	Slip Sense	Length (km)	Slip Rate (mm/year)	Maximum Magnitude
Newport Inglewood Connected alt 1	73.20	strike slip	208	1.3	7.50
Newport-Inglewood (Offshore)	73.20	strike slip	66	1.5	7.00
Raymond	73.36	strike slip	22	1.5	6.80
Newport-Inglewood, alt 1	76.03	strike slip	65	1.0	7.20
Burnt Mtn	76.31	strike slip	21	0.6	6.80
Landers	77.60	strike slip	95	0.6	7.40
Johnson Valley (No)	78.70	strike slip	35	0.6	6.90
Eureka Peak	79.15	strike slip	19	0.6	6.70

(Source: https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/)

6.2 CBC Seismic Design Parameters

Seismic parameters based on the 2019 California Building Code (CBSC, 2019) and ASCE 7-16 are provided in the following table. These parameters were determined using the generalized coordinates (33.9655N, 117.2312W) and the Seismic Design Maps ATC online tool.

Table No. 4, CBC Seismic Design Parameters

Seismic Parameters	Value
Site Coordinates	33.9655N 117.2312W
Site Class	D
Risk Category	III
Mapped Short period (0.2-sec) Spectral Response Acceleration, S_S	2.033g
Mapped 1-second Spectral Response Acceleration, S_1	0.806g
Site Coefficient (from Table 11.4-1), F_a	1.0
Site Coefficient (from Table 11.4-2), F_v	1.7
MCE 0.2-sec period Spectral Response Acceleration, S_{MS}	2.033g
MCE 1-second period Spectral Response Acceleration, S_{M1}	1.370g
Design Spectral Response Acceleration for short period S_{DS}	1.355g
Design Spectral Response Acceleration for 1-second period, S_{D1}	0.913g
Site Modified Maximum Peak Ground Acceleration, PGA_M	0.944g

6.3 Secondary Effects of Seismic Activity

In general, secondary effects of seismic activity include surface fault rupture, soil liquefaction, landslides, lateral spreading, and settlement due to seismic shaking, tsunamis, seiches, and earthquake-induced flooding. The site-specific potential for each of these seismic hazards is discussed in the following sections.

Surface Fault Rupture: No portion of the pipeline alignments are located within a currently designated State of California or Riverside County Earthquake Fault Zone (CGS, 2007; Riverside County, 2021). The potential for surface rupture resulting from the movement of nearby or distant faults is not known with certainty but is considered very low.

Liquefaction: Liquefaction is defined as the phenomenon in which a cohesionless soil mass within the upper 50 feet of the ground surface suffers a substantial reduction in its shear strength, due the improvement of excess pore pressures. During earthquakes, excess pore pressures in saturated soil deposits may develop as a result of induced cyclic shear stresses, resulting in liquefaction.

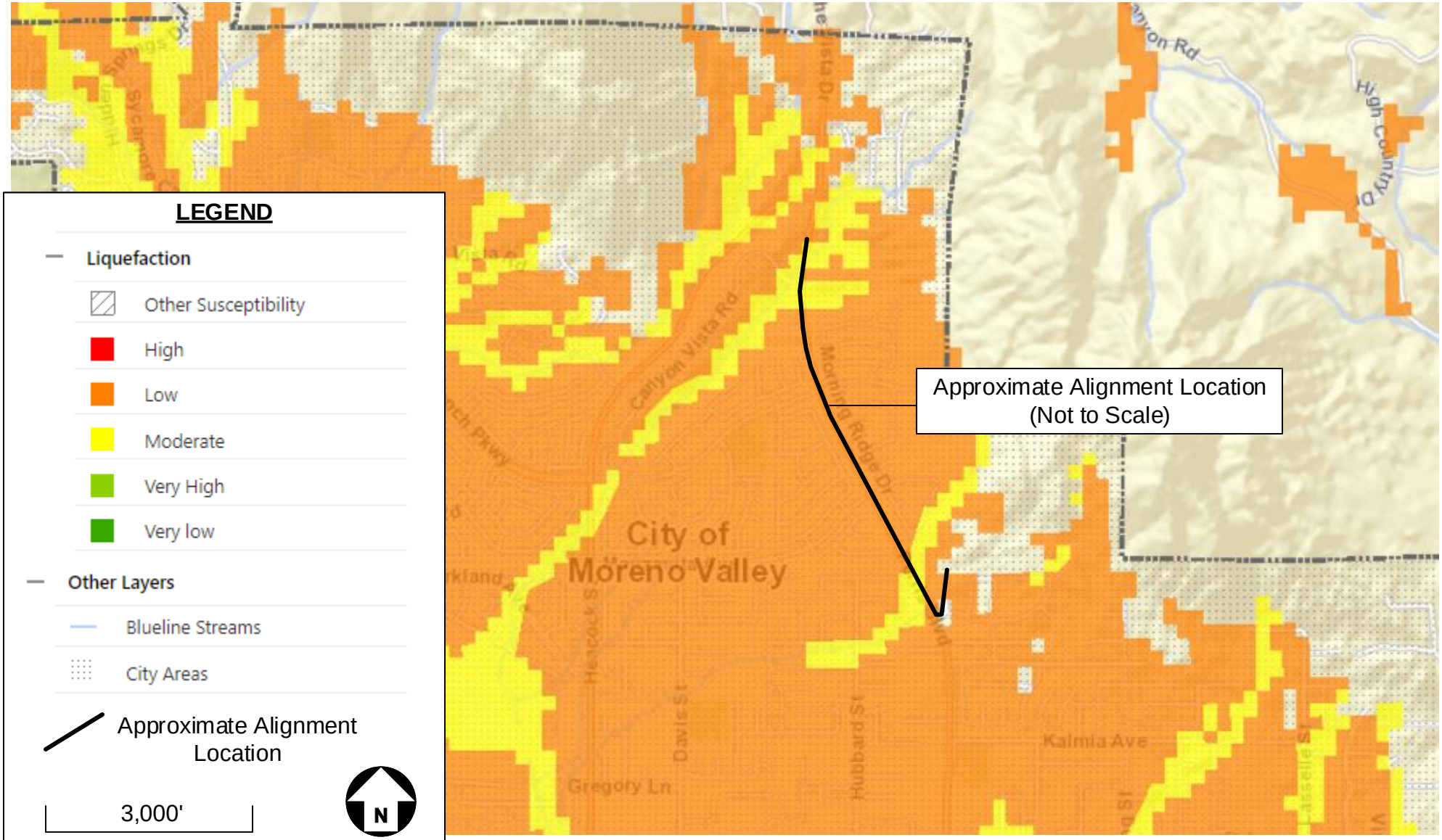
Soil liquefaction generally occurs in submerged granular soils and non-plastic silts during or after strong ground shaking. There are several general requirements for liquefaction to occur and they are as follows.

- Soils must be submerged.
- Soils must be loose to medium-dense.
- Ground motion must be intense.
- Duration of shaking must be sufficient for the soils to lose shear resistance.

The generalized liquefaction susceptibility is shown on Figure No. 5, *Liquefaction Susceptibility Map.*

Based on review of hazard maps, the pipeline alignments are located within a State of California or Riverside County designated zone of liquefaction susceptibility of low to moderate risk of liquefaction (CGS, 2007; Riverside County, 2021). Groundwater was not encountered during the investigation in any of the exploratory borings to the maximum explored depth of 16.5 feet bgs. Therefore, we anticipate liquefaction potential of the pipeline alignments is low to moderate.

Landslides: Seismically induced landslides and slope failures are common occurrences during or soon after large earthquakes. Due to the proximity of the proposed alignments to the nearby foothills, the potential for seismically induced landslides affecting the pipeline alignments is considered to be moderate.



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For: Eastern Municipal Water District (EMWD)

Liquefaction Susceptibility Map

Project No.
15-81-272-04

Converse Consultants

Figure No.
5

Lateral Spreading: Seismically induced lateral spreading involves primarily lateral movement of earth materials over underlying materials which are liquefied due to ground shaking. It differs from the slope failure in that complete ground failure involving large movement does not occur due to the relatively smaller gradient of the initial ground surface. Lateral spreading is demonstrated by near-vertical cracks with predominantly horizontal movement of the soil mass involved. Generally due to the low to moderate risk for liquefaction and flat nature of pipeline alignments, the risk of lateral spreading is considered low to moderate.

Tsunamis: Tsunamis are large waves generated in open bodies of water by fault displacement or major ground movement. Due to the inland location of the pipeline alignments, tsunamis are not considered to be a risk.

Seiches: Seiches are large waves generated in enclosed bodies of water in response to ground shaking. There are no enclosed bodies of water near the pipeline alignments. Seiching is not considered to be a risk during construction.

7.0 LABORATORY TEST RESULTS

Results of physical and chemical tests performed for this project are presented below.

7.1 Physical Testing

Results of the various laboratory tests are presented in Appendix B, *Laboratory Testing Program*, except for the results of in-situ moisture and dry density tests which are presented on the Logs of Borings in Appendix A, *Field Exploration.* The results are also discussed below.

- In-situ Moisture and Dry Density – In-situ dry densities and moisture contents of the subsurface soils along the alignments were determined in accordance with ASTM Standard D2216 and D2937. Dry densities of the upper 10 feet alluvium soils ranged from 113.0 to 129.0 pounds per cubic foot (pcf) with moisture contents of 5.0 to 11.0 percent.
- R-Value – Three representative bulk samples were tested in accordance with California Test Method 301. The results of the R-value tests were18, 22 and 61.
- Grain Size Analysis – Four representative samples were tested to determine the relative grain size distribution in accordance with the ASTM Standard D6913. The test results are graphically presented in Drawing No. B-1, *Grain Size Distribution Results.*
- Maximum Dry Density and Optimum Moisture Content – Typical moisture-density relationship tests were performed on three representative samples in accordance with ASTM D1557. The results are presented in Drawing No. B-2, *Moisture-Density Relationship Results*, in Appendix B, *Laboratory Testing Program*. The laboratory maximum dry density were 131.7, 133.5 (with rock correction 135.1) and 133.8

(with rock correction 135.6) pcf and the optimum moisture contents of 8.0 (with rock correction 7.5), 8.5 (with rock correction 8.0) and 8.6 percent.

- Direct Shear – Four direct shear tests were performed on undisturbed representative ring samples under soaked moisture condition in accordance with ASTM Standard D3080. The results are presented in Drawings No. B-3 through B-6, *Direct Shear Test Results* in Appendix B, *Laboratory Testing Program*.

7.2 Chemical Testing - Corrosivity Evaluation

Four representative soil samples were tested to determine minimum electrical resistivity, pH, and chemical content, including soluble sulfate and chloride concentrations. The purposes of these tests were to determine the corrosion potential of site soils when placed in contact with common pipe materials. These tests were performed by AP Engineering and Testing, Inc. (Pomona, CA) in accordance with California Tests 643, 422, and 417. The test results are presented in Appendix B, *Laboratory Testing Program* and summarized below.

- The pH measurements of the tested samples ranged from 7.5 to 8.2.
- The sulfate contents of the tested samples ranged from 58 to 272 ppm.
- The chloride concentrations of the tested samples ranged from 93 to 177 ppm.
- The minimum electrical resistivities when saturated ranged from 4,829 to 11,799 ohm-cm.

8.0 EARTHWORK RECOMMENDATIONS

Earthwork for the pipeline alignments will include trench excavation, pipe subgrade preparation, pipeline bedding placement, and trench backfill following the placement of the pipeline.

8.1 General

Prior to the start of construction, all existing underground utilities and appurtenances should be located within the vicinity of the proposed alignments. Such utilities should either be protected in-place or removed and replaced during construction as required by the project specifications. All excavations should be conducted in such a manner as not to cause loss of bearing and/or lateral support of existing structures or utilities.

All debris, deleterious material, and surficial soils containing roots and perishable materials (if any) should be stripped and removed from the alignments. Deleterious material, including organics, and debris generated during excavation, should not be placed as fill.

Migration of fines from the surrounding native soils, in the case of water leak from the pipe, must be considered in selecting the gradation of the materials placed within the

trench, including bedding, pipe zone and trench zone backfill, as defined in the following sections. Such migration of fines may deteriorate pipe support and may result in settlement/ground loss at the surface.

It should be the responsibility of the contractor to maintain safe working conditions during all phases of construction.

Observations and field tests should be performed by the project soils consultant to confirm that the required degree of compaction has been obtained. Where compaction is less than that specified, additional compactive effort should be made with adjustment of the moisture content as necessary, until the specified compaction is obtained.

8.2 Pipeline Subgrade Preparation

The final subgrade surface should be level, firm, uniform, free of loose materials, and properly graded to provide uniform bearing and support to the entire section of the pipe placed on bedding material. Protruding oversize particles, larger than 3 inches in dimension, if any, should be removed from the trench bottom and replaced with compacted on-site materials.

Any loose, soft and/or unsuitable materials encountered at the pipe sub-grade should be removed and replaced with an adequate bedding material.

During the digging of depressions for proper sealing of the pipe joints, the pipe should rest on a prepared bottom for as near its full length as is practicable.

8.3 Pipe Bedding

Bedding is defined as the material supporting and surrounding the pipe to 1 foot above the pipe. Pipe bedding should follow EMWD Standards. If additional recommendations beyond EMWD Standards are needed, the following specifications can be used during the placement of pipe bedding.

To provide uniform and firm support for the pipe, compacted granular materials such as clean sand, gravel or ¾-inch crushed aggregate, or crushed rock may be used as pipe bedding material. The sand equivalents of the tested soils were between 19 and 21. Typically, soils with sand equivalent value of 30 or more are used as pipe bedding material. The pipe designer should determine if the soils are suitable as pipe bedding material.

The type and thickness of the granular bedding placed underneath and around the pipe, if any, should be selected by the pipe designer. The load on the rigid pipes and deflection of flexible pipes and, hence, the pipe design, depends on the type and the amount of bedding placed underneath and around the pipe.

Bedding materials should be vibrated in-place to achieve compaction. Care should be taken to densify the bedding material below the springline of the pipe. Prior to placing the pipe bedding material, the pipe subgrade should be uniform and properly graded to provide uniform bearing and support to the entire section of the pipe placed on bedding material. During the digging of depressions for proper sealing of the pipe joints, the pipe should rest on a prepared bottom for as near its full length as is practicable.

Migration of fines from the surrounding native and/or fill soils must be considered in selecting the gradation of any imported bedding material. We recommend that the pipe bedding material should satisfy the following criteria to protect migration of fine materials.

i. $\frac{D15(F)}{D85(B)} \leq 5$

ii. $\frac{D50(F)}{D50(B)} < 25$

iii. Bedding Materials must have less than 5 percent passing No. 200 sieve (0.0074 mm) to avoid internal movement of fines.

Where,
F = Bedding Material
B = Surrounding Native and/or Fill Soils
*D*15(F) = Particle size through which 15% of bedding material will pass
*D*85(B) = Particle size through which 85% of surrounding soil will pass
*D*50(F) = Particle size through which 50% of bedding material will pass
*D*50(B) = Particle size through which 50% of surrounding soil will pass

If the above criteria do not satisfy, commercially available geofabric used for filtration purposes (such as Mirafi 140N or equivalent) may be wrapped around the bedding material encasing the pipe to separate the bedding material from the surrounding native or fill soils.

8.4 Backfill Materials

The native soils encountered within the pipeline alignments, free of debris or organic matter are suitable as compacted fill after proper processing and removal of oversize materials to meet the following criteria.

- No particles larger than 3 inches in largest dimension.
- Rocks larger than one inch should not be placed within the upper 12 inches of subgrade soils.
- Free of all organic matter, debris, or other deleterious material.
- Expansion index of 20 or less.
- Sand Equivalent greater than 15 (greater than 30 for pipe bedding).
- Contain less than 30 percent by weight retained in 3/4-inch sieve.

- Contain less than 40 percent fines (passing #200 sieve).

Based on field investigation and laboratory testing results, on-site soils may be suitable as fill materials.

Imported soils, if used as fill, should be predominantly granular and meet the above criteria. Any imported fill should be tested and approved by geotechnical representative prior to delivery to the alignments.

8.5 Compacted Fill Placement

Fill soils should be thoroughly mixed and moisture conditioned to within ±3 percent of optimum moisture content for coarse soils and 0 to 2 percent above optimum moisture content for fine soils and compacted to at least 90 percent of the laboratory maximum dry density.

At least the upper 12 inches of subgrade soils underneath pavements intended to support vehicle loads should be scarified, moisture conditioned, and compacted to at least 95 percent of the laboratory maximum dry density.

Fill materials should not be placed, spread or compacted during unfavorable weather conditions. When work is interrupted by heavy rain, filling operations should not resume until the geotechnical consultant approves the moisture and density conditions of the previously placed fill.

8.6 Trench Zone Backfill

The trench zone is defined as the portion of the trench above the pipe bedding extending up to the final grade level of the trench surface. Excavated on-site soils free of oversize particles and deleterious matter may be used to backfill the trench zone. Trench backfill should follow EMWD Standards or City of Moreno Valley Standards, whichever is applicable. Based on field investigation and laboratory testing results, on-site soils may be suitable as fill materials. If additional recommendations beyond EMWD and City Standards are needed, the following specifications can be used during the placement of trench backfill.

- Trench excavations to receive backfill should be free of trash, debris or other unsatisfactory materials at the time of backfill placement.
- Trench zone backfill should be compacted to at least 90 percent of the laboratory maximum dry density as per ASTM D1557 test method. At least the upper 1 foot of trench backfill underlying pavement should be compacted to at least 95 percent of the laboratory maximum dry density as per ASTM D1557 test method.
- Particles larger than 1 inch should not be placed within 12 inches of the pavement subgrade. No more than 30 percent of the backfill volume should be larger than

¾-inch in the largest dimension. Gravel should be well mixed with finer soil. Rocks larger than 3 inches in the largest dimension should not be placed as trench backfill.

- Trench backfill should be compacted by mechanical methods, such as sheepsfoot, vibrating or pneumatic rollers or mechanical tampers to achieve the density specified herein. The backfill materials should be brought to within ± 3 percent of optimum moisture content for coarse-grained soil, and between optimum and 2 percent above optimum for fine-grained soil, then placed in horizontal layers. The thickness of uncompacted layers should not exceed 8 inches. Each layer should be evenly spread, moistened or dried as necessary, and then tamped or rolled until the specified density has been achieved.
- The contractor should select the equipment and processes to be used to achieve the specified density without damage to adjacent ground, structures, utilities and completed work.
- The field density of the compacted soil should be measured by the ASTM D1556 (Sand Cone) or ASTM D6938 (Nuclear Gauge) or equivalent.
- Trench backfill should not be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations should not resume until field tests by the project's geotechnical consultant indicate that the moisture content and density of the fill are in compliance with project specifications.

9.0 DESIGN RECOMMENDATIONS

General design recommendations, resistance to lateral loads, pipe design parameters, bearing pressures, and soil corrosivity are discussed in the following subsections. Based on the current and previous investigations, subsurface soil conditions are almost identical along Perris Blvd. and Judson Street. Therefore, design recommendations will be same.

9.1 General

Where pipes connect to rigid structures and are subjected to significant loads as the backfill is placed to finish grade, we recommend that provisions be incorporated in the design to provide support of these pipes where they exit the structures. Consideration can be given to flexible connections, concrete slurry support beneath the pipes where they exit the structures, overlaying the pipes with a few inches of compressible material, (i.e. Styrofoam, or other materials), or other techniques.

The various design recommendations provided in this section are based on the assumption that the above earthwork recommendations will be implemented.

9.2 Resistance to Lateral Loads

Resistance to lateral loads can be assumed to be provided by passive earth pressures and friction between construction materials and native soils. The resistance to lateral

loads were estimated by using on-site native soils strength parameters obtained from laboratory testing. The resistance to lateral loads recommended for use in design of the thrust blocks are presented in the following table.

Table No. 5, Resistance to Lateral Loads

Soil Parameters	Values
Passive earth pressure (psf per foot of depth)	280
Maximum allowable bearing pressure against native soils (psf)	2,500
Coefficient of friction between formed concrete and native soils, fs	0.35

9.3 Soil Parameters for Pipe Design

Structural design requires proper evaluation of all possible loads acting on pipes and structures. The stresses and strains induced on buried pipes and walls depend on many factors, including the type of soil, density, bearing pressure, angle of internal friction, coefficient of passive earth pressure, and coefficient of friction at the interface between the backfill and native soils. The recommended values of the various soil parameters for design are provided in the following table.

Table No. 6, Soil Parameters for Pipe Design

Soil Parameters	Values
Average compacted fill total unit weight (assume 92% of relative compaction), γ (pcf)	132
Soil friction angle, ϕ (°)	33
Soil cohesion, c (psf)	50
Coefficient of friction between concrete and native soils, fs	0.35
Coefficient of friction between Steel pipe and native soils, fs	0.25
Bearing pressure against native soils (psf)	2,500
Coefficient of passive earth pressure, Kp	3.39
Coefficient of active earth pressure, Ka	0.29
*Modulus of Soil Reaction E' (psi)	1,500
Note: * Modulus of soil reaction, E' is provided for native trench wall soil.	

9.4 Bearing Pressure for Anchor and Thrust Blocks

An allowable net bearing pressure presented in Table No. 6, *Soil Parameters for Pipe Design* may be used for anchor and thrust block design against alluvial soils. Such thrust blocks should be at least 18 inches wide.

If normal code requirements are applied for design, the above recommended bearing capacity and passive resistances may be increased by 33 percent for short duration loading such as seismic or wind loading.

9.5 Soil Corrosivity

The results of chemical testing of four representative soil samples were evaluated for corrosivity evaluation with respect to common construction materials such as concrete and steel. The test results are presented in Appendix B, *Laboratory Testing Program* and are discussed below.

The sulfate content of the sampled soil corresponds to American Concrete Institute (ACI) exposure category S0 for this sulfate concentration (ACI 318-14, Table 19.3.1.1). No concrete type restrictions are specified for exposure category S0 (ACI 318-14, Table 19.3.2.1). A minimum compressive strength of 2,500 psi is recommended.

We anticipate that concrete structures (if any) will be exposed to moisture from precipitation and irrigation. Based on the alignment locations and the results of chloride testing of the soils, we do not anticipate concrete structures will be exposed to external sources of chlorides, such as deicing chemicals, salt, brackish water, or seawater. ACI specifies exposure category C1 where concrete is exposed to moisture, but not to external sources of chlorides (ACI 318-14, Table 19.3.1.1). ACI provides concrete design recommendations in ACI 318-14, Table 19.3.2.1, including a compressive strength of at least 2,500 psi and a maximum chloride content of 0.3 percent.

According to Romanoff, 1957, the following table provides general guideline of soil corrosion based on electrical resistivity.

Table No. 7, Correlation Between Resistivity and Corrosion

Soil Resistivity (ohm-cm) per Caltrans CT 643	Corrosivity Category
Over 10,000	Mildly corrosive
2,000 – 10,000	Moderately corrosive
1,000 – 2,000	corrosive
Less than 1,000	Severe corrosive

The minimum electrical resistivities along pipeline alignments when saturated ranged from 4,829 to 11,799 ohm-cm. These values indicate that the tested soils are moderately to mildly corrosive to ferrous metals in contact with the soils. Converse does not practice in the area of corrosion consulting. If needed, a qualified corrosion consultant should provide appropriate corrosion mitigation measures for any ferrous metals in contact with the site soils.

9.6 Asphalt Concrete Pavement

Three soil samples were tested to determine the R-value of the subgrade soils. Based on laboratory testing, R-values were 18, 21 and 61 along the Perris Boulevard. For pavement design, we have utilized R-value of 18 and 50 and design Traffic Indices (TIs) ranging from 7 to 10.

Based on the above information, asphalt concrete and aggregate base thickness results are presented using the Caltrans Highway Design Manual (Caltrans, 2020), Chapter 630 with a safety factor of 0.2 for asphalt concrete/aggregate base section and 0.1 for full depth asphalt concrete section. Preliminary asphalt concrete pavement sections are presented in the following table.

Table No. 8, Preliminary Pavement Sections along Perris Boulevard

Design R-value	Traffic Index (TI)	Pavement Section		
		Asphalt Concrete (inches)	Aggregate Base (inches)	Full AC Section (inches)
50	7	4.0	7.5	6.5
	9	5.5	6.5	9.0
	10	6.5	7.0	10.0
18	7	4.0	12.0	11.0
	9	5.5	16.0	14.0
	10	6.5	18.0	16.0
Note: R-value = 50 for BH-01 through BH-04 R-value = 18 for BH-04 through BH-08				

Pavement sections should be based on City of Moreno Valley Standards or Table No. 8, whichever is applicable. At or near the completion of trench backfill, the subgrade should be tested to evaluate the actual subgrade R-value for final pavement design.

Prior to placement of aggregate base, at least the upper 12 inches of subgrade soils should be moisture-conditioned if necessary, and recompacted to at least 95 percent of the laboratory maximum dry density as defined by ASTM Standard D1557 test method.
Base materials should conform to Section 200-2 of the Greenbook (Public Works Standards, 2018) or as required by the City of Moreno Valley Standards and should be placed in accordance with Section 301-2 of the Greenbook.

Asphalt concrete materials should conform to Section 203 of the Greenbook or as required by the as required by the City of Moreno Valley Standards and should be placed in accordance with Section 302-5 of the Greenbook.

Positive drainage should be provided away from all pavement areas to prevent seepage of surface and/or subsurface water into the pavement base and/or subgrade.

10.0 CONSTRUCTION CONSIDERATIONS

Construction recommendations are presented below.

10.1 General

Prior to the start of construction, all existing underground utilities should be located along the pipeline alignments. Such utilities should either be protected in-place or removed and replaced during construction as required by the project specifications.

Vertical braced excavations are feasible along the pipeline alignments. Sloped excavations may not be feasible in locations adjacent to existing utilities (if any).

Where the side of the excavation is a vertical cut, it should be adequately supported by temporary shoring to protect workers and any adjacent structures.

All applicable requirements of the California Construction and General Industry Safety Orders, the Occupational Safety and Health Act, current amendments, and the Construction Safety Act should be met. The soils exposed in cuts should be observed during excavation by the owner's representative and the competent person employed by the contractor in accordance with regulations. If potentially unstable soil conditions are encountered, modifications of slope ratios for temporary cuts may be required.

10.2 Temporary Sloped Excavations

Temporary open-cut trenches may be constructed in areas not adjacent to existing underground utilities improvements with side slopes as recommended in the table below. Temporary cuts encountering soft and wet fine-grained soils, dry loose, cohesionless soils, or loose fill from trench backfill may have to be constructed at a flatter gradient than presented below.

Table No. 9, Slope Ratios for Temporary Excavations

Soil Type	OSHA Soil Type	Depth of Cut (feet)	Recommended Maximum Slope (Horizontal:Vertical)[1]
Silty Sand (SM)	C	0-10	1.5:1

[1] Slope ratio is assumed to be constant from top to toe of slope, with level adjacent ground.

For excavations up to 4 feet bgs can be vertical. For steeper temporary construction slopes or deeper excavations, or unstable soil encountered during the excavation, shoring

or trench shields should be provided by the contractor as necessary to protect the workers in the excavation.

Surfaces exposed in sloped excavations should be kept moist but not saturated to retard raveling and sloughing during construction. Adequate provisions should be made to protect the slopes from erosion during periods of rainfall. Surcharge loads, including construction materials, should not be placed within 5 feet of the unsupported slope edge. Stockpiled soils with a height higher than 6 feet will require greater distance from trench edges.

10.3 Shoring Design

Temporary shoring will be required where open sloped excavations will not be feasible due to unstable soils or due to nearby existing structures or facilities. Temporary shoring may consist of conventional soldier piles and lagging or sheet piles or any piles selected by contractor. The shoring for the pipe excavations may be laterally supported by walers and cross bracing or may be cantilevered. Drilled excavations for soldier piles will require the use of drilling fluids to prevent caving and to maintain an opened hole for pile installation.

The active earth pressure behind any shoring depends primarily on the allowable movement, type of backfill materials, backfill slopes, wall inclination, surcharges, and any hydrostatic pressures.

The lateral earth pressures to be used in the design of shoring is presented in the following table.

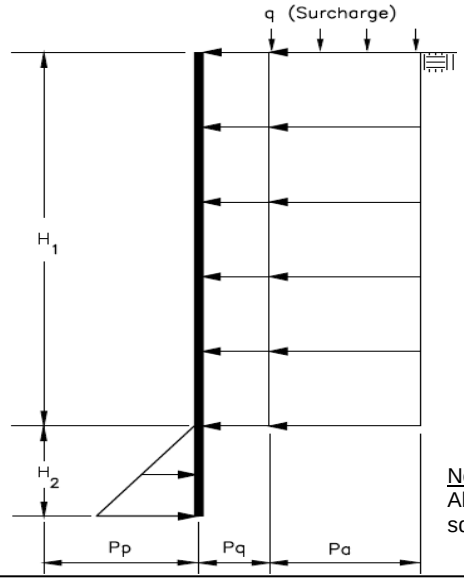
Table No. 10, Lateral Earth Pressures for Temporary Shoring

Lateral Resistance Soil Parameters*	Value
Active Earth Pressure (Braced Shoring) (psf) (A)	24
Active Earth Pressure (Cantilever Shoring) (psf) (B)	40
At-Rest Earth Pressure (Cantilever Shoring) (psf) (C)	60
Passive earth pressure (psf per foot of depth) (D)	280
Maximum allowable bearing pressure against native soils (psf) (E)	2,500
Coefficient of friction between sheet pile and native soils, fs (F)	0.25

* Parameters A through F are used in Figures No. 3 and 4 below.

Restrained (braced) shoring systems should be designed based on Figure No. 6, *Lateral Earth Pressures for Temporary Braced Excavation* to support a uniform rectangular lateral earth pressure.

Figure No. 6, Lateral Earth Pressures for Temporary Braced Excavation



Total Earth Pressure, P

P = Pq + Pa

Pq = 0.5q - incremental surcharge pressure

Pa = (A)H_1 - active earth pressure (Braced walls)

Lateral Pressure Resistance

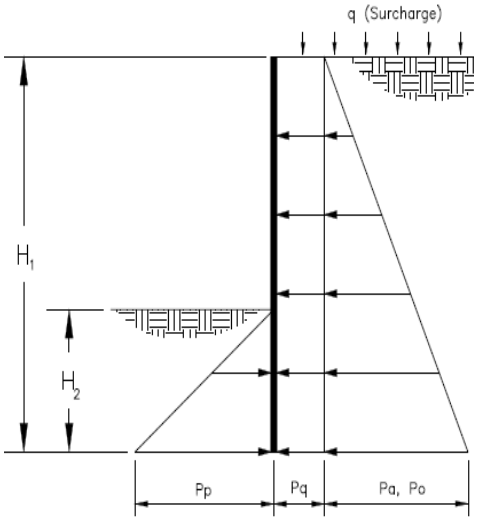
Pp = (D) H_2 ≤ (E) psf - passive earth pressure (on native soils)

μ = (F) - ultimate friction coefficient between steel sheet piles and soil

Note:
All values of height (H) in feet, pressure (P) and surcharge (q) in pounds per square foot (psf).

Unrestrained (cantilever) design of cantilever shoring consisting of soldier piles spaced at least two diameters on-center or sheet piles, can be based on Figure No. 7, *Lateral Earth Pressures on Temporary Cantilever Wall*.

Figure No. 7, Lateral Earth Pressures on Temporary Cantilever Wall



Total Earth Pressure, P

P = Pq + Pa, Po

Pq = 0.5q - incremental surcharge pressure

Pa = (B)H_1 - active earth pressure (Un-restrained)

Po = (C)H_1 - at rest earth pressure (Restrained)

Lateral Pressure Resistance

Pp = (D) H_2 ≤ (E) psf - passive earth pressure (on native soils)

μ = (F) - ultimate friction coefficient between steel sheet piles and soil

Note:
All values of height (H) in feet, pressure (P) and surcharge (q) in pounds per square foot (psf).

The provided pressures assume no hydrostatic pressures. If hydrostatic pressures are allowed to build up, the incremental earth pressures below the ground-water level should be reduced by 50 percent and added to hydrostatic pressure for total lateral pressure.

Passive resistance includes a safety factor of 1.5. The upper 1 foot for passive resistance should be ignored unless the surface is confined by a pavement or slab.

In addition to the lateral earth pressure, surcharge pressures due to miscellaneous loads, such as soil stockpiles, vehicular traffic or construction equipment located adjacent to the shoring, should be included in the design of the shoring. A uniform lateral pressure of 100 psf should be included in the upper 10 feet of the shoring to account for normal vehicular and construction traffic within 10 feet of the trench excavation. As previously mentioned, all shoring should be designed and installed in accordance with state and federal safety regulations.

The contractor should have provisions for soldier pile and sheet pile removal. All voids resulting from removal of shoring should be filled. The method for filling voids should be selected by the contractor, depending on construction conditions, void dimensions and available materials. The acceptable materials, in general, should be non-deleterious, and able to flow into the voids created by shoring removal (e.g. concrete slurry, “pea” gravel, etc.).

Excavations for the proposed pipeline should not extend below a 1:1 horizontal:vertical (H:V) plane extending from the bottom of any existing structures, utility lines or streets. Any proposed excavation should not cause loss of bearing and/or lateral supports of the existing utilities or streets.
If the excavation extends below a 1:1 (H:V) plane extending from the bottom of the existing structures, utility lines or streets, a maximum of 10 feet of slope face parallel to the existing improvement should be exposed at a time to reduce the potential for instability. Backfill should be accomplished in the shortest period of time and in alternating sections.

11.0 CLOSURE

This report is prepared for the project described herein and is intended for use solely by EMWD and their authorized agents, to assist in the design and construction of the proposed project. Our findings and recommendations were obtained in accordance with generally accepted professional principles practiced in geotechnical engineering. We make no other warranty, either expressed or implied.

Converse Consultants is not responsible or liable for any claims or damages associated with interpretation of available information provided to others. Field exploration identifies actual soil conditions only at those points where samples are taken, when they are taken. Data derived through sampling and laboratory testing is extrapolated by Converse employees who render an opinion about the overall soil conditions. Actual conditions in areas not sampled may differ. In the event that changes to the project occur, or additional, relevant information about the project is brought to our attention, the recommendations contained in this report may not be valid unless these changes and additional relevant

information are reviewed and the recommendations of this report are modified or verified in writing. In addition, the recommendations can only be finalized by observing actual subsurface conditions revealed during construction. Converse cannot be held responsible for misinterpretation or changes to our recommendations made by others during construction.

As the project evolves, continued consultation and construction monitoring by a qualified geotechnical consultant should be considered an extension of geotechnical investigation services performed to date. The geotechnical consultant should review plans and specifications to verify that the recommendations presented herein have been appropriately interpreted, and that the design assumptions used in this report are valid. Where significant design changes occur, Converse may be required to augment or modify the recommendations presented herein. Subsurface conditions may differ in some locations from those encountered in the explorations, and may require additional analyses and, possibly, modified recommendations.

Design recommendations given in this report are based on the assumption that the recommendations contained in this report are implemented. Additional consultation may be prudent to interpret Converse's findings for contractors, or to possibly refine these recommendations based upon the review of the actual site conditions encountered during construction. If the scope of the project changes, if project completion is to be delayed, or if the report is to be used for another purpose, this office should be consulted.

12.0 REFERENCES

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Appendix A

Field Exploration

APPENDIX A

FIELD EXPLORATION

Our field investigation included alignments reconnaissance and a subsurface exploration program consisting of drilling soil borings. During the reconnaissance, the surface conditions were noted, and the boring were marked at locations reviewed and approved by the District. The locations should be considered accurate only to the degree implied by the method used. Permit was obtained from the City of Moreno Valley prior to the drilling.

Eight exploratory borings (BH-01 through BH-08) were drilled on January 27, 2021 along the pipe alignments to investigate the subsurface conditions. The borings were drilled to the planned depth of 16.5 feet below existing ground surface (bgs).

The borings were drilled using a truck-mounted drill rig equipped with 8-inch diameter hollow-stem augers. Encountered materials were continuously logged by a Converse engineer and classified in the field by visual classification in accordance with the Unified Soil Classification System. Where appropriate, the field descriptions and classifications have been modified to reflect laboratory test results.

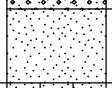
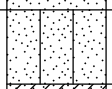
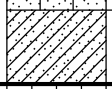
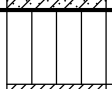
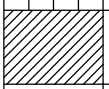
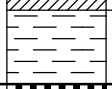
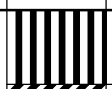
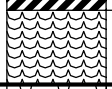
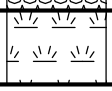
Relatively undisturbed samples were obtained using California Modified Samplers (2.4 inches inside diameter and 3.0 inches outside diameter) lined with thin sample rings. The steel ring sampler was driven into the bottom of the borehole with successive drops of a 140-pound driving weight falling 30 inches. Blow counts at each sample interval are presented on the boring logs. Samples were retained in brass rings (2.4 inches inside diameter and 1.0 inch in height) and carefully sealed in waterproof plastic containers for shipment to the Converse laboratory. Bulk samples of typical soil types were also obtained.

Following the completion of logging and sampling, the borings were backfilled with soil cuttings mixed cement, compacted by pushing down with augers using the drill rig weight and surface patched with cold asphalt, except boring (BH-06) which the surface was patched with cement slurry and painted with black color.

If construction is delayed, the surface may settle over time. We recommend the owner monitor the boring location and backfill any depressions that might occur or provide protection around the boring locations to prevent trip and fall injuries from occurring near the area of any potential settlement.

For a key to soil symbols and terminology used in the boring logs, refer to Drawing No. A-1, *Unified Soil Classification and Key to Boring Log Symbols*. For logs of borings, see Drawing Nos. A-2 through A-9, *Logs of Borings*. Field investigation including boring locations map and boring logs from previous investigation (Converse, 2017) are included in Appendix A-1.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

BORING LOG SYMBOLS

SAMPLE TYPE

STANDARD PENETRATION TEST
Split barrel sampler in accordance with ASTM D-1586-84 Standard Test Method

DRIVE SAMPLE 2.42" I.D. sampler (CMS).

DRIVE SAMPLE No recovery

BULK SAMPLE

GROUNDWATER WHILE DRILLING

GROUNDWATER AFTER DRILLING

LABORATORY TESTING ABBREVIATIONS			
TEST TYPE (Results shown in Appendix B)		STRENGTH	
		Pocket Penetrometer	p
		Direct Shear	ds
		Direct Shear (single point)	ds*
		Unconfined Compression	uc
CLASSIFICATION		Triaxial Compression	tx
Plasticity	pi	Vane Shear	vs
Grain Size Analysis	ma	Consolidation	c
Passing No. 200 Sieve	wa	Collapse Test	col
Sand Equivalent	se	Resistance (R) Value	r
Expansion Index	ei	Chemical Analysis	ca
Compaction Curve	max	Electrical Resistivity	er
Hydrometer	h	Permeability	perm
Disturb	Dist.	Soil Cement	sc

Apparant Density	Very Loose	Loose	Medium	Dense	Very Dense
SPT (N)	< 4	4 - 11	11 - 30	31 - 50	> 50
CA Sampler	< 5	5 - 12	13 - 35	36 - 60	> 60
Relative Density (%)	< 20	20 - 40	40 - 60	60 - 80	> 80

Consistency	Very Soft	Soft	Medium	Stiff	Very Stiff	Hard
SPT (N)	< 2	2-4	5-8	9-15	16-30	> 30
CA Sampler	< 3	3-6	7-12	13-25	26-50	> 50

UNIFIED SOIL CLASSIFICATION AND KEY TO BORING LOG SYMBOLS

Converse Consultants

The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Project No. **15-81-272-04**

Drawing No. **A-1**

Project ID: 15-81-272-04.GPJ; Template: KEY

Log of Boring No. BH-01

Dates Drilled: 1/27/2021 Logged by: Mahmoud Suliman Checked By: Robert Gregorek

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 1938 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		7" ASPHALT CONCRETE/ 10" AGGREGATE BASE						
		ALLUVIUM						ca, er, ma
		SILTY SAND (SM): fine to coarse-grained, few gravel up to 0.5" maximum dimension, medium dense, moist, reddish brown.	■		4/6/8	6	118	
5			■		4/13/22	6	113	ds
		- dense to very dense	■		26/38/48	7	114	
10			■		10/23/25	6	114	
15			■		23/27/38	7	125	
		End of boring at 16.5 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings mixed with cement, compacted by pushing down with augers using drill rig weight and surface patched with cold asphalt on 01/27/2021.						

Log of Boring No. BH-02

Dates Drilled: 1/27/2021 Logged by: Mahmoud Suliman Checked By: Robert Gregorek

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 1927 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		6" ASPHALT CONCRETE/ 11" AGGREGATE BASE						
		ALLUVIUM **SILTY SAND (SM):** fine to coarse-grained, few gravel up to 0.5" maximum dimension, dense to very dense, moist, reddish brown.	■	▨	20/35/50-5"	7	128	se
5			■	▨	25/20/28	8	124	max
			■	▨	19/27/30	6	122	
10		- grayish brown	■		24/23/18	7	115	
15		- loose, brown	■		4/5/6	3	107	
		End of boring at 16.5 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings mixed with cement, compacted by pushing down with augers using drill rig weight and surface patched with cold asphalt on 01/27/2021.						

Log of Boring No. BH-03

Dates Drilled: 1/27/2021 Logged by: Mahmoud Suliman Checked By: Robert Gregorek

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 1950 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		4" ASPHALT CONCRETE/ 7" AGGREGATE BASE						
		ALLUVIUM						r
		SILTY SAND (SM): fine to coarse-grained, few gravel up to 0.5" maximum dimension, medium dense to dense, moist, reddish brown.	■	▨	11/18/21	6	118	
5			■		10/20/24	5	120	
			■		15/23/23	5	124	ds
10		- increase in fine content, grayish brown	■	▨	11/18/29	11	127	
15		- very dense, reddish brown	■		14/23/43	6	114	
		End of boring at 16.5 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings mixed with cement, compacted by pushing down with augers using drill rig weight and surface patched with cold asphalt on 01/27/2021.						

Converse Consultants

The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Project No. 15-81-272-04

Drawing No. A-4

Log of Boring No. BH-04

Dates Drilled: 1/27/2021 Logged by: Mahmoud Suliman Checked By: Robert Gregorek

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 1940 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		4" ASPHALT CONCRETE/ 6" AGGREGATE BASE						
		ALLUVIUM **SILTY SAND (SM):** fine to coarse-grained, few gravel up to 0.5" maximum dimension, dense, moist, reddish brown.	■	▨	12/20/26	8	123	se
5			■	▨	19/20/28	7	114	ca, er, ma
		- very dense	■	▨	22/39/50-5"	11	126	
10		- increase in sand content, grayish brown	■		25/50-5"	8	127	
15		- reddish brown	■		16/37/50-5"	8	128	
		End of boring at 16.5 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings mixed with cement, compacted by pushing down with augers using drill rig weight and surface patched with cold asphalt on 01/27/2021.						

The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Converse Consultants

Project No. 15-81-272-04

Drawing No. A-5

Log of Boring No. BH-05

Dates Drilled: 1/27/2021 Logged by: Mahmoud Suliman Checked By: Robert Gregorek

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 1943 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		4" ASPHALT CONCRETE/ 4" AGGREGATE BASE						
		ALLUVIUM **SILTY SAND (SM):** fine to coarse-grained, scattered gravel up to 0.5" maximum dimension, trace clay, medium dense, moist, reddish brown.						max, r
			■		7/12/16	11	113	
5			■		7/13/20	6	116	ds
			■		8/8/20	9	115	
10		- increase in sand content, dry, grayish brown	■		7/14/16	2	104	
15		- very dense, reddish brown	■		49/50-3"	8	93	dist.
		End of boring at 16.5 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings mixed with cement, compacted by pushing down with augers using drill rig weight and surface patched with cold asphalt on 01/27/2021.						

Log of Boring No. BH-06

Dates Drilled: 1/27/2021 Logged by: Mahmoud Suliman Checked By: Robert Gregorek

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 1948 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		4" ASPHALT CONCRETE/ 7" AGGREGATE BASE						
		ALLUVIUM **SILTY SAND (SM):** fine to coarse-grained, few gravel up to 0.5" maximum dimension, trace clay, medium dense to dense, moist, reddish brown.	■	▨	14/18/26	8	128	ca, er, ma, se
5			■		14/18/21	7	128	
			■		15/23/30	5	124	
10		- increase in sand content, very dense, grayish brown	■	▨	26/46/50-5"	6	128	
15		- reddish brown	■		28/36/43	9	127	
		End of boring at 16.5 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings mixed with cement, compacted by pushing down with augers using drill rig weight and surface patched with cement slurry and painted with black color on 01/27/2021.						

Converse Consultants

The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Project No. 15-81-272-04

Drawing No. A-7

Log of Boring No. BH-07

Dates Drilled: 1/27/2021 Logged by: Mahmoud Suliman Checked By: Robert Gregorek

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 1923 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		4" ASPHALT CONCRETE/ 7" AGGREGATE BASE						
		ALLUVIUM **SILTY SAND (SM):** fine to coarse-grained, few gravel up to 0.5" maximum dimension, trace clay, dense to very dense dense, moist, reddish brown.						r
			■		12/18/44	10	128	
5			■		38/50-5"	7	129	
								max
			■		17/21/24	8	127	
10		- grayish brown	■		14/22/25	7	119	
15		- reddish brown	■		6/12/27	8	120	
		End of boring at 16.5 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings mixed with cement, compacted by pushing down with augers using drill rig weight and surface patched with cold asphalt on 01/27/2021.						

The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Project No. 15-81-272-04

Drawing No. A-8

Converse Consultants

Log of Boring No. BH-08

Dates Drilled: 1/27/2021 Logged by: Mahmoud Suliman Checked By: Robert Gregorek

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): 1906 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		4" ASPHALT CONCRETE/ 6" AGGREGATE BASE						
		ALLUVIUM						se
		SILTY SAND (SM): fine to coarse-grained, few gravel up to 0.5" maximum dimension, trace clay, dense, moist, reddish brown.	■		16/24/50	8	129	
5			■		17/33/35	8	127	ca, er, ma
			■		23/27/36	8	126	ds
10		- increase in sand content, medium dense, grayish brown	■		8/9/9	4	113	
15		- loose, reddish brown	■		3/3/5	5	115	
		End of boring at 16.5 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings mixed with cement, compacted by pushing down with augers using drill rig weight and surface patched with cold asphalt on 01/27/2021.						

Appendix A-1

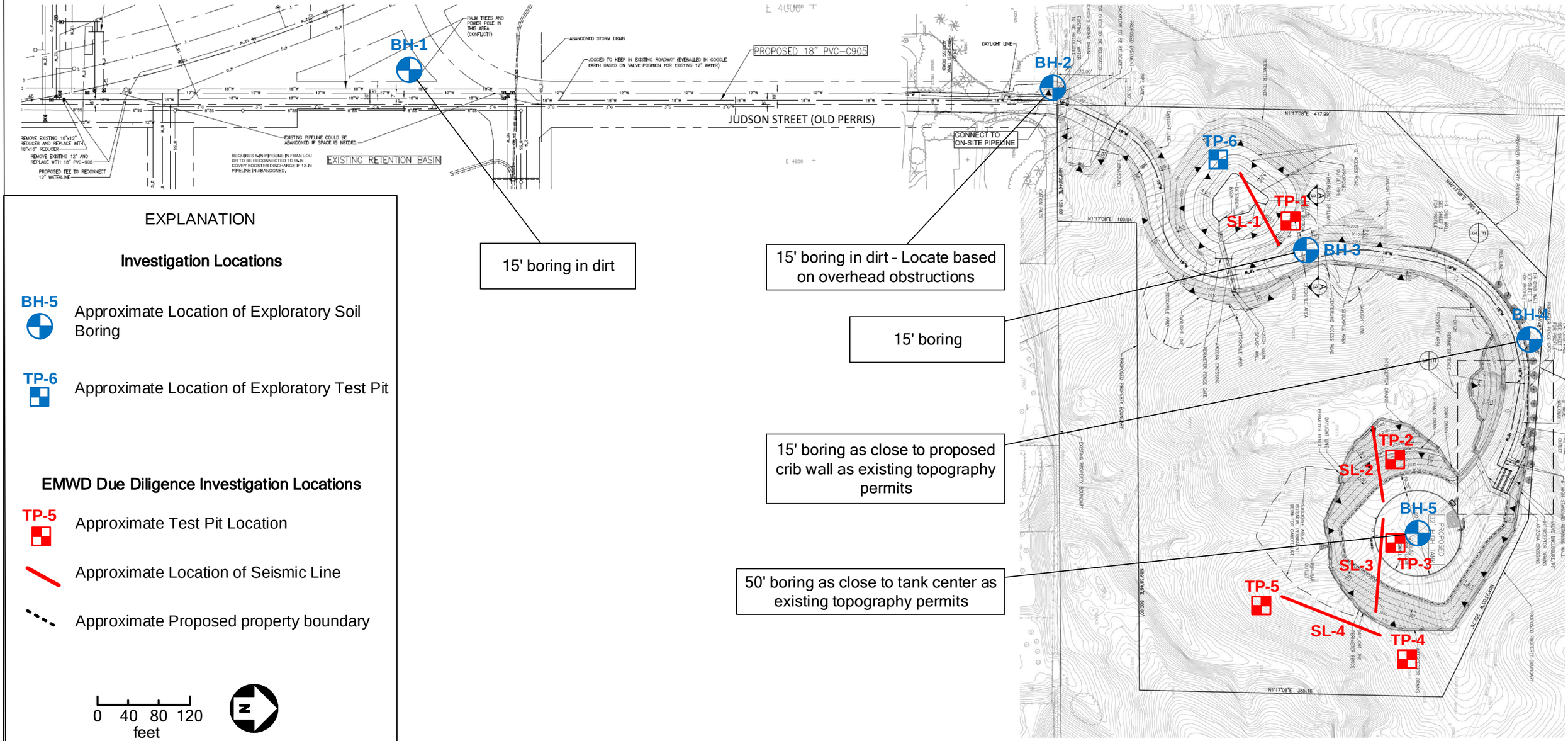
Previous Field Investigation (Converse, 2017)

APPENDIX A-1

PREVIOUS FIELD INVESTIGATION (CONVERSE, 2017)

Five soil borings (BH-1 through BH-5) were drilled on December 1, 2016 to depths ranging from approximately 12 to 50 feet below existing ground surface (bgs). BH-1 and BH-2 were drilled along the pipe alignment on Judson Street. Boring BH-3 through BH-5 were drilled for access road, wall and tank. Boring BH-4 was planned to be drilled to 15 feet bgs but was terminated at 12 feet bgs due to refusal in granitic bedrock. The borings were advanced using a track-mounted drill rig equipped with 8-inch diameter hollow stem auger and a drive sampler for soils sampling.

Five test pits (TP-1 through TP-5) were excavated on March 15, 2016 as part of a due diligence study performed for EMWD, and one additional test pit (TP-6) was excavated on November 22, 2016. The test pits were planned to be excavated to depths ranging from 10 to 15 feet below existing ground surface (bgs). However, due to the presence of bedrock, test pits TP-1 through TP-5 were terminated at shallower depths. The test pits were excavated using a rubber-tired backhoe equipped with a 24-inch wide bucket.



15' boring in dirt

15' boring in dirt - Locate based on overhead obstructions

15' boring

15' boring as close to proposed crib wall as existing topography permits

50' boring as close to tank center as existing topography permits

EXPLANATION

Investigation Locations

BH-5 — Approximate Location of Exploratory Soil Boring

TP-6 — Approximate Location of Exploratory Test Pit

EMWD Due Diligence Investigation Locations

TP-5 — Approximate Test Pit Location

Approximate Location of Seismic Line

Approximate Proposed property boundary

0 40 80 120
feet

N

Approximate Exploration Locations Map

Project: MV 2060 Pressure Zone Potable Water Storage Tank Project
Location: City of Moreno Valley, Riverside County, California

For: Albert A. Webb Assocaites

Project No
15-81-272-02

Converse Consultants

Figure No.
2

Log of Boring No. BH-1

Dates Drilled: 12/1/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): ±1943 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		ALLUVIUM:						
		SILTY SAND (SM): fine to coarse-grained, reddish-brown.						ma, se, ca, er, max
5			■		4/19/30	3	118	
10			■		31/50-6"	4	120	
15			■		25/30/28	6	120	
		End of boring at 16.5 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings and lightly compacted with auger on 12/1/2016.						

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Converse Consultants

Project No. 15-81-272-02

Drawing No. A-2

Log of Boring No. BH-2

Dates Drilled: 12/1/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): ±1965 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		ALLUVIUM: **SILTY SAND (SM):** fine to coarse-grained, scattered gravel to 0.5" in largest dimension, reddish-brown.						se, r
5		**GRANITIC BEDROCK (TONALITE)** completely weathered, no visible rock fabric, friable under hand pressure **Excavates As:** **SILTY SAND (SM):** fine to coarse-grained, reddish-brown.			17/33/38	1	109	
10		-severely weathered, some relict granitic fabric intact, grayish brown			50-6"	4	78	dist
15		- severely to moderately weathered, granitic fabric intact, gray and white			50-2"	2	96	
20					50-1.5"			
		End of boring at 20.1 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings and lightly compacted with auger on 12/1/2016.						

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. 15-81-272-02

Drawing No. A-3

Converse Consultants

Log of Boring No. BH-3

Dates Drilled: 12/1/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): ±2001 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		ALLUVIUM: **SILTY SAND (SM):** fine to coarse-grained, reddish-brown.						
5					50-6"			
10		**GRANITIC BEDROCK (TONALITE)** fine to coarse-grained, reddish-brown **Excavates As:** **SILTY SAND (SM):** fine to coarse-grained, reddish-brown.			50-3"	10	99	ds
15		-severely to moderately weathered, some relict granitic fabric intact, reddish-brown			50-4"	6	77	dist
		End of boring at 15.3 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings and lightly compacted with auger on 12/1/2016.						

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. 15-81-272-02

Drawing No. A-4

Log of Boring No. BH-4

Dates Drilled: 12/1/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): ±2015 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVE	SAMPLES BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		ALLUVIUM:						
		SILTY SAND (SM): fine to coarse-grained, scattered gravel to 0.5" in largest dimension, reddish-brown.						
		GRANITIC BEDROCK (TONALITE)			43/50-5"	6	118	ds
5		fine to coarse-grained, minor relict granitic fabric intact, red and white			50-2"	1	114	
		Excavates As: **SILTY SAND (SM):** fine to coarse-grained, grayish brown.						
		-severely to moderately weathered, some relict granitic fabric intact, grayish brown			50-3"	1	78	dist.
10					50-1.5"			
					50-1.5"			
		End of boring at 12.1 feet bgs due to refusal in granitic bedrock. No groundwater encountered. Borehole backfilled with soil cuttings and lightly compacted with auger on 12/1/2016.						

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Converse Consultants

Project No. 15-81-272-02

Drawing No. A-5

Log of Boring No. BH-5

Dates Drilled: 12/1/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): ±2048 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		ALLUVIUM: **SILTY SAND (SM):** fine to coarse-grained, scattered gravel to 0.5" in largest dimension, reddish-brown.						
		GRANITIC BEDROCK (TONALITE) completely to severely weathered, some relict granitic fabric intact, reddish-brown			50-5"	3	126	ma, max
5		**Excavates As:** **SILTY SAND (SM):** fine to coarse-grained, reddish-brown.			50-3"	2	82	dist.
		- severely weathered, granitic fabric intact, gray and white			46/50-3"			
10					50-2"	2	74	ds
15		- olive gray			50-1"			
20					50-1"			
25					50-2"			
30					21/50-2"			

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Converse Consultants

Project No. 15-81-272-02

Drawing No. A-6a

Log of Boring No. BH-5

Dates Drilled: 12/1/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: CME 75/ 8" HSA Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): ±2048 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		GRANITIC BEDROCK (TONALITE) completely to severely weathered, some relict granitic fabric intact, gray and white **Excavates As:** **SILTY SAND (SM):** fine to coarse-grained, olive gray.			50-1"	4	122	
40					50-3"			
45					50-2.5"			
50					50-2.5"			
		End of boring at 50.2 feet bgs. No groundwater encountered. Borehole backfilled with soil cuttings and lightly compacted with auger on 12/1/2016.						

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Converse Consultants

Project No. 15-81-272-02

Drawing No. A-6b

Log of Test Pit No. TP-1

Dates Drilled: 3/15/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: 24" WIDE BUCKET BACKHOE Driving Weight and Drop: N/A

Ground Surface Elevation (ft): ±2003 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		ALLUVIUM: **SILTY SAND (SM):** fine to coarse-grained, reddish-brown.						ca, er, ei, ma, max
5		**GRANITIC BEDROCK (TONALITE)** moderately to severely weathered, **Excavates As:** **SILTY SAND (SM):** fine to coarse-grained, scattered gravel to 1" in largest dimension, grayish brown.						
10		End of test pit at 6 feet bgs due to refusal in weathered granitic bedrock. No groundwater encountered. Test pit backfilled with soil cuttings and wheel rolled on 3/15/2016.						

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. 15-81-272-02

Drawing No. A-8

Log of Test Pit No. TP-2

Dates Drilled: 3/15/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: 24" WIDE BUCKET BACKHOE Driving Weight and Drop: N/A

Ground Surface Elevation (ft): ±2064 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
5		**GRANITIC BEDROCK (TONALITE)** completely weathered, **Excavates As:** **SILTY SAND (SM):** fine to coarse-grained, reddish brown to grayish brown. - severely weathered - moderately weathered End of test pit at 3 feet bgs due to refusal in weathered granitic bedrock. No groundwater encountered. Test pit backfilled with soil cuttings and wheel rolled on 3/15/2016.						

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Converse Consultants

Project No. 15-81-272-02

Drawing No. A-8

Log of Test Pit No. TP-3

Dates Drilled: 3/15/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: 24" WIDE BUCKET BACKHOE Driving Weight and Drop: N/A

Ground Surface Elevation (ft): ±2045 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		ALLUVIUM: **SAND with SILT (SP-SM):** fine to coarse-grained, reddish-brown.						ma
5		**GRANITIC BEDROCK (TONALITE)** moderately to severely weathered, **Excavates As:** **SILTY SAND (SM):** fine to coarse-grained, scattered gravel to 1" in largest dimension, grayish brown.						
		End of test pit at 5 feet bgs due to refusal in weathered granitic bedrock. No groundwater encountered. Test pit backfilled with soil cuttings and wheel rolled on 3/15/2016.						

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. 15-81-272-02

Drawing No. A-9

Log of Test Pit No. TP-4

Dates Drilled: 3/15/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: 24" WIDE BUCKET BACKHOE Driving Weight and Drop: N/A

Ground Surface Elevation (ft): ±2056 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		ALLUVIUM: **SILTY SAND (SM):** fine to coarse-grained, reddish-brown.						ca, er, ei, ma, max
5		**GRANITIC BEDROCK (TONALITE)** moderately to severely weathered, **Excavates As:** **SILTY SAND (SM):** fine to coarse-grained, scattered gravel to 1" in largest dimension, grayish brown.						
10		End of test pit at 7 feet bgs due to refusal in weathered granitic bedrock. No groundwater encountered. Test pit backfilled with soil cuttings and wheel rolled on 3/15/2016.						

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. 15-81-272-02

Drawing No. A-10

Log of Test Pit No. TP-5

Dates Drilled: 3/15/2016 Logged by: Jay Burnham Checked By: Scot Mathis

Equipment: 24" WIDE BUCKET BACKHOE Driving Weight and Drop: N/A

Ground Surface Elevation (ft): ±2049 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		ALLUVIUM: **SILTY SAND (SM):** fine to coarse-grained, scattered gravel to 1" in maximum dimension, reddish-brown.						ei, ma
5								
10		**GRANITIC BEDROCK (TONALITE)** severely weathered, **Excavates As:** **SILTY SAND (SM):** fine to coarse-grained, scattered gravel to 1" in largest dimension, grayish brown. - moderately weathered						
15		End of test pit at 12 feet bgs due to refusal in weathered granitic bedrock. No groundwater encountered. Test pit backfilled with soil cuttings and wheel rolled on 3/15/2016.						

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Converse Consultants

Project No. 15-81-272-02

Drawing No. A-11

Log of Test Pit No. TP-6

Dates Drilled: 11/22/2016 Logged by: Jordan Roper Checked By: Scot Mathis

Equipment: 24" WIDE BUCKET BACKHOE Driving Weight and Drop: N/A

Ground Surface Elevation (ft): ±2049 Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS	MOISTURE	DRY UNIT WT. (pcf)	OTHER
		ALLUVIUM: **SILTY SAND (SM):** fine to coarse-grained, trace clay, reddish-brown.						ma, max, ds
5		- hard digging						
		GRANITIC BEDROCK (TONALITE) completely weathered, **Excavates As:** **SILTY SAND (SM):** fine to coarse-grained, scattered gravel to 1" in largest dimension, grayish brown.						
10		- severely weathered						
15		End of test pit at 12 feet bgs due to refusal in weathered granitic bedrock. No groundwater encountered. Test pit backfilled with soil cuttings and wheel rolled on 3/15/2016.						

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Converse Consultants

Project No. 15-81-272-02

Drawing No. A-12

Appendix B

Laboratory Testing Program

APPENDIX B

LABORATORY TESTING PROGRAM

Tests were conducted in our laboratory on representative soil samples for the purpose of classification and evaluation of their physical properties and engineering characteristics. The amount and selection of tests were based on the geotechnical parameters required for this project. Test results are presented herein and on the Logs of Borings, in Appendix A, *Field Exploration*. Laboratory test results from previous investigation (Converse, 2017) are included in Appendix B-1. The following is a summary of the various laboratory tests conducted for this project.

***In-Situ* Moisture Content and Dry Density**

In-situ dry density and moisture content tests were performed on relatively undisturbed ring samples, in accordance with ASTM Standard D2216 and D2937 to aid soils classification and to provide qualitative information on strength and compressibility characteristics of the alignments soils. For test results, see the Logs of Borings in Appendix A, Field Exploration.

Sand Equivalent

Four representative soil samples were tested in accordance with the ASTM Standard D2419 test method to determine the sand equivalent. The test results are presented in the following table.

Table No. B-1, Sand Equivalent Test Results

Boring No	Depth (feet)	Soil Description	Sand Equivalent
BH-02	1.5-5	Silty Sand (SM)	21
BH-04	1-5	Silty Sand (SM)	19
BH-06	1-5	Silty Sand (SM)	21
BH-08	1-5	Silty Sand (SM)	20

R-value

Three representative bulk soil samples were tested in accordance with California Test Method CT301 for resistance value (R-value). The test provides a relative measure of soil strength for use in pavement design. The test results are presented in the following table.

Table No. B-2, R-Value Test Results

Boring No.	Depth (feet)	Soil Classification	Measured R-value
BH-03	1-5	Silty Sand (SM)	61
BH-05	1-5	Silty Sand (SM), Trace Clay	18
BH-07	1-5	Silty Sand (SM), Trace Clay	22

Soil Corrosivity

Four representative soil samples were tested to determine minimum electrical resistivity, pH, and chemical content, including soluble sulfate and chloride concentrations. The purpose of these tests was to determine the corrosion potential of soils when placed in contact with common construction materials. The tests were performed by AP Engineering and Testing, Inc. (Pomona, CA) in accordance with Caltrans Test Methods 643, 422 and 417. Test results are presented in the following table.

Table No. B-3, Summary of Soil Corrosivity Test Results

Boring No.	Depth (feet)	pH	Soluble Sulfates (CA 417) (ppm)	Soluble Chlorides (CA 422) (ppm)	Min. Resistivity (CA 643) (Ohm-cm)
BH-01	1.5-5	8.2	58	93	4,829
BH-04	5-10	8.2	72	117	11,799
BH-06	1-5	7.5	105	102	10,040
BH-08	5-10	7.8	272	177	7,552

Grain-Size Analyses

To assist in classification of soils, mechanical grain-size analyses were performed on Four select samples in accordance with the ASTM Standard D6913 test method. Grain-size curves are shown in Drawing Nos. B-1, *Grain Size Distribution Results* and results are presented in the below table.

Table No. B-4, Grain Size Distribution Test Results

Boring No.	Depth (ft)	Soil Classification	% Gravel	% Sand	%Silt	%Clay
BH-01	1.5-5	Silty Sand (SM)	0.0	77.0	23.0	
BH-04	5-10	Silty Sand (SM)	0.0	82.0	18.0	
BH-06	1-5	Silty Sand (SM)	0.0	74.0	26.0	
BH-08	5-10	Silty Sand (SM)	0.0	77.0	23.0	

Maximum Density and Optimum Moisture Content

Laboratory maximum dry density-optimum moisture content relationship tests were performed on three representative bulk samples in accordance with the ASTM Standard D1557 test method. The test results are presented in Drawing No. B-2, *Moisture-Density Relationship Results,* and are summarized in the following table.

Table No B-5, Summary of Moisture-Density Relationship Results

Boring No.	Depth (feet)	Soil Description	Optimum Moisture (%)	Maximum Dry Density (lb/cft)
*BH-02	5-10	Silty Sand (SM), Reddish brown	8.5 (8.0*)	133.5 (135.1*)
BH-05	1-5	Silty Sand (SM), Reddish brown	8.6	131.7
*BH-07	5-10	Silty Sand (SM), Reddish brown	8.0 (7.5*)	133.8 (135.6*)

(* Rock correction: BH-02= 5.8%, BH-07=5.89%)

Direct Shear

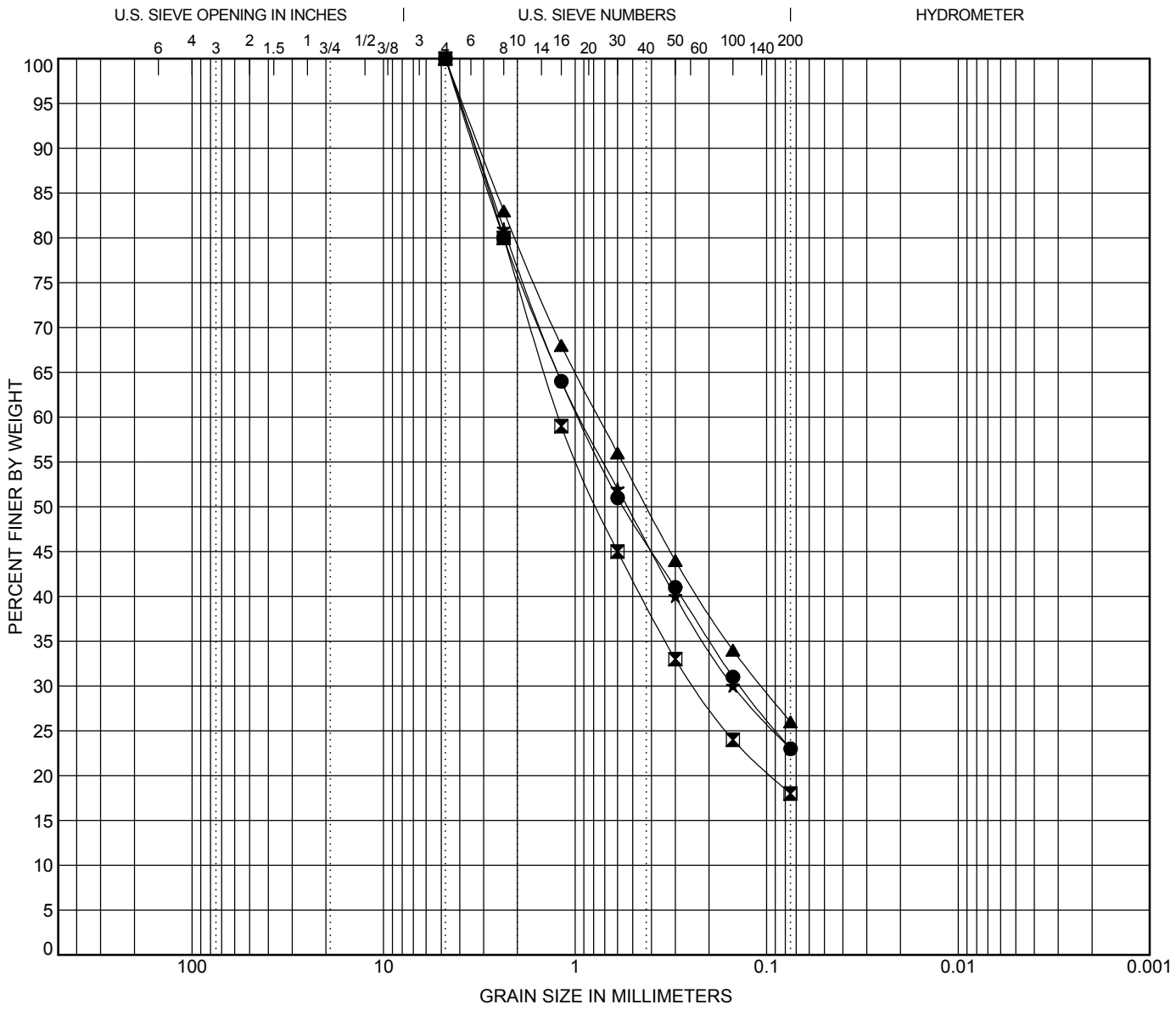
Four direct shear tests were performed on relatively undisturbed samples under soaked condition in accordance with ASTM Standard 3080. For each test, 3 samples contained in a brass sampler ring were placed, one at a time, directly into the test apparatus and subjected to a range of normal loads appropriate for the anticipated conditions. The samples were then sheared at a constant strain rate of 0.02 inch/minute. Shear deformation was recorded until a maximum of about 0.25-inch shear displacement was achieved. Ultimate strength was selected from the shear-stress deformation data and plotted to determine the shear strength parameters. For test results, including sample density and moisture content, see Drawing Nos. B-3 through B-6*, Direct Shear Test Results,* and in the following table.

Table No. B-6, Summary of Direct Shear Test Results

Boring No.	Depth (feet)	Soil Description	Peak Strength Parameters	
			Friction Angle (degrees)	Cohesion (psf)
BH-01	5.0-6.5	Silty Sand (SM)	34	100
BH-03	7.5-9.0	Silty Sand (SM)	35	100
BH-05	5.0-6.5	Silty Sand (SM)	35	50
BH-08	7.5-9.0	Silty Sand (SM)	33	100

Sample Storage

Soil samples presently stored in our laboratory will be discarded 30 days after the date of this report, unless this office receives a specific request to retain the samples for a longer period.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring No.	Depth (ft)	Description	LL	PL	PI	Cc	Cu
●	**BH-01**	**1.5-5**	**SILTY SAND (SM)**					
⊠	**BH-04**	**5-10**	**SILTY SAND (SM)**					
▲	**BH-06**	**1-5**	**SILTY SAND (SM)**					
★	**BH-08**	**5-10**	**SILTY SAND (SM)**					

	Boring No.	Depth (ft)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH-01**	**1.5-5**	**4.75**	**0.958**	**0.138**		**0.0**	**77.0**	**23.0**	
⊠	**BH-04**	**5-10**	**4.75**	**1.22**	**0.238**		**0.0**	**82.0**	**18.0**	
▲	**BH-06**	**1-5**	**4.75**	**0.752**	**0.106**		**0.0**	**74.0**	**26.0**	
★	**BH-08**	**5-10**	**4.75**	**0.942**	**0.15**		**0.0**	**77.0**	**23.0**	

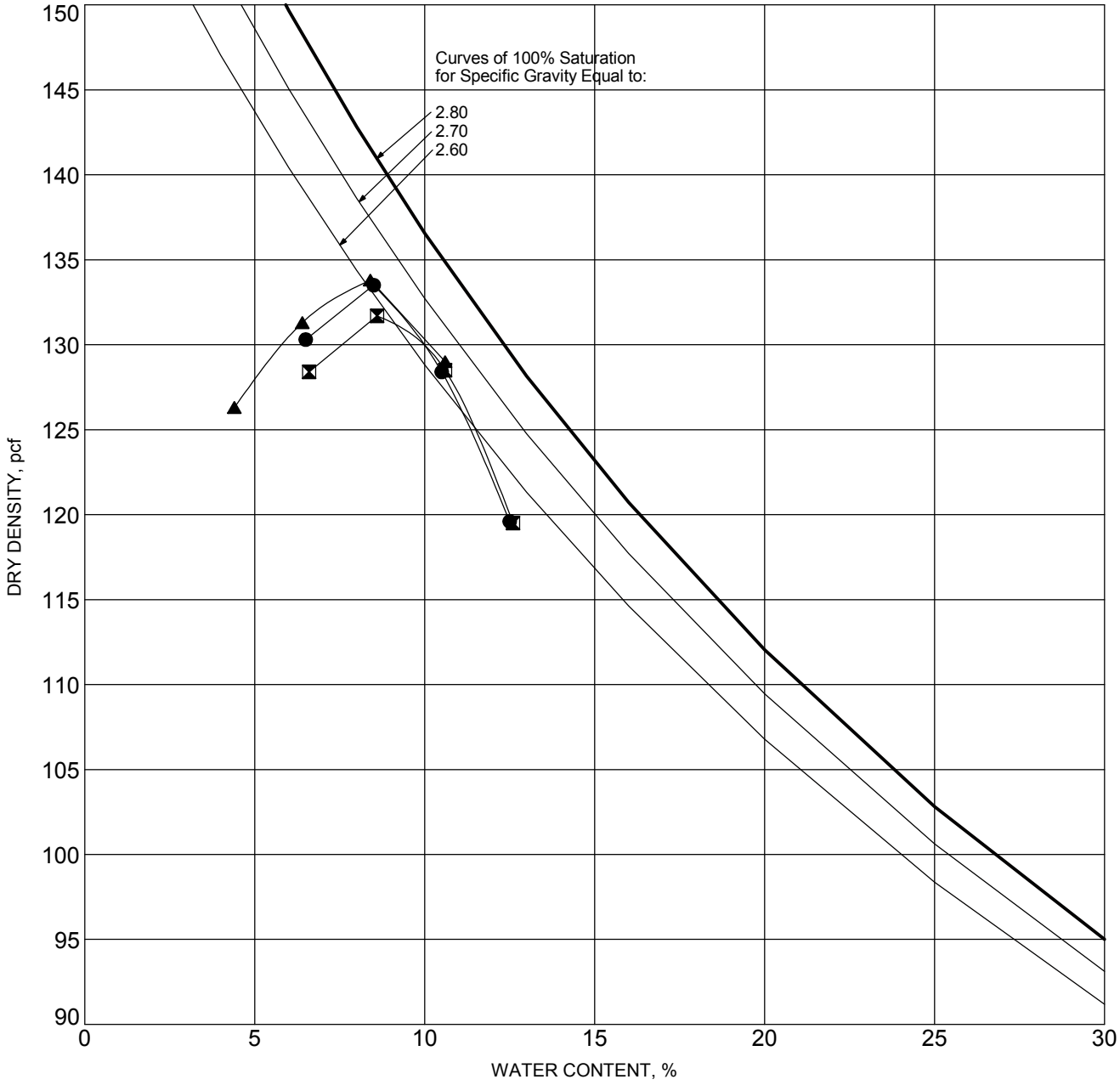
GRAIN SIZE DISTRIBUTION RESULTS

Converse Consultants

The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Project No. **15-81-272-04**

Drawing No. **B-1**



SYMBOL	BORING NO.	DEPTH (ft)	DESCRIPTION	ASTM TEST METHOD	OPTIMUM WATER, %	MAXIMUM DRY DENSITY, pcf
●	***BH-02**	**5-10**	**SILTY SAND (SM), REDDISH BROWN**	**D1557 - A**	**8.5 (8.0*)**	**133.5 (135.1*)**
⊠	**BH-05**	**1-5**	**SILTY SAND (SM), REDDISH BROWN**	**D1557 - A**	**8.6**	**131.7**
▲	***BH-07**	**5-10**	**SILTY SAND (SM), REDDISH BROWN**	**D1557 - A**	**8.0 (7.5*)**	**133.8 (135.6*)**

(*Rock correction: BH-02=5.80% and BH-07=5.89%)

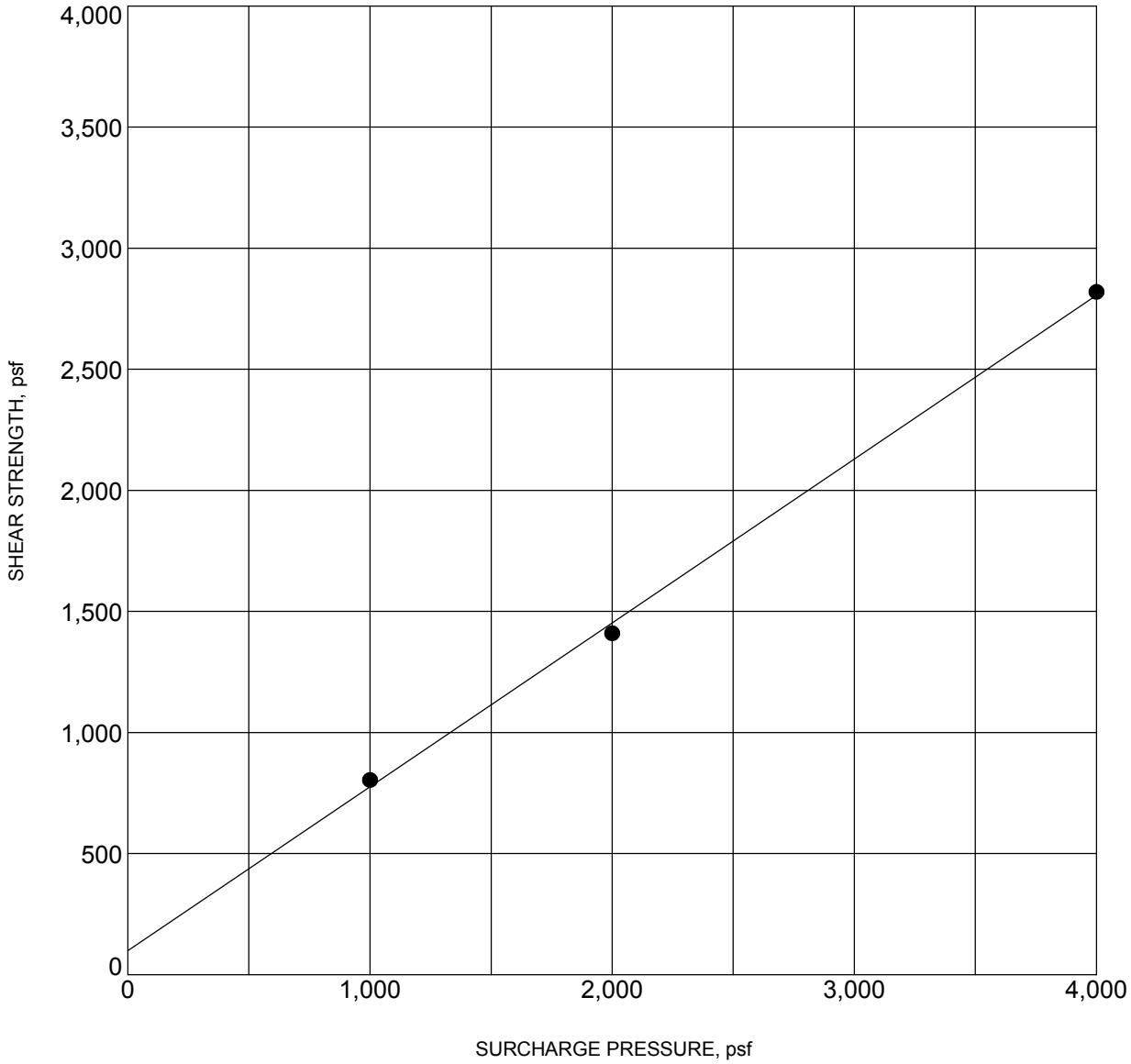
MOISTURE-DENSITY RELATIONSHIP RESULTS

Converse Consultants

The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Project No. **15-81-272-04**

Drawing No. **B-2**



BORING NO.	:	**BH-01**	DEPTH (ft)	:	**5.0-6.5**
DESCRIPTION	:	**SILTY SAND (SM)**			
COHESION (psf)	:	**100**	FRICTION ANGLE (degrees):		**34**
MOISTURE CONTENT (%)	:	**6.0**	DRY DENSITY (pcf)	:	**113.0**

NOTE: Ultimate Strength.

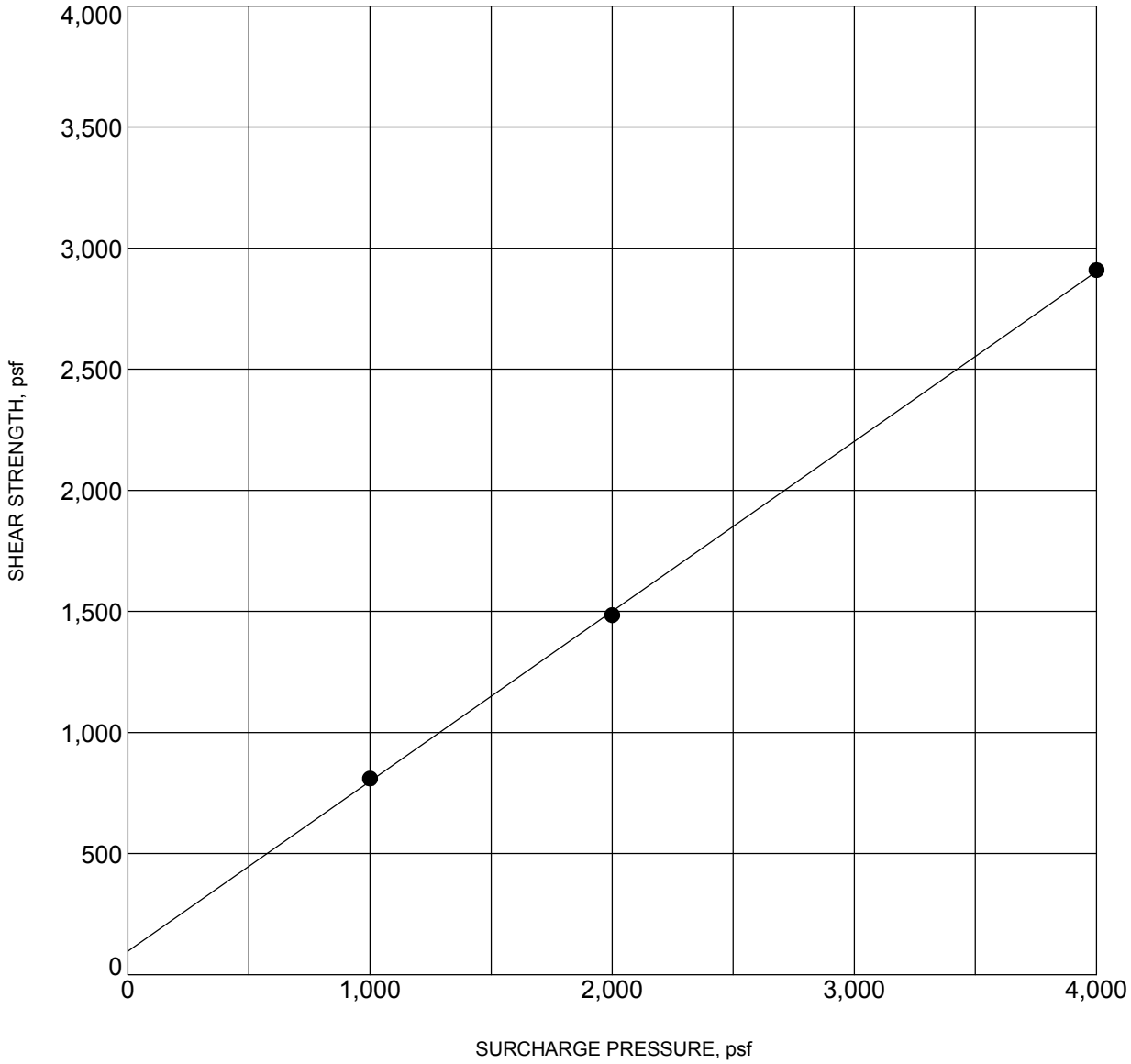
DIRECT SHEAR TEST RESULTS

Converse Consultants

The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Project No. **15-81-272-04**

Drawing No. **B-3**



BORING NO.	:	**BH-03**	DEPTH (ft)	:	**7.5-9.0**
DESCRIPTION	:	**SILTY SAND (SM)**			
COHESION (psf)	:	**100**	FRICTION ANGLE (degrees):		**35**
MOISTURE CONTENT (%)	:	**5.0**	DRY DENSITY (pcf)	:	**124.0**

NOTE: Ultimate Strength.

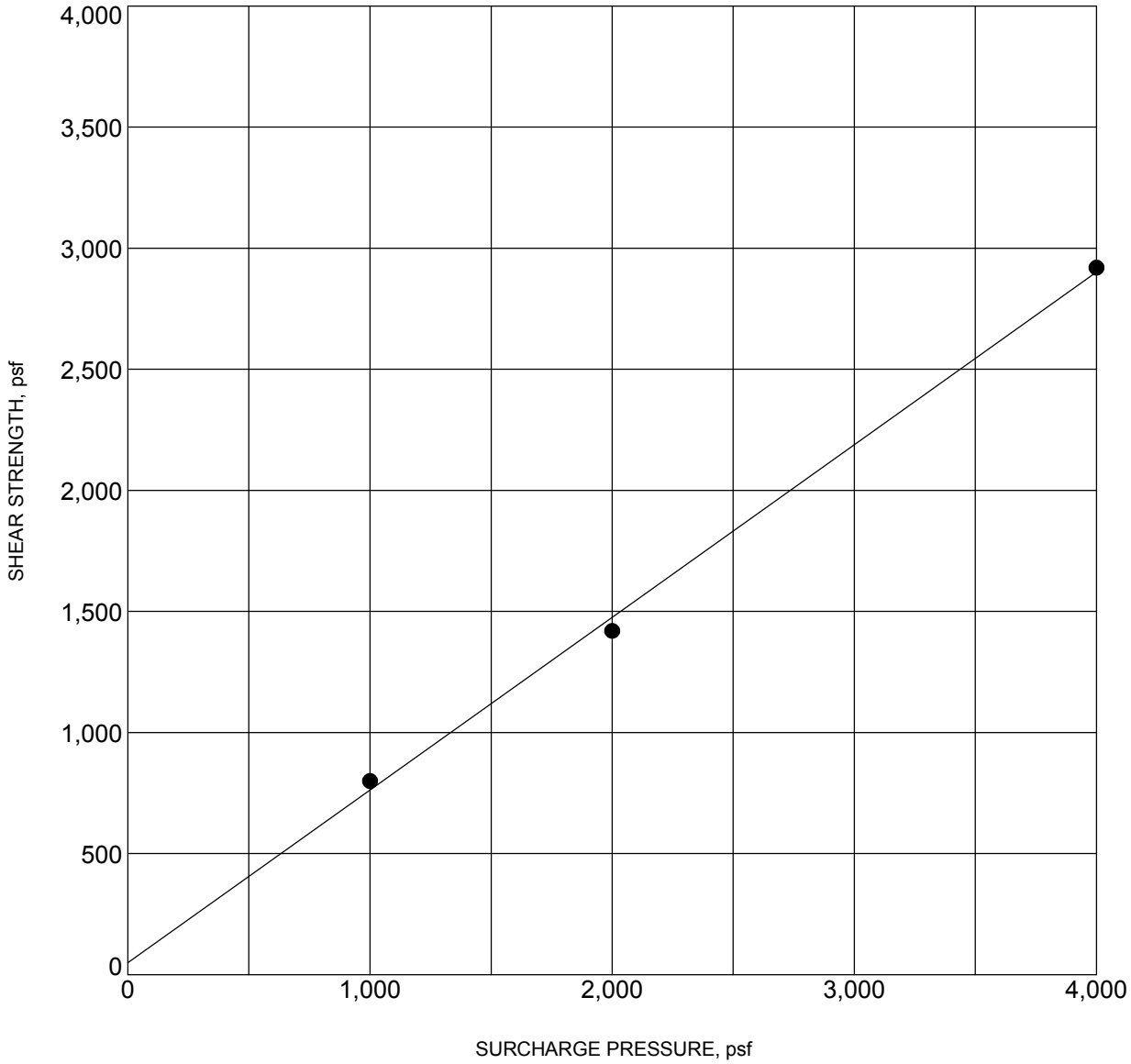
DIRECT SHEAR TEST RESULTS

Converse Consultants

The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Project No. **15-81-272-04**

Drawing No. **B-4**



BORING NO.	:	**BH-05**	DEPTH (ft)	:	**5.0-6.5**
DESCRIPTION	:	**SILTY SAND (SM)**			
COHESION (psf)	:	**50**	FRICTION ANGLE (degrees):		**35**
MOISTURE CONTENT (%)	:	**6.4**	DRY DENSITY (pcf)	:	**116.0**

NOTE: Ultimate Strength.

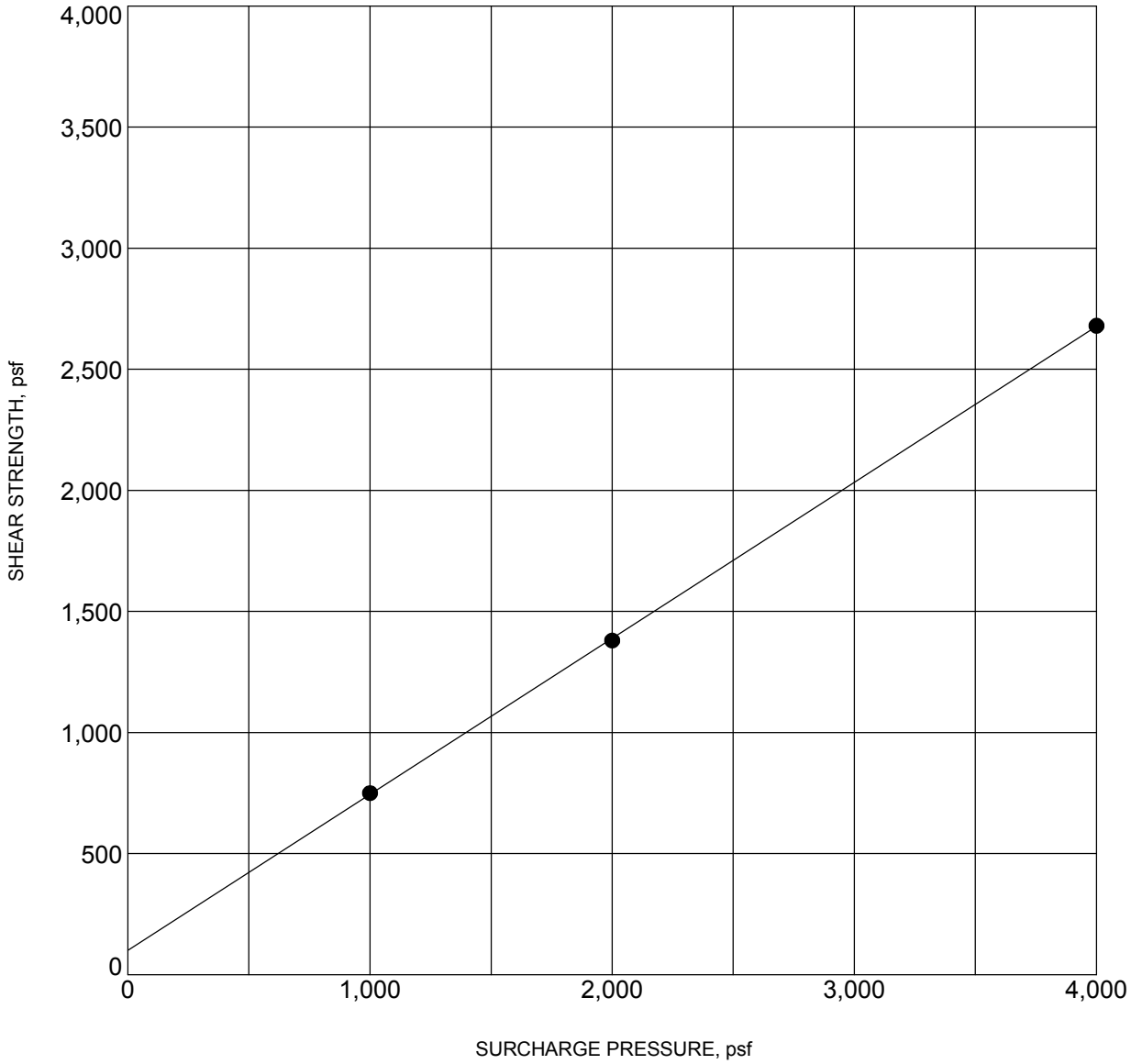
DIRECT SHEAR TEST RESULTS

Converse Consultants

The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Project No. **15-81-272-04**

Drawing No. **B-5**



BORING NO.	:	**BH-08**	DEPTH (ft)	:	**7.5-9.0**
DESCRIPTION	:	**SILTY SAND (SM)**			
COHESION (psf)	:	**100**	FRICTION ANGLE (degrees):		**33**
MOISTURE CONTENT (%)	:	**8.2**	DRY DENSITY (pcf)	:	**126.0**

NOTE: Ultimate Strength.

DIRECT SHEAR TEST RESULTS

Converse Consultants

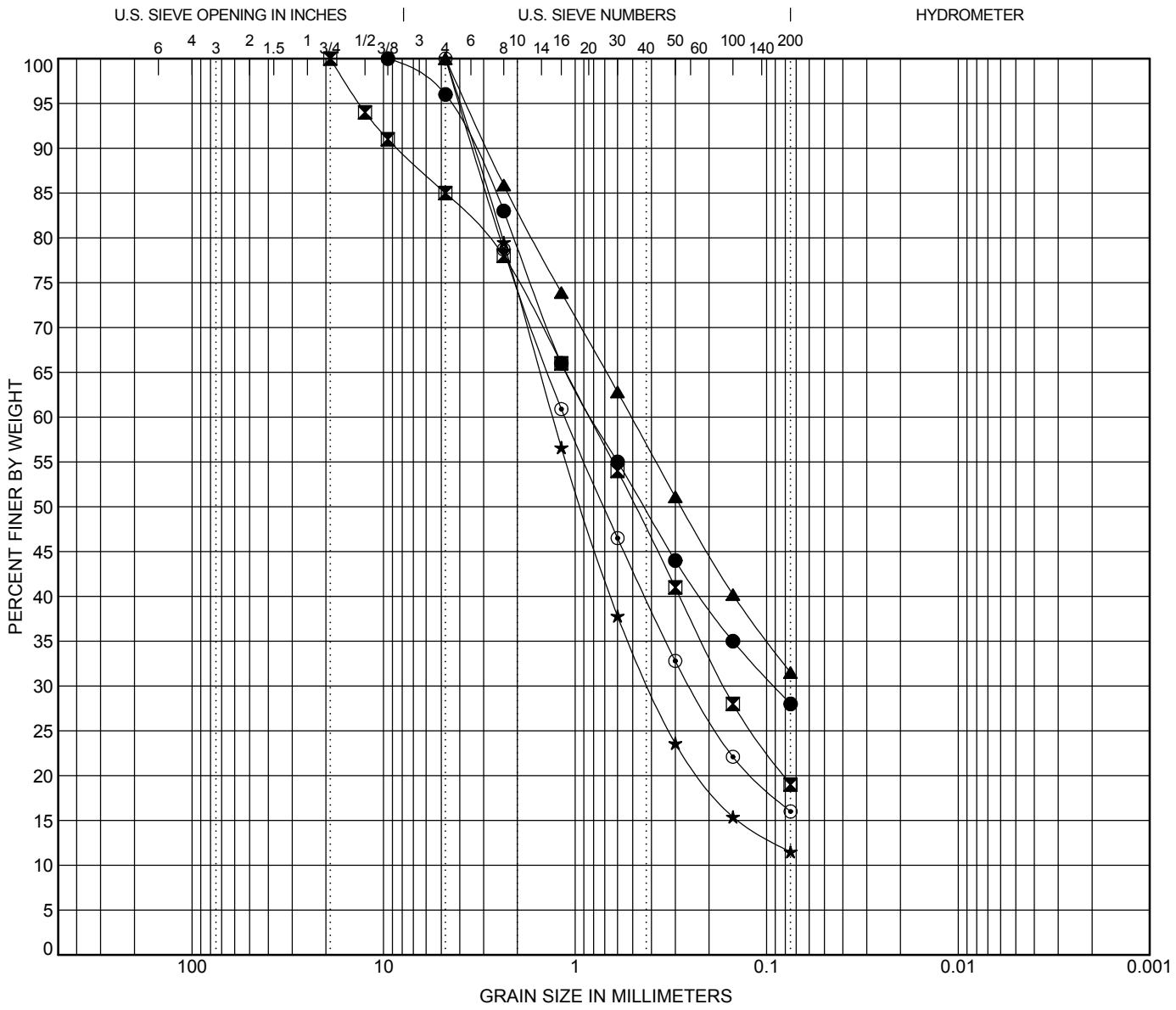
The Judson Transmission Main and Judson Tank Off-site Pipeline
City of Moreno Valley, Riverside County, CA
For:Eastern Municipal Water District (EMWD)

Project No. **15-81-272-04**

Drawing No. **B-6**

Appendix B-1

Previous Laboratory Testing Results (Converse, 2017)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring No.	Depth (ft)	Description	LL	PL	PI	Cc	Cu
●	**BH-1**	**1.0-5.0**	**Silty Sand (SM)**					
⊠	**BH-5**	**1.0-5.0**	**Silty Sand with Gravel (SM)**					
▲	**TP-1**	**1.0-4.0**	**Silty Sand (SM)**					
★	**TP-3**	**1.0-3.0**	**Sand with Silt (SP-SM)**				**2.24**	**22.77**
⊙	**TP-4**	**1.0-5.0**	**Silty Sand (SM)**					

	Boring No.	Depth (ft)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH-1**	**1.0-5.0**	**9.5**	**0.816**	**0.091**		**4.0**	**68.0**	**28.0**	
⊠	**BH-5**	**1.0-5.0**	**19**	**0.841**	**0.167**		**15.0**	**66.0**	**19.0**	
▲	**TP-1**	**1.0-4.0**	**4.75**	**0.508**			**0.0**	**68.5**	**31.5**	
★	**TP-3**	**1.0-3.0**	**4.75**	**1.308**	**0.41**		**0.0**	**88.5**	**11.5**	
⊙	**TP-4**	**1.0-5.0**	**4.75**	**1.131**	**0.25**		**0.0**	**84.0**	**16.0**	

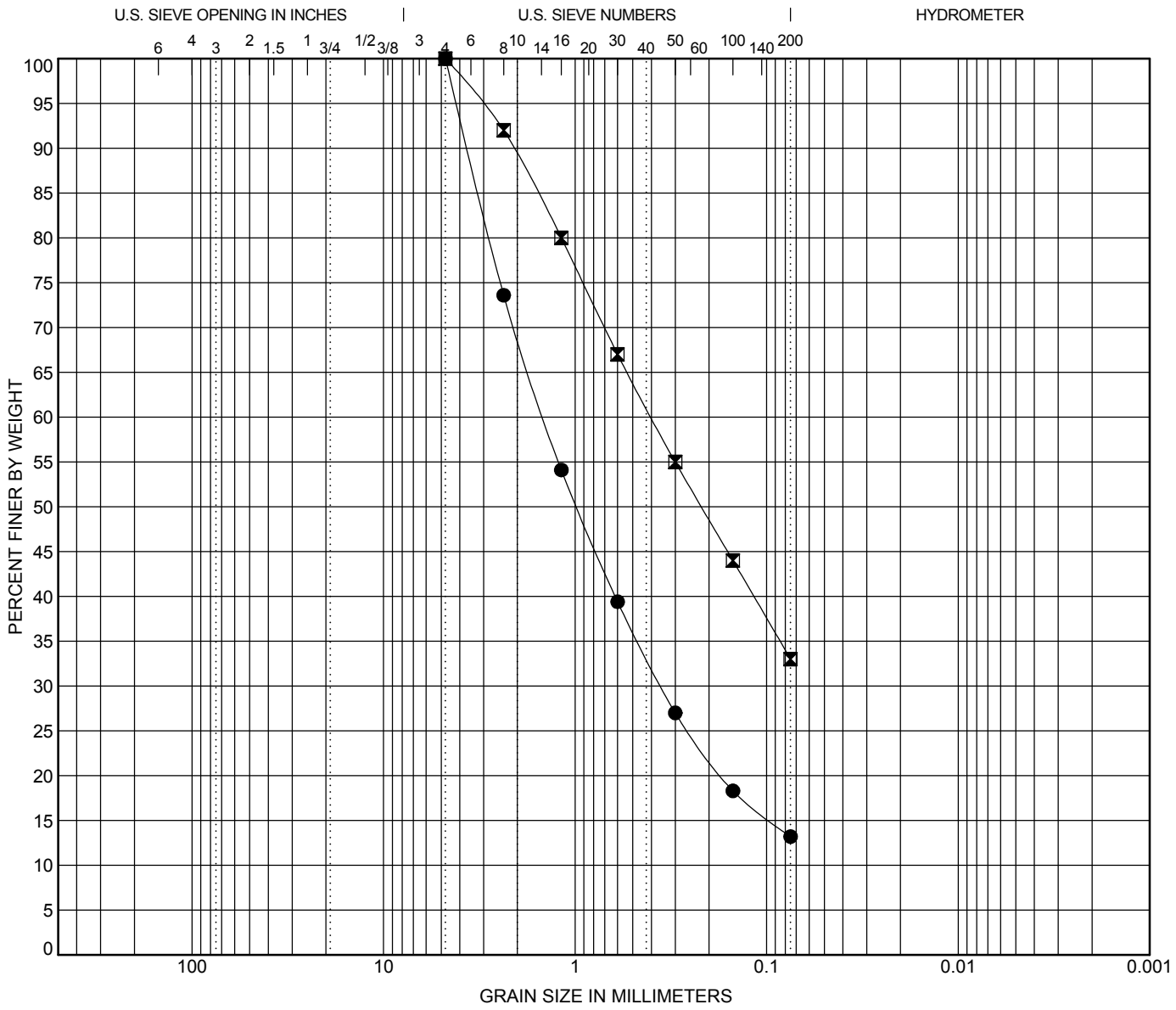
GRAIN SIZE DISTRIBUTION RESULTS

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. **15-81-272-02**

Drawing No. **B-1a**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring No.	Depth (ft)	Description	LL	PL	PI	Cc	Cu
●	**TP-5**	**0.0-2.0**	**Silty Sand (SM)**					
⊠	**TP-6**	**0.0-3.0**	**Silty Sand (SM), trace Clay**					

	Boring No.	Depth (ft)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**TP-5**	**0.0-2.0**	**4.75**	**1.455**	**0.355**		**0.0**	**86.8**	**13.2**	
⊠	**TP-6**	**0.0-3.0**	**4.75**	**0.4**			**0.0**	**67.0**	**33.0**	

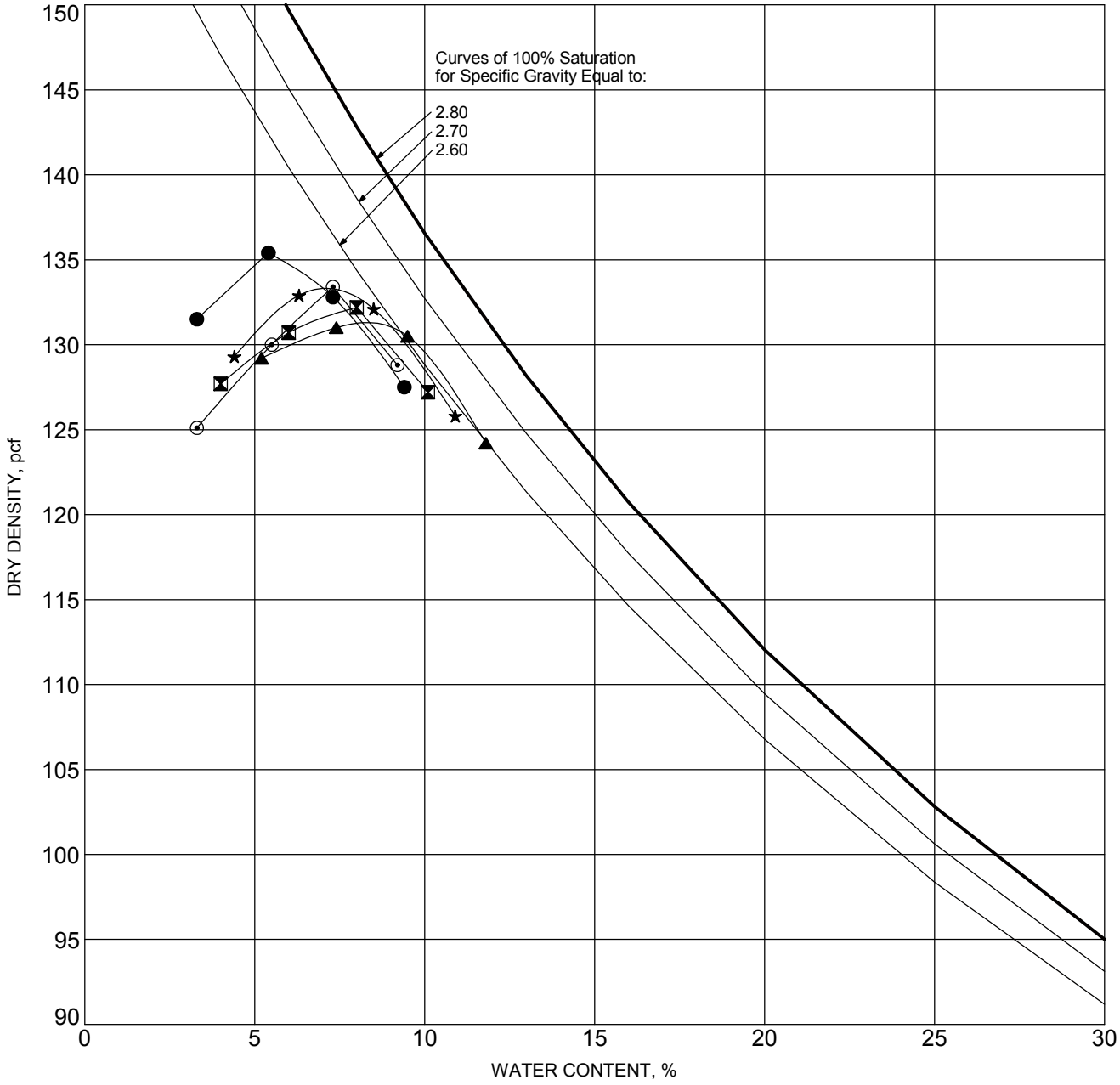
GRAIN SIZE DISTRIBUTION RESULTS

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. **15-81-272-02**

Drawing No. **B-1b**



SYMBOL	BORING NO.	DEPTH (ft)	DESCRIPTION	ASTM TEST METHOD	OPTIMUM WATER, %	MAXIMUM DRY DENSITY, pcf
●	**BH-1**	**1.0-5.0**	**Silty Sand (SM), Reddish Brown**	**D1557 - B**	**5.8**	**136.0**
⊠	**BH-5**	**1.0-5.0**	**Silty Sand with Gravel (SM), Reddish Brown**	**D1557 - B**	**7.5**	**132.7**
▲	**TP-1**	**1.0-4.0**	**Silty Sand (SM), Reddish-Brown**	**D1557 - B**	**8.8**	**131.5**
★	**TP-4**	**1.0-5.0**	**Silty Sand (SM), Reddish-Brown**	**D1557 - B**	**7.5**	**134.0**
⊙	**TP-6**	**0.0-3.0**	**Silty Sand (SM), trace Clay, Reddish Brown**	**D1557 - B**	**7.0**	**133.5**

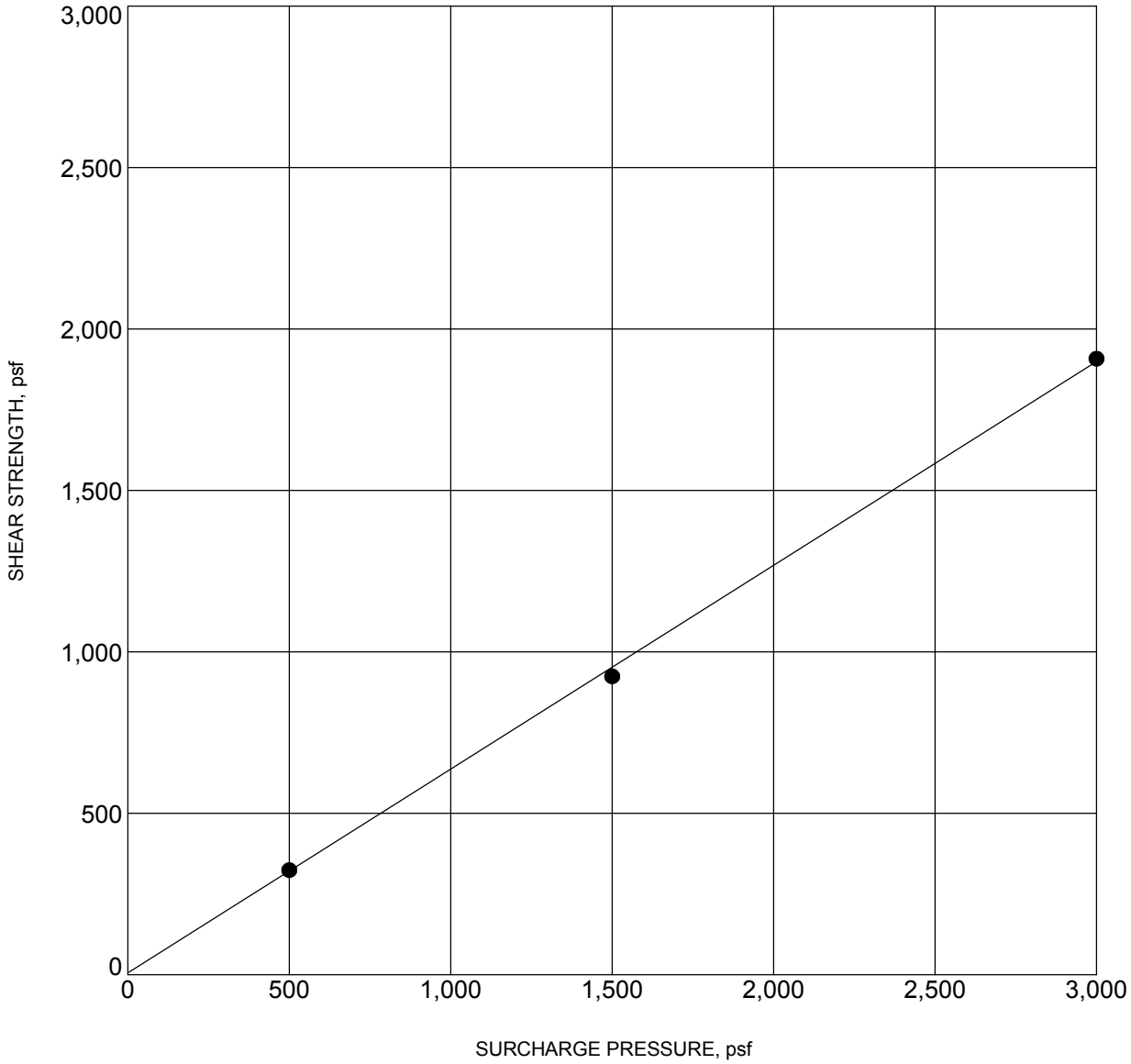
MOISTURE-DENSITY RELATIONSHIP RESULTS

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. **15-81-272-02**

Drawing No. **B-2**



BORING NO.	:	**BH-3**	DEPTH (ft)	:	**10.0-10.25**
DESCRIPTION	:	**Granitic Rock, Weathered to Silty Sand (SM)**			
COHESION (psf)	:	**0**	FRICTION ANGLE (degrees):		**32**
MOISTURE CONTENT (%)	:	**10.1**	DRY DENSITY (pcf)	:	**98.7**

NOTE: Ultimate Strength.

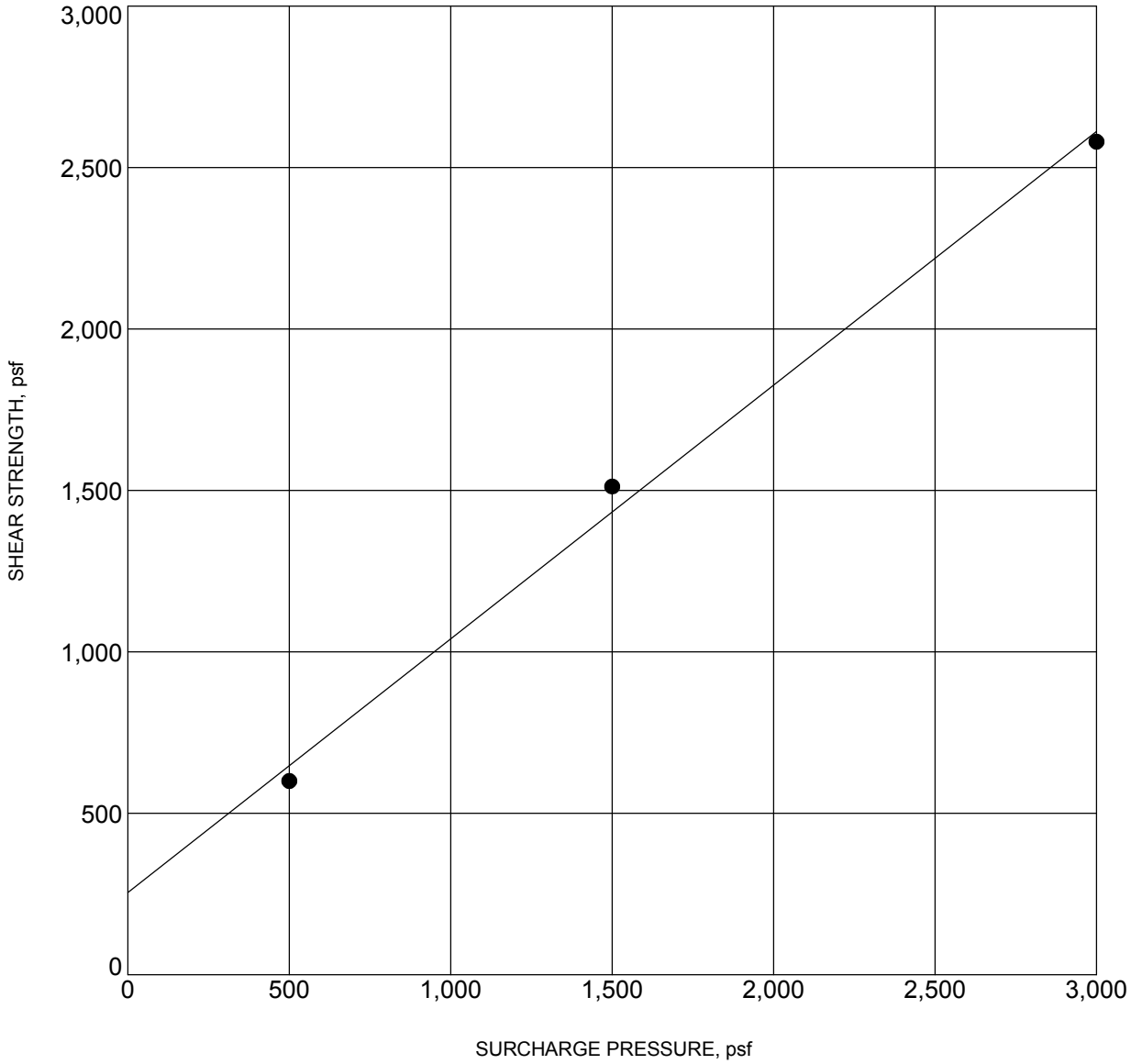
DIRECT SHEAR TEST RESULTS

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. **15-81-272-02**

Drawing No. **B-3**



BORING NO.	:	**BH-4**	DEPTH (ft)	:	**2.5-3.5**
DESCRIPTION	:	**Granitic Bedrock, Weathered to Silty Sand (SM)**			
COHESION (psf)	:	**260**	FRICTION ANGLE (degrees):		**38**
MOISTURE CONTENT (%)	:	**5.7**	DRY DENSITY (pcf)	:	**117.8**

NOTE: Ultimate Strength.

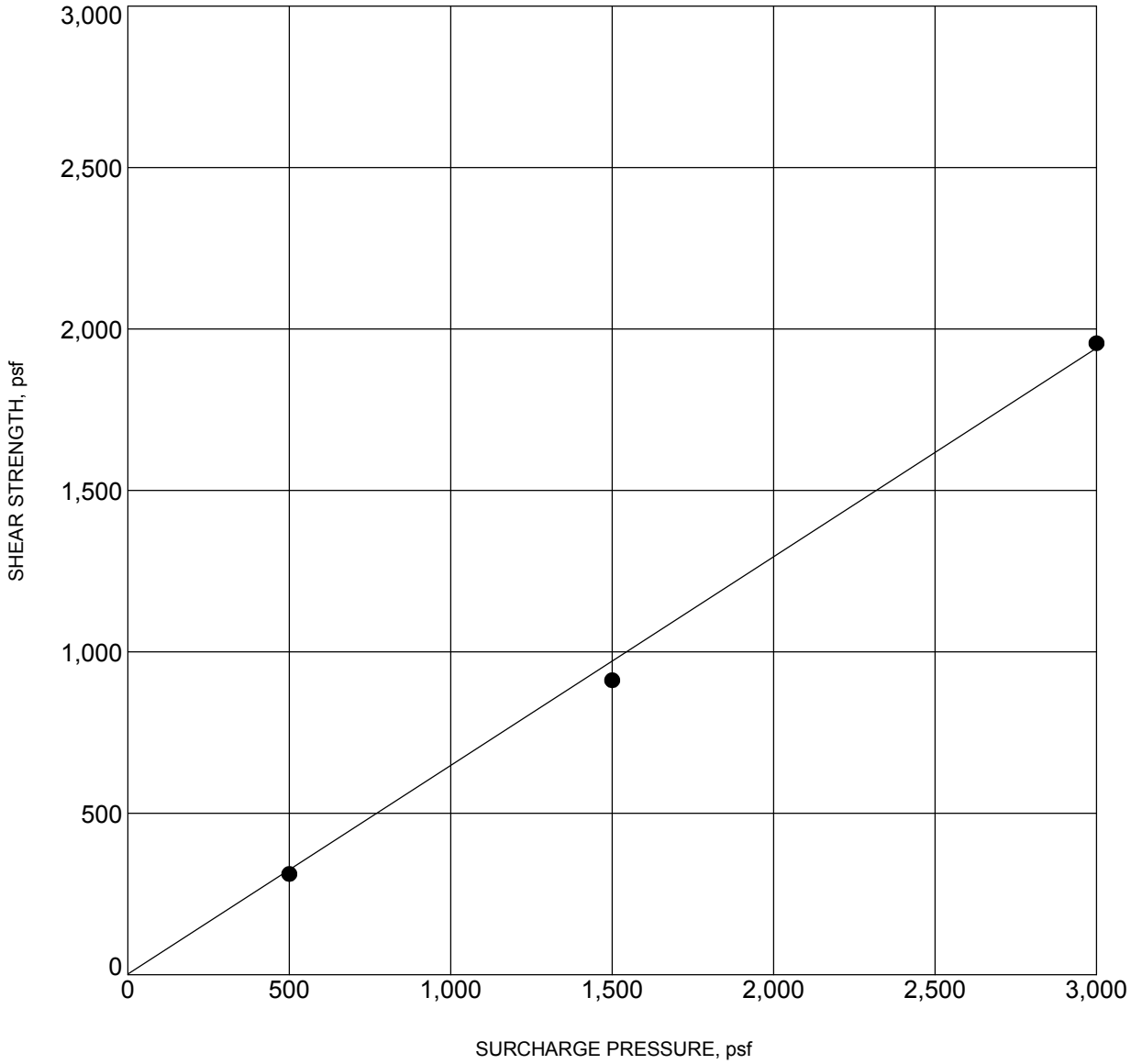
DIRECT SHEAR TEST RESULTS

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. **15-81-272-02**

Drawing No. **B-4**



BORING NO.	:	**BH-5**	DEPTH (ft)	:	**7.5-8.5**
DESCRIPTION	:	**Granitic Rock, Severely Weathered to Silty Sand (SM)**			
COHESION (psf)	:	**0**	FRICTION ANGLE (degrees):		**33**
MOISTURE CONTENT (%)	:	**12.8**	DRY DENSITY (pcf)	:	**105.8**

NOTE: Ultimate Strength.

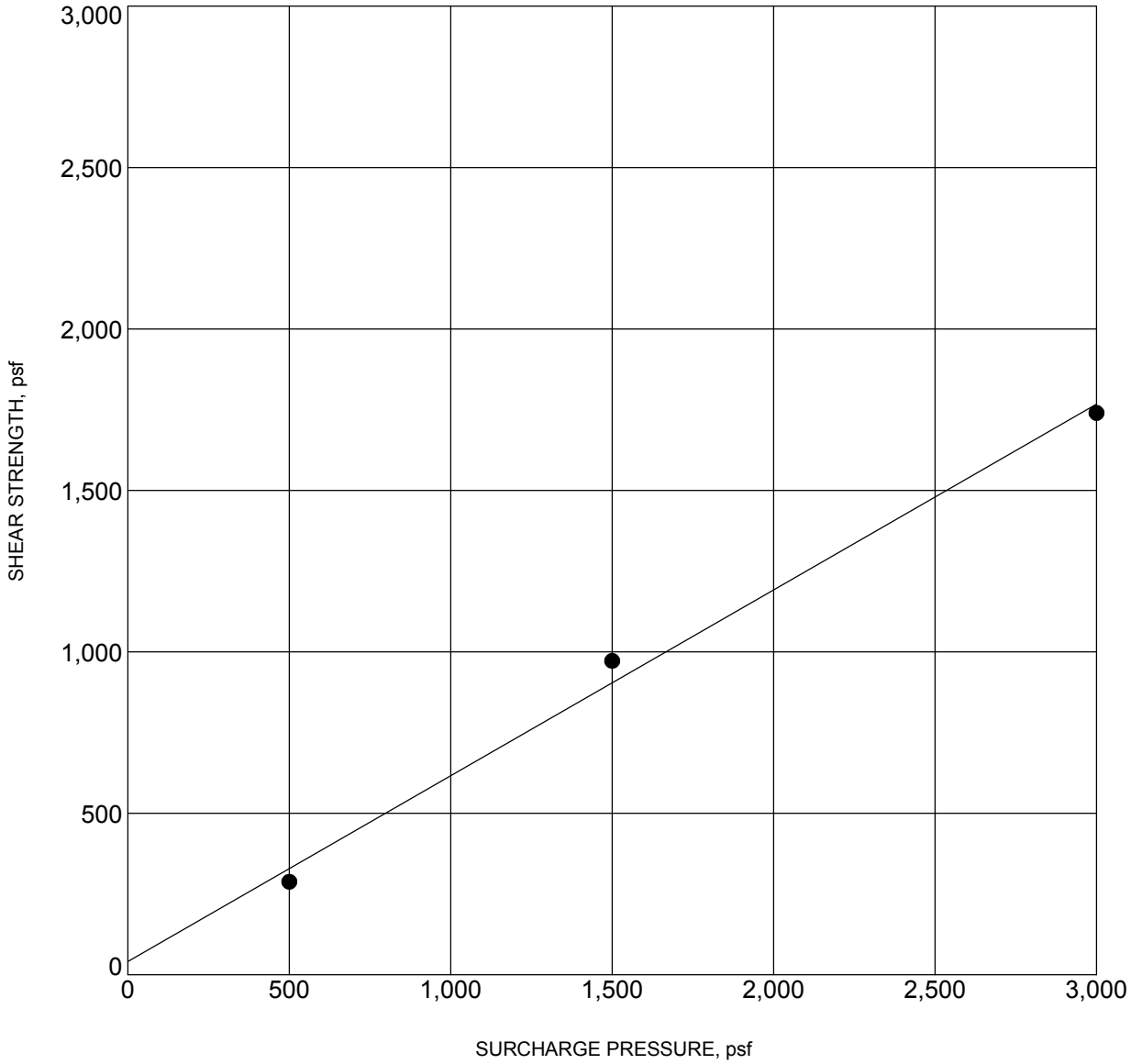
DIRECT SHEAR TEST RESULTS

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. **15-81-272-02**

Drawing No. **B-5**



BORING NO.	:	**TP-6**	DEPTH (ft)	:	**0.0-3.0**
DESCRIPTION	:	**Silty Sand (SM), trace Clay**			
COHESION (psf)	:	**40**	FRICTION ANGLE (degrees):		**30**
MOISTURE CONTENT (%)	:	**8.5**	DRY DENSITY (pcf)	:	**118.1**

NOTE: Ultimate Strength, Remolded to 90% of laboratory maximum dry density.

DIRECT SHEAR TEST RESULTS

Converse Consultants

MV 2060 Pressure Zone Portable Water Storage Tank
City of Moreno Valley, Riverside County, California
For: Albert A. Webb Associates

Project No. **15-81-272-02**

Drawing No. **B-6**

APPENDIX E: PALEONTOLOGICAL RESOURCE ASSESSMENT

Paleontological Resources Technical Report for the Eastern Municipal Water District Judson Transmission Pipeline Project, Moreno Valley, California

OCTOBER 2021

PREPARED FOR

Woodard & Curran

PREPARED BY

SWCA Environmental Consultants

PALEONTOLOGICAL RESOURCES TECHNICAL REPORT FOR THE EASTERN MUNICIPAL WATER DISTRICT JUDSON TRANSMISSION PIPELINE PROJECT, MORENO VALLEY, CALIFORNIA

Prepared for

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Attn: Haley Johnson

Prepared by

Mathew Carson, M.S., Project Paleontologist
and
Russell Shapiro, Ph.D., Principal Investigator

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SWCA Project No. 065264

October 2021

EXECUTIVE SUMMARY

Purpose and Scope: Woodard & Curran retained SWCA Environmental Consultants (SWCA) to conduct a paleontological resources assessment for the proposed Eastern Municipal Water District (EMWD) Judson Transmission Pipeline Project (project), situated within the City of Moreno Valley, California. The project would construct an 18-inch-diameter transmission pipeline within Perris Boulevard from the Robin Lane intersection in the south to an access road that leads to Casey Court storage tank in the north. The total proposed pipeline length is estimated to be 6,700 linear feet and would be constructed using open-cut trenching methods within paved roadway rights-of-way. The following study was conducted to analyze any potential impacts this project may have on paleontological resources located in the project site to comply with the California Environmental Quality Act (CEQA), local regulations, and best practices in paleontological mitigation. This report documents the methods and results of a paleontological resources assessment, which included a review of geologic maps, scientific literature, and confidential fossil locality records from the Natural History Museum of Los Angeles County (NHMLA), used to evaluate the likelihood of paleontological resources within the project site.

Dates of Investigation: SWCA received the results of a museum records search from the NHMLA on March 11, 2021.

Summary of Findings: The project site is directly underlain by Pleistocene older alluvial fan deposits (Qoa) and Holocene alluvial gravel and sand of stream channels (Qg). Additionally, Holocene alluvial sand, gravel, and clay of valley areas (Qa) may be present at the surface and/or subsurface, and Cretaceous plutonic rocks of the Peninsular Ranges (qdx) and Paleozoic or Mesozoic metasedimentary rocks (ms) may be present at shallow or unknown depths within the project area. The NHMLA records search indicated the museum has several localities in Pleistocene-aged sediments within vicinity of the project site; however, there are no museum records of fossil localities within the project site. A review of the scientific literature provided context for these and other fossil discoveries. Analysis of these data allowed the assignment of paleontological sensitivity using the Society of Vertebrate Paleontology (SVP) paleontological potential classes, such that Pleistocene older alluvial fan deposits have a High Potential; Holocene alluvial gravel and sand of stream channels and Holocene alluvial sand, gravel, and clay of valley areas both have a Low to High Potential, increasing with depth; and Cretaceous plutonic rocks of the Peninsular Ranges and Paleozoic and Mesozoic metasedimentary rocks have No Potential.

Conclusions and Recommendations: Because there is High Potential for the surficial or subsurficial geologic units to preserve fossils, this report contains measures designed to reduce potential impacts to less than significant levels. These measures include retaining a Project Paleontologist to implement paleontological mitigation measures that include full-time monitoring when ground-disturbing activities impact previously undisturbed sediments 5 feet below ground surface or deeper in areas mapped as Pleistocene old alluvial fan deposits, and part-time monitoring when ground-disturbing activities impact previously undisturbed sediments 5 feet below ground surface or deeper in areas mapped as Holocene alluvial gravel and sand of stream channels (or Holocene alluvial sand, gravel, and clay of valley areas) to check for the presence of older alluvial deposits with higher potential (monitoring is not required when ground-disturbances impact previously disturbed sediments and/or sediments less than 5 feet below ground surface, Cretaceous plutonic rocks of the Peninsular Ranges, and Paleozoic or Mesozoic metasedimentary rocks); conducting a Worker Environmental Awareness Program (WEAP); salvaging and curating any significant fossils encountered during project activities; and final reporting.

Disposition of Data: This report will be on file with EMWD, Woodard & Curran, and SWCA's Pasadena office.

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CONTENTS

Appendices

Figures

Tables

1 INTRODUCTION

Woodard & Curran retained SWCA Environmental Consultants (SWCA) to conduct a paleontological resources assessment for the proposed Eastern Municipal Water District (EMWD) Judson Transmission Pipeline Project (project), situated within Riverside County within the boundaries of the City of Moreno Valley, California (Figure 1). The following study was conducted to analyze any potential impacts this project may have on paleontological resources located in the project site to comply with the California Environmental Quality Act (CEQA), local regulations, and best practices in paleontological mitigation (Murphey et al. 2019). This report documents the methods and results of a paleontological resources assessment, which included a review of geologic maps, scientific literature, and confidential fossil locality records from the Natural History Museum of Los Angeles County (NHMLA), used to evaluate the likelihood of paleontological resources within the project site.

SWCA Project Paleontologist Mathew Carson, M.S., conducted the paleontological resources assessment presented herein and authored this report. SWCA Paleontological Principal Investigator Russell Shapiro, Ph.D., provided technical review of the report. Senior Biologist and Project Manager Jackie Worden served as project manager and provided additional quality assurance/quality control. Figures were generated by SWCA Geographic Information System (GIS) Specialist Marty Kooistra, M.A., RPA. Copies of the report are on file with SWCA's Pasadena office.

2 PROJECT DESCRIPTION

The project would construct an 18-inch-diameter steel potable water transmission pipeline and appurtenances within Perris Boulevard from the Robin Lane intersection in the south to approximately 550 feet south of the Heacock Street intersection at the Casey Court Tank access road in the north (Figure 2). The overall goal of the project is to improve operational efficiency of EMWD's potable water distribution system between existing Casey Tank and North Country Tank in the north and the future Judson Tank in the south. The project also aims to improve operational redundancy in EMWD's potable water system, specifically the Moreno Valley 2060 Pressure Zone. Operation of the proposed project would include conveyance of water between the Casey Court storage tank and future Judson storage tank to balance operating levels. The total proposed pipeline length is estimated to be 6,700 linear feet and would be constructed using open cut trenching methods within paved roadway rights-of-way. The total proposed disturbance width is anticipated to be up to 16 feet wide over the 6,700 linear feet to accommodate both the pipe trench, restoration detail, and resurfacing. The pipeline trench is expected to be up to 42 inches wide and 6-10 feet deep, with the City's restoration detail being 12 inches wide and 8 inches deep on either side of the trench. Additional areas of disturbance include up to two of the four alternative construction staging areas, with one situated at the southern end and one at the northern end. Each staging area would be between 0.5 and 1 acre in area and would be situated in vacant land with access to the project alignment, and if additional staging space is needed, staging would occur within the paved roadway rights-of-way.

The site has been previously disturbed at the surface to an unknown depth within the rights-of-way of Perris Boulevard. Topographically, the project site is situated along the strike of a broad alluvial fan emanating from a canyon wash of the northern mountains, with an elevation of approximately 1,920 feet above mean sea level. The project site is situated within Sections 19-20 and 30-32, Township 2 South, Range 3 West of the 1967 Sunnymead, California, U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 3).

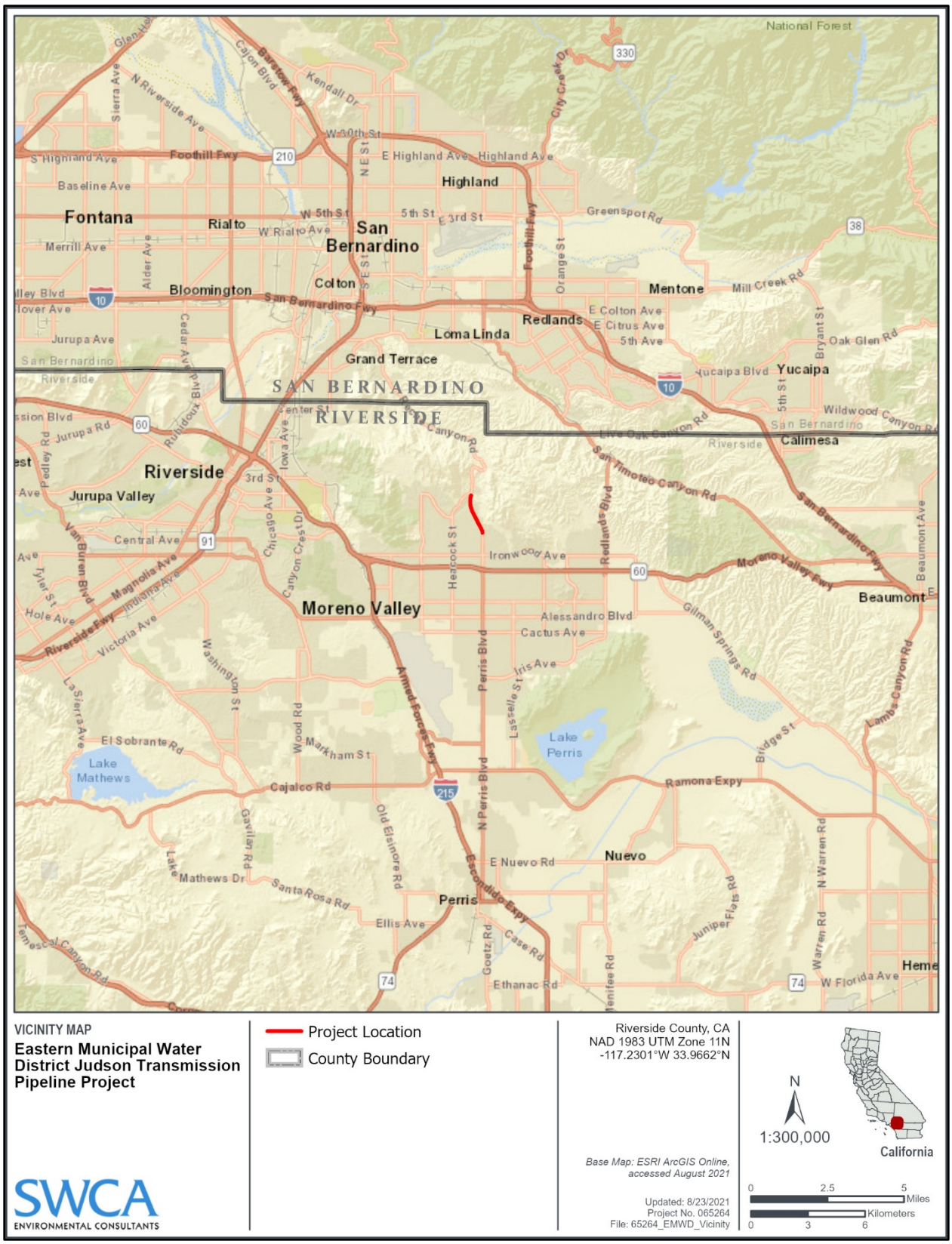

Figure 1. Project location within Riverside County.

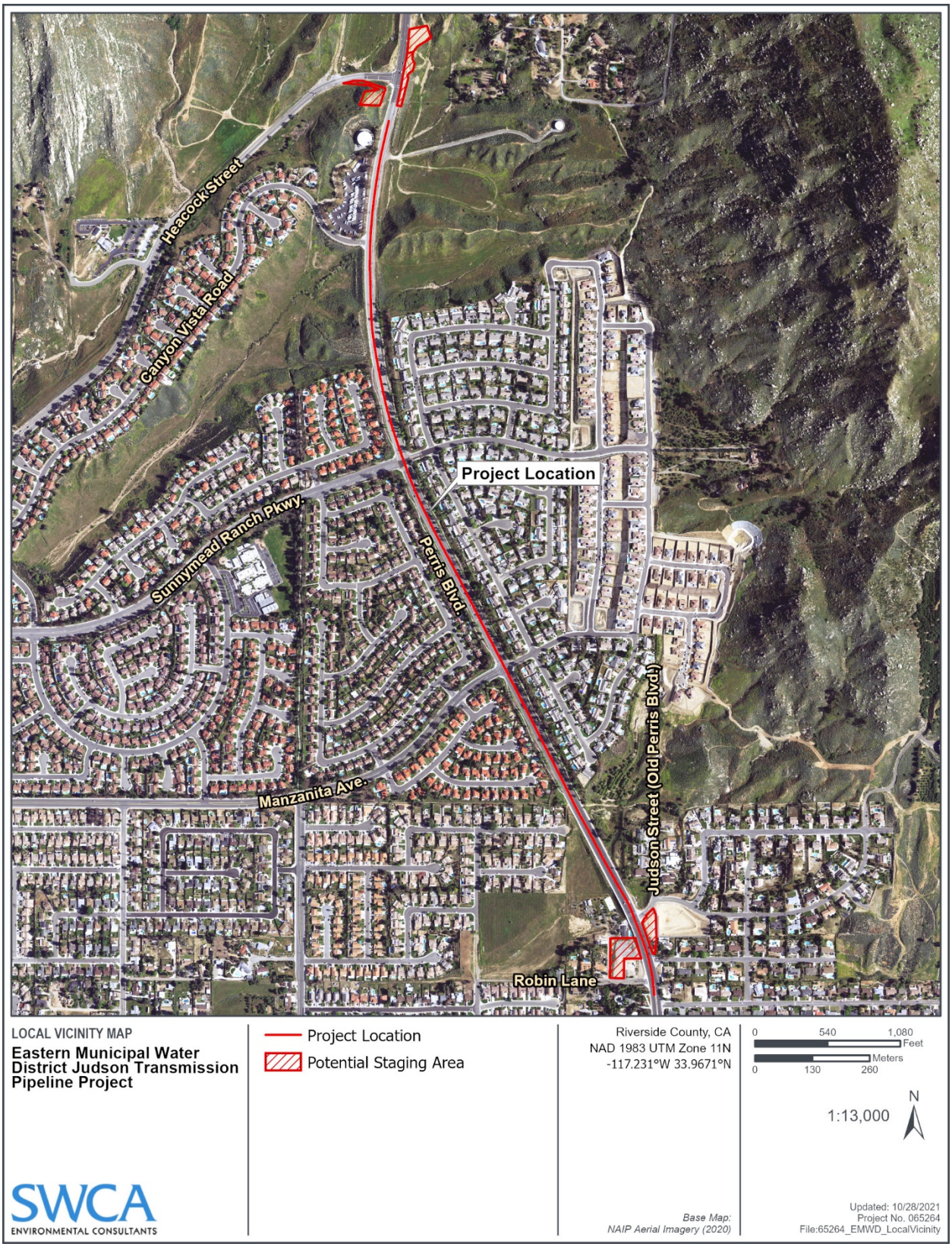

Figure 2. Project site plotted on a 2020 aerial photograph.

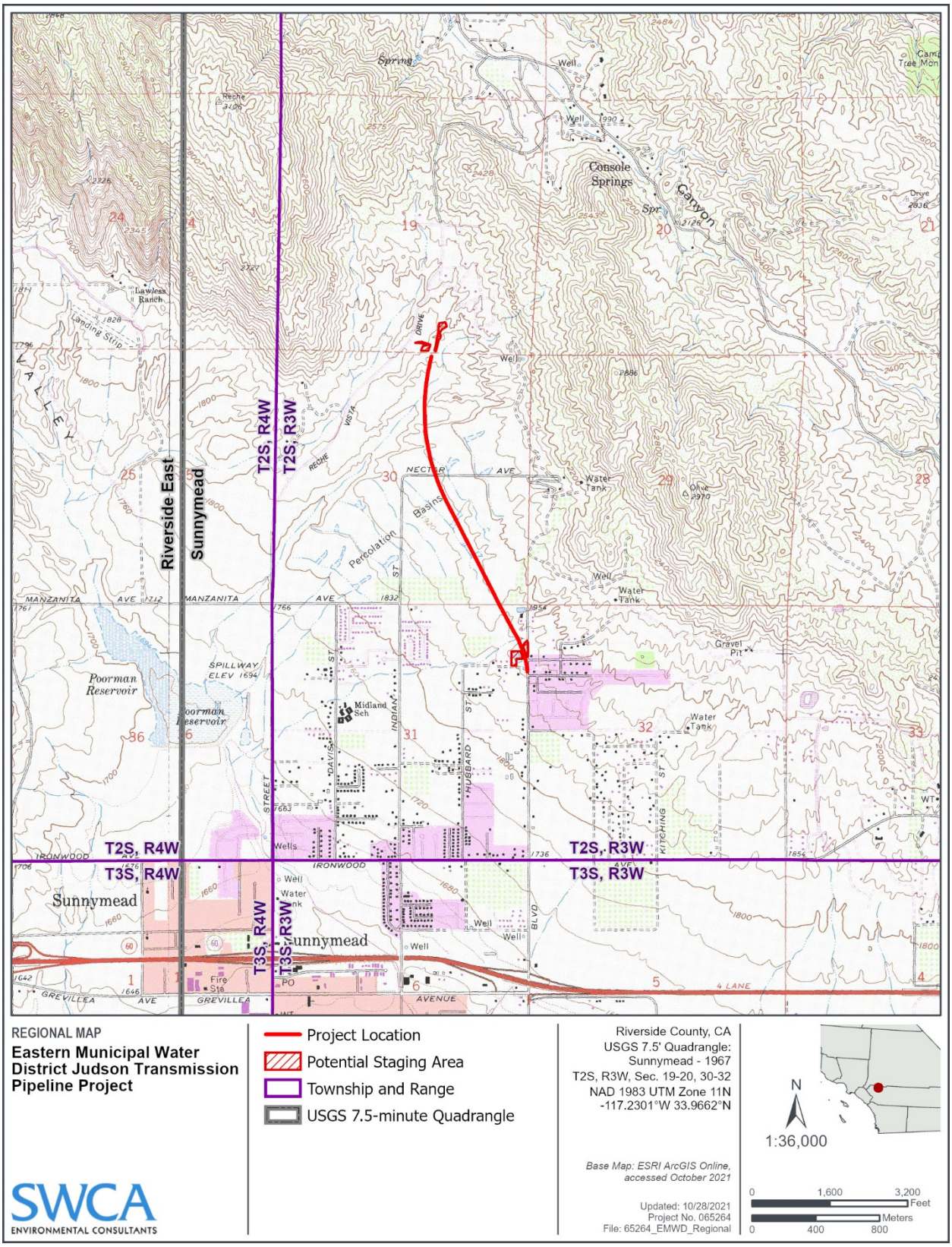

Figure 3. Project site plotted on USGS Sunnymead, California, 7.5-minute topographic quadrangle.

3 PROFESSIONAL STANDARDS

The Society of Vertebrate Paleontology (SVP) has established standard guidelines that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation (SVP 1995, 2010). Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological laws, ordinances, regulations, and standards accept and use the professional standards set forth by the SVP.

As defined by the SVP (2010:11), significant paleontological resources are

> fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years).

Numerous paleontological studies have developed criteria for the assessment of significance for fossil discoveries (e.g., Eisentraut and Cooper 2002; Murphey et al. 2019; Scott and Springer 2003). In general, these studies assess fossils as significant if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct;
2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life; or
5. The fossils are in short supply and/or are in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

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

> It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontological sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontological potential in each case. (SVP 1995:23)

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

In summary, paleontologists cannot know either the quality or quantity of fossils prior to natural erosion or human-caused exposure. As a result, even in the absence of fossils on the surface, it is necessary to assess the sensitivity of rock units based on their known potential to produce significant fossils elsewhere within the same geologic unit (both within and outside the study area), a similar geologic unit, or whether the unit in question was deposited in a type of environment known to be favorable for fossil preservation. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken to prevent adverse impacts to these resources.

4 REGULATORY SETTING

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under federal and state laws and regulations. This study satisfies project requirements in accordance with state and local regulations and was conducted as a means of characterizing the existing conditions consistent with the application of the screening criteria defined in Appendix G of the CEQA Guidelines (as amended December 28, 2018). This analysis also complies with guidelines and criteria specified by the SVP (2010) and follows best practices in mitigation paleontology (Murphey et al. 2019).

4.1 State Regulations

4.1.1 *California Environmental Quality Act*

CEQA is the principal statute governing environmental review of projects occurring in the state and is codified at Public Resources Code (PRC) Section 21000 et seq. CEQA requires lead agencies to determine if a proposed project would have a significant effect on the environment, including significant effects on paleontological resources. Guidelines for the Implementation of CEQA, as amended December 1, 2016 (Title 14, Chapter 3, California Code of Regulations 15000 et seq.), define procedures, types of activities, persons, and public agencies required to comply with CEQA. Section VII(f) of the Environmental Checklist asks whether a project would directly or indirectly destroy a unique paleontological resource and result in impacts to the environment.

4.1.2 *Public Resources Code Section 5097.5*

Requirements for paleontological resource management are included in PRC Division 5, Chapter 1.7, Section 5097.5, and Division 20, Chapter 3, Section 30244, which states:

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

These statutes prohibit the removal, without permission, of any paleontological site or feature from land under the jurisdiction of the state or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, local agencies are required to comply with PRC 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others. PRC Section 5097.5 also establishes the removal of paleontological resources as a misdemeanor and requires reasonable mitigation of adverse impacts to paleontological resources from developments on public (state, county, city, and district) land.

4.2 Local Regulations

4.2.1 *City of Moreno Valley General Plan*

The Conservation Element of the City of Moreno Valley General Plan contains one program regarding the mitigation of paleontological resources (City of Moreno 2006). Conservation Element Program 7-6 states:

> In areas where archaeological or paleontological resources are known or reasonably expected to exist, based upon citywide survey conducted by the [University of California, Riverside] Archaeological Research Unit, incorporate the recommendations and determinations of that report to reduce potential impacts to levels of significance.

5 METHODS

The following sections present an overview of the methodology used to analyze the potential for paleontological resources within the project site. This report conforms to industry standards as developed by the SVP (1995, 2010) and best practices in mitigation paleontology (Murphey et al. 2019). The purpose of this analysis is to 1) determine whether any previously recorded fossil localities occur in the project site; 2) if so, assess the potential for disturbance of these localities during construction; and 3) evaluate the paleontological potential of the project site.

5.1 Existing Data Analysis

SWCA conducted an analysis of available existing data pertinent to paleontological resources. This analysis included a review of geologic maps, scientific literature, and museum records search results. The geologic maps used in this analysis include one by Dibblee and Minch (2003) at a scale of 1:24,000. The museum records search was submitted to the NHMLA on March 11, 2021. The results of the museum records search were received on March 11, 2021, and are incorporated into the Results section of this report. A copy of the museum records search results from NHMLA is also included in a confidential Appendix A.

5.2 Paleontological Potential Classification

Paleontological potential is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In its "Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources," the SVP (2010:1–2)

defines four categories of paleontological sensitivity (potential) for rock units: high, low, undetermined, and no potential:

> **High Potential**. Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e.g., ash or tephra), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e.g., middle Holocene and older, fine-grained fluvial sandstone, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstone, fine-grained marine sandstone, etc.). Paleontological potential consists of both a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.
>
> **Low Potential**. Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e.g., basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.
>
> **Undetermined Potential**. Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.
>
> **No Potential**. Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection or impact mitigation measures relative to paleontological resources. (SVP 2010:1–2)

6 RESULTS

6.1 Regional Geology

The project area is located within the northern Peninsular Ranges Geomorphic Province, one of several geomorphic provinces situated within California with distinct geophysical characteristics, such as geologic history, topography, climate, vegetation, and other geomorphic attributes (Harden 2004; Norris and Webb 1990). The Peninsular Ranges Geomorphic Province is mostly located offshore but spans from

the Transverse Ranges Geomorphic Province on the north to the tip of Baja California on the south. It is bound on the east by the San Andreas Fault Zone, the Eastern Transverse Ranges, and the Colorado Desert and consists of northwest–southeast-trending faults that separate discrete structural blocks, with ranges, valleys, and coastal plains throughout the province (Hall 2007; Norris and Webb 1990; Yerkes et al. 1965). Within the Peninsular Ranges Geomorphic Province, the project area is situated within the northwestern portion of the Perris Block, bound on the north by the Cucamonga Fault Zone, on the east by the San Jacinto Fault Zone and San Jacinto Mountains Block, and on the west by the Elsinore Fault Zone and Santa Ana Mountains Block (Morton and Miller 2006). The Perris Block is a roughly rectangular area of low relief that has remained relatively stable and undeformed during the Neogene (Morton and Matti 2001). The block is underlain by Paleozoic to Mesozoic metasedimentary rocks intruded by Cretaceous plutons of the Peninsular Ranges Batholith. Within the Perris Block, the project site is situated along a large alluvial fan complex emanating from the northern adjacent mountains, composed of the Peninsular Ranges Batholith complex (Dibblee and Minch 2003, Morton and Matti 2001).

The geologic history of the Peninsular Ranges Geomorphic Province is marked by subduction of the Farallon Plate below the North American Plate; batholith formation, volcanism, and metamorphism; tectonic uplift and erosion; and deposition of nonmarine sediments in a broad plain (Norris and Webb 1990). When the Farallon Plate subducted below the North American Plate during the Jurassic and Cretaceous, hundreds of molten bodies of magma, called plutons, formed and coalesced into a few batholiths (large igneous intrusive bodies of molten rock, extending deep below the surface), forming a magmatic arc or intrusive granitic rocks, extrusive volcanic rocks, and metamorphosed rocks of pre-batholith age (Sylvester and O'Black Gans 2016). The presence of schist, quartzite, and marble, which represent alteration of the original marine continental shelf rocks deposited during the Paleozoic before the Farallon Plate collided with the North American Plate, suggests widespread metamorphism below the surface from contact of existing rocks with molten plutons (Dibblee and Morton 2003; Morton and Matti 2001; Norris and Webb 1990; Sylvester and O'Black Gans 2016). Throughout the Cretaceous, Paleogene, and Neogene, subsequent tectonic uplift of the plutonic batholith mountainous blocks resulted in erosion and deposition of sediments in down-dropped basins, such as those within the Perris Block (Morton and Matti 2001; Norris and Webb 1990; Sylvester and O'Black Gans 2016). Sediment deposition into lowland areas continued into the latest Neogene, resulting in variably thick, but flat, deposits of fluvial, lacustrine, and fan deposits (Morton and Matti 2001; Norris and Webb 1990; Sylvester and O'Black Gans 2016).

6.2 Local Geology and Paleontology

Geologic mapping by Dibblee and Minch (2003) indicates that the project area is directly underlain by Holocene alluvial gravel and sand of stream channels (Qg) and Pleistocene older alluvial fan deposits (Qoa) (Figure 4). Although not mapped by Dibblee and Minch (2003) within the bounds of the project area, Holocene alluvial sand, gravel, and clay of valley areas (Qa) is present within the vicinity of the project area and may be interbedded with deposits of Holocene alluvial gravel and sand of stream channels. Based on their proximity to the project area to the northwest, north, and east in the surrounding hills and mountains, geologic units classified as Cretaceous plutonic rocks of the Peninsular Ranges (qdx) and Paleozoic or Mesozoic metasedimentary rocks (ms) may be present at shallow or unknown depths within the project area. Therefore, Holocene alluvial sand, gravel, and clay of valley areas; Cretaceous plutonic rocks of the Peninsular Ranges; and Paleozoic or Mesozoic metasedimentary rocks are also included in this assessment.

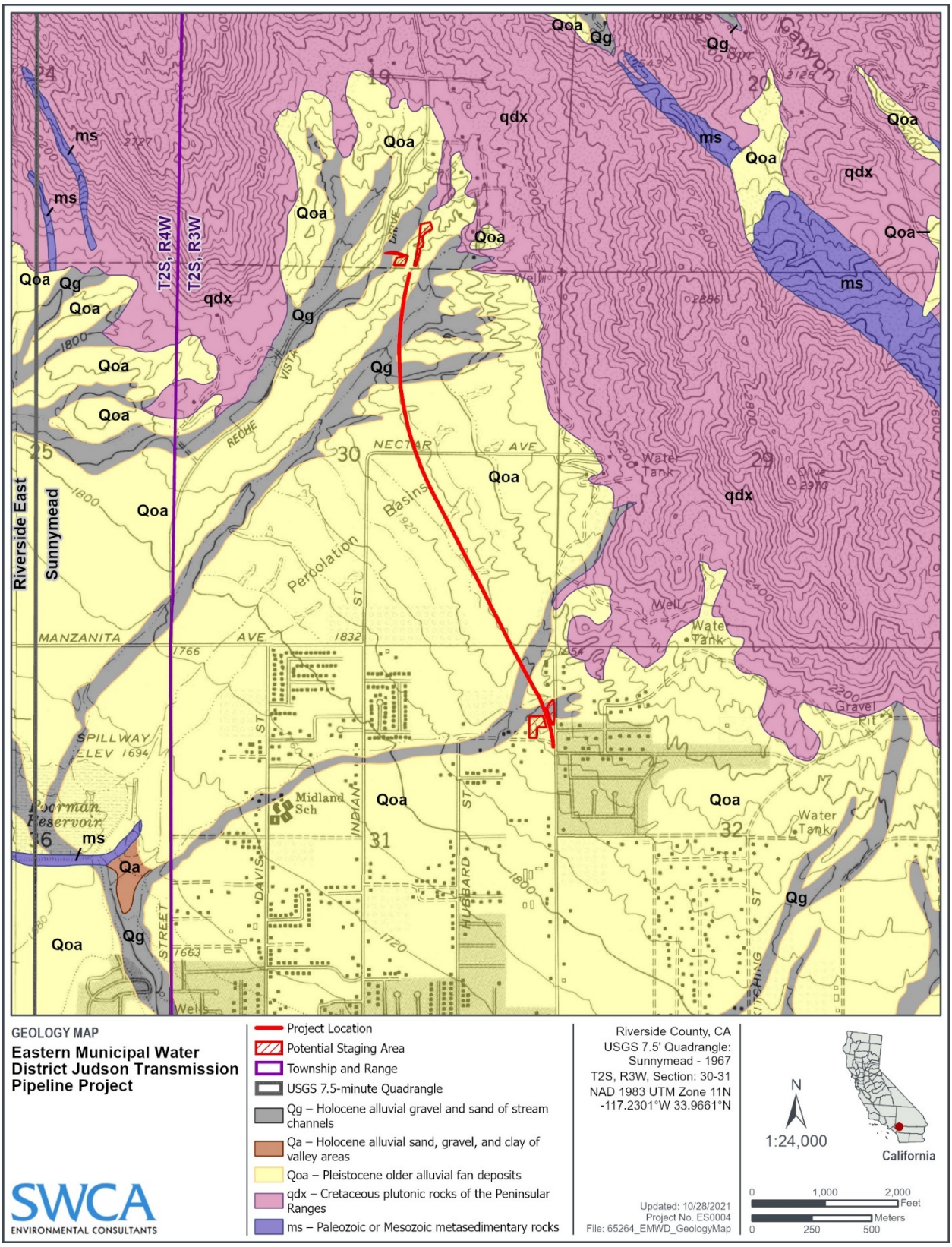

Figure 4. Geologic map of the project site and vicinity.

The following subsections present the geologic units that are present at the surface, or may be present in the subsurface, within the bounds of the project area. These geologic units are described in geochronological order below.

6.2.1 *Paleozoic or Mesozoic Metasedimentary Rocks*

According to geologic mapping by Dibblee and Minch (2003), Paleozoic or Mesozoic metasedimentary rocks (ms) are mapped to the northwest, north, and east of the project site (Figure 4). Although outside of the bounds of the project area, the proximity of the project area to the surrounding mountainous areas suggests that metasedimentary rocks may be present at shallow or unknown depths within the project area, underlying the surficial alluvial sediments. Metasedimentary rocks in this area are likely small remnants of Paleozoic-aged marine sediments (Dibblee and Minch 2003). They consist of mostly metamorphic rocks, such as biotite schist, a medium-grade metamorphic rock composed of medium to dark grey, fine-grained biotite schist to biotite-quartz-feldspar schist, with some rocks in this unit characterized as gneiss, a high-grade metamorphic rock (Dibblee and Minch 2003; Morton and Matti 2001). This metasedimentary rocks in this region are heavily migmatized, with enclosed plutonic rocks and migmatite features (Dibblee and Minch 2003).

Metasedimentary and metamorphic rocks are formed under high heat and/or high pressure. The extreme conditions in which they form are not conducive to fossil preservation since any fossils that may have been present in the original sedimentary rocks would now be destroyed by the recrystallization and diagenetic processes that occurred in the unit during metamorphism. Although paleontologists have previously identified and recovered preserved fossils from metasedimentary or low-grade metamorphic rocks, metasedimentary rocks that may be present under the project area likely represent moderate- to high-grade metamorphosed rocks based on geologic descriptions from other authors (Morton and Matti 2001; Morton and Miller 2006), suggesting fossil preservation to be highly unlikely.

6.2.2 *Cretaceous Plutonic Rocks of the Peninsular Ranges*

According to geologic mapping by Dibblee and Minch (2003), Cretaceous plutonic rocks of the Peninsular Ranges (qdx) are mapped to the northwest, north, and east of the project site (see Figure 4). Although outside of the bounds of the project area, the proximity of the project area to the surrounding mountainous areas suggests that plutonic rocks of the Peninsular Ranges may be present at shallow or unknown depths within the project area, underlying the surficial alluvial sediments. Plutonic rocks of the Peninsular Ranges consist of xenolith-rich quartz diorite to granodiorite, composed of varying proportions of quartz, sodic plagioclase feldspar, minor potassium feldspar, biotite, and hornblende, which sometimes form gneissoid structures (Dibblee and Minch 2003; Morton and Matti 2001; Morton and Miller 2006).

Plutonic rocks of the Peninsular Ranges formed from the cooling of molten rock deep below the surface, below the habitable zone of living organisms. Due to the high heat, high pressure, and depth below the surface in which this geologic unit formed, paleontological resources would not be present within this unit.

6.2.3 *Pleistocene Older Alluvial Fan Deposits*

According to geologic mapping by Dibblee and Minch (2003), the project area is directly underlain by Pleistocene older alluvial fan deposits (Qoa), which consist of weakly to well indurated alluvial fan deposits derived from local plutonic rocks (see Figure 4). These older alluvial fan deposits may be equivalent to the degraded Pleistocene "Paloma surface" (Morton and Matti 2001). Older alluvial fan deposits consist of tan to light reddish-brown sand and minor gravel, with top surfaces sloping more than

40 feet per 0.7 mile from the source terrains and are dissected by stream channels flowing from the surrounding higher elevations (Dibblee and Minch 2003). Morton and Matti (2001) note that deposits on older erosional surfaces lack diagnostic features and that they may or may not be alluvial fan deposits. Nonetheless, alluvial fan deposits are widespread throughout northern and southern Moreno Valley and may have as much as 10 feet of moderately developed to well-developed pedogenic soil overlying them throughout the region (Morton and Matti 2001). The age of the older alluvium is roughly early Pleistocene, based on a paleomagnetic study of a core collected nearby at March Air Force Base, where old alluvial deposits date to 780,000 years ago at approximately 10 feet below the top of the degraded "Paloma surface", and based on a drilling investigation in Romoland, where a volcanic tuff underlying the old alluvial fan deposits at depths of approximately 10 feet below ground surface date to 3.3 million years old (Morton and Miller 2006). Older alluvial fan deposits are directly underlain by basement plutonic rocks of the Peninsular Ranges; however, the depth to the underlying basement rock is unknown but possibly shallow based on the proximity of the project area to the surrounding mountains composed of plutonic rocks of the Peninsular Ranges.

In general, Pleistocene terrestrial alluvial deposits have a rich fossil history in southern California (Brattstrom 1961; Jefferson 1991a, 1991b; McDonald and Jefferson 2008; Miller 1971; Paleobiology Database 2021; Reynolds and Reynolds 1991; Springer et al. 2009; University of California Museum of Paleontology [UCMP] 2021). Within Riverside County, Pleistocene fossil localities have yielded horses, tapirs, camels, llamas, deer, bison, pronghorn, peccaries, mammoths, mastodons, ground sloths, saber-toothed cats, American lions, short-faced bears, dire wolves, coyotes, foxes, rabbits, rodents, tortoises, turtles, and other vertebrates (Dooley et al. 2019; Jefferson 1991a; Paleobiology Database 2021; UCMP 2021). Within the vicinity of Moreno Valley, Pleistocene fossil localities have yielded various rodents, including voles and pack rats; reptiles, such as the tortoises; and proboscideans, including mammoths and mastodons (Dooley et al. 2019; UCMP 2021). Pleistocene fossil localities in the area have also yielded invertebrates, such as gastropods, as well as plants and pollen (Sohl and Kollman 1985; UCMP 2021). Additionally, the UCMP (2021) online fossil locality database contains numerous records of fossil localities recovered from Riverside County from named geologic units spanning the Irvingtonian to Rancholabrean North American Land Mammal Ages of the Pleistocene.

6.2.4 *Holocene Alluvial Sand, Gravel, and Clay of Valley Areas*

According to geologic mapping by Dibblee and Minch (2003), Holocene alluvial sand, gravel, and clay of valley areas (Qa) is mapped to the west-southwest of the project site (see Figure 4). Although outside of the bounds of the project area, these deposits may be present at shallow or unknown depths within the project area, overlying the Pleistocene older alluvial fan deposits (Qoa), and/or underlying or interbedded with Holocene alluvial gravel and sand of stream channels (Qg). These deposits are presumably late Holocene in age but may extend to late Pleistocene at depth (Dibblee and Minch 2003; Morton and Matti 2001). Although the depth to the underlying Pleistocene older alluvial fan deposits is unknown, the contact between the overlying Holocene alluvial sand, gravel, and clay of valley areas and underlying Pleistocene sediments is likely shallow based on the proximity of these deposits from their source along the mountains to the northwest, north, and east of the project area.

Late Holocene alluvial deposits are typically too young (i.e., less than 5,000 years old) to contain significant paleontological resources; however, they may grade at shallow or unknown depths to middle-early Holocene to late Pleistocene deposits that have the potential to contain significant paleontological resources.

6.2.5 *Holocene Alluvial Gravel and Sand of Stream Channels*

According to geologic mapping by Dibblee and Minch (2003), the project area is directly underlain by Holocene alluvial gravel and sand of stream channels (Qg) (see Figure 4), which consists of gray, arenaceous, unconsolidated alluvium composed of fine-grained sand and silt with gravel (Morton and Matti 2001). These deposits represent young axial channels, which are poorly lithified and undissected, and are found in many drainages emanating from the mountains on the north side of Moreno Valley (Morton and Matti 2001). These deposits are presumably late Holocene in age but may extend to late Pleistocene at depth (Dibblee and Minch 2003; Morton and Matti 2001). Although the depth to the underlying Pleistocene older alluvial fan deposits is unknown, the contact between the overlying Holocene alluvial gravel and sand of stream channels and underlying Pleistocene sediments is likely shallow, based on the proximity of these deposits from their source along the mountains to the northwest, north, and east of the project area.

Late Holocene alluvial deposits are typically too young (i.e., less than 5,000 years old) to contain significant paleontological resources; however, they may grade at shallow or unknown depths to middle-early Holocene to late Pleistocene deposits that have the potential to contain significant paleontological resources.

6.3 Museum Records Search

The NHMLA performed a museum records search for paleontological localities within the vicinity of the project site. Based on the results of the museum records search, the NHMLA does not contain records of paleontological resources from within the project site; however, several fossil localities have been recorded within the vicinity of the project site from unknown/unnamed Pleistocene geologic units. Vertebrate fossil locality LACM VP 7811, situated approximately 5 miles from the project area, has yielded whip snake (*Masticophis*) from depths of 9 to 11 feet below ground surface. Vertebrate fossil localities LACM VP 1207 and LACM VP 6059, situated in different directions approximately 22 miles from the project site, have yielded bovine (Bovidae) and camel (Camelidae), respectively, from unspecified depths. Invertebrate fossil locality LACM IP 437, also situated approximately 22 miles away from the project site, yielded invertebrates, such as insect (*Sobobapteron kirkbaye*) and brachiopod (*Terebratalia hemphili*) from unspecified depths. The furthest fossil locality reported by NHMLA, LACM VP 7261, is approximately 27 miles from the project site; this locality yielded proboscideans (Proboscidea) and hooved mammals (Ungulata) (NHMLA 2021). The results of the museum records search are summarized in Table 1.

Table 1. NHMLA Fossil Localities near the Project Site

Locality Number	Approximate distance to the project site (miles)	Formation	Taxa	Depth (below ground surface)
LACM VP 7811	5 miles	Unknown formation (eolian, tan silt, Pleistocene)	Whip snake (*Masticophis*)	9 to 11 feet
LACM VP 1207	22 miles	Unknown formation (Pleistocene)	Bovine family (Bovidae)	Unknown
LACM IP 437	22 miles	Unknown formation (Pleistocene)	Invertebrates – insect (*Sobobapteron kirkbaye*), brachiopod (*Terebratalia hemphili*)	Unknown
LACM VP 6059	22 miles	Unknown formation (Pleistocene)	Camel (Camelidae)	Unknown
LACM VP 7261	27 miles	Unknown formation (Pleistocene, arenaceous silt)	Elephant family (Proboscidea), ungulate (i.e., hooved) mammal (Ungulata)	Unknown

Source: NHMLA (2021)

6.4 Paleontological Potential of the Project Area

The Moreno Valley General Plan Final Program Environmental Impact Report (City of Moreno Valley 2006) presents a map of paleontological resource sensitivity within the City of Moreno Valley. Based on this map (Figure 5.10-3: Paleontologic Resource Sensitive Areas), the project area is within an area of Low Potential (City of Moreno Valley 2006); however, an analysis of existing data and project-specific information presented in this report permits a refinement of the paleontological potential of the project area. Based on an analysis of available existing data, including geologic maps, scientific literature, and museum records search results, SWCA determined the paleontological potential of the geologic units underlying the project site, either at the surface or in the subsurface, ranges from No Potential to High Potential (Figure 5).

Due to the high heat, high pressure, and/or substantial depths at which they form, Cretaceous plutonic rocks of the Peninsular Ranges (qdx) and Paleozoic or Mesozoic metasedimentary rocks (ms) have No Potential for paleontological resources (SVP 2010). Pleistocene older alluvial fan deposits (Qoa) throughout Riverside County, including the Moreno Valley area, have yielded numerous significant paleontological resources, such as vertebrates, invertebrates, and plants, as corroborated by the results of the museum records search from the NHMLA (2021). Therefore, Pleistocene older alluvial fan deposits have a High Potential for paleontological resources (SVP 2010). Holocene alluvial sand, gravel, and clay of valley areas (Qa) and Holocene alluvial gravel and sand of stream channels (Qg) may be underlain by Pleistocene older alluvial fan deposits at shallow depths based on the proximity of these deposits to their source along the mountains to the northwest, north, and east of the project area. Although late Holocene alluvial deposits are typically too young (i.e., less than 5,000 years old) to contain significant paleontological resources, they may be underlain by middle-early Holocene to Pleistocene sediments that have a High Potential. Therefore, both Holocene alluvial sand, gravel, and clay of valley areas and Holocene alluvial gravel and sand of stream channels have a Low to High Potential, increasing with depth, for paleontological resources (SVP 2010). The paleontological potential of the geologic units within the project site, either at the surface or at depth, are summarized in Table 2.

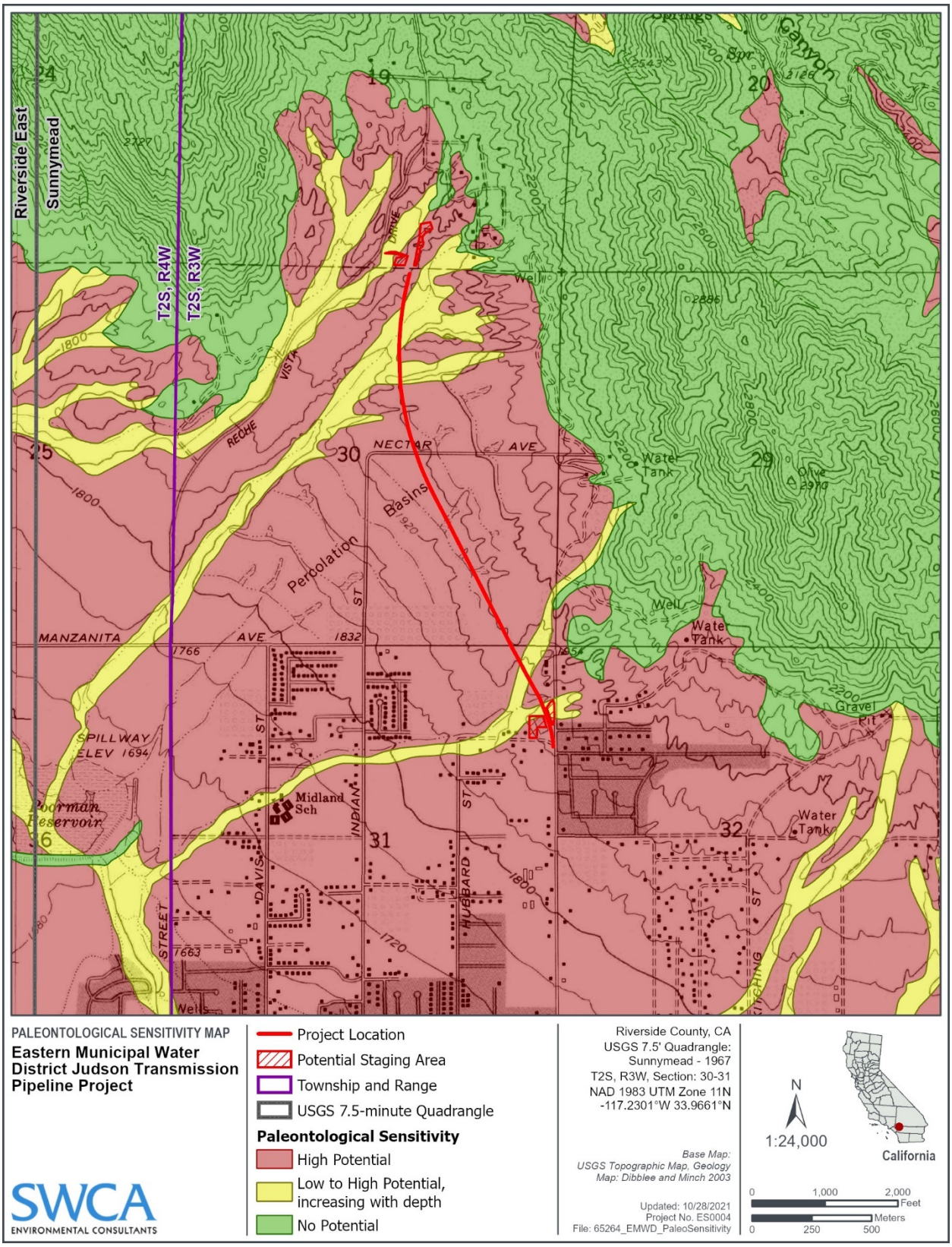

Figure 5. Paleontological potential of the geologic units underlying the project site.

Table 2. Paleontological Potential of the Underlying Geologic Units within the Project Site

Age	Geologic Unit[a]	Typical Fossil Types	Paleontological Potential[b]
Holocene	Alluvial gravel and sand of stream channels (Qg)	Too young to contain significant paleontological resources, but may grade into older sediments, which have the potential to yield significant paleontological resources, at shallow or unknown depth	Low to High Potential, increasing with depth
Holocene	Alluvial sand, gravel, and clay of valley areas (Qa)	Too young to contain significant paleontological resources, but may grade into older sediments, which have the potential to yield significant paleontological resources, at shallow or unknown depth	Low to High Potential, increasing with depth
Pleistocene	Older alluvial fan deposits (Qoa)	Vertebrates, such as horses, tapirs, camels, llamas, deer, bison, pronghorn, peccaries, mammoths, mastodons, ground sloths, saber-toothed cats, American lions, short-faced bears, dire wolves, coyotes, foxes, rabbits, rodents, tortoises, turtles, and others; invertebrates; and plants	High Potential
Cretaceous	Plutonic rocks of the Peninsular Ranges (qdx)	None	No Potential
Paleozoic or Mesozoic	Metasedimentary rocks (ms)	None	No Potential

Source: a = Dibblee and Minch (2003); b = SVP (2010)

7 IMPACT ASSESSMENT

This paleontological assessment was conducted to analyze any potential impacts this project may have on paleontological resources located in the project site to comply with CEQA, local regulations, and best practices in paleontological mitigation (Murphey et al. 2019). Based on an analysis of existing data, the project site is mostly underlain by Pleistocene old alluvial fan deposits (Qoa), which have a High Potential for paleontological resources, and Holocene alluvial gravel and sand of stream channels (Qg), which have a Low to High Potential, increasing with depth, for paleontological resources. Although not mapped directly within the bounds of the project area, Holocene alluvial sand, gravel, and clay of valley areas (Qa) may be present within the project site, either at the surface or in the subsurface, and also have a Low to High Potential, increasing with depth, for paleontological resources. Additionally, Cretaceous plutonic rocks of the Peninsular Ranges (qdx) and Paleozoic or Mesozoic metasedimentary rocks (ms) are also not mapped within the bounds of the project area at the surface but may be present at shallow or unknown depth as basement rock. Both units have No Potential for paleontological resources.

Ground-disturbing activities associated with the project would involve open cut trenching along 6,700 linear feet of the paved roadway rights-of-way, with a trench width of 42 inches (plus 12 inches of restoration work on either side) and depth of 6-10 feet below ground surface. Additionally, minor surface grubbing may be needed in the areas identified as potential staging areas for construction equipment. Previous ground-disturbing activities that occurred during construction of Perris Boulevard likely disturbed the upper 5 feet of sediments; therefore, ground-disturbing activities to previously disturbed sediments and/or sediments less than 5 feet below ground surface would not likely impact significant paleontological resources. Ground disturbances greater than or equal to 5 feet below ground surface, however, may impact previously undisturbed, native geologic deposits (e.g., Pleistocene old alluvial fan

deposits [Qoa]) with the potential to yield significant paleontological resources. Should fossils be encountered during ground-disturbing activities that impact native, previously undisturbed sediments and/or sediments at depths of 5 feet below ground surface or greater, they would be at risk for damage or destruction from construction activities, which would constitute an impact under CEQA.

8 CONCLUSIONS AND RECOMMENDATIONS

Based on this analysis of available existing data, most of the project site is underlain by geologic units that have a High Potential for paleontological resources either at the surface or at depth. Although no previously recorded paleontological resources are present within the project area, and although the project site has been previously disturbed in the uppermost sediments, project-related ground-disturbing activities 5 feet below ground surface or deeper may impact significant paleontological resources. Ground-disturbances greater than or equal to 5 feet below ground surface in areas mapped as High Potential for paleontological resources, such as Pleistocene old alluvial fan deposits (Qoa), should be monitored full time for the presence of paleontological resources. Ground disturbances greater than or equal to 5 feet below ground surface in areas mapped as Low to High Potential, increasing with depth, for paleontological resources, such as Holocene alluvial gravel and sand of stream channels (Qg) and Holocene alluvial sand, gravel, and clay of valley areas (Qa), should be monitored part time (i.e., spot-checked) for the presence of geologic units with High Potential for paleontological resources in the subsurface. If geologic units with the potential to yield significant paleontological resources are observed at depths 5 feet below ground surface or deeper during part-time monitoring, monitoring efforts should be increased. Ground-disturbing activities associated with the project will include trenching. Should fossils be encountered during trenching, or during any other ground-disturbing activities that impact native, previously undisturbed geologic units within the project site, they would be at risk for damage or destruction from construction activities, which would constitute an impact under CEQA. The implementation of appropriate mitigation measures will ensure that fossils, if encountered, are assessed for significance and, if significant, salvaged and curated with an accredited repository. This will reduce the impacts to fossil resources from the project to less than significant.

Accordingly, SWCA recommends the following mitigation measures to reduce potential impacts to paleontological resources to less-than-significant levels, as outlined below. The mitigation measures have been developed in accordance with and incorporate the performance standards of the SVP (1995, 2010), state and local regulations, and best practices in mitigation paleontology (Murphy et al. 2019).

> **MM-GEO-1:** A Project Paleontologist meeting SVP (2010) standards will be retained to implement paleontological mitigation efforts, including overseeing paleontological monitoring, fossil salvaging (if needed), reporting, and curation (if needed) during the lifetime of the project. The Project Paleontologist will also prepare a report of the findings of the monitoring efforts after construction is completed.
>
> **MM-GEO-2:** The Project Paleontologist will develop a Worker Environmental Awareness Program (WEAP) to train the construction crew on the legal requirements for preserving fossil resources as well as procedures to follow in the event of a fossil discovery. This training program will be given to the crew before ground-disturbing work commences and will include handouts to be given to new workers as needed.
>
> **MM-GEO-3:** Full-time monitoring will be required when ground-disturbing activities impact previously undisturbed, native sediments 5 feet below ground surface or deeper in areas mapped as Pleistocene old alluvial fan deposits (Qoa), which have a High Potential for paleontological resources. Part-time monitoring (i.e., spot-checking) will be required when ground-disturbing

activities impact previously undisturbed, native sediments 5 feet below ground surface or deeper in areas mapped as Holocene alluvial gravel and sand of stream channels (Qg) (or Holocene alluvial sand, gravel, and clay of valley areas [Qa]), which have a Low to High Potential, increasing with depth, to check for the presence of older alluvial deposits with higher potential for paleontological resources. Monitoring will not be required if/when ground-disturbing activities impact any previously disturbed sediments and/or when trenching is less than 5 feet below ground surface. Monitoring will also not be required if/when basement rocks in the subsurface with No Potential for paleontological resources, such as Cretaceous plutonic rocks of the Peninsular Ranges (qdx) and Paleozoic or Mesozoic metasedimentary rocks (ms), are impacted.

Monitoring should be conducted by a paleontological monitor who meets the standards of the SVP (2010). Monitoring will be conducted under the supervision of the Project Paleontologist. The Project Paleontologist may periodically inspect construction activities to adjust the level of monitoring in response to subsurface conditions. Monitoring efforts can be increased, reduced, or ceased entirely if determined adequate by the Project Paleontologist. Paleontological monitoring will include inspection of exposed sedimentary units during active excavations within sensitive geologic sediments. The monitor will have authority to temporarily divert activity away from exposed fossils to evaluate the significance of the find and, should the fossils be determined significant, professionally and efficiently recover the fossil specimens and collect associated data. Paleontological monitors will record pertinent geologic data and collect appropriate sediment samples from any fossil localities.

MM-GEO-4: In the event of a fossil discovery, whether by the paleontological monitor or a member of the construction crew, all work will cease in a 50-foot radius of the find while the Project Paleontologist assesses the significance of the fossil and document its discovery. Should the fossil be determined significant, it will be salvaged following the procedures and guidelines of the SVP (1995, 2010) and in consultation with the Western Science Center (WSC) in Hemet, California, or the NHMLA. Recovered fossils will be prepared to the point of curation, identified by qualified experts, listed in a database to facilitate analysis, and deposited in a designated paleontological curation facility. The most likely repositories will be the WSC or the NHMLA. A repository will be identified and a curatorial arrangement will be signed prior to collection of the fossils.

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APPENDIX A

Natural History Museum of Los Angeles County
Paleontological Records Search

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APPENDIX F: CONSTRUCTION NOISE MODEL OUTPUT

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat 3/1/2022
Case Desc Judson Pipeline Construction Noise

		Baselines (dBA)		---- Receptor #1 ----
Descriptio	Land Use	Daytime	Evening	Night
Residence	Residentia	65	55	45

			Equipment Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Saw	No	20		89.6	50	0
Concrete Saw	No	20		89.6	50	0
Crane	No	16		80.6	50	0
Dump Truck	No	40		76.5	50	0
Dump Truck	No	40		76.5	50	0
Excavator	No	40		80.7	50	0
Pickup Truck	No	40		75	50	0
Pickup Truck	No	40		75	50	0
Pickup Truck	No	40		75	50	0
Pumps	No	50		80.9	50	0
Backhoe	No	40		77.6	50	0
Backhoe	No	40		77.6	50	0
Welder / Torch	No	40		74	50	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	76.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Dump Truck	76.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	75	71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	75	71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	75	71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	80.9	77.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	74	70	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	87.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat 3/1/2022
Case Desc Judson Pipeline Construction Noise

		Baselines (dBA)		---- Receptor #1 ----
Descriptio	Land Use	Daytime	Evening	Night
Residence	Residentia	65	55	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	50	5
Concrete Saw	No	20		89.6	50	5
Crane	No	16		80.6	50	5
Dump Truck	No	40		76.5	50	5
Dump Truck	No	40		76.5	50	5
Excavator	No	40		80.7	50	5
Pickup Truck	No	40		75	50	5
Pickup Truck	No	40		75	50	5
Pickup Truck	No	40		75	50	5
Pumps	No	50		80.9	50	5
Backhoe	No	40		77.6	50	5
Backhoe	No	40		77.6	50	5
Welder / Torch	No	40		74	50	5

	Calculated (dBA)		Results	Noise Limits (dBA)					Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	84.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	84.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	75.6	67.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	71.5	67.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Dump Truck	71.5	67.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	75.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	70	66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	70	66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	70	66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	75.9	72.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	72.6	68.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	72.6	68.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	69	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.6	82.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

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