Appendix A: Shoreline Golf Links Bridge Replacement Detailed Emissions Report

Shoreline Golf Links Bridge Replacement Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Shoreline Golf Links Bridge Replacement
Construction Start Date	3/1/2024
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.70
Precipitation (days)	28.2
Location	37.43034529957799, -122.0833590893834
County	Santa Clara
City	Mountain View
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	1700
EDFZ	1
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.16

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Bridge/Overpass Construction	0.04	Mile	0.00	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

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

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.37	1.14	10.7	13.3	0.02	0.43	0.17	0.60	0.39	0.04	0.44	—	2,650	2,650	0.11	0.04	0.94	2,666
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.37	1.14	10.7	13.2	0.02	0.43	0.17	0.60	0.39	0.04	0.44	—	2,639	2,639	0.11	0.04	0.02	2,654
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.40	0.33	3.12	3.83	0.01	0.12	0.05	0.17	0.11	0.01	0.13	—	767	767	0.03	0.01	0.12	771
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.07	0.06	0.57	0.70	< 0.005	0.02	0.01	0.03	0.02	< 0.005	0.02	—	127	127	0.01	< 0.005	0.02	128

2.2. Construction Emissions by Year, Unmitigated

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

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

2024	1.37	1.14	10.7	13.3	0.02	0.43	0.17	0.60	0.39	0.04	0.44	—	2,650	2,650	0.11	0.04	0.94	2,666
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.37	1.14	10.7	13.2	0.02	0.43	0.17	0.60	0.39	0.04	0.44	—	2,639	2,639	0.11	0.04	0.02	2,654
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.40	0.33	3.12	3.83	0.01	0.12	0.05	0.17	0.11	0.01	0.13	—	767	767	0.03	0.01	0.12	771
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.07	0.06	0.57	0.70	< 0.005	0.02	0.01	0.03	0.02	< 0.005	0.02	—	127	127	0.01	< 0.005	0.02	128

3. Construction Emissions Details

3.1. Linear, Grubbing & Land Clearing (2024) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.29	1.08	10.5	12.5	0.02	0.43	—	0.43	0.39	—	0.39	—	2,387	2,387	0.10	0.02	—	2,395
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	1.29	1.08	10.5	12.5	0.02	0.43	—	0.43	0.39	—	0.39	—	2,387	2,387	0.10	0.02	—	2,395
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.37	0.31	3.06	3.62	0.01	0.12	—	0.12	0.11	—	0.11	—	693	693	0.03	0.01	—	696
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.56	0.66	< 0.005	0.02	—	0.02	0.02	—	0.02	—	115	115	< 0.005	< 0.005	—	115
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	—
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.05	0.77	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	153	153	< 0.005	0.01	0.65	—
Vendor	0.01	< 0.005	0.15	0.07	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	110	110	0.01	0.02	0.29	—
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.69	0.69	< 0.005	< 0.005	< 0.005	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.06	0.66	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	142	142	< 0.005	0.01	0.02	—
Vendor	0.01	< 0.005	0.15	0.07	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	110	110	0.01	0.02	0.01	—
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.69	0.69	< 0.005	< 0.005	< 0.005	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	41.6	41.6	< 0.005	< 0.005	0.08	—
Vendor	< 0.005	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.9	31.9	< 0.005	< 0.005	0.04	—
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.20	0.20	< 0.005	< 0.005	< 0.005	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.89	6.89	< 0.005	< 0.005	0.01	—
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.27	5.27	< 0.005	< 0.005	0.01	—
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.03	0.03	< 0.005	< 0.005	< 0.005	—

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

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

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

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

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

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

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

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

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

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

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

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Linear, Grubbing & Land Clearing	Linear, Grubbing & Land Clearing	3/1/2024	7/26/2024	5.00	106	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Linear, Grubbing & Land Clearing	Bore/Drill Rigs	Diesel	Average	1.00	8.00	83.0	0.50
Linear, Grubbing & Land Clearing	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Linear, Grubbing & Land Clearing	Cranes	Diesel	Average	1.00	8.00	367	0.29
Linear, Grubbing & Land Clearing	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Linear, Grubbing & Land Clearing	Forklifts	Diesel	Average	1.00	7.00	82.0	0.20
Linear, Grubbing & Land Clearing	Cement and Mortar Mixers	Diesel	Average	1.00	8.00	10.0	0.56

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Linear, Grubbing & Land Clearing	—	—	—	—

Linear, Grubbing & Land Clearing	Worker	17.5	11.7	LDA,LDT1,LDT2
Linear, Grubbing & Land Clearing	Vendor	4.00	8.40	HHDT,MHDT
Linear, Grubbing & Land Clearing	Hauling	0.01	20.0	HHDT
Linear, Grubbing & Land Clearing	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

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

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Ton of Debris)	Material Exported (Ton of Debris)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Linear, Grubbing & Land Clearing	0.00	10.0	0.00	0.00	—

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt

Bridge/Overpass Construction	0.07	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	204	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

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

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

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

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	12.7	annual days of extreme heat
Extreme Precipitation	4.40	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	8.55	annual hectares burned

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

6.2. Initial Climate Risk Scores

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

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.

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

6.3. Adjusted Climate Risk Scores

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

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

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

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

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	11.6
AQ-PM	18.6
AQ-DPM	86.2

Drinking Water	62.0
Lead Risk Housing	10.4
Pesticides	0.00
Toxic Releases	25.6
Traffic	98.7
Effect Indicators	—
CleanUp Sites	98.0
Groundwater	98.9
Haz Waste Facilities/Generators	86.8
Impaired Water Bodies	94.6
Solid Waste	66.7
Sensitive Population	—
Asthma	9.14
Cardio-vascular	19.4
Low Birth Weights	—
Socioeconomic Factor Indicators	—
Education	42.7
Housing	68.5
Linguistic	74.4
Poverty	39.2
Unemployment	65.6

7.2. Healthy Places Index Scores

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

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	—

Employed	—
Median HI	—
Education	—
Bachelor's or higher	—
High school enrollment	—
Preschool enrollment	—
Transportation	—
Auto Access	—
Active commuting	—
Social	—
2-parent households	—
Voting	—
Neighborhood	—
Alcohol availability	—
Park access	—
Retail density	—
Supermarket access	—
Tree canopy	—
Housing	—
Homeownership	—
Housing habitability	—
Low-inc homeowner severe housing cost burden	—
Low-inc renter severe housing cost burden	—
Uncrowded housing	—
Health Outcomes	—
Insured adults	—
Arthritis	7.6

Asthma ER Admissions	92.1
High Blood Pressure	12.4
Cancer (excluding skin)	13.2
Asthma	40.2
Coronary Heart Disease	9.8
Chronic Obstructive Pulmonary Disease	19.2
Diagnosed Diabetes	30.7
Life Expectancy at Birth	0.0
Cognitively Disabled	54.2
Physically Disabled	60.6
Heart Attack ER Admissions	74.4
Mental Health Not Good	51.7
Chronic Kidney Disease	10.6
Obesity	49.6
Pedestrian Injuries	0.0
Physical Health Not Good	39.9
Stroke	19.7
Health Risk Behaviors	—
Binge Drinking	82.5
Current Smoker	57.8
No Leisure Time for Physical Activity	49.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	32.8
Children	79.8
Elderly	36.8
English Speaking	0.0

Foreign-born	0.0
Outdoor Workers	29.8
Climate Change Adaptive Capacity	—
Impervious Surface Cover	3.1
Traffic Density	0.0
Traffic Access	23.0
Other Indices	—
Hardship	0.0
Other Decision Support	—
2016 Voting	0.0

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	50.0
Healthy Places Index Score for Project Location (b)	—
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

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

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	Updated construction phases and schedule based on project data request response received 6/28/23.
Construction: Off-Road Equipment	Updated construction equipment type and number based on data request response received 6/28/23.
Construction: Trips and VMT	Updated vendor trips based on project construction schedule.
Construction: Paving	Project assumed to have no paving-related activities based on data request response received on 6/28/23.

Appendix B: Pond 4 Shoreline Golf Course Bird Nesting Survey for Bridge Projectd 4 Shore

Pond 4 Shoreline Golf Course Bird Nesting Survey for Bridge Project

July 2023

Two bird nesting surveys were conducted at Pond 4 at the front 9 section of the golf course to determine bird activity in preparation for the bridge project.

NOTE: this time of the year (July) is not the prime time for bird nesting activity, although we are still within the timeline for the breeding season, however, significant breeding activity was observed during both surveys.

One survey was conducted July 18th and a second survey was conducted July 21st, both surveys were conducted early in the morning (start time was 7am July 18th and 6am July 21st) when bird species are more active. The weather both days was clear, with temperatures around 62F and 59F respectively both days, at least at the start of the survey period, which lasted approximately two hours for each survey.

During the survey on July 18th, a total of 26 species were observed with 95 individuals, while on July 21st, a total of 23 species and 202 individuals were observed (Table 1).

Breeding activity was observed for 9 species: American coot, black phoebe, common gallinule, great-tailed grackle, green heron, hooded oriole, marsh wren, pied-billed grebe, and song sparrow. Breeding activity varied from a nest with eggs to active feeding of young to observations of recently fledged young.

One State Species of Special Concern was observed: the San Francisco Common Yellowthroat (SFCY), this species has been observed breeding at Pond 4 and adjacent areas, (the high-level ditch to the east of the pond and along Permanente Creek) for several years now. This species is a wetland obligate species and inhabits the typical wetland flora (cattails and tules) of the pond year-round. Figure 1 shows the locations of where the SFCY were observed during the survey, while Figure 2 shows the historical locations of nesting SFCY at Shoreline including Pond 4.

Table 1: bird species and breeding activity observed during surveys on July 18th & 21st, 2023 at Pond 4 on the Front 9 of the Golf Course

	Date & Quantity		
Species	18-Jul-23	21-Jul-23	Breeding Activity
American coot	6	8	Nest with eggs
Anna's hummingbird	1	3	

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Barn swallow	3	2	
Bewicks wren	1	1	
Black -headed grosbeak		1	
Black phoebe	7	2	Recently fledged young
Black-crowned night-heron	6	7	
Bullocks oriole		1	
Bushtit	1		
California towhee		2	
Canada goose	8		
Cinnamon teal	4	5	
Cliff swallow	6	1	
Common gallinule	4		Recently fledged young
Great blue heron	1		
Great egret		1	
Great-tailed grackle	12	2	Feeding young
Green heron	2	3	Recently fledged young
Hooded oriole		2	Carrying food
House finch	1	3	
Mallard	15	76	
Marsh wren	1	3	Territorial display
Mourning dove	1		
Nuttall's woodpecker	1		
Pied-billed grebe	2	1	Recently fledged young
Red-tailed hawk	1		
red-winged blackbird	1	65	
San Francisco common yellowthroat	2	5	
Snowy egret	1		
Song sparrow	5	6	Recently fledged young
Violet-green swallow	2	2	

Figure 1: Map showing location of San Francisco Common Yellowthroats observed during the surveys on July 18th and 21st 2023, at Pond 4 of the Shoreline Golf Course

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Figure 2: Map showing location of San Francisco Common Yellowthroat nesting locations at Shoreline 2017-2022

Additional Species of Concern that have been observed within and adjacent to the Golf Course Pond historically.

In addition to the bird nesting survey, a western pond turtle (a state species of special concern) was observed within Pond 4 of the golf course on April 21, 2021. No pond turtles were observed during the surveys during July, most likely as the temperature was not conducive this early in the morning, as turtles are reptiles and prefer warmer temperatures.

Burrowing owls (a state species of special concern) have nested historically within and adjacent to the golf course. Both resident and migratory burrowing owls inhabit Shoreline. During the 2023 breeding season, one pair of burrowing owls successfully raised chicks on the Back 5 section of the golf course on Fairway 14, while during 2022, one pair of burrowing owls successfully raised chicks on Fairway 9, which is located adjacent to Pond 4. Burrowing owls can forage up to 2 miles from their burrow and during 2023 we have had 41 burrowing owls residing at Shoreline.

Conclusion

Bird nesting activity was observed for several species (9 species in total) while a total of 31 bird species were observed during both surveys. The Pond 4 area provides prime nesting and foraging habitat for a significant number of birds species and other wildlife (aquatic species including turtles). The adjacent golf fairways and tree species provide nesting and foraging habitat for a diversity of other species, including burrowing owls, red-tailed hawks (nesting of this species has occurred on the golf course previously on Fairway 7), white-tailed kites and golden eagles.

It is highly recommended that the bridge construction avoids the bird nesting season based on historical use of this area by nesting birds including San Francisco Common Yellowthroats.

Appendix 1: Photos of bird activity July 2023 at Pond 4 Shoreline Golf Course

Photo 1: American coot nest with 4 eggs

Photo 2: American coot and common gallinule in territorial dispute of nesting areas

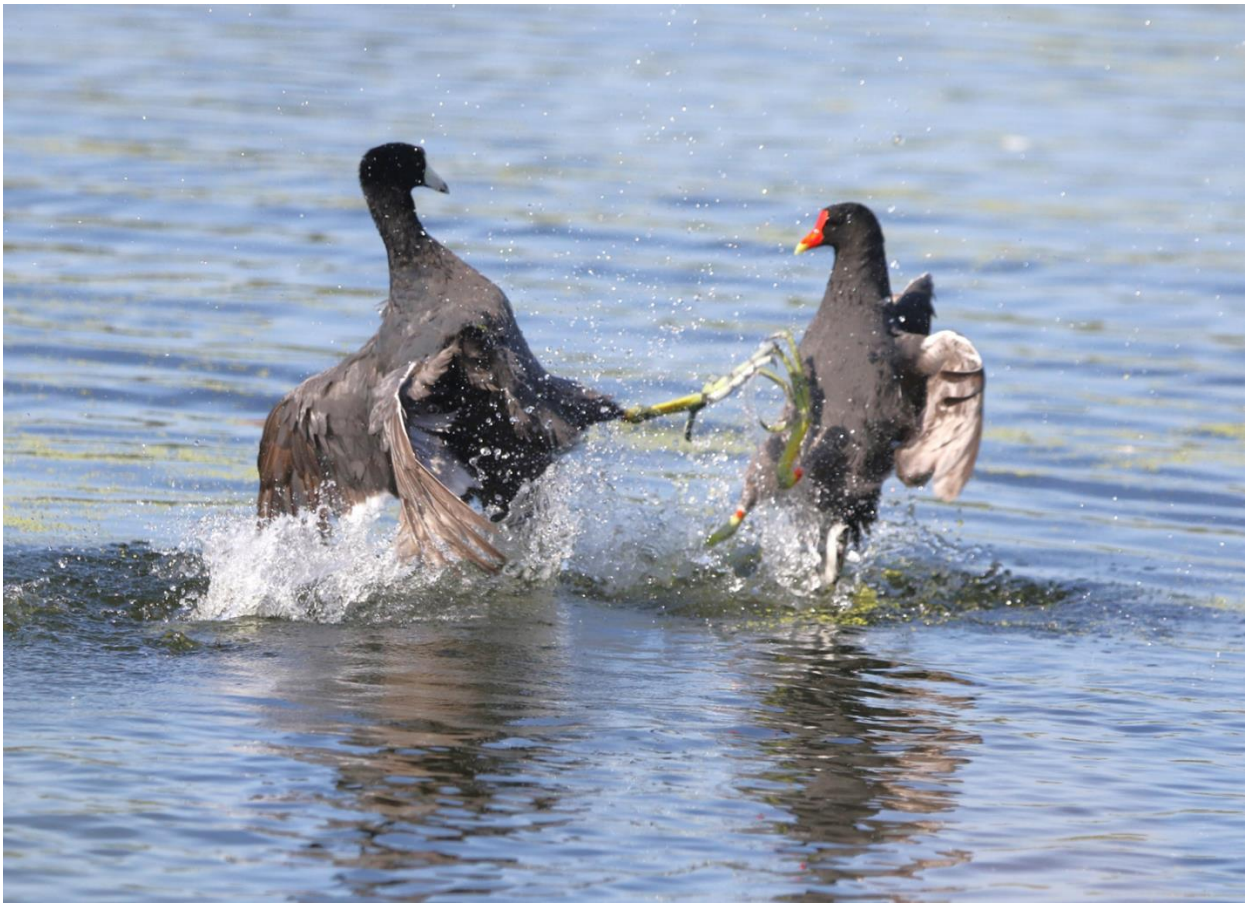

Photo 3: great-tailed grackle adult feeding young

Photo 4: green heron fledgling

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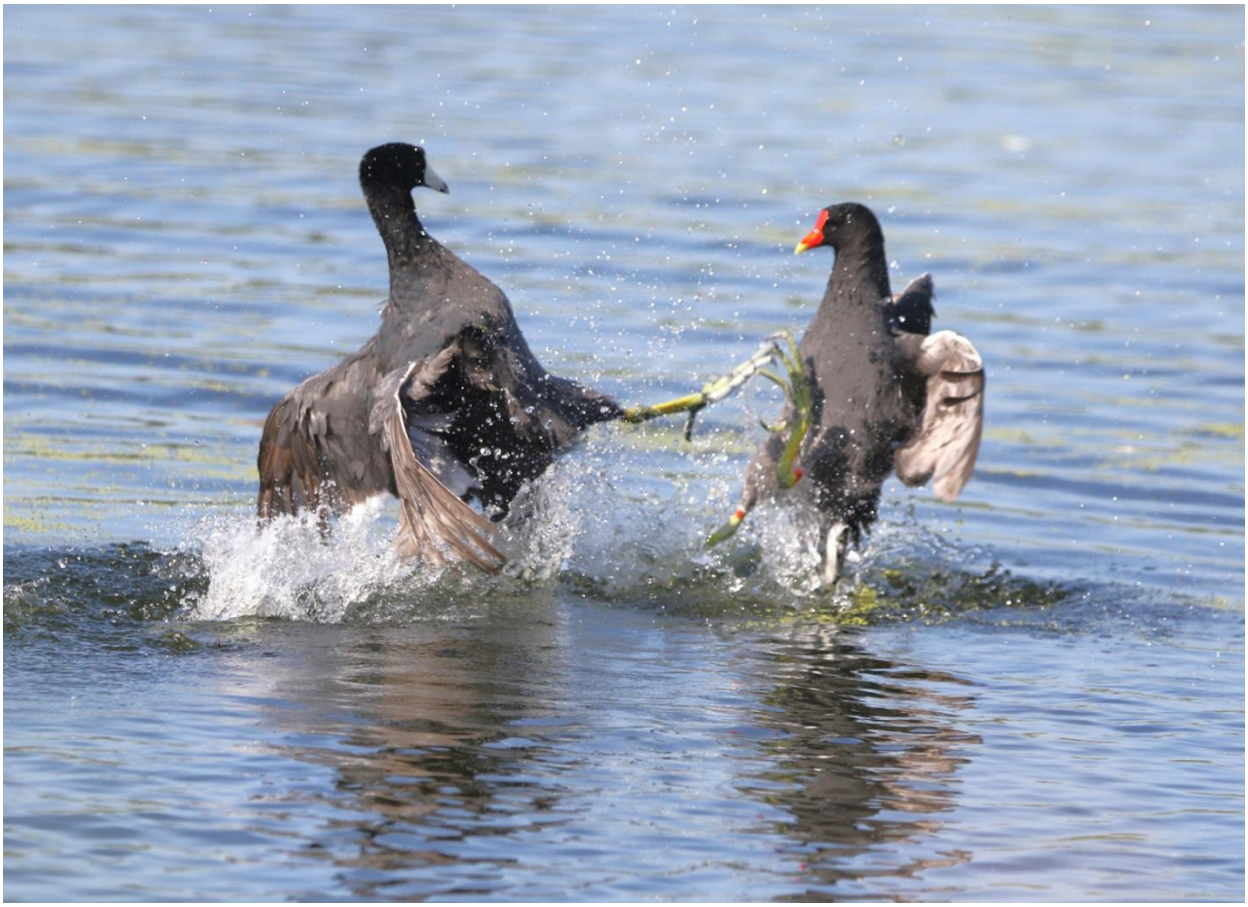

Photo 3: great-tailed grackle adult feeding young

Photo 4: green heron fledgling

Appendix C: Biological Species Tables

Appendix A: Special-Status Animal Species Evaluated for Potential to Occur on the Project Site**.**

Species	Status	Geographic Distribution[1]	Habitat Requirements[2]	Potential for Occurrence[3]
INVERTEBRATES				
Crotch bumblebee *Bombus crotchii*	SCE	Coastal California east to the Sierra-Cascade crest and south into Mexico; mainly in the Central Valley.	Food plant genera include *Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia,* and *Eriogonum.*	**Not Expected.** There is one CNDDB record of crotch bumblebee within 5 miles of the project site at Stanford University from 1909. Food plants are not present in or near the project site, which is open water and mowed grass.
Western bumblebee *Bombus occidentalis*	SCE	Once common and widespread, this species has declined precipitously from central California to southern British Columbia. They are now largely confined to high-elevation sites and areas east of the Cascade Crest**.**	Western bumble bees use a wide variety of natural, agricultural, urban, and rural habitat types. Require suitable nesting sites, overwintering sites for the queens, and nectar and pollen resources throughout the spring, summer, and fall.	**Not Expected.** There are two CNDDB records of western bumblebee within 5 miles of the project site at Stanford University and the Palo Alto Baylands, from 1960 and 1974. Food plants are not present in or near the project site, which is open water and mowed grass.
Monarch- California overwintering population *Danaus plexippus plexippus* pop. 1	FC	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico.	Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	**Not Expected.** There are no wind-protected tree groves in the project area and the project site is a golf course with limited nectar sources.
Bay checkerspot butterfly *Euphydryas editha bayensis*	FT	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay.	*Plantago erecta* is the primary host plant, *Castilleja densiflorus* and *C. purpurscens* are secondary host plants.	**Not Expected.** Bay checkerspot butterfly is included on the USFWAS IPAC species list for the project site. However, there are no serpentine outcrops or host plants at or near the site.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid waters.	Inhabited pools are often found in grass-bottomed swales of unplowed grasslands; some pools are mud-bottomed and highly turbid.	**Not Expected.** Vernal pool tadpole shrimp is included on the USFWAS IPAC species list for the project site. However, there are no vernal pools or swales at or near the site.

Appendix B: Special-Status Animal Species with Potential to Occur on the Project Site**.**

FISH				
Green sturgeon Southern DPS *Acipenser medirostris*	FT	Green sturgeon range from the Bering Sea, Alaska, to Ensenada, Mexico. The Southern DPS inhabits coastal watersheds south of the Eel River. The only known spawning population for the Southern DPS is in the Sacramento River.	Green sturgeon spend a large portion of their lives in coastal marine waters as adults and subadults. Spawning most likely occurs in fast, deep water (> 10 feet or 3 meters deep) over substrates ranging from clean sand to bedrock, with preferences for cobble.	**Not Expected.** Green sturgeon Southern DPS inhabits the San Francisco Bay Estuary and its tributaries. The tidal portion of Permanente Creek is critical habitat for this species, but the species does not spawn there. However, green sturgeon do not occur in ponds such as the one at the project site.
Steelhead - central California coast DPS *Oncorhynchus mykiss irideus*	FT	This DPS includes all populations of steelhead from the Russian River south to Aptos Creek. Steelhead in drainages of San Francisco, San Pablo, and Suisun Bays are also part of this DPS.	Steelhead are the anadromous form of rainbow trout. Adult steelhead migrate from the ocean into streams in the late fall, winter, or early spring seeking out deep pools within fast moving water to rest prior to spawning. Steelhead spawn in shallow-water gravel beds.	**Not Expected.** Steelhead occurred historically in Permanente Creek, but are no longer present according to Leidy et al. 2004; although resident rainbow trout are present in the creek according to a 2008 study by the Santa Clara Valley Water District. Since most of the creek's flow is diverted to the Permanente Creek Diversion which culminates in a 10-foot (3.0 m.) drop, steelhead can no longer ascend the creek.
Longfin smelt *Spirinchus thaleichthys*	FC, ST, CSSC	Found in California's bays, estuaries, and nearshore coastal environments from the San Francisco Bay north to Lake Earl near the Oregon border. The San Francisco Bay estuary and the Sacramento-San Joaquin Delta support the largest longfin smelt population in California.	Found in aquatic and estuary habitats. This species is euryhaline, nektonic and anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15-30 parts per thousand but can be found in completely freshwater to almost pure seawater.	**Not Expected.** Longfin smelt is known to occur in the San Francisco Bay. However, this species is restricted to the open waters of estuaries; it does not occur in ponds or creeks.

Appendix B: Special-Status Animal Species with Potential to Occur on the Project Site**.**

AMPHIBIANS				
California tiger salamander *Ambystoma californiense*	FT, ST	Found in the Coast Range and Sierra Nevada foothills of California. In the Coast Range, it occurs from southern San Mateo County south to central San Luis Obispo County, and also in the vicinity of northwestern Santa Barbara County. In the Sierra Nevada foothills, it occurs from northern Yolo County to northwestern Kern County and northern Tulare County.	Found in cismontane woodland, meadows and seeps, riparian woodland, valley and foothill grassland, vernal pools, and wetland habitats. Need California ground squirrel or gopher burrows for underground refuges, and vernal pools or other seasonal water sources that do not support predatory fish or frog populations for breeding.	**Not Expected.** There are four CNDDB records of California tiger salamander within 5 miles of the project site, although two are extirpated. The closest to the project site is at Stanford University from 2018. However, there is no suitable habitat for this species at or near the site.
Santa Cruz black salamander *Aneides niger*	CSSC	Found in mixed deciduous and coniferous woodlands and coastal grasslands in San Mateo, Santa Cruz, and Santa Clara counties.	Adults found under rocks, talus, and damp woody debris.	**Not Expected.** There is no suitable habitat or nearby occurrences of Santa Cruz black salamander in the project area.
California giant salamander *Dicamptodon ensatus*	CSSC	Known from wet coastal forests near streams and seeps from Mendocino County south to Monterey County, and east to Napa County.	Aquatic larvae found in cold, clear streams, occasionally in lakes and ponds. Adults known from wet forests under rocks and logs near streams and lakes.	**Not Expected.** There is no suitable habitat or nearby occurrences of California giant salamander in the project area.
foothill yellow-legged frog-Central Coast DPS *Rana boylii* pop. 4	FPT, SE	San Francisco Peninsula and Diablo Range south of San Francisco Bay Estuary, and south through the Santa Cruz and Gabilan Mountains east of the Salinas River in the southern inner Coast Ranges.	Partly shaded shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg-laying and at least 15 weeks to attain metamorphosis.	**Not Expected.** There is no suitable habitat or nearby occurrences of California giant salamander in the project area. This species is possibly extirpated from the project region.
California red-legged frog *Rana draytonii*	FT, CSSC	Found from Riverside County to Mendocino County along the Coast Range, from Calaveras County to Butte County in the Sierra Nevada, and in Baja California.	Found in aquatic, artificial flowing waters, artificial standing waters, freshwater marsh, marsh and swamp, riparian forest, riparian scrub, riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, south coast flowing waters, south coast standing waters, and wetland habitats. Likely within lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	**Not Expected.** There are two CNDDB records of California red-legged frogs within 5 miles of the project site, although one is extirpated. The closest to the project site is in Matadero Creek from 2016. This species is also known from the upper reaches of Permanente Creek but there is extensive urban development between the occurrence location and the project site. Red-legged frogs are not known from the artificial pond at the project site.
red-bellied newt *Taricha rivularis*	CSSC	Coastal drainages from Humboldt County south to Sonoma County, inland to Lake County. Isolated population of uncertain origin in Santa Clara County.	Lives in terrestrial habitats, juveniles generally underground, adults active at surface in moist environments. Will migrate over 1 km to breed, typically in streams with moderate flow and clean, rocky substrate.	**Not Expected.** There is no suitable habitat or nearby occurrences of red-bellied newt in the project area.

Appendix B: Special-Status Animal Species with Potential to Occur on the Project Site**.**

REPTILES				
Northern California legless lizard *Anniella pulchra*	CSSC	Found in sandy or loose loamy soils under sparse vegetation.	Soil moisture is essential. They prefer soils with a high moisture content.	**Not Expected.** There is no suitable habitat or nearby occurrences of Northern California legless lizard in the project area.
Western pond turtle *Actinemys marmorata*	CSSC	Found from Baja California, Mexico north through Klickitat County, Washington. In California, found west of the Sierra-Cascade crest. Absent from desert regions, except the Mojave Desert along the Mojave River and its tributaries.	Requires permanent or nearly permanent bodies of water including ponds, marshes, rivers, streams, and irrigation ditches below 6,000 feet in elevation. Requires basking sites, such as submerged rocks, logs, open mud banks, or floating vegetation mats. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 kilometers from water for egg-laying.	**Low Potential.** There are three CNDDB records of western pond turtle within 5 miles of the project site. The closest to the project site is in the channels along the Bay Trail near the Moffet Field Golf Course, from 2012. However, there are significant movement barriers between the known occurrence and the project site, and basking and nesting sites are lacking at the project site.
Alameda whipsnake *Masticophis lateralis euryxanthus*	FT, ST	Typically found in chaparral and scrub habitats but will also use adjacent grassland, oak savanna and woodland habitats.	Mostly south-facing slopes and ravines, with rock outcrops, deep crevices or abundant rodent burrows, where shrubs form a vegetative mosaic with oak trees and grasses.	**Not Expected.** There is no suitable habitat or nearby occurrences of Alameda whipsnake in the project area.
San Francisco garter snake *Thamnophis sirtalis tetralaenia*	FE, SE, CFP	Found primarily within San Francisco county and San Mateo county, with a small portion of the range extending into northern Santa Cruz county (Big Basin Redwoods State Park).	Found in artificial standing waters, marsh and swamp, Sacramento/San Joaquin standing waters, and wetland habitats. Likely found in the vicinity of freshwater marshes, ponds and slow-moving streams in San Mateo County and extreme northern Santa Cruz County. Avoids brackish marsh areas because their preferred prey (CRLF) cannot survive in saline water. Prefers dense cover and water depths of at least one foot. Upland areas near water are also very important.	**Not Expected.** There are seven CNDDB records of San Francisco garter snake within 5 miles of the project site, although the exact location is suppressed. The closest to the project site is in Matadero Creek from 2016. There is some freshwater marsh habitat along the artificial pond, but the area has high use as a golf course and is regularly disturbed.
BIRDS				
Tricolored blackbird *Agelaius tricolor*	CSSC (nesting colony)	Permanent resident in Central Valley from Butte to Kern Counties; breeds at scattered coastal locations from Marin to San Diego Counties and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties.	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony.	**Low Potential.** There are no CNDDB records of tricolor blackbird within 5 miles of the project site, but it has been observed at the Mountain View Shoreline according to eBird. There is some freshwater marsh vegetation at the project site, but site has frequent disturbance and high human visitation.

Appendix B: Special-Status Animal Species with Potential to Occur on the Project Site**.**

Golden eagle *Auila chrysaetos*	CFP	Inhabits foothills and mountains throughout California.	Nests on cliffs and escarpments or in tall trees overlooking open country; forages in annual grasslands, chaparral, and oak woodlands with plentiful medium and large-sized mammals.	**Low Potential.** There are no CNDDB records golden eagle within 5 miles of the project site, but it has been observed at the Mountain View Shoreline according to eBird. There is no suitable breeding habitat for this species at or near the site.
Short-eared owl *Asio flammeus*	CSSC	Found in swamp lands, both fresh and salt; lowland meadows; irrigated alfalfa fields.	Tule patches/tall grass needed for nesting/daytime seclusion. Nests on dry ground in depression concealed in vegetation.	**Not Expected.** There is no suitable habitat or nearby occurrences of short-eared owl in or near the project site.
Long-eared owl *Asio otus*	CSSC	Riparian bottomlands grown to tall willows and cottonwoods; also, belts of live oak paralleling stream courses.	Require adjacent open land, productive of mice and the presence of old nests of crows, hawks, or magpies for breeding.	**Not Expected.** There is no suitable habitat or nearby occurrences of long-eared owl in or near the project site.
Burrowing owl *Athene cunicularia*	CSSC	Found year-round throughout much of California, except the coastal counties north of Marin and mountainous areas. Breeding has not been observed in Sonoma County since 1987 and breeding colonies are considered extirpated from this county.	Found in coastal prairie, coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran Desert scrub, and valley and foothill grassland habitats. Likely in open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	**Present.** There are 13 CNDDB records of burrowing owl within 5 miles of the project site; including at the Mountain View Shoreline. This species is known to occur near the project site.
Marbled murrelet *Brachyramphus marmoratus*	FT, SE	Feeds near-shore; nests inland along coast from Eureka to Oregon border and from Half Moon Bay to Santa Cruz.	Nests in old-growth redwood-dominated forests, up to six miles inland, often in Douglas-fir.	**Not Expected.** There is no suitable habitat or nearby occurrences of marbled murrelet in or near the project site.
Swainson's hawk *Buteo swainsoni*	ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees.	Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**Not Expected.** There is no suitable habitat or nearby occurrences of Swainson's hawk in or near the project site.
Western snowy plover *Charadrius nivosus nivosus*	FT	Pacific population of western snowy plover occurs along the entire coastline.	Found in standing waters, sand shore, and wetland habitats. Likely within open sandy beaches, salt pond levees and shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	**Low Potential.** There are three CNDDB records of western snowy plover within 5 miles of the project site; the closest is at the Palo Alto Golf Course from 2002. It was observed at the Mountain View Shoreline in February 2022 according to eBird. However, there is no suitable breeding or foraging habitat for this species at or near the site.

Appendix B: Special-Status Animal Species with Potential to Occur on the Project Site**.**

Northern harrier *Circus hudsonius*	CSSC	Throughout lowland California; has been recorded in fall at high elevations.	Grasslands, meadows, marshes, and seasonal and agricultural wetlands.	**Low Potential.** There are three CNDDB records of Northern harrier within 5 miles of the project site; the closest is at the Palo Alto Golf Course from 2002. It was observed at the Mountain View Shoreline most recently in November 2021 according to eBird. There is suitable breeding and foraging habitat for this species in coastal marsh north of the site; but there is no suitable habitat within or adjacent to the project site.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FT, SE	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems.	Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	**Not Expected.** There is no suitable habitat or nearby occurrences of western yellow-billed cuckoo in or near the project site. This species has been extirpated from the project region.
Yellow rail *Coturnicops noveboracensis*	CSSC	Summer resident in eastern Sierra Nevada in Mono County.	Inhabits freshwater marsh and meadows and seeps.	**Not Expected.** There are three CNDDB records of yellow rail within 5 miles of the project site, the most recent from the Palo Alto Baylands in 1988. However, there is no suitable habitat at or near the site.
White-tailed kite *Elanus leucurus*	CFP	Found year-round in nearly all areas of California up to the western Sierra Nevada foothills and southeast deserts. Common in the Central Valley of California and along the entire length of the coast, possibly breeding in more arid regions east of the Sierra Nevada and Transverse Range (Inyo and eastern Kern Counties). Documented breeding in Imperial County, western Riverside County, and eastern San Diego County. In the Sacramento Valley, populations have predominantly increased in irrigated agricultural areas where the California vole (*Microtus californicus*) often occurs.	Found in cismontane woodland, marsh and swamp, riparian woodland, valley and foothill grassland, and wetland habitats. Likely in rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	**Present.** This species is known to occur at the Mountain View Shoreline and nests near the project site according to City of Mountain View records.

Appendix B: Special-Status Animal Species with Potential to Occur on the Project Site**.**

Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	CSSC	Found year-round in the vicinity of San Francisco Bay, from Tomales Bay in Marin County and Napa Sloughs in southern Sonoma County on the north, east to Carquinez Straight, and south to vicinity of San Jose in Santa Clara County. Historic locations of confirmed breeding include Lake Merced in San Francisco County, and Coyote Creek, Alviso, and Milpitas in Santa Clara County	Found in fresh and salt water marshes. Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	**Present.** Saltmarsh common yellowthroat is known from the Mountain View Shoreline from recent CNDDB records and eBird observations. This species breeds in the project area according to the wildlife biologist at the Mountain View Shoreline.
Bald eagle *Haliaeetus leucocephalis*	SE, CFP	Year-round resident in northern California, winters throughout the rest of the state.	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests are within 1 mile of water. Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.	**Low Potential.** There are no CNDDB records of bald eagle within 5 miles of the project site, but it has been observed at the Mountain View Shoreline according to eBird. There is no suitable breeding habitat for this species at or near the site.
California black rail *Laterallus jamaicensis coturniculus*	ST, CFP	The majority found in the tidal salt marshes of the northern San Francisco Bay region, primarily in San Pablo and Suisun Bays. Smaller populations occur in San Francisco Bay, the Outer Coast of Marin County, freshwater marshes in the foothills of the Sierra Nevada, and in the Colorado River Area.	Found in brackish marsh, freshwater marsh, marsh and swamp, salt marsh, and wetland habitats. Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	**Low Potential.** California black rail was last observed at the Mountain View Shoreline in 2014 according to CNDDB records. There is no suitable breeding or foraging habitat for this species in or adjacent to the project site, but suitable habitat occurs nearby in the marsh habitat along Permanente Creek the Bay shore.
Alameda song sparrow *Melospiza melodia pusillula*	CSSC	Resident of salt marshes bordering south arm of San Francisco Bay.	Found in salt marsh habitats. Inhabits pickleweed (*Salicornia* sp.) marshes; nests low in gumplant (*Grindelia* sp.) bushes (high enough to escape high tides) and in pickleweed.	**High Potential.** There are seven CNDDB records of Alameda song sparrow within 5 miles of the project site, most recently near the Palo Alto Golf Course and Alviso in 2004. Song sparrows have been observed at the Mountain View Shoreline as recently as July 2023 according to eBird, but it is unknown if they are Alameda song sparrows. There is suitable habitat near the site.

Appendix B: Special-Status Animal Species with Potential to Occur on the Project Site**.**

California ridgway's rail *Rallus obsoletus obsoletus*	FE, SE, CFP	Found almost exclusively in the marshes of the San Francisco estuary in San Mateo, Santa Clara, Alameda, Contra Costa, Solano, Napa, Sonoma, and Marin counties.	Found in brackish marsh, marsh and swamp, salt marsh, and wetland habitats. Likely in salt water and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay. Associated with abundant growths of pickleweed but feeds away from cover on invertebrates from mud-bottomed sloughs.	**Moderate Potential.** California ridgeway's rail occurs near project site according to a 2001 CNDDB record at Permanente Creek and recent observations on eBird. This species is occasionally observed in the part of Permanente Creek in or near the project site, but there is no breeding habitat at the site and it likely occurs in the marsh habitat along the Bay shore more often.
Bank swallow *Riparia riparia*	ST	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert.	Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	**Not Expected.** There is no suitable habitat or nearby occurrences of bank swallow in or near the project site.
Black skimmer *Rynchops niger*	CSSC	Breeds along the coast in Central California, occurs year round in coastal Southern California.	Nests on gravel bars, low islets, and sandy beaches, in unvegetated sites. Nesting colonies usually less than 200 pairs.	**Moderate Potential.** Black skimmers are known to nest at the Mountain View Shoreline Lake from a 2015 CNDDB record, and have been most recently observed in May 2023 according to eBird. This species may forage at the project site but is unlikely to nest there.
California least tern *Sternula antillarum browni*	FE, SE, CFP	Nests along the coast from San Francisco Bay south to Northern Baja California.	Found foraging in alkali playa, coastal, lake, and wetland habitats. Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas.	**Low Potential.** There are two CNDDB records of California least tern within 5 miles of the project site from 1987. This species has occasionally been observed at the Mountain View Shoreline according to eBird, most recently in July 2020. This species may forage at the project site but is unlikely to nest there.

Appendix B: Special-Status Animal Species with Potential to Occur on the Project Site**.**

MAMMALS				
Pallid bat *Antrozous pallidus*	CSSC	Common throughout low elevations of California. No found in the high Sierra from Shasta to Kern counties and the northwestern corner of the State from Del Norte and western Siskiyou counties to northern Mendocino County.	Found in chaparral, coastal scrub, desert wash, Great Basin grassland, Great Basin scrub, Mojavean Desert scrub, riparian woodland, Sonoran Desert scrub, upper montane coniferous forest, and valley and foothill grassland habitats. Prefers deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Low Potential.** There are two CNDDB records of pallid bat within 5 miles of the project site, in Mountain View and at Stanford University from 1945 and 1951. However, the site is in a developed area with limited roosting habitats and this species is very sensitive to disturbance.
Townsend's big-eared bat *Corynorhinus townsendii*	CSSC	Found throughout California, but details of its distribution are not well known. Found in all but subalpine and alpine habitats.	Found in broadleaved upland forest, chaparral, chenopod scrub, Great Basin grassland, Great Basin scrub, Joshua tree woodland, lower montane coniferous forest, meadow and seep, Mojavean Desert scrub, riparian forest, riparian woodland, Sonoran Desert scrub, Sonoran thorn woodland, upper montane coniferous forest, and valley and foothill grassland habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	**Low Potential.** There are two CNDDB records of Townsend's big-eared bat within 5 miles of the project site, most recently in Mountain View and in 2015. However, the site is in a developed area with limited roosting habitats and this species is extremely sensitive to disturbance.
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	CSSC	This California endemic is found throughout the San Francisco Bay area in grasslands, scrub and wooded areas.	Forest habitats of moderate canopy and moderate to dense understory. May prefer chaparral and redwood habitats. Constructs nests of shredded leaves, grass and other material. May be limited by availability of nest-building materials.	**Not Expected.** There is one CNDDB record of San Francisco dusky-footed woodrat within 5 miles of the project site at Foothill College from 1985. Nest building materials are very limited at the project site and no woodrat houses were observed during the July 2023 site visit.

Appendix B: Special-Status Animal Species with Potential to Occur on the Project Site**.**

Salt-marsh harvest mouse *Reithrodontomys raviventris*	FE, SE, CFP	Occurs only in the saline emergent wetlands of the San Francisco Bay and its tributaries.	Found in marsh and swamp and wetland habitats. Pickleweed is primary habitat but may occur in other marsh vegetation types and in adjacent upland areas. Does not burrow; builds loosely organized nests. Requires higher areas for flood escape.	**Low Potential.** There are 13 CNDDB records of saltmarsh harvest mouse within 5 miles of the project site near the Bayshore; the closest one is about 1 mile south of the site at the Stevens Creek Shoreline Nature Study Area from 1991. There is no suitable pickleweed marsh habitat for this species at the project site, although suitable habitat occurs north of the site along the shoreline.
Salt-marsh wandering shrew *Sorex vagrans halicoetes*	CSSC	Found in the salt marshes of the south arm of San Francisco Bay.	Found in marsh and swamp and wetland habitats; medium high marsh 6-8 feet above sea level where abundant driftwood is scattered among pickleweed.	**Low Potential.** There are two extant CNDDB record of salt-marsh wandering shrew within 5 miles of the project site at the Mowry Slough in 1985. There is suitable pickleweed marsh habitat for this species north of the site. However, this species is restricted to a narrow band of marsh habitat not present at or adjacent to the project site.
American badger *Taxidea taxus*	CSSC	Occurs throughout California, the western United States, and Canada.	American badger is rare in western San Francisco Bay area. It occurs in grasslands and open stages of forest and scrub habitats with friable soils and good prey base of burrowing rodents. Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	**Not Expected.** There is one CNDDB record American badger within 5 miles of the project site at Stanford University from 1894. There is no suitable marsh habitat for this species at or near the project site.

STATUS KEY:
Federal
FE: Federally-listed Endangered
FT: Federally-listed Threatened

State
SE: State-listed Endangered
ST: State-listed Threatened
SCE: State-listed Candidate Endangered
CSSC: California Species of Special Concern
CFP: California Fully Protected

Appendix B: Special-Status Animal Species with Potential to Occur on the Project Site**.**

SOURCES:

1. United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPAC) Species List (September 4, 2020).
2. California Natural Diversity Database (CNDDB) Rarefind 5 search of Mountain View USGS Quad and eight surrounding quads; BIOS five mile radius search (September 4, 2020).
3. Cornell Lab of Ornithology. 2020. eBird. Accessed September 2020 at: https://ebird.org/home.
4. National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS). 2020a. Critical Habitat- Green Sturgeon (Southern DPS). Accessed September 2020 at: https://www.fisheries.noaa.gov/resource/map/critical-habitat-green-sturgeon-southern-dps.
5. Leidy, R.A., G.S. Becker, B.N. Harvey. 2005. Historical distribution and current status of steelhead/rainbow trout (*Oncorhynchus mykiss*) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, CA.
6. Phillip Higgins, Wildlife Preservation Biologist, Shoreline at Mountain View, pers. com., September 16, 2020.

CNDDB SPECIES WITHIN 9 QUAD SEARCH THAT DON'T MEET THE DEFINITION OF SPECIAL-STATUS SPECIES:

- California linderiella, *Linderiella occidentalis*
- Obscure bumblebee, *Bombus caliginosus*
- Unsilvered fritillary, *Speyeria adiaste adiaste*
- Western ridged mussel, *Gonidea angulate*
- Mimic tryonia, *Tryonia imitator*
- Cooper's hawk, *Accipiter cooperii*
- Great blue heron, *Ardea Herodias*
- Snowy egret, *Egretta thula*
- American peregrine falcon, *Falco peregrinus anatum*
- Double-crested cormorant, *Nannopterum auritum*
- Black-crowned night heron, *Nycticorax nycticorax*
- Santa Cruz kangaroo rat, *Dipodomys venustus venustus*
- Hoary bat, *Lasiurus cinereus*
- Yuma myotis, *Myotis yumanensis*

Appendix A: Special Status Plant Species Evaluated for Potential to Occur on the Project Site

Species	Status	Geographic Distribution[1]	Habitat Requirements[2]	Life Form; Blooming Period[2]	Potential Occurrence in the Project Area[3]
Franciscan onion *Allium peninsulare-var. franciscanum*	CRPR 1B.2	Coastal mid California, from Monterey to Mendocino Counties.	Cismontane woodland, valley and foothill grasslands. Often on dry hillsides and in serpentine bunchgrass grasslands; 52-300 m.	Perennial bulbiferous herb; Blooms May to June	**Not Expected.** There is one CNDDB record of Franciscan onion within 5 miles of the project site along Page Mill Road from 1949. However, there is no suitable habitat for this species at or near the site.
Alkali milk-vetch *Astragalus tener* var. *tener*	CRPR 1B.2	Endemic to the San Francisco Bay Area and surrounding counties.	Playas, valley and foothill grassland (adobe clay) or vernal pools on alkaline soils; 1-60 m.	Annual herb, March to June	**Not Expected.** There is one CNDDB record of alkali milk-vetch within 5 miles of the project site north of the Mountain View shoreline from 1905, but it is possibly extirpated. There is no suitable habitat for this species at or near the site.
Congdon's tarplant *Centromadia parryi* ssp. *congdonii*	CRPR 1B.1	Throughout western California from San Luis Obispo to Solano County.	Valley and foothill grasslands with alkaline or clay soils; 0-230 m.	Annual herb; Blooms May to November	**Low Potential.** There are five CNDDB records of Congdon's tarplant within 5 miles of the project site, including two at the Mountain View shoreline from 2019. However, the project alignment is in a golf course and artificial pond unlikely to support this species.
Point Reyes bird's beak *Chloropyron maritimum* ssp. *palustre*	CRPR 1B.2	Extant occurrences in Humboldt, Marin, San Francisco and Sonoma Counties.	Marshes and swamps (coastal salt); 0-10 m.	Annual herb (hemiparasitic); Blooms June to October	**Not Expected.** There are two CNDDB records of Point Reye's bird's beak within 5 miles of the project site at Alviso and the Palo Alto Baylands from 1915 and 1914, but both are possibly extirpated. There is no suitable habitat for this species at or near the site.
San Francisco collinsia *Collinsia multicolor*	1B.2	Mid-coastal California from Monterey to Marin county including Santa Clara county.	Moist shady woodland, closed-cone coniferous forests and coastal scrub. Occasionally found in serpentine; 30-250 m.	Annual herb; Blooms March to May	**Not Expected.** There is one CNDDB record of San Francisco collinsia within 5 miles of the project site at Stanford University from 1903. However, there is no suitable habitat for this species at or near the site.

Appendix A: Special Status Plant Species Evaluated for Potential to Occur on the Project Site

Species	Status	Geographic Distribution[1]	Habitat Requirements[2]	Life Form; Blooming Period[2]	Potential Occurrence in the Project Area[3]
Western leatherwood *Dirca occidentalis*	CRPR 1B.2	San Francisco Bay area including Santa Clara to Marin county and east to Alameda county.	Cool, moist slopes in foothill woodland and riparian forests. Mesic environments in broadleaved upland forests, chaparral and coniferous woodlands and mixed evergreen and oak woodlands; 25-425 m.	Perennial deciduous shrub; Blooms January to April.	**Not Expected.** There is one CNDDB record of western leatherwood within 5 miles of the project site at Stanford University from 1931. However, there is no suitable habitat for this species at or near the site.
Hoover's button-celery *Eryngium aristulatum* var. *hooveri*	CRPR 1B.1	Endemic to Alameda, San Benito, Santa Clara, San Diego and San Luis Obispo Counties.	Vernal pools; 3-45 m.	Annual/perennial herb; Blooms July to August	**Not Expected.** There are two CNDDB records of Hoover's button celery within 5 miles of the project site near the Mountain View shoreline and at Stanford University from 1909 and 1907, but both are possibly extirpated. There is no suitable habitat for this species at or near the site.
Fragrant fritillary *Fritillaria liliacea*	CRPR 1B.2	Found throughout northern and central California wherever there is suitable habitat.	Cismontane woodland and coastal scrub and prairie, in valley and foothill grasslands (often serpentine bunchgrass grassland); 3-410 m.	Perennial bulbiferous herb; Blooms February to April	**Not Expected.** There is one CNDDB record of fragrant fritillary within 5 miles of the project site near Stanford University from 1934. However, there is no suitable habitat for this species at or near the site.
Slender-leaved pondweed *Stuckenia filiformis* ssp. *alpina*	CRPR 2B.2	In California, found in and around the Sierra Nevada from Modoc National Forest to near Yosemite National Park; also found in the coast ranges from Santa Rosa to Los Banos.	Marshes and swamps (assorted shallow and freshwater); 300-2,150 m.	Perennial rhizomatous herb (aquatic); Blooms May to July	**Not Expected.** There is one CNDDB record of fragrant fritillary within 5 miles of the project site near Stanford University from 1899. However, there is no suitable habitat for this species at or near the site.
California seablite *Suaeda californica*	FE, CRPR 1B.1	Endemic to coastal California in the San Francisco Bay Area and near San Luis Obispo.	Marshes and swamps (coastal salt); 0-15 m.	Perennial evergreen shrub, July to October	**Not Expected.** There is one CNDDB record of California seablite within 5 miles of the project site at the Palo Alto Baylands from 1971, but it is possibly extirpated. There is no suitable habitat for this species at or near the site.

Appendix A: Special Status Plant Species Evaluated for Potential to Occur on the Project Site

STATUS KEY:
Federal
FE: Federally-listed Endangered
FT: Federally-listed Threatened

State
SE: State-listed Endangered
ST: State-listed Threatened

California Native Plant Society (CNPS) California Rare Plant Rank (CRPR):
1B: Plants listed as rare, threatened, or endangered in California and elsewhere
2B: Plants listed as rare, threatened, or endangered in California but more common elsewhere

CNPS CRPR added a decimal threat rank to the List rank to parallel that used by the CNDDB. This extension replaces the E (Endangerment) value from the R-E-D Code. CRPR ranks therefore read like this: 1B.1, 1B.2, etc. Threat code extensions and their meanings are as follows:
.1 – Seriously endangered in California (over 80% of occurrences threatened / high degree of immediacy of threat)
.2 – Fairly endangered in California (20-80% occurrences threatened)
.3 – Not very endangered in California (<20% of occurrences threatened or no current threats known)

SOURCES:
1. United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPAC) Species List (August 3, 2023).
2. California Natural Diversity Database (CNDDB) Rarefind 5 search of Mountain View USGS Quad and eight surrounding quads; BIOS five mile radius search (August 3, 2023).
3. California Native Plant Society (CNPS) Rare and Endangered Plant Inventory Mountain View USGS Quad and eight surrounding quads (August 3, 2023).

OTHER CNDDB AND/OR CNPS SPECIAL-STATUS PLANT SPECIES IN 9 QUAD SEARCH AREA (NOT WITHIN 5 MILES OF THE PROJECT SITE)

- San Mateo thorn-mint (*Acanthomintha duttonii*), FE, SE, CRPR 1B.1
- Bent-flowered fiddleneck (*Amsinckia lunaris*), CRPR 1B.2
- California androsace (*Androsace elongata* ssp. *acuta*), CRPR 4.2
- Kings Mountain manzanita (*Arctostaphylos regismontana*), CRPR 1B.2
- Brittlescale (*Atriplex depressa*), CRPR 1B.2
- Lesser saltscale (*Atriplex minuscula*), CRPR 1B.1
- Brewer's calandrinia (*Calandrinia breweri*), CRPR 4.2
- Robust spineflower (*Chorizanthe robusta* var. *robusta*), FE, CRPR 1B.1
- Fountain thistle (*Cirsium fontinale* var. *fontinale*), FE, SE, CRPR 1B.1
- Lost thistle (*Cirsium praeteriens*), CRPR 1A
- Santa Clara red ribbons (*Clarkia concinna* ssp. *automixa*), CRPR 4.3
- Lewis' clarkia (*Clarkia lewisii*), CRPR 4.3
- Round-headed collinsia (*Collinsia corymbosa*), CRPR 1B.2
- Clustered lady's slipper (*Cypripedium fasciculatum*), CRPR 4.2
- Small spikerush (*Eleocharis parvula*), CRPR 4.3
- Bay buckwheat (*Eriogonum umbellatum* var. *bahiiforme*), CRPR 4.2
- San Mateo woolly sunflower (*Eriophyllum latilobum*), FE, SE, CRPR 1B.1
- Jepson's coyote thistle (*Eryngium jepsonii*), CRPR 1B.2
- San Joaquin spearscale (*Extriplex joaquinana*), CRPR 1B.2

Appendix A: Special Status Plant Species Evaluated for Potential to Occur on the Project Site

- Minute pocket moss (*Fissidens pauperculus*), CRPR 1B.2
- Marin western flax (*Hesperolinon congestum*), FT, ST, CRPR 1B.1
- Loma Prieta hoita (*Hoita strobilina*), CRPR 1B.1
- Coast iris (*Iris longipetala*), CRPR 4.2
- Contra Costa goldfields (*Lasthenia conjugens*), FE, CRPR 1B.1
- Legenere (*Legenere limosa*), CRPR 1B.1
- Serpentine leptosiphon (*Leptosiphon ambiguus*), CRPR 4.2
- Bristly leptosiphon (*Leptosiphon aureus*), CRPR 4.2
- Large-flowered leptosiphon (*Leptosiphon grandiflorus*), CRPR 4.2
- Broad-lobed leptosiphon (*Leptosiphon latisectus*), CRPR 4.3
- Woolly-headed lessingia (*Lessingia hololeuca*), CRPR 3
- Spring lessingia (*Lessingia tenuis*), CRPR 4.2
- Arcuate bush mallow (*Malacothamnus arcuatus*), CRPR 1B.2
- Hall's bush mallow (*Malacothamnus hallii*), CRPR 1B.2
- Woodland woollythreads (*Monolopia gracilens*), CRPR 1B.2
- Prostrate vernal pool navarretia (*Navarretia prostrata*), CRPR 1B.2
- Dudley's lousewort (*Pedicularis dudleyi*), CRPR 1B.2
- White-flowered rein orchid (*Piperia candida*), CRPR 1B.2
- Michael's rein orchid (*Piperia michaelii*), CRPR 4.2
- Choris' popcornflower (*Plagiobothrys chorisianus* var. *chorisianus*), CRPR 1B.2
- Hickman's popcornflower (*Plagiobothrys chorisianus* var. *hickmanii*), CRPR 4.2
- Hairless popcornflower (*Plagiobothrys glaber*), CRPR 1A
- California alkali grass (*Puccinellia simplex*), CRPR 1B.2
- Lobb's aquatic buttercup (*Ranunculus lobbii*), CRPR 4.2
- Chaparral harebell (*Ravenella exigua*), CRPR 1B.2
- Sanford's arrowhead (*Sagittaria sanfordii*), CRPR 1B.2
- Hoffman's sanicle (*Sanicula hoffmannii*), CRPR 4.3
- Chaparral ragwort (*Senecio aphanactis*), CRPR 2B.2
- Long-styled sand-spurrey (*Spergularia macrotheca* var. *longistyla*), CRPR 1B.2
- Most beautiful jewelflower (*Streptanthus albidus* ssp. *peramoenus*), CRPR 1B.2
- Two-fork clover (*Trifolium amoenum*), FE, CRPR 1B.1
- Santa Cruz clover (*Trifolium buckwestiorum*), CRPR 1B.1
- Saline clover (*Trifolium hydrophilum*), CRPR 1B.2
- Methuselah's beard lichen (*Usnea longissima*), CRPR 4.2

Appendix D: Archaeological Review, Basin Research Associates, September 1, 2023 [Confidential held on file at the City]

Appendix E: Preliminary Foundation Report Golf Cart Bridge Replacement (Bridge #25) Shoreline Golf Links 1st Fairway, City of Mountain View, California

DRAFT

PRELIMINARY FOUNDATION REPORT
GOLF CART BRIDGE REPLACEMENT (BRIDGE #25)
SHORELINE GOLF LINKS 1ST FAIRWAY
CITY OF MOUNTAIN VIEW, CALIFORNIA

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August 15, 2022

Project No. 2021-139-GEO

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CITY OF MOUNTAIN VIEW, CALIFORNIA

1.0 SCOPE OF WORK

This Preliminary Foundation Report (PFR) presents the preliminary geotechnical information for the proposed Golf Cart Bridge Replacement (Bridge #25) at Shoreline Golf Links 1st Fairway in the City of Mountain View, CA. The Project Location Map is shown on Plate No. 1.

The purpose of this report is to summarize the preliminary investigations performed and to provide foundation recommendations for the proposed bridge replacement. The recommendations presented in this report are based on the explorations performed by Parikh, laboratory test results, preliminary plans provided by the bridge engineer, review of available geological literature, and discussions with the design team.

The geotechnical recommendations presented in this report are intended for design input and are not intended to be used as specifications. These recommendations should not be used directly for bidding purposes or construction cost estimates by prospective contractors.

2.0 PROJECT DESCRIPTION

The planned bridge replacement is for the existing Bridge #25, which is an existing CMP culvert at the 1st fairway. The existing CMP culvert and Cart path have suffered settlement damages have been repaired by City several times. According to the preliminary General Plan provided, the proposed project will replace the existing CMP culvert with a single span prefabricated steel truss structure. The proposed bridge is 152 feet in length and 8 feet in width, supported on Caltrans standard 24-inch diameter cast-in-drilled-hole (CIDH) concrete piles. Minimal site grading is anticipated. The two abutments will conform to the existing grade.

In addition to Bridge #25, the geotechnical exploration also included Bridge #27 at the 5th fairway. It is our understanding that Bridge #27 will involve replacing the superstructure and no new foundation elements are planned. Therefore, no new foundation recommendations are required.

3.0 EXCEPTION TO POLICY

No.

4.0 FIELD INVESTIGATION

Total of three (3) Cone Penetration Tests, CPT-1, CPT-2 & CPT-3, and two (2) Geoprobes, GP-1 & GP-2 were performed at site on October 4 and 5, 2022. CPT-1 and GP-1 were done on the north

side (planned new Abutment 2) of the existing Bridge #25. CPT-3 was done on the south side (planned new Abutment 1) of the exiting Bridge #25. CPT-2 and GP-2 were done on the north side of existing Bridge #27 as additional reference. Note that CPT-1, GP-1 and CPT-3 data were the basis for designing of the subject bridge (replacement of Bridge #25). The exploration location map is attached in Appendix II.

The CPTs were pushed to 100 feet below grade. The Geoprobes were pushed to 30 feet below grade. The CPT soundings collected continuous data from tip/side resistance and pore pressure data through the depth for interpretation of soil strength and properties. The Geoprobes retrieved continuous soil samples in plastic sleeves for the 30 feet depth for further examination and testing in the laboratory

The drilling subcontractor was GeoEx Exploration from Dixon, CA. The Geoprobe samples were sealed and transported to our laboratory for further evaluation and testing. The field investigation was conducted under the supervision of our field engineer who observed the field operation and prepared the samples for subsequent laboratory testing and evaluation. The existing grades at two end of the existing Bridge #25 are at about Elev. 13 to 14 feet based on the General Plan dated July 21, 2022.

The boring logs were prepared from the samples retrieved from the Geoprobes, which were edited after visual re-examination of the soil samples in the laboratory and results of classification tests on selected soil samples as indicated on the logs. The abrupt stratum changes shown on these logs may be gradual and relatively minor changes in soil types within a stratum may not be noted on the logs due to field limitations. Both the CPT report (by GeoEx) and Geoprobe Boring logs are attached in Appendix II.

Due to limitations inherent in geotechnical investigations, it is neither uncommon to encounter unforeseen variations in the soil conditions during construction nor is it practical to determine all such variations during an acceptable program of drilling and sampling for a project of this scope. Such variations, when encountered, generally require additional engineering services to attain a properly constructed project. It is, therefore, recommended that a contingency fund be provided to accommodate any additional charges resulting from technical services that may be required during construction.

5.0 LABORATORY TESTING PROGRAM

Laboratory tests were performed on selected samples in the laboratory to evaluate the physical and engineering properties of the subsoils. The tests performed for the study include the

following: Laboratory determination of Moisture-Density (ASTM D 2216), Atterberg Limits (ASTM D 4318), Grain Size Analysis (ASTM D 422), and Corrosion Test (California Test Method 643). The laboratory test results are attached in Appendix II.

6.0 SITE GEOLOGY AND SUBSURFACE CONDITIONS

6.1 Site Geology

The project is located within the Coast Ranges Geomorphic Province and adjacent to the southern San Francisco Bay. Geologic unit extents and descriptions have been derived from Witter et al., (2006), "Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California, USGS OF-06-1037".

Project site geology is shown on Plate 2 and indicates the site is underlain by artificial fill over estuarine mud (afem). The unit is described as fill deposited over sediments along the margins of San Francisco Bay and other estuarine deposits mapped in the Sacramento/San Joaquin delta. The fill may be engineered and/or non-engineered material and each may occur within the same area. This mapped artificial fill overlies estuarine sediment and was placed to form new land. The thickness of the fill overlying estuarine sediment is typically five to twenty feet.

Depth to bedrock was not revealed during this investigation, however a well drilled about 6,000 feet south-east of the project site (Well # 24340) did not intersect bedrock to a maximum depth of about 750 feet below surface. Geologic and elevation data relative to the site does not indicate the presence of geologic hazards such as landslides, slope failure, rockfalls, or debris flows.

An artificial lake is located adjacent to the Project site and covers an area about 6.2 acres. Historical aerial photography and topographic maps indicate the Project area was occupied by marshland, agricultural land, and partly by a shallow perennial artificial lake that was mostly infilled prior to 1939.

6.2 Subsurface Conditions

The exploration data indicate that the subsoils consist predominantly of fine-grained cohesive soils of medium plasticity. The consistency generally is medium stiff to stiff. CPT-1, at Abutment 2, encountered two sand layers/lenses at approx. 25 and 50 feet deep. CPT-3,

at Abutment 1, did not encounter sand layers through 100 feet depth. Sand pockets/lenses could be sporadic and intermixed in the clay stratigraphy.

Groundwater is at shallow depth as the site is next to the pond. Filed observation indicated that the water may be just a couple feet below grade. The CPT data interpretation appears to indicate that the groundwater level could be at ground surface. Groundwater may vary with the passage of time due to seasonal groundwater fluctuation, local irrigation practice, surface and subsurface flows, ground surface run-off, and other factors that may not be present at the time of investigation.

Due to limitations inherent in geotechnical investigations, it is neither uncommon to encounter unforeseen variations in the soil conditions during construction nor is it practical to determine all such variations during an acceptable program of drilling and sampling for a project of this scope. Such variations, when encountered, generally require additional engineering services to attain a properly constructed project. We, therefore, recommend that a contingency fund be provided to accommodate any additional charges resulting from technical services that may be required during construction.

7.0 AS-BUILT FOUNDATION DATA

It is our understanding that the existing "Bridge #25" is just a culvert leading the path to Fairway 1. The existing culvert has suffered damage from settlement and pavement cracking. There is no data regarding how the culvert was constructed.

8.0 SCOUR EVALUATION

The proposed bridge crosses a pond within the golf course. We are not aware of design concern due to scour at the site. The abutment locations were selected behind the water edge, and the footings are buried in the soil with FG gently sloping away from the footings per the General Plan.

9.0 CORROSION EVALUATION

The corrosion investigation for this project was performed on selected samples in general accordance with the provisions of California Test Method 643. A summary of the corrosion test results is presented in the following table. For structural elements, Caltrans Corrosion Guidelines (May 2021) consider a site to be corrosive if one or more of the following conditions exist for the representative soil/water samples at the site: Chloride concentration is 500 ppm or greater; Sulfate concentration is 1500 ppm or greater; or the pH value is 5.5 or less.

Table 9.1 – Corrosion Test Results

Boring No.	Depth (ft)	pH	Minimum Resistivity (ohms-cm)	Chloride Content (ppm)	Sulfate Content (ppm)
GP-1	0 - 5	7.59	830	137.82	982

Based on the test results, the on-site material is considered non-corrosive according to the Corrosion Guidelines by Caltrans Division of Engineering Services. The guidelines presented in the California Amendments to the AASHTO LRFD Bridge Design Specifications (BDS, 2012), Article 5.12.3, for a minimum cement factor and cover thickness may be used for the substructure.
The corrosion test results are presented in Appendix II.

10.0 SEISMIC RECOMMENDATIONS

10.1 Seismic Sources

The project site is located in a seismically active part of northern California. Santa Clara County and the rest of the Bay Area are in one of the most active seismic regions in the United States. Many active faults exist in the regional area and can produce earthquakes that may cause strong ground shaking at the project site. Each year, low- and moderate-magnitude earthquakes occurring within or near the Bay Area are felt by residents. Since the mid-nineteenth century, hundreds of earthquakes have been felt in Santa Clara County. The "Loma Prieta Earthquake" of October 17, 1989, originated within the San Andreas Fault Zone and caused severe damage throughout much of the Bay Area. The major fault zones of the San Andreas Fault System (including the Hayward and Calaveras faults) have been the source of other earthquakes and are expected to be a source of future earthquakes. A fault map showing the active faults within about sixty miles of the Project site is shown in Plate No. 3.

10.2 Seismic Hazards

10.2.1 Fault Rupture

A review of the Mountain View Alquist-Priolo Earthquake Fault Zone Map indicates the project is not located within an Alquist-Priolo Earthquake Fault Zone. The USGS Quaternary Fault and Fold Database shows that the project is not located within 1,000 feet of an unzoned fault that is Holocene/Latest Pleistocene (15,000 years) or younger in age. In assessing seismic risks, we consider that surface fault rupture does not contribute to the seismic hazards at the site during the useful life of the project. The preceding statements do not make inferences on the potential for aseismic

surface cracking.

10.2.2 Liquefaction Potential

Liquefaction is a phenomenon that saturated cohesionless soils are subject to a temporary but essentially total loss of shear strength under the reversing, cyclic shear stresses associated with earthquake shaking. Submerged cohesionless sands and silts of low relative density are the type of soils, which usually are susceptible to liquefaction. Clays are generally not susceptible to liquefaction.

The liquefaction potential was evaluated in accordance with the methods proposed by Youd, et al. (2001), using the boring data obtained in 2012. As indicated in soil liquefaction engineering (Bray, 2006), for soils with sufficient fines content to separate the coarser particles and control behavior, liquefaction appears to occur in soils where these fines are either non-plastic or are low plasticity silts and/or silty clays (PI<12%, and LL<37%), and with high water content relative to their liquid limit (w> 0.85LL). Further research based on EERI MNO-12 (Idriss and Boulanger, 2008) indicated that fine-grained soils with PI of 7% of more tend to exhibit “clay-like” material behavior during seismic loading.

The project site is located in an area where has very high liquefaction susceptibility according to the Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California; USGS in Cooperation with the California Geological Survey; Open-File Report 06-1037; by Robert C. Witter, et al. 2006. A Liquefaction Susceptibility Map for the site is attached as Plate No. 4.

Based on the exploration data at site, the subsoils are primarily cohesive soils. There are isolated pockets and lenses of medium dense sand and gravel in the clayey deposits. These locally encountered sand and gravel pockets are relatively thin and not continuous. In our opinion, liquefaction triggering potential exists at the site, but it is considered to have relatively insignificant impact on foundation design of the planned bridge replacement.

10.3 Seismic Design Criteria

The site may be subject to strong ground motions from nearby earthquake sources during the design life of the bridge. Based on available subsurface information and standard soil

strength correlations for determining shear wave velocity per Caltrans guidelines, the average shear wave velocity (V_{S30m}) for the upper 100 feet of soil is estimated to be about 195 m/sec based on the CPT data.

The development of the acceleration response spectrum (ARS) followed the current Caltrans procedure based on the Caltrans Seismic Design Criteria (SDC V. 2.0) by using Caltrans ARS Online V. 3.0.2. The Design Spectrum is based on the USGS 975-year uniform hazard spectrum which is based on the 2014 National Hazard Map. We have generated the preliminary spectrum based on the site location and the parameters, as summarized below. The recommended ARS curve is presented in Appendix I with backup data. The site soil is categorized as Soil Type "S2" per Caltrans SDC V. 2.0.

Table 10.3 – Recommended Ground Motion Parameters for Geotechnical Design

Site Parameters			Design Ground Motion Parameters (Return Period = 975 years)		
Locations		Shear-Wave Velocity V_{S30m}, m/sec	Horizontal Peak Ground Acceleration (HPGA) [1], g	Mean Earthquake [1] M, Moment Magnitude	Mean Site-to-Fault/ Rupture Surface Distance [2] Rrup, km
Latitude, degrees	Longitude, degrees				
37.429986	-122.084612	195	0.62	7.10	16.3

Note: (1) Based on the Caltrans web tool ARS Online (Version 3.0.2)

11.0 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

11.1 General

This report was prepared specifically for the proposed project described in Section 2.0. Normal procedures were assumed for construction of the bridge structure throughout our analysis and represent the basis of the recommendations presented herein. The design criteria provided are based on the materials encountered in our test borings at the site. Therefore, this office should be notified if changed subsurface conditions are encountered, so that we are provided an opportunity to modify or amend our recommendations, if needed.

11.2 Bridge Structure Foundations

For selection of foundation type for the project, we have considered the site constraints and noise and vibration effect for the area. Per our discussion with the designer, Cast-in-Drilled-Hole (CIDH) concrete pile is the preferred foundation support system.

The plans indicate minimum fill at the approaches, and the bridge is a prefabricated steel truss structure. The CIDH pile design (vertical and lateral) follows Caltrans standard guidelines and the AASHTO LRFD specifications with California Amendments (8th edition, 2017). A minimum pile spacing of 3 x Diameter is recommended.

Vertical Design. The pile capacities of the CIDH piles were estimated in general accordance with the procedures outlined in Section 10.8.3.5 of AASHTO LRFD BDS 8th Edition (2017) with California Amendments. For clay soils, the procedure utilizes a α factor for cohesive materials, where α is a function of the undrained shear strength of the clayey material. For granular soils, the β method is commonly adopted and accepted by Caltrans for design, where the β factor is a function of depths.

The pile capacity of the CIDH pile was derived only from frictional resistance along the pile shafts, and end bearing capacity was not included when estimating the pile capacity. Computer program "SHAFT" (by ENSOFT, Inc.) was used for calculation purpose.

Based on discussion with the designer, we have considered pile sizes of 2, 2.5 and 3 feet to show ultimate pile shaft capacity vs. pile length for information. Note that per Caltrans Memo to Designers (MTD) 3-1, the maximum pile length to diameter ratio should be kept under 30:1 from construction aspect. The pile capacity plot is attached in Appendix III. The foundation design is typically governed by the Strength Limit State design of the AASHTO LRFD Specifications. For pile sizes of 2, 2.5 and 3 feet, the pile embedment lengths are limited to 60, 75 and 90 feet, respectively. The designer may select appropriate pile diameter and length for foundation support.

Lateral Design. It is our understanding that the designer will perform lateral design of the abutment piles using LPILE program. For LPILE analysis, the recommended geotechnical parameters are presented in the following table.

Table 11.1 – Recommended LPILE PARAMETERS

Approx. Depth (ft.)	Generalized Soil Profile	LPILE Soil Type	Soil Strength	K (pci)	E_{50} (in/in)	Effective Unit Wt. (pcf)
0 to 5	Sand and Silt	Sand	$\phi = 30°$	Default	Default	120
5 to 10	Clay, trace sand	Clay, stiff (without free water)	C = 1000 psf	Default	Default	57.6
10 to 20	Lean Clay	Clay, stiff (without free water)	C = 800 psf	Default	Default	57.6

Approx. Depth (ft.)	Generalized Soil Profile	LPILE Soil Type	Soil Strength	K (pci)	E_{50} (in/in)	Effective Unit Wt. (pcf)
20 to 30	Lean Clay	Clay, stiff (without free water)	C = 1500 psf	Default	Default	57.6
30 to 40	Lean Clay	Clay, stiff (without free water)	C = 1750 psf	Default	Default	57.6
40 to 45	Lean Clay	Clay, stiff (without free water)	C = 1000 psf	Default	Default	57.6
45 to 55	Lean Clay	Clay, stiff (without free water)	C = 1250 psf	Default	Default	57.6
55 to 65	Lean Clay	Clay, stiff (without free water)	C = 2000 psf	Default	Default	57.6
65 to 100	Lean Clay	Clay, stiff (without free water)	C = 1250 psf	Default	Default	57.6

Default values can be used for ε_{50} and K.
Depth "0" is existing roadway grade at ~ Elev. 13 ft. Design groundwater level at ~ 5 ft below grade.

Refer to the California Amendments to AASHTO LRFD Spec – 8th ed. (Table 10.7.2.4-1), "Pile P-Multipliers, Pm for Multiple Row Shading," to account for group effect in longitudinal and transverse directions.

11.3 Lateral Earth Pressures

The bridge abutment backfill material should consist of Caltrans standard Structure Backfill. Proper drainage should be provided.

Active Condition	36 pcf (drained condition), 80 pcf (undrained condition with water pressure)
At-Rest Condition	55 pcf (drained condition), 90 pcf (undrained condition with water pressure)
Passive Resistance	For the longitudinal stiffness and passive resistance, the abutment walls should be designed based on the bilinear model per Sect. 6.3.1 of the Caltrans SDC v2.0. The bilinear model is based on experimental and calibrated analytical models using engineered structural backfill to relative compaction of at least 95%.

For seismic design, the recommended kh is 50% PGA per AASHTO. Per Caltrans ARS V. 3.0, the PGA at site is 0.62 g, and kh is 0.31. Per AASHTO LRFD Specifications, the recommended total Kae is 0.50 (Kae = 0.50, DKae = 0.50-Ka= 0.50-0.28 = 0.22 where Ka = 0.28 for Structure Backfill with f=34 deg). Use total unit weight of 125 pcf for Structure Backfill. The seismic lateral earth pressure is distributed as a regular triangular shape per AASHTO specifications.

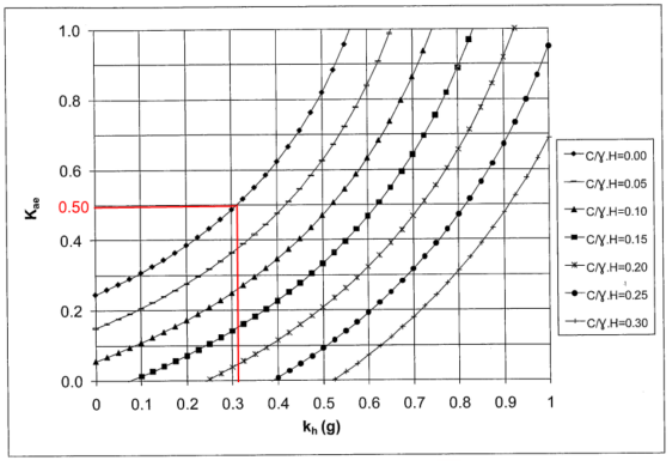


Figure A11.3.2-3—Seismic Active Earth Pressure Coefficient for ϕ = 35 degrees (c = soil cohesion, γ = soil unit weight, and *H* = retaining wall height)

11.4 Pavement Design

Based on the exploration data, the native upper material at anticipated pavement subgrade appear to consist of silts with fine sands. We believe a R-value of 5 would be on the conservative side for design. For any import material for engineering use, we recommend a maximum PI of 15 for the import.

The anticipated traffic is from golf carts, occasional maintenance trucks and foot traffics. It is our understating that an exact Traffic Index (TI) is not available for design. For budgeting purpose, the following pavement sections may be considered, and the City/designer may determine the applicable Traffic Index (TI).

- TI = 5 8 inches full depth HMA, or 3 inches HMA over 10.5 inches AB
- TI = 6 9 inches full depth HMA, or 4 inches HMA over 13.0 inches AB

Follow Caltrans standard specifications. HMA: Type A, Aggregate Base (Class 2, R =78). The subgrade should be prepared and compacted to min. 95% compaction.

12.0 CONSTRUCTION OF CIDH CONCRETE PILES

Caltrans standard specifications (2018) for "Cast-in-Place Concrete Piling" should be used for construction of the CIDH concrete piles. Access tubes for acceptance testing should be provided in all CIDH concrete piles that are 24 inches in diameter or larger for construction quality control, except when the holes are dry or when the holes are dewatered without the use of temporary casing to control groundwater. The acceptance test should include Gamma-Gamma Logging and

may also include cross-hole sonic logging for verification. Gamma-Gamma Logging should be performed in accordance with California Test 233 Standard (CT233) to check the homogeneity of CIDH concrete piles. Anomalies detected should be evaluated by the designers for their significance and potential impact on design and to see if mitigation plans are required.

Due to the presence of granular pockets and lenses, raveling or caving may be anticipated, which may require additional drilling and cleaning effort and may increase the concrete volume for the piles. It is prudent to make the contractor aware of these conditions so that appropriate steps can be taken to comply with the standards and maintain the integrity of the CIDH concrete pile. The contractor should be prepared if temporary steel casing is required for pile installation.

It is recommended that the specifications set certain criteria for qualifications and previous work experience requirements to pre-qualify the potential contractors. The intent is to help select qualified contractors to reduce construction issues. Mitigation and repair procedures for CIDH anomaly should be anticipated. All pile excavations should be observed by a geotechnical engineer prior to the placement of reinforcement and concrete so that if conditions differ from those anticipated, appropriate recommendations can be made.

13.0 INVESTIGATION LIMITATION

Our services consist of professional opinions and recommendations made in accordance with generally accepted geotechnical engineering principles and practices and are based on our site reconnaissance and the assumption that the subsurface conditions do not deviate from observed conditions. All work done is in accordance with generally accepted geotechnical engineering principles and practices. No warranty, expressed or implied, of merchantability or fitness, is made or intended in connection with our work or by the furnishing of oral or written reports or findings.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in structures, soil, surface water, groundwater or air, below or around this site. Unanticipated soil conditions are commonly encountered and cannot be fully determined by taking soil samples and excavating test borings; different soil conditions may require that additional expenditures be made during construction to attain a properly constructed project. Some contingency fund is thus recommended to accommodate these possible extra costs.

This report has been prepared for the proposed project as described earlier, to assist the engineer in the design of this project. In the event any changes in the design or location of the facilities are planned, or if any variations or undesirable conditions are encountered during construction, our conclusions and recommendations shall not be considered valid unless the changes or variations are reviewed, and our recommendations modified or approved by us in writing.

This report is issued with the understanding that it is the designer's responsibility to ensure that the information and recommendations contained herein are incorporated into the project and that necessary steps are also taken to see that the recommendations are carried out in the field.

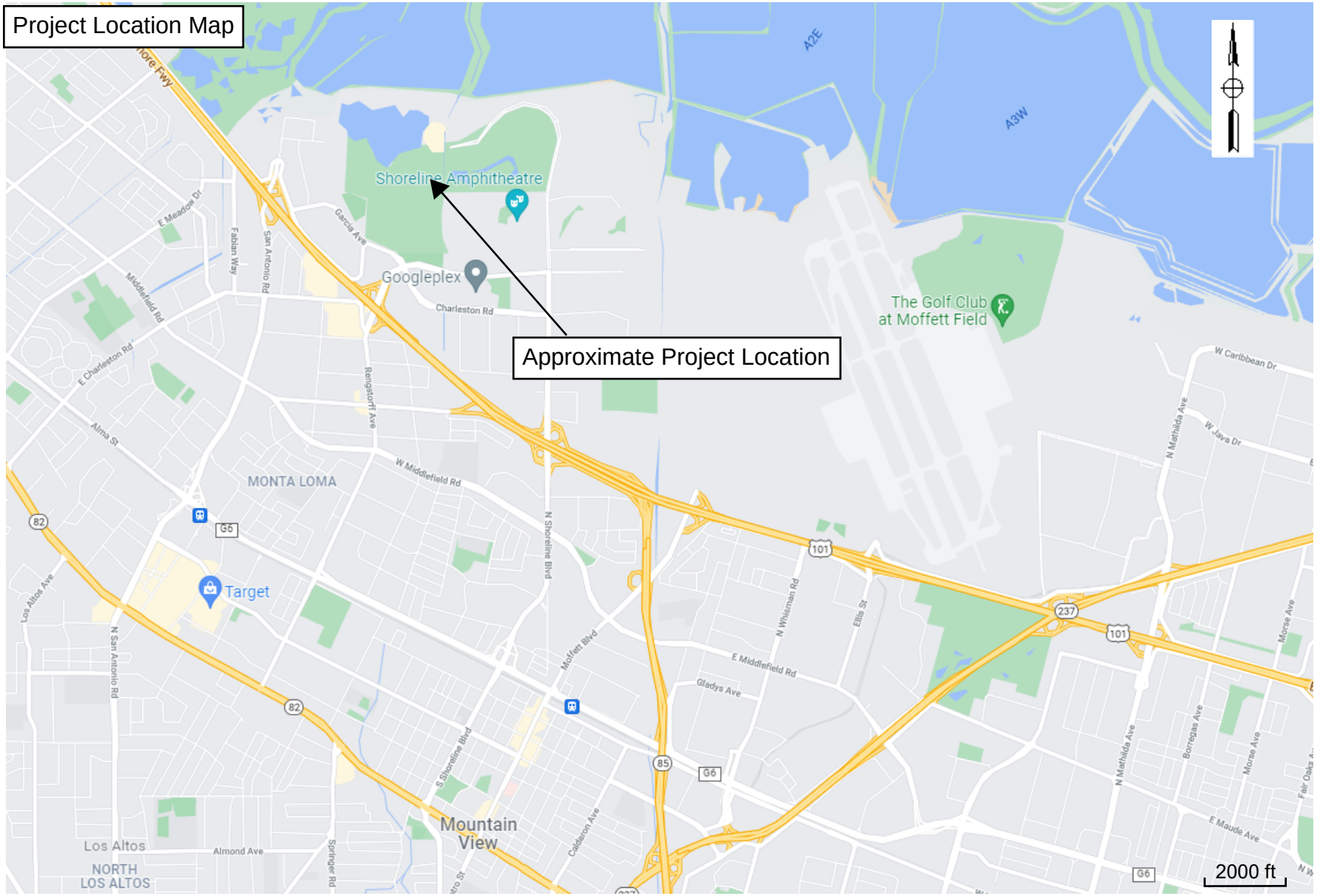
The findings in this report are valid as of the present date. However, changes in the subsurface conditions can occur with the passage of time, whether they are due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or from the broadening of knowledge. Accordingly, the findings in this report might be invalidated, wholly or partially, by changes outside of our control.

Respectfully submitted,
PARIKH CONSULTANTS, INC.

Y. David Wang, Ph.D., P.E. 52911
Senior Engineer

Gary Parikh, P.E., G.E. 666
Project Manager

Project Location Map



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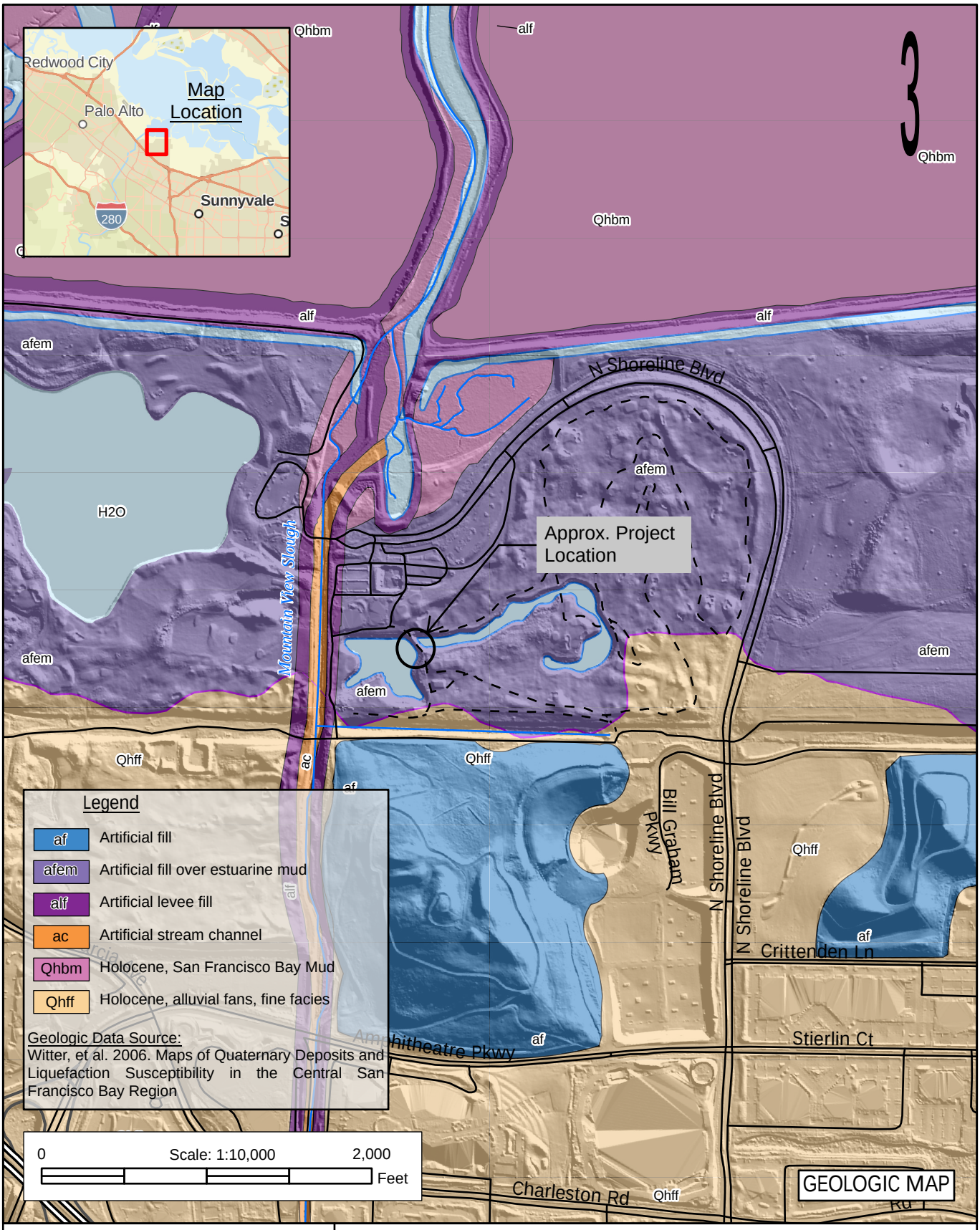
SHORELINE GOLF LINKS - BRIDGE (#25) REPLACEMENT
CITY OF MOUNTAIN VIEW, CALIFORNIA

JOB NO.: 2021-139-GEO	PLATE NO.: 1



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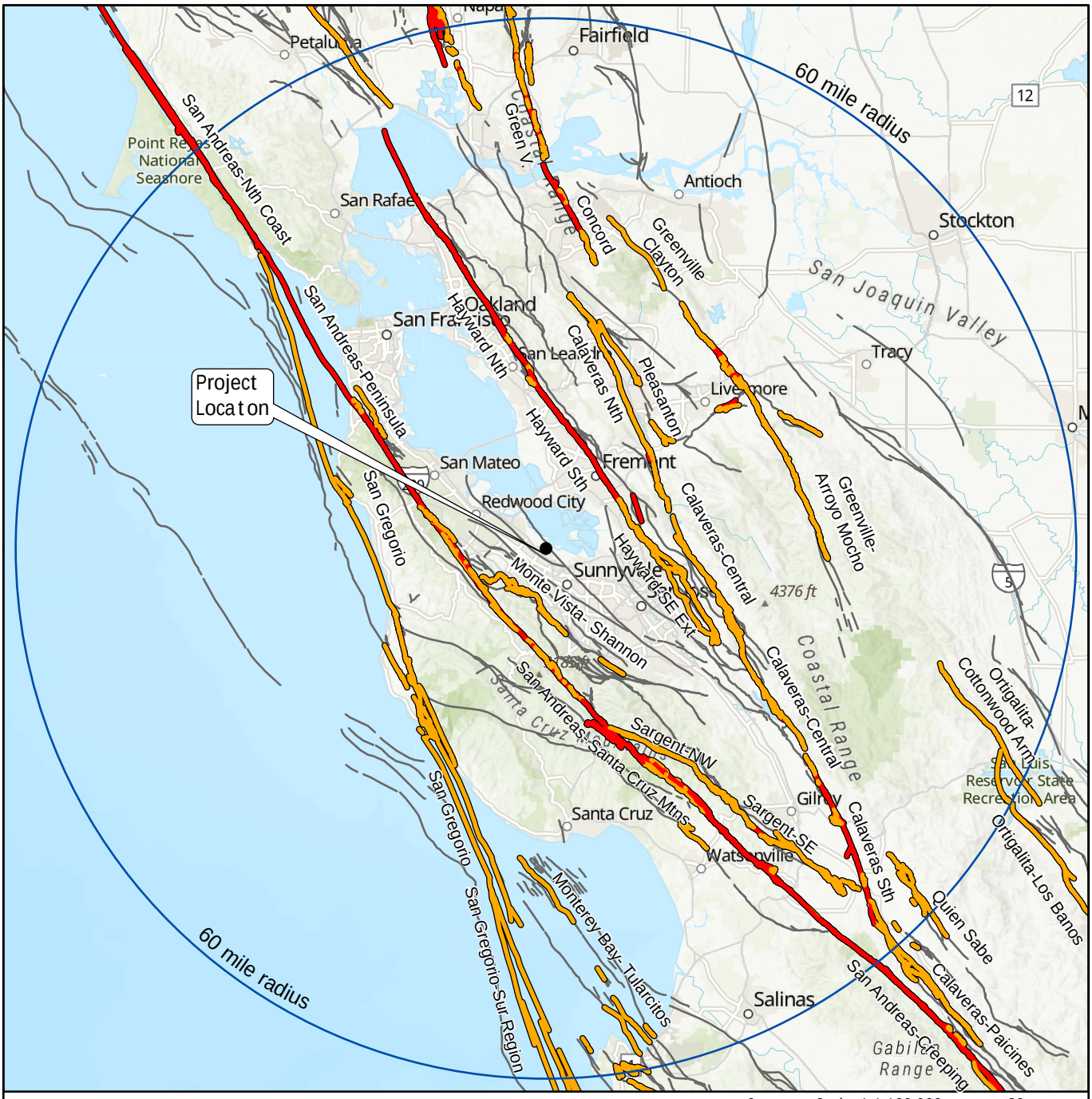
SHORELINE GOLF LINKS - BRIDGE (#25) REPLACEMENT
CITY OF MOUNTAIN VIEW, CALIFORNIA

Job No. 2021-139-GEO

Plate No. 2



Legend

Fault trace

Fault name

Cascade

Historic <150 yrs

Latest Quaternary <15,000 yrs

Quaternary <1.6 million yrs

MAP LOCATION 3

0 Scale: 1:1,100,000 30 Miles

Fault data source:

USGS & CGS. Quaternary Fault and Fold Database for the United States. Accessed 4/28/2019.

FAULT MAP

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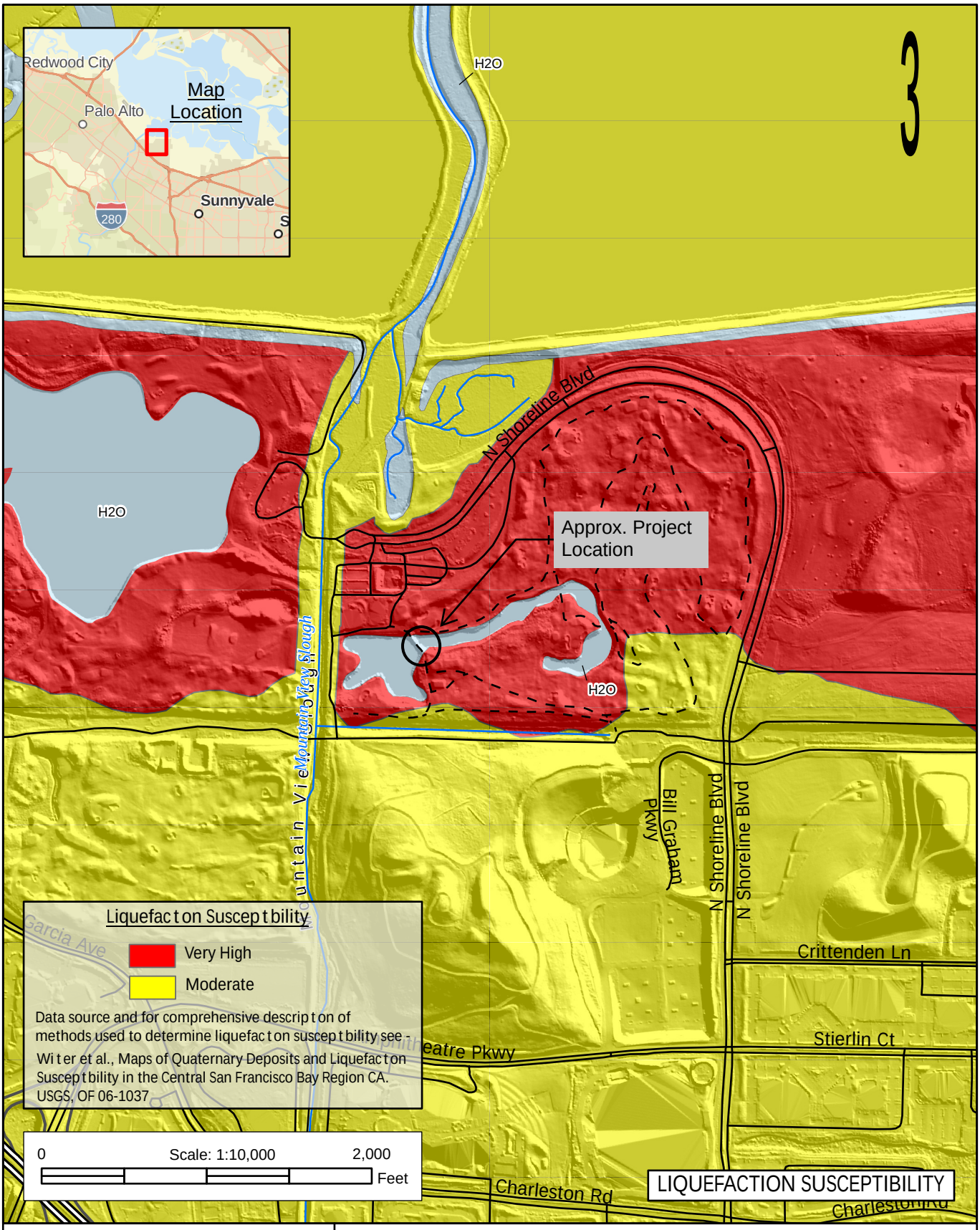
SHORELINE GOLF LINKS - BRIDGE (#25) REPLACEMENT
CITY OF MOUNTAIN VIEW, CALIFORNIA

Job No. 2021-139-GEO

Plate No. 3



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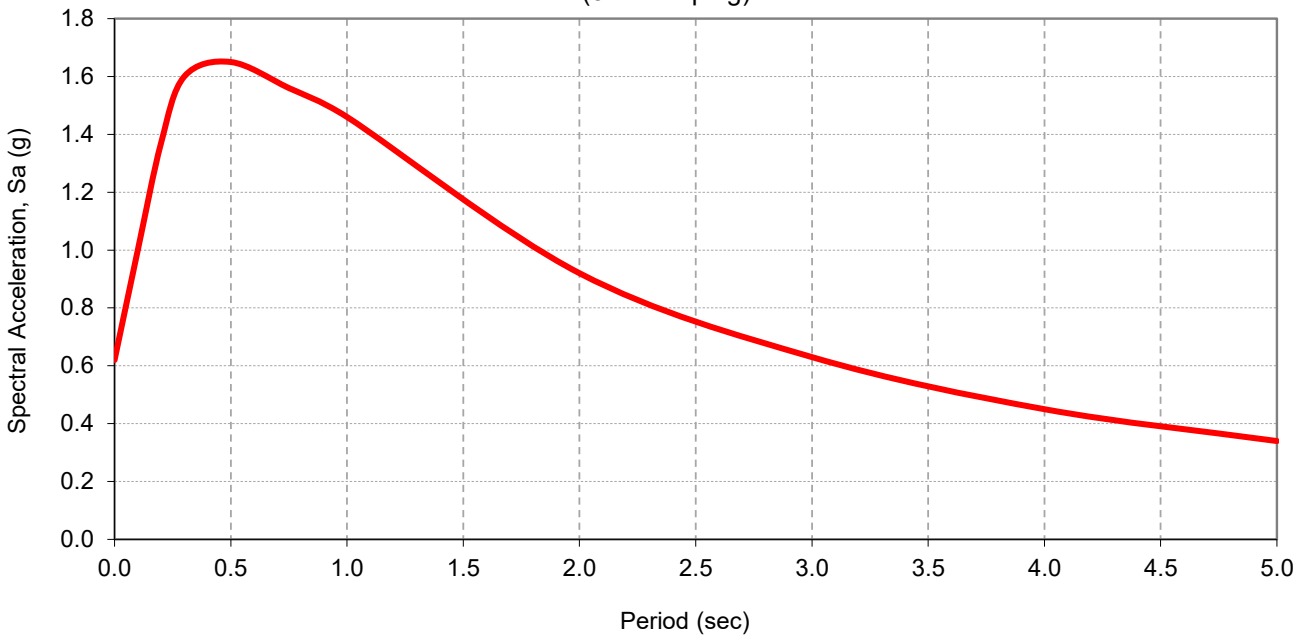
SHORELINE GOLF LINKS - BRIDGE (#25) REPLACEMENT
CITY OF MOUNTAIN VIEW, CALIFORNIA

Job No. 2021-139-GEO | Plate No. 4

APPENDIX I

RECOMMENDED ACCELERATION RESPONSE SPECTRUM

(5% Damping)



Site Information

Latitude:	37.429986
Longitude	-122.084612
V_{S30} (m/s) =	195
Mean Magnitude (for PGA)	7.10
Near Fault Factor, Derived from USGS Unified Hazard Site (km) =	16.3

Recommended Response Spectrum

Period (sec)	Spectral Acceleration (2014) (g)	Adjusted for Near Fault Effect	Adjusted For Basin Effect	Design Spectral Acceleration (2014) (g)
0.0	0.62	1	1	0.620
0.1	1	1	1	1.000
0.2	1.37	1	1	1.370
0.3	1.6	1	1	1.600
0.5	1.65	1	1	1.650
0.75	1.43	1.09	1	1.560
1.0	1.25	1.17	1	1.460
2.0	0.78	1.17	1	0.920
3.0	0.53	1.17	1	0.630
4.0	0.38	1.17	1	0.450
5.0	0.29	1.17	1	0.340

Source:

1. Caltrans ARS Online tool (V.3.0.2, https://arsonline.dot.ca.gov/)

2. Caltrans SDC 2.0 was adopted September 1, 2019. Design Spectrum is based on the USGS 975 year uniform hazard spectrum only.

ARS Online V3.0.2

Using the tool: Specify latitude and longitude in decimal degrees in the input boxes below. Alternatively, **Google Maps** can be used to find the site location. Specify the time-averaged shear-wave velocity in the upper 30m (Vs30) in the input box. After submitting the data, the USGS 2014 hazard data for a 975-year return period will be reported along with adjustment factors required by Caltrans Seismic Design Criteria (SDC) V2.0.

Latitude: 37.429986 **Longitude:** -122.084612 **Vs30 (m/s):** 195 Submit

Caltrans Design Spectrum (5% damping)

Period(s)	Sa_{2008}(g)	Sa_{2014}(g)	$Basin_{2008}$	$Basin_{2014}$	Near Fault Amp	Design Sa_{2008}(g)	Design Sa_{2014}(g)
PGA	0.58	0.62	1	1	1	0.58	0.62
0.10	0.98	1	1	1	1	0.98	1
0.20	1.23	1.37	1	1	1	1.23	1.37
0.30	1.27	1.6	1	1	1	1.27	1.6
0.50	1.16	1.65	1	1	1	1.16	1.65
0.75	1.01	1.43	1	1	1.09	1.09	1.56
1.0	0.87	1.25	1	1	1.17	1.02	1.46
2.0	0.56	0.78	1	1	1.17	0.66	0.92
3.0	0.37	0.53	1	1	1.17	0.44	0.63
4.0	0.27	0.38	1	1	1.17	0.32	0.45
5.0	0.22	0.29	1	1	1.17	0.26	0.34

Copy table

Deaggregation (based on 2014 hazard)

mean magnitude (for PGA)	7.1
mean site-source distance (km, for Sa at 1s)	16.3

Option: recalculate Near Fault amplification with user specified distance

Site-source distance (km): 16.3 Update

APPENDIX II

PARIKH
Practicing in the Geosciences

SHORELINE GOLF LINKS - BRIDGE REPLACEMENT
CITY OF MOUNTAIN VIEW, CALIFORNIA

JOB NO.: 2021-139-GEO	PLATE NO.: 2

CPT Data Report

Geo-Ex Subsurface Exploration
Dixon, CA

Date: October 12, 2021

CPT Report 021-004-12

1. Introduction

This report has been prepared by Geo-Ex Subsurface Exploration on October 12, 2021. It contains the data of 3 cone penetration tests at the Parikh Shoreline in Mountainview, CA. using the CPeT-it software (version 3.2.1.7).

Geo-Ex Subsurface Exploration is a registered California Small Business Enterprise (Micro Business), located in Dixon, CA, providing among others CPT services to the geotechnical, environmental and construction industries.

Our corporate goal is to provide quality services as well as innovative solutions for our clients ever changing needs. We are also committed to providing cost-effective solutions, quality project management, schedule control and ensuring that all services are in compliance with all applicable regulatory requirements.

For more information, including a more complete listing of the services we can provide, please visit our website (www.geoexsubsurface.com) and for clarifications or additional information please contact our offices:

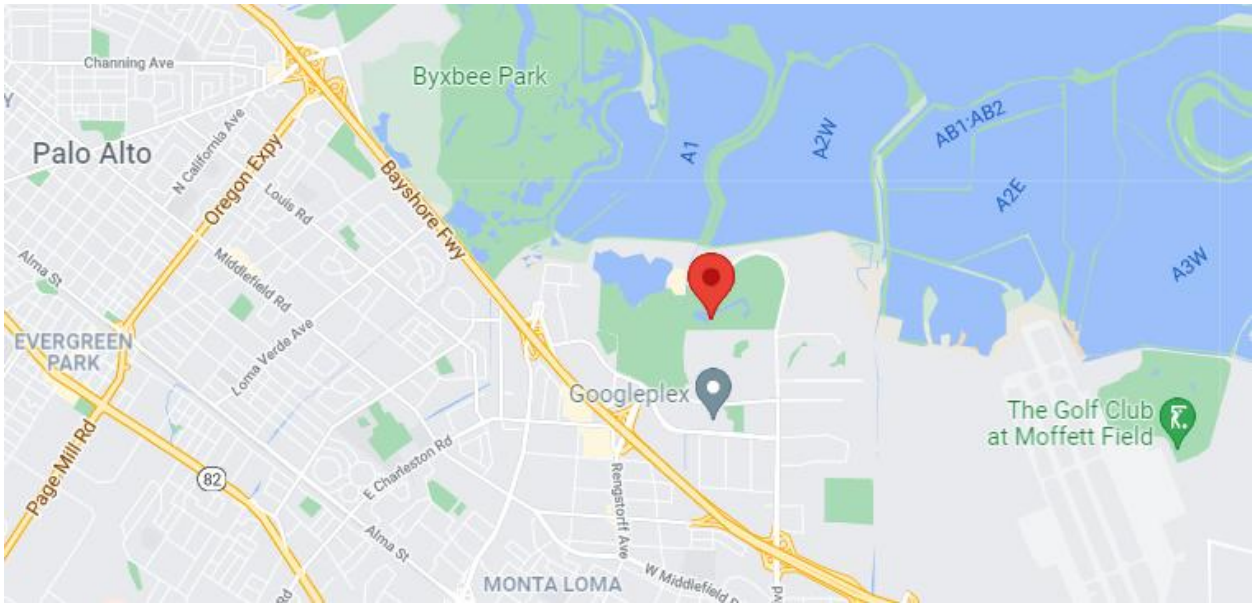
Tom Scott
Geo-Ex Subsubsurface Exploration
1510 Madera Dr.
Dixon, CA 95620

Ph: (916) 799-8198

WARNING:
Geo-Ex Subsubsurface Exploration uses a commercial CPT interpretation and plotting software CPeT-IT (https://geologismiki.gr/products/cpet-it/). The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997) and updated by Robertson and Cabal (2015). The interpretation is presented in tabular format. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Geo-Ex Subsubsurface does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

2. Project Location

Geo-Ex Subsubsurface Exploration has performed 3 cone penetration tests at the Parikh Shoreline in Mountainview, CA.



3. General Proj ect Information

Operator name (or initials)	Nicholas Maher
Project designation	Parikh Shoreline, Mountainview, CA
Ground surface elevation	0 ft
Ground water surface elevation	this was not confirmed during the testing; therefore all plots have been generated assuming an elevation of 0 ft;
Sounding locations	CPT-1, CPT-2 and CPT-3
Sounding date	October 4, 2021,

Equipment Used

Cone manufacturer	Hogentogler
Cone type used	10 cm^2 piezocone
Cone serial number	5583.101
Type of thrust machine	20 kN pusher
Method used to provide reaction force	vehicle dead weight
Location and type of friction reduction system	none
Calibration data	see section 5

Any special difficulties or other observations concerning performance of the equipment
none

Information on other sensing devices used during the sounding
N/A

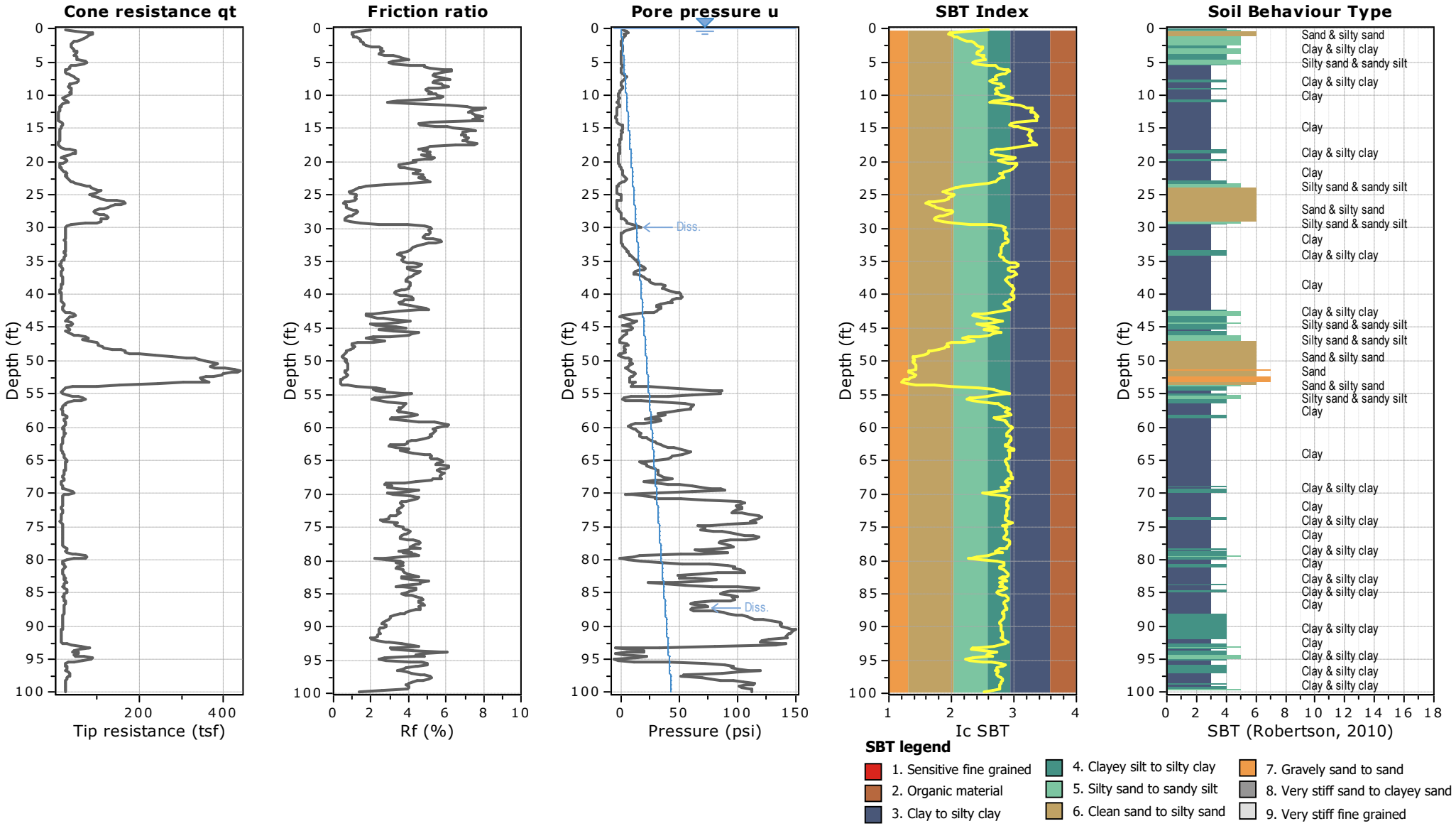
Any observations concerning the quality of the recorded data
N/A

4. CPT Plots

Geo-Ex Subsurface
Geotechnical - Environmental
Dixon, CA
http://www.geoexsubsurface.com

CPT: CPT-1
Total depth: 99.90 ft, Date: 10/4/2021
Surface Elevation: 0.00 ft
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Parikh Shoreline**
Location: **Mountainview, CA**



Dissipation Tests Results

Dissipation tests

Dissipation tests consists of stopping the piezocone penetration and observing porepressures (u) with elapsed time (t). The data are automatic recorded by the field computer and should take place until a minimum of 50% dissipation.

The porepressures are plotted as a function of square root of (t). The graphical technique suggested by Robertson and Campanella (1989), yields a value for t_{50}, which corresponds to the time for 50% consolidation.

The value of the coefficient of consolidation in the radial or horizontal direction c_h was then calculated by Houlsby and Teh's (1988) theory using the following equation:

$$c_h = \frac{T \times r^2 \times I_r^{0.5}}{t_{50}}$$

where:

T: time factor given by Houlsby and Teh's (1988) theory corresponding to the porepressure position
r: piezocone radius
I_r: stiffness index, equal to shear modulus G divided by the undrained strength of clay (S_u).
t_{50}: time corresponding to 50% consolidation

Permeability estimates based on dissipation test

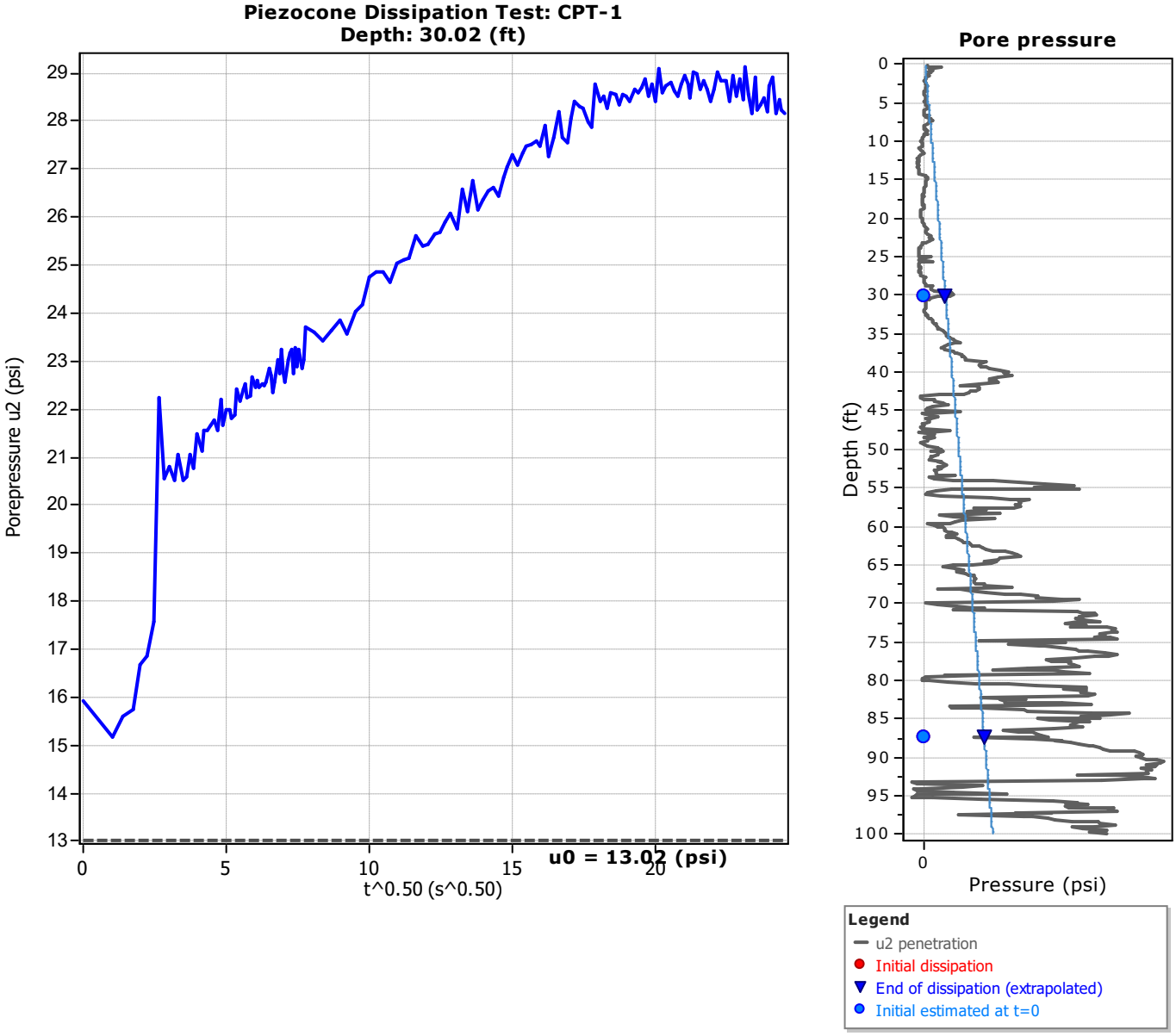
The dissipation of pore pressures during a CPTu dissipation test is controlled by the coefficient of consolidation in the horizontal direction (c_h) which is influenced by a combination of the soil permeability (k_h) and compressibility (M), as defined by the following:

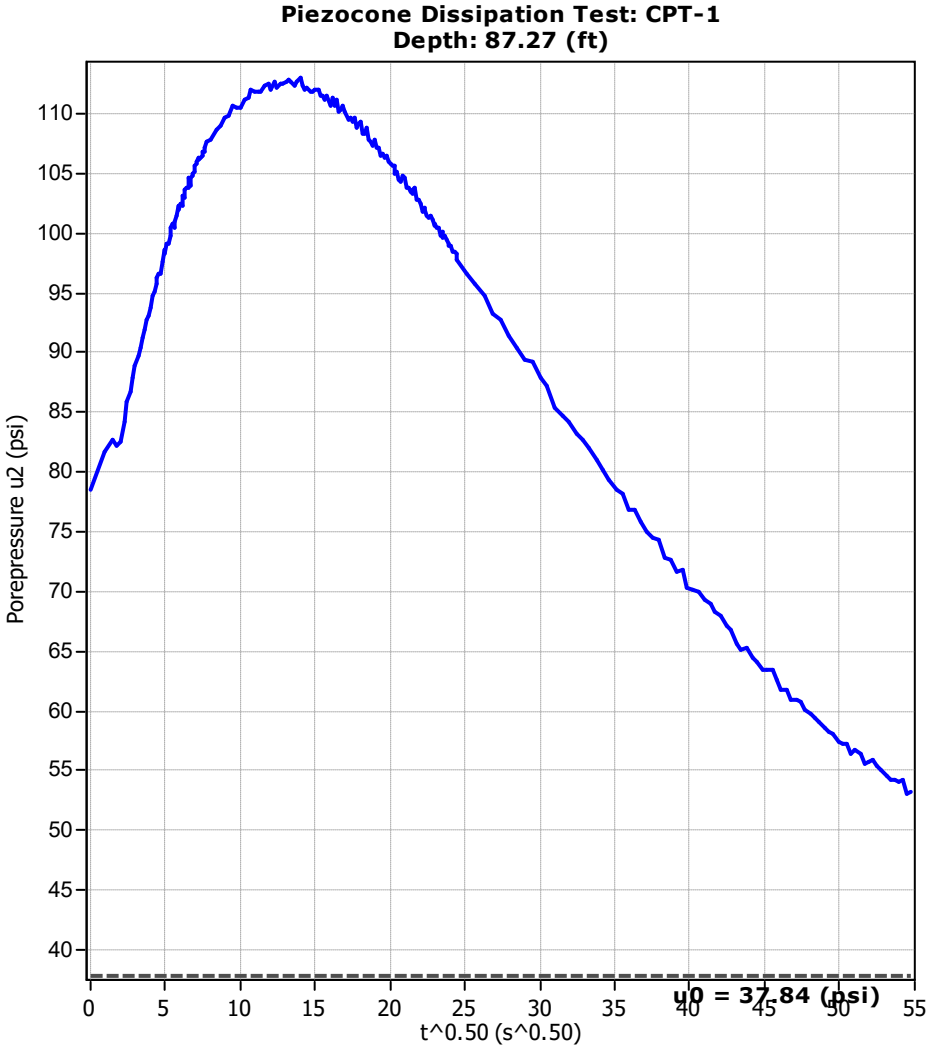
$$k_h = c_h \times \gamma_w / M$$

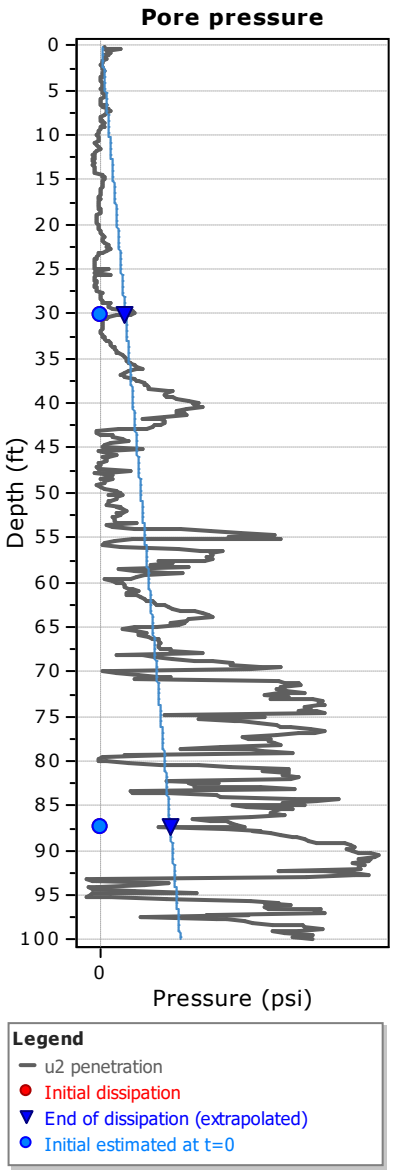
where: M is the 1-D constrained modulus and γ_w is the unit weight of water, in compatible units.

Tabular results

CPTU Borehole	Depth (ft)	$(t_{50})^{0.50}$	t_{50} (s)	t_{50} (years)	G/S_u	c_h (ft²/s)	c_h (ft²/year)	M (tsf)	k_h (ft/s)
CPT-1	30.02	0.0	0	0.00E+000	454775.75	0.00E+000	0	335.84	-1.00E+004
CPT-1	87.27	0.0	0	0.00E+000	901501.56	0.00E+000	0	86.43	-1.00E+004


Piezocone Dissipation Test: CPT-1
Depth: 30.02 (ft)
Porepressure u2 (psi)
t^0.50 (s^0.50)
u0 = 13.02 (psi)
Pore pressure
Depth (ft)
Pressure (psi)
Legend
u2 penetration
Initial dissipation
End of dissipation (extrapolated)
Initial estimated at t=0

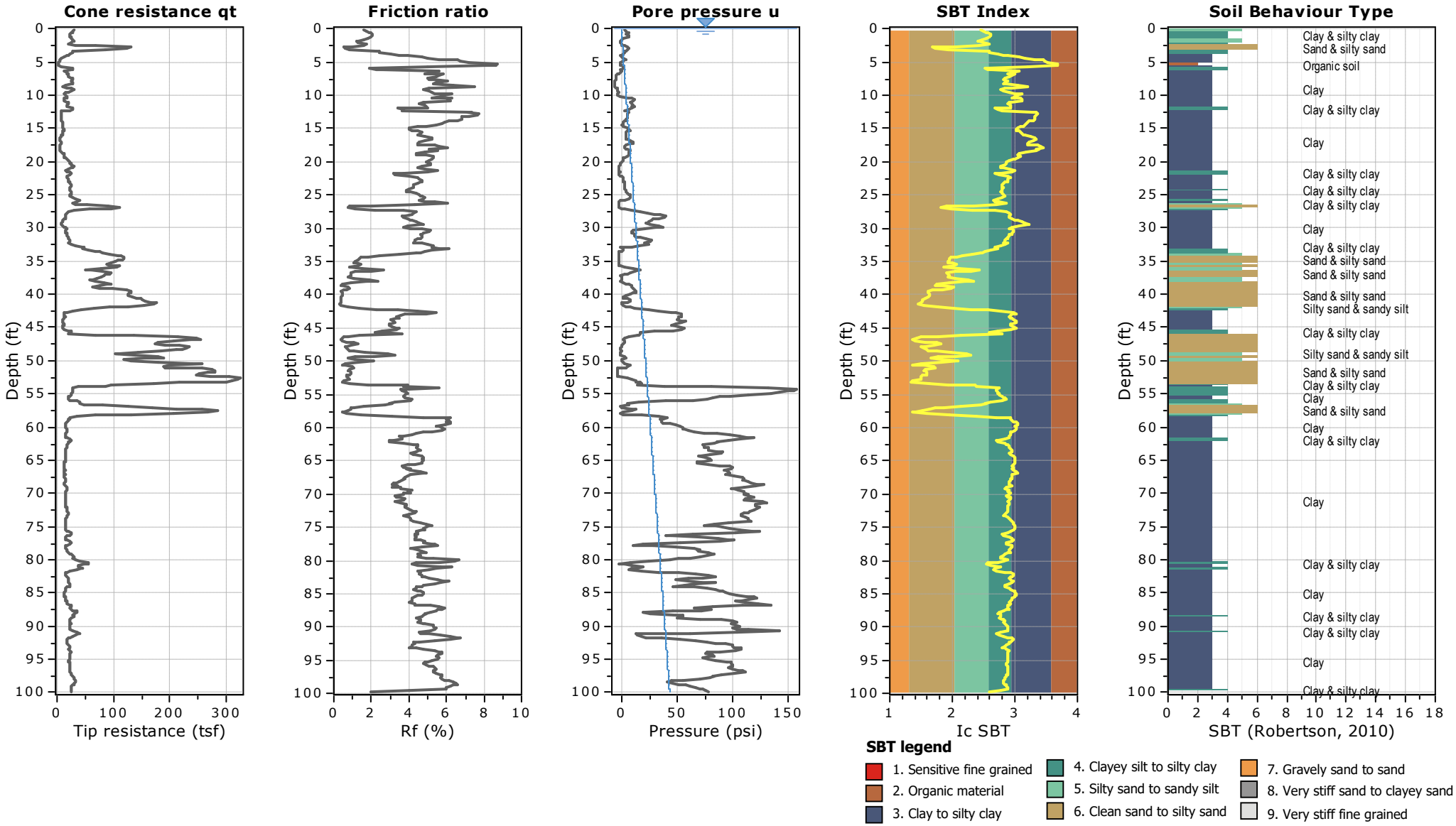

Piezocone Dissipation Test: CPT-1
Depth: 87.27 (ft)
Porepressure u2 (psi)
t^0.50 (s^0.50)
u0 = 37.84 (psi)


Pore pressure
Depth (ft)
Pressure (psi)
Legend
u2 penetration
Initial dissipation
End of dissipation (extrapolated)
Initial estimated at t=0

Geo-Ex Subsurface
Geotechnical - Environmental
Dixon, CA
http://www.geoexsubsurface.com

CPT: CPT-2
Total depth: 99.90 ft, Date: 10/4/2021
Surface Elevation: 0.00 ft
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

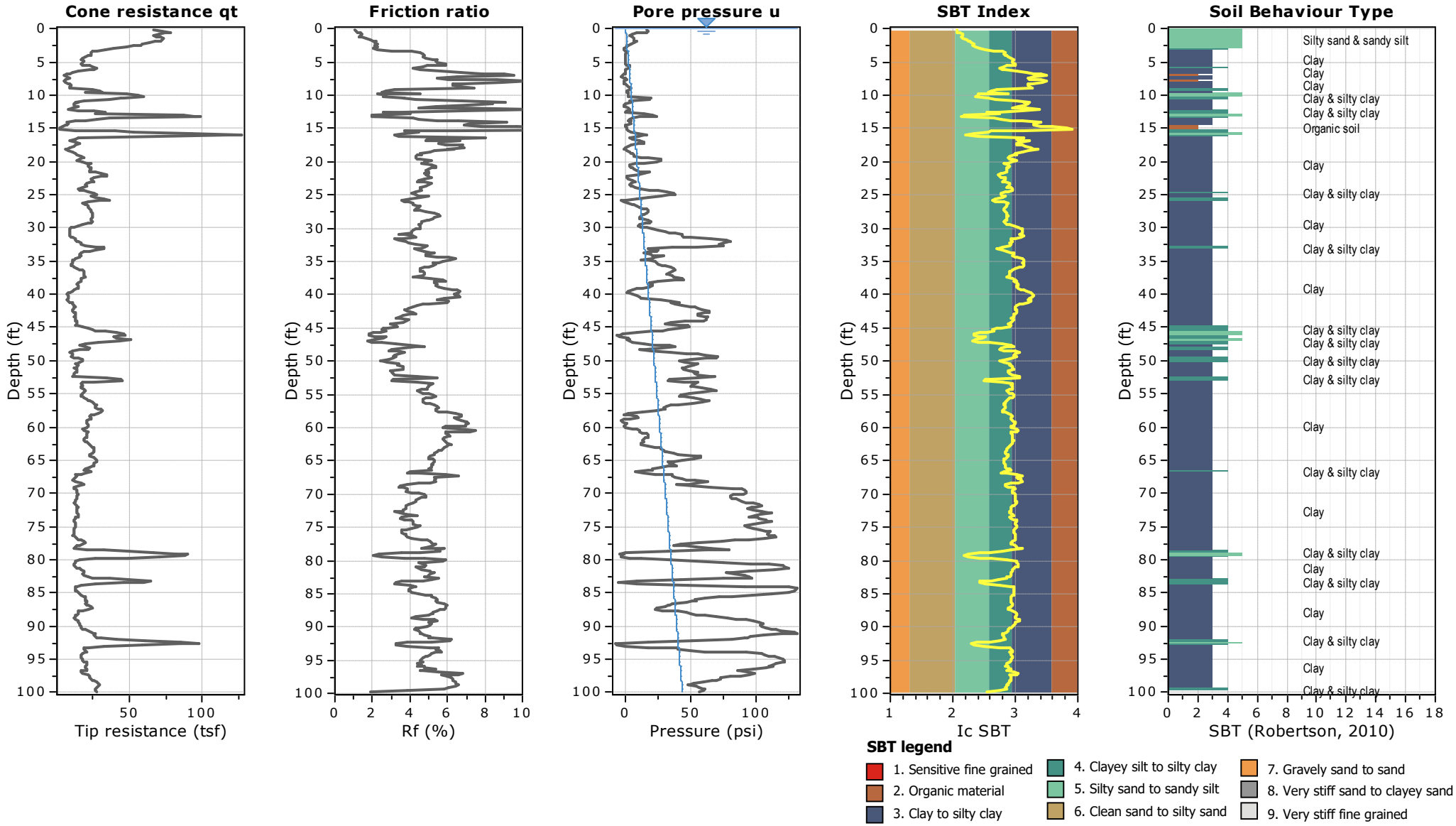
Project: **Parikh Shoreline**
Location: **Mountainview, CA**



Geo-Ex Subsurface
Geotechnical - Environmental
Dixon, CA
http://www.geoexsubsurface.com

CPT: CPT-3
Total depth: 99.90 ft, Date: 10/4/2021
Surface Elevation: 0.00 ft
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: **Parikh Shoreline**
Location: **Mountainview, CA**



LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
Mark McKee	**10-4-21**	**10-4-21**	**37° 25' 48.71" / -122° 5' 5.15"**	**GP-1**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Geo-Ex Subsurface Exploration				**14.0 ft**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Geoprobe			**Direct Push Rig**	
SAMPLER TYPE(S) AND SIZE(S) ID			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
Direct push-pneumatic				
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
Boring backfilled with cement grout				**30.0 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	UC/UU in Shear. Str. (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
	0		SANDY SILT (ML); light olive brown; dry; low plasticity fines; fine to medium SAND.		1A						67				
	1														
12.00	2		SANDY lean to fat CLAY (CL/CH); black; dry; medium to high plasticity fines; fine SAND (Fill).		1B										
	3		Grades light olive brown and black. No recovery (3.3 to 5.0 feet).		1C										
10.00	4														
	5		SANDY lean CLAY with GRAVEL (CL); very stiff; yellowish brown; brownish gray and black; moist; low to medium plasticity fines; fine SAND; subangular fine gravel (Fill).		2A			14			100				
8.00	6														
	7														
6.00	8				2B										
	9		SANDY lean to fat CLAY (CL/CH); very stiff; yellowish brown; moist; medium to high plasticity fines; fine to coarse SAND; subangular fine gravel (Native soil / Alluvium). PP=3.3 tsf.		2C										
					2D										
4.00	10		SANDY lean CLAY (CL); very stiff; yellowish brown to light olive brown and light gray; moist; medium plasticity fines; fine and few coarse SAND (Alluvium) (LL=39, PI=20).		3A			14			100				
	11				3B			20							CR, PI
2.00	12														
	13		PP=2.7 tsf. Grades with dark gray subrounded coarse SAND and fine gravel (13.2 - 15 feet).		3C			15							
0.00	14														
	15				4A			20			222				
			PP=2.2 tsf.												
-2.00	16		SANDY fat CLAY (CH); stiff to very stiff; black; moist; high plasticity fines; fine to coarse SAND; few subangular fine gravel (LL=50, PI=31). PP=2.0 tsf. PP=1.5 tsf. PP=1.8 tsf.		4B			25							PI
	17														
-4.00	18														
	19														
	20														

(continued)

LOG OF TEST BORING

PARIKH Practicing in the Geosciences

SHORELINE GOLF LINKS

MOUNTAIN VIEW, CALIFORNIA

Date: 10/26/2021 | Boring ID: GP-1 | Job No.: 2021-139-GEO

Plate: A-1A

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	UC/UU in Shear. Str. (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
	20		SANDY lean CLAY (CL); medium stiff to stiff; olive gray; wet; fine SAND; some clayey sand pockets.		5A			19			100				
	21		PP>0.8 tsf.												
-8.00	22														
	23		SANDY lean CLAY (CL); stiff; light olive brown and gray; moist; low plasticity fines; fine SAND; (LL=26, PI=11).		5B			20							PI
-10.00	24		PP=1.0 tsf.												
			SILTY SAND (SM); medium dense; gray to olive gray; wet; fine SAND; weakly cemented.		5C			17							
	25				6			22			130				
-12.00	26		Poorly graded SAND with SILT (SP-SM); loose to medium dense; wet; fine SAND; uncemented trace coarse SAND; (+#4 = 4.7%, -#200 = 9.3%).												PA
	27														
-14.00	28		Trace subangular fine gravel.												
	29														
-16.00	30		Bottom of borehole at 30.0 ft bgs/Elev. -16.0 ft												
	31		Groundwater depth 5.7 feet below ground surface based on hand-level measurement from adjacent lake												
-18.00	32		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												
	33														
-20.00	34														
	35														
-22.00	36														
	37														
-24.00	38														
	39														
-26.00	40														
	41														
-28.00	42														
	43														
	44														

LOG OF TEST BORING

PARIKH Practicing in the Geosciences

SHORELINE GOLF LINKS

MOUNTAIN VIEW, CALIFORNIA

Date: 10/26/2021 | Boring ID: GP-1 | Job No.: 2021-139-GEO

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate: A-1B

PCI-CT 5 BR 2021-139-GEO.GPJ TEMPLATE 7-22-11.GDT 11/2/21

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
Mark McKee	**10-5-21**	**10-5-21**	**37° 25' 51.61" / -122° 4' 54.18"**	**GP-2**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Geo-Ex Subsurface Exploration				**11.0 ft**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Geoprobe			**Direct Push Rig**	
SAMPLER TYPE(S) AND SIZE(S) ID			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
Direct push-pneumatic				
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
Boring backfilled with cement grout				**30.0 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	UC/UU in Shear. Str. (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
	0		SANDY SILT (ML); brown; moist; fine to coarse SAND; trace angular fine gravel (Fill).		1 1A						61				
	1		SANDY fat CLAY (CH); black; moist; high plasticity fines; fine SAND; few coarse SAND (Fill).		1B 1C			14							
9.00	2		SANDY SILT (ML); brownish gray; moist; low plasticity fines; fine SAND.		1D			38							
	3		No recovery (3.0-5.0 feet).												
7.00	4		Grades fiberous, trace paper; plastic and wood (2.2-3.0 feet) (Fill).												
	5				2			81			35				
5.00	6		Lean CLAY with SAND (CL); stiff; dark greenish gray; wet; low plasticity fines; fine SAND; trace subangular fine gravel (Fill) (LL=32, PI=12). PP=1.2 tsf.		2A 2B			20							PI
	7		No recovery (6.7-10.0 feet).												
3.00	8														
	9														
1.00	10		PEAT (PT); black; moist; fiberous; sandy lean organic clay; paper; glass; wood debris (Fill).		3			47			72				
	11														
-1.00	12														
	13		More black organic clay (13.0-13.6 feet).												
-3.00	14														
	15		SANDY lean CLAY (CL); very stiff; moist; medium plasticity fines; fine to medium SAND (Native soil) (LL=36, PI=20). PP=2.5 tsf.		4A			24			93				CR, PI
-5.00	16														
	17														
-7.00	18		Stiff; gray; wet; low plasticity fines; fine SAND; trace subangular fine gravel. PP=1.0 tsf.		4B			28							
	19														
	20														

(continued)

LOG OF TEST BORING

PARIKH Practicing in the Geosciences

SHORELINE GOLF LINKS

MOUNTAIN VIEW, CALIFORNIA

Date: 10/26/2021 | Boring ID: GP-2 | Job No.: 2021-139-GEO

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate: A-2A

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Depth	Sample Number	Blows per 6 in.	Blows per foot	Moisture Content (%)	Dry Unit Weight (pcf)	UC/UU in Shear. Str. (tsf)	Recovery (%)	RQD (%)	Drilling Method	Casing Depth	Remarks
	20		No recovery (19.8-20.0 feet).		5A			27			100				PI
	21		SANDY lean CLAY (CL); very stiff; moist; medium plasticity fines; fine to medium SAND (Native soil) (LL=36, PI=20). *layer description continued from previous page*												
-11.00	22		Gray to light olive brown; moist; medium plasticity fines; fine SAND; trace subangular fine gravel; (LL=48, PI=24).												
	23		SANDY lean CLAY (CL) *(continued)*. PP=1.7 tsf. PP=2.7 tsf.		5B			25							
-13.00	24		Lean CLAY (CL); stiff to very stiff; gray to olive gray; moist; low to medium plasticity fines; trace fine SAND. PP=1.4 tsf. PP=2.3 tsf.												
	25				6A			19			73				
-15.00	26		PP=2.5 tsf.												
	27		Stiff; PP=1.6 tsf.												
-17.00	28		CLAYEY SAND (SC); yellowish brown; moist; (+#4 = 3.9%, -#200 = 21.3%).		6B			12							PA
	29		No recovery (28.7-30.0 feet).												
-19.00	30		Bottom of borehole at 30.0 ft bgs/Elev. -19.0 ft												
	31		Groundwater not encountered during sampling (wet below ~ 5 feet)												
-21.00	32		This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												
	33														
-23.00	34														
	35														
-25.00	36														
	37														
-27.00	38														
	39														
-29.00	40														
	41														
-31.00	42														
	43														
	44														

LOG OF TEST BORING

PARIKH
Practicing in the Geosciences

SHORELINE GOLF LINKS

MOUNTAIN VIEW, CALIFORNIA

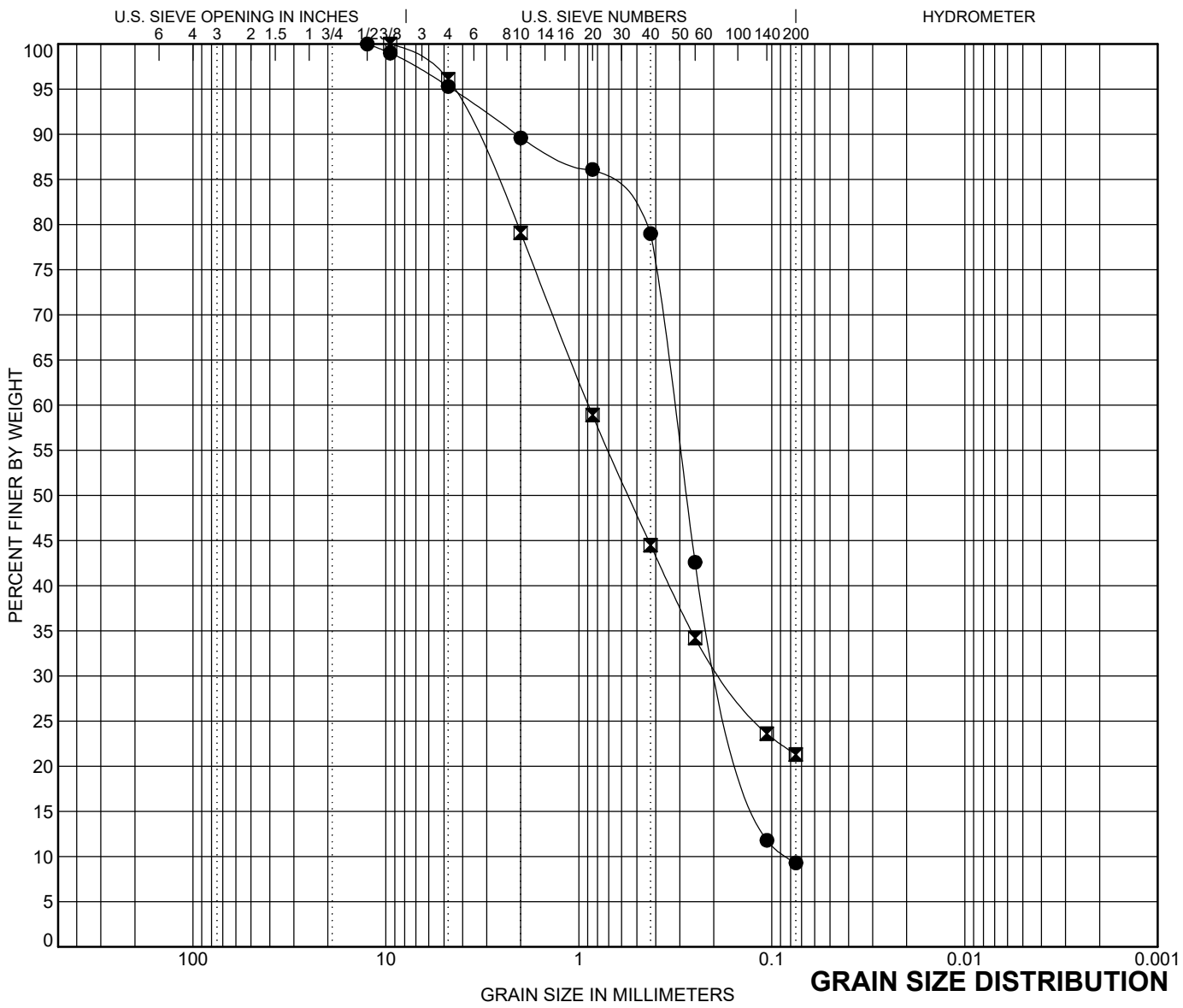
Date: 10/26/2021 | Boring ID: GP-2 | Job No.: 2021-139-GEO

This log is part of the report prepared by Parikh Consultants, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

Plate: A-2B

PCI-CT 5 BR 2021-139-GEO.GPJ TEMPLATE 7-22-11.GDT 11/2/21

Borehole	Sample Number	Depth	Classi-fication	Water Content	Dry Density	Liquid Limit	Plastic Limit	Plasticity Index	% > Sieve 4	% < Sieve 200	Shear Strength (tsf)
GP-1	1A	0.0	ML	-	-						
GP-1	1B	1.9	CL/CH	-	-						
GP-1	1C	3.0	CL/CH	-	-						
GP-1	2A	5.0	CL	14.2	-						
GP-1	2B	7.5	CL	-	-						
GP-1	2C	8.5	CL/CH	-	-						
GP-1	2D	9.5	CL/CH	-	-						
GP-1	3A	10.0	CL	14.3	-						
GP-1	3B	10.3	CL	20.2	-	39	19	20			
GP-1	3C	13.2	CL	15.0	-						
GP-1	4A	15.2	CL	20.1	-						
GP-1	4B	16.0	CH	24.6	-	50	19	31			
GP-1	5A	20.0	CL	19.5	-						
GP-1	5B	23.0	CL	19.7	-	26	15	11			
GP-1	5C	24.5	SM	16.5	-						
GP-1	6	25.0	SM	22.1	-						
GP-1		26.0	SM	-	-				4.7	9.3	
GP-2	1	0.0	ML	-	-						
GP-2	1A	0.1	ML	-	-						
GP-2	1B	0.9	CH	-	-						
GP-2	1C	1.2	ML	14.4	-						
GP-2	1D	2.2	ML	37.6	-						
GP-2	2	5.0	ML	-	-						
GP-2	2A	5.1	ML	81.1	-						
GP-2	2B	5.5	CL	19.9	-	32	20	12			
GP-2	3	10.0	-	46.6	-						
GP-2	4A	15.0	CL	23.9	-	36	16	20			
GP-2	4B	18.0	CL	27.7	-						
GP-2	5A	20.0	CL	27.1	-	48	24	24			
GP-2	5B	23.0	CL	24.9	-						
GP-2	6A	25.0	CL	18.9	-						
GP-2	6B	28.0	SC	12.3	-				3.9	21.3	



GRAIN SIZE DISTRIBUTION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING	SAMPLE #	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	GP-1		26.0	Poorly graded SAND with SILT				1.16	3.90
⊠	GP-2	6B	28.0	CLAYEY SAND					

	BORING	SAMPLE #	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	GP-1		26.0	12.5	0.322	0.176	0.083	4.7	86.0	9.3	
⊠	GP-2	6B	28.0	9.5	0.891	0.178		3.9	74.8	21.3	

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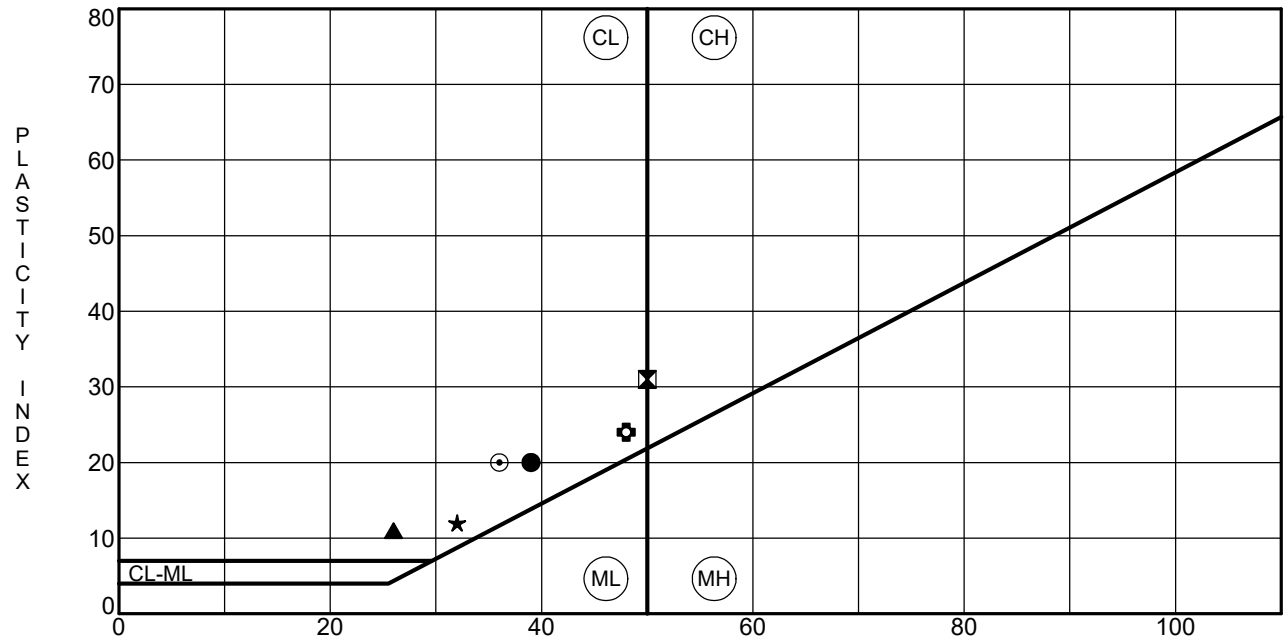
SHORELINE GOLF LINKS
MOUNTAIN VIEW, CALIFORNIA

JOB NO: 2021-139-GEO | **PLATE NO: B-3**



PLASTICITY

	BOREHOLE	SAMPLE #	DEPTH	LL	PL	PI	Fines	Classification
●	GP-1	3B	10.3	39	19	20		SANDY lean CLAY
⊠	GP-1	4B	16.0	50	19	31		SANDY fat CLAY
▲	GP-1	5B	23.0	26	15	11		SANDY lean CLAY
★	GP-2	2B	5.5	32	20	12		Lean CLAY with SAND
⊙	GP-2	4A	15.0	36	16	20		SANDY lean CLAY
✿	GP-2	5A	20.0	48	24	24		SANDY lean CLAY

PARIKH
Practicing in the Geosciences

SHORELINE GOLF LINKS

MOUNTAIN VIEW, CALIFORNIA

JOB NO: 2021-139-GEO | **PLATE NO: B-2**

Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 06/22/2022
Date Submitted 06/15/2022

To: Do Nguyen
Parikh Consultants, Inc.
1497 N.Milpitas Blvd
Milpitas, CA 95035

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 2021-139-GEO SHORE. Site ID : GP-1 @ 0-5.
Thank you for your business.

* For future reference to this analysis please use SUN # 87586-182166.

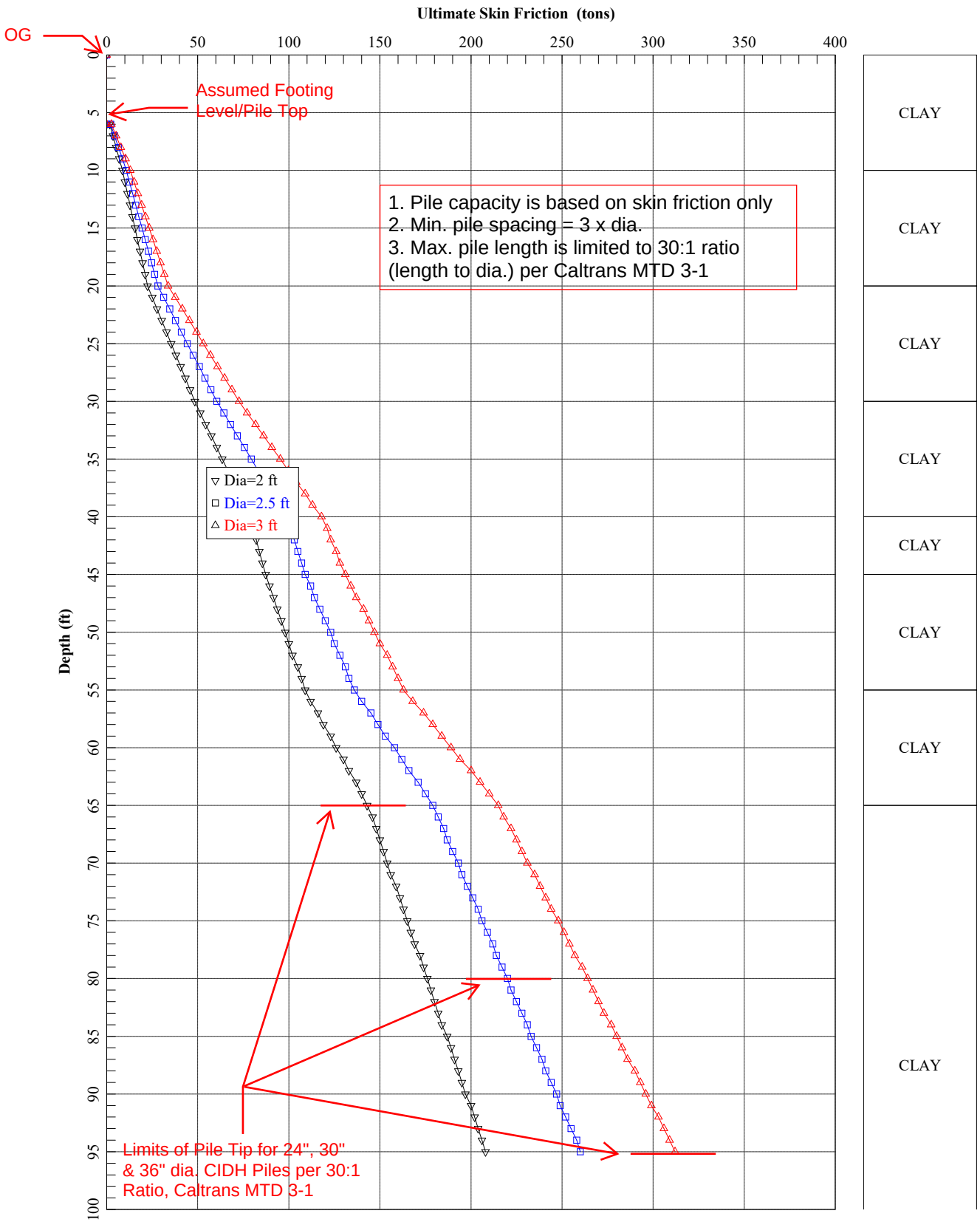
EVALUATION FOR SOIL CORROSION

Soil pH	7.59	
Minimum Resistivity	0.83 ohm-cm (x1000)	
Chloride	137.8 ppm	00.01378 %
Sulfate	98.0 ppm	00.00980 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

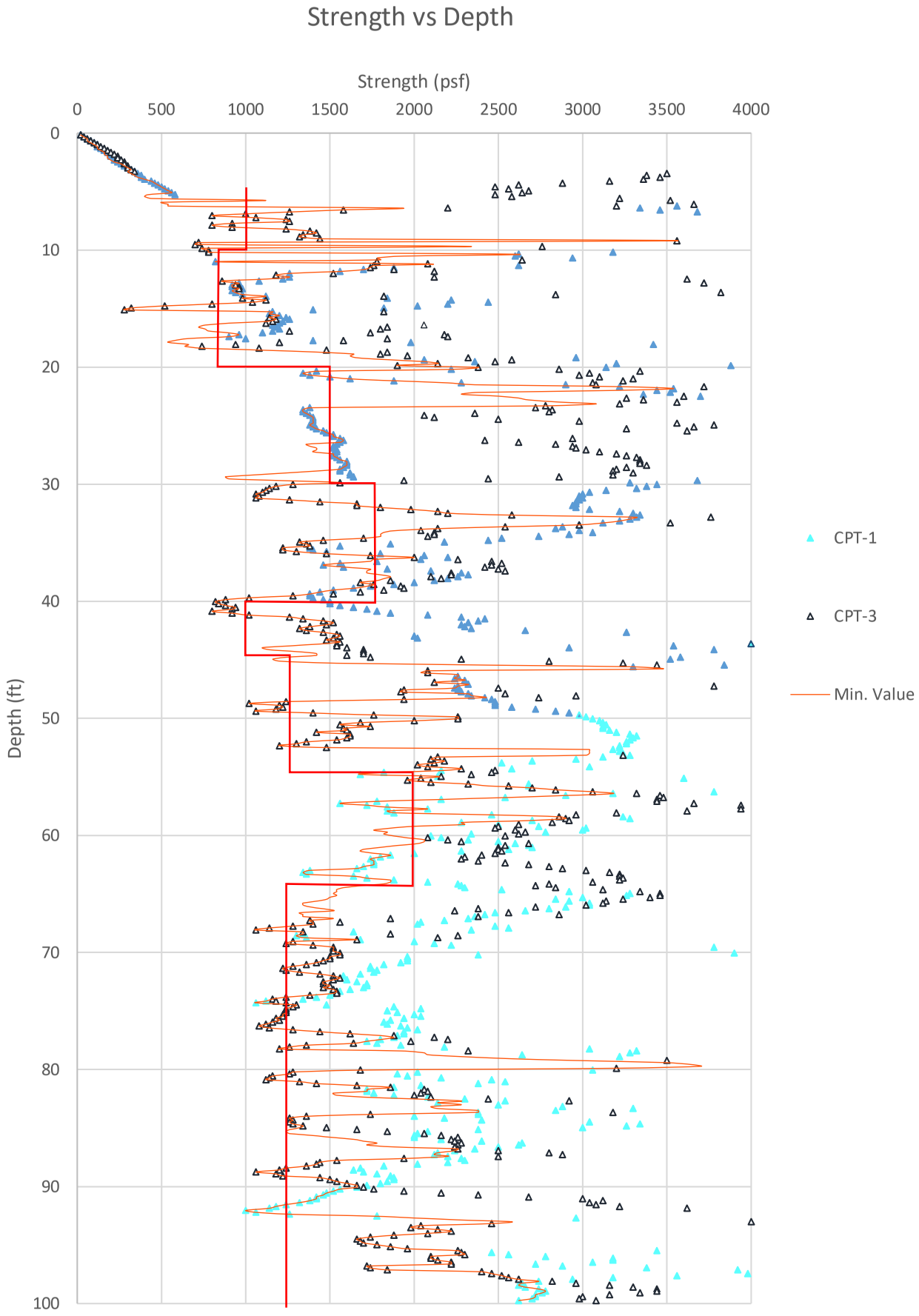
APPENDIX III

Appendix III-a



Bridge No. 25, CIDH Pile Option (24", 30" & 36" dia.)

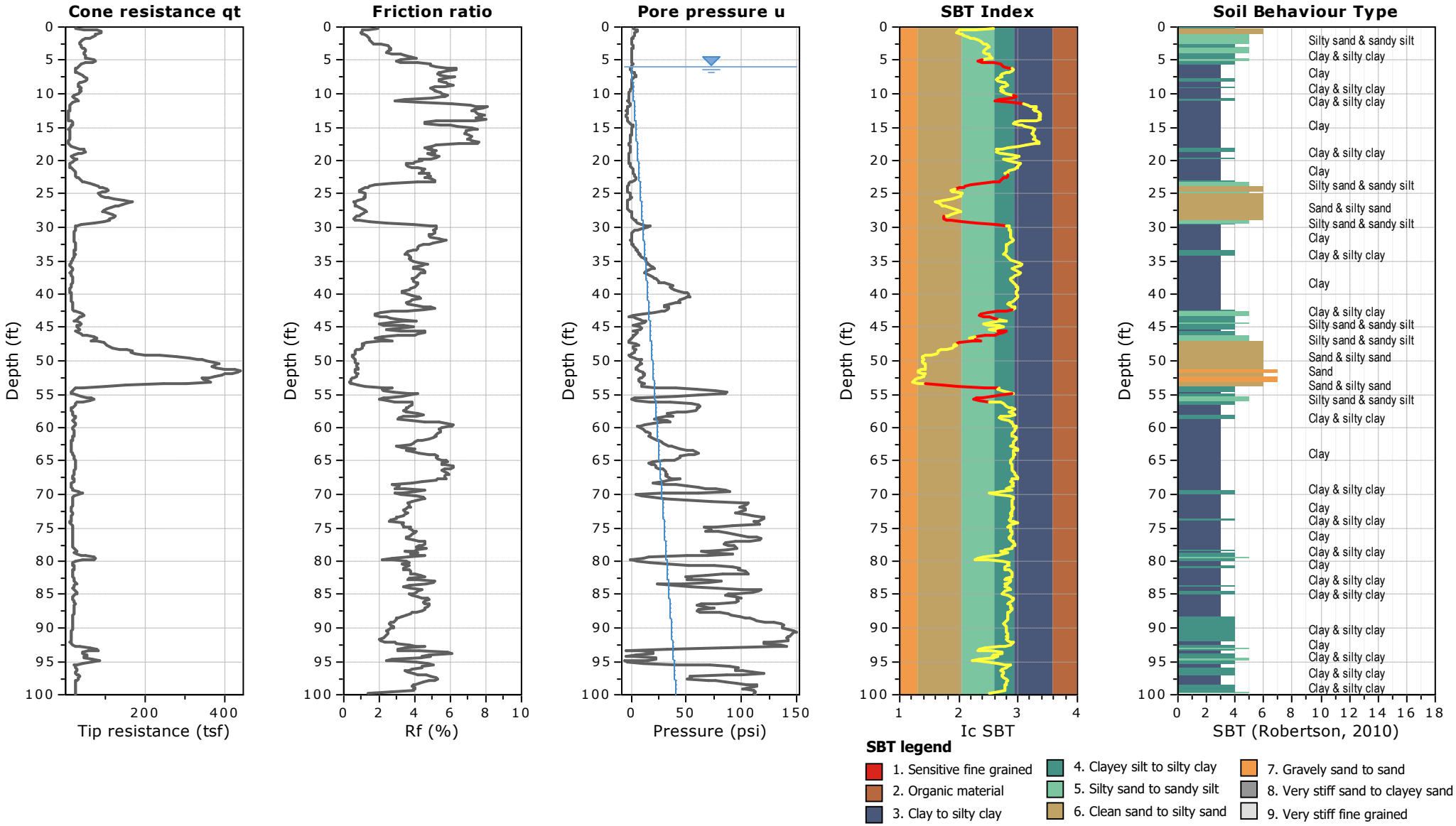
Appendix III-b



Bridge No. 25 Replacement
Shoreline Golf Links, Mountain View

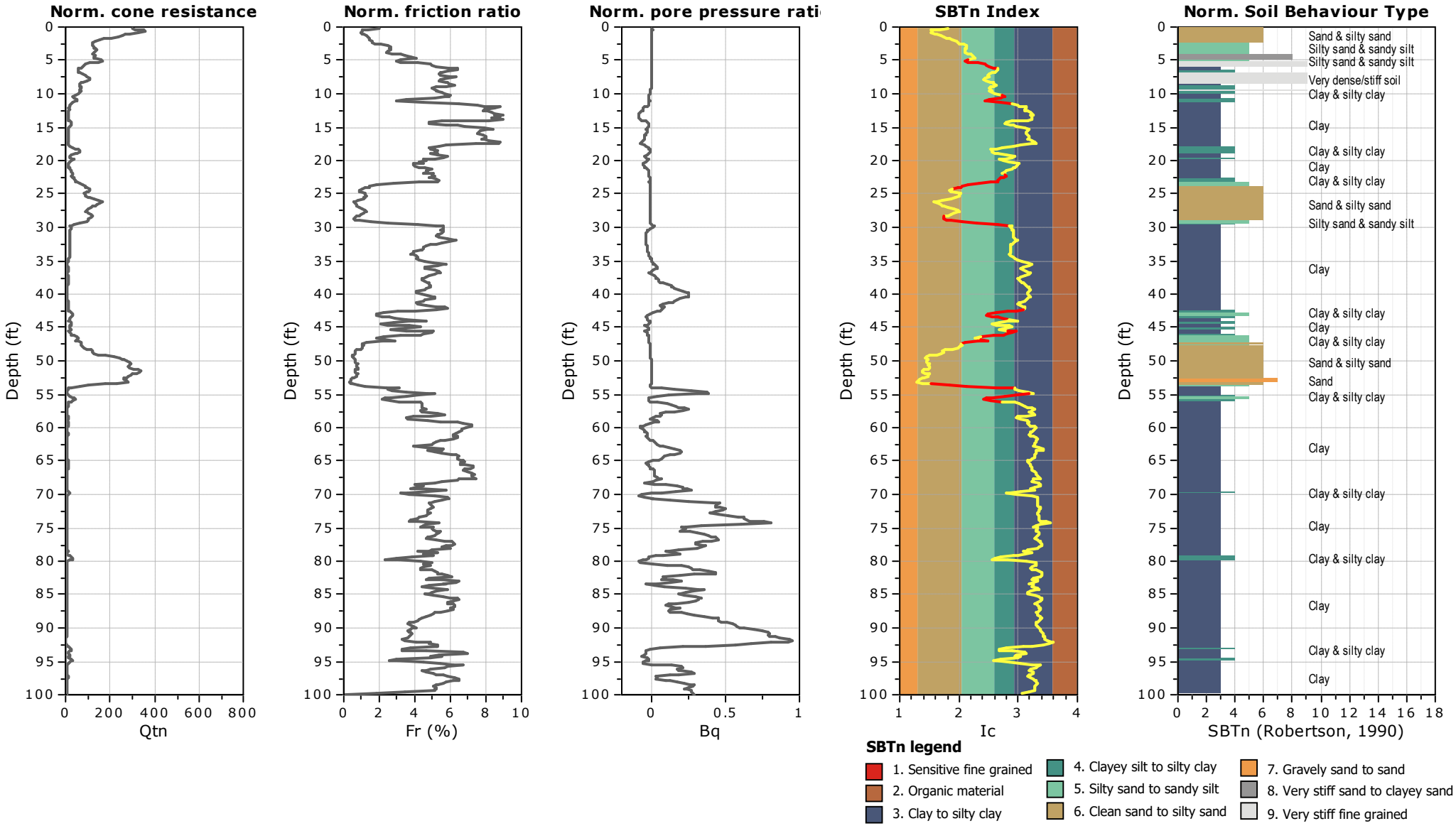
Project: SHORELINE GOLF LINKS
Location: MOUNTAIN VIEW

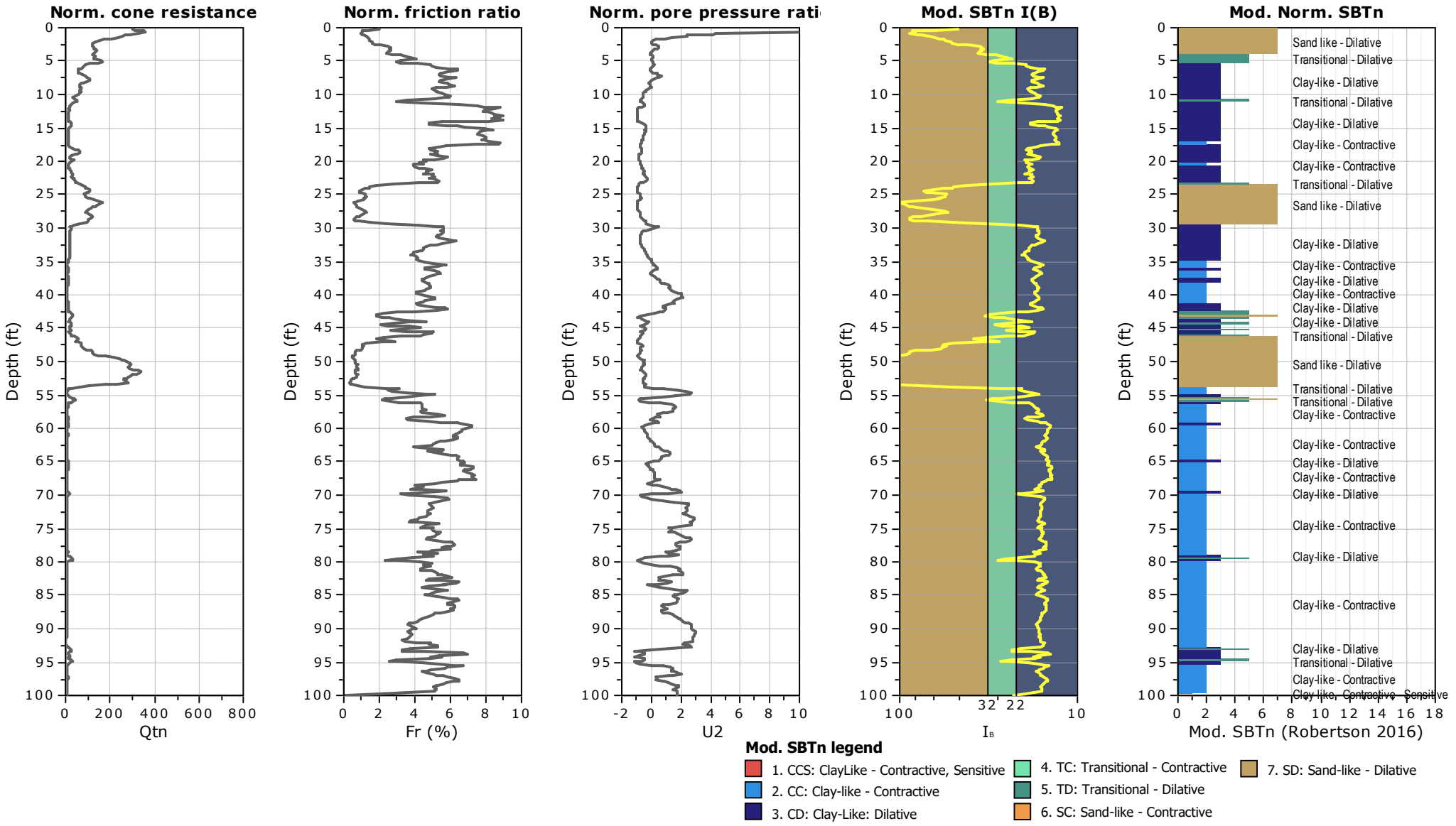
CPT: CPT-1
Total depth: 99.90 ft, Date: 11/2/2021
Surface Elevation: 14.00 ft
Cone Type: Uknown
Cone Operator: Uknown



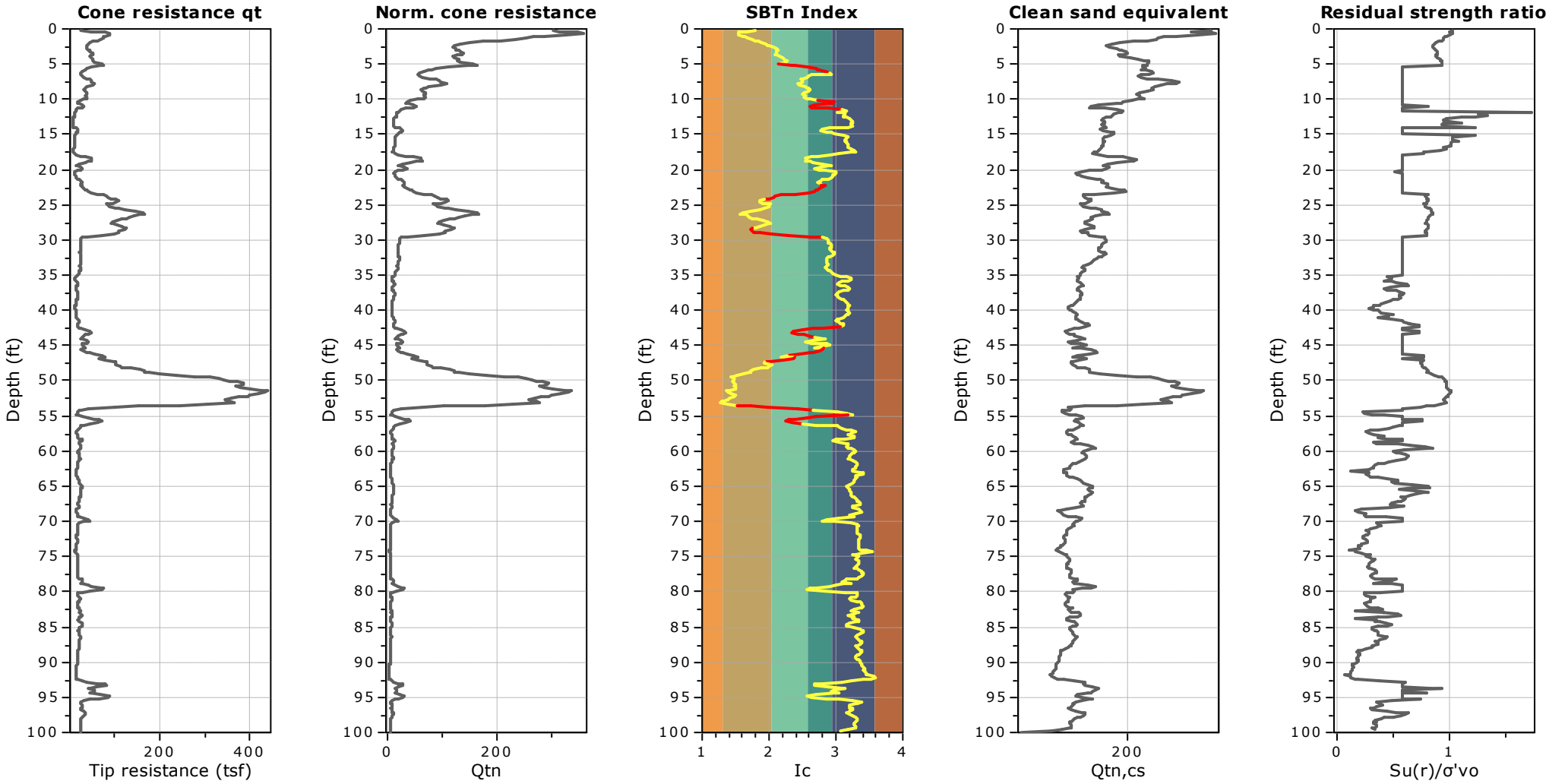
Project: SHORELINE GOLF LINKS
Location: MOUNTAIN VIEW

CPT: CPT-1
Total depth: 99.90 ft, Date: 11/2/2021
Surface Elevation: 14.00 ft
Cone Type: Uknown
Cone Operator: Uknown

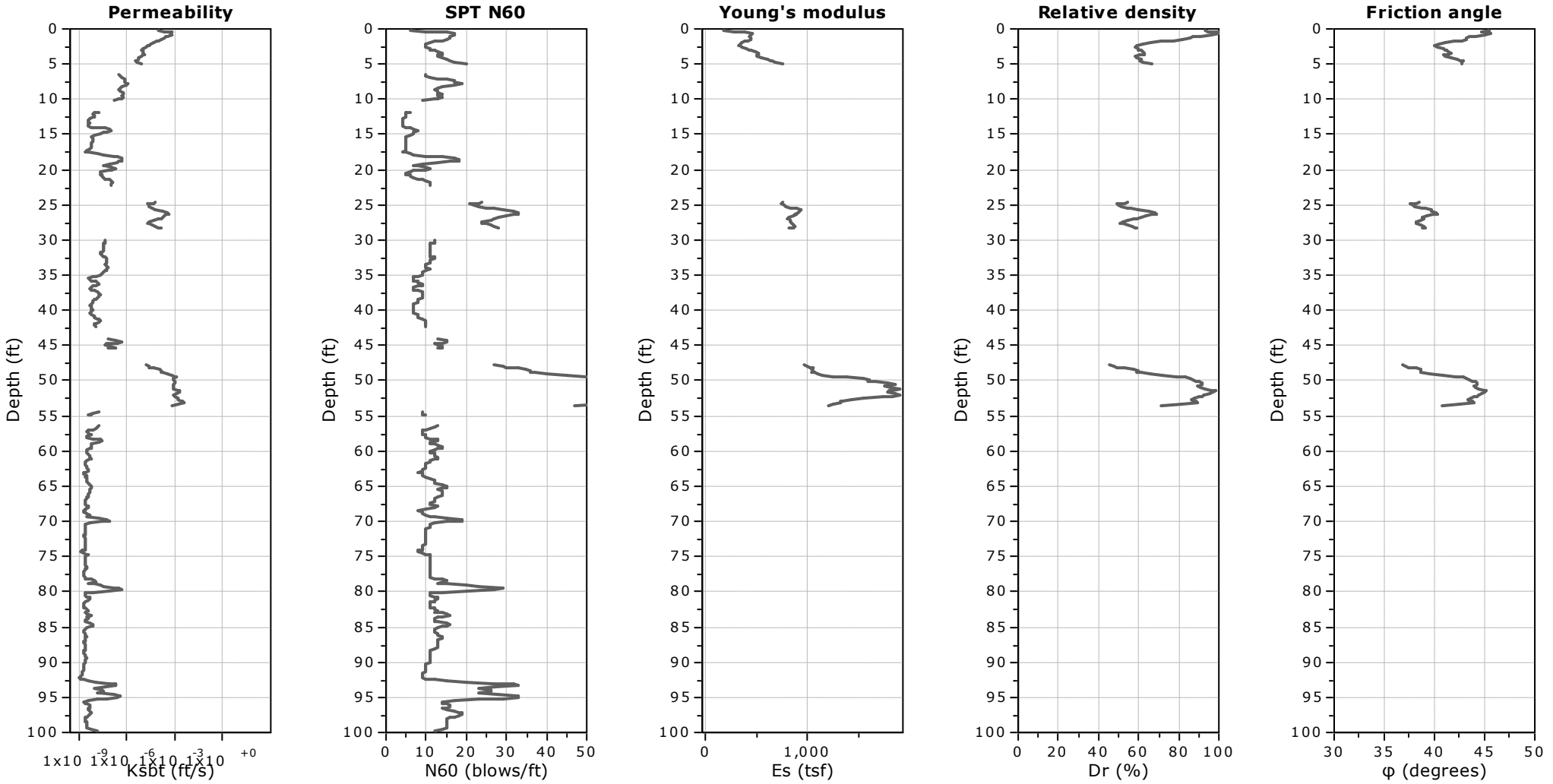



Norm. cone resistance
Depth (ft)
Qtn
Norm. friction ratio
Fr (%)
Norm. pore pressure rati
U2
Mod. SBTn I(B)
I_B
Mod. Norm. SBTn
Mod. SBTn (Robertson 2016)
Sand like - Dilative
Transitional - Dilative
Clay-like - Dilative
Transitional - Dilative
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Contractive
Transitional - Dilative
Sand like - Dilative
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Dilative
Transitional - Dilative
Sand like - Dilative
Transitional - Dilative
Transitional - Dilative
Clay-like - Contractive
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Contractive
Clay-like - Dilative
Clay-like - Dilative
Transitional - Dilative
Clay-like - Contractive
Clay-like, Contractive, Sensitive
Mod. SBTn legend
1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative

CPT: CPT-1
Total depth: 99.90 ft, Date: 11/2/2021
Surface Elevation: 14.00 ft
Cone Type: Uknown
Cone Operator: Uknown



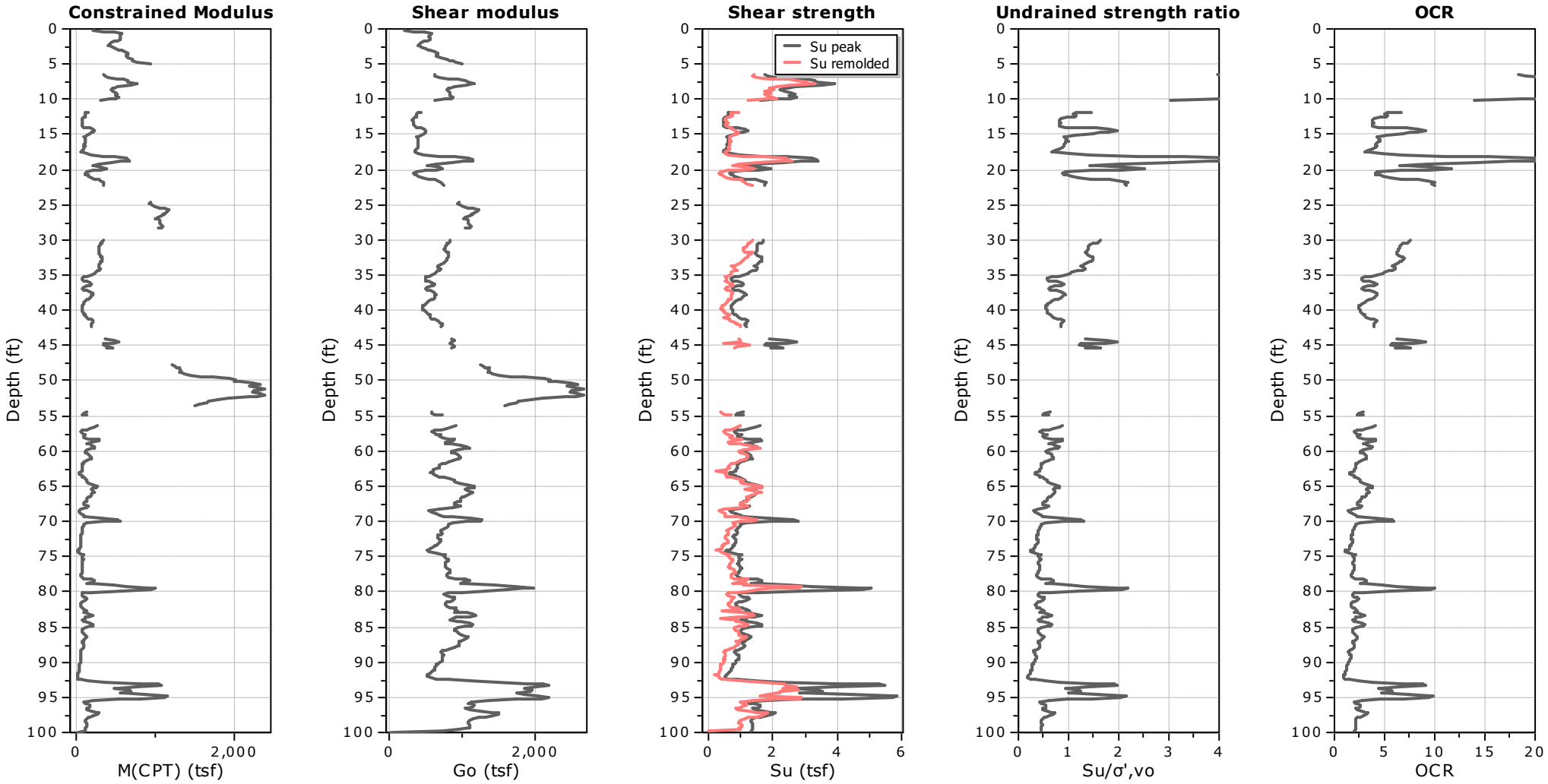
Project: **SHORELINE GOLF LINKS**
Location: **MOUNTAIN VIEW**



Calculation parameters

Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)
Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)

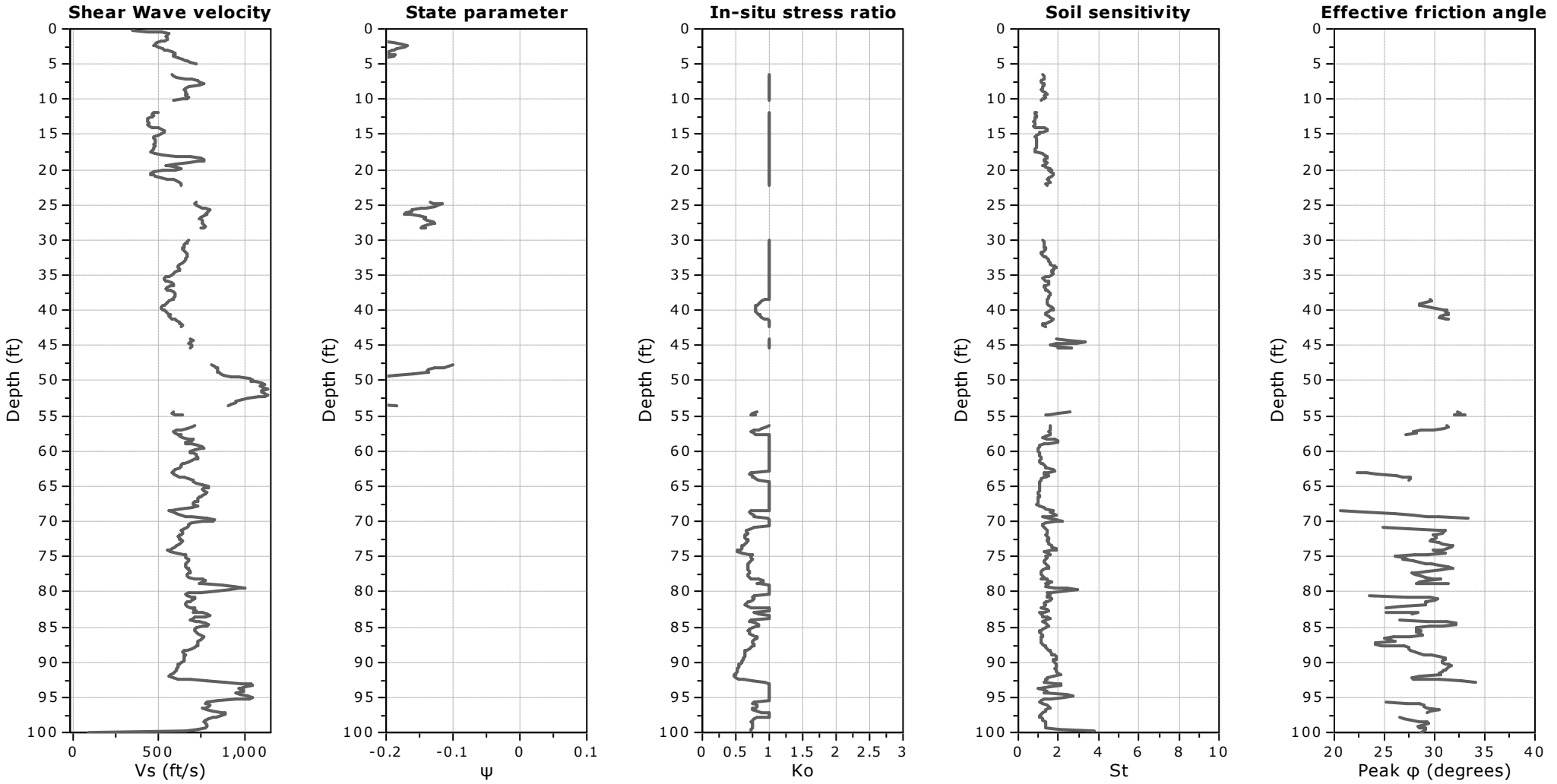
Project: SHORELINE GOLF LINKS
Location: MOUNTAIN VIEW



Calculation parameters

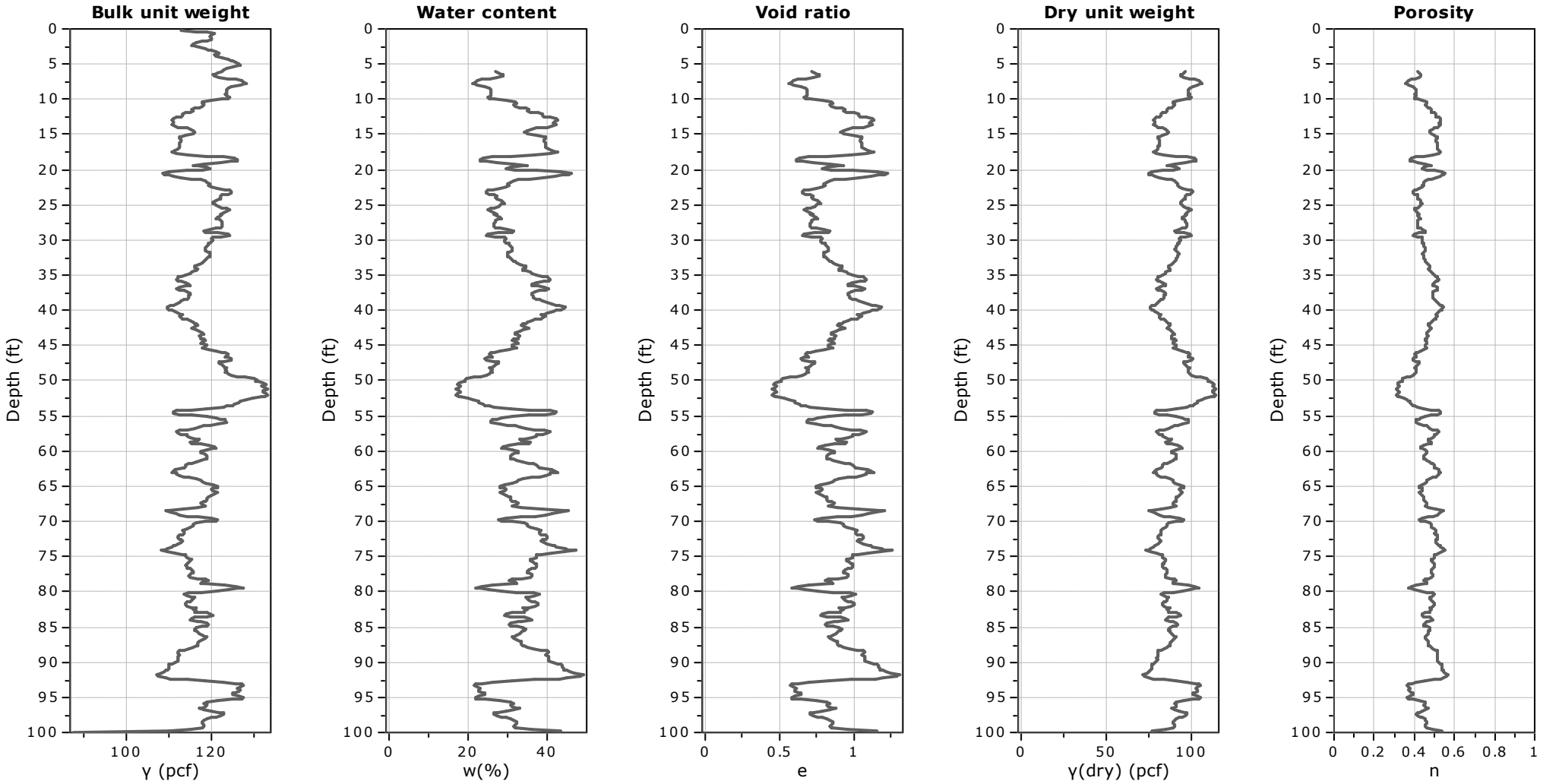
Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14
OCR factor for clays, N_{kt}: 0.33
Flat Dilatometer Test data

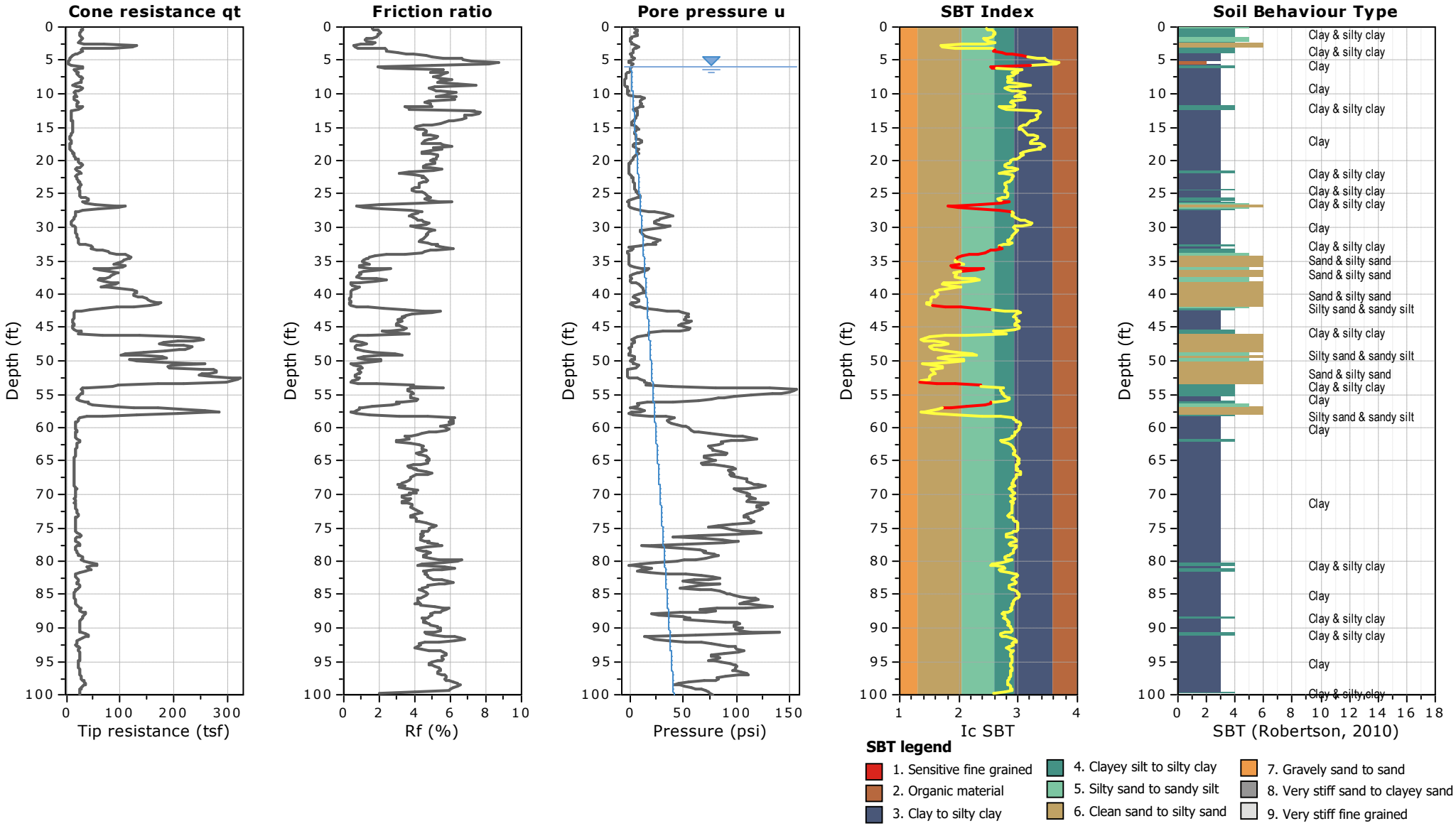
CPT: CPT-1
Total depth: 99.90 ft, Date: 11/2/2021
Surface Elevation: 14.00 ft
Cone Type: Uknown
Cone Operator: Uknown

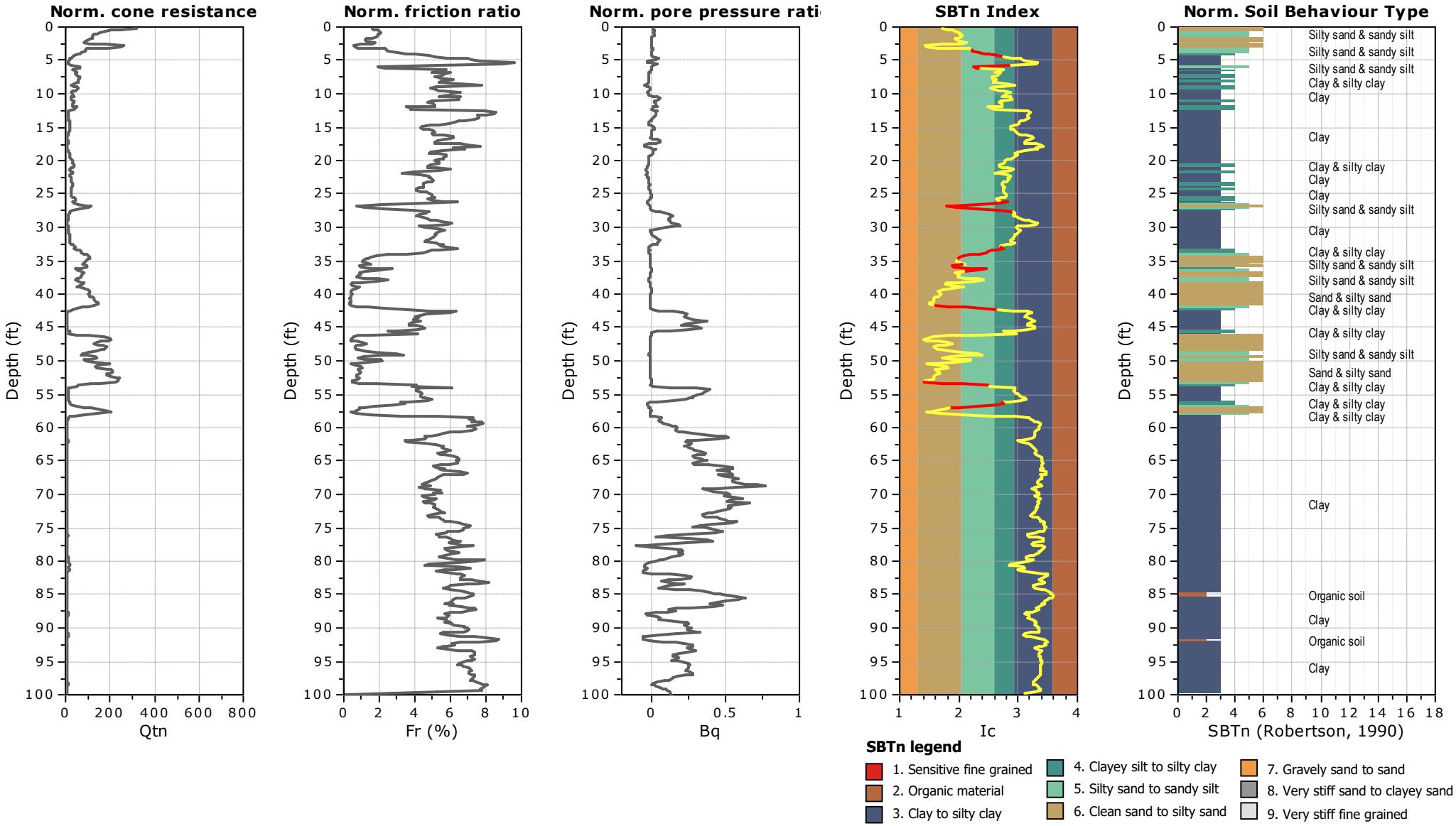


Calculation parameters

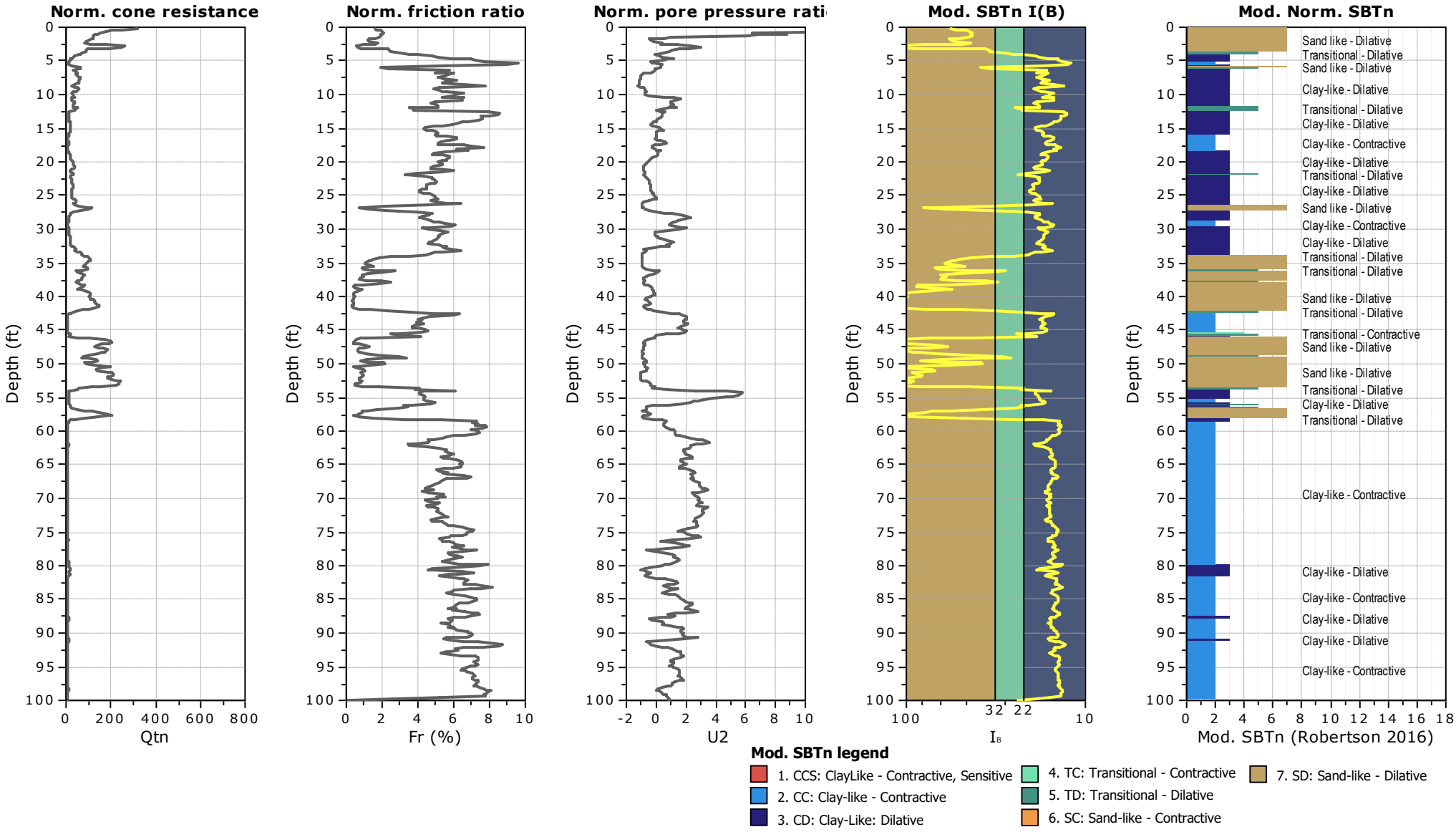
Soil Sensitivity factor, N_S: 7.00

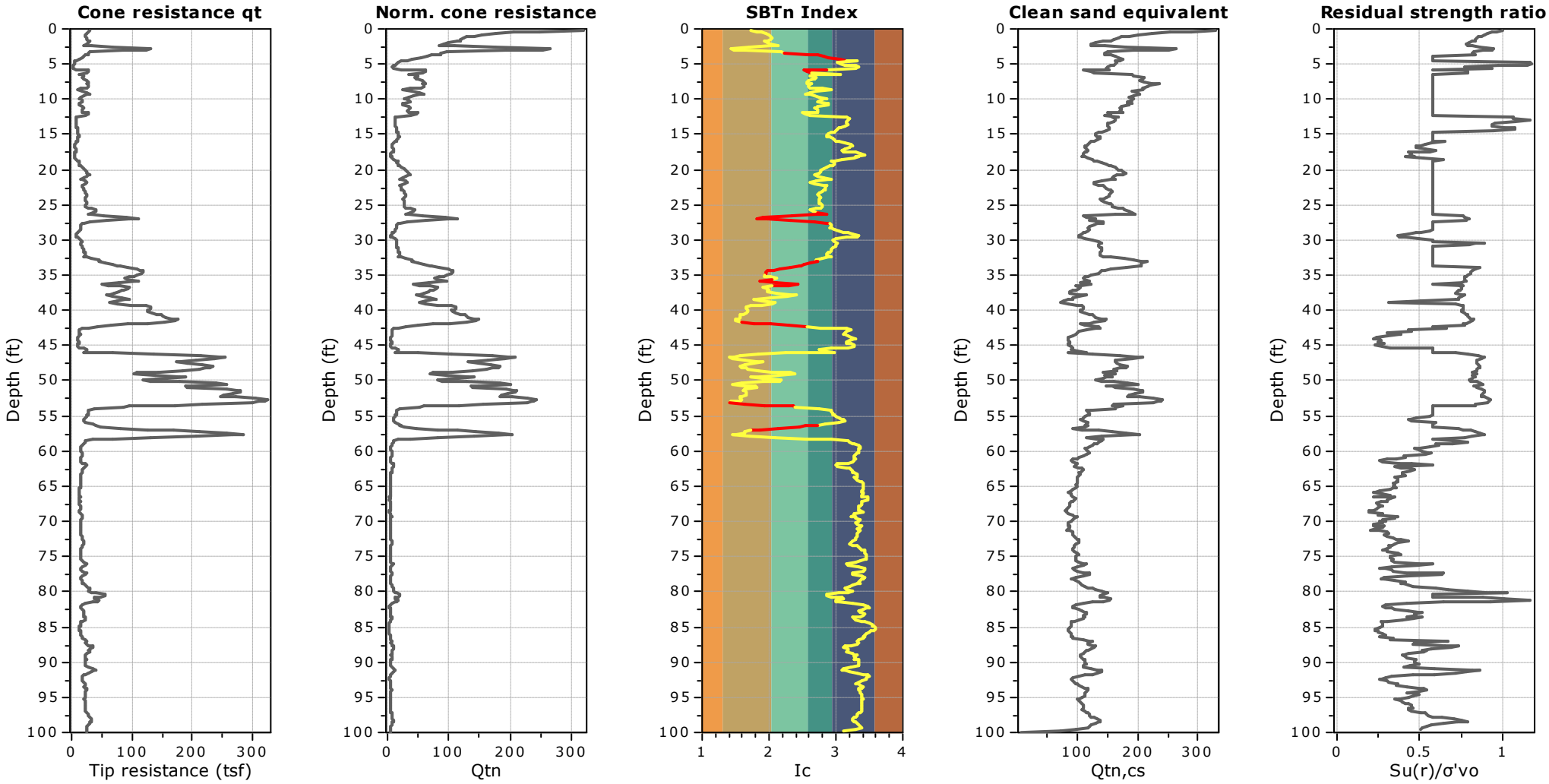

Bulk unit weight
Depth (ft)
γ (pcf)
Water content
w(%)
Void ratio
e
Dry unit weight
γ(dry) (pcf)
Porosity
n


Cone resistance qt
Depth (ft)
Tip resistance (tsf)
Friction ratio
Rf (%)
Pore pressure u
Pressure (psi)
SBT Index
Ic SBT
Soil Behaviour Type
SBT (Robertson, 2010)
Clay & silty clay
Clay
Sand & silty sand
Silty sand & sandy silt
SBT legend
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

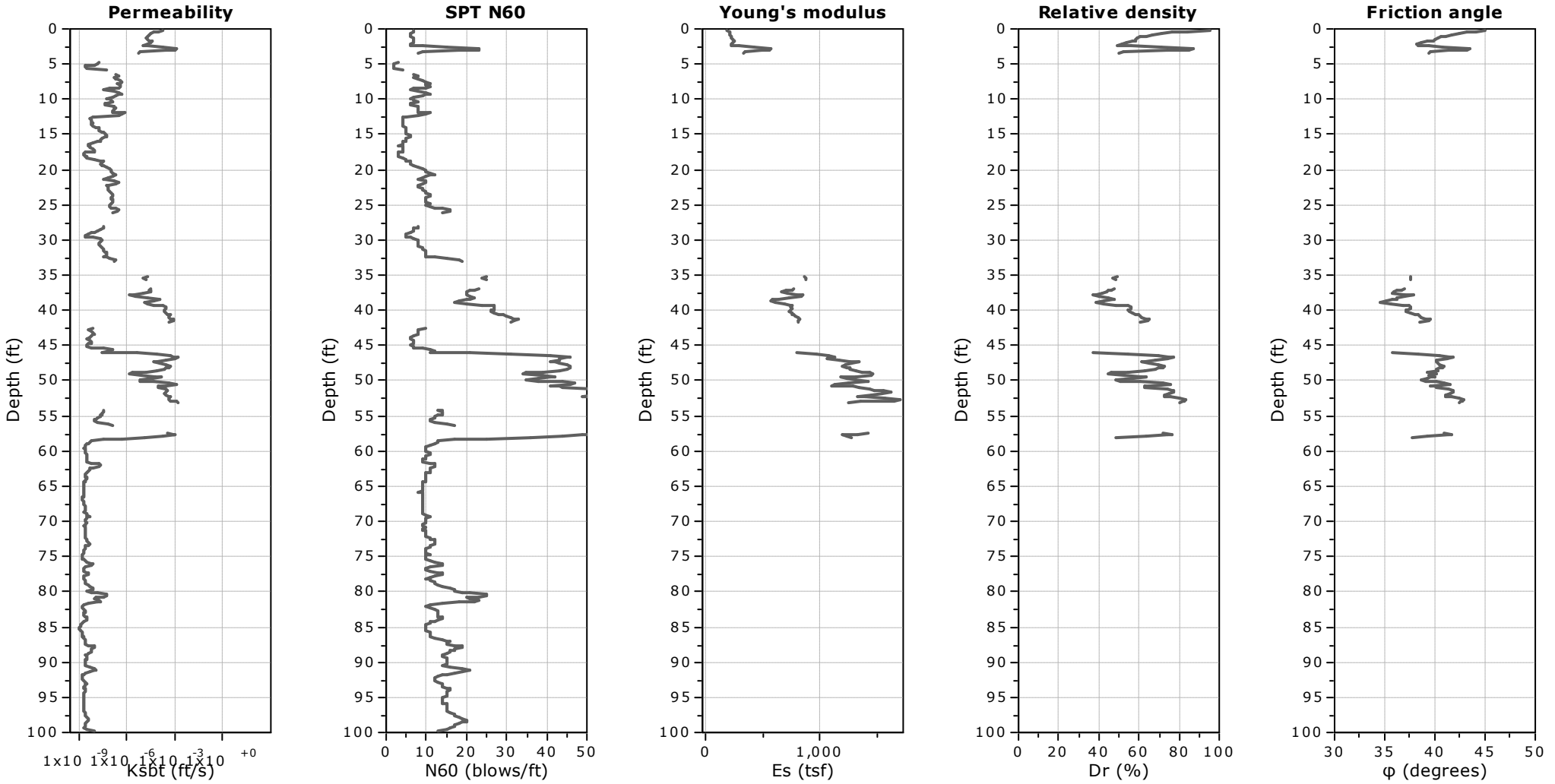

Norm. cone resistance
Depth (ft)
Qtn
Norm. friction ratio
Fr (%)
Norm. pore pressure rati
Bq
SBTn Index
Ic
Norm. Soil Behaviour Type
SBTn (Robertson, 1990)
Silty sand & sandy silt
Silty sand & sandy silt
Silty sand & sandy silt
Clay & silty clay
Clay
Clay
Clay & silty clay
Clay
Clay
Silty sand & sandy silt
Clay
Clay & silty clay
Silty sand & sandy silt
Silty sand & sandy silt
Sand & silty sand
Clay & silty clay
Clay & silty clay
Silty sand & sandy silt
Sand & silty sand
Clay & silty clay
Clay & silty clay
Clay & silty clay
Clay
Organic soil
Clay
Organic soil
Clay
SBTn legend
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

CPT: CPT-2
Total depth: 99.90 ft, Date: 11/2/2021
Surface Elevation: 11.00 ft
Cone Type: Uknown
Cone Operator: Uknown




Cone resistance qt
Depth (ft)
Tip resistance (tsf)
Norm. cone resistance
Qtn
SBTn Index
Ic
Clean sand equivalent
Qtn,cs
Residual strength ratio
Su(r)/σ'vo

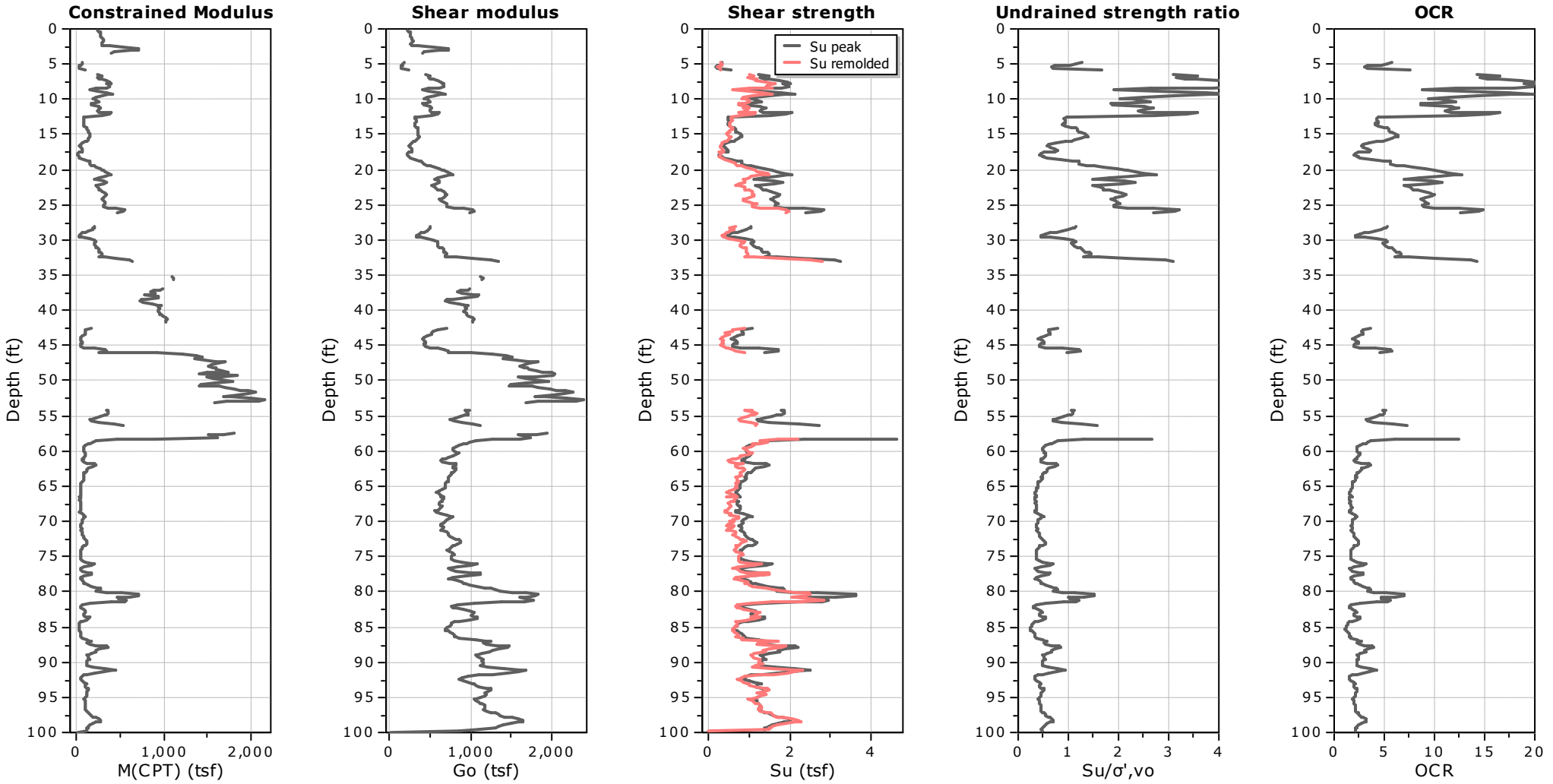
Project: **SHORELINE GOLF LINKS**
Location: **MOUNTAIN VIEW**



Calculation parameters

Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)
Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)

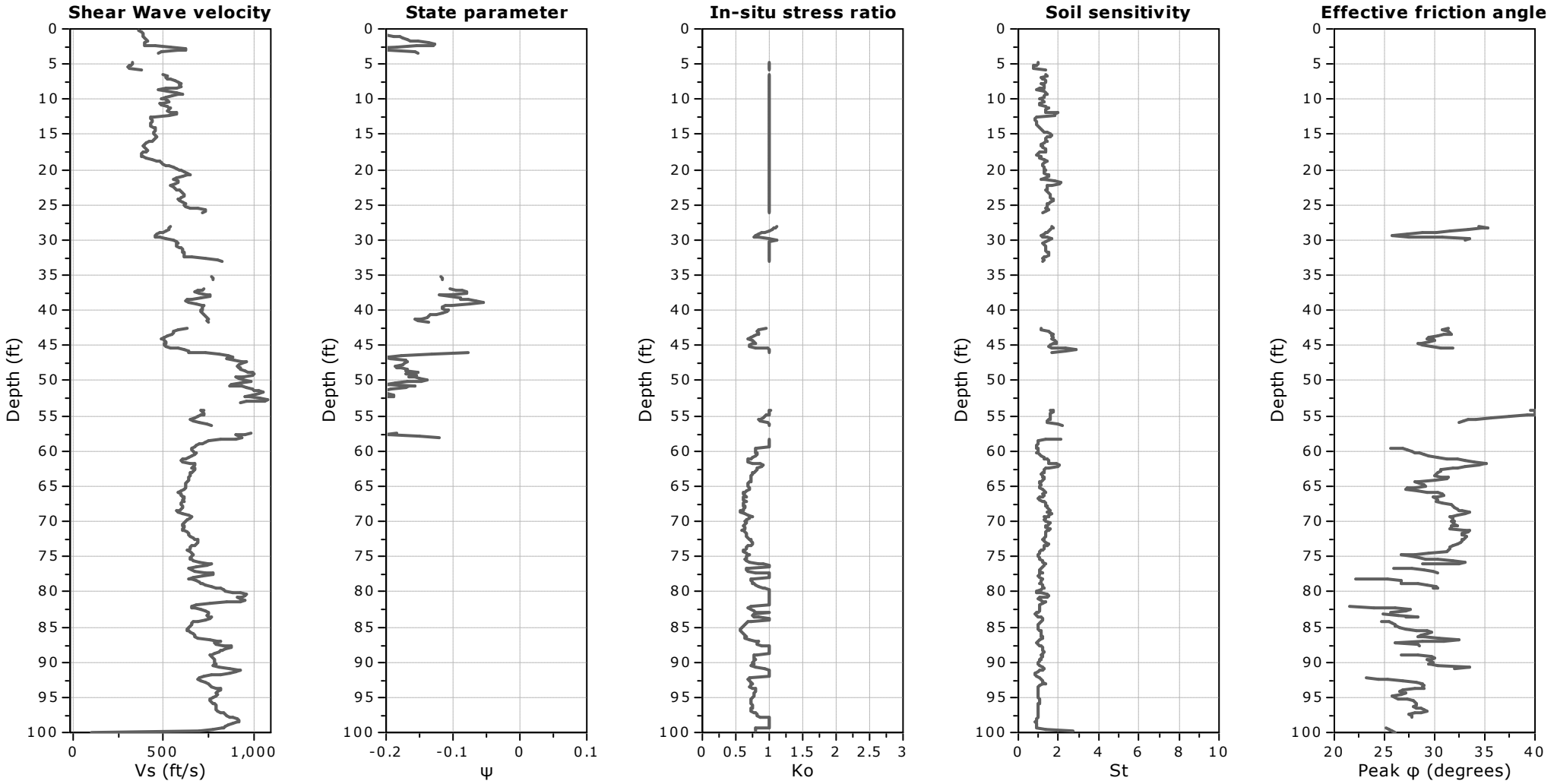
Project: SHORELINE GOLF LINKS
Location: MOUNTAIN VIEW



Calculation parameters

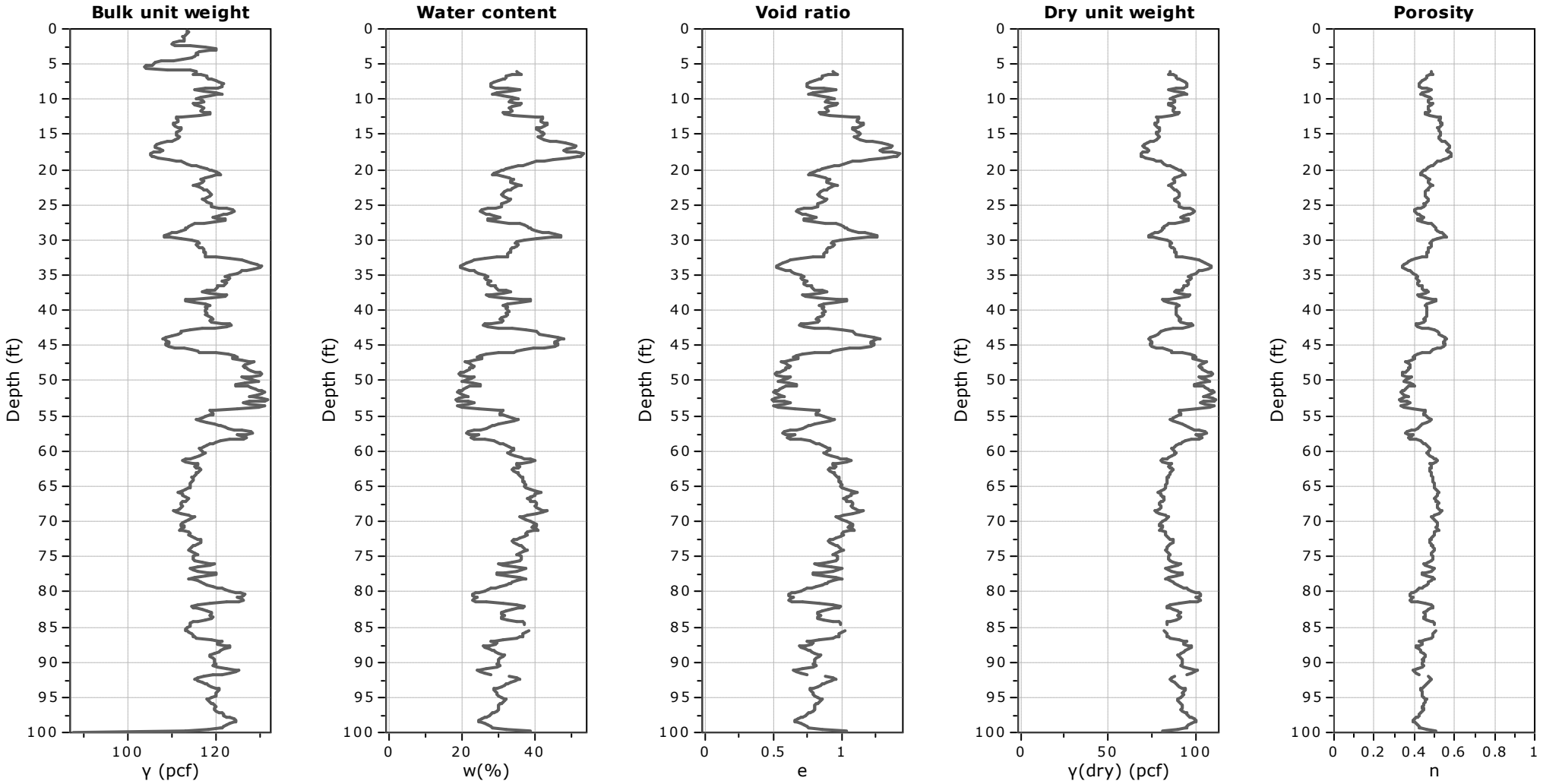
Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14
OCR factor for clays, N_{kt}: 0.33
Flat Dilatometer Test data

CPT: CPT-2
Total depth: 99.90 ft, Date: 11/2/2021
Surface Elevation: 11.00 ft
Cone Type: Uknown
Cone Operator: Uknown

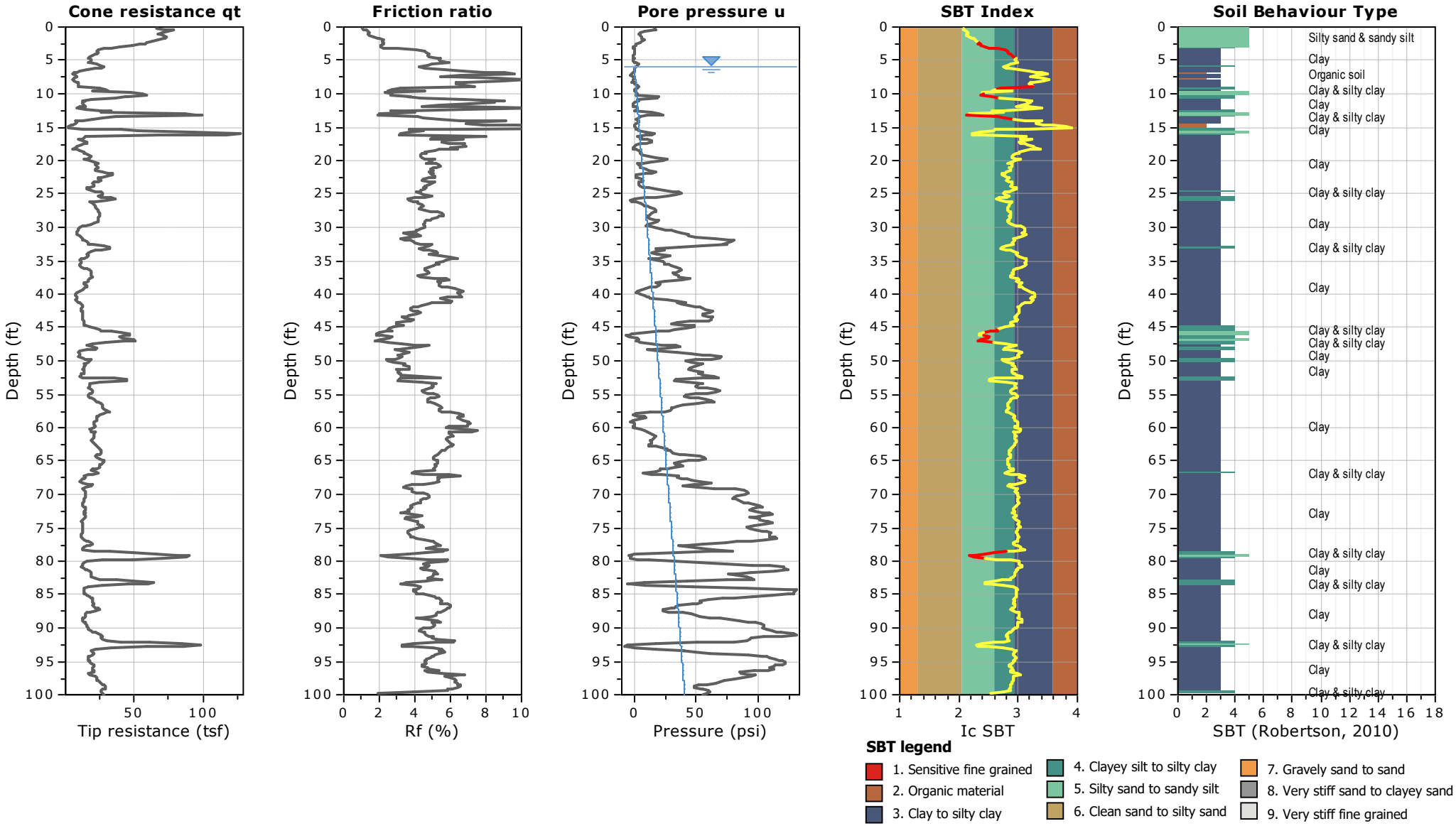


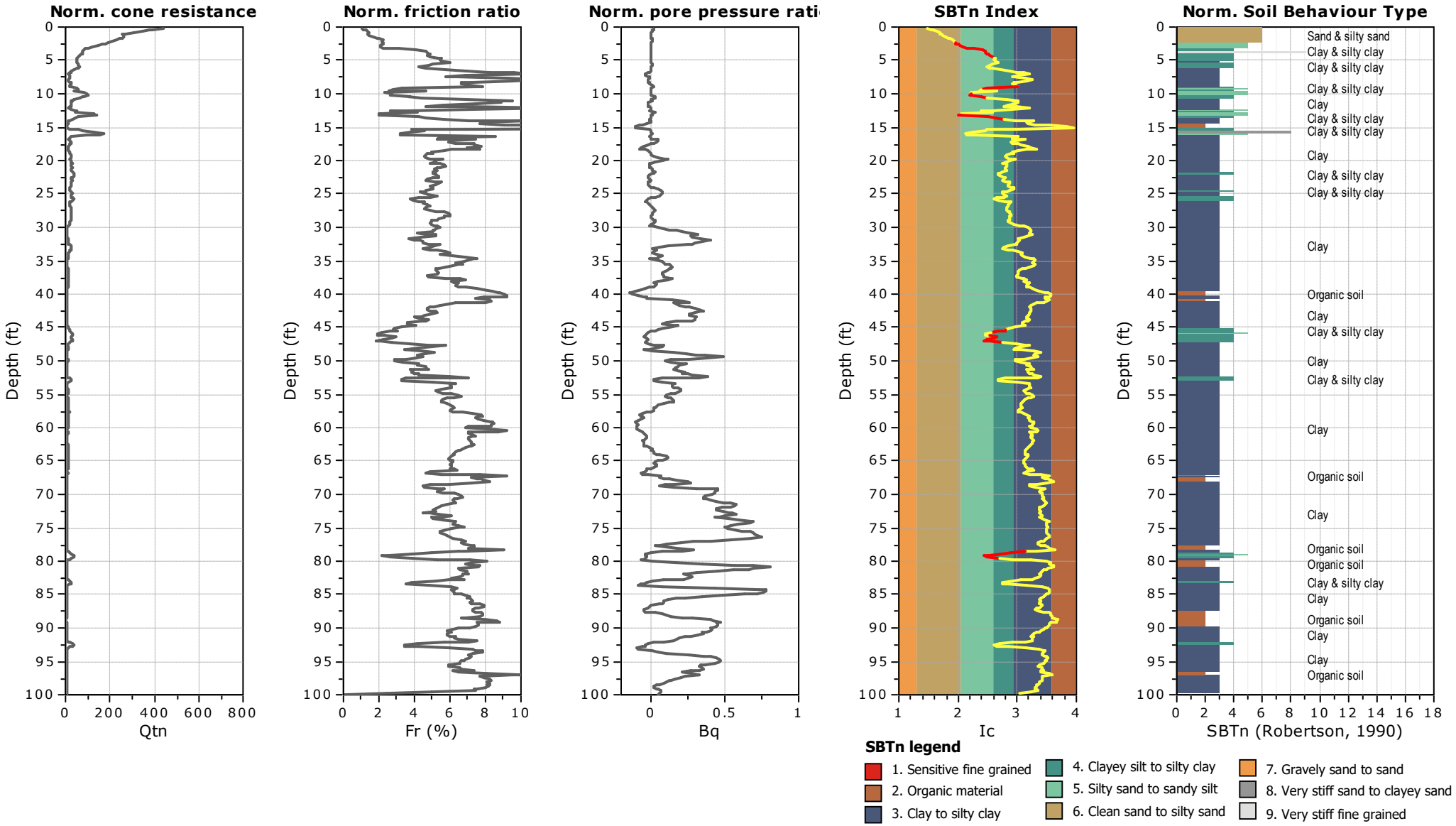
Calculation parameters

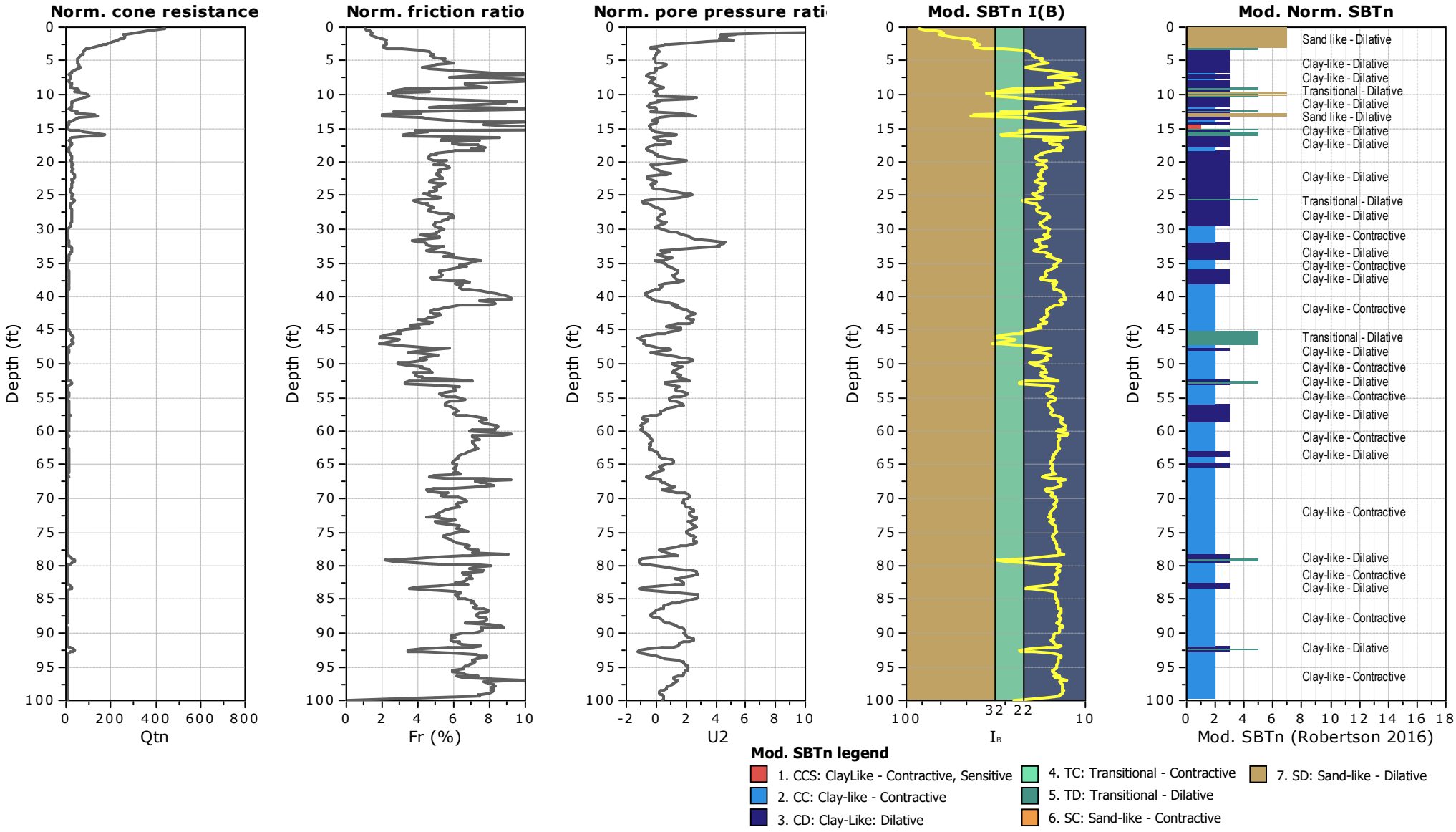
Soil Sensitivity factor, N_S: 7.00

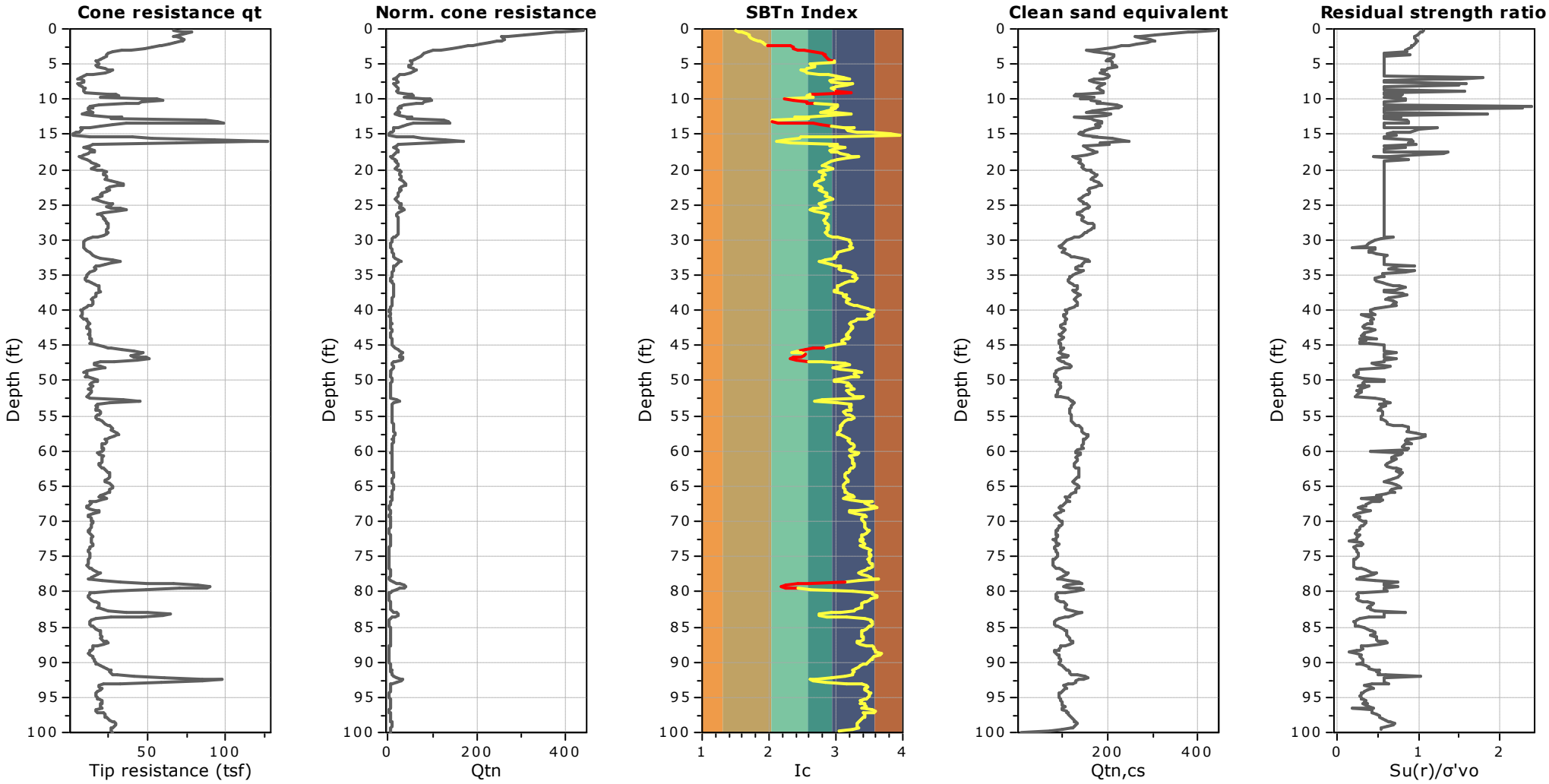

Bulk unit weight
Depth (ft)
γ (pcf)
Water content
w(%)
Void ratio
e
Dry unit weight
γ(dry) (pcf)
Porosity
n

CPT: CPT-3
Total depth: 99.90 ft, Date: 11/2/2021
Surface Elevation: 14.00 ft
Cone Type: Uknown
Cone Operator: Uknown

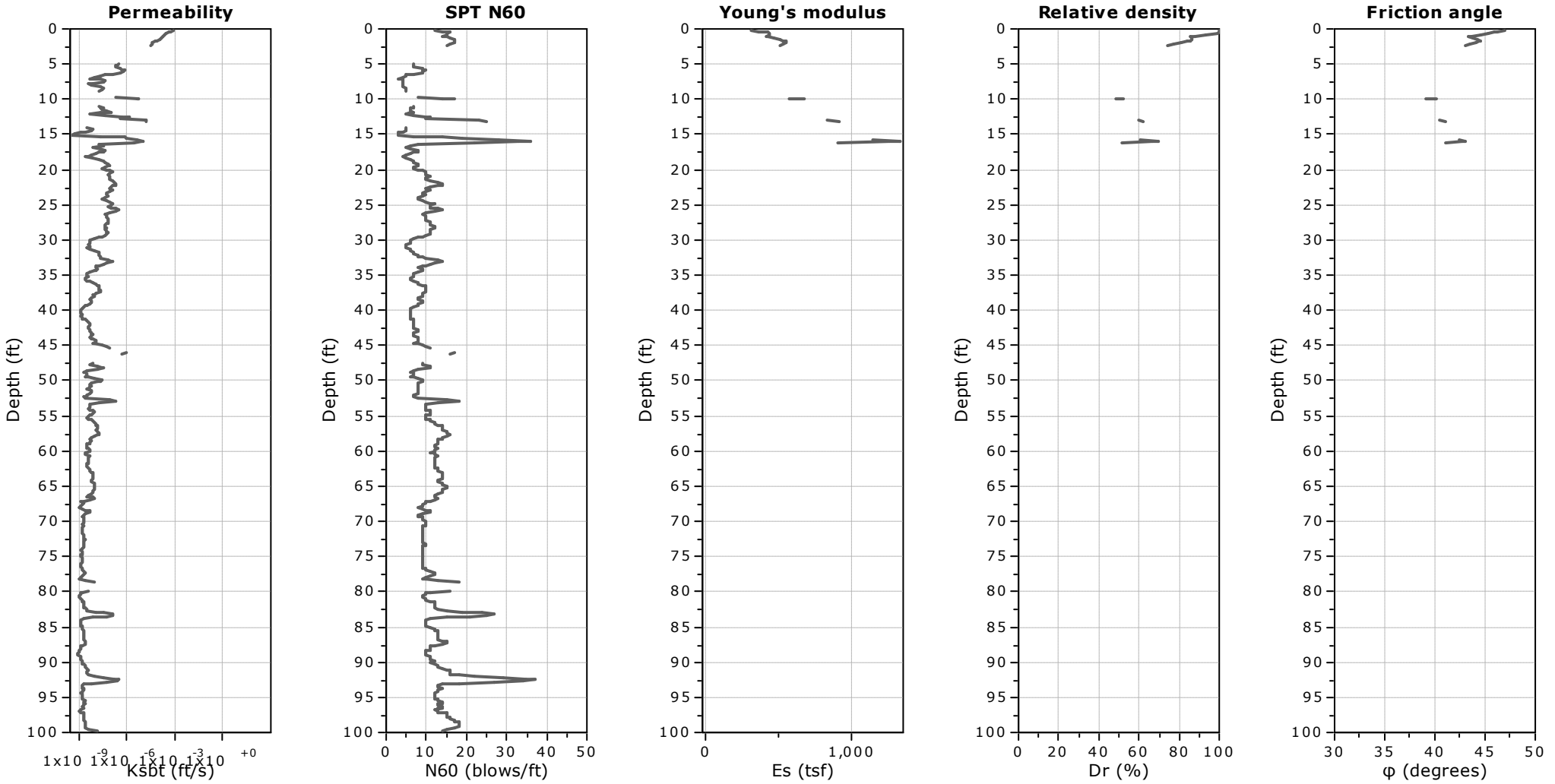



Norm. cone resistance
Depth (ft)
Qtn
Norm. friction ratio
Fr (%)
Norm. pore pressure rati
Bq
SBTn Index
Ic
Norm. Soil Behaviour Type
SBTn (Robertson, 1990)
Sand & silty sand
Clay & silty clay
Clay
Organic soil
SBTn legend
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained


Norm. cone resistance
Depth (ft)
Qtn
Norm. friction ratio
Fr (%)
Norm. pore pressure rati
U2
Mod. SBTn I(B)
I_B
Mod. Norm. SBTn
Mod. SBTn (Robertson 2016)
Sand like - Dilative
Clay-like - Dilative
Transitional - Dilative
Clay-like - Contractive
Mod. SBTn legend
1. CCS: ClayLike - Contractive, Sensitive
2. CC: Clay-like - Contractive
3. CD: Clay-Like: Dilative
4. TC: Transitional - Contractive
5. TD: Transitional - Dilative
6. SC: Sand-like - Contractive
7. SD: Sand-like - Dilative


Cone resistance qt
Depth (ft)
Tip resistance (tsf)
Norm. cone resistance
Qtn
SBTn Index
Ic
Clean sand equivalent
Qtn,cs
Residual strength ratio
Su(r)/σ'vo

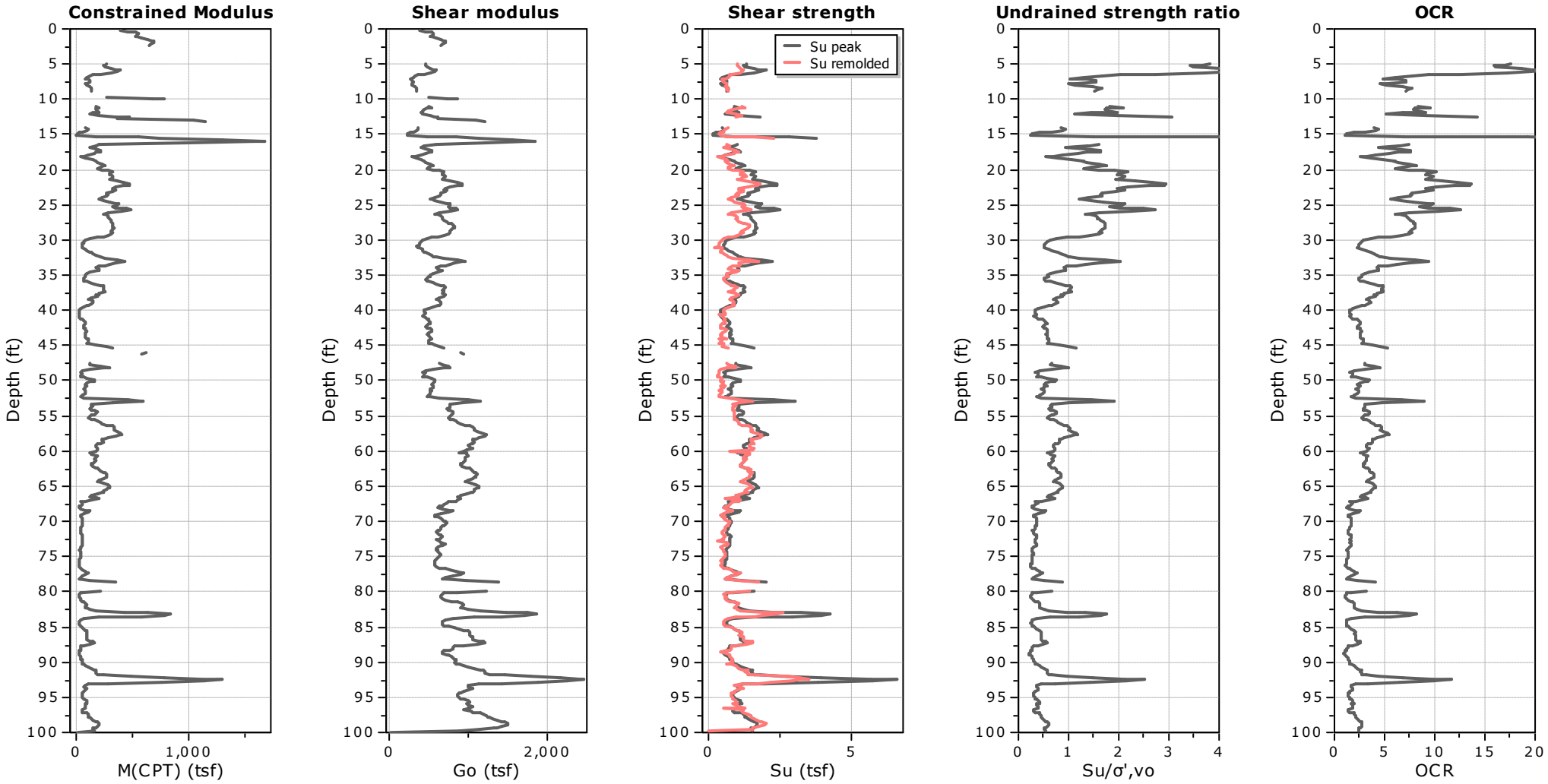
Project: **SHORELINE GOLF LINKS**
Location: **MOUNTAIN VIEW**



Calculation parameters

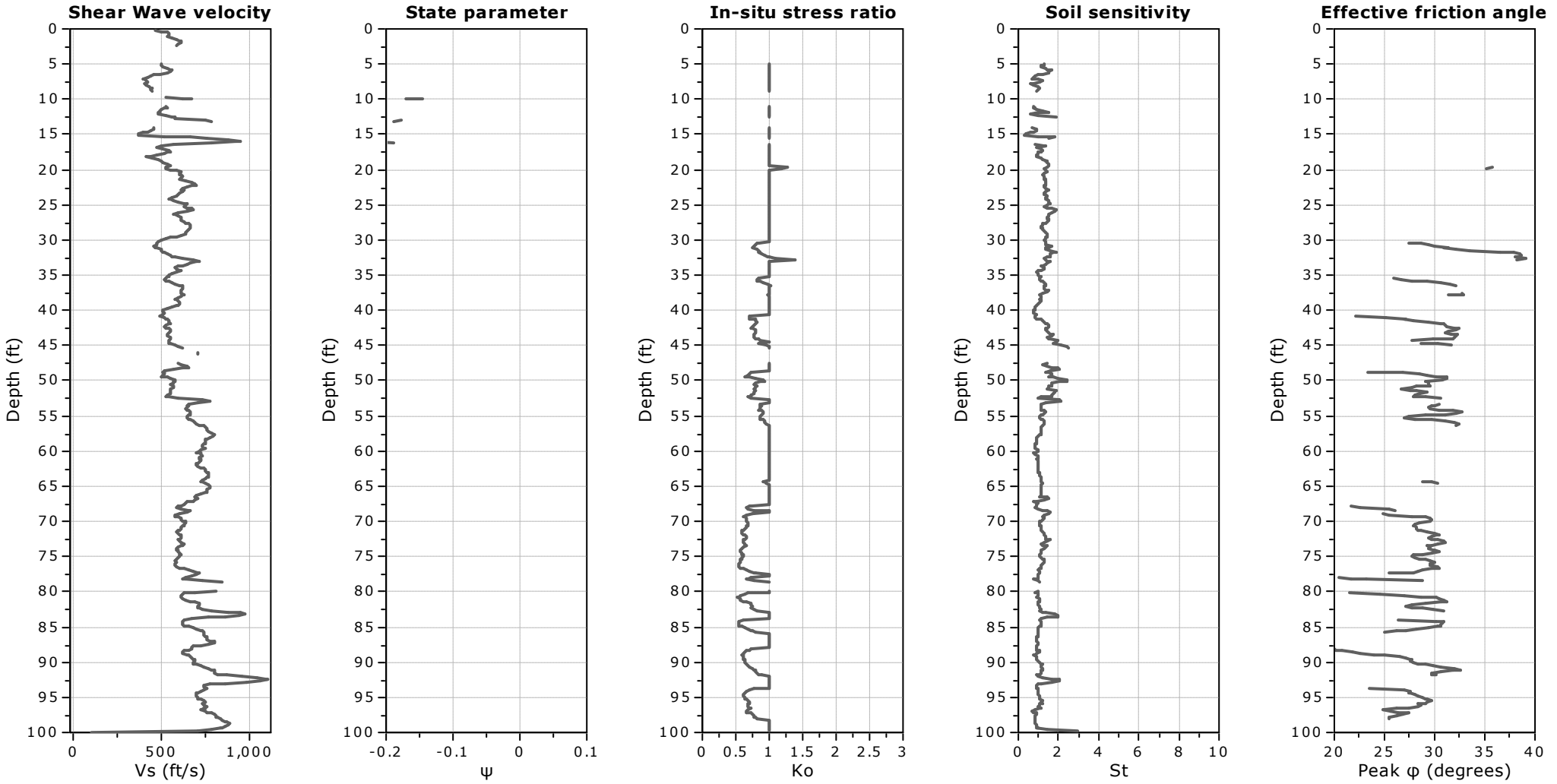
Permeability: Based on SBT_n
SPT N_{60}: Based on I_c and q_t
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)
Relative density constant, C_{Dr}: 350.0
Phi: Based on Kulhawy & Mayne (1990)

Project: SHORELINE GOLF LINKS
Location: MOUNTAIN VIEW



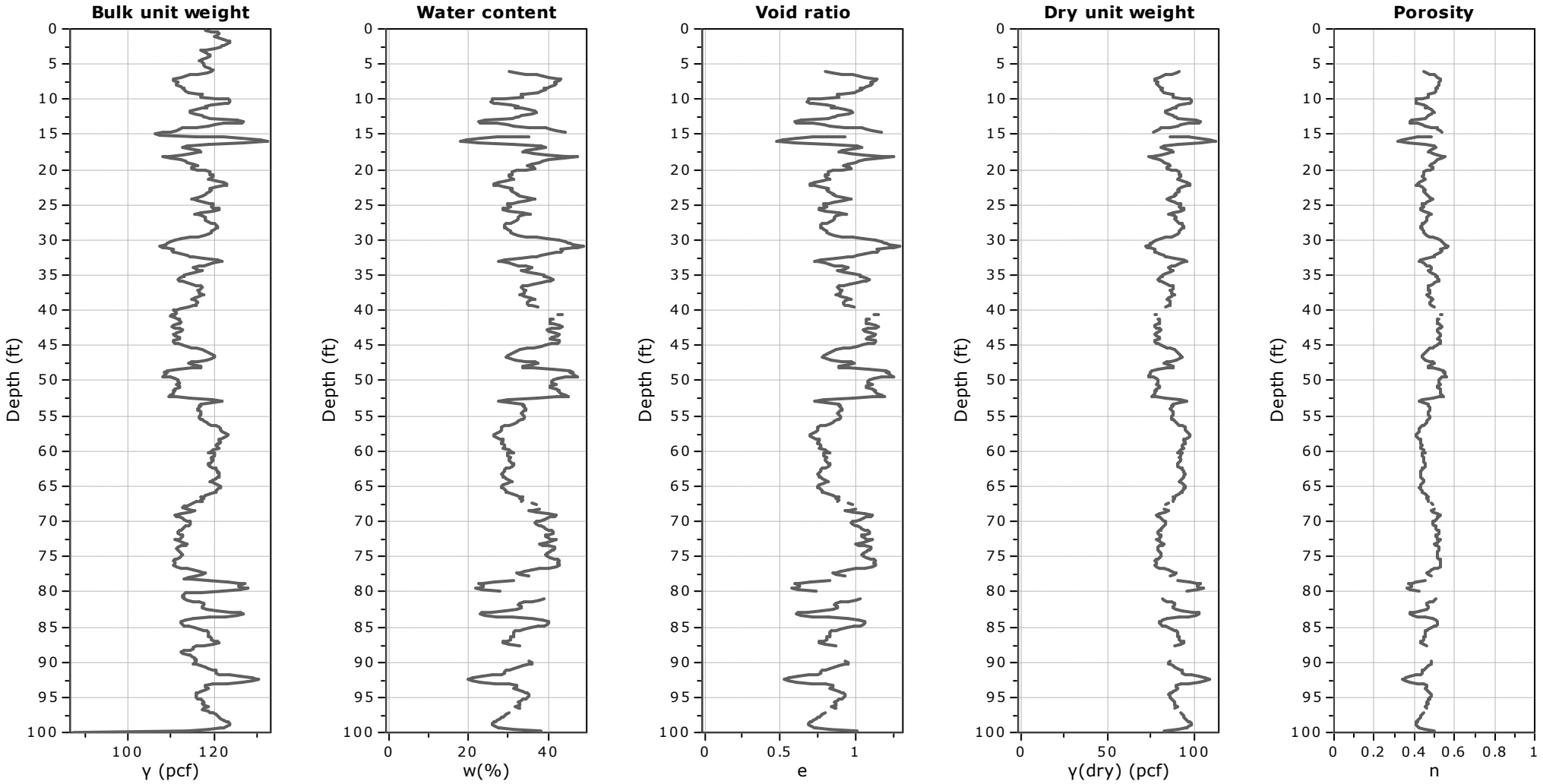
Calculation parameters

Constrained modulus: Based on variable *alpha* using I_c and Q_{tn} (Robertson, 2009)
Go: Based on variable *alpha* using I_c (Robertson, 2009)
Undrained shear strength cone factor for clays, N_{kt}: 14
OCR factor for clays, N_{kt}: 0.33
Flat Dilatometer Test data

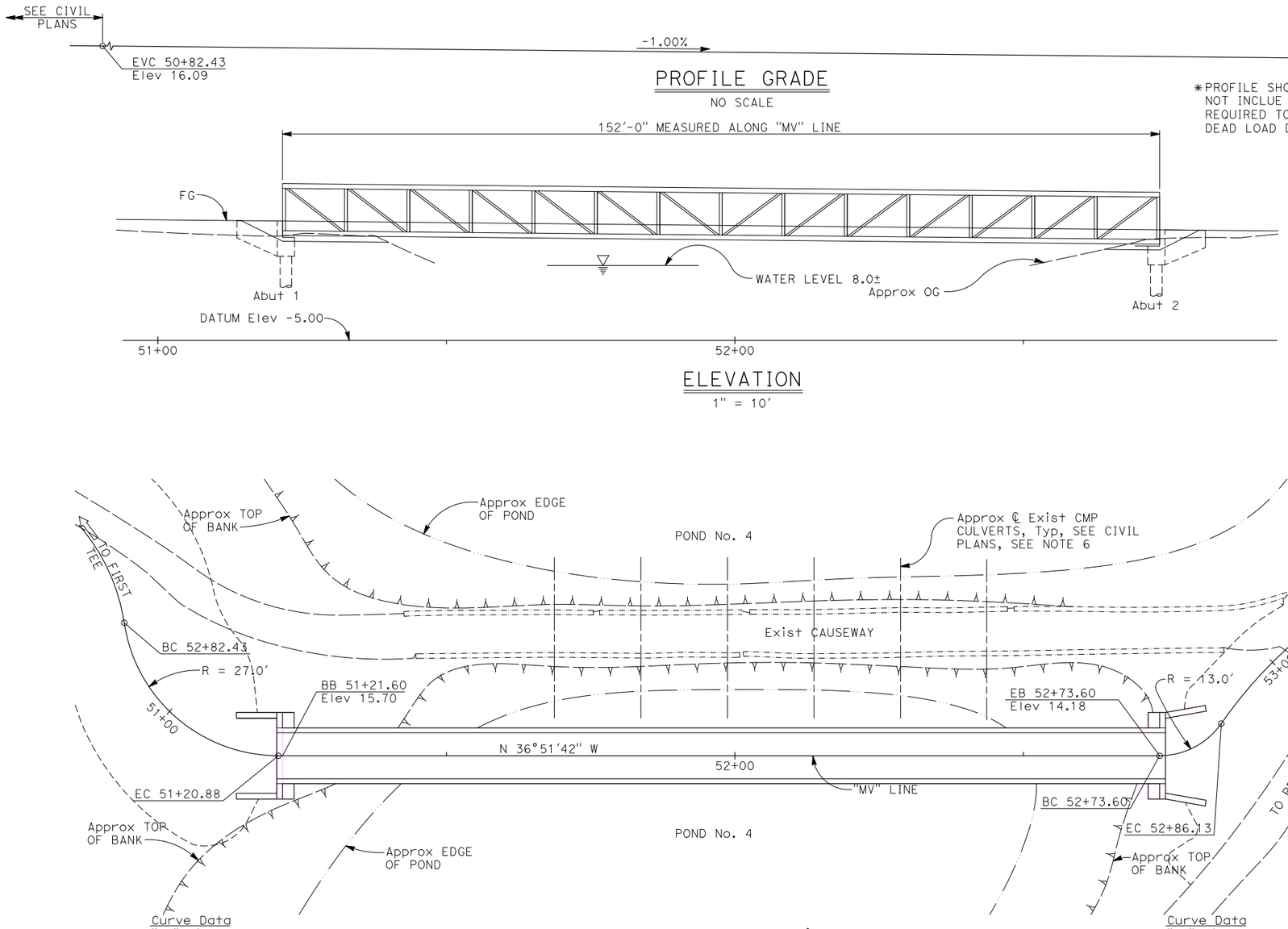


Calculation parameters

Soil Sensitivity factor, N_S: 7.00


Bulk unit weight
Depth (ft)
γ (pcf)
Water content
w(%)
Void ratio
e
Dry unit weight
γ(dry) (pcf)
Porosity
n

APPENDIX IV



*PROFILE SHOWN IS NET AND DOES NOT INCLUE ADDTIIONAL CAMBER REQUIRED TO COMPENSATE FOR DEAD LOAD DEFLECTION.

NOTES:

1. Contractor must verify all existing dimensions, elevations and conditions prior to beginning construction and/or ordering materials. Any discrepancies must be brought to the attention of the Engineer immediately.
2. Contractor must coordinate all embedded item locations with Bridge Manufacturer Drawings.
3. Bridge safety railing must not allow a sphere 4" or larger to pass through.
4. No construction activity may occur within the banks of Pond #4.
5. Contractor must not allow any construction material or equipment to enter Pond #4.
6. Existing Causeway is being replaced due to deterioration of the existing CMP Culverts. Contractor must not operate any heavy equipment that could damage the causeway or accelerate deterioration of the existing culverts.

PLAN CHECK SET/NOT FOR CONSTRUCTION (7/21/22)

REGISTERED PROFESSIONAL ENGINEER — ANTHONY P NOTARO — No. C51739 — Exp.6/30/24 — CIVIL — STATE OF CALIFORNIA

Prepared by: BIGGS CARDOSA ASSOCIATES INC.
STRUCTURAL ENGINEERS
865 THE ALAMEDA
SAN JOSE, CA 95126-3133
PHONE: 408-296-5515
FAX: 408-296-8114

BCA

REVISIONS

NO.	DATE	DESCRIPTION	APPROVED

DESIGNED BY: F. CASTILLO
DRAWN BY: S. HICKEY

CITY OF MOUNTAIN VIEW

CITY OF MOUNTAIN VIEW, CALIFORNIA
PUBLIC WORKS DEPARTMENT
500 CASTRO STREET, MOUNTAIN VIEW, CA 94041

GOLF CART BRIDGE REPLACEMENT AT
SHORELINE GOLF LINKS 1st FAIRWAY
GENERAL PLAN

SCALE:	DATE:	SHEET:
AS NOTED	12/13/2021	S1

(2021241-25_S1) 2021241

PIN XXXX-XX