Appendix A

Air Quality and Greenhouse Gas Emissions Modelling Outputs

Medea Creek IS Project

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	3.00	Acre	3.00	130,680.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 33

Climate Zone 8 **Operational Year** 2016

Utility Company Southern California Edison

CO2 Intensity (lb/MWhr) 630.89 **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 - Demolition activity would occur over a two week duration (10 workdays)
Site Prep would occur through the end of December - (100 workdays)
Arch Coating would occur over 10 days

Off-road Equipment - no air compressors

Off-road Equipment - no building construction

Off-road Equipment - -

Off-road Equipment - Off Road

Trips and VMT - Trips

On-road Fugitive Dust -

Grading - 3 acres

Architectural Coating - No interior area

Vehicle Trips - No vehicle Trips

Consumer Products - No consumer products

Area Coating - 0 interior SF - only Pedestrian Bridge (exterior and footpath) would receive some architectural coating.

Water And Wastewater - No outdoor water use

Solid Waste - no solid waste

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	65,340.00	10,000.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	196,020.00	0.00
tblAreaCoating	Area_Nonresidential_Exterior	65340	10000
tblAreaCoating	Area_Nonresidential_Interior	196020	0
tblConstructionPhase	NumDays	3.00	100.00
tblGrading	AcresOfGrading	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblSolidWaste	SolidWasteGenerationRate	0.26	0.00
tblTripsAndVMT	HaulingTripNumber	148.00	70.00
tblTripsAndVMT	HaulingTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	10.00	15.00
tblVehicleTrips	ST_TR	1.59	0.00
tblVehicleTrips	SU_TR	1.59	0.00
tblVehicleTrips	WD_TR	1.59	0.00
tblWater	OutdoorWaterUseRate	3,574,444.05	0.00

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					
2015	0.3589	3.3861	2.0753	3.2200e-003	0.3327	0.1508	0.4836	0.1718	0.1392	0.3111	0.0000	302.6107	302.6107	0.0845	0.0000	304.3849
Total	**0.3589**	**3.3861**	**2.0753**	**3.2200e-003**	**0.3327**	**0.1508**	**0.4836**	**0.1718**	**0.1392**	**0.3111**	**0.0000**	**302.6107**	**302.6107**	**0.0845**	**0.0000**	**304.3849**

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					
2015	0.3589	3.3861	2.0753	3.2200e-003	0.1383	0.1508	0.2891	0.0693	0.1392	0.2085	0.0000	302.6103	302.6103	0.0845	0.0000	304.3846
Total	**0.3589**	**3.3861**	**2.0753**	**3.2200e-003**	**0.1383**	**0.1508**	**0.2891**	**0.0693**	**0.1392**	**0.2085**	**0.0000**	**302.6103**	**302.6103**	**0.0845**	**0.0000**	**304.3846**

	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**	**58.44**	**0.00**	**40.21**	**59.68**	**0.00**	**32.96**	**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	tons/yr										MT/yr					
Area	5.8000e-003	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
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	**5.8000e-003**	**0.0000**	**4.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**0.0000**	**8.0000e-005**

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	5.8000e-003	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
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	**5.8000e-003**	**0.0000**	**4.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**0.0000**	**8.0000e-005**

	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**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
Vegetation Land Change	0.0000
Total	**0.0000**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/1/2015	7/28/2015	5	20	
2	Site Preparation	Site Preparation	7/29/2015	12/15/2015	5	100	
3	Architectural Coating	Architectural Coating	12/16/2015	12/29/2015	5	10	

Acres of Grading (Site Preparation Phase): 3

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 10,000 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	1	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Cranes	1	8.00	226	0.29
Site Preparation	Dumpers/Tenders	1	8.00	16	0.38
Site Preparation	Excavators	2	8.00	162	0.38
Site Preparation	Off-Highway Trucks	2	8.00	400	0.38
Site Preparation	Rubber Tired Dozers	1	8.00	255	0.40
Site Preparation	Skid Steer Loaders	1	8.00	64	0.37
Site Preparation	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

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
Demolition	4	15.00	0.00	70.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	8	20.00	0.00	20.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	11.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2015

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					0.0161	0.0000	0.0161	2.4300e-003	0.0000	2.4300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0368	0.3863	0.2920	2.9000e-004		0.0197	0.0197		0.0184	0.0184	0.0000	27.3615	27.3615	7.1400e-003	0.0000	27.5114
Total	**0.0368**	**0.3863**	**0.2920**	**2.9000e-004**	**0.0161**	**0.0197**	**0.0358**	**2.4300e-003**	**0.0184**	**0.0209**	**0.0000**	**27.3615**	**27.3615**	**7.1400e-003**	**0.0000**	**27.5114**

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	7.3000e-004	0.0117	8.4400e-003	3.0000e-005	6.0000e-004	1.8000e-004	7.8000e-004	1.6000e-004	1.7000e-004	3.3000e-004	0.0000	2.4142	2.4142	2.0000e-005	0.0000	2.4146
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	7.3000e-004	1.0600e-003	0.0110	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	2.0000e-005	4.5000e-004	0.0000	1.6593	1.6593	1.0000e-004	0.0000	1.6614
Total	**1.4600e-003**	**0.0128**	**0.0195**	**5.0000e-005**	**2.2400e-003**	**2.0000e-004**	**2.4400e-003**	**6.0000e-004**	**1.9000e-004**	**7.8000e-004**	**0.0000**	**4.0735**	**4.0735**	**1.2000e-004**	**0.0000**	**4.0760**

3.2 Demolition - 2015

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					6.2600e-003	0.0000	6.2600e-003	9.5000e-004	0.0000	9.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0368	0.3863	0.2920	2.9000e-004		0.0197	0.0197		0.0184	0.0184	0.0000	27.3614	27.3614	7.1400e-003	0.0000	27.5114
Total	**0.0368**	**0.3863**	**0.2920**	**2.9000e-004**	**6.2600e-003**	**0.0197**	**0.0260**	**9.5000e-004**	**0.0184**	**0.0194**	**0.0000**	**27.3614**	**27.3614**	**7.1400e-003**	**0.0000**	**27.5114**

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	7.3000e-004	0.0117	8.4400e-003	3.0000e-005	6.0000e-004	1.8000e-004	7.8000e-004	1.6000e-004	1.7000e-004	3.3000e-004	0.0000	2.4142	2.4142	2.0000e-005	0.0000	2.4146
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	7.3000e-004	1.0600e-003	0.0110	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	2.0000e-005	4.5000e-004	0.0000	1.6593	1.6593	1.0000e-004	0.0000	1.6614
Total	**1.4600e-003**	**0.0128**	**0.0195**	**5.0000e-005**	**2.2400e-003**	**2.0000e-004**	**2.4400e-003**	**6.0000e-004**	**1.9000e-004**	**7.8000e-004**	**0.0000**	**4.0735**	**4.0735**	**1.2000e-004**	**0.0000**	**4.0760**

3.3 Site Preparation - 2015

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					0.3027	0.0000	0.3027	0.1657	0.0000	0.1657	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2554	2.9634	1.6744	2.7100e-003		0.1297	0.1297		0.1194	0.1194	0.0000	257.5388	257.5388	0.0764	0.0000	259.1424
Total	**0.2554**	**2.9634**	**1.6744**	**2.7100e-003**	**0.3027**	**0.1297**	**0.4324**	**0.1657**	**0.1194**	**0.2850**	**0.0000**	**257.5388**	**257.5388**	**0.0764**	**0.0000**	**259.1424**

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	2.1000e-004	3.3400e-003	2.4100e-003	1.0000e-005	1.7000e-004	5.0000e-005	2.2000e-004	5.0000e-005	5.0000e-005	1.0000e-004	0.0000	0.6898	0.6898	1.0000e-005	0.0000	0.6899
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	4.8500e-003	7.0600e-003	0.0735	1.4000e-004	0.0110	1.1000e-004	0.0111	2.9100e-003	1.0000e-004	3.0100e-003	0.0000	11.0621	11.0621	6.6000e-004	0.0000	11.0759
Total	**5.0600e-003**	**0.0104**	**0.0759**	**1.5000e-004**	**0.0111**	**1.6000e-004**	**0.0113**	**2.9600e-003**	**1.5000e-004**	**3.1100e-003**	**0.0000**	**11.7518**	**11.7518**	**6.7000e-004**	**0.0000**	**11.7658**

3.3 Site Preparation - 2015

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					0.1181	0.0000	0.1181	0.0646	0.0000	0.0646	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2554	2.9634	1.6744	2.7100e-003		0.1297	0.1297		0.1194	0.1194	0.0000	257.5385	257.5385	0.0764	0.0000	259.1421
Total	**0.2554**	**2.9634**	**1.6744**	**2.7100e-003**	**0.1181**	**0.1297**	**0.2477**	**0.0646**	**0.1194**	**0.1840**	**0.0000**	**257.5385**	**257.5385**	**0.0764**	**0.0000**	**259.1421**

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	2.1000e-004	3.3400e-003	2.4100e-003	1.0000e-005	1.7000e-004	5.0000e-005	2.2000e-004	5.0000e-005	5.0000e-005	1.0000e-004	0.0000	0.6898	0.6898	1.0000e-005	0.0000	0.6899
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	4.8500e-003	7.0600e-003	0.0735	1.4000e-004	0.0110	1.1000e-004	0.0111	2.9100e-003	1.0000e-004	3.0100e-003	0.0000	11.0621	11.0621	6.6000e-004	0.0000	11.0759
Total	**5.0600e-003**	**0.0104**	**0.0759**	**1.5000e-004**	**0.0111**	**1.6000e-004**	**0.0113**	**2.9600e-003**	**1.5000e-004**	**3.1100e-003**	**0.0000**	**11.7518**	**11.7518**	**6.7000e-004**	**0.0000**	**11.7658**

3.4 Architectural Coating - 2015

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					
Archit. Coating	0.0579					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0300e-003	0.0129	9.5100e-003	1.0000e-005		1.1000e-003	1.1000e-003		1.1000e-003	1.1000e-003	0.0000	1.2766	1.2766	1.7000e-004	0.0000	1.2801
Total	**0.0600**	**0.0129**	**9.5100e-003**	**1.0000e-005**		**1.1000e-003**	**1.1000e-003**		**1.1000e-003**	**1.1000e-003**	**0.0000**	**1.2766**	**1.2766**	**1.7000e-004**	**0.0000**	**1.2801**

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	2.7000e-004	3.9000e-004	4.0400e-003	1.0000e-005	6.0000e-004	1.0000e-005	6.1000e-004	1.6000e-004	1.0000e-005	1.7000e-004	0.0000	0.6084	0.6084	4.0000e-005	0.0000	0.6092
Total	**2.7000e-004**	**3.9000e-004**	**4.0400e-003**	**1.0000e-005**	**6.0000e-004**	**1.0000e-005**	**6.1000e-004**	**1.6000e-004**	**1.0000e-005**	**1.7000e-004**	**0.0000**	**0.6084**	**0.6084**	**4.0000e-005**	**0.0000**	**0.6092**

3.4 Architectural Coating - 2015

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					
Archit. Coating	0.0579					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0300e-003	0.0129	9.5100e-003	1.0000e-005		1.1000e-003	1.1000e-003		1.1000e-003	1.1000e-003	0.0000	1.2766	1.2766	1.7000e-004	0.0000	1.2801
Total	**0.0600**	**0.0129**	**9.5100e-003**	**1.0000e-005**		**1.1000e-003**	**1.1000e-003**		**1.1000e-003**	**1.1000e-003**	**0.0000**	**1.2766**	**1.2766**	**1.7000e-004**	**0.0000**	**1.2801**

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	2.7000e-004	3.9000e-004	4.0400e-003	1.0000e-005	6.0000e-004	1.0000e-005	6.1000e-004	1.6000e-004	1.0000e-005	1.7000e-004	0.0000	0.6084	0.6084	4.0000e-005	0.0000	0.6092
Total	**2.7000e-004**	**3.9000e-004**	**4.0400e-003**	**1.0000e-005**	**6.0000e-004**	**1.0000e-005**	**6.1000e-004**	**1.6000e-004**	**1.0000e-005**	**1.7000e-004**	**0.0000**	**0.6084**	**0.6084**	**4.0000e-005**	**0.0000**	**0.6092**

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
City Park	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
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.533598	0.058434	0.178244	0.125508	0.038944	0.006283	0.016425	0.031066	0.002453	0.003157	0.003691	0.000543	0.001655

4.4 Fleet Mix

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					
City Park	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					
City Park	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			
City Park	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			
City Park	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	5.8000e-003	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Unmitigated	5.8000e-003	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005

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	5.7900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Total	**5.7900e-003**	**0.0000**	**4.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**0.0000**	**8.0000e-005**

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					
Landscaping	0.0000	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Architectural Coating	5.7900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.7900e-003**	**0.0000**	**4.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**0.0000**	**8.0000e-005**

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			
City Park	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			
City Park	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			
City Park	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			
City Park	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 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	0.0000	0.0000	0.0000	0.0000

10.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Wetlands	0 / 0.75	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Medea Creek IS Project

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	3.00	Acre	3.00	130,680.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 33

Climate Zone 8 **Operational Year** 2016

Utility Company Southern California Edison

CO2 Intensity (lb/MWhr) 630.89 **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 - Demolition activity would occur over a two week duration (10 workdays)
Site Prep would occur through the end of December - (100 workdays)
Arch Coating would occur over 10 days

Off-road Equipment - no air compressors

Off-road Equipment - no building construction

Off-road Equipment - -

Off-road Equipment - Off Road

Trips and VMT - Trips

On-road Fugitive Dust -

Grading - 3 acres

Architectural Coating - No interior area

Vehicle Trips - No vehicle Trips

Consumer Products - No consumer products

Area Coating - 0 interior SF - only Pedestrian Bridge (exterior and footpath) would receive some architectural coating.

Water And Wastewater - No outdoor water use

Solid Waste - no solid waste

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	65,340.00	10,000.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	196,020.00	0.00
tblAreaCoating	Area_Nonresidential_Exterior	65340	10000
tblAreaCoating	Area_Nonresidential_Interior	196020	0
tblConstructionPhase	NumDays	3.00	100.00
tblGrading	AcresOfGrading	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblSolidWaste	SolidWasteGenerationRate	0.26	0.00
tblTripsAndVMT	HaulingTripNumber	148.00	70.00
tblTripsAndVMT	HaulingTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	10.00	15.00
tblVehicleTrips	ST_TR	1.59	0.00
tblVehicleTrips	SU_TR	1.59	0.00
tblVehicleTrips	WD_TR	1.59	0.00
tblWater	OutdoorWaterUseRate	3,574,444.05	0.00

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					
2015	12.0483	59.4549	35.0603	0.0573	6.2809	2.5963	8.8772	3.3739	2.3902	5.7641	0.0000	5,947.2655	5,947.2655	1.6981	0.0000	5,982.9264
Total	**12.0483**	**59.4549**	**35.0603**	**0.0573**	**6.2809**	**2.5963**	**8.8772**	**3.3739**	**2.3902**	**5.7641**	**0.0000**	**5,947.2655**	**5,947.2655**	**1.6981**	**0.0000**	**5,982.9264**

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					
2015	12.0483	59.4549	35.0603	0.0573	2.5881	2.5963	5.1844	1.3526	2.3902	3.7428	0.0000	5,947.2655	5,947.2655	1.6981	0.0000	5,982.9264
Total	**12.0483**	**59.4549**	**35.0603**	**0.0573**	**2.5881**	**2.5963**	**5.1844**	**1.3526**	**2.3902**	**3.7428**	**0.0000**	**5,947.2655**	**5,947.2655**	**1.6981**	**0.0000**	**5,982.9264**

	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**	**58.80**	**0.00**	**41.60**	**59.91**	**0.00**	**35.07**	**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	0.0318	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
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	**0.0318**	**0.0000**	**3.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**0.0000**	**7.0000e-004**

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	0.0318	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
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	**0.0318**	**0.0000**	**3.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**0.0000**	**7.0000e-004**

	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	Demolition	Demolition	7/1/2015	7/28/2015	5	20	
2	Site Preparation	Site Preparation	7/29/2015	12/15/2015	5	100	
3	Architectural Coating	Architectural Coating	12/16/2015	12/29/2015	5	10	

Acres of Grading (Site Preparation Phase): 3

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 10,000 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	1	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Cranes	1	8.00	226	0.29
Site Preparation	Dumpers/Tenders	1	8.00	16	0.38
Site Preparation	Excavators	2	8.00	162	0.38
Site Preparation	Off-Highway Trucks	2	8.00	400	0.38
Site Preparation	Rubber Tired Dozers	1	8.00	255	0.40
Site Preparation	Skid Steer Loaders	1	8.00	64	0.37
Site Preparation	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

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
Demolition	4	15.00	0.00	70.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	8	20.00	0.00	20.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	11.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2015

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					1.6049	0.0000	1.6049	0.2430	0.0000	0.2430			0.0000			0.0000
Off-Road	3.6751	38.6332	29.1954	0.0293		1.9706	1.9706		1.8440	1.8440		3,016.0833	3,016.0833	0.7871		3,032.6125
Total	**3.6751**	**38.6332**	**29.1954**	**0.0293**	**1.6049**	**1.9706**	**3.5755**	**0.2430**	**1.8440**	**2.0870**		**3,016.0833**	**3,016.0833**	**0.7871**		**3,032.6125**

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	0.0701	1.1105	0.7571	2.6200e-003	0.0609	0.0183	0.0793	0.0167	0.0168	0.0335		266.3821	266.3821	2.1700e-003		266.4276
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	0.0740	0.0930	1.1469	2.1800e-003	0.1677	1.6800e-003	0.1693	0.0445	1.5300e-003	0.0460		190.7132	190.7132	0.0109		190.9418
Total	**0.1440**	**1.2035**	**1.9040**	**4.8000e-003**	**0.2286**	**0.0200**	**0.2486**	**0.0612**	**0.0184**	**0.0795**		**457.0953**	**457.0953**	**0.0131**		**457.3694**

3.2 Demolition - 2015

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					0.6259	0.0000	0.6259	0.0948	0.0000	0.0948			0.0000			0.0000
Off-Road	3.6751	38.6332	29.1954	0.0293		1.9706	1.9706		1.8440	1.8440	0.0000	3,016.083 3	3,016.083 3	0.7871		3,032.612 5
Total	**3.6751**	**38.6332**	**29.1954**	**0.0293**	**0.6259**	**1.9706**	**2.5965**	**0.0948**	**1.8440**	**1.9387**	**0.0000**	**3,016.083 3**	**3,016.083 3**	**0.7871**		**3,032.612 5**

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	0.0701	1.1105	0.7571	2.6200e-003	0.0609	0.0183	0.0793	0.0167	0.0168	0.0335		266.3821	266.3821	2.1700e-003		266.4276
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	0.0740	0.0930	1.1469	2.1800e-003	0.1677	1.6800e-003	0.1693	0.0445	1.5300e-003	0.0460		190.7132	190.7132	0.0109		190.9418
Total	**0.1440**	**1.2035**	**1.9040**	**4.8000e-003**	**0.2286**	**0.0200**	**0.2486**	**0.0612**	**0.0184**	**0.0795**		**457.0953**	**457.0953**	**0.0131**		**457.3694**

3.3 Site Preparation - 2015

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					6.0539	0.0000	6.0539	3.3137	0.0000	3.3137			0.0000			0.0000
Off-Road	5.1073	59.2674	33.4878	0.0542		2.5930	2.5930		2.3872	2.3872		5,677.7594	5,677.7594	1.6835		5,713.1130
Total	**5.1073**	**59.2674**	**33.4878**	**0.0542**	**6.0539**	**2.5930**	**8.6469**	**3.3137**	**2.3872**	**5.7008**		**5,677.7594**	**5,677.7594**	**1.6835**		**5,713.1130**

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	4.0000e-003	0.0635	0.0433	1.5000e-004	3.4800e-003	1.0500e-003	4.5300e-003	9.5000e-004	9.6000e-004	1.9200e-003		15.2218	15.2218	1.2000e-004		15.2244
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	0.0986	0.1240	1.5292	2.9100e-003	0.2236	2.2300e-003	0.2258	0.0593	2.0500e-003	0.0613		254.2843	254.2843	0.0145		254.5891
Total	**0.1026**	**0.1875**	**1.5725**	**3.0600e-003**	**0.2270**	**3.2800e-003**	**0.2303**	**0.0602**	**3.0100e-003**	**0.0633**		**269.5061**	**269.5061**	**0.0146**		**269.8135**

3.3 Site Preparation - 2015

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					2.3610	0.0000	2.3610	1.2923	0.0000	1.2923			0.0000			0.0000
Off-Road	5.1073	59.2674	33.4878	0.0542		2.5930	2.5930		2.3872	2.3872	0.0000	5,677.7594	5,677.7594	1.6835		5,713.1130
Total	**5.1073**	**59.2674**	**33.4878**	**0.0542**	**2.3610**	**2.5930**	**4.9540**	**1.2923**	**2.3872**	**3.6795**	**0.0000**	**5,677.7594**	**5,677.7594**	**1.6835**		**5,713.1130**

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	4.0000e-003	0.0635	0.0433	1.5000e-004	3.4800e-003	1.0500e-003	4.5300e-003	9.5000e-004	9.6000e-004	1.9200e-003		15.2218	15.2218	1.2000e-004		15.2244
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	0.0986	0.1240	1.5292	2.9100e-003	0.2236	2.2300e-003	0.2258	0.0593	2.0500e-003	0.0613		254.2843	254.2843	0.0145		254.5891
Total	**0.1026**	**0.1875**	**1.5725**	**3.0600e-003**	**0.2270**	**3.2800e-003**	**0.2303**	**0.0602**	**3.0100e-003**	**0.0633**		**269.5061**	**269.5061**	**0.0146**		**269.8135**

3.4 Architectural Coating - 2015

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					
Archit. Coating	11.5875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4066	2.5703	1.9018	2.9700e-003		0.2209	0.2209		0.2209	0.2209		281.4481	281.4481	0.0367		282.2177
Total	**11.9941**	**2.5703**	**1.9018**	**2.9700e-003**		**0.2209**	**0.2209**		**0.2209**	**0.2209**		**281.4481**	**281.4481**	**0.0367**		**282.2177**

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	0.0543	0.0682	0.8411	1.6000e-003	0.1230	1.2300e-003	0.1242	0.0326	1.1300e-003	0.0337		139.8564	139.8564	7.9800e-003		140.0240
Total	**0.0543**	**0.0682**	**0.8411**	**1.6000e-003**	**0.1230**	**1.2300e-003**	**0.1242**	**0.0326**	**1.1300e-003**	**0.0337**		**139.8564**	**139.8564**	**7.9800e-003**		**140.0240**

3.4 Architectural Coating - 2015

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					
Archit. Coating	11.5875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4066	2.5703	1.9018	2.9700e-003		0.2209	0.2209		0.2209	0.2209	0.0000	281.4481	281.4481	0.0367		282.2177
Total	**11.9941**	**2.5703**	**1.9018**	**2.9700e-003**		**0.2209**	**0.2209**		**0.2209**	**0.2209**	**0.0000**	**281.4481**	**281.4481**	**0.0367**		**282.2177**

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	0.0543	0.0682	0.8411	1.6000e-003	0.1230	1.2300e-003	0.1242	0.0326	1.1300e-003	0.0337		139.8564	139.8564	7.9800e-003		140.0240
Total	**0.0543**	**0.0682**	**0.8411**	**1.6000e-003**	**0.1230**	**1.2300e-003**	**0.1242**	**0.0326**	**1.1300e-003**	**0.0337**		**139.8564**	**139.8564**	**7.9800e-003**		**140.0240**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	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
	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
City Park	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
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.533598	0.058434	0.178244	0.125508	0.038944	0.006283	0.016425	0.031066	0.002453	0.003157	0.003691	0.000543	0.001655

4.4 Fleet Mix

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					
City Park	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					
City Park	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	0.0318	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Unmitigated	0.0318	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004

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					
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Architectural Coating	0.0318					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.0318**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

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					
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Architectural Coating	0.0318					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.0318**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

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 Vegetation

Medea Creek IS Project

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	3.00	Acre	3.00	130,680.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	8			**Operational Year**	2016
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**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 - Demolition activity would occur over a two week duration (10 workdays)
Site Prep would occur through the end of December - (100 workdays)
Arch Coating would occur over 10 days

Off-road Equipment - no air compressors

Off-road Equipment - no building construction

Off-road Equipment - -

Off-road Equipment - Off Road

Trips and VMT - Trips

On-road Fugitive Dust -

Grading - 3 acres

Architectural Coating - No interior area

Vehicle Trips - No vehicle Trips

Consumer Products - No consumer products

Area Coating - 0 interior SF - only Pedestrian Bridge (exterior and footpath) would receive some architectural coating.

Water And Wastewater - No outdoor water use

Solid Waste - no solid waste

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	65,340.00	10,000.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	196,020.00	0.00
tblAreaCoating	Area_Nonresidential_Exterior	65340	10000
tblAreaCoating	Area_Nonresidential_Interior	196020	0
tblConstructionPhase	NumDays	3.00	100.00
tblGrading	AcresOfGrading	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblSolidWaste	SolidWasteGenerationRate	0.26	0.00
tblTripsAndVMT	HaulingTripNumber	148.00	70.00
tblTripsAndVMT	HaulingTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	10.00	15.00
tblVehicleTrips	ST_TR	1.59	0.00
tblVehicleTrips	SU_TR	1.59	0.00
tblVehicleTrips	WD_TR	1.59	0.00
tblWater	OutdoorWaterUseRate	3,574,444.05	0.00

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					
2015	12.0506	59.4706	34.9783	0.0571	6.2809	2.5963	8.8772	3.3739	2.3902	5.7641	0.0000	5,932.9671	5,932.9671	1.6981	0.0000	5,968.6280
Total	**12.0506**	**59.4706**	**34.9783**	**0.0571**	**6.2809**	**2.5963**	**8.8772**	**3.3739**	**2.3902**	**5.7641**	**0.0000**	**5,932.9671**	**5,932.9671**	**1.6981**	**0.0000**	**5,968.6280**

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					
2015	12.0506	59.4706	34.9783	0.0571	2.5881	2.5963	5.1844	1.3526	2.3902	3.7428	0.0000	5,932.9671	5,932.9671	1.6981	0.0000	5,968.6280
Total	**12.0506**	**59.4706**	**34.9783**	**0.0571**	**2.5881**	**2.5963**	**5.1844**	**1.3526**	**2.3902**	**3.7428**	**0.0000**	**5,932.9671**	**5,932.9671**	**1.6981**	**0.0000**	**5,968.6280**

	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**	**58.80**	**0.00**	**41.60**	**59.91**	**0.00**	**35.07**	**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	0.0318	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
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	**0.0318**	**0.0000**	**3.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**0.0000**	**7.0000e-004**

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	0.0318	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
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	**0.0318**	**0.0000**	**3.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**	**0.0000**	**7.0000e-004**

	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	Demolition	Demolition	7/1/2015	7/28/2015	5	20	
2	Site Preparation	Site Preparation	7/29/2015	12/15/2015	5	100	
3	Architectural Coating	Architectural Coating	12/16/2015	12/29/2015	5	10	

Acres of Grading (Site Preparation Phase): 3

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 10,000 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	1	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Cranes	1	8.00	226	0.29
Site Preparation	Dumpers/Tenders	1	8.00	16	0.38
Site Preparation	Excavators	2	8.00	162	0.38
Site Preparation	Off-Highway Trucks	2	8.00	400	0.38
Site Preparation	Rubber Tired Dozers	1	8.00	255	0.40
Site Preparation	Skid Steer Loaders	1	8.00	64	0.37
Site Preparation	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

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
Demolition	4	15.00	0.00	70.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	8	20.00	0.00	20.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	11.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2015

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					1.6049	0.0000	1.6049	0.2430	0.0000	0.2430			0.0000			0.0000
Off-Road	3.6751	38.6332	29.1954	0.0293		1.9706	1.9706		1.8440	1.8440		3,016.083 3	3,016.083 3	0.7871		3,032.612 5
Total	**3.6751**	**38.6332**	**29.1954**	**0.0293**	**1.6049**	**1.9706**	**3.5755**	**0.2430**	**1.8440**	**2.0870**		**3,016.083 3**	**3,016.083 3**	**0.7871**		**3,032.612 5**

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	0.0745	1.1496	0.8677	2.6100e-003	0.0609	0.0184	0.0793	0.0167	0.0169	0.0336		265.7585	265.7585	2.1900e-003		265.8045
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	0.0771	0.1031	1.0807	2.0600e-003	0.1677	1.6800e-003	0.1693	0.0445	1.5300e-003	0.0460		180.0161	180.0161	0.0109		180.2447
Total	**0.1516**	**1.2528**	**1.9484**	**4.6700e-003**	**0.2286**	**0.0201**	**0.2487**	**0.0612**	**0.0184**	**0.0796**		**445.7746**	**445.7746**	**0.0131**		**446.0492**

3.2 Demolition - 2015

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					0.6259	0.0000	0.6259	0.0948	0.0000	0.0948			0.0000			0.0000
Off-Road	3.6751	38.6332	29.1954	0.0293		1.9706	1.9706		1.8440	1.8440	0.0000	3,016.0833	3,016.0833	0.7871		3,032.6125
Total	**3.6751**	**38.6332**	**29.1954**	**0.0293**	**0.6259**	**1.9706**	**2.5965**	**0.0948**	**1.8440**	**1.9387**	**0.0000**	**3,016.0833**	**3,016.0833**	**0.7871**		**3,032.6125**

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	0.0745	1.1496	0.8677	2.6100e-003	0.0609	0.0184	0.0793	0.0167	0.0169	0.0336		265.7585	265.7585	2.1900e-003		265.8045
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	0.0771	0.1031	1.0807	2.0600e-003	0.1677	1.6800e-003	0.1693	0.0445	1.5300e-003	0.0460		180.0161	180.0161	0.0109		180.2447
Total	**0.1516**	**1.2528**	**1.9484**	**4.6700e-003**	**0.2286**	**0.0201**	**0.2487**	**0.0612**	**0.0184**	**0.0796**		**445.7746**	**445.7746**	**0.0131**		**446.0492**

3.3 Site Preparation - 2015

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					6.0539	0.0000	6.0539	3.3137	0.0000	3.3137			0.0000			0.0000
Off-Road	5.1073	59.2674	33.4878	0.0542		2.5930	2.5930		2.3872	2.3872		5,677.7594	5,677.7594	1.6835		5,713.1130
Total	**5.1073**	**59.2674**	**33.4878**	**0.0542**	**6.0539**	**2.5930**	**8.6469**	**3.3137**	**2.3872**	**5.7008**		**5,677.7594**	**5,677.7594**	**1.6835**		**5,713.1130**

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	4.2500e-003	0.0657	0.0496	1.5000e-004	3.4800e-003	1.0500e-003	4.5300e-003	9.5000e-004	9.7000e-004	1.9200e-003		15.1862	15.1862	1.3000e-004		15.1888
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	0.1028	0.1375	1.4409	2.7400e-003	0.2236	2.2300e-003	0.2258	0.0593	2.0500e-003	0.0613		240.0215	240.0215	0.0145		240.3263
Total	**0.1070**	**0.2032**	**1.4905**	**2.8900e-003**	**0.2270**	**3.2800e-003**	**0.2303**	**0.0602**	**3.0200e-003**	**0.0633**		**255.2077**	**255.2077**	**0.0146**		**255.5151**

3.3 Site Preparation - 2015

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					2.3610	0.0000	2.3610	1.2923	0.0000	1.2923			0.0000			0.0000
Off-Road	5.1073	59.2674	33.4878	0.0542		2.5930	2.5930		2.3872	2.3872	0.0000	5,677.7594	5,677.7594	1.6835		5,713.1130
Total	**5.1073**	**59.2674**	**33.4878**	**0.0542**	**2.3610**	**2.5930**	**4.9540**	**1.2923**	**2.3872**	**3.6795**	**0.0000**	**5,677.7594**	**5,677.7594**	**1.6835**		**5,713.1130**

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	4.2500e-003	0.0657	0.0496	1.5000e-004	3.4800e-003	1.0500e-003	4.5300e-003	9.5000e-004	9.7000e-004	1.9200e-003		15.1862	15.1862	1.3000e-004		15.1888
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	0.1028	0.1375	1.4409	2.7400e-003	0.2236	2.2300e-003	0.2258	0.0593	2.0500e-003	0.0613		240.0215	240.0215	0.0145		240.3263
Total	**0.1070**	**0.2032**	**1.4905**	**2.8900e-003**	**0.2270**	**3.2800e-003**	**0.2303**	**0.0602**	**3.0200e-003**	**0.0633**		**255.2077**	**255.2077**	**0.0146**		**255.5151**

3.4 Architectural Coating - 2015

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					
Archit. Coating	11.5875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4066	2.5703	1.9018	2.9700e-003		0.2209	0.2209		0.2209	0.2209		281.4481	281.4481	0.0367		282.2177
Total	**11.9941**	**2.5703**	**1.9018**	**2.9700e-003**		**0.2209**	**0.2209**		**0.2209**	**0.2209**		**281.4481**	**281.4481**	**0.0367**		**282.2177**

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	0.0565	0.0756	0.7925	1.5100e-003	0.1230	1.2300e-003	0.1242	0.0326	1.1300e-003	0.0337		132.0118	132.0118	7.9800e-003		132.1794
Total	**0.0565**	**0.0756**	**0.7925**	**1.5100e-003**	**0.1230**	**1.2300e-003**	**0.1242**	**0.0326**	**1.1300e-003**	**0.0337**		**132.0118**	**132.0118**	**7.9800e-003**		**132.1794**

3.4 Architectural Coating - 2015

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					
Archit. Coating	11.5875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4066	2.5703	1.9018	2.9700e-003		0.2209	0.2209		0.2209	0.2209	0.0000	281.4481	281.4481	0.0367		282.2177
Total	**11.9941**	**2.5703**	**1.9018**	**2.9700e-003**		**0.2209**	**0.2209**		**0.2209**	**0.2209**	**0.0000**	**281.4481**	**281.4481**	**0.0367**		**282.2177**

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	0.0565	0.0756	0.7925	1.5100e-003	0.1230	1.2300e-003	0.1242	0.0326	1.1300e-003	0.0337		132.0118	132.0118	7.9800e-003		132.1794
Total	**0.0565**	**0.0756**	**0.7925**	**1.5100e-003**	**0.1230**	**1.2300e-003**	**0.1242**	**0.0326**	**1.1300e-003**	**0.0337**		**132.0118**	**132.0118**	**7.9800e-003**		**132.1794**

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
City Park	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
City Park	16.60	8.40	6.90	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.533598	0.058434	0.178244	0.125508	0.038944	0.006283	0.016425	0.031066	0.002453	0.003157	0.003691	0.000543	0.001655

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					
City Park	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					
City Park	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	0.0318	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Unmitigated	0.0318	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004

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	0.0318					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Total	**0.0318**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

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					
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Architectural Coating	0.0318					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.0318**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

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 Vegetation

Appendix B

Geotechnical Investigation Report

Medea Creek

Restoration Project

Geotechnical Investigation

Report- revised

Prepared for:

City of Agoura Hills
Engineering Division
30001 Ladyface Court
Agoura Hills, CA 91301

Submitted by:

Questa Engineering Corporation
1220 Brickyard Cove Road, Suite 206
Point Richmond, California 94807
(510) 236-6114

November 24, 2014

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Questa Engineering Corporation
1220 Brickyard Cove Road, Suite 206
P. O. Box 70356
Point Richmond, California 94807
(510) 236-6114

Questa Project Number 1300042

Sydney Temple, PE # 59695
Principal/Senior Engineer

Willard N. Hopkins, CEG #1761, exp. 7/31/15
Senior Engineering Geologist

REGISTERED PROFESSIONAL ENGINEER
SYDNEY A. TEMPLE
59695
12-31-15
EXPIRES
CIVIL
STATE OF CALIFORNIA

November 24, 2014

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PROJECT DESCRIPTION AND ADJACENT FACILITIES PROTECTION

The Medea Creek Restoration project site (project site) is located within the City of Agoura Hills (City) between Canwood Street and Thousand Oaks Boulevard on the east side of Kanan Road. Based on our review and the summarized project description below the proposed measures will adequately protect the adjacent lands and structures from geological hazards such as landslide, settlement or slippage.

The project site is located in the eastern Conejo Valley between the Simi Hills and Santa Monica Mountains in western Los Angeles County. The site is depicted in Township 1 North, Range 18 West of the U.S. Geographical Survey (USGS) Thousand Oaks 7.5-minute topographic quadrangle. Sheet 1 (**Attachments**), Regional Location, shows the regional context of the project site. The project site includes an approximately 450 foot reach of Medea Creek and its associated access roads and right-of-way, located between Kanan Road and Chumash Park. This reach of Medea Creek is currently contained in a trapezoidal concrete channel with a slope of 1%. This channel, which collects flows from a steep box culvert draining under Kanan Road, conveys flows to a naturally vegetated segment of the creek approximately 450 feet south of Kanan Road consisting of riparian vegetation and pool habitat. Currently, there is an informal trail along the edge of existing fence lines that connects Chumash Park to Kanan Road. This trail is unimproved consisting of dirt surfacing with steep gradients. It crosses private residential property, which fronts Medea Valley Drive, along the rear portion of the parcels adjacent to the project area. A major trunk sewer line draining a significant portion of the City parallels the existing channel along this reach of the creek.

Land uses surrounding the project site consist of residential single-family housing and Chumash Park to the east, Kanan Road and commercial mixed-use developments to the north, open space to the west, and a naturalized portion of Medea Creek to the south abutted by residential high-density housing development.
Project Characteristics

Project implementation would involve removal of the approximately 425 feet of concrete trapezoidal channel and construction of a natural channel stabilized with native vegetation, boulders and log structures. The project would also provide pedestrian connectivity from Kanan Road, through a vacant parcel to the west of Medea Creek, to Chumash Park east of Medea Creek via a footbridge.

Demolition. As part of the proposed project, the existing concrete channel and asphalt access roads would be demolished and the rubble will be hauled off site to an appropriate refuse disposal facility. A 30-foot length of concrete channel directly downstream from the Kanan Road culvert would be left in place and a concrete cutoff wall would be constructed, as shown in Sheet 4.

Restoration. Once removal of the concrete channel is complete, the creek would be restored to a natural condition through the planting of native riparian vegetation, which would be generally consistent with vegetation found south of the project site. Project construction would also entail the construction of a pedestrian trail from Kanan Road to Chumash Park, crossing Medea Creek via a footbridge.

Channel Gradient Control. The first restoration component involves the slope of the channel. The current channel has a slope of approximately 1% with an elevation drop of approximately 4 feet over the 425-foot project reach. If the concrete was to be removed and the existing slope maintained, then flow velocities would be high, turbulent flow would dominate, and the channel bed would likely undergo significant bed degradation.

The proposed project addresses these issues through a series of pools and riffles with rock weirs constructed throughout the sequences to insure that the channel features are maintained over time. Varying the number of rock weirs and their vertical drop heights allows for numerous options; however, to accommodate passage of the rainbow trout that inhabit the downstream channel, the project design limits drop heights to less than 1 foot (see Sheet 5, Channel Grading). In addition to the gradient control weirs, constructed riffles would be installed using a variety of rock sizes to mimic a natural channel riffle.

The channel banks along the riffles and grade control structures would be planted would willow stakes to ensure that vegetation cover becomes part of the overall channel structure. Willow would be planted in the deep trenches associated with the weir and keyway construction. The trenches would be of sufficient depth so that willow planting could have access to underflow and groundwater resources. Additional riparian planting would be completed on the flood plains and channel banks to insure long term stability of the channel.

Bank Slope Configuration. The existing concrete bank slopes are currently 1.5 (horizontal) to 1 (vertical). For the restoration of the bank slopes to be successful, the angle of the slope would be reduced. Typically, a slope of 2:1 or flatter is recommended for re-vegetation. Steeper slopes such as 1.75:1 can be re-vegetated but require greater effort; colonization and growth can be slower, as well. As shown in Sheet 8, Proposed Channel Sections, the project has been designed with a minimum bank slope of 2:1 with most slopes at least 2.5:1 or flatter.

Sewer Line Protection. The existing trunk sewer line would not be realigned as part of the proposed project. Instead the sewer line would be protected from scour with grouted riprap rock placed adjacent and on top of the line at locations where the creek channel is within 10 to 15 feet of the sewer line. See Sheet 6, Sewer Line Protection Plan, for details.

Flood Control. Because the project has increased frictional resistance in the channel, predicted water surface elevations show that flooding could affect small portions of private property (although predicted water surface elevations pose no threat to any improvements or structures). In order to eliminate flooding of private property, a 4-foot high retaining wall would be constructed adjacent to the private parcels on the eastern side of the project, as shown in Sheet 13.

Erosion Control. Channel erosion potential would change over time as the planted vegetation matures. Typically, the erosion potential of the channel and banks decreases as the project ages, and mature, stable vegetation is established. Approaches that integrate vegetation and biodegradable products such as fiber blankets, logs, and coir products would be used. The biodegradable products are used to provide temporary erosion protection and allow for the vegetation to mature and provide the primary erosion control within 3 to 5 years, giving re-vegetation plantings time to establish.

In order to provide short term erosion control but also not construct an entirely riprap-lined channel, the project design combines rock placement with other “softer” erosion control and habitat features. The floodplain terrace would be covered with an erosion control blanket that would be made of biodegradable coir fiber. Typically, the fiber begins to degrade within 2 to 3 years but takes up to 10+ years to fully disintegrate. The bank slope would be hydroseeded with an appropriate woody and grass seed mixture, and a biodegradable erosion control blanket would be installed on top of all exposed slopes. Bank slope planting would be completed by cutting holes within the blanket and installing appropriate tree and shrub species. Anchored logs would be incorporated into the pools and grade control structures to dissipate erosive energy and create habitat complexity. These logs would anchored using large stone counter weights. In addition, coir bio-blocks would be installed along the channel edge in association with willow stakes.

Confluence Restoration. The confluence area at the downstream portion of the project would be treated with many of the same channel stabilization and habitat enhancement techniques utilized throughout the rest of the project. Near the outflow of the storm drain pipe, riprap rock armoring will be installed to dissipate the energy of flows exiting the drain. Farther downstream, a small pool, two rock grade control structures, and large wood habitat features will create a smooth transition into the main channel.

Planting Plan. Planting for the project area would be divided into three different planting zones: a) floodplain and lower bank, b) mid-bank slope, and c) uplands, allowing for site-specific native species selection. Willow staking of the rock weirs, rock revetment, and coir bio-blocks have been previously discussed. A temporary irrigation system would need to be installed to ensure adequate irrigation during the vegetation establishment period. See Sheet 10 and 11, Planting and Irrigation Plan, for details.

Public Access. Sheet 9 illustrates the conceptual alignment of the proposed public access facilities. A pedestrian bridge and trail compliant with the American Disability Act (ADA) is proposed to connect Chumash Park with Kanan Road. The pedestrian bridge would be installed with a minimum of 1 foot of freeboard above the 100-year flood elevation with a low chord at approximately 865 feet. In addition, a trail is proposed accessing the “confluence area” at the downstream extent of the project site and an additional connection to Kanan Road via concrete steps is also being considered.

INTRODUCTION

This report presents results from the Geotechnical Investigation for the Medea Creek Restoration Project Public Access Improvements. Questa's Geotechnical Investigation included background geologic and seismic data review, a geophysical survey, a subsurface investigation including drilling, logging and sampling of three boreholes, laboratory soils testing, engineering analysis, and development of geotechnical design recommendations. The design recommendations presented in this report are limited to the site preparation and grading, paved and unpaved trail sections, pedestrian bridge foundations, and stairs foundation. For information on the creek bank and channel stabilization measures to be undertaken following removal of the concrete channel, refer to the *Design Report for Medea Creek Restoration Project, City of Agoura Hills, California* and the Project Plans.

REGIONAL SEISMICITY

The project site is located within the Traverse Ranges Geomorphic Province in Southern California, a region characterized by connected valleys, low hills, and undulating terrain bounded on the south by the Santa Monica Mountains on the north by Mountclef ridge, Conejo Ridge, and the Simi Hills. This area forms a major structural block of the earth's crust between the San Gabriel and San Andreas faults on the northeast, and the Malibu Coast and Anacapa-Dume faults on the south. Within this area the City of Agoura Hills occupies part of a depression extending from the western Conejo Valley to the Southwestern San Fernando Valley, known as the Conejo-Las Virgenes region.

Within the Transverse Ranges there are abundant compressional reverse, thrust, and normal faults and strike-slip faults that generally trend in an east-west direction. The dominant structural feature that has shaped the geologic development of the province is the San Andreas Fault. This fault, located approximately 45 miles northeast of the site, has a northwest strike, located both to the north and south of the Transverse Ranges, but bends into a west to northwest strike within the Transverse Ranges.

FAULTING

The Southern California region is seismically active and commonly experiences strong ground-shaking resulting from earthquakes along both known and previously unknown active faults. Active faults are defined as faults that have caused displacement within the Holocene period (the last 11,000 years). Potentially active faults are faults that have experienced movement in the Quaternary period (the last 1.6 million years), but not during the Holocene period. Faults that have not experienced movement in the last 1.6 million years are generally considered inactive.

The nearest active fault traces in relation to the project site are the Malibu Coast fault located approximately 7 miles to the south and the Simi-Santa Rosa fault located approximately 7 miles to the north. These faults each have an Alquist-Priolo Earthquake Fault Zone Boundary and are the nearest regulated active faults to the project site. Other nearby active faults include the San

Andreas fault located 45 miles northeast, the Anacapa-Dume fault located 12 miles south, the Santa Monica fault located 13 miles southeast, and the Northridge fault located 13 miles northeast. In addition, the Thousand Oaks area contains segments of the potentially active Sycamore Canyon-Boney Mountain fault zone, which lies no closer than 5 miles from the City of Agoura Hills. The faults most likely to produce earthquakes in the geographic region are the San Andreas, San Jacinto, Elsinore-Whittier and the Newport-Inglewood faults. The risk of surface rupture at the site is considered low. The Project Site is not located within an Alquist-Priolo Earthquake Fault Zone or other mapped fault trace. **Table 1** presents a summary of the regional active and potentially active faults that could impact the site. No faults zoned as active by the State of California Geological Survey cross the subject property.

Table 1. Regional Faults and Activity

Fault Name	Maximum Magnitude (Richter)	Slip Rate (mm/yr)	Distance From Site (mi)	Direction From Site
Malibu Coast	6.7	0.3	7	S
Simi-Santa Rosa	7	1	7	N
Anacapa-Dume	7.5	3	12	S
Santa Monica	6.6	1	13	SE
Northridge	7	4.5	13	NE
Santa Susana	6.7	5	15	NE
Oak Ridge	7	4	17	NW
San Cayetano	7	6	18	NW
Hollywood	6.4	1	20	E
San Fernando	6.7	2	21	NE
Chino-Central Avenue	6.7	1	22	NE
Verdugo	6.9	0.5	22	NE
San Gabriel	7.2	1	22	NE
Upper Elysian Park	6.4	1.3	24	E
Newport-Inglewood	7.0	1	27	SE
Sierra Madre	7.2	2	27	NE
Raymond	6.5	4.5	29	E
Palos Verdes	7.3	3	32	SE
Elsinore	6.8	5	42	SE
San Andreas	7.4	30	45	NE
Clamshell-Sawpit	6.5	.5	47	E
Whittier	6.8	2.5	48	SE
San Jose	6.4	.5	50	SE

Sources: California Geological Survey, 2007; US Geological Survey and California Geological Survey,2006; Wills and Others, 2008

Table 2 presents a summary of the major historic earthquakes in Southern California with the date of occurrence, magnitude and the approximate distance and direction to the epicenter relative to the site location.

Table 2. List of Major Historic Earthquakes in Southern California

Fault	Date of Earthquake	Magnitude (Richter)	Distance From Site (mi)	Direction To Epicenter
Long Beach	March 11, 1933	6.4	56	SE
Kern County	July 21, 1952	7.3	60	NW
San Fernando	February 9, 1971	6.6	30	NE
Whittier Narrows	October 1, 1987	5.9	40	SE
Sierra Madre	June 28, 1991	5.8	44	NE
Big Bear	June 28, 1992	6.4	111	E
Landers	June 28, 1992	7.3	143	E
Northridge	January 17, 1994	6.7	25	E
Hector Mine	October 16, 1999	7.1	145	NE

Source: California Geological Survey, 2013, California Historical Earthquake Online Database (M>=5.5)

SITE GEOLOGY

Bedrock geology is shown on the *Geologic Map of the Thousand Oaks Quadrangle in Ventura and Los Angeles Counties* (USGS 1993). Overlying the bedrock is Quaternary gravel and sand and recent alluvial gravel, sand and clay deposited by historic stream channels where the existing concrete channel now lies. These materials overlie the bedrock units which include marine-deposited sedimentary rocks generally consisting of conglomerate, sandstone, siltstone, and shale of the Topanga, Calabasas, and Modelo Formations, and andesitic and basaltic volcanic rocks of the Conejo Formation. Andesitic flows and breccias of the Conejo Volcanics are exposed along the southwestern slope in the vicinity of the proposed project corridor (USGS 1993). Although not exposed, a lense of gray thinly bedded clay shale and siltstone, the Upper Topanga Formation is mapped along the northwestern slope of the site (USGS 1993). **Plate 1** presents a geologic map of the site and vicinity.

SITE SOILS

The USDA soil survey map for the Santa Monica Mountains National Recreation Area (CA 692) classifies this site as urban land-Cropley fill complex with slopes between 0 and 8 percent. The typical soil section is composed of 0 to 2 inches of sandy loam, 2 to 10 inches of gravelly sandy clay loam, 10 to 14 inches of clay, 14 to 30 inches of sandy clay loam, 30 to 37 inches of clay loam and 37 to 69 inches of clay. The observable soils on the western bank and open-space are quite shallow. Bedrock outcrops can be seen throughout the area. Soils on the eastern portion of the site are expected to be deeper, but highly disturbed due to the adjacent residential development.

SLOPE STABILITY

Slope failure is relatively common in the Traverse Ranges of Southern Califronia and often results from a combination of step slope and periods of intense rainfall, where saturation of the ground results in a loss of soil or rock strength. Occasionally, seismic shaking may trigger slope failure in the form of a rockslide, slump or other type of failure. Mudflows or debris flows generally refer to a deforming mass of soil, organic material and rock that when saturated starts to flow downhill. Landsliding or slumping involves slippage of a discrete mass along a zone or plane of weakness. The plane of weakness commonly occurs along bedding, a fracture, or a contact between fill and native material. The frequency of nearly all types of failure is strongly dependent upon the specific rock and soil conditions occurring on a slope.

The Geologic Map (USGS 1993) for the project vicinity maps the area primarily as gravel and sand of major stream channels and some additional areas of alluvial gravel, sand and clay of valley areas along the slopes of the project vicinity as shown in **Plate 1.** The Relative Slope Stability map of the project area (CDMG, 1983) indicated that the channel is located in an area underlain by geologically competent formations having few or no perceptible landslides and no landslides are shown on the Landslide map of the area (CDMG, 1983). The area has been mapped in accordance with the Seismic Hazard Mapping Act for risk of earthquake-induced landsliding as shown in **Plate 2**. No areas of the site have been identified as areas at risk of earthquake-induced landsliding according to the Seismic Hazards Zone Map for the Thousand Oaks Quadrangle (CDMG, 2000).

The primary slope stability concerns at the proposed project corridor are the possibility of upstream slope failures that may impact the site.

LIQUEFACTION

The area has been mapped in accordance with the Seismic Hazard Mapping Act for liquefaction potential (**Plate 2**). The liquefaction potential of the Agoura Hills area has been examined and is summarized in the Seismic Hazard Zone Report for Thousand Oaks (CDMG, 2000). According to CDMG maps, the risk from liquefaction at this site is considered very low. However, the subsurface drilling investigation revealed loose to medium dense sandy soils present in two of the boreholes completed. These materials are potentially liquefiable or could undergo dynamic densification and are evaluated in the following section.

Liquefaction Analysis

Based on the results of our subsurface investigation, sand, silty sand and clayey sand deposits found in boreholes BH-1 at a depth of 2.75 feet to 5.75 feet BGS have a high potential for liquefaction or dynamic densification. Clayey sand deposits in BH-2 at a depth of 14.75 to 18.75 feet BGS have a low to moderate potential for liquefaction. These sediments may undergo ground shaking induced liquefaction (if saturated with groundwater) or dynamic densification (if in the dry state) during a major earthquake event. The potentially liquefiable soils in BH-1 at the proposed stairs bottom landing location are located above the existing groundwater table which would preclude liquefaction from occurring. No groundwater was found in BH-1 to the total depth at 18 feet below ground surface. Based on soil moisture contents, soils shallower than 5 feet are dry to moist and moisture contents increase considerably below 5 feet where soils become wet. In the dry state, these sands would still be subject to the effects of dynamic densification during earthquake induced ground shaking.

Potentially liquefiable clayey sand soils in BH-2 are located below the groundwater table and have a moderate potential for liquefaction during earthquake induced ground shaking. The laboratory testing of physical properties of these materials indicate that they have approximately 25 percent fines, but the low liquid limit of 30 and plasticity index of 15 are in a range that could potentially be subject to liquefaction.

Liquefaction Settlement

Liquefaction settlement of sand, silty sand, and clayey sand lenses underlying the proposed stair landing and clayey sand underlying the proposed eastern bridge abutment were calculated using the computer program Liquefaction SPT 3.0 (SoilStructure.com, 2014) which follows the procedures of Idriss and Boulanger (2008) in conformance with Special Publication 117A, California Geological Survey (2008). Based on Liquefaction factor of safety analysis using a design groundwater depth of 5.0 feet, the soils underlying the stair landing area in borehole BH-1 would have no liquefaction settlement or lateral displacement. The dry sand and silty sand soils in the upper 5.25 feet could undergo dynamic densification. Clayey sand soils found in BH-2 at depths of 14.75 to 18.75 feet could have liquefaction induced settlements of as much as 2.0 inches at the eastern abutment of the pedestrian bridge with no lateral displacement. A groundwater design level of 5.0 feet was used in this calculation. Liquefaction settlement analysis results are presented in **Appendix A.**

Lateral Spreading

Lateral spreading is another secondary effect of seismically induced ground shaking wherein pore-pressure buildup during liquefaction can result in the movement of gently sloping ground towards a free face or down slope direction. Calculations of lateral displacement for soils found in BH-2 indicate that no lateral displacement would occur during liquefaction settlement at the eastern bridge abutment. Lateral displacement calculations are presented in **Appendix A.**

FIELD INVESTIGATION

A multiple phase field investigation was conducted for the project site. Initially, a site reconnaissance was performed to review the surface conditions along the proposed project corridor. Much of the project area that is outside of the concrete channel is covered in brush and vegetation. Outcrops of volcanic rocks of the Conejo Formation are exposed in a few locations along the channel banks to the southwest. Locally, there were no slope or bank instabilities observed in or around the project location.

Following this, a geophysical study was performed to determine the general subsurface conditions of the project site to aid in determining the feasibility of removal of the channel improvements to establish an engineered “natural” drainage course. The final stage of the field investigation included the drilling, logging and sampling of three boreholes at the proposed locations of the stairs and pedestrian bridge abutments.

Geophysical Survey

Geophysical study of the site area was conducted by Spectrum Geophysics on August 6, 2013 using seismic refraction surveying (**Appendix B**). This seismic method indirectly examines the strength of rocks and their suitability for foundations, and can detect pressure zones and discontinuities within the rock. It can detect the depth to bedrock and provide an initial assessment of the rippability of earth materials. All three seismic refraction transects show two distinct units: (1) a low velocity (1,100-1,900 ft/s) upper layer and (2) a high velocity (9,600-13,000 ft/s) lower layer. The Geophysical Survey line locations and cross-sections are presented in **Appendix B.**

When comparing the results of the three geophysical surveys there are similarities between the thickness of the layers and their corresponding velocities. Line 1 shows the upper alluvium unit varying between 10 and 15 feet thick with low velocities (1,000-1,800 ft/s) and the lower bedrock unit as being at least 40 feet thick with a high velocity (9,900 ft/s). Line 2 shows the upper alluvium unit varying between 10 and 15 feet thick with low velocities (1,500-1,900 ft/s) and the lower bedrock unit as being at least 40 feet thick with a high velocity (9,600 ft/s). Line 3 shows the upper alluvium unit as being 5 feet thick with low velocities (1,100-1,800 ft/s) and the lower bedrock unit as being at least 40 feet thick with a high velocity (13,000 ft/s).

The variance shown in the velocities of the upper unit suggest a composition of fill, native alluvial soils and sedimentary rocks that would be easily rippable and could be excavated with conventional equipment. Conversely the lower bedrock unit velocities indicate an intact bedrock unit that would be difficult to excavate. This unit is likely the Conejo Formation consisting of andesitic volcanic rock.

Subsurface Drilling Investigation

The subsurface drilling investigation included completion of three boreholes to depths of 13.5 feet below ground surface to 23.5 feet BGS. Drilling was performed on October 21, 2013, by High Definition Drilling of Woodland Hills, California, using a truck mounted CME 75. Drilling utilized hollow-stem augers and sampling was performed using a 140-pound safety hammer dropped from a height of 30 inches. Samples were collected using the California Modified split-spoon sampler with 2.45 inch inside diameter brass liners and with the Standard Penetration Test sampler with 1.38 inch inside diameter**.** Boreholes were logged by a Staff Geologist under the supervision of our Senior Engineering Geologist. Borehole locations are presented on **Figure 1,** site location and borehole location plan.

Borehole 1 (BH-1) was completed at the location of the proposed stairs adjacent to the northeast side of the culvert at Kanaan Road The log of BH-1 is presented as **Figure 2.** The soils as penetrated in this borehole underlie a pavement section of asphalt concrete and Class 2 AB 0.75 feet deep. The soils consist of clayey sand and silty sand to 3.5 feet, well graded sand to 5.5 feet, and clayey sand to 5.75 feet. These are underlain by silty sandstone and interbedded claystone, siltstone, and sandstone to a depth of 12.5 feet BGS, and andesite volcanic bedrock to the total depth of drilling at 18 feet BGS

Borehole 2 (BH-2) was completed on the east side of Medea Creek at the proposed abutment location for the Pedestrian Bridge across the creek. The log of BH-2 is presented as **Figure 3.** The soils as penetrated in this borehole underlie asphalt concrete and Class 2 AB which extend to approximately 1 foot in depth. The soils consist of clayey sand to 4.75 feet, sandy lean clay to 7.5 feet, sandy fat clay to 10.5 feet, clayey sand to 14.75 feet, silty sand to 18.75 feet, and clayey sand to 20 feet BGS. These soils are underlain by andesite volcanic bedrock to the total depth of the hole at 23.5 feet BGS.

Borehole 3 (BH-3) was completed on the west side of Medea Creek at the proposed abutment location for the Pedestrian Bridge across the creek. The log of BH-3 is presented as **Figure 4.** The soils as penetrated in this borehole consist of sandy gravel to a depth of 2.5 feet, sandy lean clay to 4.5 feet, and sandy fat clay to 7.25 feet BGS. These soils are underlain by andesite volcanic bedrock from 7.25 feet to the total depth of the borehole at 13.5 feet BGS.

LABORATORY TESTING

Laboratory testing was performed on selected soil samples from the boreholes. Laboratory testing was performed in Questa's laboratory in general accordance with American Society for Testing and Materials (ASTM) standards for moisture content, dry density, particle size analysis, and liquid and plastic limits (including plasticity index). Unconfined compressive strength (UC) testing was performed in accordance with ASTM standards by Soil Mechanics Laboratory. Full reports of strength testing are included in **Appendix C**. Corrosion testing was performed by Cooper Testing Laboratories of Palo Alto California. The corrosion testing results are also included in **Appendix C**. A brief explanation of the testing that was performed follows.

Moisture/Density

Moisture content and dry density testing were performed on selected soil samples to characterize the moisture content and dry density of material throughout the soil column. Testing was performed in accordance with ASTM 2937. In this test, the dry density of the soil is determined by a mathematical relationship between moisture content and wet density of the soil sample. Results of moisture-density testing are summarized on the borehole logs (**Figures 2** through **4**).

Particle Size Analysis

Particle size analysis testing was performed in accordance with ASTM D 422. Samples collected from each of the boreholes were tested for grain size using both the dry sieve method and the hydrometer method, used to determine clay and silt fraction percentages. Results are presented on **Figures 7** through **12.**

Liquid Limit, Plastic Limit and Plasticity Index

Testing of liquid limit, plastic limit and plasticity index were performed in accordance with ASTM D 4318. Samples collected from each of the boreholes were tested by this method. Results are presented on **Figures 13** through **15.**

Laboratory test data is summarized on **Table 3**.

Table 3. Results of Laboratory Testing

Sample Number	Moisture Content (%)	Dry Density (pcf)	% Passing #200 Sieve	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index
BH-1 @ 3.0'	5.4	93.4	15	--	--	--
BH-1 @ 3.5'	5.4	90.6	5	--	--	--
BH-1 @ 5.0'	6.4	98.6	10	--	--	--
BH-1 @ 5.5'	25.6	92.9	15	42	19	23
BH-1 @ 8.0'	26.7	88.3	25	--	--	--
BH-2 @ 2.5'	23.4	98.0	48	40	22	18
BH-2 @ 4.0'	13.9	102.2	45	--	--	--
BH-2 @ 6.0'	25.9	87.3	52	41	20	21
BH-2 @ 7.5'	37.8	74.8	87	85	28	57
BH-2 @ 10.0'	37.3	71.0	73	70	29	41
BH-2 @ 14.5'	32.1	86.8	57	56	19	37
BH-2 @ 15.0'	21.6	91.6	27	--	--	--
BH-2 @ 16.5'	29.8	88.4	24	--	--	--
BH-2 @ 3.0'	18.7	89.4	50	58	22	36
BH-3 @ 4.5'	26.0	80.5	56	63	23	40
BH-3 @ 10.0'	17.2	96.0	51	--	--	--

Unconfined Compressive Strength Testing

Results of unconfined compressive strength testing are presented in **Appendix B**. BH-2 at 6.5-7.0 feet BGS has an unconfined compressive strength of 6,290 psf. BH-2 at 10.5-11.0 feet BGS has an unconfined compressive strength of 3,000 psf.

Corrosion Testing

Soil samples were obtained for corrosion analyses from boreholes located at the site. Based on the results of the corrosion analyses, the site soils in the vicinity of BH-2 3-3.5' BGS are considered marginally corrosive by Caltrans standards (Caltrans Corrosion Guidelines version 2.0). The soils in the vicinity of BH-1 2-2.5 feet BGS and BH-3 2.5-8.0 feet BGS are considered non-corrosive. Corrosion test data is summarized in **Table** 4. The full laboratory test report by Cooper Testing Laboratory is presented in **Appendix B**.

Table 4. Corrosion Testing Results

Sample No.	Moisture Content (%)	Resistivity (Ohm-cm)	Chloride (ppm)	Sulfate (ppm)	pH	Redox (mV)
BH-1 2-2.5'	22.1	1,352	<2	42	7.5	524
BH-2 3-3.5'	20.8	962	4	1,352	7.6	535
BH-3 2.5-8.0'	21.3	2,778	8	80	7.7	544

Notes: ppm-parts per million; mV-millivolt

GEOTECHNICAL RECOMMENDATIONS

Site Preparation and Grading

Areas to be graded during Creek restoration should be cleared and grubbed to a depth of 4 to 6 inches to remove vegetation and surface organic soils, or to the depth of subgrade soil preparation at the base of the structural section which includes aggregate base (AB) and trail surfacing. Subgrade soils underlying trail sections should be scarified to a minimum of six inches, moisture conditioned to 2 to 4 percent above the optimum moisture content and compacted to a minimum of 90 percent of the maximum dry density as determined in the laboratory in accordance with ASTM D 1557.

Trail Sections

Unpaved

Foot path trail sections should be underlain by a minimum of six inches of Caltrans Class 2 AB placed over compacted subgrade soils as detailed above. A layer of woven geotextile may be desirable to provide segregation between the subgrade soils and the trail aggregate base. Class 2 AB should be compacted to a minimum of 95 percent of the maximum dry density at moisture contents within 2 percent of the optimum as determined in the laboratory in accordance with ASTM D 1557. The trail surface material should consist of a suitable quarry fines or decomposed granite (DG) material that is non-expansive and should be a minimum of 3 inches in thickness and compacted to 95 percent minimum relative compaction within 2 percent of optimum moisture content.

Paved

Roadway sections intended for limited light weight truck or medium weight truck traffic at reduced speeds less than 15 miles per hour should be underlain by a minimum of 9 inches of Class 2 AB placed over the woven geotextile. Asphalt concrete (AC) pavement should be a minimum of 3 inches in thickness. This section is based on a Traffic Index (TI) of 5.0 and an assumed Resistance value (R-value) of 10 for the subgrade soils.

PEDESTRIAN BRIDGE FOUNDATIONS

Based on results of our geotechnical investigation, the soils at the proposed bridge abutment locations should be founded on a cast-in-place pier and grade beam type foundation abutment, with piers extending into underlying sedimentary and volcanic bedrock a minimum of 6 feet. Based on the boreholes completed, bedrock was present at a depth of approximately 20 feet BGS in BH-2 under the east bank of the creek and at a depth of approximately 7.25 feet under the west bank of the creek.

Drilled cast-in-place concrete piers should be a minimum of 18 inches in diameter and should be designed to support vertical and uplift loads based on an allowable skin friction of 500 psf in stiff clay and clayey sand soils and 1,000 psf in sandstone and andesite, neglecting the top 5 feet of soils. Skin friction should be neglected in clayey sand soils beneath the eastern bridge abutment at depths of 14.75 to 18.75 feet due to the potential for liquefaction of soils in that depth range, which could reduce the skin friction in that zone to near zero. The recommended skin friction is for dead plus long-term live loads and can be increased by 33 percent for total loads including wind or seismic forces. End bearing should be neglected due to the difficulty in cleaning out small diameter pier holes. Resistance to lateral loads should be based on passive pressures using an equivalent fluid weight of 250 pcf over a width of two pier diameters on the portion of the piers extending into firm supporting soil, and 400 pcf in andesite bedrock.

The pier holes should be straight and free of loose soil and debris. Due to the possible presence of shallow ground water in the area, pier holes may require temporary casing during drilling and pouring of the concrete to prevent caving of the pier walls. The holes should be filled with concrete on the same days they are drilled. If holes are allowed to remain open, then the clay soils in portions of the sidewalls could begin to soften, reducing the skin friction on the sides of the piers. The concrete should be tremied into place and there should be no over-pouring of the concrete at the surface.

The pier reinforcements should be placed with a minimum of 3 inches clearance from the bottom and sidewalls of the pier holes using dobees or other approved spacers. Concrete should be Type II/V, or another type of corrosion resistant concrete.

Downdrag Forces

Downdrag loads could develop on the piles because of liquefaction-induced settlement of the soil adjacent to the piles. The magnitude of the downdrag load due to liquefaction-induced settlement will depend on several factors, including the thickness of liquefiable soil beneath the bridge abutment. We estimate the downdrag load will be on the order of 70 kips for 18-inch diameter cast-in-place piers. The downdrag load will only be applied temporarily shortly following a large earthquake on a nearby fault. Accounting for downdrag load and based on preliminary capacity estimates, we estimate the factor of safety of cast-in-place piers in compression will temporarily be reduced to about 1.7, which is acceptable.

STAIR FOUNDATION

The stairs to be located adjacent to the culvert and vehicle bridge across the creek at Kanan Road are underlain by shallow loose sandy soils having supporting characteristics for foundations that could be subject to a dynamic densification of less than 2”. Loose soils located beneath the stair landing should be excavated to a depth of 4 feet and replaced with Class 2 aggregate base compacted to a minimum of 95 percent of the maximum dry density to create a firm base for the concrete landing at the base of the stairs.

The stairs should be founded on a cast-in-place pier and grade beam type foundation abutment, with piers for the bottom landing extending into underlying sedimentary and volcanic bedrock a minimum of 10 feet. Piers for the landings located on the existing road embankment should have piers penetrating a minimum of 10 feet into the embankment engineered fill soils.

Drilled cast-in-place concrete piers should be a minimum of 18 inches in diameter and should be designed to support vertical and uplift loads based on a skin friction of 500 psf in sedimentary bedrock and engineered fill soils, neglecting the top 6 feet of potentially densifiable or liquefiable sandy soils or 3 feet of engineered embankment fill soils. The recommended skin friction is for dead plus long-term live loads and can be increased by 33 percent for total loads including wind or seismic forces. End bearing should be neglected due to the difficulty in cleaning out small diameter pier holes. Resistance to lateral loads should be based on passive pressures using an equivalent fluid weight of 250 pcf over a width of two pier diameters on the portion of the piers extending into firm supporting sedimentary bedrock or engineered fill soils.

SEISMIC DESIGN CRITERIA

The project should be designed in conformance with current applicable standards for seismic stability as presented in the 2013 California Building Code. The average soil conditions in the upper 100 feet indicate Site Class B, Rock. Seismic Design Criteria are summarized in **Table 5** for design of the project in accordance with the 2013 California Building Code, ASCE 7-10 Standard.

Table 5. Seismic Design Criteria in accordance with the 2013 California Building Code

Site Class	B
Soil Profile Name	Rock
Risk Category	I/II/III
Seismic Design Category	D
Peak Ground Acceleration (PGA)	0.574 g
Fpga	1.0
Mapped Spectral Response for Short Periods - 0.2 Sec (S_s)	1.545 g
Mapped Spectral Response for Long Periods - 1 Sec (S_1)	0.600 g
Site Coefficient- Fa, based on the mapped spectral response for short periods	1.0
Site Coefficient- Fv, based on the mapped spectral response for long periods	1.0
Adjusted Maximum Considered EQ Spectral Response for Short Periods (S_{MS})	1.545
Adjusted Maximum Considered EQ Spectral Response for Long Periods (S_{M1})	0.6
Design (5-percent damped) Spectral Response Acceleration Parameters at short periods (S_{DS})	1.030
Design (5-percent damped) Spectral Response Acceleration Parameters at long periods (S_{D1})	0.4
Design Response Spectrum T_L	8 seconds

CONCLUSIONS

Provided that the site is properly prepared and the structures and foundations are designed and constructed as recommended, we estimate that normal post-construction settlement for the Pedestrian Bridge and Stairs areas will be small, less than 1.0 inch. Differential settlements from the northeast bridge abutment to the southwest bridge abutment could be as much as 1 inch. Differential settlements under the Stairs are anticipated to be less than ½-inch.

Liquefaction settlement analysis indicates that liquefaction induced settlements of as much as 2.0 inches could occur at the northeastern abutment of the pedestrian bridge. Differential settlements associated with the liquefaction could be as much as 2 inches between the southwest and northeast bridge abutments.

LIMITATIONS

This investigation was performed in accordance with present geotechnical and engineering geologic standards applicable to this project. In our opinion, the scope of services adequately supports the conclusions and recommendations presented. The findings are valid now, but should not be relied upon after two years without our review.

The recommendations of this report are based upon the assumption that the conditions do not deviate from those interpreted from the surface observations of this investigation and review of available subsurface information developed by others. If any variation or undesirable conditions are encountered during construction, or if the proposed construction differs from that planned at the present time, we should be notified so that supplemental recommendations can be given. The recommendations of this report are intended for the site described only, and must not be extended to adjacent areas. This report is issued with the understanding that it is the responsibility of the owner to ensure that contractors and subcontractors carry out the recommendations presented.

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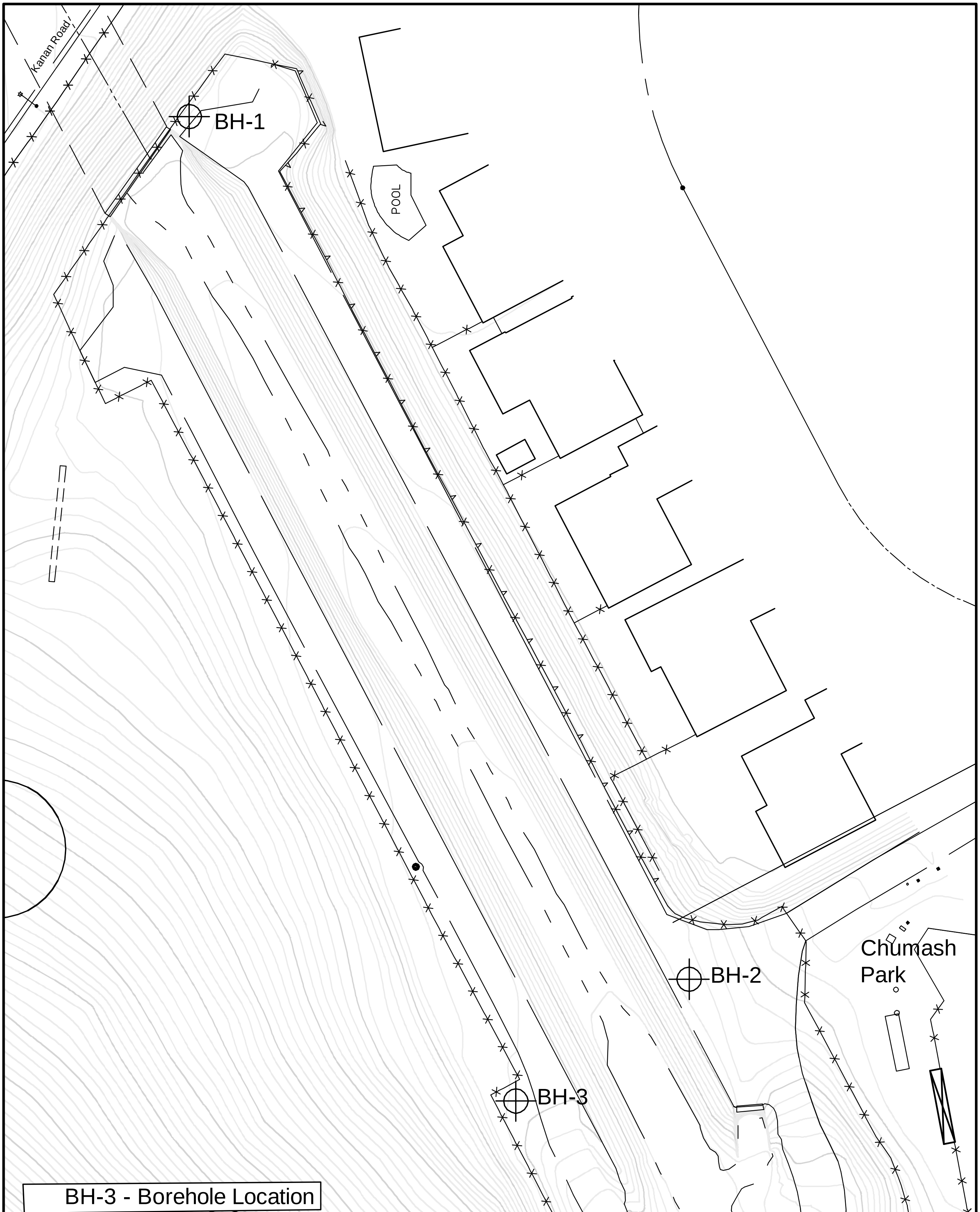
Figures



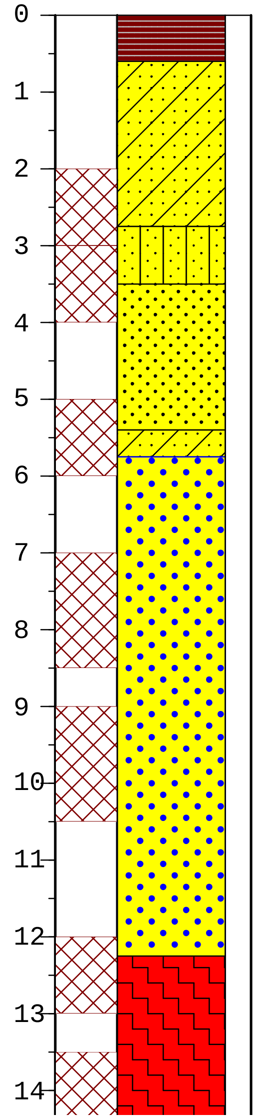
QUESTA
Civil
Environmental
& Water Resources
ENGINEERING CORP.
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

Borehole Locations
Medea Creek
Agoura Hills, CA

Date: 11/25/2013
Project: 1300042
Figure: 1

Lab Tests	Torvane, tsf	Sampler Type	% Passing #200 Sieve	Dry Density, pcf	Moisture %	Penetrometer, tsf	Blows/Foot * (Converted to SPT N-value)
Corr.							
		CA MOD	15	93.4	5.4	0.5	4*
	1.0	CA MOD	5	90.6	5.4	1.0	2*
			10	98.6	6.4		
PI23 LL42 PL19	1.2	CA MOD	15	92.9	25.6	4.5	5*
		CA MOD	25	88.3	26.7	>4.5	24*
		SPT				>4.5	34
		CA MOD				>4.5	48*

Sample Location / Graphical Symbol / Groundwater Depth (depth scale 0–14 ft)



USCS Symbol	Lithologic Description
	ASPHALT: 1.5" AC overlying 6" AB
SC	SC: Mottled brown clayey sand w/gravel, slightly moist, stiff and moderately cemented
SM	SM: Brown fine to silty sand, dry, loose
SW	SW: Brown fine to coarse grained sand, dry, very loose, coarsening downward
SC	SC: Brown Clayey Sand, wet, loose
	SANDSTONE: Silty Sandstone, Mottled brown, moderately weathered, interlayered w/claystone, siltstone & sandstone, moist to wet, friable, laminated bedding
	ANDESITE: Andesitic volcanic bedrock, dark gray, moist, weathered, moderately hard to hard, unfractured

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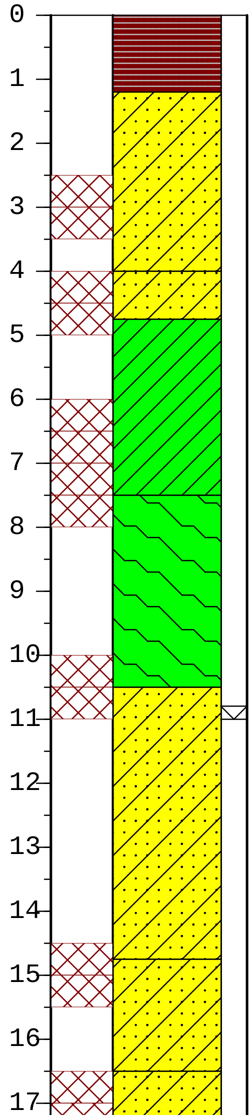
LOG OF BOREHOLE BH-1

Medea Creek

Agoura Hills, CA

Figure 2

Lab Tests	Torvane, tsf	Sampler Type	% Passing #200 Sieve	Dry Density, pcf	Moisture %	Penetrometer, tsf	Blows/Foot * (Converted to SPT N-value)	Depth	Sample Location	Graphical Symbol	Groundwater Depth	USCS Symbol	Lithologic Description
		SPT				>4.5	84/ 9"						
								15					ANDESITE: Andesitic volcanic bedrock,dark gray, moist, slightly weathered, hard, unfractured
								16					
								17					
		SPT					98/ 10"						
								18					End @ 18.0' 10/21/13 9:00am No Groundwater Encountered
								19					



Lab Tests	Torvane, tsf	Sampler Type	% Passing #200 Sieve	Dry Density, pcf	Moisture %	Penetrometer, tsf	Blows/Foot * (Converted to SPT N-value)	USCS Symbol	Lithologic Description
									ASPHALT: 1.5" of AC overlying 6" AB
								SC	SC: Light brown clayey sand w/gravel, slightly moist, medium dense
PI18 LL40 PL22		CA MOD	48	98	23.4	3.0	21*		
Corr.		CA MOD	45	102	13.9	3.0	14*	SC	SC: Brown clayey sand, moist, med. dense
								CL	CL: Mottled brown sandy clay, moist, stiff, medium plasticity
PI21 LL41 PL20	1.0 1.5	CA MOD	52	87.3	25.9	4.0	11*		
PI57 LL85 PL28	1.5	CA MOD	87	74.8	37.8	3.0	10*	CH	CH: Mottled brown sandy fat clay, moist to wet, stiff, high plasticity
PI41 LL70 PL29	1.5	CA MOD	73	71.0	37.3	1.5 2.0	7*		
								SC	SC: Dark gray-brown clayey sand, moist to wet, high to medium plasticity, loose to medium dense
PI37 LL56 PL19		CA MOD	57 27	86.8 91.6	32.1 21.6	0.5	7*	SC	SC: Gray-brown clayey sand, wet, loose to medium dense
			24	88.4	29.8			SC	SC: Gray-brown clayey sand , moist,

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LOG OF BOREHOLE BH-2

Medea Creek

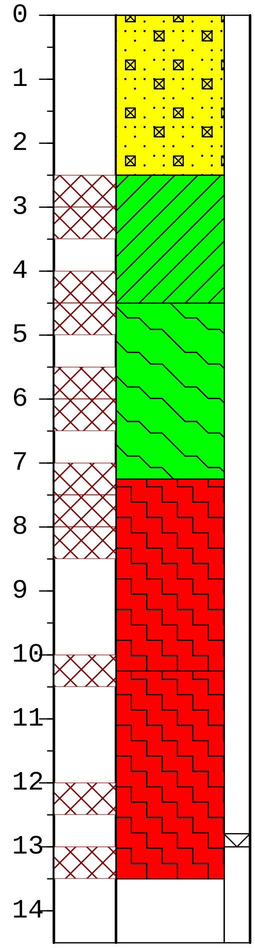
Agoura Hills, CA

Figure 3

Lab Tests	Torvane, tsf	Sampler Type	% Passing #200 Sieve	Dry Density, pcf	Moisture %	Penetrometer, tsf	Blows/Foot * (Converted to SPT N-value)	Depth	Sample Location	Graphical Symbol	Groundwater Depth	USCS Symbol	Lithologic Description
PI15 LL30 PL15		CA MOD				1.0	31*						medium dense to dense
								18					
		SPT					80/ 11"	19				SC	SC: Mottled brown clayey sand w/gr., moist, v. dense
		SPT					50/ 4"	20					ANDESITE: Dark gray andesitic volcanic bedrock, dry, slightly weathered, moderately hard to hard, unfractured, calcite veins
								21					
								22					
		SPT					50/ 4"	23					
								24					End @ 23.5' 10/21/13 11:00am Groundwater encountered @ 11' BGS
								25					

Lab Tests	Torvane, tsf	Sampler Type	% Passing #200 Sieve	Dry Density, pcf	Moisture %	Penetrometer, tsf	Blows/Foot * (Converted to SPT N-value)
PI36 LL58 PL22	15	CA MOD	50	89.4	18.7	3.0	18*
PI40 LL63 PL23		CA MOD	56	80.5	26.0	3.0	13*
Corr.		CA MOD				>4.5	15*
		CA MOD				>4.5	48*
		CA MOD	51	96.0	17.2		50/ 6"
		SPT					50/ 5"
		SPT					50/ 5"

Sample Location | Graphical Symbol | Groundwater Depth



USCS Symbol	Lithologic Description
GP	GP: Light brown sandy gravel, dry, medium dense
CL	CL: Mottled brown sandy clay to clayey sand, moist, very stiff, medium dense, medium plasticity
CH	CH: Yellow-brown sandy clay, moist, stiff, high plasticity
	ANDESITE: Dark gray weathered andesitic volcanic bedrock, moist, hard, massive, fractured
	ANDESITE: Dark gray andesitic volcanic bedrock, moist, hard, massive, fractured
	End @ 13.5' 10/21/13 1:30pm Goundwater encountered @ 13' BGS

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LOG OF BOREHOLE BH-3

Medea Creek

Agoura Hills, CA

Figure 4

MAJOR DIVISION				TYPICAL NAMES
COARSE GRAINED SOILS MORE THAN HALF IS LARGER THAN #200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN #4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	Well graded Gravels, Gravel-Sand mixtures
			GP	Poorly graded Gravels, Gravel-Sand mixtures
		GRAVELS WITH OVER 12% FINES	GM	Silty Gravels, poorly graded, Gravel-Sand-Silt mixtures
			GC	Clayey Gravels, poorly graded Gravel-Sand-Clay mixtures
	SANDS MORE THAN HALF COARSE FRACTION IS LARGER THAN #4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	Well graded Sands, Gravelly-Sands
			SP	Poorly graded Sands, Gravelly-Sands
		SANDS WITH OVER 12% FINES	SM	Silty Sands, poorly graded, Sand-Silt mixtures
			SC	Clayey Sands, poorly graded, Sand-Clay mixtures
FINE GRAINED SOILS MORE THAN HALF IS SMALLER THAN #200 SIEVE	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 Clays and Organic Silty Clays of low plasticity
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	Inorganic Silts, micaceous or diatomaceous fine Sandy or Silty Soils,elastic Silts
			CH	Inorganic Clays of high plasticity, fat Clays
			OH	Organic Clays of medium to high plasticity, organic Silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

BGS	Below Ground Surface	PSA	Particle Size Analysis
SPT	Standard Penetration Test Sampler (1.38“ inside diameter)	UC/TXUU	Unconfined Compression / Triaxial Shear Unconsolidated-Undrained
CAM	California Modified Sampler (S & H) (2.45“ inside diameter)	LL, PL, PI	Liquid Limit, Plastic Limit, Plasticity Index

Questa Engineering Corporation P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807 Phone: (510) 236-6114 FAX: (510) 236-2423	**UNIFIED SOIL CLASSIFICATION SYSTEM AND KEY TO ABBREVIATIONS**	FIGURE 5

PHYSICAL PROPERTIES CRITERIA FOR EVALUATING CONDITIONS OF BEDROCK

I. INDURATION - The process of hardening or consolidating of sediments or other rock aggregates through cementation, pressure, heat, or other cause.

U = unindurated   P = poorly indurated   M = moderately indurated   W = well indurated

II. BEDDING

Splitting Property		Thickness (feet)	Stratification
massive	greater than 4.0	very thick bedded	
blocky		2.0 to 4.0	thick bedded
slabby		0.2 to 2.0	thin bedded
flaggy		0.05 to 0.2	very thin bedded
shaly or platy	0.01 to 0.05	laminated	
papery		less than 0.01	thinly laminated

III. FRACTURING

Intensity	Frequencies of Fractures (feet)
little fractured	greater than 4.0
occasionally fractured	1.0 to 4.0
moderately fractured	0.5 to 1.0
closely fractured	0.1 to 0.5
intensely fractured	0.05 to 0.1
crushed	less than 0.05

IV. HARDNESS

soft - Reserved for plastic material

low hardness - Can be gouged deeply or carved easily with a knife blade

moderately hard - Can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away

hard - Can be scratched with difficulty; scratch produces little powder and is often faintly visible

very hard - Cannot be scratched with knife blade; leaves a metallic streak

V. STRENGTH

plastic - Very low strength, similar to soil

friable - Crumbles easily by rubbing with fingers

weak - An unfractured specimen will crumble under light hammer blows

moderately strong - Specimen will withstand a few heavy hammer blows before breaking

strong - Specimen will withstand a few heavy ringing hammer blows before breaking into large fragments

very strong - Specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments

VI. WEATHERING - The physical and chemical disintegration and decomposition or rocks and minerals by natural processes such as oxidation, reduction, hydration, solution, carbonation, and freezing and thawing.

deep - Moderate to complete mineral decomposition; extensive disintegration; deep and thorough discoloration; many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt

moderate - Slight change or partial decomposition of minerals; little disintegration; cementation is little to unaffected; moderate to occasionally intense discoloration; moderately coated fractures

little - No megascopic decomposition of minerals; little to no effect on normal cementation; slight and intermittent or localized discoloration; a few stains on fracture surfaces

fresh - Unaffected by weathering agents; no disintegration or discoloration; fractures usually less numerous than joints

Questa Engineering Corporation
P.O. Box 70356
1220 Brickyard Cove Road
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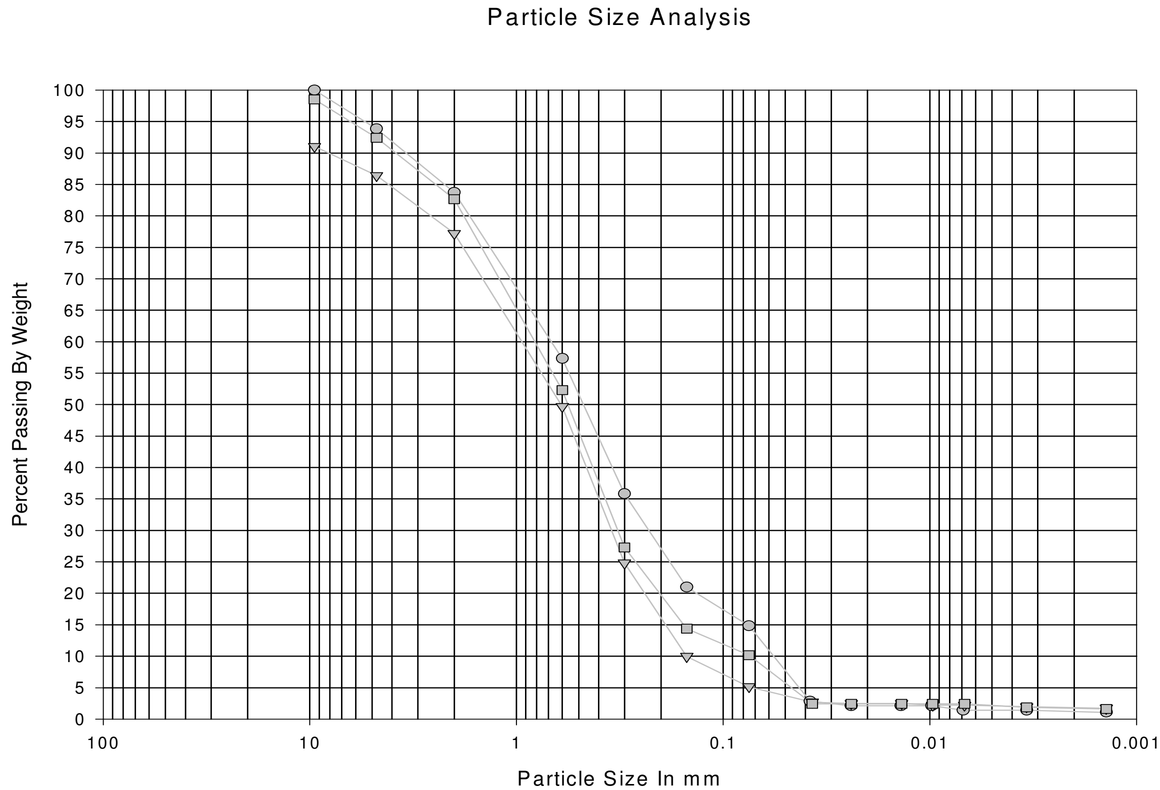
PHYSICAL PROPERTIES CRITERIA FOR EVALUATING CONDITIONS OF BEDROCK

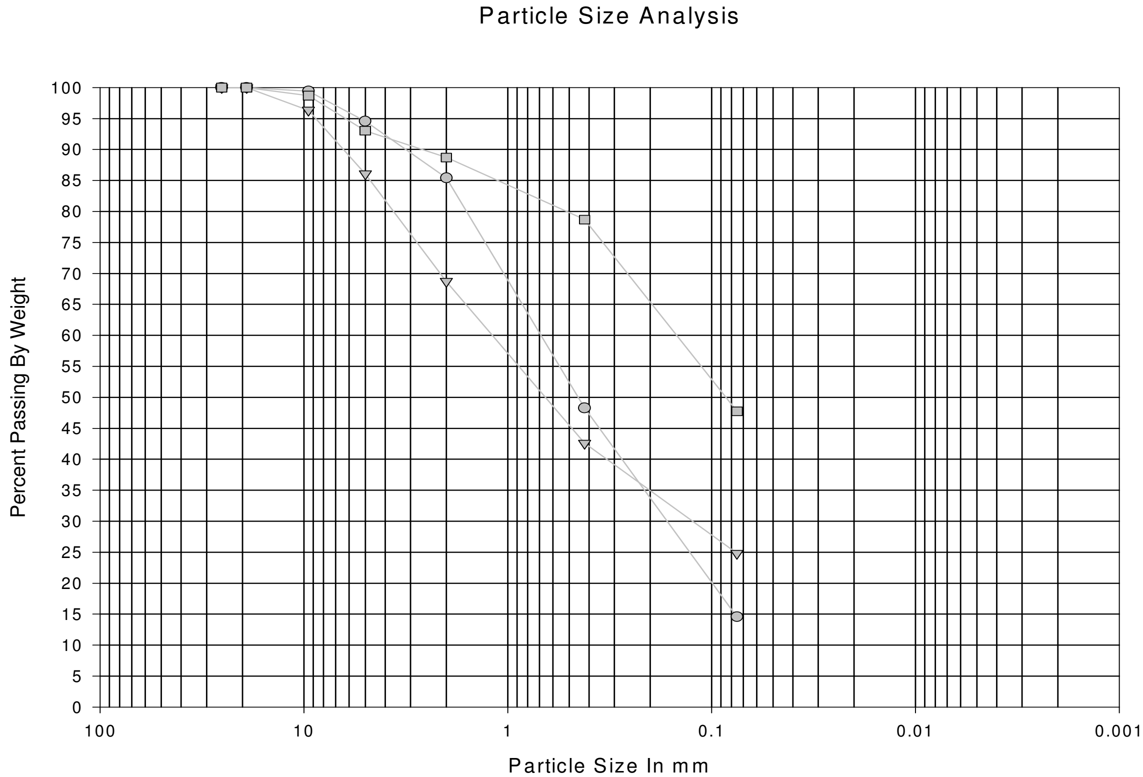
FIGURE 6



GRAVEL		SAND			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		

Symbol	Source
●	BH-1 3.0-3.5'
▼	BH-1 3.5-4.0'
■	BH-1 5.0-5.5'

Questa Engineering Corporation	Particle Size Analysis	Figure
PO Box 70356 (510) 236-6114 1220 Brickyard Cove Road FAX (510) 236-2423 Point Richmond, CA 94807 questa@questaec.com	Medea Creek Agoura Hills, CA	7



GRAVEL		SAND			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		

Symbol	Source
Circle	BH-1 5.5-6.0'
Triangle	BH-1 8.0-8.5'
Square	BH-2 2.5-3.0'

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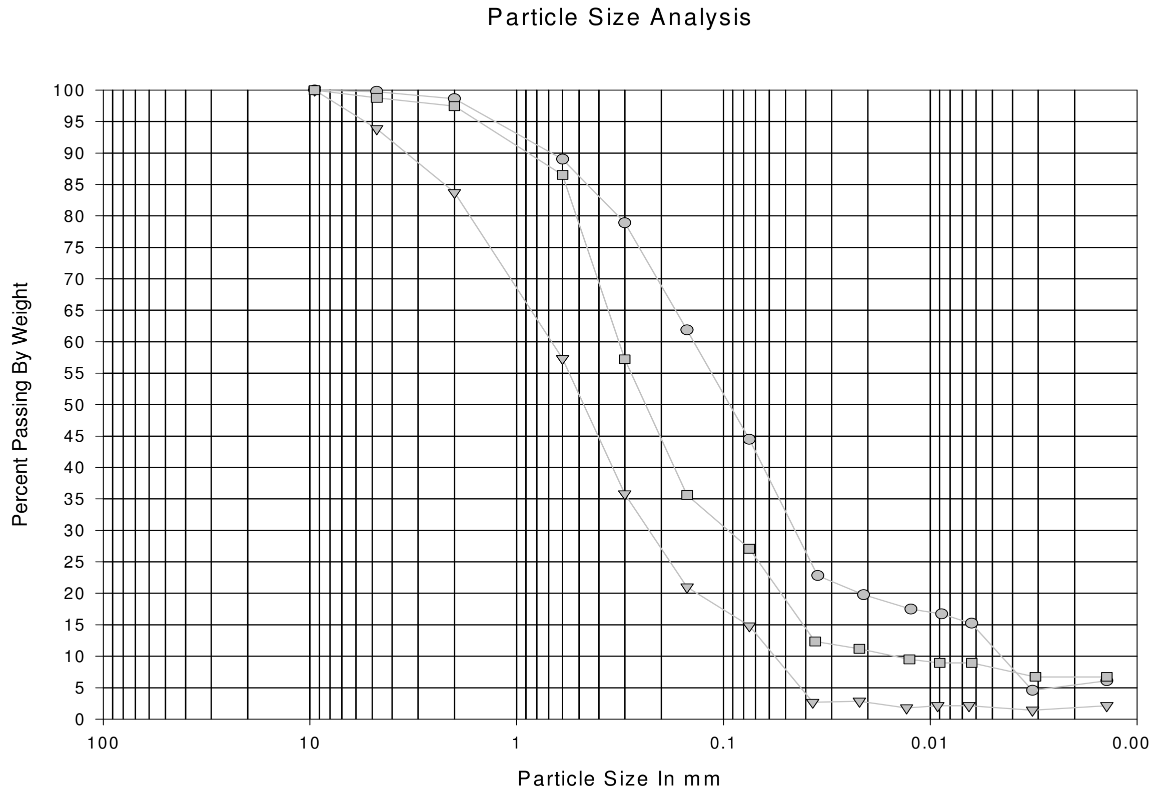
Particle Size Analysis

Medea Creek
Agoura Hills, CA

Figure
8



GRAVEL		SAND			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		

Symbol	Source
●	BH-2 4.0-4.5'
▼	BH-2 15.0-15.5'
■	BH-2 16.5-17.0'

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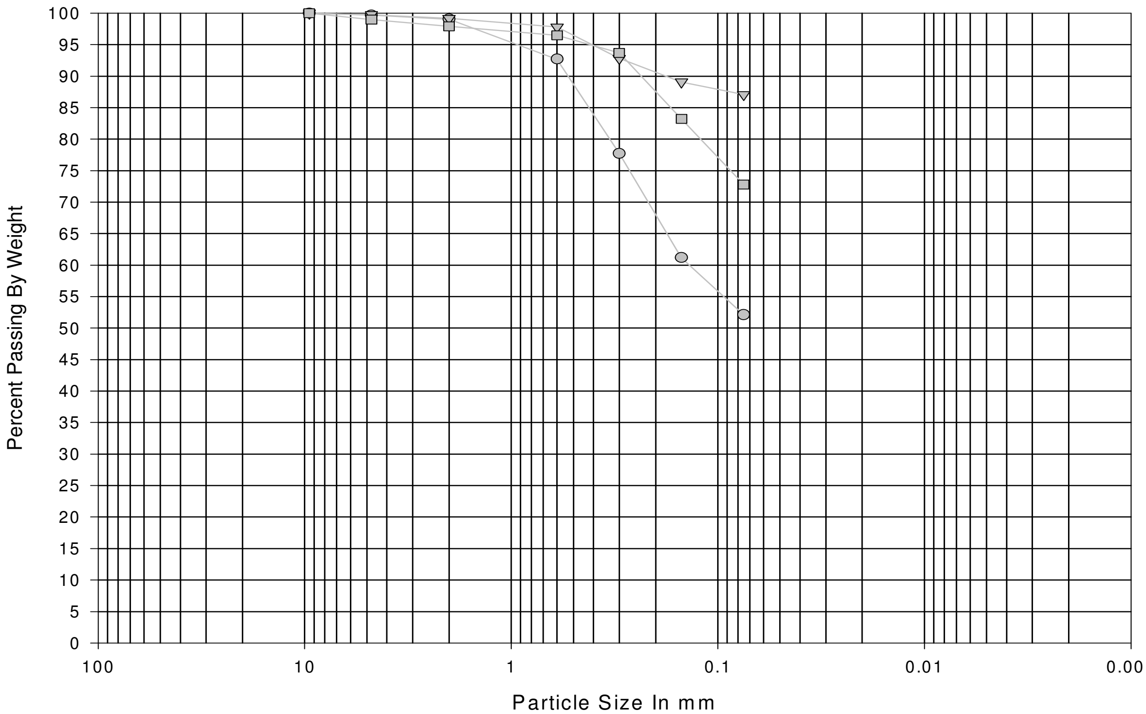
Particle Size Analysis

Medea Creek
Agoura Hills, CA

Figure
9

Particle Size Analysis



GRAVEL		SAND			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		

Symbol	Source
● (circle)	BH-2 6.0-6.5'
▼ (triangle)	BH-2 7.5-8.0'
■ (square)	BH-2 10.0-10.5'

Questa Engineering Corporation		Particle Size Analysis	Figure
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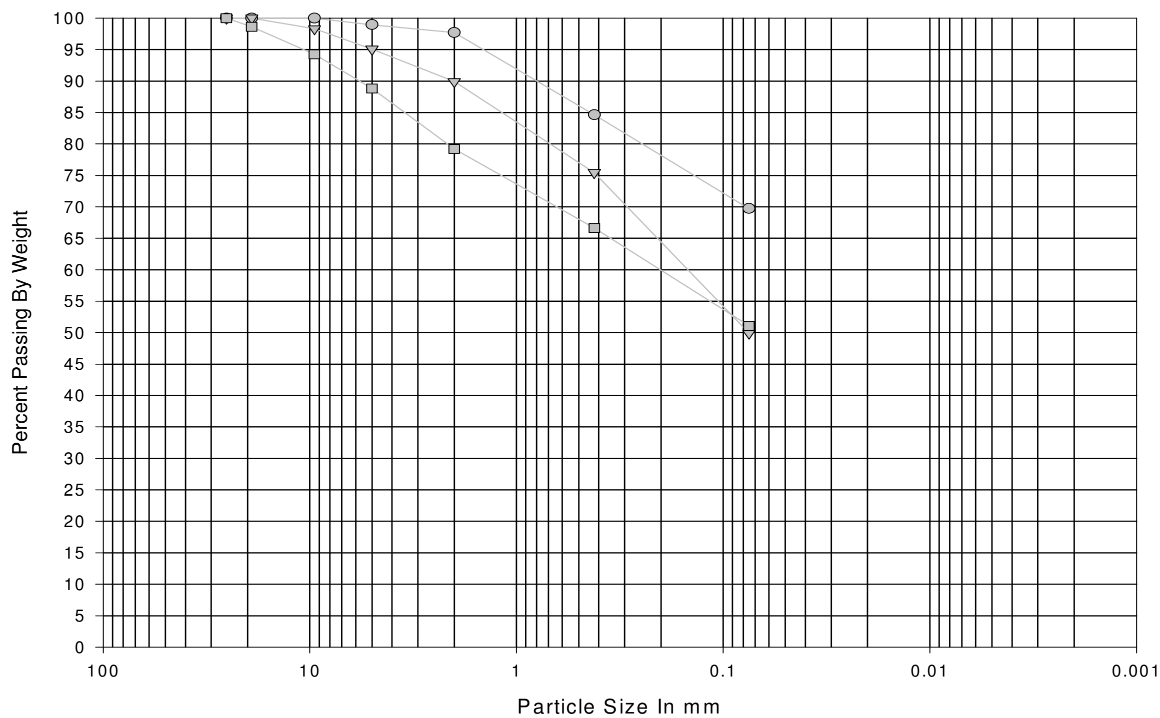
1220 Brickyard Cove Road	FAX (510) 236-2423	Medea Creek	
Point Richmond, CA 94807	questa@questaec.com	Agoura Hills, CA	

Particle Size Analysis



GRAVEL		SAND			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		

Symbol	Source
●	BH-2 Bulk 10-12'
▼	BH-3 3.0-3.5'
■	BH-3 Bulk 5-7'

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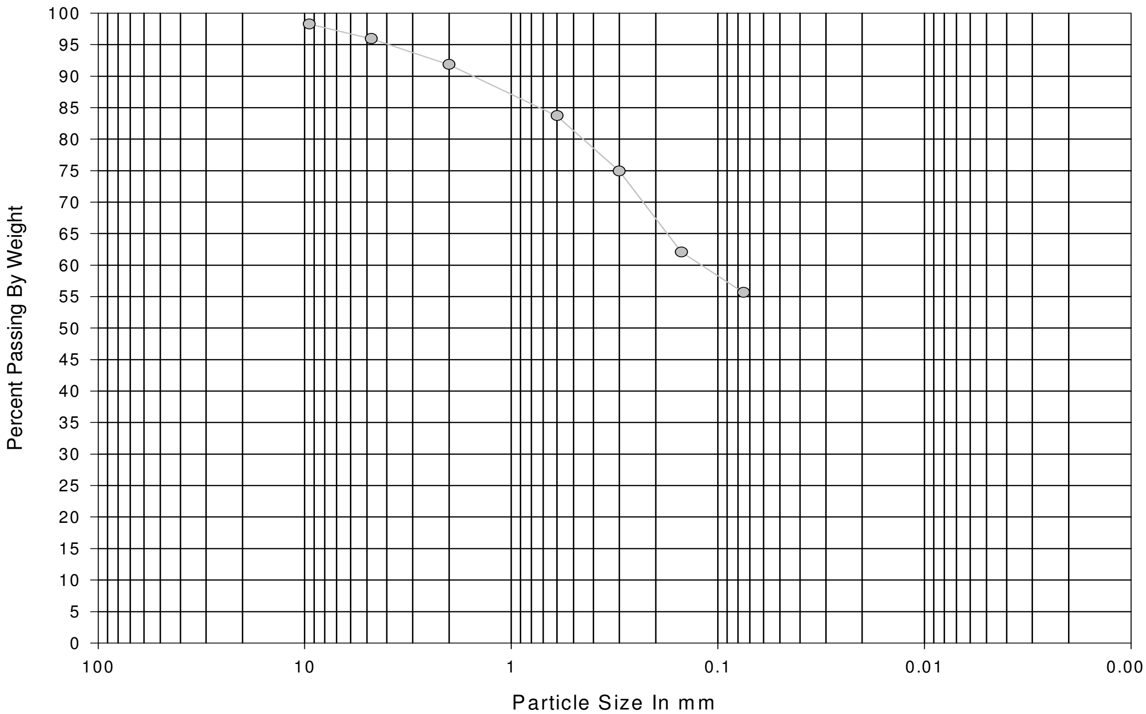
Particle Size Analysis

Medea Creek
Agoura Hills, CA

Figure
11

Particle Size Analysis

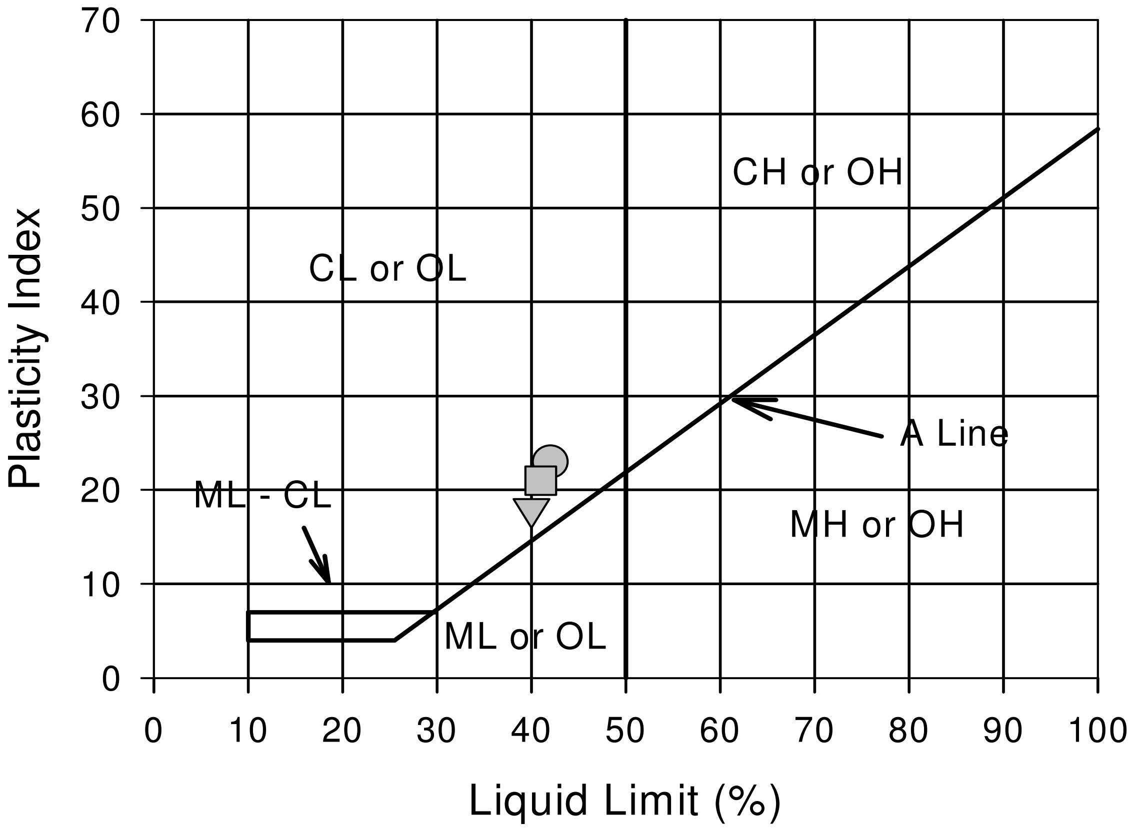


GRAVEL		SAND			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		

Symbol	Source
●	BH-3 4.5-5.0'
▼	
■	

Questa Engineering Corporation	Particle Size Analysis	Figure
PO Box 70356 (510) 236-6114 1220 Brickyard Cove Road FAX (510) 236-2423 Point Richmond, CA 94807 questa@questaec.com	Medea Creek Agoura Hills, CA	12

Atterberg Limits



Symbol	Classification and Source	Liquid Limit %	Plastic Limit %	Plasticity Index	% Passing #200 Sieve
●	Brown clayey sand (SC), BH-1 5.5-6.0'	42	19	23	15
▼	Light brown clayey sand (SC), BH-2 2.5-3.0'	40	22	18	48
■	Mottled brown sandy clay (CL), BH-2 6.0-6.5'	41	20	21	52

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Point Richmond, CA 94807

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FAX (510) 236-2423
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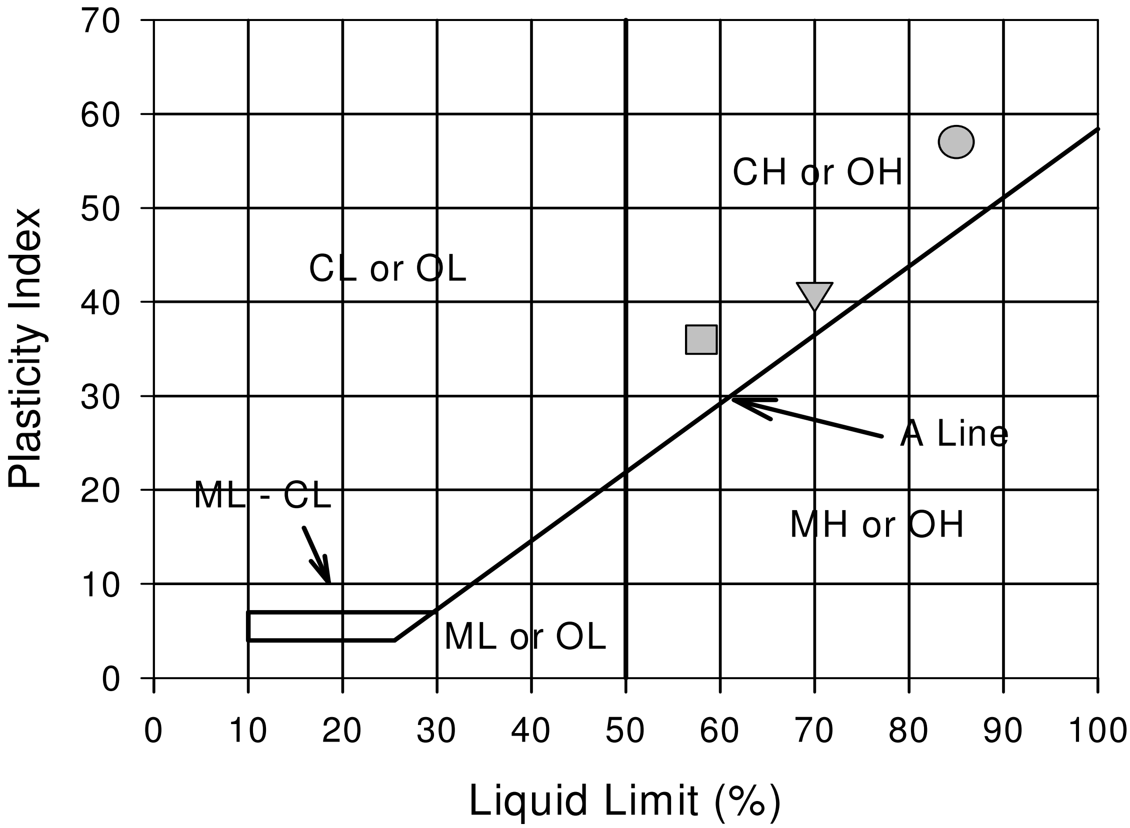
Atterberg Limits Testing
by ASTM D4318

Medea Creek
Agoura Hills, CA

Figure
13

Atterberg Limits



Symbol	Classification and Source	Liquid Limit %	Plastic Limit %	Plasticity Index	% Passing #200 Sieve
●	Mottled brown sandy clay (CH), BH-2 7.5-8.0'	85	28	57	87
▼	Mottled brown sandy clay (CH), BH-2 10.0-10.5'	70	29	41	73
■	Mottled brown sandy clay (CH), BH-3 3.0-3.5'	58	22	36	50

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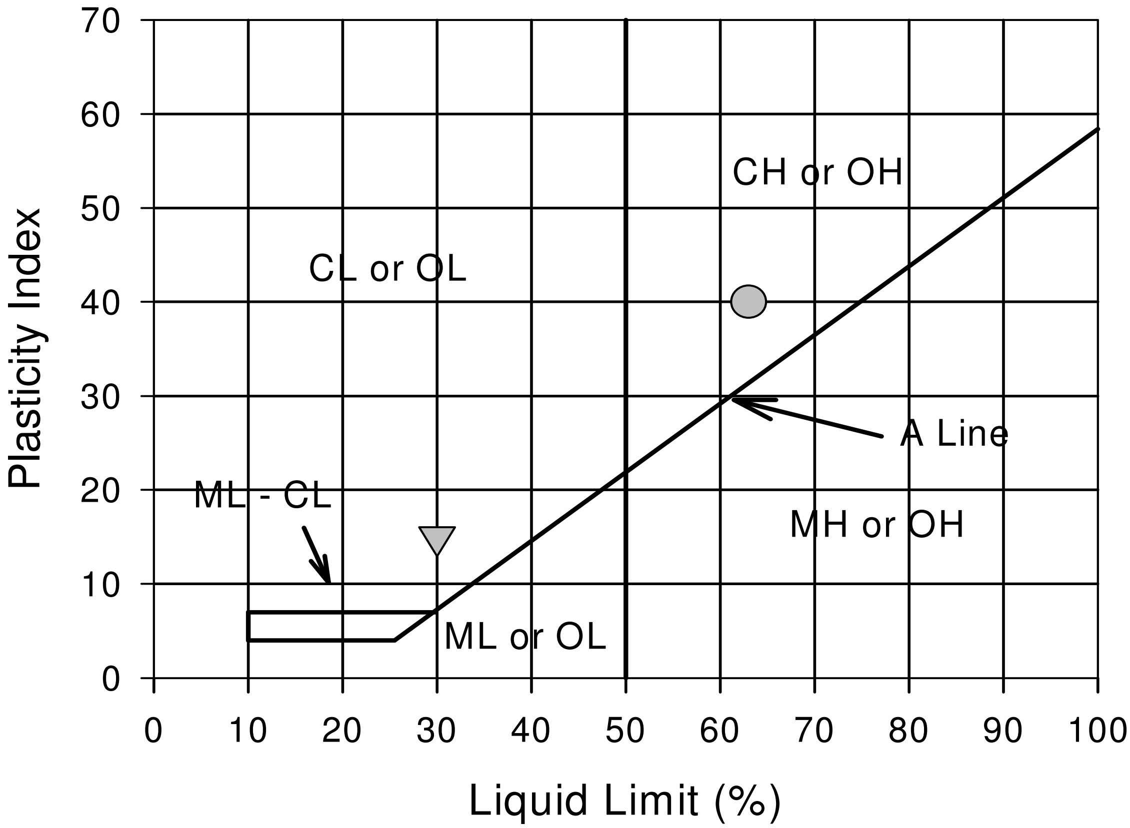
Atterberg Limits Testing
by ASTM D4318

Medea Creek
Agoura Hills, CA

Figure
14

Atterberg Limits



Symbol	Classification and Source	Liquid Limit %	Plastic Limit %	Plasticity Index	% Passing #200 Sieve
●	Mottled brown sandy clay (CH), BH-3 4.5-5.0'	63	23	40	56
▼	Grayish Brown Clayey Sand (SC), BH-2 15-15.5'	30	15	15	27
■					

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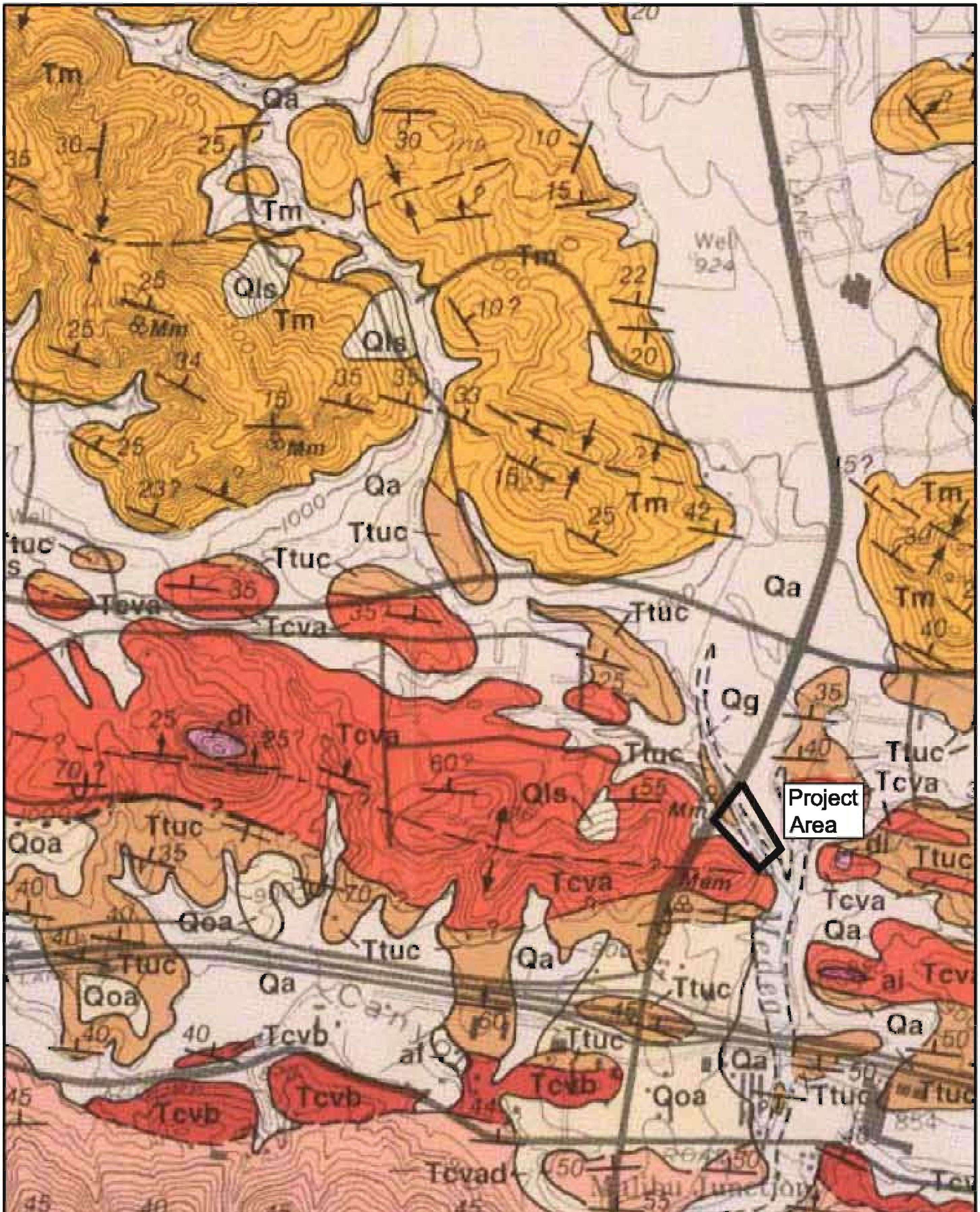
Atterberg Limits Testing
by ASTM D4318

Medea Creek
Agoura Hills, CA

Figure
15

Plates



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N

0 500' 1000'
(1" = 1000')

Source: Geologic Map of the Thousand Oaks Quadrangle, Diblee (1993)

Geologic Map
Medea Creek
Agoura Hills, CA

Date: 11/25/2013
Project: 1300042
Plate: 1a

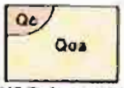
THOUSAND OAKS QUADRANGLE

LEGEND

SURFICIAL SEDIMENTS

unconsolidated detrital sediments, undissected to partly dissected

Qg gravel and sand of major stream channels
Qa alluvial gravel, sand and clay of valley areas
af artificial cut and fill
Qls landslide debris



OLDER SURFICIAL SEDIMENTS

unconsolidated to weakly consolidated alluvial sediments, dissected where elevated; late Pleistocene age

Qoa older dissected alluvial gravel
Qc talus fan gravel and sand, locally indurated

—UNCONFORMITY—

MONTEREY FORMATION

(Modelo Formation and in part upper Topanga Formation of Weber 1984; Yerkes and Showalter 1992, Monterey Formation of Truex and Hall 1969; same lithologic unit as Monterey Shale of Ventura basin of Dibblee 1989)

marine biogenic; middle and late Miocene age

Luisian and Mohnian Stages, (Yerkes and Showalter 1992)

Tm white weathering, thin bedded, platy, locally brittle siliceous shale to soft, punky shale; devoid of sandstone in this quadrangle; mostly late Miocene age (Mohnian Stage)

Tml lower part, similar to Tm, but soft, fissile to punky; includes scattered thin, hard calcareous layers and concretions; middle Miocene age (Luisian Stage)

DETRITAL SEDIMENTS OF LINDERO CANYON

typically exposed in upper Lindero and Skeleton Canyons (Dibblee 1989); assigned to upper Topanga Formation by Weber 1984, Calabasas Formation by Yerkes and Showalter 1992; in Simi Hills may be in part equivalent to upper Topanga Formation

marine and nonmarine? clastic; late middle Miocene age

Tls sandstone, light gray to tan, soft, friable to semi-coherent, massive to vaguely bedded, locally calcareous, hard, rarely fossiliferous; east of upper Medea Creek locally includes conglomerate similar to Tlgc; in northwest area may be in part intertongued with unit Tluc; in a few places contains shallow marine molluscan fossils

Tlsc conglomerate of granitic detritus: light gray, composed of rounded pebbles, cobbles and small boulders of granitic and lesser metavolcanic rocks in incoherent sandstone matrix, massive to poorly bedded; in Simi Hills comprises facies of unit Tls

Tlvc basal epiclastic (reworked) conglomerate of detritus derived from Conejo Volcanics: gray to rusty brown, massive to crudely layered; in southwestern area and Simi Hills composed of poorly sorted, subrounded clasts as large as small boulders, of mostly andesitic rocks in incoherent detrital matrix; southwest of Thousand Oaks partly intertongued with shale of unit Tml; in Simi Hills contains smooth rounded cobbles reworked from Simi Conglomerate (Tsug) as well as volcanic (andesitic) detritus; in northwestern area mostly massive to crudely bedded, light brown pebble-small cobble conglomerate and breccia of volcanic detritus in semi-coherent matrix, probably deposited subaerially on platform of deeply eroded pre-existing rocks

—MAJOR UNCONFORMITY—

UPPER TOPANGA FORMATION

(of Durrell 1954; Topanga Formation of Truex and Hall 1969, Truex 1976; Calabasas Formation of Yerkes and Showalter 1991)

marine clastic; middle Miocene age, exposed only in Agoura area

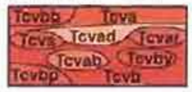
Ttuc clay shale and siltstone, gray, thin-bedded, soft, crumbly, weakly resistant to erosion; locally contains calcareous concretions or lenses, includes few thin sandstone strata

Ttus sandstone, light gray to tan, friable, massive to vaguely bedded, interbedded with clay shale

CONEJO VOLCANICS

(of Taliaferro 1924, Campbell et al. 1970; Weber 1984; Yerkes and Showalter 1991; middle Topanga Formation of Durrell 1954; Topanga Volcanics of Truex and Hall 1969; Truex 1976)

submarine and subaerial volcanic extrusive and related intrusive rocks; middle Miocene (Relizian-Luisian?) age [16.1 to 13.1 m.y. old in western Santa Monica Mountains - Turner 1970, in Yerkes and Campbell 1979]



EXTRUSIVE ROCKS

Tcvbb basaltic flow breccias exposed only on Mountclef Ridge, dark gray to dark reddish brown, dense to scoriaceous basalt; contains small elongate phenocrysts of plagioclase feldspar and hypersthene (Williams 1982); moderately coherent, erosion resistant

Tcva andesitic flows and breccias: in northwest area, and at Agoura, reddish brown to gray, massive, moderately coherent, fine grained, felspathic to locally slightly porphyritic, deposited as laharic (mud flow) breccia; in Westlake area ranges from tan to light brown, massive, coherent, fine grained feldspathic rock to less coherent, somewhat darker andesitic breccia; in Triunfo Canyon area light gray to tan, massive to crudely bedded, fine grained feldspathic andesite-dacite (?), composed of unsorted angular fragments in coherent matrix of same rock, deposited subaerially (?) as laharic flows (broken and jumbled during movement) from nearby volcanic source

Tcvad andesite-dacite breccia of Westlake (designated as Tcvab in Calabasas quadrangle of Dibblee 1992); light colored (light pinkish gray to light brown), composed of moderately to poorly sorted, mostly cobble-boulder sized angular fragments of light colored, very fine grained feldspathic andesite-dacite in semi-coherent, detrital or tuffaceous (?) matrix of same rock; crudely stratified, in eastern exposures well stratified and many fragments subrounded; in western exposures near Lake Sherwood some of lower part of breccia is firmly indurated to form prominent, resistant outcrops; unit gradational into Tcva; probably deposited subaerially as laharic (rock and mudflow) and reworked detritus from nearby volcanic source to west; prominently exposed near Westlake Dam; lithologically similar to and may be equivalent to more coherent unit Tcvdb in Triunfo Pass and Newbury Park quadrangles (Dibblee and Ehrenspeck 1990a and b)

Tcvab andesitic breccias; medium gray to brown, composed of angular to slightly subrounded, mostly cobble to boulder-size fragments of andesitic to basaltic rocks in moderately coherent detrital andesitic matrix, moderately to crudely bedded, lenticular within Tcvb, on Mountclef Ridge includes thin stratum of gray brown volcanic sandstone; breccias probably deposited subaerially as laharic rock and mudflow and reworked detritus from nearby volcanic sources

Tcvar andesitic flow breccia, exposed only on north slope of Ladyface Ridge, brown, reddish to gray, composed of unsorted angular fragments of commonly vesicular, sub-porphyritic andesitic rocks in semi-coherent brown to reddish, fragmented, pyroclastic andesitic matrix; includes flows of platy gray andesite locally; unit contains scattered spindle shaped volcanic "bombs" of andesitic rocks up to 1/2 meters long (Dibblee and Ehrenspeck 1993), massive to crudely stratified, deposited subaerially

Tcvbv porphyritic basaltic-andesite flow breccia of Ladyface Ridge; exposed only on that ridge and on a low ridge 1 km south; dark gray to nearly black, composed of unsorted large angular (rubbly) to subrounded fragments of vesicular to scoriaceous gray-black porphyritic basalt-andesite in coherent detrital matrix of same rock, phenocrysts composed of white lathy (elongated) plagioclase feldspar; very crudely stratified, erosion resistant, deposited subaerially (?)

Tcvb basaltic flows and breccias, black to dark gray, weather dark olive-brown, fine grained, massive to vaguely bedded, incoherent and crumbly where weathered, weakly resistant to erosion; range from basalt to basaltic andesite composed of plagioclase feldspar (average An_{55}) and ferromagnesian minerals (hypersthene or augite, rarely olivine, [Weigand 1982]), in places amygdaloidal; in a few places, mostly in northwestern area, includes a few thin lenses up to a few meters thick of dark gray basaltic sandstone and siltstone; probably deposited subaerially, possibly in part under shallow sea

Tcvbp basaltic flows, minor breccias in northwestern area; similar to unit Tcvb, but composed largely of basalt pillows, and hyaloclastic breccias (shattered by rapid underwater chilling) deposited under sea; also includes several thin lenses of dark gray basaltic sandstone and siltstone

Tcvs lenses of dark gray basaltic sandstone and siltstone in northwestern and southeastern areas where mappable

INTRUSIVE ROCKS

bi basalt; gray-black, fine grained, in places porphyritic, weakly to moderately coherent, forms thin dikes in volcanics or older rocks

ai andesite; fine grained, gray to brown, massive, locally contains minor disseminated pyrite

di andesite-dacite, light gray to tan, fine grained, hard, resistant, made of feldspar and minor altered hornblende and/or biotite?, forms dikes, pods, and a small plug near Lake Sherwood

—UNCONFORMITY—

LOWER TOPANGA FORMATION

marine transgressive clastic; middle or early Miocene age

Ttls thin sandstone unit exposed only northwest of Bard Reservoir; light gray to tan, semifriable, thick bedded; in a few places contains molluscan fossils

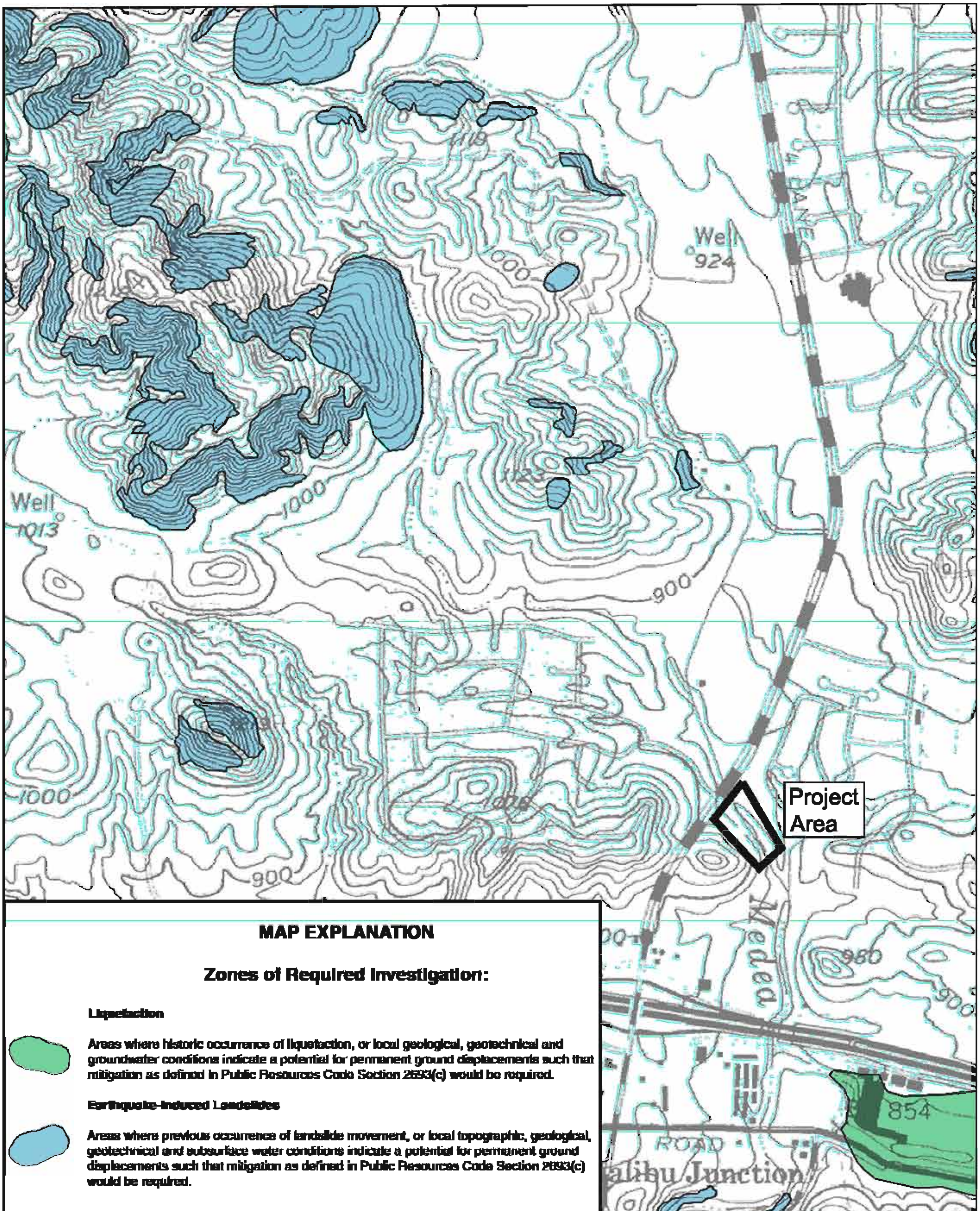
—UNCONFORMITY?—

SESPE FORMATION

nonmarine clastic; primarily of Oligocene age

Tsp mostly sandstone, gray-white, tan to light brown, friable, arkosic, fine to coarse grained, bedded, in places conglomeratic with scattered pebbles and cobbles of granitic rocks, metavolcanic rocks and quartzite; includes a few thin strata of maroon to red silty claystone, mostly near top

QUESTA ENGINEERING CORP. Civil Environmental & Water Resources; P.O. Box 70356, 1220 Brickyard Cove Road, Point Richmond, CA 94807	Source: Geologic Map of the Thousand Oaks Quadrangle, Dibblee (1993)	Geologic Map Key Medea Creek Agoura Hills, CA	Date: 11/25/2013 Project: 1300042 Plate: 1b



MAP EXPLANATION

Zones of Required Investigation:

Liquefaction

Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslides

Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

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N

0 500' 1000'
(1" = 1000')

Source: State of California Seismic Hazards Map of the Thousand Oaks Quadrangle (2000)

Seismic Hazards Map
Medea Creek
Agoura Hills, CA

Date: 11/25/2013
Project: 1300042
Plate: 2

Appendix A

Liquefaction SPT Analysis 3.1

Borehole 1

Organization: **Questa Engineering**
Project Name: **Medea Creek- BH-1**
Job #: **1300042**
Analysis by: **W. Hopkins**
Date: **10/30/2014**

Input Parameters

Borehole 1

Units: **English**

Variable	Value	Variable	Value
Peak Ground Acceleration	0.574 g	Design GWT (Historical)	5.50 ft
Earthquake Magnitude	7.5 MW	Site GWT	18.0 ft
Bottom Depth	18.00 ft	Average Soil Unit Weight	
Bore Hole Diameter	4.0 in	above GWT	100.0 pcf
Rod Length Height Stick up	4.9 ft	below GWT	115.0 pcf
Correction for Sample Liners	Yes	Sloping Ground	No

Geotechnical Properties

#	Material Type	USCS	Bottom Depth, ft	Consistency	Flags	SPT field	Fines Content, %	Energy Ratio, %
1	Structural Fill	95%	0.60	Competent	Unsaturated	50	5	70
2	Granular Soil	SC	2.75	Medium Dense	Unsaturated	4	15	70
3	Granular Soil	SM	3.50	Loose	Unsaturated	2	15	70
4	Granular Soil	SW	5.25	Very Loose	Unsaturated	2	5	70
5	Granular Soil	SC	5.75	Loose	Unsaturated	5	15	70
6	Sandstone Bedrock	Bedrock1	12.25	Dense		34	25	70
7	Hard Rock Bedrock	Bedrock4	18.00	Dense		48	25	70

Results

Dynamic Settlement: 0.00 in
Lateral Displacement: 0.00 ft

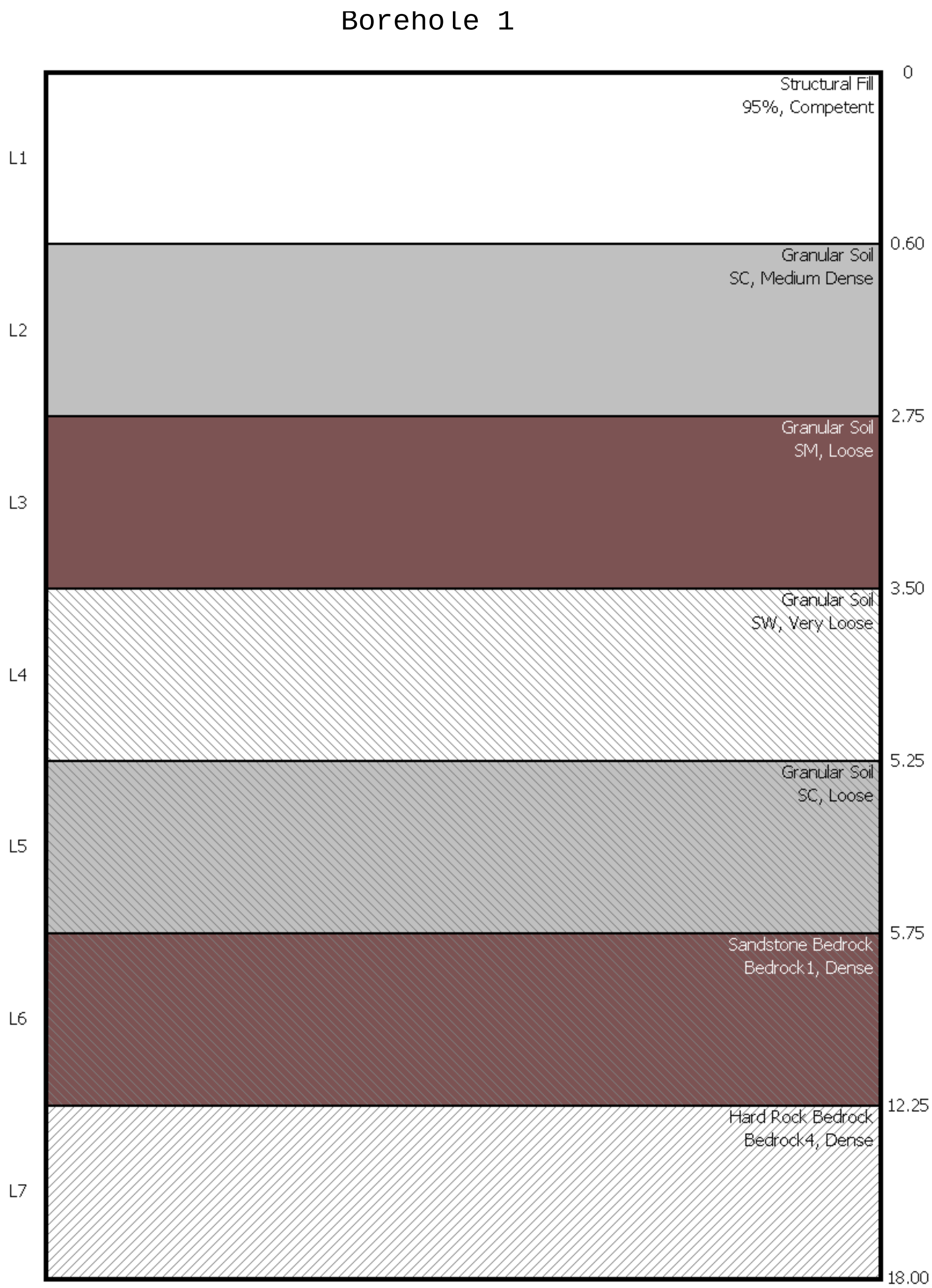


Fig. 1: Subsurface profile

Liquefaction Analysis - Set 1/4

Sample #	Depth, ft	C_E	C_B	C_R	C_S	N_{60}
1	0.60	1.17	1.00	0.75	1.30	56.88
2	2.75	1.17	1.00	0.75	1.10	3.85
3	3.50	1.17	1.00	0.75	1.10	1.93
4	5.25	1.17	1.00	0.80	1.10	2.05
5	5.75	1.17	1.00	0.80	1.10	5.13
6	12.25	1.17	1.00	0.85	1.30	43.83
7	18.00	1.17	1.00	0.95	1.30	69.16

Liquefaction Analysis - Set 2/4

Sample #	Depth, ft	σ V, psf	σ V', psf	C_N	$(N_1)_{60}$
1	0.60	60.0	60.0	1.70	96.69
2	2.75	275.0	275.0	1.70	6.55
3	3.50	350.0	350.0	1.70	3.27
4	5.25	525.0	525.0	1.70	3.49
5	5.75	578.8	563.2	1.70	8.73
6	12.25	1326.3	905.1	1.25	54.76
7	18.00	1987.5	1207.5	1.16	80.09

Liquefaction Analysis - Set 3/4

Sample #	Depth, ft	ΔN-Fines	$(N_1)_{60}$-CS	Stress Reduc.	CSR	MSF-Sand
1	0.60	0.00	96.69	1.005	0.375	1.000
2	2.75	3.26	9.81	1.000	0.373	1.000
3	3.50	3.26	6.53	0.999	0.373	1.000
4	5.25	0.00	3.49	0.994	0.371	1.000
5	5.75	3.26	11.99	0.993	0.381	1.000
6	12.25	5.07	59.83	0.975	0.533	1.000
7	18.00	5.07	85.16	0.955	0.587	1.000

Liquefaction Analysis - Set 4/4

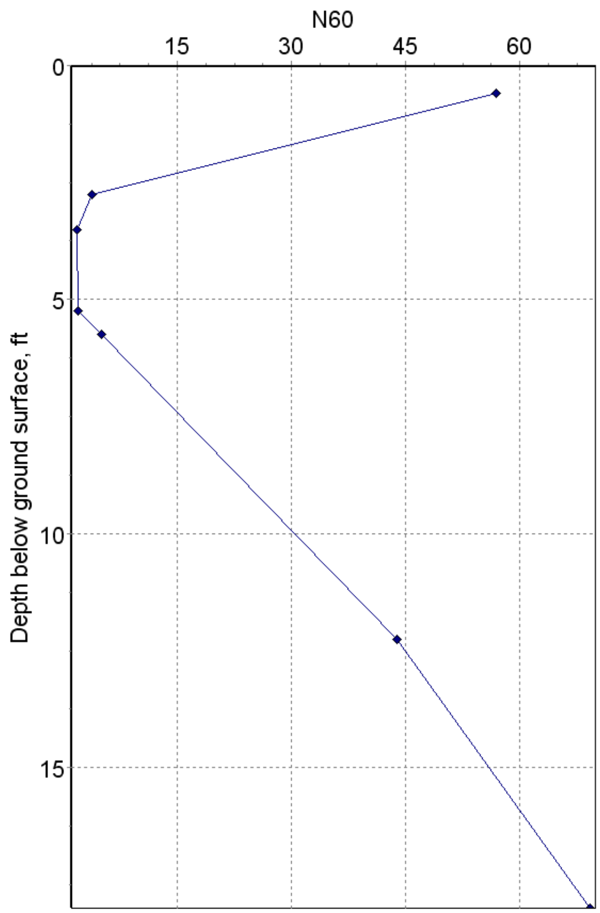
Sample #	Depth, ft	K_σSand	CRR-M=7.5 & σvc=1	CRR	Liq. F.S.
1	0.60	1.100	2.00	n.a	n.a
2	2.75	1.100	0.12	n.a	n.a
3	3.50	1.100	0.10	n.a	n.a
4	5.25	1.098	0.08	n.a	n.a
5	5.75	1.100	0.13	n.a	n.a
6	12.25	1.100	2.00	2.000	2.00
7	18.00	1.100	2.00	2.000	2.00

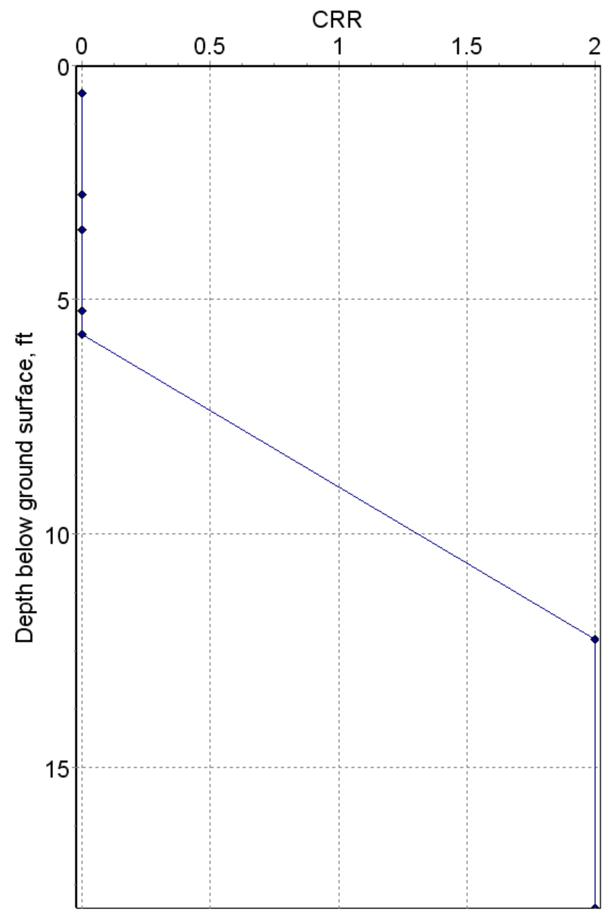
Dynamic Settlement - Set 1/2

Sample #	Depth, ft	Lim. Shear Strain, γlim	Fα Parameter	Max. Shear Strain, γmax	ΔH I, ft
1	0.60	0.00	-5.753	0.000	0.60
2	2.75	0.48	0.918	0.000	2.15
3	3.50	0.50	0.948	0.000	0.75
4	5.25	0.50	0.948	0.000	1.75
5	5.75	0.38	0.863	0.000	0.50
6	12.25	0.00	-2.409	0.000	6.50
7	18.00	0.00	-4.672	0.000	5.75

Dynamic Settlement - Set 2/2

Sample #	Depth, ft	Vert. Consol. Str, εV	Dyn. Sett, in	Accum. Sett, in
1	0.60	0.000	0.000	0.000
2	2.75	0.000	0.000	0.000
3	3.50	0.000	0.000	0.000
4	5.25	0.000	0.000	0.000
5	5.75	0.000	0.000	0.000
6	12.25	0.000	0.000	0.000
7	18.00	0.000	0.000	0.000


N60
15
30
45
60
0
5
10
15
Depth below ground surface, ft


CRR
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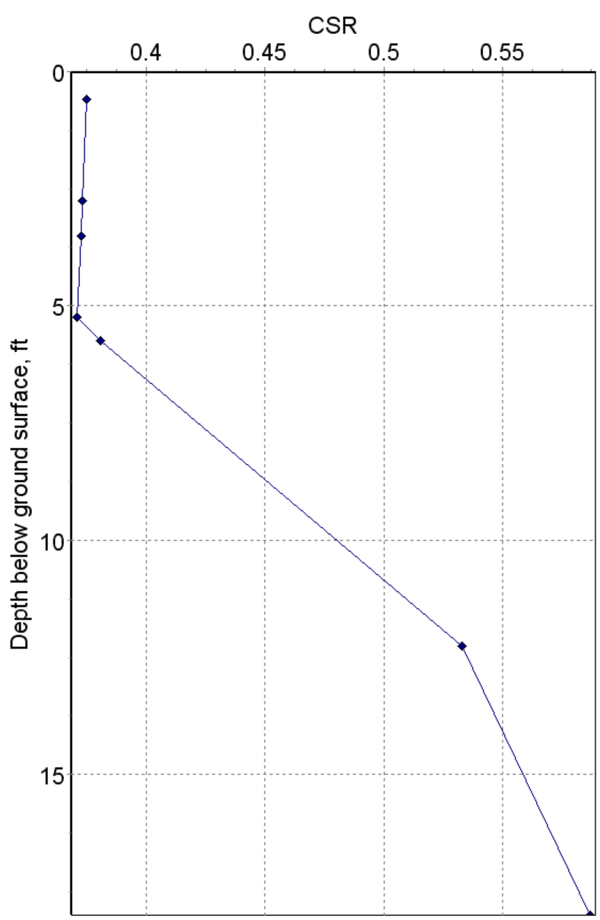
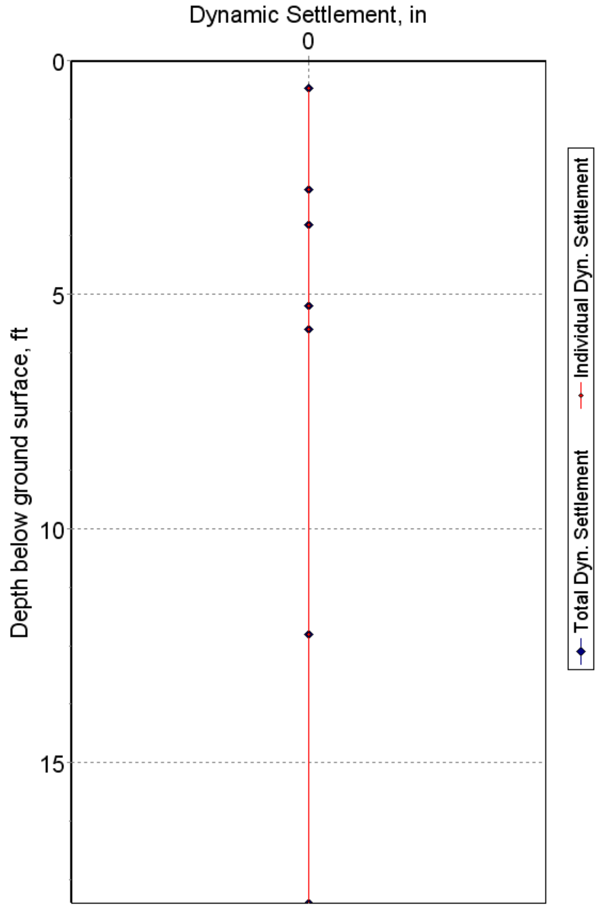
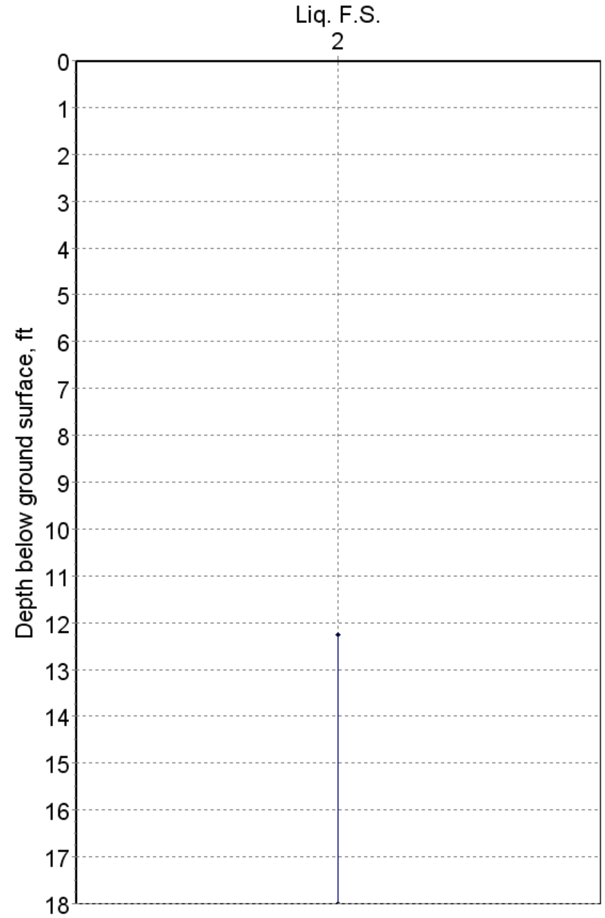
1
1.5
2
0
5
10
15
Depth below ground surface, ft


CSR
0.4
0.45
0.5
0.55
0
5
10
15
Depth below ground surface, ft





References:

1. "Soil Liquefaction During Earthquakes",
   I.M. Idriss & R.W. Boulanger, 2008, MNO-12, EERI
2. LiquefactionSPT by SoilStructure.com

Liquefaction SPT Analysis 3.1

Borehole 2

Organization: **Questa Engineering**
Project Name: **Medea Creek**
Job #: **1300042**
Analysis by: **W. Hopkins**
Date: **10/29/2014**

Input Parameters

Units: **English** Borehole 2

Variable	Value	Variable	Value
Peak Ground Acceleration	0.574 g	Design GWT (Historical)	5.00 ft
Earthquake Magnitude	7.5 MW	Site GWT	11.0 ft
Bottom Depth	23.50 ft	Average Soil Unit Weight	
Bore Hole Diameter	4.0 in	above GWT	115.0 pcf
Rod Length Height Stick up	4.9 ft	below GWT	120.0 pcf
Correction for Sample Liners	Yes	Sloping Ground	No

Geotechnical Properties

#	Material Type	USCS	Bottom Depth, ft	Consistency	Flags	SPT field	Fines Content, %	Energy Ratio, %
1	Structural Fill	95%	1.25	Competent	Unsaturated	50	5	70
2	Granular Soil	SC	4.75	Medium Dense	Unsaturated	21	48	70
3	Cohesive Soil	CL	7.50	Stiff	Clay	11	52	70
4	Cohesive Soil	CH	10.50	Stiff	Clay	10	87	70
5	Granular Soil	SC	14.75	Medium Dense		7	27	70
6	Granular Soil	SC	16.50	Medium Dense		7	24	70
7	Granular Soil	SC	18.75	Dense		31	25	70
8	Granular Soil	SC	20.00	Very Dense		50	25	70
9	Hard Rock Bedrock	Bedrock4	23.50	Dense		50	20	70

Results

Dynamic Settlement: 2.00 in
Lateral Displacement: 0.00 ft

Borehole 2

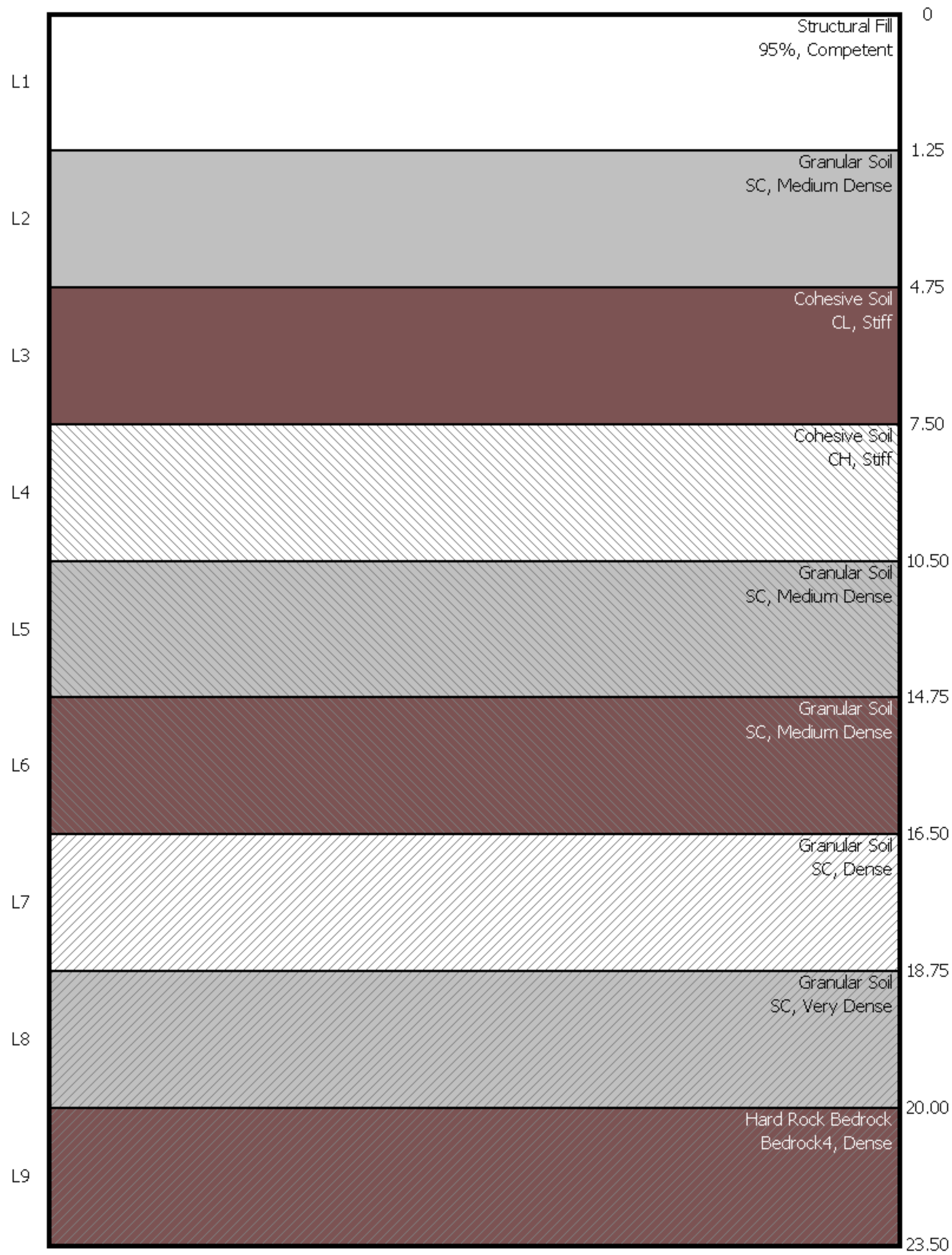


Fig. 1: Subsurface profile

Borehole 2

Liquefaction Analysis - Set 1/4

Sample #	Depth, ft	C_E	C_B	C_R	C_S	N_{60}
1	1.25	1.17	1.00	0.75	1.30	56.88
2	4.75	1.17	1.00	0.75	1.30	23.89
3	7.50	1.17	1.00	0.80	1.10	11.29
4	10.50	1.17	1.00	0.85	1.10	10.91
5	14.75	1.17	1.00	0.85	1.10	7.66
6	16.50	1.17	1.00	0.95	1.11	8.62
7	18.75	1.17	1.00	0.95	1.30	44.67
8	20.00	1.17	1.00	0.95	1.30	72.04
9	23.50	1.17	1.00	0.95	1.30	72.04

Liquefaction Analysis - Set 2/4

Sample #	Depth, ft	σ V, psf	σ V', psf	C_N	$(N_1)_{60}$
1	1.25	143.8	143.8	1.70	96.69
2	4.75	546.3	546.3	1.48	35.44
3	7.50	875.0	719.0	1.70	n.a
4	10.50	1235.0	891.8	1.70	n.a
5	14.75	1745.0	1136.6	1.35	10.31
6	16.50	1955.0	1237.4	1.29	11.11
7	18.75	2225.0	1367.0	1.12	50.06
8	20.00	2375.0	1439.0	1.11	79.66
9	23.50	2795.0	1640.6	1.07	76.96

Liquefaction Analysis - Set 3/4

Sample #	Depth, ft	ΔN-Fines	$(N_1)_{60}$-CS	Stress Reduc.	CSR	MSF-Sand
1	1.25	0.00	96.69	1.004	0.374	1.000
2	4.75	5.61	41.05	0.996	0.371	1.000
3	7.50	n.a	n.a	0.989	0.449	1.000
4	10.50	n.a	n.a	0.980	0.506	1.000
5	14.75	5.21	15.53	0.966	0.554	1.000
6	16.50	4.98	16.10	0.961	0.566	1.000
7	18.75	5.07	55.14	0.953	0.578	1.000
8	20.00	5.07	84.74	0.948	0.584	1.000
9	23.50	4.48	81.44	0.935	0.594	1.000

Liquefaction Analysis - Set 4/4

Sample #	Depth, ft	K_σSand	CRR-M=7.5 & σvc=1	CRR	Liq. F.S.
1	1.25	1.100	2.00	n.a	n.a
2	4.75	1.100	2.00	n.a	n.a
3	7.50	1.057	n.a	n.a	n.a
4	10.50	1.046	n.a	n.a	n.a
5	14.75	1.070	0.16	0.172	0.31
6	16.50	1.062	0.17	0.176	0.31
7	18.75	1.100	2.00	2.000	2.00
8	20.00	1.100	2.00	2.000	2.00
9	23.50	1.074	2.00	2.000	2.00

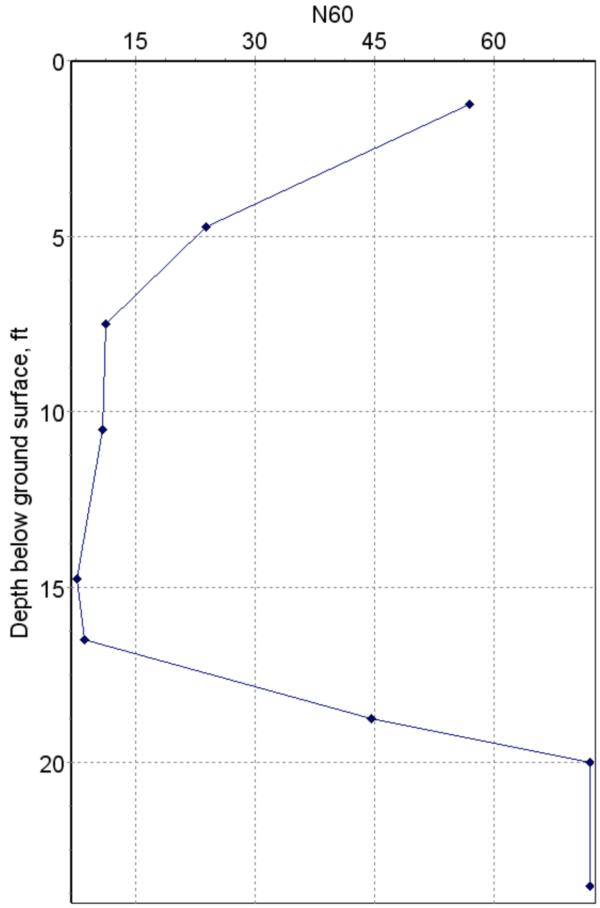
Dynamic Settlement - Set 1/2

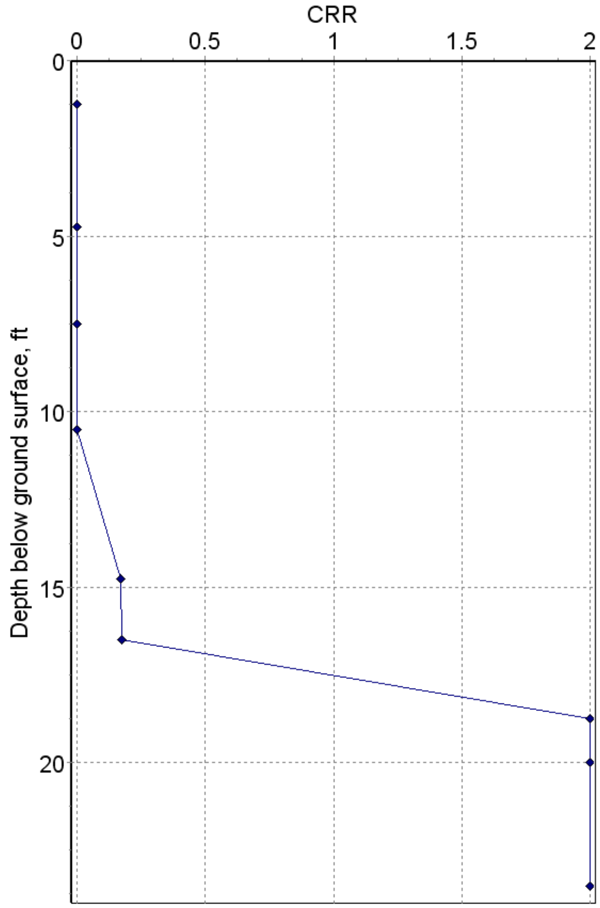
Sample #	Depth, ft	Lim. Shear Strain, γlim	Fα Parameter	Max. Shear Strain, γmax	ΔH I, ft
1	1.25	0.00	-5.753	0.000	1.25
2	4.75	0.01	-0.884	0.000	3.50
3	7.50	0.00	0.000	0.000	2.75
4	10.50	0.00	0.000	0.000	3.00
5	14.75	0.26	0.732	0.260	4.25
6	16.50	0.24	0.708	0.244	1.75
7	18.75	0.00	-2.012	0.000	2.25
8	20.00	0.00	-4.632	0.000	1.25
9	23.50	0.00	-4.328	0.000	3.50

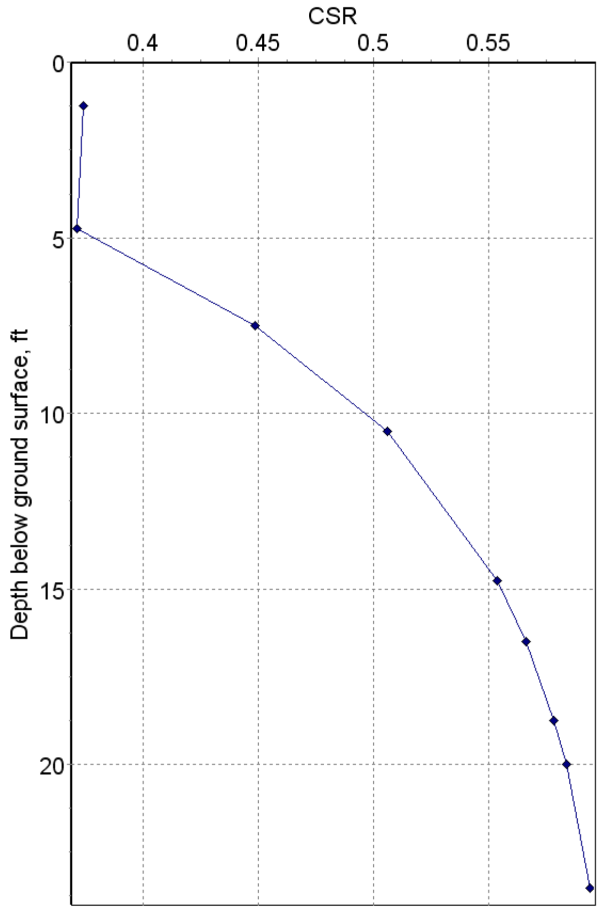
Dynamic Settlement - Set 2/2

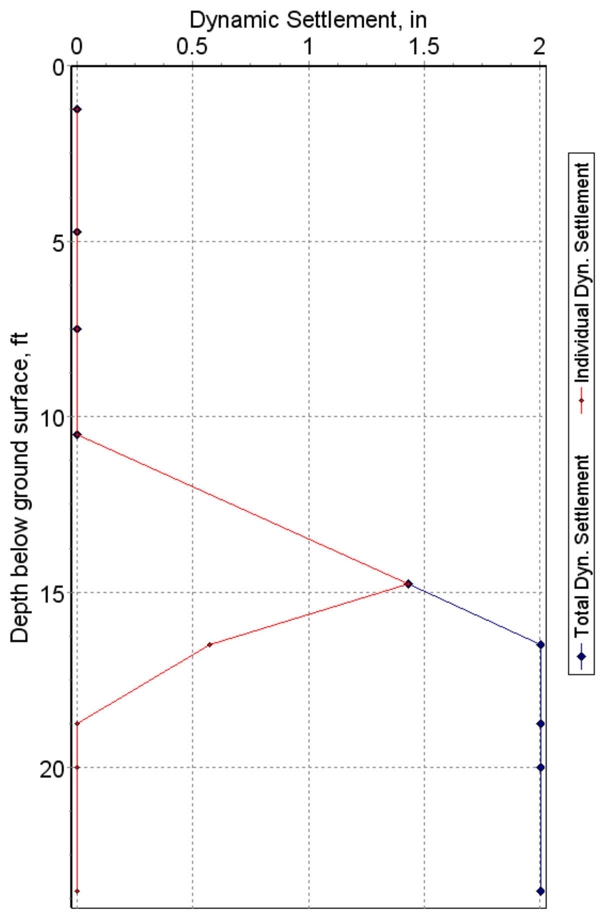
Borehole 2

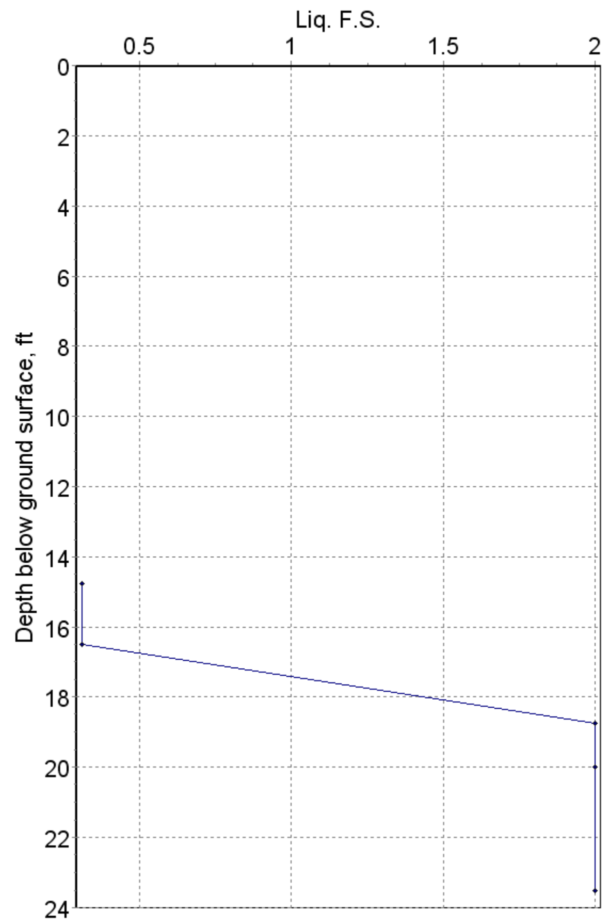
Sample #	Depth, ft	Vert. Consol. Str, εV	Dyn. Sett, in	Accum. Sett, in
1	1.25	0.000	0.000	0.000
2	4.75	0.000	0.000	0.000
3	7.50	0.000	0.000	0.000
4	10.50	0.000	0.000	0.000
5	14.75	0.028	1.430	1.430
6	16.50	0.027	0.573	2.003
7	18.75	0.000	0.000	2.003
8	20.00	0.000	0.000	2.003
9	23.50	0.000	0.000	2.003


N60
15
30
45
60
0
5
10
15
20
Depth below ground surface, ft


CRR
0
0.5
1
1.5
2
0
5
10
15
20
Depth below ground surface, ft


CSR
0.4
0.45
0.5
0.55
0
5
10
15
20
Depth below ground surface, ft





References:

1. "Soil Liquefaction During Earthquakes", I.M. Idriss & R.W. Boulanger, 2008, MNO-12, EERI
2. LiquefactionSPT by SoilStructure.com

Liquefaction Equations- Based on 2008 Idriss & Boulanger EERI MNO-12:

SPT Correction factor for Energy ratio, CE ,Hammer Energy % / 60,example:70%/60 = 1.17

$$C_E = \frac{ER_m}{60} \qquad \begin{array}{ll} \text{Doughnut hammer} & C_E = 0.5\text{–}1.0 \\ \text{Safety hammer} & C_E = 0.7\text{–}1.2 \\ \text{Automatic triphammer} & C_E = 0.8\text{–}1.3 \end{array}$$

SPT Correction factor for Borehole Diameter, CB = If DIA. < 4.53 inch, =1.0, else = 1.15

$$\begin{array}{ll} \text{Borehole diameter of 65–115 mm} & C_B = 1.0 \\ \text{Borehole diameter of 150 mm} & C_B = 1.05 \\ \text{Borehole diameter of 200 mm} & C_B = 1.15 \end{array}$$

SPT Correction factor for Rod Length, CR=

$$\begin{array}{ll} \text{Rod length} < 3\text{ m} & C_R = 0.75 \\ \text{Rod length 3–4 m} & C_R = 0.80 \\ \text{Rod length 4–6 m} & C_R = 0.85 \\ \text{Rod length 6–10 m} & C_R = 0.95 \\ \text{Rod length 10–30 m} & C_R = 1.00 \end{array}$$

SPT Correction factor for Sampler, CS =

$$\begin{array}{ll} C_S = 1.1 \quad \text{for} & (N_1)_{60} \le 10 \\ C_S = 1 + \frac{(N_1)_{60}}{100} \quad \text{for} & 10 \le (N_1)_{60} \le 30 \\ C_S = 1.3 \quad \text{for} & (N_1)_{60} \ge 30 \end{array}$$

Corrected SPT, N60 =;

$$N_{60} = C_E C_B C_R C_S N_m \qquad N_{60} = N_m \frac{ER_m}{60}$$

Total Vertical Stress, σ_{vc} = Gamma Soil x Depth + Pore water Pressure

Effective Vertical Stress, σ'_{vc} = σ_{vc} - Pore water pressure

Overburden Correction factor, C_N=

$$C_N = \left(\frac{P_a}{\sigma'_{vc}}\right)^{0.784-0.0768\sqrt{(N_1)_{60}}} \leq 1.7$$

with $(N_1)_{60}$ limited to values ≤ 46 for use in this expression

$$C_N = \left(\frac{P_a}{\sigma'_{vc}}\right)^{1.338-0.249(q_{c1N})^{0.264}} \leq 1.7$$

SPT corrected for 60% & 1atm, (N1)60 = $(N_1)_{60} = C_N N_{60}$

ΔN-Fines =

$$\Delta(N_1)_{60} = \exp\left(1.63 + \frac{9.7}{FC+0.01} - \left(\frac{15.7}{FC+0.01}\right)^2\right)$$

(N1-60)CS = $(N_1)_{60cs} = (N_1)_{60} + \Delta\,(N_1)_{60}$

Stress Reduction Coefficient, rd =

$$r_d = \exp(\alpha(z) + \beta(z)M)$$

$$\alpha(z) = -1.012 - 1.126\sin\left(\frac{z}{11.73} + 5.133\right)$$

$$\beta(z) = 0.106 + 0.118\sin\left(\frac{z}{11.28} + 5.142\right)$$

Cyclic Shear Stress Ration (Earthquake induced), CSR =

$$\mathrm{CSR} = 0.65\frac{\tau_{\max}}{\sigma'_{vc}} = 0.65\frac{\sigma_{vc}}{\sigma'_{vc}}\frac{a_{\max}}{g}r_d \qquad \mathrm{CSR} = \frac{q_{cyc}}{2\sigma'_{3c}}$$

Magnitude Scaling Factor, MSF-Sand =

$$\mathrm{MSF} = 6.9\exp\left(\frac{-M}{4}\right) - 0.058$$
$$\mathrm{MSF} \leq 1.8$$

K-σ SAND =

$$K_\sigma = 1 - C_\sigma \ln\left(\frac{\sigma'_{vc}}{P_a}\right) \leq 1.1$$

$$C_\sigma = \frac{1}{18.9 - 17.3D_R} \leq 0.3$$
$$C_\sigma = \frac{1}{18.9 - 2.55\sqrt{(N_1)_{60}}} \leq 0.3$$
$$C_\sigma = \frac{1}{37.3 - 8.27(q_{c1N})^{0.264}} \leq 0.3$$

Cyclic Shear Resistance Ratio, CRR =

$$\mathrm{CRR}_{M=7.5,\sigma'_{vc}=1} = \exp\left(\frac{(N_1)_{60cs}}{14.1} + \left(\frac{(N_1)_{60cs}}{126}\right)^2 - \left(\frac{(N_1)_{60cs}}{23.6}\right)^3 + \left(\frac{(N_1)_{60cs}}{25.4}\right)^4 - 2.8\right)$$

$$\mathrm{CRR} = a \cdot N^{-b}$$

Factor of Safety against Liquefaction, F.S. Liq =

$$FS_{liq} = \frac{\mathrm{CRR}_{M,\sigma'_{vc}}}{\mathrm{CSR}_{M,\sigma'_{vc}}} \qquad FS_{liq} = \frac{\mathrm{CRR}_{M=7.5,\sigma'_{vc}=1}}{\mathrm{CSR}_{M=7.5,\sigma'_{vc}=1}}$$

Limiting Shear Strain, Ɣlim =

$$\gamma_{\lim} = 1.859\left(1.1 - \sqrt{\frac{(N_1)_{60cs}}{46}}\right)^3 \geq 0 \qquad \gamma_{\lim} = 1.859\,(1.1 - D_R)^3 \geq 0$$

$$\gamma_{\lim} = 1.859\left(2.163 - 0.478\,(q_{c1Ncs})^{0.264}\right)^3 \geq 0$$

F Alpha Parameter =

$$F_\alpha = 0.032 + 0.69\sqrt{(N_1)_{60cs}} - 0.13\,(N_1)_{60cs}$$

$$F_\alpha = 0.032 + 4.7\,D_R - 6.0\,(D_R)^2$$

Maximum Shear Strain =

$$\gamma_{\max} = \min\left(\gamma_{\lim}, 0.035\,(2 - FS_{\text{liq}})\left(\frac{1 - F_\alpha}{FS_{\text{liq}} - F_\alpha}\right)\right) \quad \text{if} \quad 2 > FS_{\text{liq}} > F_\alpha$$

$$\gamma_{\max} = \gamma_{\lim} \quad \text{if} \quad FS_{\text{liq}} \leq F_\alpha$$

Lateral Displacement =

Maximum Shear Strain x ΔH

Volumetric Strain, εV =

$$\varepsilon_v = 1.5 \cdot \exp(-2.5 D_R) \cdot \min(0.08, \gamma_{\max})$$

$$\varepsilon_v = 1.5 \cdot \exp\left(-0.369\sqrt{(N_1)_{60cs}}\right) \cdot \min(0.08, \gamma_{\max})$$

$$\varepsilon_v = 1.5 \cdot \exp\left(2.551 - 1.147\,(q_{c1Ncs})^{0.264}\right) \cdot \min(0.08, \gamma_{\max})$$

Dynamic Settlement = εV x ΔH

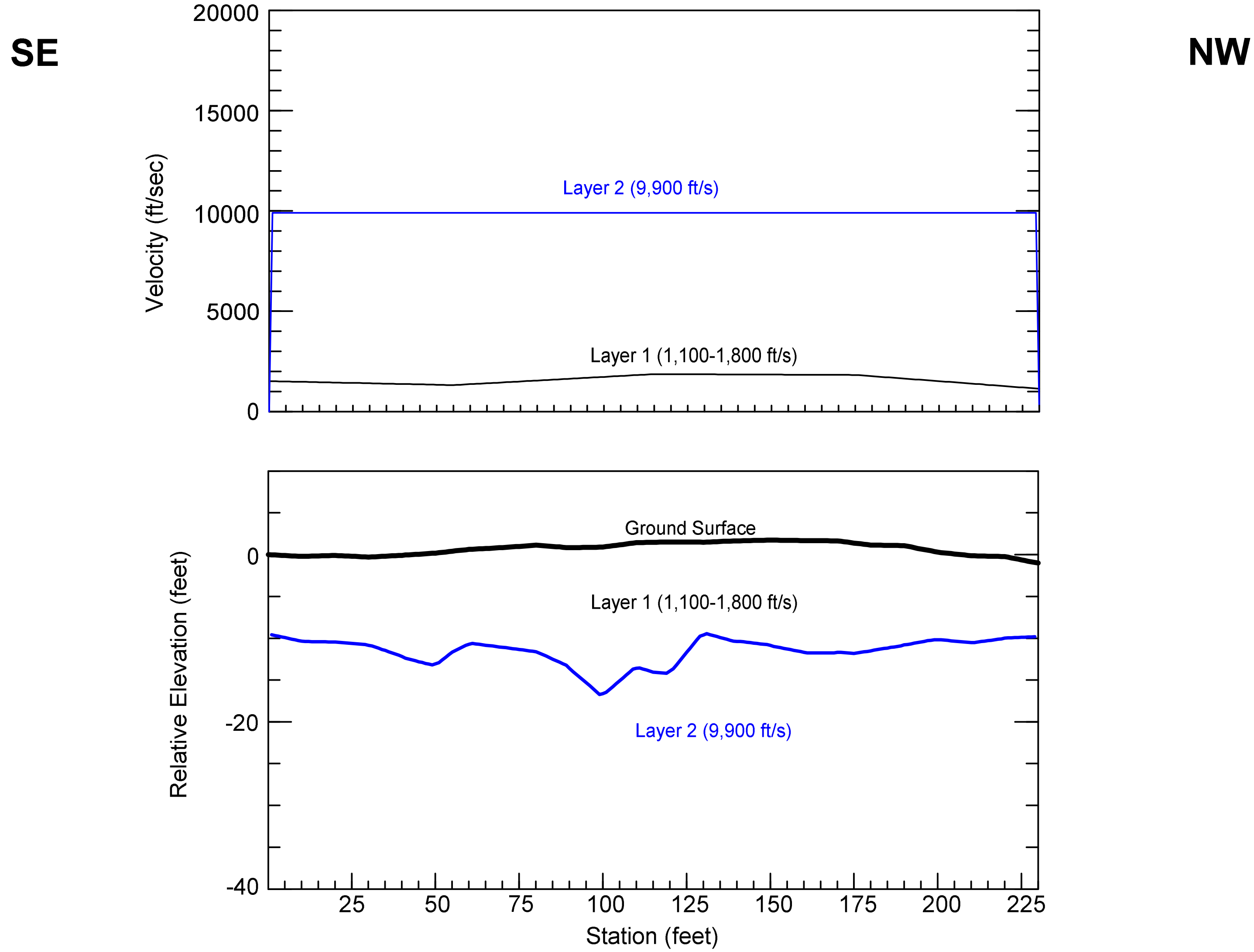
Appendix B

SPECTRUM GEOPHYSICS
"Revealing The Subsurface"

2727 Croddy Way, Unit I
Santa Ana, CA 92704

(714) 435-1073 www.spectrum-geophysics.com

Overview Map - NOT TO SCALE			FIGURE NUMBER 1
PROJECT Geophysical Investigation Agoura Hills, California			
PREPARED FOR Questa Engineering Corp Pt. Richmond, California			PROJECT NUMBER 1307111H
FOR DISCUSSION PURPOSES ONLY	FIGURE BY BAU	REVIEWED BY LCD	DATE 8/1/13



Horizontal scale in feet

0 25 50

Vertical scale in feet

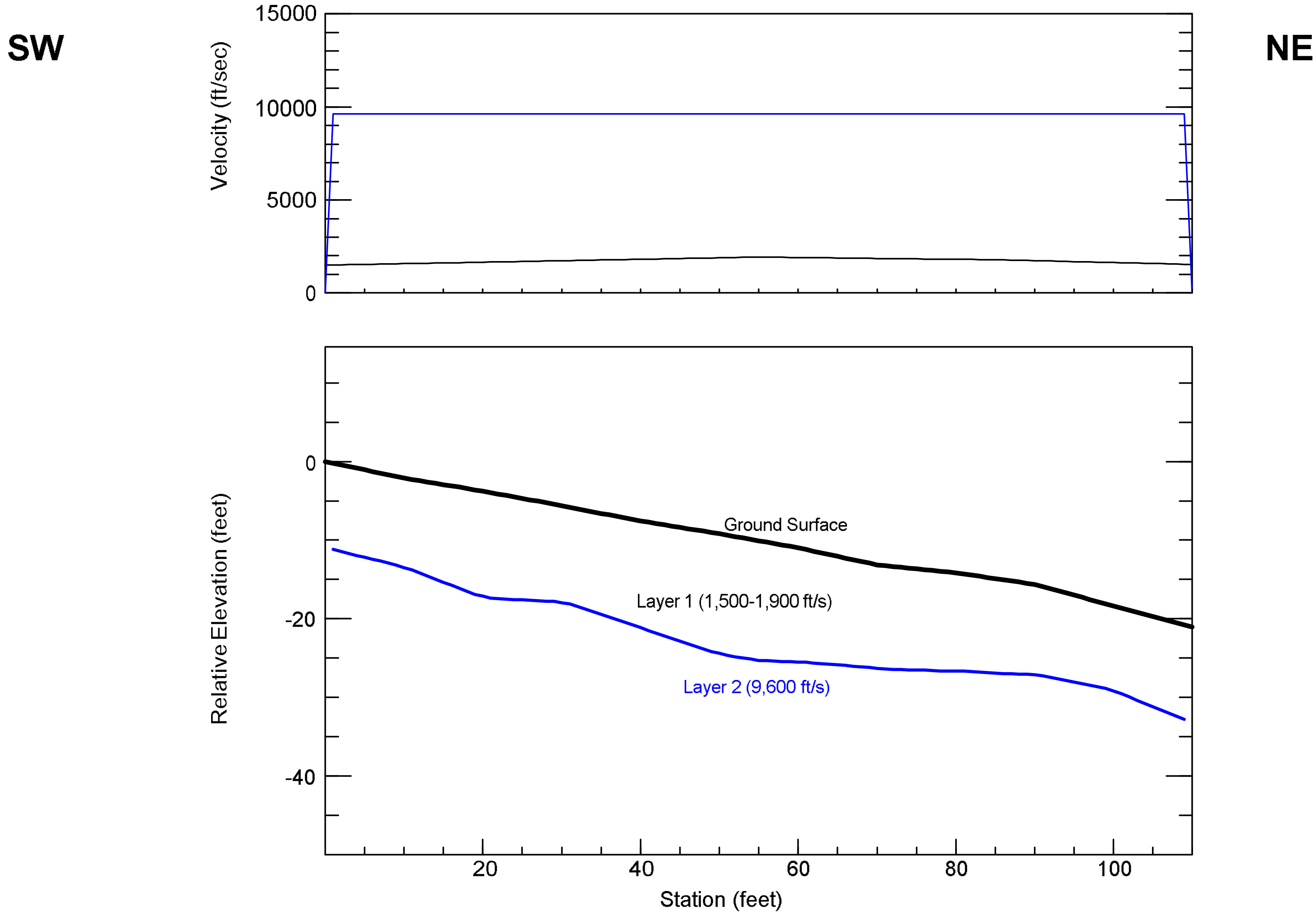
0 10 20

SPECTRUM GEOPHYSICS
"Revealing The Subsurface"

2727 Croddy Way, Unit I
Santa Ana, CA 92704

(714) 435-1073 www.spectrum-geophysics.com

Seismic Refraction Transect - Line 1				FIGURE NUMBER **2**
PROJECT Geophysical Investigation Agoura Hills, California				
PREPARED FOR Questa Engineering Corp Pt. Richmond, California				PROJECT NUMBER 1307111H
HORIZONTAL SCALE 1 inch = 50 feet	VERTICAL SCALE 1 inch = 20 feet	FIGURE BY BAU	REVIEWED BY LCD	DATE 8/1/13



Horizontal scale in feet

0 10 20

Vertical scale in feet

0 10 20

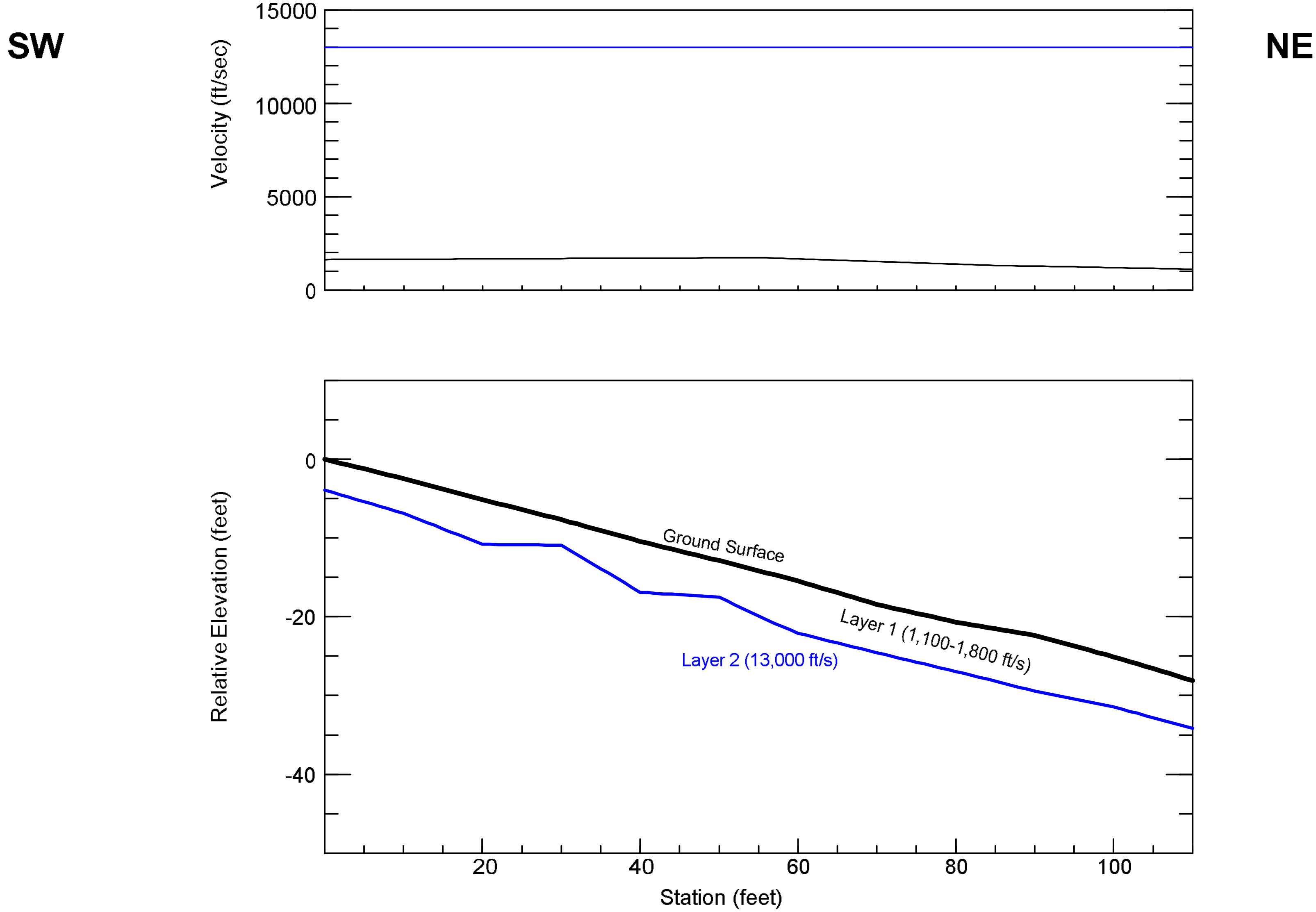
SPECTRUM GEOPHYSICS
"Revealing The Subsurface"

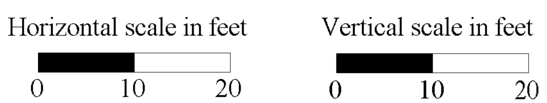
2727 Croddy Way, Unit I
Santa Ana, CA 92704

(714) 435-1073 www.spectrum-geophysics.com

Seismic Refraction Transect - Line 2

PROJECT	Geophysical Investigation Agoura Hills, California
PREPARED FOR	Questa Engineering Corp Pt. Richmond, California
FIGURE NUMBER	3
PROJECT NUMBER	1307111H
HORIZONTAL SCALE	1 inch = 20 feet
VERTICAL SCALE	1 inch = 20 feet
FIGURE BY	BAU
REVIEWED BY	LCD
DATE	8/6/13





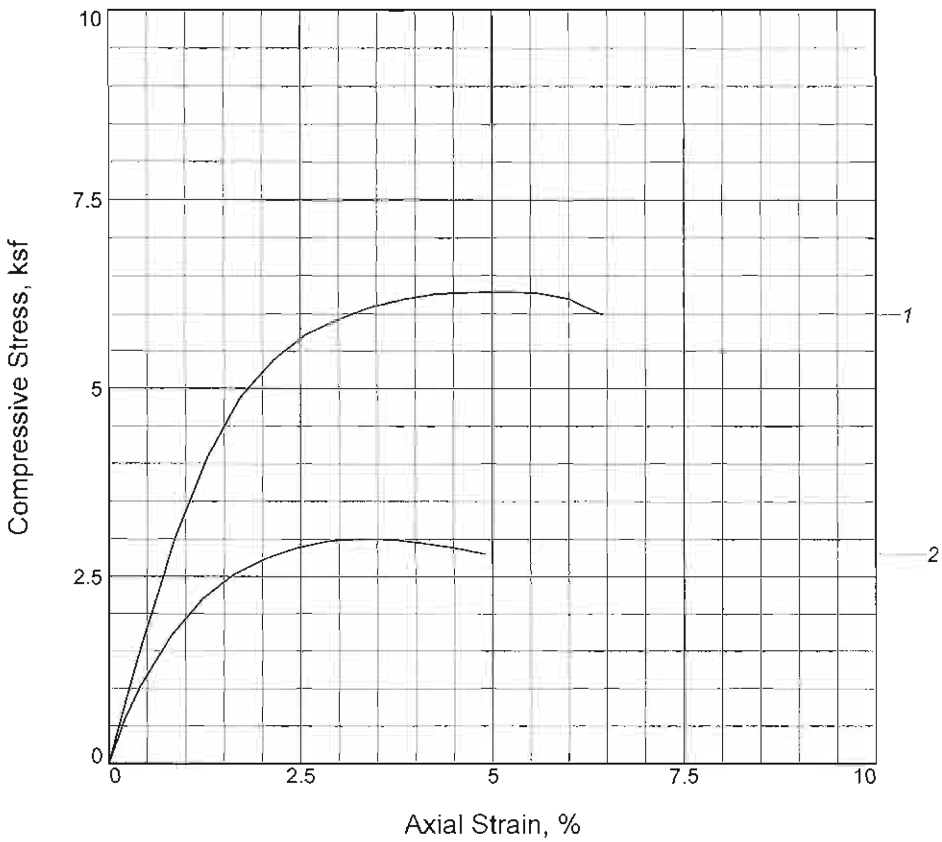
SPECTRUM GEOPHYSICS
"Revealing The Subsurface"

2727 Croddy Way, Unit I
Santa Ana, CA 92704
(714) 435-1073 www.spectrum-geophysics.com

Seismic Refraction Transect - Line 3 - Revised				FIGURE NUMBER 4
PROJECT Geophysical Investigation Agoura Hills, California				
PREPARED FOR Questa Engineering Corp Pt. Richmond, California				PROJECT NUMBER 1307111H
HORIZONTAL SCALE 1 inch = 20 feet	VERTICAL SCALE 1 inch = 20 feet	FIGURE BY BAU	REVIEWED BY LCD	DATE 8/8/13

Appendix C

UNCONFINED COMPRESSION TEST



Sample No.	1	2		
Unconfined strength, ksf	6.29	3.00		
Undrained shear strength, ksf	3.14	1.50		
Failure strain, %	5.2	3.3		
Strain rate, in./min.	0.08	0.08		
Water content, %	27.6	35.0		
Wet density, pcf	116.6	112.6		
Dry density, pcf	91.4	83.4		
Saturation, %	88.1	92.5		
Void ratio	0.8446	1.0212		
Specimen diameter, in.	2.42	2.42		
Specimen height, in.	4.66	4.90		
Height/diameter ratio	1.93	2.03		

Description: See remarks.

LL =	PL =	PI =	GS= 2.70	Type: Mod.Cal.

Project No.: 13142

Date Sampled:

Remarks:
#1/ B-2 @ 6.5-7':V.stiff,mottled,brownish gray lean CLAY(CL)
#@/ B-2 @ 10.5-11':Very stiff,very dark gray FAT CLAY(CH)

Figure ________

Client: Questa Engineering Corp.

Project: Medea Creek

Location: B-2
Depth: 6.5-7'

UNCONFINED COMPRESSION TEST
Soil Mechanics Lab
Oakland, California

Tested By: MA

Corrosivity Tests Summary

CTL # 606-024 **Date:** 11/1/2013 **Tested By:** PJ **Checked:** PJ
Client: Questa Engineering Corp **Project:** Medea Creek **Proj. No:** 1300042
Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP		Sulfide	Moisture	Soil Visual Description
			As Rec.	Min	Sat.	mg/kg	mg/kg	%		(Redox)		Qualitative	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		E_H (mv)	At Test	by Lead	%	
Boring	Sample, No.	Depth, ft.	ASTM G57	Cal 643	ASTM G57	ASTM D4327	ASTM D4327	ASTM D4327	ASTM G51	ASTM G200	Temp °C	Acetate Paper	ASTM D2216	
BH-1	-	2.0-2.5'	-	-	1,352	<2	42	0.0042	7.5	524	22	-	22.1	Dark Olive Brown Sandy CLAY w/ Gravel
BH-2	-	3.0-3.5'	-	-	962	4	1,352	0.1352	7.6	535	22	-	20.8	Light Olive Brown Sandy CLAY
BH-3	-	2.5-8.0'	-	-	2,778	8	80	0.0080	7.7	544	22	-	21.3	Olive Clayey SAND w/ Gravel

Date: September 8, 2014
GDI #: 14.00103.0195

CITY OF AGOURA HILLS - GEOTECHNICAL REVIEW SHEET

To: Allison Cook

Project Location: Medea Creek, Agoura Hills, California.

Building & Safety #:

Geotechnical Report: Questa Engineering, Corporation, (2014), "*Medea Creek Restoration Project, Geotechnical Investigation Report, Agoura Hills, California*", Report Number 9427, Project Number: 1300042, dated May 16, 2014.

Plans: Questa Engineering, Corporation (2014), "*Medea Creek Restoration Project, 60% Design, Sheets 1 through 16,"* Project Number: 1300042, dated October 31, 2013.

Previous Reviews: None

FINDINGS

Geotechnical Report

☐ Acceptable as Presented

☒ Response Required

REMARKS

Questa Engineering, Corporation (QEC; consultant) provided a geotechnical report for the proposed Medea Creek Restoration Project, City of Agoura Hills, California. A discussion of the proposed development was not provided in the report. However, based on a brief review of the above-referenced plans as well as a review of the submitted report, we completed the review with an understanding that the proposed development includes demolishing an existing concrete channel, and constructing a pedestrian bridge and staircase, gravel-covered footpath, and paved driveway.

GeoDynamics, Inc. (GDI) reviewed the above-referenced report and plans from a geotechnical perspective for compliance with applicable codes, guidelines, and standards of practice. GDI performed the geotechnical review on behalf of the City of Agoura Hills. Based upon our review, the consultant should adequately respond to the following geotechnical report comments prior to approval of the project. Plan-Check comments should be addressed in Building & Safety Plan Check. A separate geotechnical submittal is not required for plan-check comments.

Planning/Feasibility Comments

1. The consultant should provide a complete description of the development proposed at the site.

2. The consultant should discuss, and evaluate as necessary, the impact of the proposed development on adjacent improvements/developments. The consultant should provide 111 statements in accordance with the County of Los Angeles, Manual for preparation of Geotechnical Reports. Mitigation measures should be recommended as necessary.

3. The consultant indicates that the underlying materials at the site are "potentially liquefiable", and estimates seismic settlement at about 1.5 inches and 1 inch respectively in the areas of the staircase and bridge. The consultant also indicates that "*Lateral spreading could occur in areas along the banks of Medea Creek during strong ground shaking following removal of the concrete channel armoring that exposes potentially*

liquefiable sands and silty sands to the ground surface." Based on the above, the consultant should address the following comments:

a) The consultant should provide calculations of liquefaction potential, seismic settlement, and lateral spreading for review. In liquefaction analyses, the consultant should assume the highest anticipated ground water level at the site, and utilize seismic parameters in accordance with the current edition of the City of Agoura Hills Building Code. Any other assumptions or correction factors should be discussed and outlined as appropriate.

b) The consultant should evaluate and account for the impact of liquefaction and related hazards on the proposed foundations. For example: liquefiable soils may not provide the anticipated skin friction, and liquefaction settlement may cause downdrag forces on piles that should be accounted for in the design. In addition, lateral spreading may mobilize lateral pressure on piles. Mitigation measures should be recommended as necessary.

4. The consultant should provide seismic parameters in accordance with the current edition of the California Building Code (UBC), and by adaption, the City of Agoura Hills Building Code.

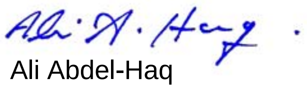
Plan-Check Comments

1. The name, address, and phone number of the Consultant and a list of all the applicable geotechnical reports shall be included on the building/grading plans.
2. The grading plan should include the limits and depths of overexcavation for the road and flatwork areas as recommended by the Consultant.
3. The following note must appear on the grading and foundation plans: "*Excavations shall be made in compliance with CAL/OSHA Regulations*."
4. The following note must appear on the foundation plans: "*All foundation excavations must be observed and approved, in writing, by the Project Geotechnical Consultant prior to placement of reinforcing steel*."
5. Foundation plans and foundation details shall clearly depict the embedment material and minimum depth of embedment for the foundations.
6. Drainage plans depicting all surface and subsurface non-erosive drainage devices, flow lines, and catch basins shall be included on the building plans.
7. Final grading, drainage, and foundation plans shall be reviewed, signed, and wet stamped by the consultant.
8. Provide a note on the grading and foundation plans that states: "*An as-built report shall be submitted to the City for review. This report prepared by the Geotechnical Consultant must include the results of all compaction tests as well as a map depicting the limits of fill, locations of all density tests, outline and elevations of all removal bottoms, keyway locations and bottom elevations, locations of all subdrains and flow line elevations, and location and elevation of all retaining wall backdrains and outlets. Geologic conditions exposed during grading must be depicted on an as-built geologic map*."

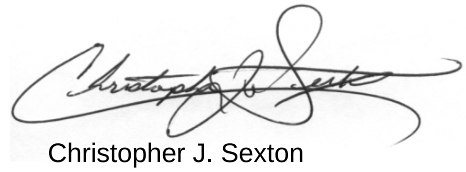
If you have any questions regarding this review letter, please contact GDI at (805) 496-1222.

Respectfully Submitted,

GeoDynamics, INC.



Ali Abdel-Haq
Geotechnical Engineering Reviewer
GE 2308 (exp. 12/31/15)



Christopher J. Sexton
Engineering Geologic Reviewer
CEG 1441 (exp. 11/30/14)

Jennifer Haddow

From: Allison Cook <ACook@ci.agoura-hills.ca.us>
Sent: Wednesday, December 10, 2014 7:50 AM
To: Jennifer Haddow
Cc: Kelly Fisher; Syd Temple
Subject: FW: Medea Creek revised plan set and geotech study

Hi - Please see below. Thanks.

Allison Cook
Principal Planner
City of Agoura Hills
30001 Ladyface Court
Agoura Hills, CA 91301
T 818-597-7310 F 818-597-7352

From: Ali Abdel-Haq [mailto:ali@geodynamics-inc.com]
Sent: Tuesday, December 09, 2014 3:36 PM
To: Allison Cook
Subject: RE: Medea Creek revised plan set and geotech study

Hi Allison:

I reviewed the revised report, response report and plans. Based on my review, we need the consultant to make these two minor corrections prior to approval of the geotechnical report, in compliance with the City requirements:

1) The consultant needs to sign and stamp the response report;
2) As required in the September 8, 2014 review letter, the consultant should provide 111 statements in accordance with the County of Los Angeles, Manual for preparation of Geotechnical Reports. An example of such statement is provided below:
"*This statement is made in accordance with Section 111 of the County of Los Angeles Building Code. It is the opinion of this office, based on the findings of this investigation, provided our recommendations are followed and properly maintained, (1) the proposed development will be safe for its intended use against hazard from landslide, settlement or slippage and (2) the proposed grading and development will have no adverse effect on the stability of the site or adjoining properties. This statement should be provided at the end of the report.*"

I will be happy to contact the consultant and discussed the above with him if you so desire.

Thanks

Ali

From: Allison Cook [mailto:ACook@ci.agoura-hills.ca.us]
Sent: Monday, December 01, 2014 5:14 PM
To: Ali Abdel-Haq
Subject: FW: Medea Creek revised plan set and geotech study

Hi Ali - Could you please go to this link, where you will find the revised geotech report for the Medea Creek Restoration Project, including responses to your comments? Please let me know what you think. Thanks!

Allison Cook
Principal Planner
City of Agoura Hills
30001 Ladyface Court
Agoura Hills, CA 91301
T 818-597-7310 F 818-597-7352

From: Syd Temple [mailto:STemple@questaec.com]
Sent: Monday, December 01, 2014 4:57 PM
To: Kelly Fisher; Jennifer Haddow
Cc: Allison Cook
Subject: Medea Creek revised plan set and geotech study

https://www.dropbox.com/sh/if41gzdwi3ks4hg/AAD9uoG-KJuth6YgNJBXlVbGa?dl=0

I hope this works. Let me know if you cannot get these files. Thanks

Sydney Temple P.E.
Principal

Suite 206
1220 Brickyard Cove Road
Richmond, CA 94807
(510) 236-6114 ext. 220

Appendix C

Biological Constraints Analysis Report

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

805 644 4455
FAX 644 4240

info@rinconconsultants.com
www.rinconconsultants.com

July 18, 2013
Project Number 13-00990

Sydney Temple, P.E.
Principal
Questa Engineering Corporation
1220 Brickyard Cove Road, Suite 206
Point Richmond, CA 94801-4171
stemple@questaec.com

Subject: **Biological Constraints Analysis for the Medea Creek Restoration Project, Agoura Hills, Los Angeles County, California**

Dear Mr. Temple:

Rincon Consultants, Inc. (Rincon) was retained by the City of Agoura Hills to provide a Biological Constraints Analysis for the Medea Creek Restoration Project, Agoura Hills, Los Angeles County, California. The purpose of this report is to identify potential "fatal flaws" or items associated with biological resources that may cause an exceptional cost or significant project delays, establish baseline conditions for purposes of CEQA and project permitting, and recommend further studies or mitigation measures, if any, that will be appropriate for the project.

PROJECT LOCATION AND DESCRIPTION

The Medea Creek Restoration project site (project site) is generally located within the City of Agoura Hills (City) in western Los Angeles County. The City of Agoura Hills is in the eastern Conejo Valley between the Simi Hills and the Santa Monica Mountains. The site is depicted in Township 1 North, Range 18 West of the U.S. Geographical Survey (USGS) Thousand Oaks 7.5-minute topographic quadrangle. The project site is specifically located between Canwood Street and Thousand Oaks Boulevard on the east side of Kanan Road. The project site includes an approximately 450 foot reach of Medea Creek and its associated access roads and right-of-way, located between Kanan Road and Chumash Park. Land uses surrounding the project site consist of residential single-family housing and Chumash Park to the east, Kanan Road and commercial mixed-use developments to the north, open space to the west, and a naturalized portion of Medea Creek to the south abutted by residential high-density housing development. The proposed activities will include removing the concrete-lined flood channel containing Medea Creek, reestablishing a native riparian corridor, and providing pedestrian connectivity from Chumash Park to Kanan Road.

METHODOLOGY

The Biological Resources Assessment for the proposed project consisted of a review of relevant literature followed by a field reconnaissance survey. The literature review included information on sensitive resource occurrences within a five mile buffer around the project site from the California Department of Fish and Wildlife (CDFW) California Natural Diversity Data Base (CNDDB), Biogeographic Information and Observation System (BIOS – www.bios.dfg.ca.gov), and U.S. Fish and Wildlife Service (USFWS) Critical Habitat Portal (http://criticalhabitat.fws.gov). Site plans provided by the client, aerial photographs, and topographic maps were also examined.

Rincon Senior Biologist, Julie Broughton and Biologist Lindsay Griffin, conducted field reconnaissance surveys to document existing site conditions and the potential presence of sensitive biological resources, including sensitive plant and wildlife species, sensitive plant communities, jurisdictional waters and wetlands, and habitat for nesting birds. The survey area included the project site, the adjacent open space parcel to the west of the project site, the shoulder associated with Kanan Road between Canwood Street and Thousand Oaks Boulevard, and adjacent portions of Chumash Park and the naturalized portions of Medea Creek. Existing biological conditions (e.g. vegetative communities, potential presence of sensitive species and/or habitats, and presence of potentially jurisdictional waters) within the project site and survey buffer were documented. The purpose of the surveys was to identify potential sensitive biological resources and constraints for the restoration project.

The potential presence of sensitive species is based on a literature review and field surveys designed to assess habitat suitability only. Definitive surveys to confirm the presence or absence of special-status species were not performed. Definitive surveys for sensitive plant and wildlife species generally require specific survey protocols requiring extensive field survey time to be conducted only at certain times of the year. The findings and opinions conveyed in this report are based on this methodology.

EXISTING SITE CONDITIONS

The field surveys were conducted on June 18, 2013, between the hours of 1200 and 1500, and July 1, 2013, between the hours of 1000 and 1200. Weather conditions during both surveys included an average temperature of 75 degrees Fahrenheit, with winds between 1 and 3 miles per hour and minimal cloud cover.

Medea Creek flows from under Kanan Road via a concrete-lined channel that continues south for approximately 500 feet until it transitions to a natural bottom channel covered by a dense native riparian vegetated canopy. The adjacent western parcel boundary is a hillside with native trees including Valley oak (*Quercus lobata*), Coast live oak (*Quercus agrifolia*), and California sycamore (*Platanus racemosa*). The remainder of the parcel is dominated by several alliances of coastal sage scrub habitat including *Eriogonum fasciculatum* Shrubland Alliance (California buckwheat scrub), *Opuntia littoralis* Shrubland Alliance (coast prickly pear scrub), *Salvia mellifera* Shrubland Alliance (black sage scrub), *Baccharis pilularis* Shrubland Alliance (coyote brush scrub), and interspersed with an herbaceous California semi-natural stands. Along the eastern side of the channel adjacent to the residential housing are non-native landscape trees including myoporum (*Myoporum laetum*), palm trees (*Phoenix* sp.), and oleander (*Nerium oleander*).

Wildlife activity during the site visit was very low. California ground squirrel (*Otospermophilus beecheyi*) was observed on the hillside. Approximately six house finch (*Haemorhous mexicanus*) were observed perched on the chainlink fence on the west side of the channel. Three northern mockingbirds (*Mimus polyglottos*) were observed foraging in the coyote bush on the hillside. Western gull (*Larus occidentalis*) were observed flying overhead. One red-tailed hawk (*Buteo jamaicensis*) was observed perched on top of a coast live oak on the hillside. Two killdeer (*Charadrius vociferous*) and two black phoebe (*Sayornis nigricans*) were observed in the concrete-lined portion of the channel. One downy woodpecker (*Picoides pubescens*) was observed foraging in a sycamore tree (*Platanus occidentalis*).

SENSITIVE BIOLOGICAL RESOURCES DISCUSSION AND IMPACT ANALYSIS

The CNDDB has records for 11 sensitive plant species, 3 sensitive plant communities, and 10 sensitive wildlife species within the USGS topographic quadrangle that contains the project site. Sensitive plant and wildlife species typically have very specific habitat requirements and the majority of these species are not expected to occur on the project site or within the surrounding area. The following discusses those species with potential to occur on the project site.

Sensitive Plant Species. The project site within the open space hillside does contain suitable soil to sustain Lyon's pentachaeta; however, the species was not observed within anticipated impact areas on the project site. Although definitive surveys to confirm the presence or absence of rare plant species were not performed, Lyon's pentachaeta (*Pentachaeta lyonii*) was observed at two reference sites less than a mile from the project site and therefore, would be blooming on-site if the species was present. No effects to sensitive plant species are expected to occur from this project.

Sensitive Plant Communities. No sensitive plant communities were observed onsite. *Quercus agrifolia* Woodland Alliance (coast live oak woodland) is present on the north facing slopes. Valley oak is also found on the project site but are represented by only three individual trees. Seven of the oak trees located along the shoulder of Kanan Road, in addition to California sycamore, are a result of landscaping as determined by the presence of supportive tree stakes. Although native oak species are present, they do not form a sensitive community because they are not contiguous with the riparian canopy that occurs to the south of the parcel boundary. Native riparian vegetation is present to the south of the project boundary, within the naturalized portion of Medea Creek, and includes arroyo willow (*Salix lasiolepis*), California sycamore and black cottonwood (*Populus trichocarpa*). Construction effects would occur at the northern fringe of this riparian habitat, but in the long term, effects would be beneficial.

Sensitive Wildlife Species. The CNDDB contains several records for sensitive wildlife species within the vicinity of the project site, many of which are associated with the Las Virgenes Creek. The project site is channelized and not suitable for most species of wildlife.

Marginally suitable habitat for western pond turtle (*Emys marmorata*) occurs within the naturalized section of Medea Creek, south of the project site. This species typically prefers larger areas of suitable habitat with basking sites, sandy banks, and nearby upland soils suitable for egg laying. As the project site lacks larger pools, sandy banks, and suitable upland habitat, this species is not expected to occur onsite except potentially as a transitional individual moving between suitable habitat locations. Western pond turtle was not observed onsite during surveys. Therefore, minimal effects to sensitive wildlife species are expected to occur from this project.

Nesting Birds. The California Fish and Game Code (CFGC) Section 3503 and the Migratory Bird Treaty Act (MBTA) protect native birds and their nests. No nests or breeding/nesting behavior such as courtship displays, copulation, vegetation or food carries, presence of fledglings, or territorial displays (e.g. singing or aggression) was observed during the survey. No evidence of raptor nesting was observed during the site visits; however, one red-tailed hawk was observed perched on top of a coast live oak. However, suitable nesting habitat occurs within and directly adjacent to the project site. Therefore, the project has the potential to affect nesting birds if construction occurs during the nesting season.

Jurisdictional Drainages and Wetlands. Although channelized, Medea Creek is subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE), Los Angeles Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW). As the project includes restoration and creation of wetlands, it will have long-term beneficial impacts by creating wetlands. However, restoration will also have temporary impacts on jurisdictional waters, and as such is subject to permits from the agencies listed above.

Protected Trees. The *City of Agoura Hills Appendix A- Oak Tree Preservation Guidelines* prescribes avoiding impacts to all oak trees unless compelling reasons justify the removal of such trees. Valley oak and coast live oak, both protected species, were found on the project site. Although project activities are not proposed in areas where these trees occur, final design plans could require the encroachment of or removal of trees. Should the project impact protected trees, an oak tree permit may be needed pursuant to the provisions of sections 9657 through 9657.5 of the City Zoning Ordinance.

CONCLUSIONS AND RECOMMENDATIONS

The project site does not contain suitable habitat for sensitive plant species, sensitive wildlife or sensitive plant communities where project impacts are anticipated to occur. Therefore, impacts to these sensitive resources as a result of the proposed project are not expected to occur and no further actions with respect to these resources are recommended unless project impacts extend beyond what is currently anticipated.

Nesting Birds. The project site and adjoining area contains habitat suitable for nesting birds. If project activities will occur during the avian nesting season (typically February to September), a survey of the project site and surrounding area for active nests should be conducted by a qualified biologist 1 to 2 weeks prior to construction. If active nest(s) are located, an appropriate buffer shall be established surrounding the nest(s) and shall be flagged for avoidance. The avoidance buffer shall be determined by the monitoring biologist based upon the species nesting and the activity being conducted. Alternatively, construction within the buffer area may be conducted at the discretion of a qualified biological monitor. The biologist shall monitor the active nest(s) during initial disturbance activities and/or development activities to determine if the recommended avoidance buffers are adequate and that the nests are not being stressed or jeopardized

Jurisdictional Drainages and Wetlands. A Section 404 permit of the Clean Water Act will be required from the ACOE for alteration of Medea Creek. A water quality certification will be required from the RWQCB. Additionally, a Streambed Alteration Agreement will be required from the CDFW. Compliance with the requirements of the appropriate ACOE, CDFW, and RWQCB permits and implementation of any mitigation therein, will reduce impacts to wetlands to a less than significant level.

Protected Trees. If project activities will impact any oak tree, regardless of the size of the tree, a permit from the City of Agoura Hills Department of Planning and Community Development is required. Encroachment, cutting, pruning, the physical removal or relocation of a tree or causing of the death of a tree through damaging, poisoning or other direct or indirect action shall constitute an impact. The protected zone of an oak tree is defined in the *City of Agoura Hills Appendix A- Oak Tree Preservation Guidelines* as the point five (5) feet outside of the dripline that extends inwards to the trunk of the tree and shall be less than fifteen (15) feet from the trunk of an oak tree.

Please do not hesitate to contact Rincon Consultants if you have any questions regarding this biological constraints analysis or the above recommendations.

Sincerely,
RINCON CONSULTANTS, INC.

Lindsay Griffin
Associate Biologist

Lacrissa Davis, MESM
Principal

Nancy Fox-Fernandez, MS
Biologist/Project Manager

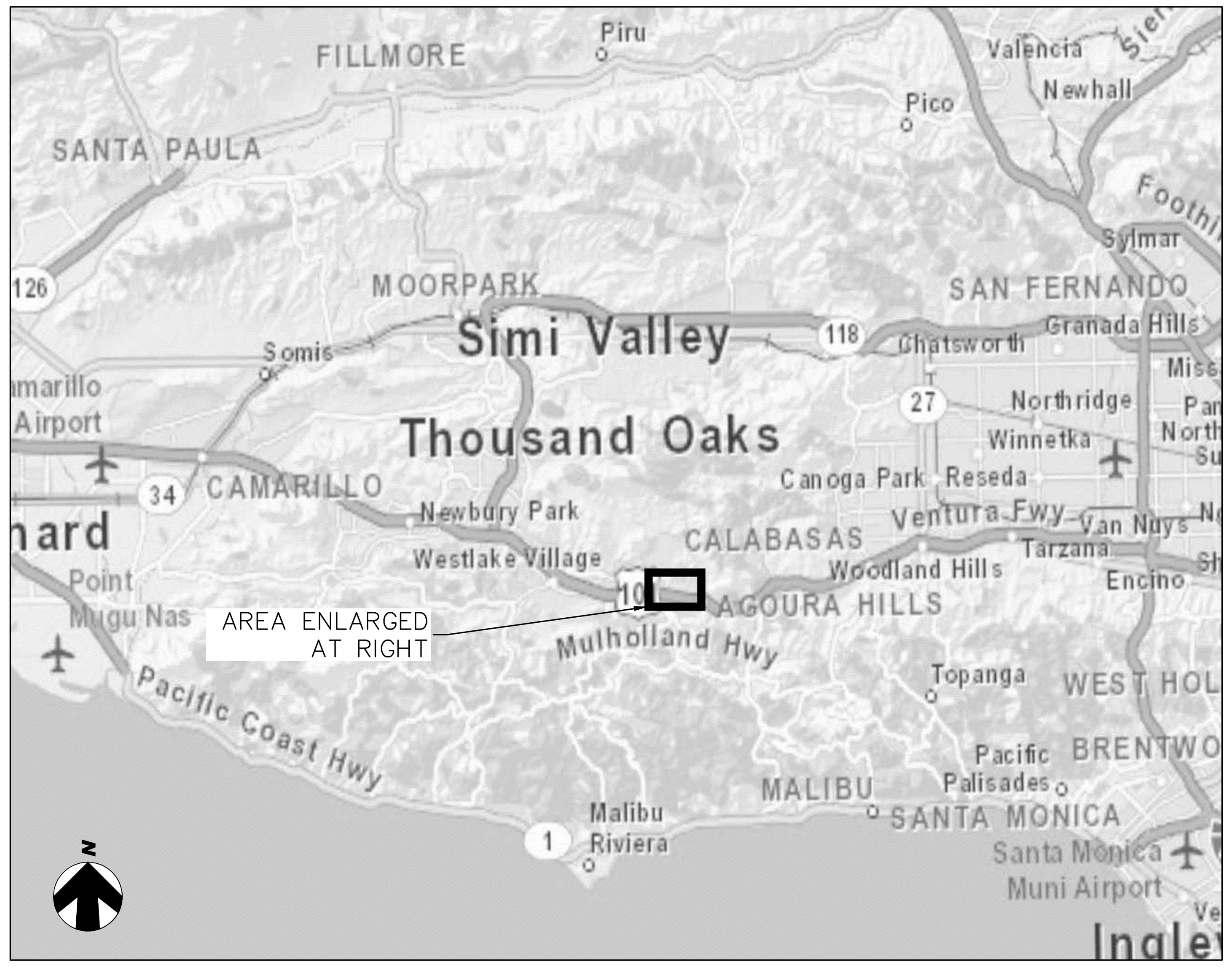
Appendix D

Preliminary Construction Drawings

rincon

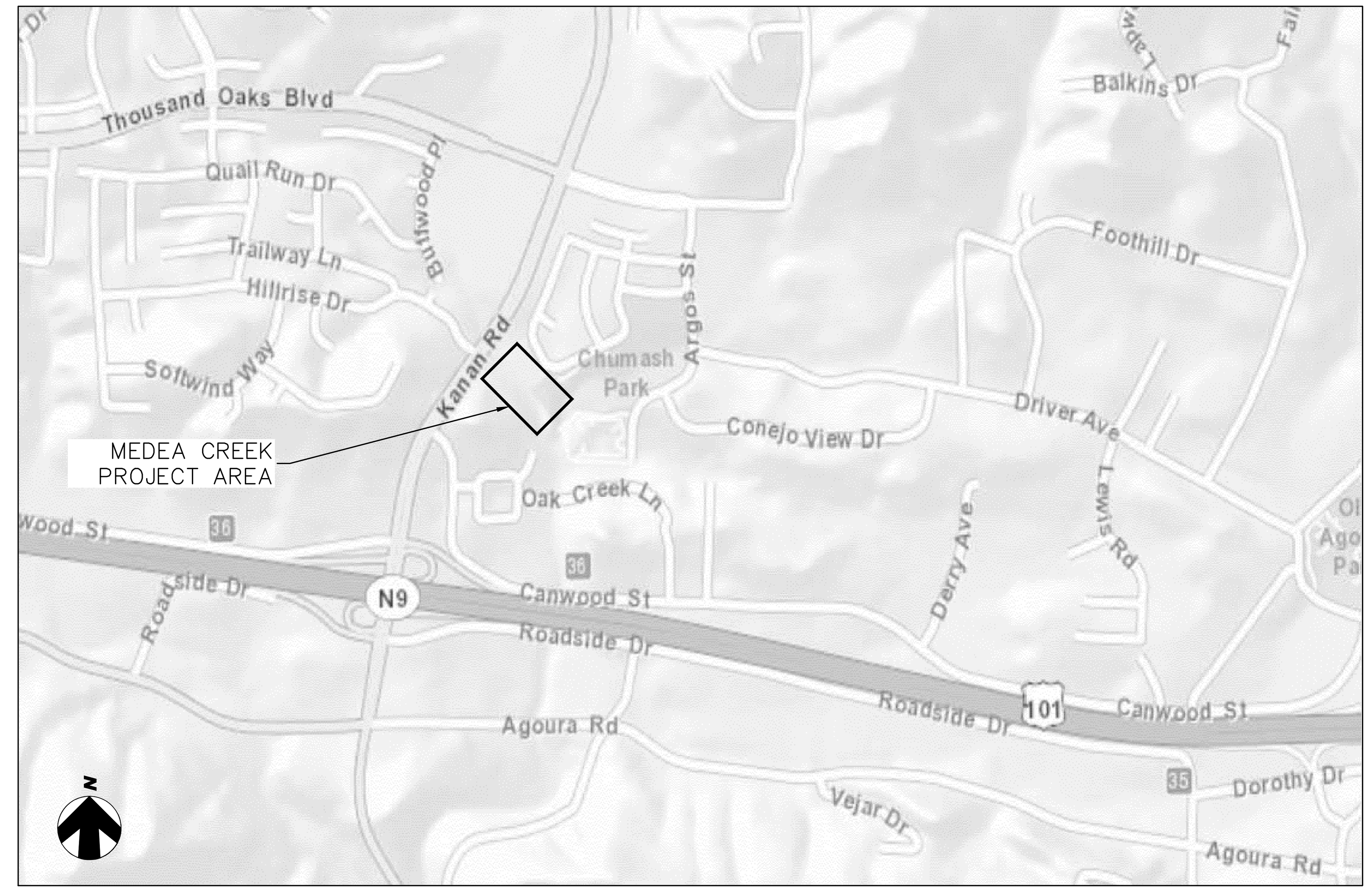
MEDEA CREEK RESTORATION PROJECT

CITY OF AGOURA HILLS



AREA MAP

N.T.S.



VICINITY MAP

N.T.S.

PRELIMINARY CONSTRUCTION QUANTITIES:

EARTHWORK CUT: 5,000 CY
EARTHWORK FILL: 5,000 CY
OFFHAUL: 750 CY CONCRETE RUBBLE
IMPORT: 2,000 CY RIPRAP;

DRAWING INDEX

DETAIL DRAWING DESIGNATION

X/XX — DETAIL NO. / SHEET NO.

GENERAL NOTES

1. **DESIGN INTENT:** THESE PLANS AND SPECIFICATIONS REPRESENT THE DESIGN INTENT OF QUESTA ENGINEERING CORPORATION (THE ENGINEER), AS APPROVED BY THE OWNER, CITY OF AGOURA HILLS. THE CONTRACTOR IS RESPONSIBLE FOR ALL ITEMS SHOWN ON THESE PLANS AND SPECIFICATIONS AND SHALL BE RESPONSIBLE FOR ANY DEVIATIONS FROM THESE PLANS AND ASSOCIATED RISK AND EXPENSE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A COPY OF THE APPROVED PLANS AND SPECIFICATIONS AND ANY ADDENDA AT THE JOB SITE AT ALL TIMES. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY CITY OF PASADENA OF ANY UNFORESEEN CIRCUMSTANCES OR CONDITIONS THAT WOULD ALTER THESE PLANS AND SPECIFICATIONS FOR APPROVAL OF MODIFICATIONS TO THE INTENDED DESIGN.

2. **BASE MAP:** THE PROPOSED IMPROVEMENTS SHOWN ON THESE DRAWINGS ARE SUPERIMPOSED ON A BASE MAP. THIS BASE MAP IS COMPILED FROM AERIAL AND GROUND SURVEYS, AND OTHER DATA AS MADE AVAILABLE TO THE ENGINEER, WHO SHALL NOT BE HELD LIABLE FOR CHANGES, INACCURACIES, OMISSIONS OR OTHER ERRORS ON THESE DOCUMENTS. THE COMPOSITE BASE MAP IS PROVIDED AS AN AID ONLY AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING THESE DOCUMENTS AND INCORPORATING/INTEGRATING ALL CONSTRUCTION AS REQUIRED TO ACCOMMODATE THE SAME. NONE OF THE INCLUDED DRAWINGS DEPICT A BOUNDARY SURVEY ALTHOUGH A PARTIAL ALTA SURVEY WAS PERFORMED ALONG A PORTION OF THE UP ROW. BOUNDARY LINES SHOWN ARE APPROXIMATE AND FOR INFORMATIONAL PURPOSES ONLY.

3. **DISCREPANCIES:** IN THE EVENT THAT SUBGRADE OBSTRUCTIONS ARE ENCOUNTERED OR DISCREPANCIES ARE FOUND BETWEEN THE DRAWINGS AND FIELD CONDITIONS, NOTIFY ENGINEER OR CITY OF AGOURA HILLS FOR DIRECTIONS. DO NOT PROCEED WITH THE WORK WITHOUT DIRECTION FROM THE ENGINEER.

4. **PRECONSTRUCTION MEETING:** A PRECONSTRUCTION MEETING ATTENDED BY THE CONTRACTOR, CITY OF AGOURA HILLS REPRESENTATIVE, AND OTHERS AS APPROPRIATE, WILL BE HELD WITHIN FIFTEEN (15) DAYS OF AWARD OF CONTRACT TO DISCUSS THE WORK. SUBMIT ALL REQUIRED DOCUMENTS, REQUESTS, AND PROPOSALS AT THIS MEETING FOR DISCUSSION.

5. **UTILITIES:** CONTRACTOR SHALL NOTIFY ALL PUBLIC AND PRIVATE UTILITY COMPANIES IN THE PROJECT AREA A MINIMUM OF THREE (3) WORKING DAYS PRIOR TO COMMENCEMENT OF WORK. CONTRACTOR MUST INVESTIGATE AND VERIFY THE LOCATION OF ANY EXISTING UTILITIES WITHIN THE PROJECT AREA. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO IDENTIFY, LOCATE, AND PROTECT ALL UNDERGROUND UTILITIES. ANY UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE CONSIDERED TENTATIVE AND APPROXIMATIONS AND THEREFORE, NO WARRANTY EXPRESSED OR IMPLIED IS MADE AS TO THE COMPLETENESS OR CORRECTNESS OF THEIR LOCATION. THE UTILITY COMPANIES ARE THOUGHT TO BE MEMBERS OF THE UNDERGROUND SERVICE ALERT (U.S.A.) ON-CALL PROGRAM. THE CONTRACTOR SHALL NOTIFY U.S.A. 72-HOURS IN ADVANCE OF PERFORMING EXCAVATION WORK AT 811 FROM 7:00 AM TO 5:00 PM, MONDAY THROUGH FRIDAY. EXISTING PUBLIC UTILITIES SHALL BE KEPT IN SERVICE AT ALL TIMES. UTILITIES THAT INTERFERE WITH THE WORK TO BE PERFORMED SHALL BE PROTECTED AS REQUIRED BY CITY OF AGOURA HILLS AND ALL OTHER AFFECTED ENTITIES. DAMAGE TO UTILITIES SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE CITY OF AGOURA HILLS AND TO THE SATISFACTION OF THE ENGINEER AND OWNER. POTHOLING IS REQUIRED. ANY EXCAVATION WITHIN FIVE (5) FEET OF THE EXISTING GAS TRANSMISSION PIPE SHALL BE DUG BY HAND IN THE PRESENCE OF UTILITY INSPECTOR.

6. **RESOURCE PROTECTION:** THE CONTRACTOR IS ADVISED OF THE PRESENCE OF SENSITIVE RESOURCES LOCATED NEAR PROJECT WORK AREAS. THE TRAIL ALIGNMENT, FENCING, STAGING AREAS AND ALL OTHER PROJECT FACILITIES HAVE BEEN CAREFULLY LOCATED TO MINIMIZE DISTURBANCE OF SENSITIVE RESOURCES. THE LIMITS OF WORK ARE SHOWN ON THE DRAWINGS. ALL CONTRACTOR ACTIVITIES, INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION ACTIVITIES, VEHICLE MAINTENANCE, AND MATERIALS AND EQUIPMENT STORAGE AND STAGING, MUST BE STRICTLY CONFINED TO THE WORK AREAS SHOWN ON THE DRAWINGS. THE LIMITS OF WORK WILL BE CAREFULLY LOCATED IN THE FIELD BY THE CONTRACTOR AND ENGINEER OF RECORD, AND ALL WORK LIMIT AREAS WILL BE PROTECTED BY STRAW WATTLES, CONSTRUCTION BARRIER FENCING, OR SILT FENCING AS SHOWN ON THE DRAWINGS.

7. **BIOLOGICAL AND CULTURAL RESOURCE MONITOR:** CITY OF AGOURA HILLS WILL PROVIDE A QUALIFIED BIOLOGICAL/ARCHEOLOGICAL MONITOR THAT WILL INITIALLY REVIEW SITE CONSTRUCTION PROTOCOLS WITH ALL CONSTRUCTION CONTRACTOR EMPLOYEES AT A PRE-CONSTRUCTION MEETING THAT WILL BE SPECIFICALLY HELD ON RESOURCE PROTECTION. EACH EMPLOYEE ASSIGNED TO THIS PROJECT MUST PARTICIPATE IN THIS PRE-CONSTRUCTION MEETING AND DISCUSSION OF ADJACENT SENSITIVE RESOURCES, AND SIGN A STATEMENT INDICATING THAT THEY HAVE READ AND UNDERSTOOD THE PROTOCOLS AND AGREE TO ADHERE TO THEM. SIGNIFICANT BREACHES OF PROTOCOL AND FAILURE TO ADEQUATELY PROVIDE THE DEGREE OF RESOURCE PROTECTION REQUIRED BY THIS PROJECT WILL RESULT IN THE ISSUANCE OF A STOP WORK ORDER BY THE ENGINEER OR BY THE MONITOR. CITY OF AGOURA HILLS PROVIDED MONITOR WILL CAREFULLY INSPECT ALL WORK AREAS FOR THE PRESENCE OF WILDLIFE OR CULTURAL RESOURCES PRIOR TO INSTALLATION OF PROTECTIVE BARRIER FENCING AND FIELD FENCING, AND PRIOR TO INITIATION OF CONSTRUCTION EACH DAY. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY PENALTIES AND ALL REPAIRS AND MITIGATIONS IMPOSED DUE TO BREACH OF PROTOCOL AND UNAUTHORIZED INTRUSION INTO SENSITIVE RESOURCE AREAS.

8. **CONTRACTOR RESPONSIBILITY:** BY ENTERING INTO THIS CONTRACT WITH CITY OF AGOURA HILLS, THE CONTRACTOR AGREES TO HAVING EXAMINED THE SITE, COMPARING THE SITE CONDITIONS WITH THE DRAWINGS AND SPECIFICATIONS AND HAS CAREFULLY EXAMINED ALL OF THE CONTRACT DOCUMENTS AND IS SATISFIED AS TO THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. NO ALLOWANCE SHALL BE MADE SUBSEQUENTLY ON BEHALF OF THE CONTRACTOR DUE TO FAILURE TO BE ACQUAINTED WITH THE CONDITIONS OF THE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH SUBCONTRACTORS AS REQUIRED TO ACCOMPLISH ALL CONSTRUCTION OPERATIONS. CONTRACTOR SHALL PROTECT ALL EXISTING ON-SITE AND OFF-SITE IMPROVEMENTS AGAINST DAMAGE RESULTING FROM OPERATIONS. RESPONSIBILITY EXTENDS TO THE CONTRACTOR'S WORKERS, SUBCONTRACTORS AND OTHERS PROVIDING SERVICES. CONTRACTOR SHALL REPAIR AND/OR REPLACE DAMAGE AT THEIR OWN EXPENSE AND TO THE SATISFACTION OF THE ENGINEER AND CITY OF AGOURA HILLS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD CITY OF AGOURA HILLS AND THE ENGINEER (QUESTA ENGINEERING CORPORATION) HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPT FROM LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF CITY OF AGOURA HILLS OR THE ENGINEER. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

9. **JOB SITE CONDITIONS:** CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY, TRAFFIC CONTROL, ACCESS TO AND FROM ADJOINING DRIVEWAYS AND STREETS, AND ANY LANE CLOSURES. TRASH GENERATED BY THIS WORK (CONSTRUCTION DEBRIS, PAPER, BOTTLES, CIGARETTES, ETC) SHALL BE REMOVED ON A DAILY BASIS. CONTRACTOR SHALL CONTROL DUST AT ALL TIMES WITH WATER.

10. **SAFETY AND TRAFFIC CONTROL:** ALL WORK SHALL BE IN COMPLIANCE WITH APPLICABLE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS AS SET FORTH BY THE FEDERAL DEPARTMENT OF LABOR AND/OR THE STATE OF CALIFORNIA AND CITY OF RICHMOND. ALL TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE CALTRANS MANUAL OF TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OF WORK ZONES. ALL SIGNS SHALL BE APPROPRIATELY CONSTRUCTED WITH REFLECTIVE MATERIAL ON A BACKING OF METAL OR FABRIC (NO WOOD OR PLASTIC ALLOWED) AND SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION TO PROVIDE PROPER VISIBILITY, PER SECTION 12 OF THE CALTRANS SPECIAL PROVISIONS. THE CONTRACTOR SHALL MAINTAIN REASONABLE ACCESS TO ALL ROADWAYS DURING CONSTRUCTION

11. **SPECIFICATIONS:** REFER TO THE SPECIFICATIONS THAT ARE A PART OF THESE CONTRACT DOCUMENTS. COMPLY WITH ALL REGULATIONS AND CODES GOVERNING WORK PERFORMED UNDER THIS CONTRACT. REFER TO CALTRANS STANDARD PLANS AND SPECIFICATIONS AS REQUIRED.

12. **MISCELLANEOUS:** WRITTEN DIMENSIONS ALWAYS TAKE PRECEDENCE OVER SCALED DIMENSIONS IF THERE IS A CONFLICT. THE CONTRACTOR SHALL CONTACT CITY OF AGOURA HILLS TO OBTAIN ADDITIONAL CLARIFICATION. NO DEVIATION OR SUBSTITUTION SHALL BE ALLOWED WITHOUT OBTAINING PRIOR WRITTEN APPROVAL FROM CITY OF AGOURA HILLS AND THE ENGINEER.

13. **GEOTECHNICAL REPORT:** QUESTA ENGINEERING CORPORATION. 1220 BRICKYARD COVE ROAD, POINT RICHMOND, CA 94807. (510) 236 - 6114

MEDEA CREEK RESTORATION

CITY OF AGOURA HILLS

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

REGISTERED PROFESSIONAL ENGINEER SIDNEY A. TEMPLE No. 59695 EXPIRES 12-31-15 CIVIL STATE OF CALIFORNIA

Sht:	Rev:	Date:	By:	Description:	App'd:

Design:	ST/JM
Drawn:	JM
Checked:	ST
Appr'd:	ST

TITLE SHEET AND DRAWING INDEX

AGOURA HILLS, LOS ANGELES COUNTY

Size	D
Project	1300042
Scale:	AS NOTED
Date:	2014-11-25
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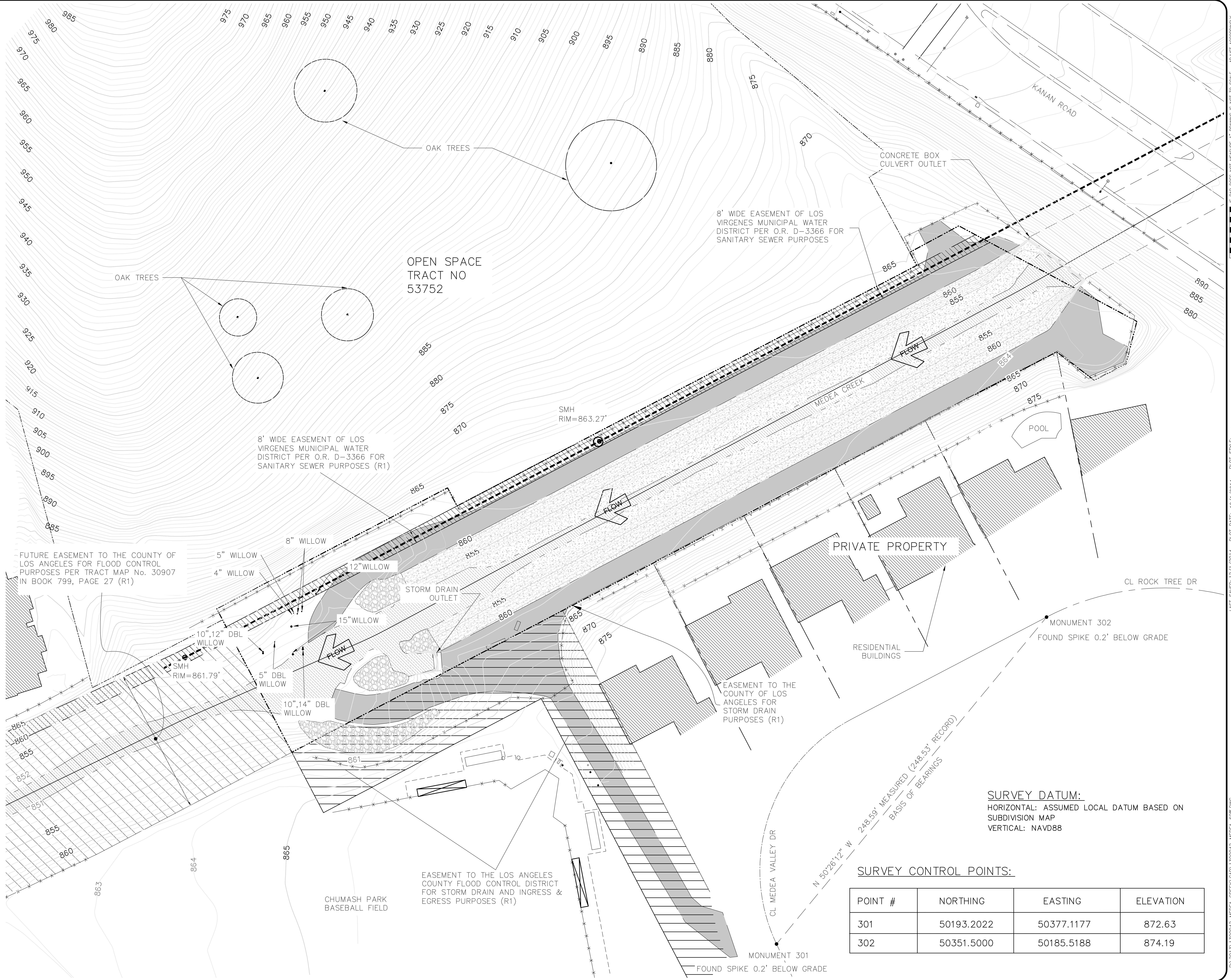
LEGEND

- EXISTING ROCK REVETMENT
- SUMMER TIME FLOW EXTENT
- ASPHALT ACCESS ROAD
- CONCRETE CHANNEL
- EASEMENTS
- EXISTING FENCE
- EXTENT OF LA COUNTY FLOOD CONTROL PROPERTY
- OTHER PARCEL BOUNDARIES
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED SILT/BIO FENCE
- TEMPORARY SECURITY FENCE
- TEMPORARY DIVERSION PIPE

0 30' 60'
(1" = 30')

N



SURVEY DATUM:

HORIZONTAL: ASSUMED LOCAL DATUM BASED ON SUBDIVISION MAP
VERTICAL: NAVD88

SURVEY CONTROL POINTS:

POINT #	NORTHING	EASTING	ELEVATION
301	50193.2022	50377.1177	872.63
302	50351.5000	50185.5188	874.19

MEDEA CREEK RESTORATION

CITY OF AGOURA HILLS

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Appr'd: ST

EXISTING CONDITIONS - PLAN VIEW

AGOURA HILLS, LOS ANGELES COUNTY

Size: D
Project: 1300042
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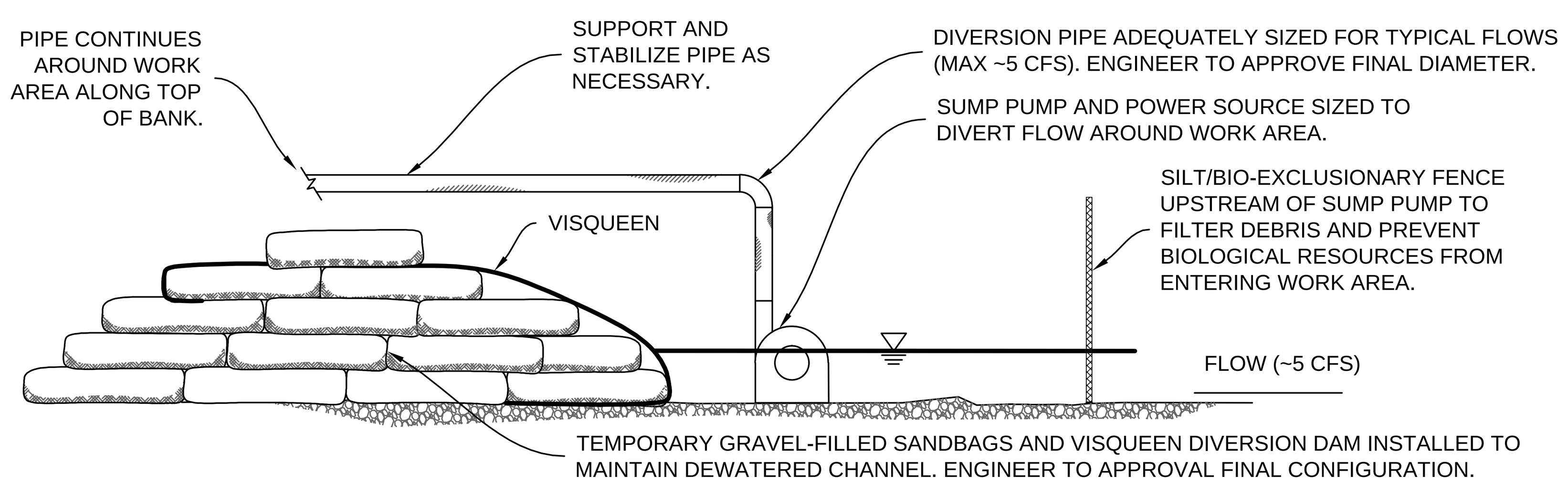
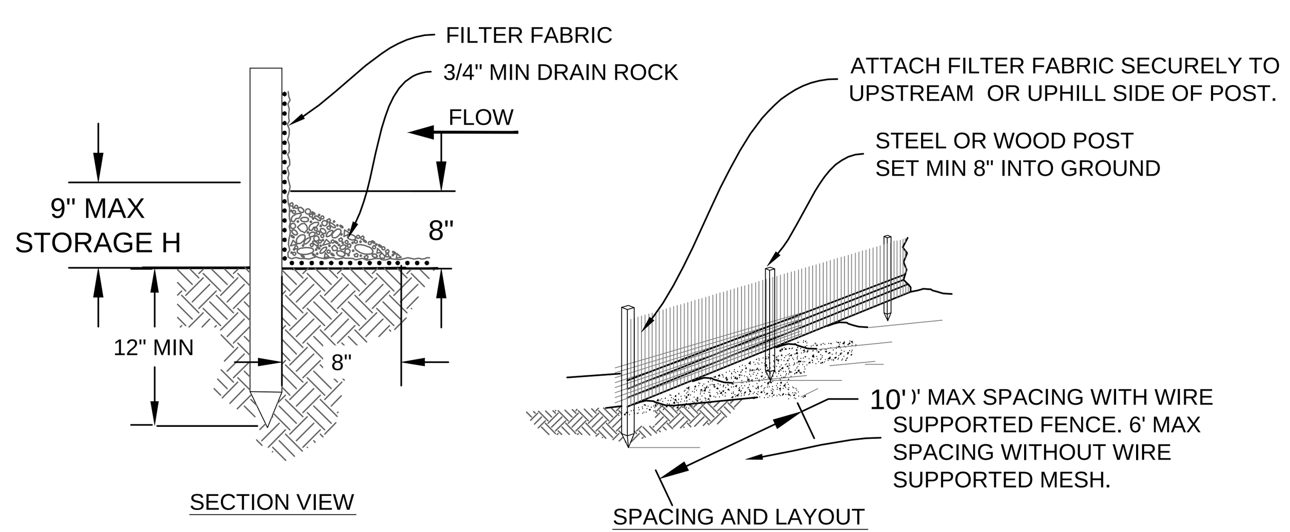


1 TEMPORARY PLASTIC AND SANDBAG COFFER DAM

NTS



2 SILT/BIO-EXCLUSIONARY FENCING

NTS

MEDEA CREEK RESTORATION

CITY OF AGOURA HILLS

QUESTA ENGINEERING CORP.
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(510) 236-6114
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questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

Sht:	Rev:	Date:	By:	Description:	App'd:

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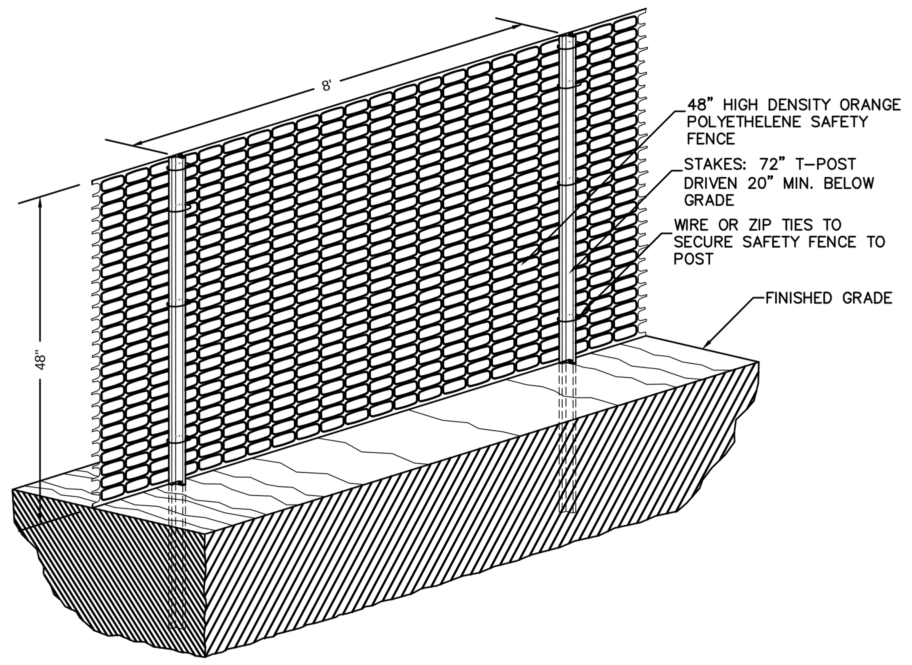
Appr'd: ST

DEWATERING and EROSION BMPS

AGOURA HILLS, LOS ANGELES COUNTY

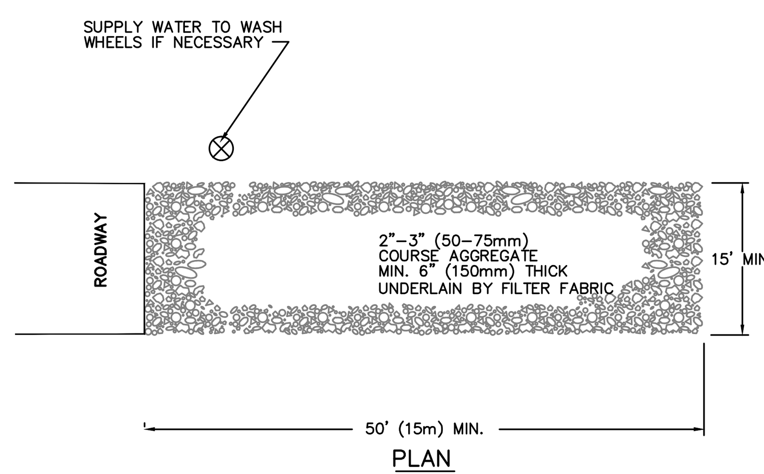
Size: D
Project: 1300042
Scale: AS NOTED
Date: 2014-11-25
Sheet: 3 OF 23



NOTES:

1. ALL SENSITIVE AREAS SHALL BE PROTECTED AS PER PLAN.
2. ALL TREES IN THE CONSTRUCTION AREA NOT SPECIFICALLY DESIGNATED FOR REMOVAL SHALL BE PRESERVED AND PROTECTED WITH HIGH VISIBILITY FENCE AS PER PLAN.
3. WHEN PRACTICABLE, INSTALL HIGH VISIBILITY 3 FEET OUTSIDE OF THE DRIP LINE OF THE TREE.
4. SAFETY FENCE SHOULD BE FASTENED SECURELY TO THE T–POSTS.
5. THE FENCING MUST REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION; ANY CHANGE OF THE PROTECTIVE FENCING MUST BE APPROVED.

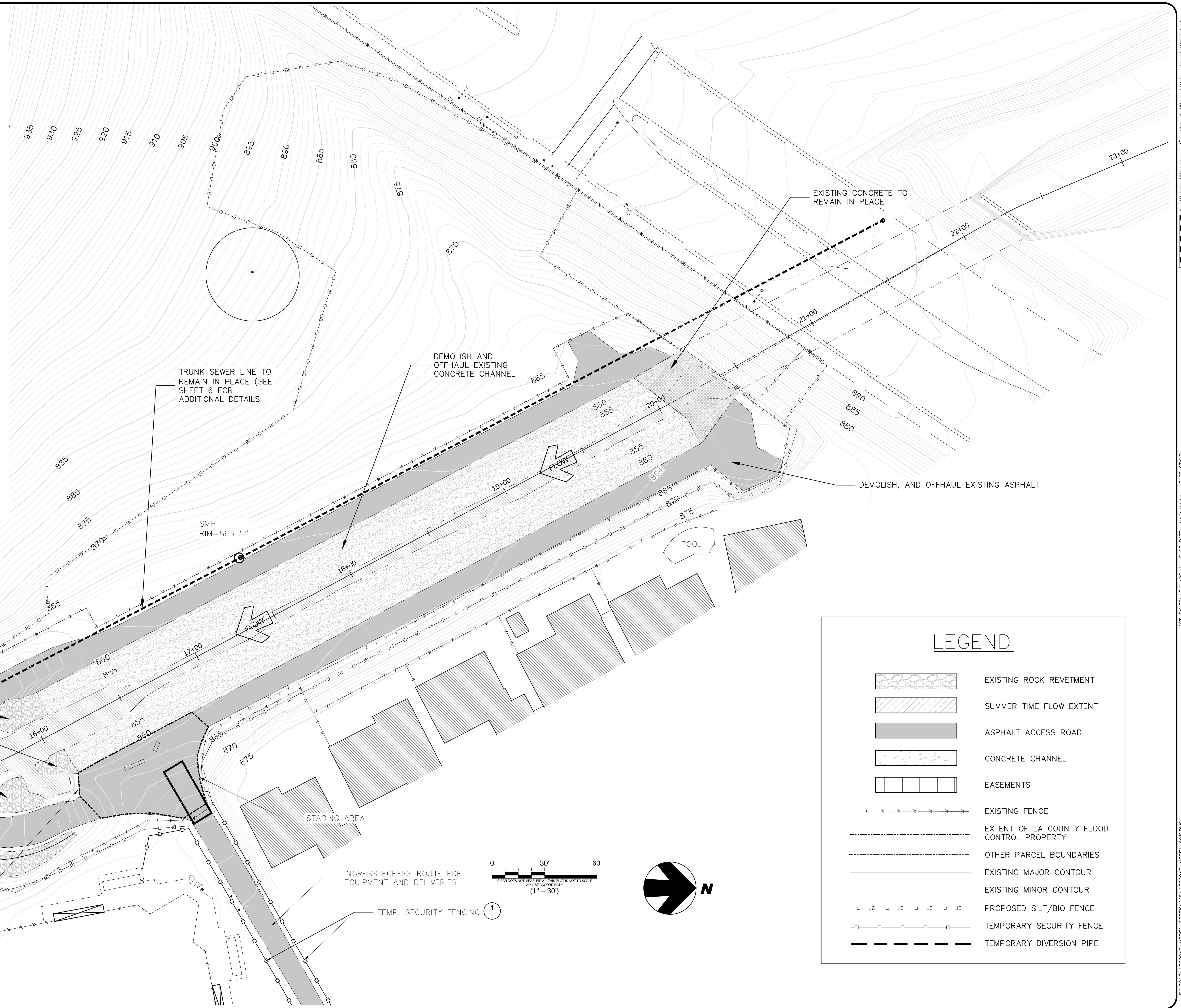
1 CONSTRUCTION BARRIER FENCE
NTS



NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT–OF–WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

2 TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT
NTS



LEGEND

- EXISTING ROCK REVETMENT
- SUMMER TIME FLOW EXTENT
- ASPHALT ACCESS ROAD
- CONCRETE CHANNEL
- EASEMENTS
- EXISTING FENCE
- EXTENT OF LA COUNTY FLOOD CONTROL PROPERTY
- OTHER PARCEL BOUNDARIES
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED SILT/BIO FENCE
- TEMPORARY SECURITY FENCE
- TEMPORARY DIVERSION PIPE

MEDEA CREEK RESTORATION

CITY OF AGOURA HILLS

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

Sht:	Rev:	Date:	By:	Description:	App'd:

Design: ST/JM
Drawn: JM
Checked: ST
Appr'd: ST

DEMOLITION and STAGING

AGOURA HILLS, LOS ANGELES COUNTY

Size	Project
D	1300042
Scale:	AS NOTED
Date:	2014-11-25
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NOTE:
ALL GRADING/EXCAVTION SHALL BE PERFORMED IN COMPLIANCE WITH CAL/OSHA REGULATIONS

MEDEA CREEK RESTORATION

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GRADING AND DRAINAGE PLAN

AGOURA HILLS, LOS ANGELES COUNTY

Size: D
Project: 1300042
Scale: AS NOTED
Date: 2014-11-25
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