Revised Geologic Hazards and Geotechnical Engineering Report College Of The Siskiyous Theater Arts Renovations and McCloud Hall Canopy

800 College Avenue
Weed, California
MPE No. 05040-03
July 26, 2024

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INTRODUCTION

Mid Pacific Engineering, Inc. (MPE) has completed a *Revised Geologic Hazards and Geotechnical Engineering Report* (GHZ-GER) for the proposed College of the Siskiyous Theater Arts Renovations and McCloud Hall Canopy project to be located at 800 College Avenue in Weed, California. The purposes of our work have been to investigate the soil, groundwater, geologic and seismic conditions at the project site, and to prepare an appropriate Revised Geologic Hazards and Geotechnical Engineering Report conclusions and recommendations for use by other design team members in preparing project plans and specifications and for the contractor's use during construction of the proposed project. This report presents the results of our work.

SCOPE OF SERVICES

Our scope of work included the following:

1. Site reconnaissance;
2. Review of the following documents and project plans:
    - *Theater and McCloud Hall Renovations, Site Plan – Campus Site*, Sheet GA101, prepared by Lionakis, dated September 15, 2023.
    - *Theater and McCloud Hall Renovations, Site Plan – Accessibility*, Sheet GA102, prepared by Lionakis, dated September 15, 2023.
    - *College of the Siskiyous, Plan – Foundation – Level 1 – Canopy*, Sheet M.S-111, prepared by Lionakis, undated.
    - *Memo for the College of the Siskiyous Theater Arts and McCloud Hall Renovation – Geotechnical and Geohazard*, provided by Lionakis, dated January 19, 2023.

- *Geologic Hazards and Geotechnical Engineering Report Update, College of the Siskiyous Fire Training Tower, Weed, California*, prepared by Mid Pacific Engineering, Inc. (MPE No. 05040-01, dated July 31, 2020).
- *Geotechnical Investigation and Geologic Hazards Evaluation Report, Proposed Science Building, College of the Siskiyous, Weed, California*, prepared by Brown & Mills, Inc. (BMI Project No. 08S-294, dated August 10, 2010).
- *Foundation Report, College of the Siskiyous Life Science Building and Theater Arts Building*, prepared by Clair A. Hill & Associates, Foundation Engineering & Testing Laboratory, Redding, California (Project C 1031.19, dated January 1968).
- *Plan – Foundation – Level 1*, Sheet S-111, provided by Lionakis, undated.
- *College of the Siskiyous, Draft Topographic Survey*, Sheet 1, prepared by Pace Engineering, dated November 20, 2020.

3. Review of available historic aerial photographs, topographic maps and groundwater information within the project vicinity;
4. Review of geologic maps and fault maps;
5. Review of historic seismicity within 62 miles (100 kilometers) of the site;
6. Subsurface exploration, including the drilling, logging, and sampling of four exploratory soil borings between approximate depths of 21½ and 50 feet below ground surface (bgs) within or adjacent to proposed site structural areas; and advancement of four Cone Penetration Tests (CPTs) to approximate depths between 50 and 69 feet bgs;
7. Collection of bulk and in-situ soil samples at various depths within the borings;
8. Laboratory testing of selected soil samples;
9. Engineering analyses; and,
10. Preparation of this report.

FIGURES AND ATTACHMENTS

Figure	Title	Figure	Title
1	Vicinity Map	9	Unified Soil Classification System
2	Regional Geologic Map	10 - 11	Geologic Cross-Sections A - A' and B – B'
3	Project Site Geologic Map	12	Regional Fault Map
4	Site Investigation Map	13	Earthquake Epicenter Map
5 - 8	Logs of Soil Borings	14	FEMA Flood Map

Appended to this report are:

- Appendix A - General information regarding project concepts; exploratory methods used during our field investigation; and laboratory test results not included on the boring logs.
- Appendix B - *Guide Earthwork Specifications* that may be used in the preparation of contract documents.
- Appendix C – Cone Penetration Test results.
- Appendix D – EQFAULT and EQSEARCH programs output.
- Appendix E – GeoSuite© analysis output.
- Appendix F – A list of references cited.
- Appendix G – Theory and Methodology of Liquefaction and Seismic Settlement.

This report is specific to the design and construction of the proposed College of the Siskiyous Theater Arts Building Renovation and McCloud Hall Canopy project and associated improvements to be located at 800 College Avenue in Weed, California. This report should not be used for the design or construction of any other future buildings or structures at the site or campus without review of the proposed improvements by our office. Additional reports and site investigations may be required for future buildings, groups of buildings, or structures, depending on the proposed development.

PROPOSED DESCRIPTION

Review of the *Memo* and the available plans indicates the project will consist of renovation for the existing Theater Arts building and a new canopy on the west side of McCloud Hall. Based on the review of Theater and McCloud Hall Renovations plans, it is our understanding that the majority of existing Theater Arts building is supported on deep pad foundations and the restrooms are supported on conjunction of piers and grade beams. We anticipate light to moderate foundation and structural loads for the Theater Arts building and McCloud Hall canopy. Associated development is anticipated to include exterior concrete flatwork, underground utilities, and typical landscaping.

It is our understanding the referenced BMI *Geotechnical Investigation and Geologic Hazards Evaluation Report, Proposed Science Building, College of the Siskiyous, Weed, California* was reviewed by the California Geological Survey (CGS) and an approval letter was issued on January 26, 2011. In addition, our referenced *Geologic Hazards and Geotechnical Engineering*

Report Update, College of the Siskiyous Fire Training Tower, Weed, California was reviewed by CGS and an *Engineering Geology and Seismology Review* was issued on December 9, 2020. This report includes updated and revised geologic hazard data and information, as needed, to meet current CGS - Note 48 guidelines.

This GHZ-GER was prepared to meet Division of the State Architect (DSA) requirements and the *California Geological Survey* (CGS) *Note 48 Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings* (November 2022) subject to the 2022 California Building Code (CBC). It is our understanding the final *Revised Geologic Hazards and Geotechnical Engineering Report* for this project will be reviewed by DSA and/or CGS.

This report was prepared based on the provided project plans and documents. When final site plans are available, or if the project plans change, Mid Pacific Engineering should be afforded the opportunity to review the plans and revise and/or update our conclusions and recommendations as necessary.

Based on relatively level site topography, we anticipate minimal earthwork cuts and fills will be required to achieve final design grades.

FINDINGS

Site Description

The project site is located at 800 College Avenue in Weed, California. Based on our site investigation, and review of the project plans and Google Earth images, the existing Theater Arts building and McCloud Hall canopy are located in the northern portion of the school campus. The approximate location of the project is north latitude 41.4137° and west longitude -122.3900°.

The project site is generally bounded to the north by an asphalt-paved parking lot and irrigated grass and landscaping; to the east and south by irrigated grass and trees; and to the west an asphalt-paved parking lot. On the dates of our investigation, the project site vicinity supported various school buildings and structures, concrete flatwork, irrigated landscaping, and underground utilities.

Review of the United States Geological Survey (USGS) *Weed Quadrangle, California – Siskiyou County, 7.5-minute series* (2022), indicates an approximate project site ground surface elevation +3,575 feet relative to mean sea level (msl). A portion of the USGS topographic map containing the site and vicinity is included with this report as Figure 1. Project site topography is relatively level.

Historical Aerial Photographs

Review of the historical aerial photographs (https://www.historicaerials.com/viewer) dated 1955, 1976, 1983, 1994, 1998, 2005, 2009, 2010, 2012, 2014, 2016, 2018, and 2020; and, Google Earth (http://earth.google.com) images dated 2017 and 2021 indicates the project site was undeveloped in 1955 (earliest available photograph). Additional review indicates the campus was developed between 1955 and 1976. The project site has remained relatively unchanged since at least 1976.

Our review of available literature and historical photographs provides a limited site history. Therefore, unknown buried structures (wells, foundations, utility lines, septic systems, etc.) may be present on-site and may be encountered during construction.

GEOLOGIC SETTING

Regional Geology and Structure

The project site lies in the northwestern portion of the Cascade Range geomorphic province of California. The Cascade Range, an arc-shaped chain of volcanic cones, extends from British Columbia to northern California, roughly parallel to the Pacific coastline. In the project region, the province is dominated by Mount Shasta, a glacier-mantled volcanic cone, rising 14,162 feet above mean sea level (msl). The southern termination is Lassen Peak. The Cascade Range is transected by deep canyons of the Pit River. The river flows through the range between these two major volcanic cones, after winding across the interior of the Modoc Plateau on its way to the Sacramento River.

The Cascade volcanics have been divided into the Western Cascade series and the High Cascade series. The Western Cascade series rocks consist of Miocene-aged basalts, andesites, and dacite flows interlayered with rocks of explosive origin, including rhyolite tuff, volcanic breccia, and agglomerate. This series is exposed at the surface in a belt 15 miles wide and 50 miles long from the Oregon border to the town of Mt. Shasta. After a short period of uplift and erosion that extended into the Pliocene, volcanism resumed creating the High Cascade volcanic series. The High Cascade series forms a belt 40 miles wide and 150 miles long just east of the Western Cascade series rocks. Early High Cascade rocks formed from very fluid basalt and andesite that extruded from fissures to form low shield volcanoes. Later eruptions during the Pleistocene contained more silica, causing more violent eruptions. Large composite cones like Mt. Shasta and Mt. Lassen had their origins during the Pleistocene (Norris and Webb, 1990).

SITE GEOLOGY

The California Division of Mines and Geology (CDMG) *Geologic Map of the Weed Quadrangle, California*, *1:250,000* compiled by D.L. Wagner and G.J. Saucedo (1987) indicates the project location is underlain by Pleistocene age High Cascade Volcanics consisting of Shastina pyroclastic flow deposits (Map Symbol: Qv^{ps}). The subsurface conditions observed in our boring were generally consistent with those typically mapped as pyroclastic deposits. The distribution of surficial deposits and geologic formations in the project vicinity are shown on the Regional Geologic Map, Figure 2.

The United States Department of Agriculture, Natural Resources Conservation Service website (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx), indicates the site is underlain by Deetz gravelly loam, 0 to 5 percent slopes. The Deetz gravelly loam, 0 to 5 percent slopes is very deep, somewhat excessively drained soil is typically located on glacial outwash fans. It formed in glacial-fluvial deposits derived dominantly from mixed extrusive igneous rock and volcanic ash. The surface layer is very dark, grayish-brown, and brown gravelly loamy sand approximately seven inches thick. The upper 31 inches of the underlying material is pale brown, light yellowish-brown, and very pale brown gravelly loamy sand. The lower part to a depth of 65 inches or more is pale brown, gray, and light gray very gravelly sand. Permeability of the Deetz soil is rapid, runoff is slow, and the hazard of water erosion is slight.

The mapped soils are generally consistent with those encountered during our subsurface investigation.

SUBSURFACE SOIL CONDITIONS

The four exploratory borings advanced during our on-site investigations of June 13, 2023, and June 18 and 19, 2024 encountered native pyroclastic flow deposits. As encountered in the borings and CPTs, the pyroclastic flow deposits generally consisted of very loose to dense silty sand with gravel-sized rock fragments; and loose to medium dense silty sand to the maximum explored depth of 50 feet bgs. Groundwater was encountered in all four borings between approximate depths of 20½ and 25 feet bgs.

To supplement our soil borings, four CPT soundings were advanced to approximate maximum depths between 50 and 69 feet below existing site grades. Refusal was encountered within all four CPT soundings. The soil conditions encountered in the CPT soundings were relatively consistent with those encountered in the soil borings.

Please refer to Figure 4 for boring and CPT locations, and Figures 5 through 8 for Logs of Soil Borings for further details regarding the soil conditions at a particular location. Graphic illustrations of the subsurface conditions encountered in the borings are presented on geologic cross-sections A-A' and B-B' as Figures 10 and 11. The results of the CPT soundings are provided in Appendix C.

Please note that subsurface conditions within the borings and CPTs are representative of the soil and groundwater conditions at the time of exploration and at the specific location. It should be expected that soil and groundwater conditions across the site can and will vary laterally and vertically from the soil encountered during our investigation.

GROUNDWATER

Groundwater was encountered in all four borings advanced on June 13 and 16, 2023, and May 16 -18, 2024, between approximate depth s of 20½ and24 feet. Review of the State Water Resource Control Board - GeoTracker (https://geotracker.waterboards.ca.gov/) closest groundwater monitoring well, located approximately ½-mile northeast of the project site, indicates groundwater in the project vicinity has been measured between approximate depths 19 and 40 feet bgs.

Groundwater levels may fluctuate beneath the site depending on the time of year and rainfall/snowfall amounts. In addition, shallow perched water may accumulate above less permeable or cemented soils following periods of heavy rainfall. Therefore, groundwater conditions presented in this report may not be representative of those which may be encountered during or subsequent to construction.

REGIONAL SEISMICITY

FAULTING

The project site is not located across the mapped trace of any known fault, nor was there any indication of surface rupture or fault-related surface disturbance at the site during our review of aerial photographs, site reconnaissance, or geotechnical investigation.

The site is not located within an Alquist-Priolo Earthquake Fault Zone as currently designated by CGS Special Publication No. 42 (revised November 2022). However, no hazard zonation map has been released by CGS for the project site area. According to the United States Geological Survey (USGS), 2008 National Seismic Hazard Maps – Source Parameters website, (https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/query_main.cfm), the closest active fault is the Cedar Mountain-Mahogany Mountain fault system (Meiss Lake fault), located approximately 26½ miles (42¾ kilometers) east-northeast of the project site. In addition, the surface manifestation of the southern portion of the Cascadia megathrust is located approximately 128 miles (206 kilometers) southwest of the project site. A Regional Fault Map (Figure 12) is included with this report.

Using the USGS Earthquake Hazards Program, 2008 National Seismic Hazard Maps-Fault Parameters, we have prepared the following table containing CGS Class A and B faults and fault systems within 62 miles (100 kilometers) of the site that are considered capable of producing earthquakes with moment magnitudes (M_W) 6.5 or greater.

Faults Influential to College of the Siskiyous

Fault Name	Maximum Magnitude (Mw)	Distance To Site Miles (Kilometers)
Cedar Mtn-Mahogany Mtn fault system	7.1	24.5 (39.4)
Hat Creek-McArthur-Mayfield fault zone	7.2	39.3 (63.2)
Gillem-Big Crack fault system	6.8	45.5 (73.2)
Sky Lakes fault zone	7.1	53.6 (86.3)
Klamath graben fault system (east)	7.4	59.8 (96.2)

Although not included in the table above, it is our opinion the Cascadia megathrust should be considered influential to the project site. Based on our review of the regional faulting and historic seismic activity, it is our opinion the Cedar Mountain-Mahogany Mountain fault system, as well as the Cascadia megathrust, can be considered causative faults due to their relatively close proximity to the project site and potential for large earthquakes.

HISTORIC SEISMICITY

Seismological data regarding significant historical earthquakes affecting the site was obtained using the commercially available software program EQSEARCH (Blake, 2000; database updated 2021). The EQSEARCH database was developed by extracting records of events greater than magnitude 5.0 from the DMG Comprehensive Computerized Earthquake Catalog, and supplemented by records from the USGS; University of California, Berkeley; the California Institute of Technology; and, the University of Nevada at Reno. A search radius of 62 miles (100 kilometers) was specified for this analysis. A historic earthquake epicenter map showing earthquakes (magnitude 5.0 or greater) within a minimum 62-mile (100 kilometer) radius of the project site is presented as Figure 13.

Review of the historical earthquake data indicates the closest earthquake to the site measuring Mw 5.0 or greater, and the most significant shaking (acceleration) experienced at the project site occurred during the M_R 5.0 earthquake of June 3, 1950, with an epicenter located approximately 46 miles (74 kilometers) west-southwest of the site. An examination of the tabulated EQSEARCH data suggests the project site has experienced ground shaking equivalent to Modified Mercalli Intensity V[1] as the result of two earthquakes.

The largest earthquake to occur within the EQSEARCH radius of 62 miles (100 kilometers) was measured at M_W 5.2. The largest acceleration experienced at the site is estimated to be 0.035 g. Five earthquakes measuring Mw 5.0 or greater have occurred within a 62-mile (100-kilometer) radius of the project site.

EQFAULT/EQSEARCH program output files are included in Appendix D.

Seismic Ground Deformation

The California State Legislature passed the Seismic Hazards Mapping Act (SHMA) in 1990 (Public Resources Code Division 2, Chapter 7.8) as a result of earthquake damage caused by the 1987 Whittier Narrows and 1989 Loma Prieta earthquakes. The purpose of the SHMA is to protect public safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and other hazards caused by earthquakes (CGS Special Publication [SP] 117).

There are currently 14 State designated Seismic Hazard Zone maps for Siskiyou County. The project site is not located within a State designated Seismic Hazard Zone.

Shear Wave Seismic Velocity and Seismic Site Class

CPT-2 was advanced to an approximate maximum depth of 52 feet bgs. CPT-2 data and indicates an average shear wave velocity of 899 feet per second (ft/s) [274 meters per second (m/s)] beneath the project site assuming similar soil properties below the maximum depth of boring D-1 to a depth of 100 feet bgs (Appendix E).

Based on the mapped geology, the soil conditions encountered within our exploratory borings and CPTs, and our knowledge of the project area, it is our opinion the soils at this site should be designated as Site Class D when used in determining seismic design forces in accordance with Section 1613A of the 2022 CBC.

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1 V – Moderate: Felt by nearly everyone, many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.

SEISMIC CODE PARAMETERS

2022 CBC Seismic Coefficients

The 2022 CBC Seismic Design Parameters have been generated using the Structural Engineers Association of California/Office of Statewide Health Planning and Development (SEAOC/OSHPD) Seismic Design Maps Tool (https://seismicmaps.org/). This web-based software application calculates seismic design parameters in accordance with the American Society of Civil Engineers (ASCE) 7-16 and the 2022 CBC. The results indicate a mapped S_1 value of 0.326 Per ASCE 7-16, Section 11.4.8, a site-specific ground motion study should be performed in accordance with Section 21.2 of ASCE 7-16 for Site Class D sites with an S_1 value greater than or equal 0.2.

Supplement 3 to Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites.

EXCEPTION: A ground motion hazard analysis is not required where the value of the parameter S_{M1} determined by ASCE 7-16 Equation (11.4-2) is increased by 50% for all applications of S_{M1} in this Standard. The resulting value of the parameter S_{D1} determined by Equation (11.4-4) shall be used for all applications of S_{D1}, in this Standard.

The commentary for Section 11 of ASCE 7-16 Supplement 3 states "The Item 1 exception is intended as an acceptable way to address the inaccuracy of the spectral shape observed in the velocity domain for Site Class D sites subject to high ground motions. Increasing S_{M1} by 50% in Eq. (11.4-2) results in an increase in the value of S_{D1} determined by Equation (11.4-4) by 50 percent. These increased values of S_{M1} and S_{D1} are to be used for all applications of these parameters throughout the Standard, including for the formulation of the design response spectrum where a design response spectrum is needed per this standard. It should be noted that the 50% increase in S_{D1} also increases T_s by 50% resulting in an extension of the acceleration-controlled plateau of the design response spectrum."

Based on this exception, the spectral response accelerations presented in the following table were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 1613 of the 2022 CBC.

Description	Value
Site Location	Latitude: 41.4137°/Longitude: -122.3900°
Site Classification	D
Mapped MCE_R ground motion 1)	S_S = 0.629 and S_1 = 0.329
Site Coefficients	F_a = 1.297 and F_v = 1.971 2)
Site-modified spectral acceleration	S_{MS} = 0.816 and S_{M1} = 0.973 3)
Numeric seismic design value	S_{DS} = 0.544 and S_{D1} = 0.648 3)
Site modified peak ground acceleration	PGA_M = 0.379 g
Mode de-aggregated Magnitude 2)	7.98
Closet Distance, r_{Rup} 4)	75.9 km
The T_S (Section 11.4.6, ASCE 7-16) for the site is 1.24.	

1) These values were obtained using on-line ASCE7 Hazard Tool (https://asce7hazardtool.online/).
2) Per 2022 CBC Table 1613.2.3 (2).
3) The value of the parameters, S_{M1}, determined by Eq. (11.4-2) of ASCE 7-16 is increased by 50% for all applications of SM1 per ASCE 7-16 Supplement 3.
4) This value was obtained using on-line Unified Hazard Tool by the USGS (https://earthquake.usgs.gov/hazards/interactive/) for return period of 2% in 50 years.

MCE_R – Maximum Considered Earthquake
g – Acceleration due to gravity

The mean de-aggregate magnitude is 7.89[2].
The closest distance, r_{Rup}[3] is 86.2 kilometers (53.6 miles) for mode de-aggregated magnitude.

PRIMARY SEISMIC HAZARDS

Seismic Hazards

No active or potentially active faults are known to cross the project site as indicated by the published geologic maps or aerial photographs reviewed for this project. The project site is not located within an Earthquake Fault Zone or designated seismic hazard zone. In addition, it is our opinion Site Class D is most applicable to the soils conditions upon the completion of site development. The project site is located within an area of minor seismic activity;

2 These values were obtained using the on-line Unified Hazard Tool by the USGS (https://earthquake.usgs.gov/hazards/interactive/) for return period of 2% in 50 years.

however, design of the structures in conformance with the 2022 edition of the California Building Code (Title 24 of the California Code of Regulations, Chapter 16A), should be sufficient to prevent significant damage from ground shaking during seismic events resulting from movement on any of the faults or fault systems discussed in this report.

Seismic Sources

According to the United States Geological Survey (USGS) 2008 National Seismic Hazard Maps –Source Parameters website (https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/query_main.cfm), five active and/or potentially active faults are mapped within 62 miles (100 kilometers) of the project site. These include the Cedar Mtn.-Mahogany Mtn. fault zone, the Hat Creek-McArthur-Mayfield fault zone, the Gillem-Big Crack fault system, the Sky Lakes fault zone, and the Klamath graben fault system (east and west). In addition, the surface manifestation of the southern portion of the Cascadia Subduction Zone (CSZ) is located approximately 128 miles (206 kilometers) southwest of the project site.

The Cedar Mountain-Mahogany Mountain fault system, located approximately 36.5 miles (58.7 kilometers) northeast of the project site, is a 27.3 mile (44 kilometer) long, complex association of generally north to north-northwest striking normal faults along the boundary between the Cascade Ranges and the Modoc Plateau that offset latest Pleistocene and Holocene volcanic rocks, glacial, and alluvial deposits (Williams, 1949; Wood, 1960; Bryant, 1990). The Cedar Mountain fault system is comprised of the Cedar Mountain, Mahogany Mountain, Mt. Hebron, Meiss Lake, and Ikes Mountain faults. Detailed reconnaissance level mapping by Wood (1960) and Bryant (1990) is at 1:62,500 scale. There are no detailed studies for any of these faults. Bryant (1990) estimated a late Pleistocene slip rate of 0.2 millimeters per year (mm/yr)/0.008 inches per year (in/yr) for a strand of the East Cedar Mountain fault, based on offset late Tioga equivalent outwash deposits. Historic surface fault rupture was associated with the August 1, 1978 Stephens Pass earthquake (Bennett and others, 1979). First mapped, but not named, by Williams (1949) and Wood (1960). Bryant (1990) first proposed the names Cedar Mountain fault zone, West Cedar Mountain fault, East Cedar Mountain fault, Meiss Lake fault, Mahogany Mountain fault zone, and Mt. Hebron fault zone for structures within this fault system. The Stephens Pass fault was unmapped prior to the local magnitude (ML) 4.6 Stephens Pass earthquake of August 1, 1978.

The Mahogany Mountain section borders the northeastern side of Butte Valley in Siskiyou County and extends from the Oregon border southeast to the vicinity just north of Red Rock Valley. The Mahogany Mountain section is delineated by the Mahogany Mountain fault zone. Wood (1960) first mapped the fault zone and Bryant (1990) first proposed the name Mahogany Mountain for the fault zone.

The northern end of the Cedar Mountain fault system may extend into Oregon as the Sky Lakes fault zone [844]. The southern extent of the fault system is poorly understood and not mapped in detail. The fault zone is the result of east-west extension. The fault zone bounds Butte Valley, a structurally controlled closed drainage basin. Cumulative vertical displacement is not known, but scarps on late Tertiary bedrock suggest a minimum cumulative Quaternary vertical displacement of 1,640 feet (500 meters) along the Mahogany Mountain fault. Scarp heights on Cedar Mountain, a Pliocene-Pleistocene volcanic cone, suggest a minimum cumulative Pleistocene displacement of 200 feet (60 meters). The Maximum Magnitude Earthquake (M_{max}) listed for the fault system in the project area is 7.1. The M_{max} is the maximum earthquake believed possible for the fault system.

The Hat Creek-McArthur-Mayfield fault zone, located approximately 39.3 miles (63.2 kilometers) east of the project site, is comprised of high-angle, down-to-west, left-stepping normal faults that bound the west side of Hat Creek Rim. There is more than 1,640 feet of Quaternary displacement across the fault zone (Muffler and others, 1994). The Hat Creek fault forms a prominent 820 to 1,640-feet-high compound escarpment that is capped by early Pleistocene basalt. The base of the escarpment is buried by stabilized talus along significant portions of the fault. This talus has been disrupted by scarps and linear troughs and ridges resulting from recent activity. Some individual scarps turn into monoclinal flexures near their ends (Muffler and others, 1994). The M_{max} assumed for the Hat Creek-McArthur-Mayfield fault in this region is 7.2.

The Gillem-Big Crack fault system, located approximately 45.5miles (73.2 kilometers) east of the project site, is an 18 mile long (30 kilometers) and approximately nine mile (15 kilometer) wide zone of north-striking extensional faults in the Modoc Plateau geomorphic province. The fault system extends from approximately two miles (three kilometers) south of the Oregon border south to the northern flank of Medicine Lake volcano. Cumulative vertical displacement is not known, but the east-facing bedrock escarpment delineating the northern Gillem fault is about 970 feet (295 meters) high, indicating a minimum of 970 feet (295 meters) of post late Tertiary displacement (Bryant, 1990). A southern strand of the

Gillem fault offsets 40,000 to 100,000 Mammoth Crater Basalt about 50 feet (15 meters). Bryant (1990) estimated a late Pleistocene slip rate of 0.15 to 0.38 millimeters per year (mm/yr) for the Gillem fault.

The Gillem-Big Crack fault system locally is delineated by geomorphic features indicative of late Pleistocene normal faulting, principally prominent east-facing scarps on late Tertiary and Quaternary volcanic bedrock (Donnelly-Nolan and Champion, 1987; Bryant, 1990). The Gillem fault bounds the eastern side of a west-tilted fault block. North of Lava Beds National Monument the Gillem fault lacks geomorphic evidence of recent faulting, but within Lava Beds National Monument the fault is delineated by east-facing scarps locally as high as 50 feet (15 meters) on late Pleistocene Mammoth Crater basalt (Donnelly-Nolan and Champion, 1987; Bryant, 1990). A younger flow unit within the Mammoth Crater basalt flowed across the 50 foot (15 meter) high scarp with minimal to no vertical displacement. Early Holocene Devils Homestead basalt (Donnelly-Nolan and Champion, 1987) erupted along and locally conceals the Gillem fault (Bryant, 1990). The Crumbs Lake and Fleener Place faults are delineated by geomorphic features indicative of late Pleistocene normal faulting. Closed depressions and ponded alluvium may be associated with these normal faults, but other constructional volcanic features make this a tenuous association. The Big Crack fault is characterized predominantly by extensional displacement and is delineated by linear, unfilled fissures (Bryant, 1990). The M_{max} assumed for the Gillem-Big Crack fault system in this region is 6.8

The Sky Lakes fault zone, located approximately 53.6 miles (86.2 kilometers) northeast of the project site, consists of north- and northwest-striking, mostly down-to-the-east normal faults offset late Miocene and Pliocene to Pleistocene volcanic rocks, and probably are older structures related to the western margin of the Klamath graben. These faults form prominent escarpments on late Tertiary and Quaternary volcanic rocks. Scarps range in height from less than 33 feet (10 meters) to as much as 985 feet (300 meters); most are less than 95 feet (30 meters) high and have slope angles of less than 25 degrees. Scarps are formed on bedrock, and in most places are covered by late Pleistocene (approximately 10,000–30,000 year old) glacial deposits and Holocene colluvium. Although most faults in the zone have been active in the middle and late Quaternary, at least one fault strand near the northern end of the zone has apparently been active in the latest Quaternary. The M_{max} assumed for the Sky Lakes fault zone in this region is 7.08.

The Klamath graben fault system (east), located approximately 59.8 miles (96.2 kilometers) northeast of the project site, is a group of north and northwest-trending normal faults that form a complex graben system that confines the Klamath Lake basin at the intersection of the northwestern Basin and Range and Cascade Mountains in southern Oregon. These faults offset upper Miocene to Holocene volcanic rocks and Pleistocene and Holocene valley-fill sediments. The Klamath graben fault system is divided into three sections: the West Klamath Lake section, the East Klamath Lake section, and the south Klamath Lake section. The West Klamath Lake and south Klamath Lake sections in part show evidence of latest Quaternary displacement; youngest displacement on the East Klamath Lake section occurred in the Quaternary. The M_{max} assumed for the Klamath graben fault system in this region is 7.06 (west) and 7.36 (east).

The Cascadia megathrust, located approximately 128 miles (206 kilometers) west of the project site, forms the collisional plate boundary between the subducting Explorer, Juan de Fuca, and Gorda Plates and the overriding North America Plate, and extends 745 miles (1,200 km) from offshore northern California to southern British Columbia. Subduction is driven by westward migration of the North America Plate and eastward migration of the Explorer, Juan de Fuca, and Gorda Plates due to spreading of the Gorda-Juan de Fuca-Explorer Ridge system. The latter three plates are the remnants of the Farallon Plate, which originally underlay much of the eastern Pacific and has been converging with the North America Plate since at least the Jurassic. Few, if any, historical earthquakes have been located on the boundary between the subducting and overriding plates, but geological studies show that repeated great (>M8) earthquakes have occurred in the past 7,000 years, and geodetic studies indicate strain accumulation consistent with the assumption that the Cascadia megathrust is locked beneath offshore northern California, Oregon, Washington, and southern British Columbia. Numerous geological and geophysical studies suggest that the Cascadia megathrust may be segmented, but the most recent studies suggest that, at least for the most recent great earthquake on January 26, 1700, much of the megathrust ruptured in a single M9 earthquake (https://earthquake.usgs.gov/data/crust/cascadia.php).

Surface Fault Rupture

No known faults are mapped crossing the immediate vicinity of the site. The site does not lie within an Earthquake Fault Zone as currently designated by the State of California and no evidence of surface faulting was observed during our historical aerial photography review, site reconnaissance, or geotechnical investigation. It is our opinion that the potential of fault-related surface rupture at the site is low. A project vicinity Special Studies Zone map has not been released by CGS

Seismic Risk

The primary seismic risk at the site are earthquakes originating from the Cascade megathrust, which is capable of producing large earthquakes. Results of the EQFAULT analysis indicate an Mw 7.3 earthquake on the faults located in northeastern California would result in a site acceleration of 0.183 g, based on the Boore et al (1997) NEHRP D (520) attenuation relation.

SECONDARY HAZARDS

Liquefaction

Liquefaction is a soil strength and stiffness loss phenomenon that typically occurs in loose, saturated cohesionless soils as a result of strong ground shaking during earthquakes. The potential for liquefaction at a site is usually determined based on the results of a subsurface geotechnical investigation [including a 50-foot exploration boring or cone penetration test (CPT)] and the groundwater conditions beneath the site. Hazards to buildings associated with liquefaction include bearing capacity failure, lateral spreading, and differential settlement of soils below foundations, which can contribute to structural damage or collapse. The site is not located within a State Designated Seismic Hazard Zone for liquefaction. A project vicinity Special Studies Zone map has not been released by CGS.

The site is underlain by native volcanic Shastina pyroclastic flow sediments. As encountered in the borings, native alluvial soils generally consisted of very loose to dense silty sand with gravel-sized rock fragments; and loose to medium dense silty sand to the maximum explored depth of 51 feet bgs. Groundwater was encountered in the borings advanced on June 13, 2023 and June 18 and 19, 2024.

Site liquefaction potential was evaluated based on Yi (2023) method utilizing boring D-1 Standard Penetration Test (SPT) blow counts. An estimated groundwater depth of 14 feet below existing site grades was used to calculate the liquefaction potential in the project area. The recommended design PGA_M of 0.379g, derived from the SEAOC/OSHPD website, Program Unified Hazard Tool website (https://earthquake.usgs.gov/hazards/interactive/).

Based on our experience and knowledge in the project vicinity, it is our opinion an M_w of 9.34 is appropriate for liquefaction analysis

Analyses utilizing CPT-1 data, a groundwater depth of 14 feet bgs, and the above design earthquake parameters (PGA_M and M_W) resulted in approximately three to seven inches of potential total liquefaction settlement, and up to four inches of differential settlement. The results of our subsurface investigation and engineering analyses indicate the above settlements for the canopy would be difficult to mitigate. The canopy could be damaged during a design earthquake event. However, the canopy would not collapse and would not result in death of human life provided the recommendations in the CANOPY FOUNDATION DESIGN section of this report are followed.

The theory and methodology of liquefaction potential and seismic settlement evaluations are described in Theory and Methodology of Liquefaction and Seismic Settlement section of this report, presented in Appendix G of this report.

The results indicate that potential seismic settlements between three and seven inches could occur within the upper 50 feet of the project site. Based on the results our subsurface investigation and analyses, we consider seismic settlement to be a hazard that should be factored into the structural design at this site.

Cyclic Softening

The native subsurface soils encountered in our borings consisted of very loose to dense silty sand with gravel-sized rock fragments; and loose to medium dense silty sand to the maximum explored depth 51 feet bgs. No soft clays were encountered in the borings. Based on the relatively dense silty sand, we do not consider cyclic softening as a significant hazard for this site. Our analyses using GeoSuite includes automatic modelling clay like behavior of soils (See Appendix E).

Lateral Spreading

Liquefaction-induced lateral spreading is defined as the finite, lateral displacement of gently sloping ground as a result of pore pressure build up or liquefaction in a shallow underlying deposit during an earthquake. Lateral spreading usually occurs on gently sloping ground exposed to a slope or free face. The proposed improvements will be located on relatively level ground. Based on the relatively dense nature of the on-site soils, it is our opinion the potential for lateral spreading at the site is low.

Dry Sand Seismic Settlement

Dry sand seismic settlement can be evaluated using the method of Pradel (1998). This method is a simplified method based on earlier work by Tokimatsu and Seed (1987) applicable to sands. The subsurface conditions encountered in the borings and CPTs generally consisted of very loose to dense silty sand with gravel-sized rock fragments; and loose to medium dense silty sand. Loose, clean sands were not encountered within the borings. Analyses of the on-site soils using the GeoSuite software, and utilizing the field and laboratory test data from CPT-2, indicates dry sand seismic-induced settlements is negligible.

Subsidence and Hydrocollapse

Regional subsidence occurs when large areas of land sink in response to withdrawal of groundwater, petroleum, or natural gas. The site is not located within a region generally subject to groundwater, petroleum, or natural gas withdrawal. In our opinion, the site is not subject to high subsidence, due to the absence of factors and conditions needed to cause subsidence.

Due to the age and composition of the native soils and geologic materials encountered during our field exploration, it is our opinion that hydrocollapse of the on-site soils as the result of rain or irrigation water percolation is unlikely.

Landslides

Site topography is relatively flat. Review of historic aerial photographs containing the project site and our on-site observations show no indications of past slope instabilities or landslides. Based on the absence of slope failures and/or instabilities within the project site or vicinity, it is our opinion the potential for earthquake induced landsliding at the site is negligible. The site does not lie in a Landslide Hazard Zone as designated by the State of California and no landslides are mapped within or in the vicinity of the site. However, the site should not be precluded from the possibility of being impacted by seismically induced landsliding.

Slope Stability

Site topography and the surrounding area is relatively flat. In addition, it is our understanding no on-site cut and fill slopes will be constructed. Based on the absence of mapped or observed slope instabilities within the project site or vicinity, it is our opinion that slope stability is not considered a factor in site development.

Tsunami

The project site is well inland and there are no significant bodies of standing water near the site; therefore, the potential for tsunamis influencing the site is negligible.

Seiche

The Iron Gate Reservoir is located approximately 6½ miles (10 ½ kilometers) east-northeast of the project site. Based on the distance between the reservoir and the project site, it is our opinion the potential for seiches influencing the site is negligible.

Flood/Dam Inundation

The site is not located within a Special Flood Hazard Area (SFHA) as designated by the Federal Emergency Management Agency (FEMA). According to the Flood Insurance Rate Maps (FIRM) Panel 06093C, Map Number 06093C2567D, published by FEMA, with an effective date of January 19, 2011, the project site lies within an Area of Minimal Flood Hazard, Zone X. Zone X is defined as areas determined to be within the 0.2 percent annual chance flood hazard, areas of one percent chance flood with average depth less than one foot, or with drainage areas of less than one square mile. It is our opinion that the site is not at significant risk of flooding (Figure 14).

Review of the California Department of Water Resources, Division of Safety of Dams (https://fmds.water.ca.gov/maps/damim/), indicates the project site does not lie within a Dam Inundation Zone.

Hazardous Materials

Based on the absence of conditions that contribute to the development or production of methane, hydrogen-sulfide gases, and tar seeps, it is our opinion that these hazardous materials are not present within the project site or vicinity.

Volcanic Hazard

Review of the USGS Map of Potential Hazards from Future Volcanic Eruptions in California (Miller, 1989), indicates the project site lies within the immediate Mount Shasta, Medicine Lake Highland, and Lassen Peak Area Volcanic Hazard Zone, Areas Subject to flowage hazards, Combined flowage-hazard zone (locally precedent). These areas are adjacent to explosive volcanoes or vents, subject of eruption of domes, pyroclastic flows, and lava flows, and at some volcanoes debris flows and floods, associated with future eruptions as large as those during Holocene time at that volcano or a similar volcano in the Cascade Range. The most recent volcanic eruption from the Mount Shasta area occurred approximately 200 years ago (Miller, 1989). The hazard of volcanic eruption at the project site is considered high.

Naturally Occurring Asbestos (NOA)

Asbestos is the generic term for the naturally occurring fibrous (asbestiform) varieties of six silicate minerals. Asbestos also refers to an industrial product obtained by mining and processing deposits of asbestiform minerals. According to California Geological Survey Open-File Report 2000-19, A General Location Guide for Ultramafic rocks in California-Areas More Likely to Contain Naturally Occurring Asbestos (2000), and the USGS Open-File Report 2011-1188, Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California (2011), the project site does not lie within an area mapped as containing Naturally Occurring Asbestos (NOA) or ultramafic rock in outcrop. However, the Eastern Klamath Belt, Trinity peridotite (partially serpentinized) is mapped to the west of the site.

Radon Gas

Sections 307 and 309 of the Indoor Radon Abatement Act of 1988 (IRAA) directed EPA to list and identify areas of the U.S. with the potential for elevated indoor radon levels. EPA's Map of Radon Zones assigns each of the 3,141 counties in the U.S. to one of three zones based on radon potential. Siskiyou County and the project site are located in Zone 3 for radon potential. Zone 3 counties have a predicted average indoor radon screening level less than two pCi/L and are indicated to have a Low Potential for radon.

CONCLUSIONS

FOUNDATION AND STRUCTURAL SUPPORT

Based on our field investigation, it is our opinion the on-site, near-surface soils are comprised of native Shasta Pyroclastic Flow deposits that possess variable density and support qualities. In addition, site clearing will disturb a majority of the surface and near-surface soils creating variable density and support conditions. Therefore, we will recommend proper processing and re-compaction of all disturbed native soils as engineered fill within project structural areas, including building pads, exterior concrete flatwork, and pavement areas, to promote more uniform support for the planned improvements.

Based on our field investigation and laboratory test results, it is our opinion that firm, undisturbed native soils, and engineered fill that is properly placed and compacted, will be capable of supporting the planned improvements and canopy statically, provided the following recommendations regarding site preparation and engineered fill placement and compaction are carefully followed. Specific recommendations for processing and re-compaction are presented in the SITE PREPARATION section of this report.

EXPANSIVE SOILS

Laboratory test results indicate the on-site, near-surface clayey soils possess a "low" expansion potential when tested in accordance with ASTM D4829. Based on the results of our work, we conclude that expansive soils will not be a factor in site development.

SUITABILITY OF ON-SITE SOILS FOR USE AS FILL

The on-site soils are considered suitable for use as engineered fill materials, provided these materials are free from concentrations of organic debris (roots and root balls), expansive clays, over-size rock, rubble, debris, rubbish, or other deleterious materials and are at the proper moisture content for compaction. Removal of rubble, debris, and organic debris from on-site soils may require laborers handpicking the fill materials, and/or screening prior to allowing the soils to be re-used as fill.

EXCAVATION CONDITIONS

Based on our field investigation, the on-site native soils should be readily excavatable with conventional earthmoving and trenching equipment typically used in the area. The on-site excavations may be subject to sloughing and caving if cohesionless or saturated soils are exposed, requiring sloped excavations to reduce the effects of sidewall stabilities.

Excavations to be entered by workers should be braced or shored in accordance with current Occupational Safety and Health Administration (OSHA) regulations. The contractor must provide an adequately constructed and braced shoring system in accordance with federal, state and local safety regulations for individuals working in an excavation that may expose them to the danger of moving ground. If material is stored or heavy equipment is operated near an excavation, stronger shoring would be needed to resist the extra pressure due to the superimposed loads.

Excavations encountering low cohesion sandy soils, groundwater and/or seepage will be susceptible to sloughing or caving upon excavation or if left open for an extended period of time requiring sloped excavations and other stabilization methods. Deeper excavations may encounter groundwater, requiring dewatering and/or trench sidewall stabilization.

SOIL CORROSION POTENTIAL

Two representative soil samples were submitted to Sunland Analytical Lab, Inc., located in Rancho Cordova, California, for testing to determine pH, resistivity, chloride and sulfide concentrations to help evaluate the potential for corrosive attack upon reinforced concrete. Results of the corrosion testing performed by Sunland Analytical Lab are summarized in the following table.

SOILS CORROSIVITY TESTING			
Analyte	Test Method	Sample Identification	
		Bag #1 (0-3')	Bag # 2
pH	CA DOT Test #643 Modified (Sm. Cell)	6.2	6.0
Minimum Resistivity		4,380 Ω-cm	3,700 Ω-cm
Chloride	CA DOT 417	4.4 ppm	10.1
Sulfate	CA DOT 422	4.0 ppm	9.8

* = Small cell method
Ω-cm = Ohm-centimeters
ppm = Parts per million

The California Department of Transportation (Caltrans), Division of Engineering Services, Materials Engineering and Testing Services, Corrosion Branch, Corrosion Guidelines Version 3.2, dated May 2021, defines a corrosive environment in terms of resistivity, pH, and soluble salt content or the soil and/or water. Resistivity serves as an indicator parameter for the possible presence of soluble salts and is not included as a parameter to define a corrosive environment for structures. In general, the higher the resistivity, the lower the corrosion rate. A minimum resistivity value for soil and/or water less than or equal to 1,500 ohm-centimeters indicates the presence of high quantities of soluble salts and a higher propensity for corrosion. For structural elements, Caltrans considers a site to be corrosive if one or more of the following conditions exist for the representative soil and /or water sample collected at the site: a chloride concentration of 500 parts per million (ppm) or greater, a sulfate concentration of 1,500 ppm or greater, or a pH of 5.5 or less. Based on this criterion, the on-site soils tested for this project are not considered corrosive to reinforced concrete. Table 19.3.1.1 – *Exposure Categories and Classes*, American Concrete Institute (ACI) 318, Section 19.3, as referenced in Section 1904.1 of the 2022 CBC, indicates the severity of sulfate exposure for the samples tested is *not a concern*. Ordinary Type I-II Portland cement is considered suitable for use on this project, assuming a minimum concrete cover is maintained over the reinforcement.

Our experience with concrete and steel corrosion is generally based on the Caltrans corrosion guidelines, which have been developed for use by designers for use on public transportation projects, such as bridges. Generally, these structures are more highly sensitive to corrosion of concrete and steel when compared to the proposed development.

Mid Pacific Engineering, Inc. do not practice corrosion engineering. Therefore, to further define the soil corrosion potential at the site, or to determine the need or design parameters for cathodic protection or grounding systems, a Registered Corrosion Engineer should be consulted.

Import fills, if used for construction, should be sampled and tested to verify the materials have corrosion characteristics within acceptable limits and generally should be similar to the tested on-site soils.

GROUNDWATER

Subsurface conditions encountered during our investigations indicate depth to groundwater is 24 to 25 feet beneath the project site. Groundwater was encountered in the borings, advanced on June 13, 2023 and June 18 and 19, 2024, to an approximate maximum explored depth of 51 feet bgs.

SEASONAL WATER

The near-surface soils may be in a near-saturated condition during and for a significant time following the rainy season. Earthwork operations attempted following the onset of the rainy season and prior to prolonged drying will likely be hampered by high soil moisture contents. Heavy, prolonged rainfall events will promote high soil moisture contents and increase the potential for trapped water over impermeable soil layers that could further affect grading operations. If grading operations are to proceed shortly after the rainy season, and before prolonged periods of warm dry weather, the near-surface soils and soils to be used as engineered fill, including trench backfill, may be at moisture contents where significant and prolonged aeration or lime-treatment may be required to dry the soils to a moisture content where the specified degree of compaction can be achieved. The contractor should anticipate the additional time and effort necessary to achieve a compactable moisture content.

Groundwater or seepage water may be present within excavations, depending upon the time of year when construction takes place. The need for dewatering of excavations or other drainage provisions can best be determined during site work when subsurface conditions are fully exposed.

Seasonal moisture and landscape irrigation will result in high soil moisture contents below interior floor slabs throughout their lifetime. Moisture vapor penetration resistance should be a significant consideration in design and construction of interior floor slabs.

EROSION AND WINTERIZATION

The near-surface on-site soils generally consist of very loose to dense silty sand with gravel-sized rock fragments; and loose to medium dense silty sand to an approximate maximum explored depth of 51 feet bgs. In our opinion, the undisturbed pyroclastic flow deposits may be susceptible to erosion by surface run-off that occurs during intense rainfall. As a minimum, erosion control measures including placement of straw bale sediment barriers or construction of silt filter fences in areas where surface run-off may be concentrated would be prudent. The project civil engineer should develop a site-specific erosion and sediment control plan based upon their site grading and drainage plan and the anticipated construction schedule.

All excavations should be protected from concentrated storm water run-off to minimize potential erosion. Control of water over slopes may be accomplished by constructing small berms at the top of the slope, constructing V-ditches near the top of the slope, or by grading the area behind the top of the slope to drain away from the slope. Ponding of surface water at the top of the slope or allowing sheet flow of water over the top of the slope should be avoided.

RECOMMENDATIONS

The project is in a preliminary stage of design; therefore, we consider it essential that our office review site, grading, and structural foundation plans to verify the applicability of the following recommendations, perform additional investigations, and provide supplemental recommendations, as conditions dictate. Our recommendations are contingent upon our office performing the recommended plan reviews and providing a letter indicating that the recommendations of this report are applicable to the proposed construction. Grading plans were not available for review at the time this report was prepared. However, based on the following SITE PREPARATION section of this report, excavations and fills of one to two feet in depth may be required for development of the planned improvements.

Based on our field investigation and laboratory testing, it is our opinion on-site, near-surface soils are variable with respect to density and support quality. In addition, site clearing operations and removal of existing surface and subsurface structures will disturb a majority of the near-surface soils creating variable density and support conditions. Therefore, we will recommend proper processing and re-compaction of native soils below building pad elevations and all site structural areas to promote more uniform support for slab-on-grade structures, foundations, pavements and concrete flatwork.

Soils located beneath existing pavements will likely be at elevated moisture contents regardless of the time of year of construction and require drying. Wet soils should be anticipated and considered in the construction schedule for this project.

Existing structures, concrete slabs, and asphalt pavements were observed during our review of historical aerial photographs and Google Earth images containing the project site, and during the field investigation phase of our work. Therefore, the contractor should anticipate additional excavation, backfilling and reworking of areas that may contain previous existing structures, foundations, concrete slabs, pavements, and/or soft, loose, disturbed artificial fill and native soils.

The recommendations presented below are appropriate for typical construction in the late spring through fall months. The on-site soils likely will be saturated by rainfall in the winter and spring months, and will not be compactable without drying by aeration or the addition of lime (or a similar product) to dry the soils. The soils exposed at the bottoms of excavations and those soils removed from excavations may be too wet to compact, requiring an extended period of drying or other stabilization methods. In our opinion, wet soils should be anticipated and considered in the construction schedule for this project. Should the construction schedule require work to continue during the wet months, additional recommendations should be provided by the Geotechnical Engineer retained to provide services during project construction.

SITE CLEARING

Initially, all structural areas of the site should be cleared of existing surface and subsurface structures, foundations, trees, vegetation, debris, and other deleterious materials to expose firm and stable soil conditions as identified by our on-site representative. Our review of available literature and historical photographs provide a limited site history. Therefore, known (foundations) and unknown buried structures (utility lines, etc.) may be present on-site and may be encountered during construction. If encountered, these structures should be removed and the resulting cavities or holes should be backfilled with properly moisture conditioned and compacted engineered fill as described in this report.

The contractor should anticipate additional excavation, backfilling and reworking of areas that may contain existing and former structures. We recommend construction bid documents contain a unit price (price per cubic yard) for additional excavation of unsuitable materials and replacement with engineered fill.

Where practical, the clearing should extend a minimum of five feet beyond the limits of the proposed improvements and structural areas of the site. Existing underground utilities, if encountered, located within the proposed building pad should be completely removed and/or rerouted as necessary. Utilities located outside the building area should be properly abandoned (i.e., fully grouted provided the abandoned utility is situated at least 2½ feet below the final subgrade level to reduce the potential for localized "hard spots").

Remaining areas should be stripped of surface vegetation and organically contaminated topsoil; strippings may be stockpiled for later use or disposed of off-site. Strippings should not be used in general fill construction, but may be used in landscaped areas, provided they are kept at least five feet from the building pads, exterior flatwork, and moisture conditioned and compacted. *Strippings should not be used in landscaped berms that will support sound walls, retaining walls, concrete flatwork, or other at-grade structures.* Discing of the organics into the surface soils may be a suitable alternate to stripping, depending on the condition and quantity of the organics at the time of grading.

Adequate removal of debris and rubble may require laborers and handpicking to clean the subgrade soils to the satisfaction of our on-site representative. Depressions resulting from clearing operations and any other loose, disturbed, soft or otherwise unstable materials should be completely removed to expose firm, undisturbed native soils, widened as necessary to allow compaction equipment access, and backfilled in accordance with the recommendations of this report.

It is essential that our representative be present during clearing operations to verify adequate removal of existing and former structures, determine pad over-excavation depths, and determine the need for additional re-compaction and/or stabilizations of disturbed soil areas. Excavations resulting from clearing operations should be left as shallow dish-shaped depressions for proper location and to allow proper access with compaction equipment during grading operations. If clearing and removal of structures takes place without direct observation by the Geotechnical Engineer, deeper cross-ripping and/or over-excavation of the disturbed areas, building pads or structural areas affected will be required.

Site Preparation

Following site clearing activities, all areas designated to receive fill, remain at-grade or achieved by excavation, should be scarified to a depth of 12 inches, uniformly moisture conditioned to achieve at least the optimum moisture content, and compacted to at least 90 percent of the ASTM D1557 maximum dry density. Grades must be properly compacted and stable. It should be anticipated that some over-excavation and/or stabilization could be needed in these areas, if the soils are wet, soft or unstable at the time of construction.

Compaction operations should be undertaken with a heavy, self-propelled, sheepsfoot compactor (Caterpillar CP5 or equivalent sized compactor) capable of providing adequate compaction and should be performed in the presence of our representative who will evaluate the performance of the subgrade under compactive load and identify loose or unstable soils that could require additional excavation and/or compaction. Loose, soft, or unstable soils, as identified by our representative in the field, should be cleaned out to firm, undisturbed and stable soils, as determined by our representative, and should be restored to grade with engineered fill compacted in accordance with the recommendations of this report. Difficulty in achieving subgrade compaction or unusual soil instability may be indications of loose fill associated with past subsurface items. Should these conditions exist, the materials should be excavated to check for subsurface structures and the excavations backfilled with engineered fill. We recommend construction bid documents contain a unit price (price per cubic yard) for all excess excavation due to loose, soft, or unsuitable materials and replacement with engineered fill.

ENGINEERED FILL CONSTRUCTION

Engineered fill should be placed in horizontal lifts not exceeding six inches in compacted thickness. Engineered fill should be brought to at least the optimum moisture content, and compacted to at least 90 percent of the maximum dry density as determined by ASTM D1557. Compaction operations should be undertaken with a heavy, self-propelled, sheepsfoot compactor (Caterpillar CP5 or equivalent sized compactor) capable of providing adequate compaction. Additional passes with the compactor shall be added, as required by the Geotechnical Engineer, to achieve a firm, stable and unyielding subgrade condition. Compactive effort should be applied uniformly across the full width of fill construction.

The on-site soils are considered suitable for use as engineered fill provided the materials are at a workable moisture content and free of rubbish, rubble, debris and concentrations of organics, are non-expansive, and have a maximum particle size of three inches or less for fill within the upper 24 inches of the final building pad elevation. Fills soils at depths greater than 24 inches below the building pad may contain maximum particle sizes of six inches or less. Hand picking of exposed roots, rubbish, debris, and over-sized rock should be performed by the Contractor to adequately clear the grades and properly prepare and clear the soils proposed as fill, prior to use.

Imported fill material, if required, should consist of well-graded granular soils or well-graded aggregates with a Plasticity Index of 15 or less, an Expansion Index of 20 or less, and should have no particles greater than three inches in maximum dimension. Clean, open graded gravels (such as crushed rock or pea gravel) and other such materials are *not* acceptable for fill construction. The contractor also should supply appropriate documentation for imported fill materials indicating the materials are free of known contamination and have corrosion characteristics within acceptable limits. The imported materials should be sampled, tested, and approved before being transported to the project site. Samples should be submitted to the Geotechnical Engineer at least two weeks prior to planned importation to the site.

The upper 12 inches of final building and structural pad subgrades should be scarified, brought to at least the optimum moisture content, and uniformly compacted to not less than 90 percent of the maximum dry density, as determined by ASTM D1557, regardless of whether final grade is completed by excavation, filling, or left at-grade.

The upper six inches of pavement subgrades and exterior slab subgrades supporting vehicle loadings should be scarified, moisture conditioned to at least the optimum moisture content, and uniformly compacted to at least 95 percent of the ASTM D1557 maximum dry density, and must be stable under construction traffic prior to placement of aggregate base. Final exterior slab subgrade processing and compaction should be performed just prior to placement of aggregate base, after construction of underground utilities is complete.

Site preparation should be accomplished in accordance with the recommendations of this section and the *Guide Earthwork Specifications* provided in Appendix B. It is essential that a representative from our office be present on a nearly full-time basis during site preparation and all grading operations to verify complete removal of undocumented fills and/or unstable soil deposits, to observe the earthwork construction, perform compaction testing and verify compliance with our recommendations and the job specifications.

Utility Trench Backfill

Utility trench backfill should be mechanically compacted in maximum six-inch lifts. Trench backfill should be brought to uniform moisture content above the optimum moisture and each lift mechanically compacted to at least 90 percent of the maximum dry density. The upper six inches of trenches in pavement areas should be compacted to at least 95 percent of the maximum dry density. Jetting of trench backfill as a means of compaction is not acceptable. We recommend that native soil be used as trench backfill within the perimeter of building foundations to help minimize soil moisture variations beneath the structures. The native soil backfill should extend at least three feet horizontally beyond perimeter foundation lines. Utility trenches within the building perimeters should be backfilled with compactable material matching the upper 12 inches of building subgrade material.

We recommend that underground utility trenches that are aligned nearly parallel with foundations be at least three feet laterally from the outer edge of foundations, wherever possible. As a general rule, trenches should not encroach into the zone extending outward at a 1:1 (horizontal to vertical) inclination below the bottom of the foundations. In addition, trenches parallel to foundations should not remain open longer than 72 hours. The intent of these recommendations is to prevent loss of both lateral and vertical support of foundations, resulting in possible settlement.

CANOPY FOUNDATION DESIGN

We are providing design soil values for the analysis of proposed foundations, and suggested minimums for dimensions, but only from a Geotechnical Engineering perspective. The project Structural Engineer should determine final foundation design width and depth dimensions and reinforcing requirements, based on their specific structural design which should include an appropriate factor of safety applied to the overall design. In addition, we recommend the canopy roof be constructed with a membrane roof to reduce vertical loads on the pier foundations and the risk to human life during the design seismic event.

The proposed McCloud Hall canopy may be supported upon, drilled, cast-in-place concrete piers. We recommend the piers consist of a drilled, straight-shafted hole filled with concrete, and reinforced with steel to resist and transfer lateral and axial loads. Further, we recommend the piers extend to a minimum depth of 25 feet below existing (and final) adjacent site grades, have a minimum diameter of 24 inches and generally not extend below an approximate depth of 45 feet below existing site grade.

Axial Capacities

Cast-in-place, concrete piers constructed in accordance with recommendations provided herein may be designed to resist downward loads using an allowable end bearing pressure of 2,000 pounds per square foot (psf) and an allowable unit skin friction of 60 psf. Due to the presence of undocumented fill, the uppermost 3 feet of the embedded portion of foundation should be neglected when evaluating the skin friction component of the axial capacities.

The allowable end bearing pressure provided above is a net value; therefore, the weight of pier may be neglected when evaluating downward capacities.

Lateral Capacities

We have provided following design parameters for the use of LPILE computer program used in the evaluation of lateral capacities of pier foundations.

Depth (Feet)	Unit Weight (pcf)	Sand Modulus k (pci)	Clay Modulus k (pci)	Soil Strain E_{50} (%)	Friction Angle Φ (degrees)	Cohesion (psf)	Passive Pressure, (psf/ft) 1)
0 - 2							
2 - 5	105	25			27		140
5 - 10	105	25			27		140
10 - 15	105	25			27		140
15 - 20	115	110			31		165
20 - 24	110	55			29		160
24 - 30	70	80			31		160
30 - 35	70	105			32		160
35 - 40	75	155			33		160
40 - 45	75	130			33		155

1) Equivalent fluid weight (psf/ft). Allowable value with a factor of safety of 2.

Furthermore, lateral capacity may be evaluated using the "Pole Formula" given in Sections 1807.3.1 through 1807.3.3 of the California Building Code (CBC, 2022 edition). For this method, we recommend a lateral soil bearing pressure of 1,500 pounds per square foot per foot of embedment be used for analysis. If applicable, the 100 percent increase allowed by the Code for isolated poles (which are not adversely affected by a ½-inch horizontal deflection at the ground surface due to short-term lateral loads) may be used for design.

To account for possible loss of subgrade support due to surface disturbance and presence of undocumented fill, we recommend soil located within the uppermost three feet of the embedded portion of pier be neglected when evaluating lateral capacities and/or deflections.

Interconnections Requirements

We recommend the tops of all proposed piers be structurally connected using a system of grade beams, preferably spanning all piers in two orthogonal directions. Alternatively, if a concrete slab will span between piers, this slab may be used to structurally connect the proposed piers provided this slab has sufficient structural stiffness and strength to sustain the design loads.

Estimated Settlement

Total pier settlement, including static and seismic, is estimated to be approximately 3½ to seven inches; differential settlement is estimated to be approximately four inches.

Excavation Conditions

Relatively cohesionless soils were encountered during our field exploration program. In our opinion, the presence of relatively cohesionless soils may hinder drilling operations for the proposed piers, possibly requiring casing, drilling fluids, and/or other methods to advance and maintain excavation stability at those depths.

Casing

If casing is used, we recommend it be removed from the pier excavation as concrete is being placed. The bottom of the casing should be maintained below the top of the concrete at all times during casing withdrawal and concrete placement. Further, continuous vibration or other approved methods should be used during casing withdrawal to reduce the potential for void space formation within the concrete. Abandoning the casing in-place should not be allowed.

Drilling Fluids

If drilling fluids[3] are used to facilitate construction of the proposed pier, we recommend steel reinforcement and concrete be placed immediately upon completion of pier to reduce the quantity of suspended soil particles which may settle to the bottom of the hole. Further, we recommend all pier construction operations which utilize drilling fluids be performed in accordance with procedures outlined in the Federal Highway Administration publication titled: *Drilled Shafts: Construction Procedures and Design Methods*.

[3] Drilling fluids are typically composed of water mixed with bentonite or a synthetic thickener to increase density and consistency.

Bottom Preparation

All debris and any loose or disturbed soil should be removed to the extent possible from the pier excavation just prior to placing reinforcing steel and/or concrete. A representative from Mid Pacific Engineering should observe the pier excavation to verify that subsurface conditions are consistent with those encountered during our field investigation.

Steel and Concrete Placement

Reinforcing steel and/or concrete should be placed immediately upon completion of the pier excavation. If water is present during concrete placement, or if drilling fluids are used to advance the pier excavation, concrete should be pumped or otherwise discharged to the bottom of the hole via a hose or tremie pipe. The end of the hose or tremie pipe must remain below the top surface of any water, drilling fluids, and the in-place concrete at all times. In addition, concrete used for pier construction should be consolidated using vibratory methods over the entire length and width of the pier. If water and/or drilling fluids are present, concrete within the upper portion of the pier should be consolidated to the extent possible upon removal of these fluids.

In order to develop the design skin friction value provided above, concrete used for pier construction should have a slump of from four to six inches if placed in a dry shaft without temporary casing, and from six to eight inches if casing and/or drilling fluids are used. The concrete mix should be designed with appropriate admixtures and/or water/cement ratios to achieve these recommended slumps; adding water to a conventional mix to achieve the recommended slump should not be allowed.

INTERIOR FLOOR SLAB SUPPORT

Interior concrete slab-on-grade floors can be suitably supported upon the soil subgrades prepared and constructed in accordance with the recommendations in this report and maintained in that condition (at or near optimum moisture conditions).

Interior slab-on-grade floors should be at least four inches thick and, as a minimum, contain chaired No. 3 reinforcing bars on 18-inch center-on-center spacing, located at mid-slab depth. This slab reinforcement is suggested as a guide "minimum" only; final reinforcement and joint spacing should be determined by the Structural Engineer and/or Architect based on their specific design analysis, anticipated slab loading and uses, and Owner's performance expectations. It is emphasized that thicker slabs with greater reinforcing will be needed in areas supporting higher loads or where increased performance is desired.

Temporary loads exerted during construction from vehicle traffic, cranes, forklifts, and storage of palletized construction materials should be considered in the design of the slab-on-grade floors. In addition, loads exerted by future activities must be considered in slab-on-grade floor design. Proper and consistent location of the reinforcement at mid-slab is essential to its performance. The risk of uncontrolled shrinkage cracking is increased if the reinforcement is not properly located within the slab.

Floor slabs may be underlain by a layer of free-draining crushed rock, serving as a deterrent to migration of capillary moisture. The crushed rock layer should be at least four inches thick and graded such that 100 percent passes a one-inch sieve and none passes a No. 4 sieve. Moisture protection may be provided by placing a plastic water vapor retarder (at least 10-mils thick) directly over the crushed rock. The plastic water vapor retarder should meet or exceed the minimum specifications as outlined in ASTM E1745. An optional, thin layer of clean sand above the membrane is acceptable, as an aid to curing of the slab concrete.

For increased support and if heavier floor loads are anticipated, the crushed rock section (if used) beneath interior slab-on-grade floors should be replaced with a thicker section of Class 2 aggregate base (minimum of four inches) compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557.

Consideration should be given to using a thicker, higher quality membrane for additional moisture protection such as a 15-mil thick Stego vapor barrier or other product. The membrane should be installed so that there are no holes or uncovered areas. All seams should overlap and be sealed with manufacturer-approved tape, continuous at the laps to create vapor tight conditions. All perimeter edges of the membrane, such as pipe penetrations, interior and exterior footings, joints, etc., should be sealed or caulked per manufacturer's recommendations. An optional, thin layer of clean sand above the membrane is acceptable, as an aid to curing of the slab concrete.

It is emphasized that thicker slabs with greater reinforcing will be needed in areas supporting higher loads or where increased performance is desired, especially within the areas that may be subjected to heavy concentrated loads from vehicles, forklifts, and storage of products. The Architect or Structural Engineer should determine the final thickness, strength, reinforcement, and joint spacing of slab-on-grade concrete based on anticipated slab loadings, proposed uses and desired performance.

Floor slab construction over the past 25 years or more has included placement of a thin layer of sand over the vapor retarder membrane. The intent of the sand is to aid in the proper curing of the slab concrete. However, recent debate over excessive moisture vapor emissions from floor slabs includes concern for water trapped within the sand. Therefore, we consider the use of the sand layer as optional. The concrete curing benefits should be weighed against efforts to reduce slab moisture vapor transmission. It has been our experience that slab concrete placed directly on the vapor barrier may be more susceptible to non-uniform curing and shrinkage, bleeding, and curling; therefore, it is our opinion that the concrete mix and curing methods used for construction should take into account these potential issues.

The recommendations presented above are intended to mitigate any significant soils related cracking of the slab-on-grade floors. More important to the performance and appearance of a Portland cement concrete slab is the quality of the concrete, the workmanship of the concrete contractor, the curing techniques utilized and the spacing of control joints.

Floor Slab Moisture Penetration Resistance

It is considered likely that floor slab subgrade soils will become wet to near saturated at some time during the life of the structures. This is a certainty when slab subgrades are constructed during the wet seasons or when constantly wet ground or poor drainage conditions exist adjacent to structures. For this reason, it should be assumed that all slabs in occupied areas, as well as those intended for moisture-sensitive floor coverings or materials, require protection against moisture or moisture vapor penetration. Standard practice includes the gravel and water vapor retarder as suggested above. However, the gravel and plastic membrane offer only a limited, first-line of defense against soil-related moisture. Recommendations contained in this report concerning foundation and floor slab design are presented as *minimum* requirements, only from the geotechnical engineering standpoint.

It is emphasized that the use of sub-slab crushed rock and water vapor retarder will not "moisture proof" the slab, nor does it assure that slab moisture transmission levels will be low enough to prevent damage to floor coverings or other building components. If increased protection against moisture vapor penetration of slabs is desired, a concrete moisture protection specialist should be consulted. The architect and design team should consider all available measures for slab moisture protection. It is commonly accepted that maintaining the lowest practical water-cement ratio in the slab concrete is an effective way to help reduce future moisture vapor penetration of the completed slabs.

Exterior Flatwork (Non-Pavement Areas)

Areas to receive exterior concrete flatwork should be scarified, moisture conditioned and properly compacted just prior to placement of concrete, as recommended in this report, and maintained in that condition. The upper 12 inches of exterior flatwork subgrades should consist of on-site or imported granular (non-expansive) soils. Uniform moisture conditioning of subgrade soils is important to reduce the risk of non-uniform moisture withdrawal from the concrete and the possibility of plastic shrinkage cracks. Practices recommended by the Portland Cement Association and American Concrete Institute for proper placement and curing of concrete should be followed during exterior concrete flatwork construction. Some seasonal movement of flatwork should be anticipated.

The architect or structural engineer should determine the final thickness, strength, reinforcement, and joint spacing of exterior slab-on-grade concrete; however, we offer the following suggested minimum guidelines. Exterior flatwork should be at least four inches thick and be constructed independent of perimeter building foundations and isolated column foundations by the placement of a layer of felt material between the flatwork and the foundation. Reinforcement should consist of at least heavy-duty welded wire fabric (flat sheets), or equivalent steel reinforcing bars, placed mid-depth of the slab. Thicker slabs constructed with thickened edges to at least twice the slab thickness should be constructed where light wheeled traffic or intermittent light loading is expected over the slabs. Public sidewalk design, thickness and construction should conform to local jurisdiction requirements.

Site Drainage

Final site grading should be accomplished to provide positive drainage of surface water away from buildings and structures and prevent ponding of water adjacent to foundations, slabs or pavements. The grade adjacent to structures should be sloped away from the foundations at a minimum two percent slope for a distance of at least five feet, where possible. Landscape berms, if planned, should be constructed in such a manner as to promote drainage away from the buildings. Proper control of surface water drainage is essential to the performance of foundations, slabs-on-grade, and pavements. We recommend using full-roof gutters, with downspouts from roof drains connected to rigid non-perforated piping directed to an appropriate drainage point away from the structures, or discharging onto paved surfaces leading away from the structures and foundations. Concentrated storm water discharge collected from roof downspouts or surface drains should not be allowed to drain on unprotected slopes adjacent to structures. The ground should be graded to drain positively away from all flatwork and building structures. Ponding of surface water should be avoided near pavements, foundations, and flatwork. Landscape berms, if planned, should be constructed in such a manner as to promote drainage away from the buildings.

All excavations and fill slopes should be protected from concentrated storm water run-off to minimize potential erosion. Control of water over the slopes may be accomplished by constructing V-ditches near the top of slopes or behind the top of retaining walls, or by grading the area behind the top of slope to drain away from the slope. Ponding of surface water or allowing sheet flow of water over any open excavation must be avoided.

Earthwork Testing and Observation

Site preparation should be accomplished in accordance with the recommendations of this report and the appended *Guide Earthwork Specifications*. Representatives of Mid Pacific Engineering, Inc. must be present during site preparation and all grading operations to observe and test the fills to verify compliance with our recommendations and the job specifications. In the event that MPE is not retained to provide geotechnical engineering observation and testing services during construction, the Geotechnical Engineer retained to provide this service should indicate in writing that they agree with the recommendations of this report, and prepare supplemental recommendations as necessary.

A final report by the "Geotechnical Engineer" should be prepared upon completion of the project indicating compliance with or deviations from this report and the project plans and specifications. Please be aware that the title Geotechnical Engineer is restricted in the State of California to a Civil Engineer authorized by the State of California to use the title "Geotechnical Engineer."

FUTURE SERVICES

We recommend that our firm be given the opportunity to review the final plans and specifications to verify that the intent of our recommendations has been implemented in those documents. Testing and approval of proposed import sources is an essential requirement to qualify the proposed soils for use as engineered fill for this project. This sampling and testing should be completed well in advance of the proposed start of construction.

LIMITATIONS

Our recommendations are based upon the information provided regarding the proposed construction, combined with our analysis of site conditions revealed by the field exploration and laboratory testing programs. We have used our best engineering judgment based upon the information provided and the data generated from our investigation. This report has been prepared in accordance with generally accepted standards of practice existing in northern California at the time of the report. No warranty, either express or implied, is provided.

If the proposed construction is modified or re-sited; or, if it is found during construction that subsurface conditions differ from those we encountered at the test boring locations, we should be afforded the opportunity to review the new information or changed conditions to determine if our conclusions and recommendations must be modified. Mid Pacific Engineering, Inc., should be retained to review the final plans and specifications to verify that the intent of our recommendations has been implemented in those documents.

We emphasize that this report is applicable only to the proposed construction and the investigated site and should not be utilized for construction on any other site. The conclusions and recommendations of this report are considered valid for a period of two years. If design is not completed and construction has not started within two years of the date of this report, the report must be reviewed and updated, as necessary.

Mid Pacific Engineering, Inc.

Woody Joe Pollard
Senior Engineering Geologist

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WOODY JOE POLLARD
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Geologic Hazards and Geotechnical Engineering Report
COLLEGE OF THE SISKIYOUS THEATER ARTS RENOVATION AND MCCLOUD HALL CANOPY
MPE No. 05040-03
Weed, California

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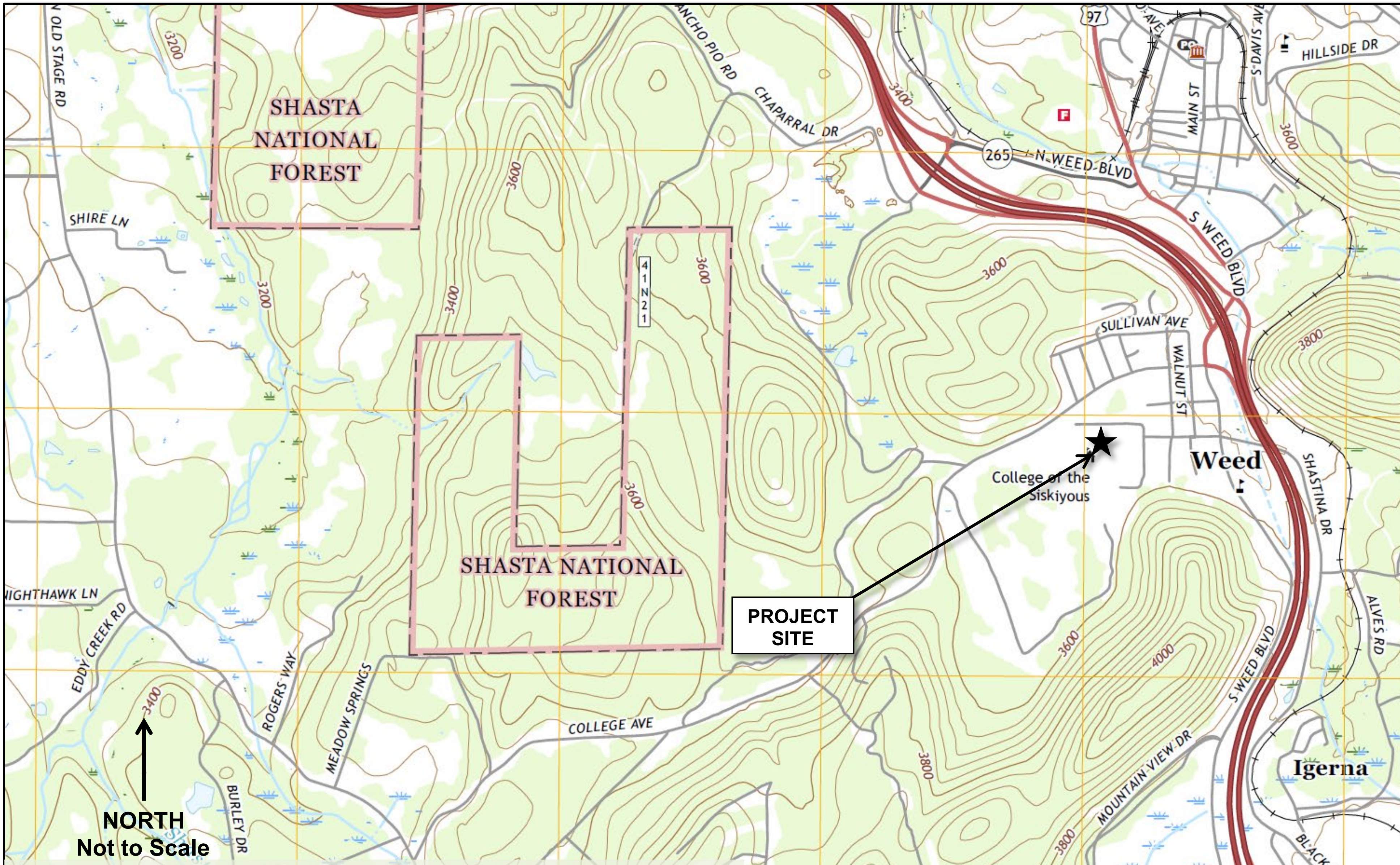
FIGURES



NOTES: Adapted from USGS *Weed Quadrangle, California – Siskiyou County, 7.5-Minute Series,* 2021.

MPE
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VICINITY MAP

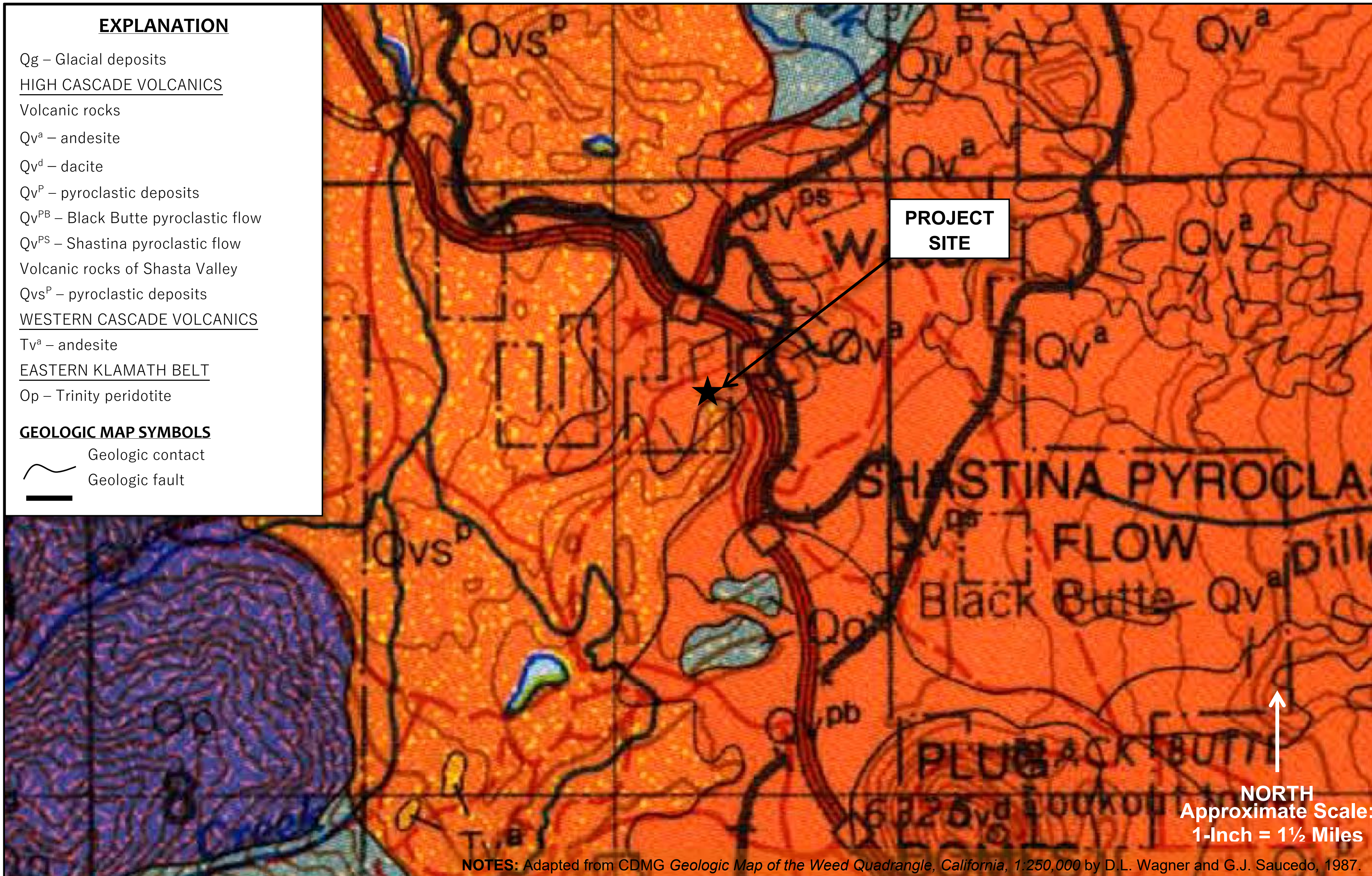
COLLEGE OF THE SISKIYOUS THEATER ARTS RENOVATION and MCCLOUD HALL CANOPY

800 College Avenue
Weed, California

FIGURE 1

Date: 07/26

MPE No. 05040-03



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REGIONAL GEOLOGIC MAP

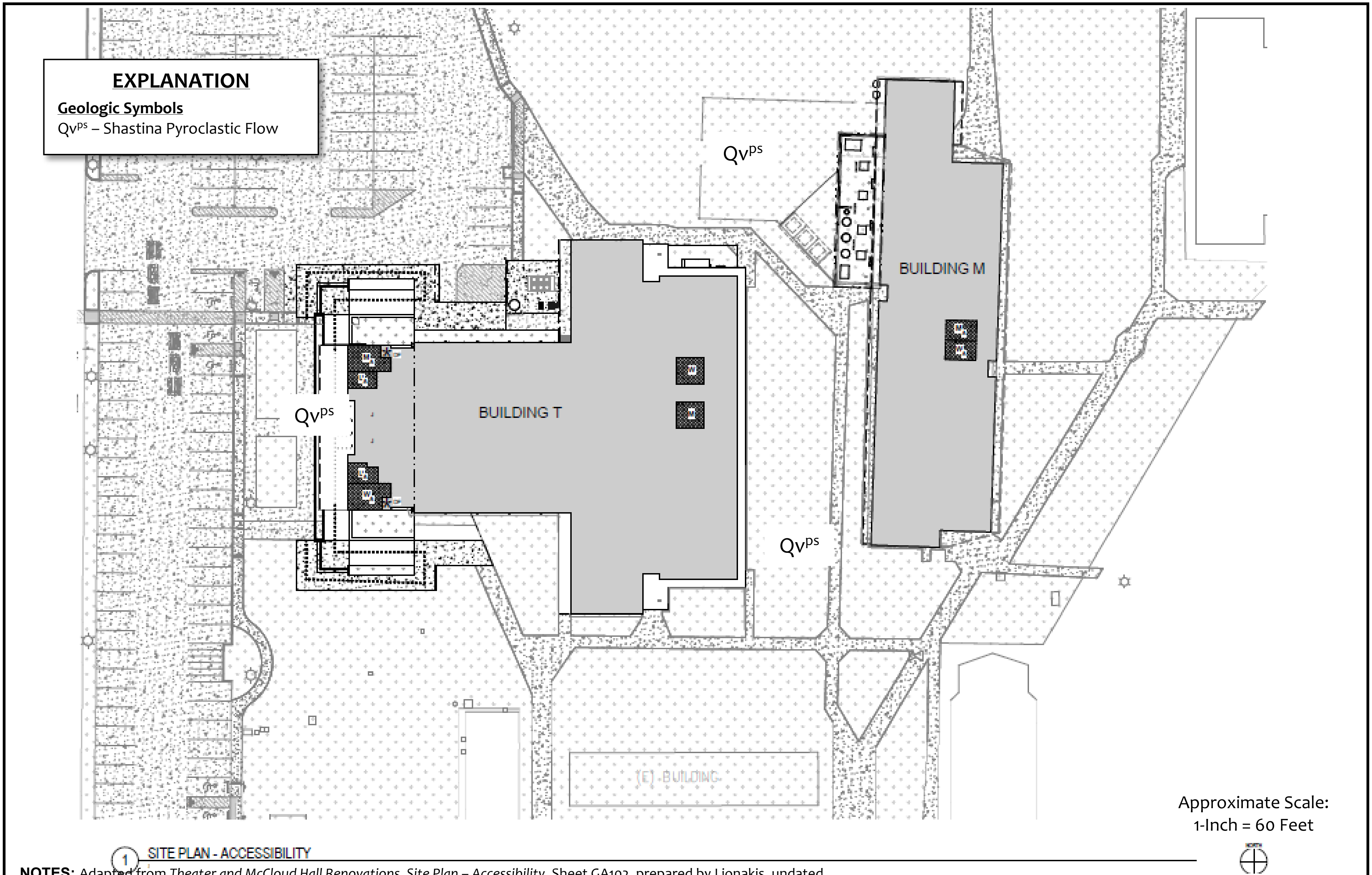
COLLEGE OF THE SISKIYOUS THEATER ARTS RENOVATION and MCCLOUD HALL CANOPY

800 College Avenue
Weed, California

FIGURE 2

Date: 07/26

MPE No. 05040-03



NOTES: Adapted from *Theater and McCloud Hall Renovations*, *Site Plan – Accessibility*, Sheet GA102, prepared by Lionakis, undated.

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PROJECT SITE GEOLOGIC MAP

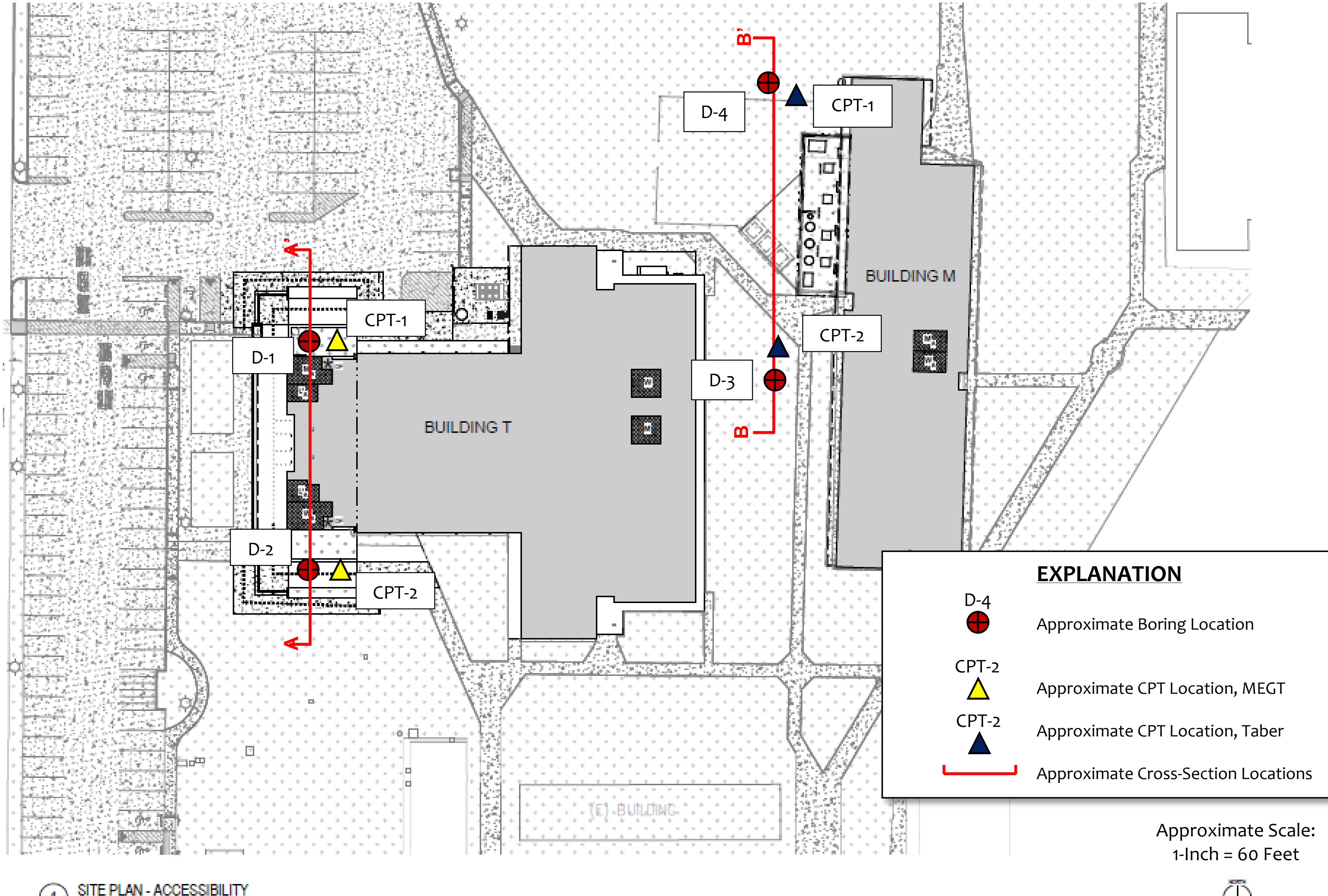
COLLEGE OF THE SISKIYOUS THEATER ARTS RENOVATION and MCCLOUD HALL CANOPY

800 College Avenue
Weed, California

FIGURE 3

Date: 07/26

MPE No. 05040-03



NOTES: Adapted from *Theater and McCloud Hall Renovations, Site Plan – Accessibility*, Sheet GA102, prepared by Lionakis, undated.

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SITE INVESTIGATION MAP

COLLEGE OF THE SISKIYOUS MCCLOUD HALL RENOVATION

800 College Avenue
Weed, California

FIGURE 4

Date: 07/26

MPE No. 05040-03

Project: MCCLOUD HALL THEATER ARTS BUILDING RENOVATION Project Location: 800 College Avenue, Weed, CA MPE Number: 05040-03	LOG OF SOIL BORING D-1 Sheet 1 of 3

Date(s) Drilled	13-Jun-23	Logged By	WJP	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Lawrence & Associates	Total Depth of Drill Hole	51 Feet
Drill Rig Type	CME-55	Diameter(s) of Hole, inches	8 Inches	Approx. Surface Elevation, ft MSL	+3,587 Feet
Groundwater Depth [Elevation], feet	25 Feet	Sampling Method(s)	140 lb Hammer/30 inch drop	Drill Hole Backfill	Bentonite
Remarks					

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG		SAMPLE DATA: SAMPLE	SAMPLE NUMBER	BLOWS PER FOOT	TEST DATA: MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
	0		Asphalt Concrete/Aggregate Base						
3,585			**Shastina Pyroclastic Flow (Qv^{ps})** Medium dense, dry to slightly moist, light gray-brown, silty fine to coarse sand (SM), trace fine gravel-sized rock fragments		D1-1	18	11.7	89	%-200 14.3 Triax ϕ=27° c=2 psf
	5		Very loose, slightly moist, light gray-brown, silty fine to coarse sand (SM), some fine gravel-sized rock fragments		D1-2	7			Triax ϕ=18° c=250 psf
3,580									
	10		Medium dense, slighlty moist, light brown-gray, silty fine to coarse sand (SM), some fine to coarse gravel-sized rock fragments		D1-3	26			
3,575									
	15		Medium dense, slighlty moist, light brown-gray, silty fine to coarse sand (SM), some fine to coarse gravel-sized rock fragments		D1-4	17	11.7	75	%-200 20.4
3,570									
	20		Medium dense, slighlty moist, light brown-gray, silty fine to medium sand (SM), some fine to coarse gravel-sized rock fragments		D1-5	25			%-200 19.1
3,565									
			Groundwater encountered at 24 feet						
	25		Medium dense, wet, light brown-gray, silty fine to medium sand (SM)		D1-6	35			

Project: MCCLOUD HALL THEATER ARTS BUILDING RENOVATION	LOG OF SOIL BORING D-2
Project Location: 800 College Avenue, Weed, CA	
MPE Number: 05040-03	Sheet 1 of 1

Date(s) Drilled	13-Jun-23	Logged By	WJP	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Lawrence & Associates	Total Depth of Drill Hole	21 Feet
Drill Rig Type	CME-55	Diameter(s) of Hole, inches	8 Inches	Approx. Surface Elevation, ft MSL	+3,579 Feet
Groundwater Depth [Elevation], feet	20½ Feet	Sampling Method(s)	140 lb Hammer/30 inch drop	Drill Hole Backfill	Bentonite
Remarks					

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE NUMBER	BLOWS PER FOOT	TEST DATA: MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
			Shastina Pyroclastic Flow (Qv^{ps}) Loose to medium dense, slightly moist, light gray-brown, silty fine to medium sand. Roots to ½-inch diameter						
3,575					D2-1	14			Triax ϕ=27° c= 2psf
	5		Loose to medium dense, slightly moist, light brown-gray, silty fine to medium sand, some fine gravel-sized rock fragments		D2-2	14	6.6	83	
3,570	10		Medium dense, slightly moist, light brown-gray, silty fine to coarse sand (SM), some fine to coarse gravel-sized rock fragments		D2-3	26	9.1	96	
3,565	15		Medium dense, slightly moist, light brown-gray, silty fine to coarse sand (SM), some fine to coarse gravel-sized rock fragments		D2-4	21			
3,560	20		Medium dense, wet, light brown-gray, silty fine to coarse (SM), scattered fine to coarse gravel-sized rock fragments Groundwater encountered at 20½ feet		D2-5	34			
3,555	25		Total Depth = 21 Feet Groundwater Encountered at 20½ Feet Backfilled with Bentonite						

Project: COS THEATER ARTS/MCCLOUD HALL CANOPY	LOG OF SOIL BORING D-3
Project Location: 800 College Drive, Weed, CA	
MPE Number: 05040-03	Sheet 2 of 2

Date(s) Drilled	18-Jun-24	Logged By	WJP	Checked By	
Drilling Method	Hollow Stem Augers	Drilling Contractor	Taber Drilling	Total Depth of Drill Hole	40 Feet
Drill Rig Type	CME-55	Diameter(s) of Hole, inches	6 Inches	Approx. Surface Elevation, ft MSL	+3,578 Feet
Groundwater Depth [Elevation], feet	24 Feet	Sampling Method(s)	140 lb Hammer/30 inch drop	Drill Hole Backfill	Cement Grout
Remarks					

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE NUMBER	BLOWS PER FOOT	TEST DATA: MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
		SM	Dense, wet, gray-brown, silty fine to coarse sand (SM) with fine to coarse gravel-sized rock fragments		D3-6	35			%-200 18.1
3,730									
	30	SM	Very dense, wet, gray-brown, silty fine to coarse sand (SM) with fine to coarse gravel-sized rock fragments		D3-7	50			
3,725									
	35	SM	Dense, wet, gray, silty fine to coarse sand (SM) with fine to coarse gravel-sized rock fragments		D3-8	43			%-200 16.8
3,720									
			Boring heaving. Unable to sample or continue drilling.						
	40		Total Depth = 40 Feet Groundwater Encountered at 24 Feet Backfilled with Cement Grout						
3,715									
	45								
3,710									
	50								

MPE *Mid Pacific Engineering, Inc .*

FIGURE 7

Project: COS THEATER ARTS/MCCLOUD HALL CANOPY	LOG OF SOIL BORING D-4
Project Location: 800 College Drive, Weed, CA	
MPE Number: 05040-03	Sheet 1 of 1

Date(s) Drilled	18-Jun-24	Logged By	WJP	Checked By	
Drilling Method	Hollow Stem Augers	Drilling Contractor	Taber Drilling	Total Depth of Drill Hole	21½ Feet
Drill Rig Type	CME-55	Diameter(s) of Hole, inches	6 Inches	Approx. Surface Elevation, ft MSL	+3,578 Feet
Groundwater Depth [Elevation], feet	24 Feet	Sampling Method(s)	140 lb Hammer/30 inch drop	Drill Hole Backfill	Cement Grout
Remarks					

ELEVATION, feet	DEPTH, feet	GRAPHIC LOG	ENGINEERING CLASSIFICATION AND DESCRIPTION	SAMPLE DATA: SAMPLE	SAMPLE NUMBER	BLOWS PER FOOT	TEST DATA: MOISTURE CONTENT, %	DRY UNIT WEIGHT, pcf	ADDITIONAL TESTS
	0		**High Cascade Volcanics-Shastina Pyroclastic Flow (Qv^{ps})** Very loose, slightly moist, gray-brown, silty fine to coarse sand (SM), some fine gravel-sized rock fragments						
3,585									
					D4-1	7			
	5		Very loose, slightly moist, gray-brown, silty fine to coarse sand (SM), some fine gravel-sized rock fragments		D4-2	7			
3,580									
	10		Medium dense, slightly moist, brown-gray, silty fine to coarse sand (SM), scattered fine gravel-sized rock fragments		D4-3	35			
3,575									
	15		Medium dense, slightly moist, gray-brown, silty fine to coarse sand (SM) with fine to coarse gravel		D4-4	17			
3,570									
	20		Dense, moist, brown-gray, silty fine to coarse sand (SM) with fine to coarse gravel-sized rock fragments		D4-5	51			
3,565			Total Depth = 21½ Feet Groundwater Not Encountered Backfilled with Cement Grout						
	25								

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		SYMBOL	CODE	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of soil > no. 200 sieve size)	GRAVELS (More than 50% of coarse fraction > no. 4 sieve size)	GW		Well graded gravels or gravel - sand mixtures, little or no fines
		GP		Poorly graded gravels or gravel - sand mixtures, little or no fines
		GM		Silty gravels, gravel - sand - silt mixtures
		GC		Clayey gravels, gravel - sand - silt mixtures
	SANDS (50% or more of coarse fraction < no. 4 sieve size)	SW		Well graded sands or gravelly sands, little or no fines
		SP		Poorly graded sands or gravelly sands, little or no fines
		SM		Silty sands, sand - silt mixtures
		SC		Clayey sands, sand clay mixtures
FINE GRAINED SOILS (More than 50% of soil < no. 200 sieve size)	SILTS & CLAYS LL< 50	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL		Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays
		OL		Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LL ≥ 50	MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH		Inorganic clays of high plasticity, fat clays
		OH		Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt		Peat and other highly organic soils
ROCK		RX		Rocks, weathered to fresh
FILL		FILL		Artificially placed fill material

OTHER SYMBOLS

= Drive Sample: 2-1/2" O.D. Modified California sampler

= Hand Driven Sample

=SPT Sampler

= Initial Water Level

= Final Water Level

= Estimated or gradational material change line

= Observed material change line

Laboratory Tests

- PI = Plasticity Index
- EI =Expansive Index
- UCC = Unconfined Compression Test
- TR = Triaxial Compression Test
- GR = Gradation Analysis (Sieve)
- K = Permeability Test

GRAIN SIZE CLASSIFICATION

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL coarse (c) fine (f)	3" to No. 4 3" to 3/4" 3/4" to No. 4	76.2 to 4.76 76.2 to 19.1 19.1 to 4.76
SAND coarse (c) Medium (m) fine (f)	No. 4 to No. 200 No. 4 to No. 10 No. 10 to No. 40 No. 40 to No. 200	4.76 to 0.074 4.76 to 2.00 2.00 to 0.420 0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074

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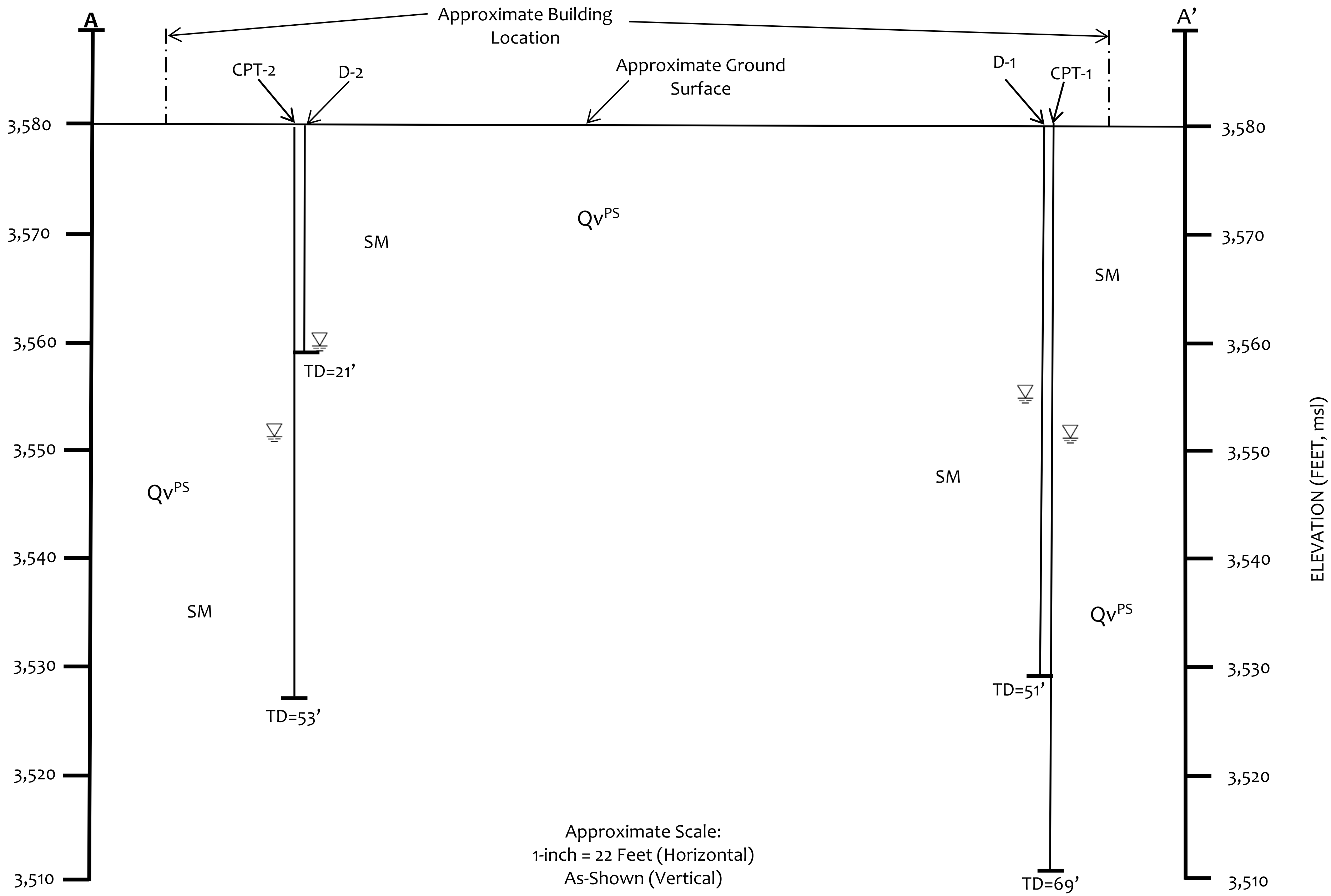
UNIFIED SOIL CLASSIFICATION SYSTEM
COLLEGE OF THE SISKIYOUS THEATER OF THE ARTS AND MCCLOUD HALL CANOPY
800 College Avenue

FIGURE 9
Date: 07/26
MPE No. 05040-03



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GEOLOGIC CROSS SECTION A-A'

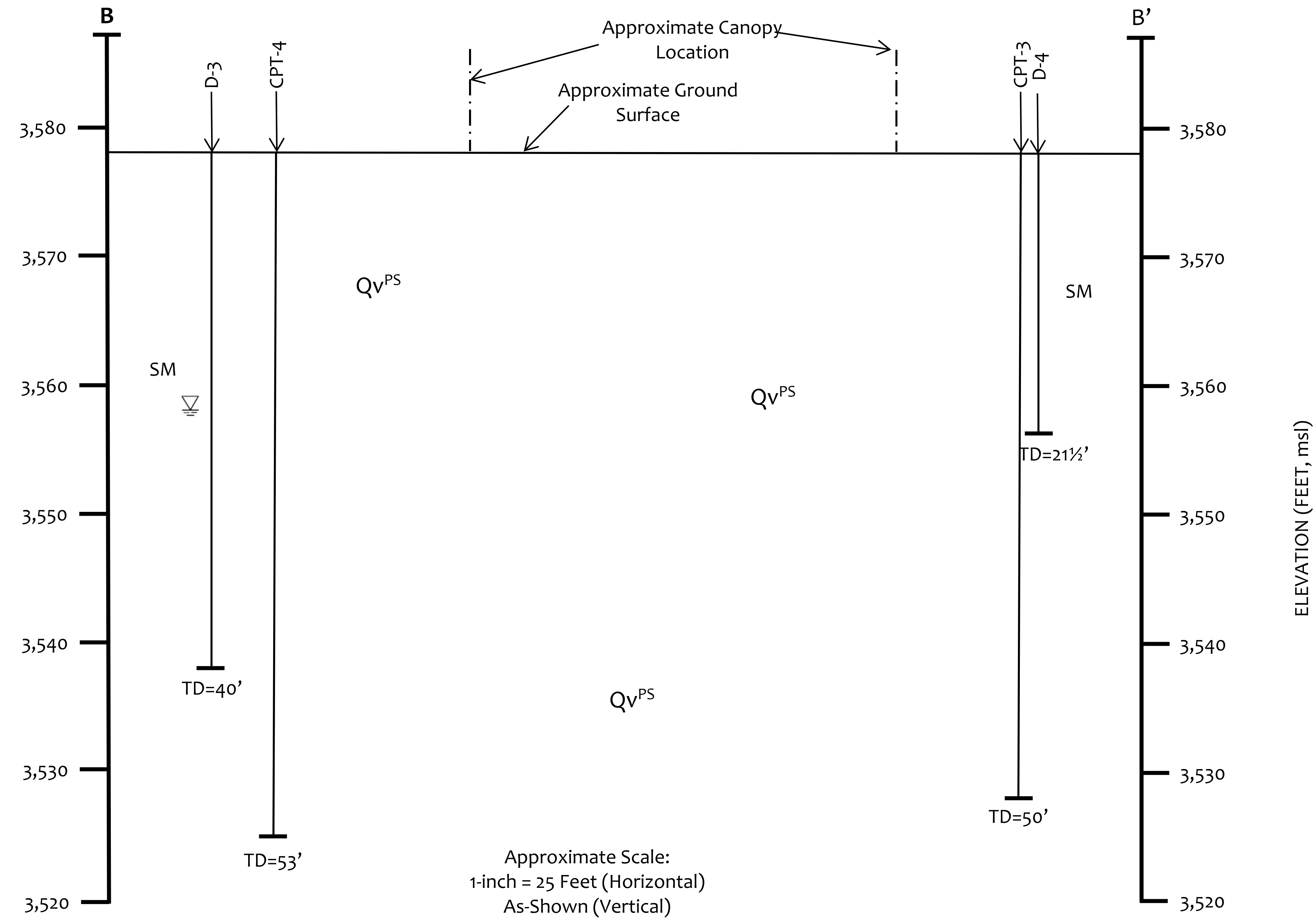
COLLEGE OF THE SISKIYOUS THEATER OF THE ARTS AND MCCLOUD HALL CANOPY

800 College Avenue
Weed, California

FIGURE 10

Date: 07/24

MPE No. 05040-03



MPE
MID PACIFIC ENGINEERING, INC.

GEOLOGIC CROSS SECTION B-B'

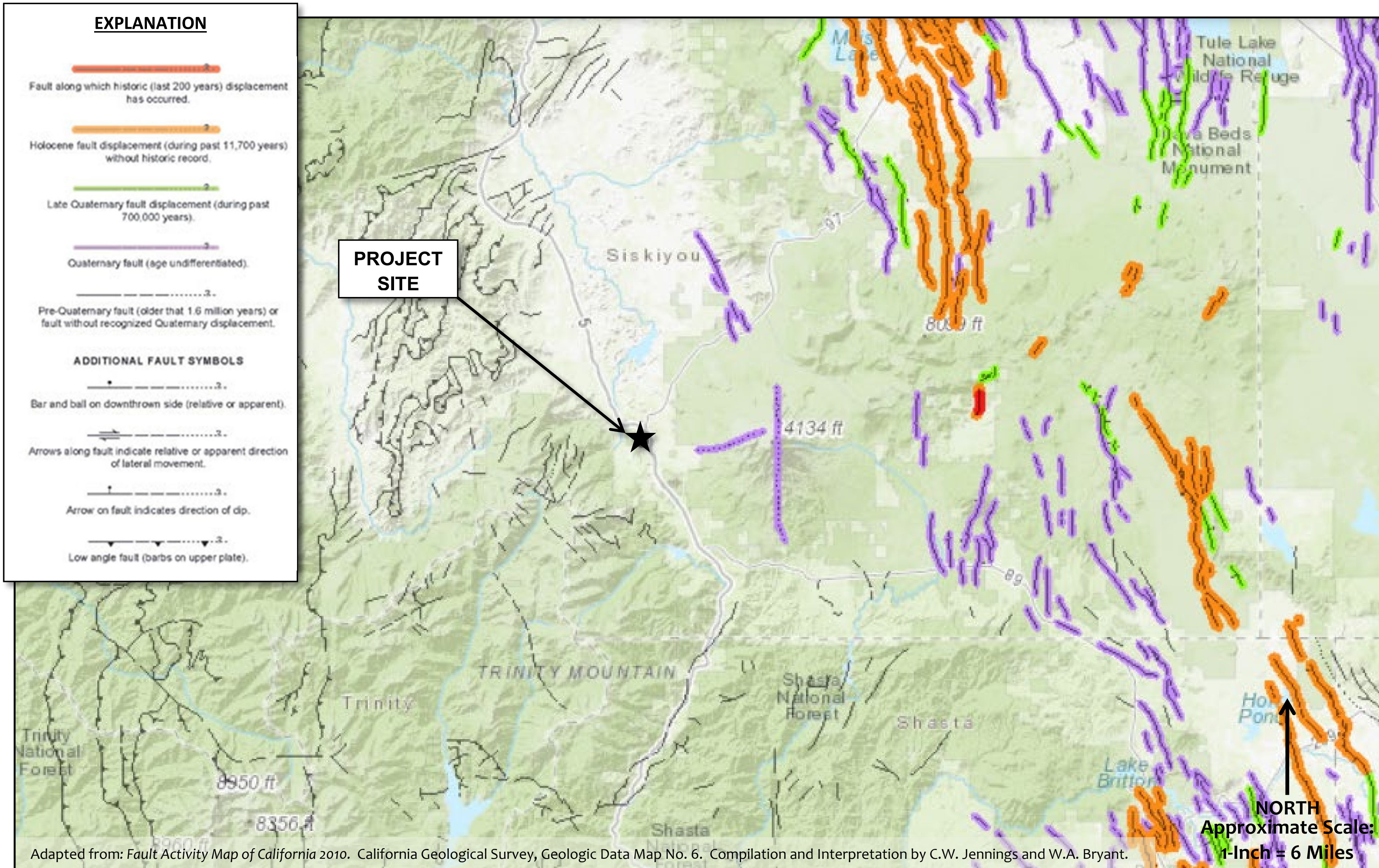
COLLEGE OF THE SISKIYOUS THEATER OF THE ARTS AND MCCLOUD HALL CANOPY

800 College Avenue
Weed, California

FIGURE 11

Date: 07/26

MPE No. 05040-03



Adapted from: *Fault Activity Map of California 2010.* California Geological Survey, Geologic Data Map No. 6. Compilation and Interpretation by C.W. Jennings and W.A. Bryant.

MID PACIFIC ENGINEERING, INC.

REGIONAL FAULT MAP

COLLEGE OF THE SISKIYOUS THEATER ARTS and MCCLOUD HALL CANOPY

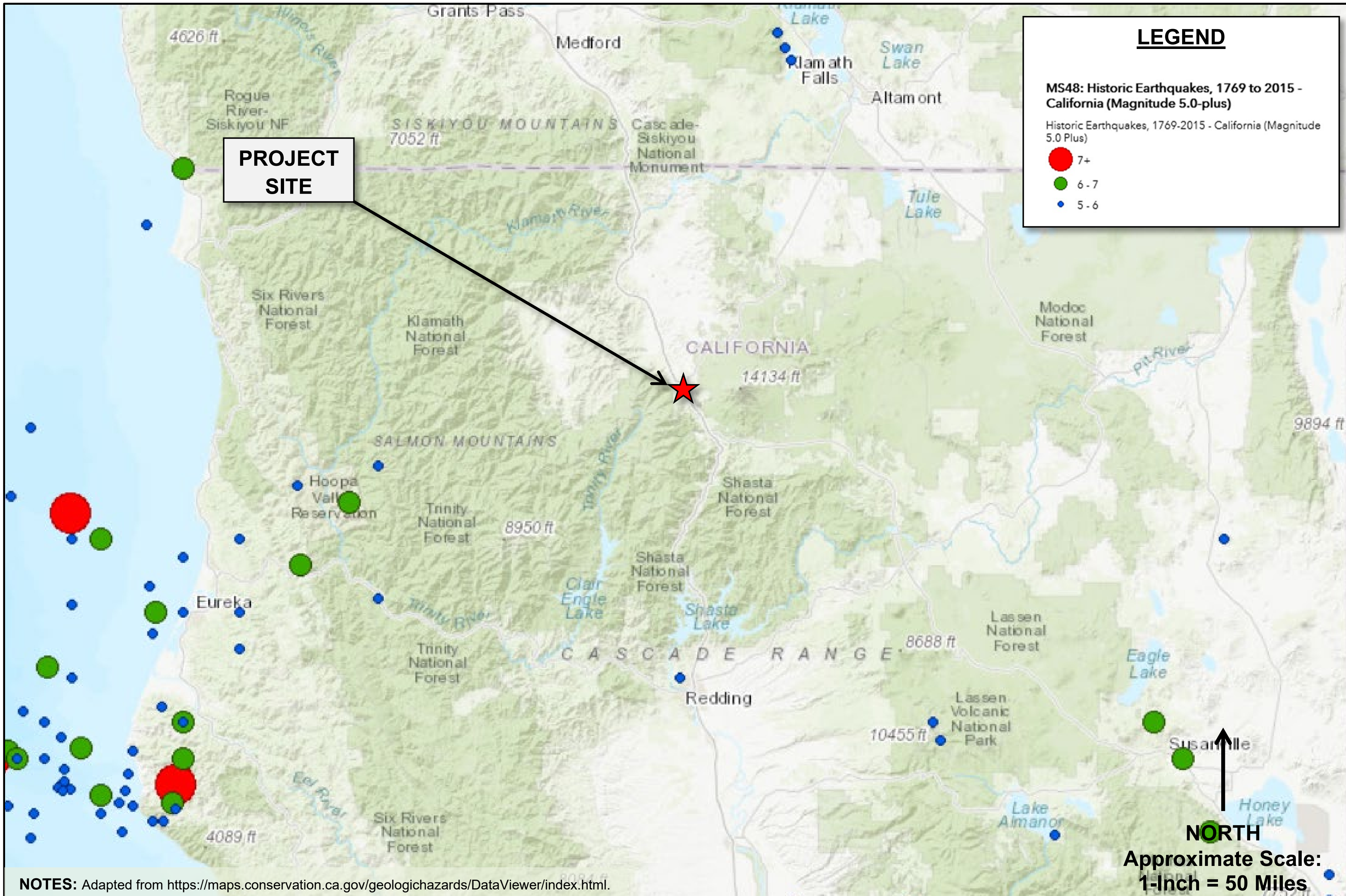
800 College Avenue

Weed, California

FIGURE 12

Date: 07/26

MPE No. 05040-03



NOTES: Adapted from https://maps.conservation.ca.gov/geologichazards/DataViewer/index.html.

MID PACIFIC ENGINEERING, INC.

EARTHQUAKE EPICENTER MAP

COLLEGE OF THE SISKIYOUS THEATER ARTS and MCCLOUD HALL CANOPY

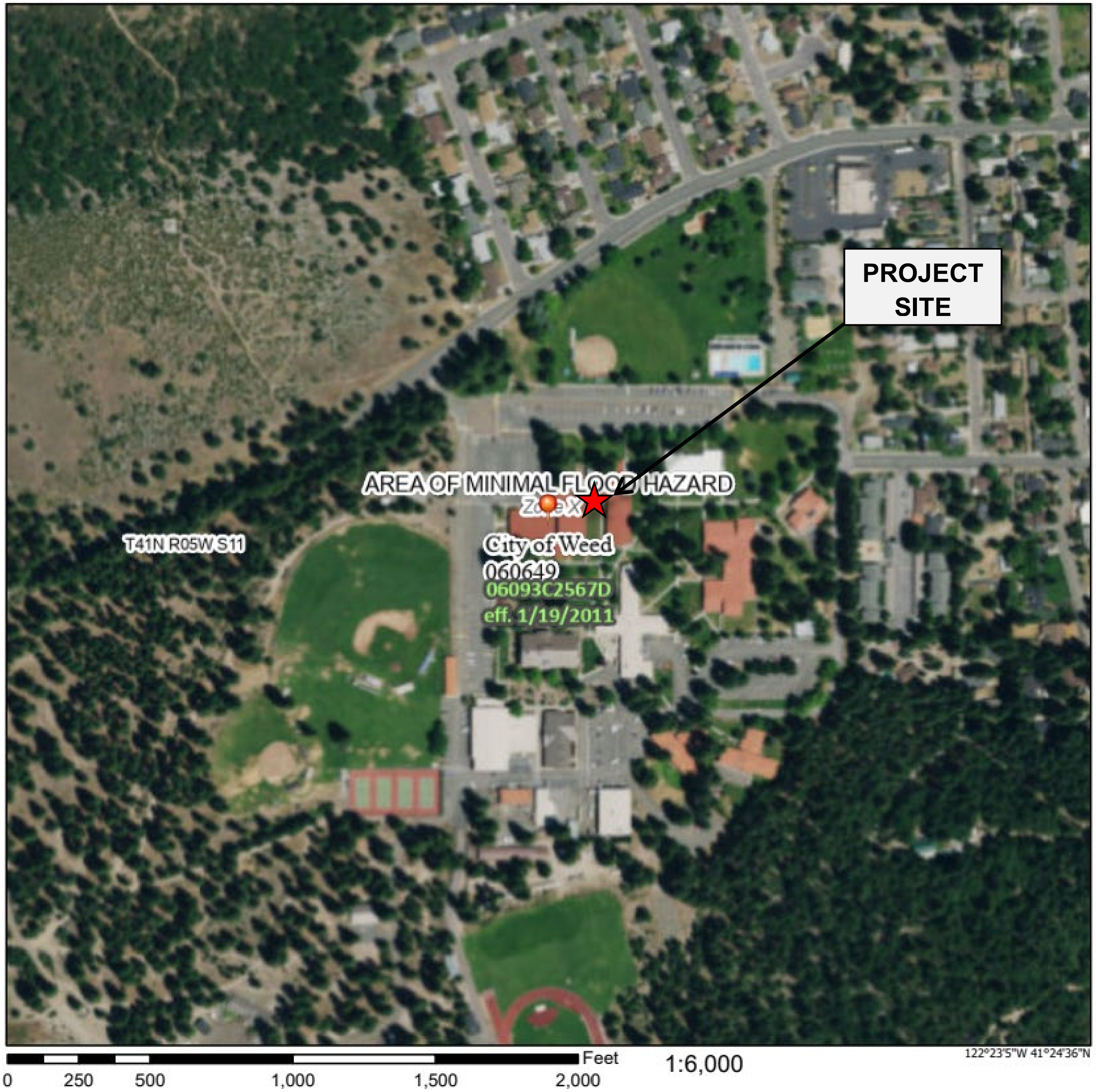
800 College Avenue

Weed, California

FIGURE 13

Date: 07/26

MPE No. 05040-03



SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/24/2023 at 2:43 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

6

NOTES: Adapted from *Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM), Map Number 06093C2567D* (1/19/11).

MPE
MID PACIFIC ENGINEERING, INC.

FEMA FLOOD MAP

COLLEGE OF THE SISKIYOUS THEATER ARTS and MCCLOUD HALL CANOPY

800 College Avenue
Weed, California

FIGURE 14

Date: 07/26

MPE No. 05040-03

APPENDICES

APPENDIX A

APPENDIX A

A. GENERAL INFORMATION

The performance of a Geologic Hazards and Geotechnical Engineering Report for the proposed College of the Siskiyous Theater Arts Building and McCloud Hall Canopy project to be located at 800 College Avenue in Weed, California, was authorized by Ms. Veronica Rivera, Director of Facilities and Maintenance, on May 23, 2024. Authorization was for an investigation describe in our proposal letter (MPE No. 24-0314 of May 22, 2024), sent to Ms. Rivera.

The project Architect is Lionakis, whose mailing address is 2025 19th Street, Sacramento, California, 95818; telephone (916) 558-1900.

In performing this investigation we referenced the following project plans and documents:

- *Theater and McCloud Hall Renovations, Site Plan – Campus Site*, Sheet GA101, prepared by Lionakis, dated September 15, 2023.
- *Theater and McCloud Hall Renovations, Site Plan – Accessibility*, Sheet GA102, prepared by Lionakis, dated September 15, 2023.
- *College of the Siskiyous, Plan – Foundation – Level 1 – Canopy*, Sheet M.S-111, prepared by Lionakis, undated.

In addition, we reviewed Google Earth images and historical aerial photographs containing the site; the United States Geological Survey (USGS) *Weed Quadrangle, California – Siskiyou* (2022); and the *Geologic Map of the Weed Quadrangle, California, 1:250,000* (1987) produced by the USGS.

B. FIELD EXPLORATION

Two exploratory soil borings were advanced on June 13, 2023 to approximate depths of 21 and 51 feet below existing site grades (bgs) utilizing a truck-mounted CME-55 drill rig equipped with eight-inch diameter, hollow stem augers. In addition, two Cone Penetration Tests (CPTs) were advance on June 16, 2023 to approximate depths of 52½ and 69 feet bgs. Two additional borings were advanced on June 18 and 19, 2024 to approximate depths of 21½ and 40 feet bgs utilizing a track-mounted CME-55 drill rig equipped with four-inch diameter, solid flight augers; and six-inch diameter, hollow stem augers. Two additional CPTs were advanced on June 17 and 18, 2024 to approximate depths of 50 and 53 feet bgs. Figure 4 of the attached report shows approximate boring and CPT locations.

At various intervals, soil samples were recovered from boring D-2 using a Standard Penetration Test (SPT) sampler. In addition, relatively undisturbed soils samples were recovered from boring D- with a 2½-inch O.D., 2-inch I.D. Modified California sampler (ASTM D3550). The SPT and Modified California samplers were driven by an automatic 140-pound hammer freely falling 30 inches. The number of blows of the hammer required to drive the 18-inch long samplers each six-inch interval was recorded with the sum of the blows required to drive the sampler the lower 12-inch interval being designated the penetration resistance or "blow count" for that particular drive.

The samples obtained with the modified California sampler were retained in two-inch diameter by six-inch long, thin-walled brass tubes contained within the sampler. Immediately after sample recovery, the field engineering geologist visually classified the soil in the tubes and the ends of the tubes were sealed to preserve the natural moisture contents. Disturbed bulk samples of the surface materials also were obtained at various locations and depths. Soil samples were taken to our laboratory for additional classification (ASTM D2488) and selection of samples for testing.

The Logs of Soil Borings, Figures 5 and 8, contain descriptions of the soils encountered in each boring. An explanation of the Unified Soil Classification System, and the symbols used on the logs are contained on Figure 9.

C. LABORATORY TESTING

Selected disturbed and undisturbed soil samples were tested to determine dry unit weight (ASTM D2937), natural moisture content (ASTM D2216), Expansion Index (ASTM D4829), Unconfined Compression Test (ASTM D2166), Triaxial Shear Testing (ASTM4767), and percent passing the No. 200 sieve (ASTM D1140). The test results are included in the GHZ-GER and/or on the boring logs at the depth each sample was obtained.

Two representative sample of on-site soils was tested by Sunland Analytical Lab to determine the preliminary corrosion characteristics of the soil (CT 417, 422 & 643). The test results are presented in the Geologic Hazards and Geotechnical Engineering Report.

Expansion Index testing (ASTM D4829) was performed on one composite bulk sample of the near-surface soils. Test results are presented on Figure A1.

LABORATORY TEST RESULTS

Unit Weight/Moisture Content		Percent Moisture	Dry Density (pcf)
Sample ID:	D1-1I	11.7	89

D1-4I	11.7	75
D2-2I	6.6	83

Percent Passing the No. 200 Sieve

Sample ID:		
	D1-1	14.3
	D1-4	20.4
	D1-5	19.17
	D1-8	18.5
	D1-9	13.1
	D1-10	12.2
	D3-2	15.1
	D3-3	16.6
	D3-4	16.8
	D3-6	18.1
	D3-8	16.8

Triaxial Shear Test Results (Effective Stress)		Friction angle (°)	Cohesion, psf
Sample ID:	D1-1I	27.0°	2
	D1-4I	8.0°	250

Expansion Index

EI_{50} = 0.

Corrosion Characteristics

See Soil Corrosion Potential, see page 24 of the report.

Input parameters used in our seismic settlement analysis included the following:

- Earthquake magnitude $M_w = 9.34$
- Maximum acceleration 0.379g
- Project groundwater elevation 24 to 25 feet bgs

Output parameters derived from our analysis include the following:

- Maximum settlement Seven-inches

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APPENDIX B

APPENDIX B

GUIDE EARTHWORK SPECIFICATIONS

REVISED GEOLOGIC HAZARDS AND GEOTECHNICAL ENGINEERING REPORT
COLLEGE OF THE SISKIYOUS THEATER ARTS RENOVATIONAND MCCLOUD HALL CANOPY

800 College Avenue
Weed, California
MPE No. 05040-03

PART 1: GENERAL

1.1 SCOPE

A. General Description

This item shall include clearing of all surface and subsurface structures including fences, surface debris, including all trees, vegetation, stockpiled soil, and any other items designated for removal; preparation of surfaces to be filled, including over-excavations, filling, spreading, compaction, observation and testing of the fill; and all subsidiary work necessary to complete the grading of the building area to conform with the lines, grades and slopes as shown on the accepted Drawings.

B. Related Work Specified Elsewhere

1. Trenching and backfilling for sanitary sewer system: Section ______.
2. Trenching and backfilling for storm drain system: Section ______.
3. Trenching and backfilling for underground water, natural gas, and electric supplies: Section ______.

C. Geotechnical Engineer

Where specific reference is made to "Geotechnical Engineer" this designation shall be understood to include either him or his representative.

1.2 PROTECTION

A. Adequate protection measures shall be provided to protect workers and passers-by at the site. Streets and adjacent property shall be fully protected throughout the operations.

B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.

C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on or near the construction site.

D. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.

E. Surface drainage provisions shall be made during the period of construction in a manner to avoid creating a nuisance to adjacent areas.

F. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance.

1.3 GEOTECHNICAL REPORT

A. A Revised Geologic Hazards and Geotechnical Engineering Report (MPE No. 05040-03; dated July 26, 2024) has been prepared for this site by Mid Pacific Engineering, Inc., Geotechnical Engineers. A copy is available for review at the office of Mid Pacific Engineering, Inc., 6310 State Highway 273, Anderson, California 96007.

B. The information contained in this report was obtained for design purposes only. The Contractor is responsible for any conclusions he/she may draw from this report; should the Contractor prefer not to assume such risk, he/she should employ their own experts to analyze available information and/or to make additional investigations upon which to base their conclusions, all at no cost to the Owner.

1.4 EXISTING SITE CONDITIONS

The Contractor shall be acquainted with all site conditions. If un-shown active utilities are encountered during the work, the Architect shall be promptly notified for instructions. Failure to notify will make the Contractor liable for damage to these utilities arising from Contractor's operations subsequent to the discovery of such un-shown utilities.

1.5 SEASONAL LIMITS

Fill material shall not be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rains or snow, fill operations shall not be resumed until field tests indicate that the moisture contents of the subgrade and fill materials are satisfactory.

PART 2: PRODUCTS

2.1 MATERIALS

A. All fill shall be of approved local materials from required excavations, supplemented by imported fill, if necessary. Approved local materials are defined as local granular soils free from significant quantities of rubble, rubbish and vegetation, and having been tested and approved by the Geotechnical Engineer prior to use. Clods, rocks or hard lumps exceeding three inches (3") in final size shall not be allowed in the upper twenty-four (24") inches of any fill supporting pavements and structures. Expansive clays shall not be used within the upper twelve inches (12") of the building pad or exterior flatwork subgrades, or subgrades supporting at-grade structures, unless lime-treated.

B. Imported fill materials shall meet the above requirements; shall have plasticity indices not exceeding fifteen (15) when tested in accordance with ASTM D4318 test method; an Expansion Index less than twenty (20) when tested in accordance with ASTM D4829 test method; shall be of three (3”) inch maximum particle size; and, shall be approved by the Geotechnical Engineer prior to transportation to the project site.

C. Import fill shall be clean of contamination with appropriate documentation and shall have corrosion characteristics within acceptable limits. All imported materials shall be sampled, tested and approved by the Geotechnical Engineer prior to being transported to the site.

D. Asphalt concrete, aggregate base, aggregate subbase, and other paving products shall comply with the appropriate provisions of the *State of California (Caltrans) Standard Specifications*, latest editions.

PART 3: EXECUTION

3.1 LAYOUT AND PREPARATION

Lay out all work, establish grades, locate existing underground utilities, set markers and stakes, set up and maintain barricades and protection of utilities--all prior to beginning actual earthwork operations.

3.2 CLEARING, GRUBBING AND PREPARING BUILDING PADS AND PAVEMENT AREAS

A. The site shall be cleared of trees, vegetation, stockpiled soil, and structures designated for removal including but not limited to, concrete slabs, retaining walls, septic tanks and leach fields, utilities to be relocated or abandoned including backfill, debris, rubbish, rubble, and other unsuitable materials. Exposed remnants, rubble and debris shall be removed from the subgrades. Hand picking of exposed roots, rubble and debris shall be performed by the Contractor to adequately clear the grades. Subsurface utilities to be relocated or abandoned shall be removed from within and to at least five feet beyond the perimeter of the proposed structural areas; utilities located outside the building area should be properly abandoned (i.e., fully grouted provided the abandoned utility is situated at least two and one-half feet (2½’) below the final subgrade level to reduce the potential for localized “hard spots).

Excavations and depressions resulting from the removal of such items, as well as any existing excavations or loose soil deposits, as determined by the Geotechnical Engineer, shall be cleaned out to firm, undisturbed soil and backfilled with suitable materials in accordance with these specifications.

B. Following site clearing operations, proper processing of the near-surface soils shall be performed to the depths and lateral extents as recommended in the Geotechnical Engineering Report. Hand picking and/or screening of roots, rubble and debris shall be performed by the Contractor to adequately clear the soils proposed for use in engineered fill construction.

C. Cut portions of building pads consisting of both cut and fill (cut/fill transitions) should be over-excavated so that the difference in fill depths across the pads is less than five feet in vertical extent.

D. Exposed subgrades shall be scarified to a minimum depth of twelve inches (12”) as recommended in the Geotechnical Engineering Report and until the surface is free from ruts, hummocks or other uneven features that would tend to prevent uniform compaction by the selected equipment.

E. Subgrade preparation and compaction shall extend at least five feet (5') beyond the proposed structure or fill boundary lines, or as required by the Geotechnical Engineer based on the exposed soil and site conditions.

F. When the moisture content of the subgrade is below that required to achieve the specified density, and that minimum content recommended in the geotechnical report, water shall be added until the proper moisture content is achieved.

G. When the moisture content of the subgrade is too high to permit the specified compaction to be achieved, the subgrade shall be aerated by blading or other methods until the moisture content is satisfactory for compaction.

H. After the foundations for fill have been cleared, plowed or scarified, they shall be disced or bladed until uniform and free from large clods, brought to the proper moisture content and compacted to not less than ninety percent (90%)

of the maximum dry density as determined by the ASTM D1557 Compaction Test. Soils compaction shall be performed using a heavy, self-propelled sheepsfoot compactor capable of providing adequate compaction (Caterpillar CP5 or equivalent size). Compaction operations shall be performed in the presence of the Geotechnical Engineer who will evaluate the performance of the materials under compactive load. Wet, soft or unstable soil deposits, as determined by the Geotechnical Engineer, shall be excavated to depths that expose a firm base and grades restored with engineered fill in accordance with these specifications.

3.3 PLACING, SPREADING AND COMPACTING FILL MATERIAL

A. Engineered fills shall be placed in layers which when compacted shall not exceed six inches (6") in thickness. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to promote uniformity of material in each layer.

B. When the moisture content of the fill material is below that required to achieve the specified density, and that minimum content recommended in the geotechnical report, water shall be added until the proper moisture content is achieved.

C. When the moisture content of the fill material is too high to permit the specified degree of compaction to be achieved, the fill material shall be aerated by blading or other methods until the moisture content is satisfactory.

D. After each layer has been placed, mixed and spread evenly, soils shall be thoroughly compacted to at least ninety percent (90%) of the ASTM D1557 maximum dry density. Soils compaction shall be performed using a heavy, self-propelled sheepsfoot compactor, to the satisfaction of our on-site representative. Each layer shall be compacted over its entire area until the desired density has been obtained. Fills deeper than five feet (5') shall be compacted to at least ninety-five percent (95%) of the ASTM D1557 maximum dry density.

E. Fills placed on or adjacent to sloping ground or where fill slopes are to be constructed shall begin with a base key as required in the Geotechnical Engineering Report. Fills placed on or adjacent to existing slopes, or excavation slopes for over- excavation, shall be properly benched into the side slope, as required by the Geotechnical Engineering Report and as recommended by the Geotechnical Engineer at the time of construction.

F. The filling operations shall be continued until the fills have been brought to the finished slopes and grades as shown on the accepted Drawings.

3.4 FINAL SUBGRADE PREPARATION

A. The upper twelve inches (12") of final building pad subgrade and subgrades supporting exterior concrete flatwork or at-grade structures shall consist of approved on-site or imported granular, non-expansive soils or aggregates placed and compacted as engineered fill. Final building pad and flatwork subgrades slabs shall be brought to a uniform moisture content of at least the optimum, and shall be uniformly compacted to at least ninety percent (90%) relative compaction.

B. The upper six inches (6") of final exterior slabs subgrades supporting vehicular traffic shall be brought to a uniform moisture content of at least the optimum moisture content and shall be uniformly compacted to at least ninety-five percent (95%) relative compaction, regardless of whether final subgrade elevations are attained by filling, excavation, or are left at existing grades. Pavement subgrades shall be proof-rolled in the presence of the Geotechnical Engineer prior to placement of aggregate base and shall be stable under construction equipment traffic.

3.5 TRENCH BACKFILL

Utility trench backfill shall be placed in lifts of no more than six inches (6") in compacted thickness. Each lift shall be compacted to at least ninety percent

(90%) compaction, as defined by ASTM D1557. The upper six inches (6") of trench backfill supporting pavement sections shall be compacted to at least ninety-five percent (95%) relative compaction. The upper twelve inches (12") of trench backfill shall match the materials used to construct final building pad subgrade and subgrades supporting exterior concrete flatwork or at-grade structures.

3.6 TESTING AND OBSERVATION

A. Grading operations shall be observed by the Geotechnical Engineer, serving as the representative of the Owner.

B. Field density tests shall be made by the Geotechnical Engineer after compaction of each layer of fill. Additional layers of fill shall not be spread until the field density tests indicate that the minimum specified density has been obtained.

C. Earthwork shall not be performed without the notification or approval of the Geotechnical Engineer. The Contractor shall notify the Geotechnical Engineer at least two (2) working days prior to commencement of any aspect of the site earthwork.

D. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, the Contractor shall make the necessary readjustments until all work is deemed satisfactory, as determined by the Geotechnical Engineer and the Project Design Engineer. No deviation from the specifications shall be made except upon written approval of the Geotechnical Engineer or Project Design Engineer.

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APPENDIX C

College of the Siskiyous McCloud Hall Renovation

Project ID: Mid Pacific Engineering
Data File: SDF(107).cpt
CPT Date: 6/16/2023 11:02:13 AM
GW During Test: 29 ft

Sounding ID: CPT-01
Project No: 05040-03
Cone/Rig: DDG1596

Depth ft	qc PS tsf	qc1n PS -	q1ncs PS -	qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato -	+ Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N1 60	SPT R-N 60	* SPT IcN1 60	* Rel Den -	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic -	* D50 - mm	* Ic SBT Indx	+ Nk -
0.33	229.8	368.6	368.6	229.9	0.6	2.1	0.3	7	grvly SAND to dense SAND	130	6.0	61	38	54	95	48	-	-	5	1.000	1.11	16
0.49	120.0	192.4	192.4	120.1	0.7	4.4	0.6	6	clean SAND to silty SAND	125	5.0	38	24	32	89	48	-	-	5	0.350	1.53	16
0.66	98.1	157.4	167.5	98.2	0.9	3.9	0.9	6	clean SAND to silty SAND	125	5.0	31	20	28	82	48	-	-	7	0.350	1.74	16
0.82	105.4	169.0	172.4	105.4	0.8	2.4	0.8	6	clean SAND to silty SAND	125	5.0	34	21	29	84	48	-	-	6	0.350	1.67	16
0.98	112.6	180.7	180.7	112.7	0.8	0.8	0.7	6	clean SAND to silty SAND	125	5.0	36	23	31	87	48	-	-	5	0.350	1.63	16
1.15	118.7	190.4	190.4	118.7	0.8	0.4	0.7	6	clean SAND to silty SAND	125	5.0	38	24	32	88	48	-	-	5	0.350	1.59	16
1.31	113.3	181.8	181.8	113.3	0.9	0.7	0.8	6	clean SAND to silty SAND	125	5.0	36	23	31	87	48	-	-	5	0.350	1.64	16
1.48	67.7	108.5	119.2	67.7	0.5	0.7	0.7	6	clean SAND to silty SAND	125	5.0	22	14	20	70	48	-	-	8	0.350	1.79	16
1.64	47.6	76.3	96.6	47.6	0.4	0.4	0.9	6	clean SAND to silty SAND	125	5.0	15	10	15	58	48	-	-	12	0.350	1.97	16
1.80	34.4	55.2	78.4	34.5	0.3	0.2	0.9	5	silty SAND to sandy SILT	120	3.0	18	11	11	47	46	-	-	15	0.200	2.08	16
1.97	32.9	52.8	85.1	32.9	0.4	0.5	1.2	5	silty SAND to sandy SILT	120	3.0	18	11	11	46	45	-	-	18	0.200	2.18	16
2.13	33.8	54.2	79.9	33.8	0.3	0.5	0.9	5	silty SAND to sandy SILT	120	3.0	18	11	11	47	45	-	-	16	0.200	2.11	16
2.30	35.5	56.9	100.4	35.5	0.6	0.5	1.6	5	silty SAND to sandy SILT	120	3.0	19	12	12	48	45	-	-	20	0.200	2.24	16
2.46	34.5	55.4	91.3	34.5	0.5	0.9	1.3	5	silty SAND to sandy SILT	120	3.0	18	12	12	47	45	-	-	19	0.200	2.19	16
2.62	39.3	63.1	93.3	39.3	0.5	0.7	1.2	5	silty SAND to sandy SILT	120	3.0	21	13	13	52	45	-	-	16	0.200	2.11	16
2.79	41.3	66.3	131.8	41.4	1.0	1.1	2.5	5	silty SAND to sandy SILT	120	3.0	22	14	15	53	45	-	-	23	0.200	2.31	16
2.95	47.1	75.6	163.0	47.2	1.6	0.8	3.3	5	silty SAND to sandy SILT	120	3.0	25	16	17	58	45	-	-	25	0.200	2.36	16
3.12	55.9	89.6	166.4	55.9	1.6	1.5	2.9	5	silty SAND to sandy SILT	120	3.0	30	19	20	63	46	-	-	21	0.200	2.27	16
3.28	109.8	176.0	214.7	109.8	2.1	1.0	1.9	6	clean SAND to silty SAND	125	5.0	35	22	34	86	48	-	-	11	0.350	1.93	16
3.45	147.3	236.2	245.8	147.3	1.8	1.6	1.2	6	clean SAND to silty SAND	125	5.0	47	29	42	95	48	-	-	6	0.350	1.70	16
3.61	189.1	303.2	303.2	189.1	1.6	2.5	0.8	6	clean SAND to silty SAND	125	5.0	61	38	50	95	48	-	-	5	0.350	1.51	16
3.77	215.6	345.9	345.9	215.7	2.1	3.1	1.0	6	clean SAND to silty SAND	125	5.0	69	43	57	95	48	-	-	5	0.350	1.52	16
3.94	227.0	364.0	364.0	227.1	1.8	4.6	0.8	6	clean SAND to silty SAND	125	5.0	73	45	59	95	48	-	-	5	0.350	1.43	16
4.10	234.3	375.8	375.8	234.4	2.1	5.5	0.9	6	clean SAND to silty SAND	125	5.0	75	47	61	95	48	-	-	5	0.350	1.47	16
4.27	244.0	391.3	391.3	244.1	2.5	6.0	1.0	6	clean SAND to silty SAND	125	5.0	78	49	65	95	48	-	-	5	0.350	1.51	16
4.43	241.4	387.2	387.2	241.6	2.4	7.5	1.0	6	clean SAND to silty SAND	125	5.0	77	48	64	95	48	-	-	5	0.350	1.51	16
4.59	229.2	367.5	367.5	229.3	1.6	6.2	0.7	6	clean SAND to silty SAND	125	5.0	74	46	59	95	48	-	-	5	0.350	1.39	16
4.76	225.3	361.3	361.3	225.4	2.3	6.9	1.0	6	clean SAND to silty SAND	125	5.0	72	45	60	95	48	-	-	5	0.350	1.54	16
4.92	210.7	338.0	338.0	210.9	1.9	6.2	0.9	6	clean SAND to silty SAND	125	5.0	68	42	56	95	48	-	-	5	0.350	1.50	16
5.09	205.0	328.8	328.8	205.0	1.7	2.5	0.8	6	clean SAND to silty SAND	125	5.0	66	41	54	95	48	-	-	5	0.350	1.48	16
5.25	166.3	266.7	266.7	166.4	1.3	3.0	0.8	6	clean SAND to silty SAND	125	5.0	53	33	44	95	48	-	-	5	0.350	1.54	16
5.41	163.8	262.7	262.7	163.9	1.2	3.5	0.7	6	clean SAND to silty SAND	125	5.0	53	33	43	95	48	-	-	5	0.350	1.50	16
5.58	158.5	254.2	254.2	158.6	0.9	3.5	0.6	6	clean SAND to silty SAND	125	5.0	51	32	41	95	48	-	-	5	0.350	1.46	16
5.74	157.7	253.0	253.0	157.8	1.2	3.2	0.7	6	clean SAND to silty SAND	125	5.0	51	32	42	95	48	-	-	5	0.350	1.52	16
5.91	163.5	262.3	262.3	163.6	0.9	3.2	0.6	6	clean SAND to silty SAND	125	5.0	52	33	42	95	48	-	-	5	0.350	1.43	16
6.07	170.1	269.6	269.6	170.2	1.5	3.6	0.9	6	clean SAND to silty SAND	125	5.0	54	34	45	95	48	-	-	5	0.350	1.55	16
6.23	180.7	282.5	282.5	180.8	1.6	4.4	0.9	6	clean SAND to silty SAND	125	5.0	57	36	47	95	48	-	-	5	0.350	1.56	16
6.40	181.7	280.4	280.4	181.8	2.0	4.8	1.1	6	clean SAND to silty SAND	125	5.0	56	36	48	95	48	-	-	5	0.350	1.63	16
6.56	188.7	287.5	287.5	188.8	1.5	4.2	0.8	6	clean SAND to silty SAND	125	5.0	58	38	47	95	48	-	-	5	0.350	1.51	16
6.73	178.3	268.3	268.3	178.4	1.2	3.4	0.7	6	clean SAND to silty SAND	125	5.0	54	36	44	95	47	-	-	5	0.350	1.48	16
6.89	184.8	274.7	274.7	184.9	1.7	6.3	0.9	6	clean SAND to silty SAND	125	5.0	55	37	46	95	48	-	-	5	0.350	1.56	16
7.05	188.2	276.4	276.4	188.3	1.7	5.1	0.9	6	clean SAND to silty SAND	125	5.0	55	38	46	95	47	-	-	5	0.350	1.56	16
7.22	200.3	290.9	290.9	200.4	1.6	4.9	0.8	6	clean SAND to silty SAND	125	5.0	58	40	48	95	48	-	-	5	0.350	1.51	16
7.38	217.1	311.7	311.7	217.3	2.2	8.1	1.0	6	clean SAND to silty SAND	125	5.0	62	43	52	95	48	-	-	5	0.350	1.56	16
7.55	216.3	307.1	307.1	216.5	1.8	11.5	0.8	6	clean SAND to silty SAND	125	5.0	61	43	51	95	48	-	-	5	0.350	1.51	16
7.71	221.9	311.7	311.7	222.1	2.0	11.7	0.9	6	clean SAND to silty SAND	125	5.0	62	44	52	95	48	-	-	5	0.350	1.53	16
7.87	227.1	315.6	315.6	227.2	1.9	7.4	0.8	6	clean SAND to silty SAND	125	5.0	63	45	52	95	48	-	-	5	0.350	1.50	16
8.04	236.2	324.9	340.3	236.4	3.7	6.2	1.6	6	clean SAND to silty SAND	125	5.0	65	47	57	95	48	-	-	6	0.350	1.71	16
8.20	279.0	379.9	379.9	279.2	3.5	7.3	1.3	6	clean SAND to silty SAND	125	5.0	76	56	65	95	48	-	-	5	0.350	1.60	16
8.37	264.0	355.8	359.0	264.2	3.8	9.6	1.4	6	clean SAND to silty SAND	125	5.0	71	53	62	95	48	-	-	5	0.350	1.66	16
8.53	269.1	359.3	359.3	269.3	2.6	6.2	1.0	6	clean SAND to silty SAND	125	5.0	72	54	59	95	48	-	-	5	0.350	1.51	16
8.69	234.2	309.6	309.6	234.3	2.3	5.7	1.0	6	clean SAND to silty SAND	125	5.0	62	47	52	95	48	-	-	5	0.350	1.56	16
8.86	228.6	299.4	299.4	228.7	2.5	5.7	1.1	6	clean SAND to silty SAND	125	5.0	60	46	51	95	47	-	-	5	0.350	1.61	16
9.02	220.8	286.5	289.5	220.9	2.7	7.5	1.2	6	clean SAND to silty SAND	125	5.0	57	44	50	95	47	-	-	5	0.350	1.66	16
9.19	199.6	256.7	256.7	199.7	1.8	5.9	0.9	6	clean SAND to silty SAND	125	5.0	51	40	44	95	47	-	-	5	0.350	1.59	16
9.35	202.3	257.8	257.8	202.4	1.7	5.5	0.8	6	clean SAND to silty SAND	125	5.0	52	40	43	95	47	-	-	5	0.350	1.56	16
9.51	200.0	252.7	252.7	200.1	1.6	5.7	0.8	6	clean SAND to silty SAND	125	5.0	51	40	42	95	46	-	-	5	0.350	1.55	16
9.68	205.6	257.5	257.5	205.7	1.0	7.2	0.5	6	clean SAND to silty SAND	125	5.0	51	41	41	95	46	-	-	5	0.350	1.40	16
9.84	215.9	268.2	268.2	216.0	1.0	6.1	0.5	6	clean SAND to silty SAND	125	5.0	54	43	43	95	47	-	-	5	0.350	1.38	16
10.01	210.6	259.4	259.4	210.7	1.2	6.1	0.6	6	clean SAND to silty SAND	125	5.0	52	42	42	95	46	-	-	5	0.350	1.44	16
10.17	201.5	246.2	246.2	201.6	1.1	5.4	0.5	6	clean SAND to silty SAND	125	5.0	49	40	40	95	46	-	-	5	0.350	1.45	16
10.34	211.0	255.8	255.8	211.1	1.3	4.6	0.6	6	clean SAND to silty SAND	125	5.0	51	42	42	95	46	-	-	5	0.350	1.46	16
10.50	204.1	245.4	245.4	204.2	1.1	4.1	0.5	6	clean SAND to silty SAND	125	5.0	49	41	40	95	46	-	-	5	0.350	1.44	16
10.66	202.2	241.2	241.2	202.3	2.0	4.4	1.0	6	clean SAND to silty SAND	125	5.0	48	40	42	95	46	-	-	5	0.350	1.64	16
10.83	196.7	232.8	245.1	196.8	2.5	4.5	1.3	6	clean SAND to silty SAND	125	5.0	47	39	41	95	46	-	-	7	0.350	1.72	16
10.99	173.1	203.4	241.6	173.2	3.3	5.0	1.9	6	clean SAND to silty SAND	125	5.0	41	35	38	90	45	-	-	10	0.350	1.90	16
11.16	196.5	229.2	246.8	196.6	2.7	3.4	1.4	6	clean SAND to silty SAND	125	5.0	46	39	41	94	46	-	-	7	0.350	1.76	16
11.32	235.9	273.1	273.1	236.0	2.7	2.8	1.1	6	clean SAND to silty SAND	125	5.0	55	47	47	95	46	-	-	5	0.350	1.64	16
11.48	197.8	227.4	227.4	197.9	1.9	3.1	0.9	6	clean SAND to silty SAND	125	5.0	45	40	39	94	46	-	-	5	0.350	1.63	16
11.65	164.4	187.6	199.3	164.5	1.8	4.6	1.1	6	clean SAND to silty SAND	125	5.0	38	33	33	88	45	-	-	7	0.350	1.74	16
11.81	155.1	175.8	181.5	155.2	1.4	4.4	0.9	6	clean SAND to silty SAND	125	5.0	35	31	31	86	44	-	-	6	0.350	1.69	16
11.98	156.5	176.2	195.1	156.6	2.0	4.0	1.3	6	clean SAND to silty SAND	125	5.0	35	31	32	86	44	-	-	8	0.350	1.80	16
12.14	155.1	173.4	182.9	155.2	1.5	3.3	1.0	6	clean SAND to silty SAND	125	5.0	35	31	31	85	44	-	-	7	0.350	1.72	16
12.30	155.6	172.8	201.7	155.7	2.4	4.4	1.6	6	clean SAND to silty SAND	125	5.0	35	31	32	85	44	-	-	10	0.350	1.88	16
12.47	159.9	176.3	206.6	159.9	2.6	4.1	1.6	6	clean SAND to silty SAND	125	5.0	35	32	33	86	44	-	-	10	0.350	1.88	16
12.63	154.6	169.4	214.0	154.7	3.1	5.0	2.0	6	clean SAND to silty SAND	125	5.0	34	31	33	84	44	-	-	12	0.350	1.97	16
12.80	154.2	167.9	192.7	154.3	2.2	4.5	1.4	6	clean SAND to silty SAND	125	5.0	34	31	31	84	44	-	-	9	0.350	1.85	16
12.96	155.5	168.2	174.0	155.6	1.3	4.3	0.8	6	clean SAND to silty SAND	125	5.0	34	31	30	84	44	-	-	6	0.350	1.69	16
13.12	164.2	176.5	202.3	164.3	2.4	3.9	1.5	6	clean SAND to silty SAND	125	5.0	35	33	33	86	44	-	-	9	0.350	1.85	16
13.29	219.0	233.9	236.2	219.0	2.3	3.1	1.0	6	clean SAND to silty SAND	125	5.0	47	44	41	95	45	-	-	5	0.350	1.66	16
13.45	153.8	163.3	187.0	153.9	2.1	3.5	1.4	6	clean SAND to silty SAND	125	5.0	33	31	30	83	44	-	-	9	0.350	1.85	16
13.62	155.6	164.2	170.8	155.6	1.3	2.9	0.9	6	clean SAND to silty SAND	125	5.0	33	31	29	83	44	-	-	6	0.350	1.70	16
13.78	133.3	139.8	151.8	133.3	1.2	3.5	0.9	6	clean SAND to silty SAND	125	5.0	28	27	25	78	43	-	-	8	0.350	1.77	16
13.94	136.7	142.5	151.5	136.7	1.1	3.3	0.8	6	clean SAND to silty SAND	125	5.0	28	27	25	79	43	-	-	7	0.350	1.74	16
14.11	131.2	136.0	151.1	131.3	1.3	3.4	1.0	6	clean SAND to silty SAND	125	5.0	27	26	25	77	43	-	-	8	0.350	1.81	16
14.27	121.3	125.0	140.8	121.4	1.2	2.9	1.0	6	clean SAND to silty SAND	125	5.0	25	24	23	74	42	-	-	9	0.350	1.83	16
14.44	131.1	134.3	164.7	131.2	1.9	3.0	1.5	6	clean SAND to silty SAND	125	5.0	27	26	26	77	42	-	-	11	0.350	1.94	16
14.60	136.1	138.7	148.8	136.2	1.1	2.8	0.8	6	clean SAND to silty SAND	125	5.0	28	27	25	78	43	-	-	7	0.350	1.75	16
14.76	152.9	154.9	162.5	153.0	1.3	3.2	0.8	6	clean SAND to silty SAND	125	5.0	31	31	27	81	43	-	-	6	0.350	1.72	16
14.93	135.9	136.9	150.4	135.9	1.3	2.9	0.9	6	clean SAND to silty SAND	125	5.0	27	27	25	77	42	-	-	8	0.350	1.79	16
15.09	145.9	146.2	163.1	145.9	1.6	1.4	1.1	6	clean SAND to silty SAND	125	5.0	29	29	27	80	43	-	-	8	0.350	1.81	16
15.26	151.1	150.6	166.9	151.1	1.6	1.6	1.1	6	clean SAND to silty SAND	125	5.0	30	30	27	81	43	-	-	8	0.350	1.80	16
15.42	157.6	156.3	167.7	157.7	1.5	2.2	1.0	6	clean SAND to silty SAND	125	5.0	31	32	28	82	43	-	-	7	0.350	1.75	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

College of the Siskiyous McCloud Hall Renovation

Project ID: Mid Pacific Engineering
Data File: SDF(107).cpt
CPT Date: 6/16/2023 11:02:13 AM
GW During Test: 29 ft

Sounding ID: CPT-01
Project No: 05040-03
Cone/Rig: DDG1596

Depth ft	qc PS tsf	* qcln PS -	qlncs PS -	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Ratio	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60	SPT R-N 60	* SPT IcN1 60	* Rel Den	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic	* D50 - mm	* Ic SBT Indx	* Nk -
15.58	157.0	154.8	170.7	157.1	1.7	2.2	1.1	6	clean SAND to silty SAND	125	5.0	31	31	28	81	43	-	-	8	0.350	1.79	16
15.75	157.1	154.1	167.1	157.1	1.5	1.9	1.0	6	clean SAND to silty SAND	125	5.0	31	31	28	81	43	-	-	7	0.350	1.77	16
15.91	144.8	141.3	159.1	144.9	1.6	2.3	1.1	6	clean SAND to silty SAND	125	5.0	28	29	26	78	42	-	-	9	0.350	1.83	16
16.08	148.3	144.0	158.1	148.4	1.4	2.7	1.0	6	clean SAND to silty SAND	125	5.0	29	30	26	79	43	-	-	8	0.350	1.79	16
16.24	155.8	150.5	165.9	155.9	1.6	2.1	1.1	6	clean SAND to silty SAND	125	5.0	30	31	27	80	43	-	-	8	0.350	1.79	16
16.40	169.0	162.4	164.4	169.1	1.2	2.2	0.7	6	clean SAND to silty SAND	125	5.0	32	34	28	83	43	-	-	5	0.350	1.66	16
16.57	177.8	170.0	180.3	177.8	1.7	2.2	1.0	6	clean SAND to silty SAND	125	5.0	34	36	30	85	43	-	-	7	0.350	1.73	16
16.73	157.5	149.9	164.6	157.5	1.6	1.9	1.0	6	clean SAND to silty SAND	125	5.0	30	31	27	80	43	-	-	8	0.350	1.79	16
16.90	161.5	152.9	169.2	161.6	1.7	1.8	1.1	6	clean SAND to silty SAND	125	5.0	31	32	28	81	43	-	-	8	0.350	1.80	16
17.06	167.2	157.5	200.9	167.2	3.3	1.6	2.0	6	clean SAND to silty SAND	125	5.0	32	33	31	82	43	-	-	12	0.350	1.98	16
17.23	172.1	161.4	198.4	172.2	3.1	2.7	1.8	6	clean SAND to silty SAND	125	5.0	32	34	31	83	43	-	-	11	0.350	1.94	16
17.39	188.1	175.5	209.8	188.1	3.2	2.2	1.7	6	clean SAND to silty SAND	125	5.0	35	38	33	86	43	-	-	11	0.350	1.91	16
17.55	155.9	144.8	162.7	156.0	1.7	2.7	1.1	6	clean SAND to silty SAND	125	5.0	29	31	27	79	42	-	-	9	0.350	1.82	16
17.72	194.6	179.9	186.0	194.7	1.8	2.4	0.9	6	clean SAND to silty SAND	125	5.0	36	39	32	86	43	-	-	6	0.350	1.69	16
17.88	210.1	193.4	199.8	210.2	2.0	2.3	1.0	6	clean SAND to silty SAND	125	5.0	39	42	34	89	44	-	-	6	0.350	1.69	16
18.05	210.8	193.1	216.9	210.9	3.0	1.6	1.5	6	clean SAND to silty SAND	125	5.0	39	42	35	89	44	-	-	9	0.350	1.82	16
18.21	210.5	191.9	198.6	210.5	2.0	3.1	1.0	6	clean SAND to silty SAND	125	5.0	38	42	34	89	44	-	-	6	0.350	1.70	16
18.37	239.8	217.7	217.7	239.9	1.8	2.6	0.8	6	clean SAND to silty SAND	125	5.0	44	48	37	93	44	-	-	5	0.350	1.58	16
18.54	285.7	258.3	258.3	285.8	2.8	2.3	1.0	6	clean SAND to silty SAND	125	5.0	52	57	44	95	45	-	-	5	0.350	1.61	16
18.70	236.9	213.1	213.1	236.9	1.9	3.3	0.8	6	clean SAND to silty SAND	125	5.0	43	47	36	92	44	-	-	5	0.350	1.61	16
18.87	220.0	197.1	197.1	220.1	1.6	3.5	0.7	6	clean SAND to silty SAND	125	5.0	39	44	34	89	44	-	-	5	0.350	1.60	16
19.03	214.4	191.2	191.2	214.5	1.5	3.7	0.7	6	clean SAND to silty SAND	125	5.0	38	43	32	88	44	-	-	5	0.350	1.59	16
19.19	230.6	204.8	204.8	230.7	1.9	2.5	0.8	6	clean SAND to silty SAND	125	5.0	41	46	35	91	44	-	-	5	0.350	1.63	16
19.36	208.4	184.3	191.9	208.5	2.0	3.3	1.0	6	clean SAND to silty SAND	125	5.0	37	42	33	87	43	-	-	6	0.350	1.71	16
19.52	211.4	186.2	192.7	211.5	2.0	3.7	0.9	6	clean SAND to silty SAND	125	5.0	37	42	33	88	43	-	-	6	0.350	1.70	16
19.69	195.8	171.7	191.5	195.8	2.5	3.5	1.3	6	clean SAND to silty SAND	125	5.0	34	39	31	85	43	-	-	8	0.350	1.81	16
19.85	189.5	165.5	181.7	189.5	2.1	3.4	1.1	6	clean SAND to silty SAND	125	5.0	33	38	30	84	43	-	-	8	0.350	1.79	16
20.01	211.8	184.2	201.6	211.9	2.6	3.7	1.2	6	clean SAND to silty SAND	125	5.0	37	42	33	87	43	-	-	8	0.350	1.78	16
20.18	197.0	170.6	182.4	197.0	2.0	0.4	1.0	6	clean SAND to silty SAND	125	5.0	34	39	31	85	43	-	-	7	0.350	1.75	16
20.34	198.9	171.6	181.2	198.9	1.9	1.8	1.0	6	clean SAND to silty SAND	125	5.0	34	40	30	85	43	-	-	7	0.350	1.73	16
20.51	198.1	170.2	178.0	198.1	1.8	0.9	0.9	6	clean SAND to silty SAND	125	5.0	34	40	30	85	43	-	-	6	0.350	1.71	16
20.67	181.7	155.5	167.8	181.7	1.8	1.4	1.0	6	clean SAND to silty SAND	125	5.0	31	36	28	82	42	-	-	7	0.350	1.76	16
20.83	163.4	139.3	154.0	163.4	1.6	1.5	1.0	6	clean SAND to silty SAND	125	5.0	28	33	25	78	42	-	-	8	0.350	1.80	16
21.00	168.3	142.9	158.3	168.3	1.7	1.4	1.0	6	clean SAND to silty SAND	125	5.0	29	34	26	79	42	-	-	8	0.350	1.80	16
21.16	183.5	155.2	167.9	183.5	1.8	0.9	1.0	6	clean SAND to silty SAND	125	5.0	31	37	28	82	42	-	-	7	0.350	1.76	16
21.33	175.7	148.0	168.1	175.7	2.1	1.0	1.2	6	clean SAND to silty SAND	125	5.0	30	35	27	80	42	-	-	9	0.350	1.84	16
21.49	158.9	133.4	152.4	158.9	1.7	0.4	1.1	6	clean SAND to silty SAND	125	5.0	27	32	25	77	41	-	-	9	0.350	1.85	16
21.65	155.0	129.6	156.1	155.0	2.1	0.6	1.3	6	clean SAND to silty SAND	125	5.0	26	31	25	76	41	-	-	11	0.350	1.92	16
21.82	146.5	122.0	164.8	146.5	2.7	1.4	1.9	5	silty SAND to sandy SILT	120	3.0	41	49	24	74	41	-	-	14	0.200	2.04	16
21.98	157.0	130.3	151.8	157.0	1.8	0.8	1.2	6	clean SAND to silty SAND	125	5.0	26	31	24	76	41	-	-	10	0.350	1.87	16
22.15	172.4	142.5	162.6	172.4	2.0	1.1	1.2	6	clean SAND to silty SAND	125	5.0	29	34	26	79	42	-	-	9	0.350	1.84	16
22.31	180.7	148.8	158.3	180.7	1.5	1.0	0.9	6	clean SAND to silty SAND	125	5.0	30	36	27	80	42	-	-	7	0.350	1.74	16
22.47	162.4	133.2	144.2	162.4	1.3	1.8	0.8	6	clean SAND to silty SAND	125	5.0	27	32	24	76	41	-	-	7	0.350	1.77	16
22.64	158.3	129.4	139.3	158.3	1.2	1.9	0.8	6	clean SAND to silty SAND	125	5.0	26	32	23	76	41	-	-	7	0.350	1.76	16
22.80	159.2	129.7	142.2	159.2	1.4	1.6	0.9	6	clean SAND to silty SAND	125	5.0	26	32	24	76	41	-	-	8	0.350	1.79	16
22.97	167.8	136.2	146.1	167.8	1.3	1.4	0.8	6	clean SAND to silty SAND	125	5.0	27	34	24	77	41	-	-	7	0.350	1.75	16
23.13	183.9	148.7	157.7	183.9	1.5	1.1	0.8	6	clean SAND to silty SAND	125	5.0	30	37	26	80	42	-	-	7	0.350	1.73	16
23.30	195.3	157.5	172.8	195.4	2.1	1.5	1.1	6	clean SAND to silty SAND	125	5.0	31	39	29	82	42	-	-	8	0.350	1.79	16
23.46	199.0	159.8	159.8	199.0	1.2	1.4	0.6	6	clean SAND to silty SAND	125	5.0	32	40	27	82	42	-	-	5	0.350	1.62	16
23.62	188.9	151.2	151.2	188.9	1.1	1.7	0.6	6	clean SAND to silty SAND	125	5.0	30	38	26	81	42	-	-	5	0.350	1.63	16
23.79	209.2	166.9	166.9	209.3	0.8	2.0	0.4	6	clean SAND to silty SAND	125	5.0	33	42	27	84	42	-	-	5	0.350	1.50	16
23.95	182.2	144.8	157.9	182.2	1.7	1.7	0.9	6	clean SAND to silty SAND	125	5.0	29	36	26	79	42	-	-	8	0.350	1.78	16
24.12	194.6	154.1	154.1	194.6	1.1	1.4	0.6	6	clean SAND to silty SAND	125	5.0	31	39	26	81	42	-	-	5	0.350	1.62	16
24.28	210.5	166.2	166.2	210.5	0.9	1.3	0.4	6	clean SAND to silty SAND	125	5.0	33	42	27	84	42	-	-	5	0.350	1.50	16
24.44	181.6	142.9	159.7	181.7	1.9	2.7	1.1	6	clean SAND to silty SAND	125	5.0	29	36	26	79	41	-	-	8	0.350	1.81	16
24.61	125.5	98.4	133.3	125.5	1.9	1.4	1.5	5	silty SAND to sandy SILT	120	3.0	33	42	20	66	39	-	-	14	0.200	2.04	16
24.77	127.5	99.7	137.3	127.5	2.0	1.6	1.6	5	silty SAND to sandy SILT	120	3.0	33	42	20	67	39	-	-	14	0.200	2.05	16
24.94	148.4	115.6	151.0	148.4	2.3	1.6	1.6	6	clean SAND to silty SAND	125	5.0	23	30	23	72	40	-	-	13	0.350	2.00	16
25.10	163.5	127.0	157.5	163.5	2.4	1.1	1.5	6	clean SAND to silty SAND	125	5.0	25	33	24	75	41	-	-	12	0.350	1.95	16
25.26	128.7	99.6	136.8	128.7	2.0	1.0	1.6	5	silty SAND to sandy SILT	120	3.0	33	43	20	67	39	-	-	14	0.200	2.05	16
25.43	149.9	115.7	137.2	150.0	1.7	2.0	1.1	6	clean SAND to silty SAND	125	5.0	23	30	22	72	40	-	-	10	0.350	1.90	16
25.59	157.8	121.4	138.9	157.8	1.6	2.2	1.0	6	clean SAND to silty SAND	125	5.0	24	32	23	73	40	-	-	9	0.350	1.85	16
25.76	170.5	130.7	132.8	170.5	0.9	2.1	0.6	6	clean SAND to silty SAND	125	5.0	26	34	23	76	41	-	-	6	0.350	1.67	16
25.92	180.5	138.0	160.9	180.5	2.2	1.6	1.3	6	clean SAND to silty SAND	125	5.0	28	36	26	78	41	-	-	10	0.350	1.88	16
26.08	194.5	148.2	162.9	194.5	2.0	1.3	1.0	6	clean SAND to silty SAND	125	5.0	30	39	27	80	41	-	-	8	0.350	1.79	16
26.25	175.8	133.5	159.8	175.8	2.3	-1.6	1.3	6	clean SAND to silty SAND	125	5.0	27	35	25	77	41	-	-	11	0.350	1.91	16
26.41	159.7	120.9	145.2	159.7	2.0	-0.9	1.2	6	clean SAND to silty SAND	125	5.0	24	32	23	73	40	-	-	11	0.350	1.91	16
26.58	139.2	105.1	123.0	139.2	1.3	-0.3	0.9	6	clean SAND to silty SAND	125	5.0	21	28	20	69	40	-	-	10	0.350	1.88	16
26.74	143.9	108.3	116.3	143.9	0.9	-0.3	0.6	6	clean SAND to silty SAND	125	5.0	22	29	19	70	40	-	-	7	0.350	1.75	16
26.90	126.7	95.1	117.6	126.7	1.3	0.4	1.1	6	clean SAND to silty SAND	125	5.0	19	25	18	65	39	-	-	12	0.350	1.95	16
27.07	134.8	100.8	122.4	134.8	1.4	0.2	1.1	6	clean SAND to silty SAND	125	5.0	20	27	19	67	39	-	-	11	0.350	1.93	16
27.23	130.0	96.9	126.2	130.0	1.7	0.1	1.3	6	clean SAND to silty SAND	125	5.0	19	26	19	66	39	-	-	13	0.350	2.00	16
27.40	107.9	80.2	113.8	107.9	1.5	0.0	1.4	5	silty SAND to sandy SILT	120	3.0	27	36	16	60	38	-	-	15	0.200	2.08	16
27.56	122.4	90.7	120.4	122.4	1.6	0.2	1.3	6	clean SAND to silty SAND	125	5.0	18	24	18	64	39	-	-	14	0.350	2.02	16
27.72	75.6	55.9	127.3	75.7	2.0	0.4	2.7	5	silty SAND to sandy SILT	120	3.0	19	25	13	48	36	-	-	26	0.200	2.39	16
27.89	80.2	59.1	87.0	80.1	0.8	-0.4	1.0	5	silty SAND to sandy SILT	120	3.0	20	27	12	50	36	-	-	16	0.200	2.11	16
28.05	80.2	59.0	90.2	80.2	0.9	-0.3	1.2	5	silty SAND to sandy SILT	120	3.0	20	27	12	50	36	-	-	17	0.200	2.14	16
28.22	84.2	61.7	83.7	84.2	0.7	-0.6	0.8	6	clean SAND to silty SAND	125	5.0	12	17	12	51	36	-	-	14	0.350	2.04	16
28.38	96.2	70.3	94.5	96.2	0.9	-0.9	1.0	6	clean SAND to silty SAND	125	5.0	14	19	14	55	37	-	-	14	0.350	2.03	16
28.54	90.5	66.0	88.1	90.5	0.8	-0.8	0.9	6	clean SAND to silty SAND	125	5.0	13	18	13	53	37	-	-	14	0.350	2.03	16
28.71	107.0	77.8	92.5	107.0	0.7	-0.5	0.7	6	clean SAND to silty SAND	125	5.0	16	21	15	59	38	-	-	10	0.350	1.90	16
28.87	115.4	83.6	98.8	115.4	0.8	-0.8	0.7	6	clean SAND to silty SAND	125	5.0	17	23	16	61	38	-	-	10	0.350	1.89	16
29.04	109.7	79.3	96.0	109.7	0.8	-0.5	0.8	6	clean SAND to silty SAND	125	5.0	16	22	15	59	38	-	-	11	0.350	1.92	16
29.20	116.5	84.1	110.8	116.4	1.3	-0.5	1.2	6	clean SAND to silty SAND	125	5.0	17	23	17	61	38	-	-	13	0.350	2.01	16
29.36	122.1	88.1	106.6	122.1	1.0	-0.3	0.9	6	clean SAND to silty SAND	125	5.0	18	24	17	63	38	-	-	11	0.350	1.92	16
29.53	145.1	104.5	123.3	145.1	1.4	-2.9	1.0	6	clean SAND to silty SAND	125	5.0	21	29	20	68	39	-	-	10	0.350	1.89	16
29.69	138.3	99.5	115.4	138.2	1.1	-3.1	0.8	6	clean SAND to silty SAND	125	5.0	20	28	19	67	39	-	-	10	0.350	1.87	16
29.86	158.3	113.7	130.6	158.3	1.5	-2.8	0.9	6	clean SAND to silty SAND	125	5.0	23	32	21	71	40	-	-	9	0.350	1.85	16
30.02	162.4	116.5	127.9	162.4	1.2	-2.9	0.8	6	clean SAND to silty SAND	125	5.0	23	32	21	72	40	-	-	8	0.350	1.79	16
30.19	152.1	109.0	119.5	152.1	1.0	-1.6	0.7	6	clean SAND to silty SAND	125	5.0	22	30	20	70	39	-	-	8	0.350	1.79	16
30.35	173.2	123.9	127.5	173.1	1.0	-2.1	0.6	6	clean SAND to silty SAND	125	5.0	25	35	22	74	40	-	-	6	0.350	1.69	16
30.51	176.0	125.7	134.7	175.9	1.3	-2.6	0.7	6	clean SAND to silty SAND	125	5.0	25	35	23	75	40	-	-	7	0.350	1.75	16
30.68	184.3	131.5	132.2	184.3	1.0	-2.9	0.5	6	clean SAND to silty SAND	125	5.0	26	37	23	76	40	-	-	5	0.350	1.65	16
30.84	194.4	138.5	143.9	194.4	1.3	-2.8	0.7	6	clean SAND to silty SAND	125	5.0	28	39	24	78	41	-	-	6	0.350	1.70	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

College of the Siskiyous McCloud Hall Renovation

Project ID: Mid Pacific Engineering
Data File: SDF(107).cpt
CPT Date: 6/16/2023 11:02:13 AM
GW During Test: 29 ft

Sounding ID: CPT-01
Project No: 05040-03
Cone/Rig: DDG1596

Depth ft	qc PS tsf	* qcln PS -	qlncs PS -	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato -	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60	SPT R-N 60	* SPT IcN1 60	* Rel Den	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic	* D50 - mm	* Ic SBT Indx	* Nk - -
31.01	208.3	148.2	152.3	208.2	1.5	-2.6	0.7	6	clean SAND to silty SAND	125	5.0	30	42	26	80	41	-	-	6	0.350	1.69	16
31.17	222.2	157.9	157.5	222.2	1.4	-2.8	0.7	6	clean SAND to silty SAND	125	5.0	32	44	27	82	41	-	-	5	0.350	1.64	16
31.33	228.5	162.1	161.9	228.5	1.5	-3.9	0.7	6	clean SAND to silty SAND	125	5.0	32	46	28	83	42	-	-	5	0.350	1.64	16
31.50	232.8	164.9	164.9	232.7	1.4	-5.7	0.6	6	clean SAND to silty SAND	125	5.0	33	47	28	84	42	-	-	5	0.350	1.60	16
31.66	235.5	166.6	166.6	235.4	1.5	-5.8	0.6	6	clean SAND to silty SAND	125	5.0	33	47	29	84	42	-	-	5	0.350	1.62	16
31.83	190.0	134.2	152.9	189.8	2.1	-6.5	1.1	6	clean SAND to silty SAND	125	5.0	27	38	25	77	41	-	-	9	0.350	1.84	16
31.99	185.3	130.7	143.3	185.2	1.6	-5.8	0.9	6	clean SAND to silty SAND	125	5.0	26	37	24	76	40	-	-	8	0.350	1.79	16
32.15	185.9	131.0	133.7	185.7	1.1	-5.5	0.6	6	clean SAND to silty SAND	125	5.0	26	37	23	76	40	-	-	6	0.350	1.68	16
32.32	203.5	143.2	146.1	203.4	1.3	-5.2	0.6	6	clean SAND to silty SAND	125	5.0	29	41	25	79	41	-	-	6	0.350	1.67	16
32.48	206.3	145.0	154.4	206.2	1.7	-5.0	0.8	6	clean SAND to silty SAND	125	5.0	29	41	26	79	41	-	-	7	0.350	1.74	16
32.65	241.2	169.3	169.3	241.1	1.6	-5.6	0.7	6	clean SAND to silty SAND	125	5.0	34	48	29	84	42	-	-	5	0.350	1.63	16
32.81	218.7	153.3	161.1	218.6	1.8	-5.4	0.8	6	clean SAND to silty SAND	125	5.0	31	44	27	81	41	-	-	7	0.350	1.72	16
32.97	207.1	145.0	145.9	207.1	1.3	-4.5	0.6	6	clean SAND to silty SAND	125	5.0	29	41	25	79	41	-	-	5	0.350	1.65	16
33.14	212.1	148.3	153.1	212.0	1.5	-3.9	0.7	6	clean SAND to silty SAND	125	5.0	30	42	26	80	41	-	-	6	0.350	1.69	16
33.30	187.1	130.6	142.3	187.0	1.6	-4.4	0.8	6	clean SAND to silty SAND	125	5.0	26	37	24	76	40	-	-	8	0.350	1.78	16
33.47	198.5	138.4	145.9	198.5	1.5	-4.8	0.7	6	clean SAND to silty SAND	125	5.0	28	40	25	78	41	-	-	7	0.350	1.72	16
33.63	220.7	153.6	159.5	220.6	1.7	-5.0	0.8	6	clean SAND to silty SAND	125	5.0	31	44	27	81	41	-	-	6	0.350	1.70	16
33.79	201.3	139.9	153.0	201.2	1.8	-5.0	0.9	6	clean SAND to silty SAND	125	5.0	28	40	25	78	41	-	-	8	0.350	1.78	16
33.96	225.1	156.3	160.6	225.0	1.7	-5.0	0.7	6	clean SAND to silty SAND	125	5.0	31	45	27	82	41	-	-	6	0.350	1.68	16
34.12	282.0	195.6	195.6	281.9	2.0	-4.9	0.7	6	clean SAND to silty SAND	125	5.0	39	56	33	89	42	-	-	5	0.350	1.60	16
34.29	275.4	190.8	192.6	275.3	2.3	-5.0	0.9	6	clean SAND to silty SAND	125	5.0	38	55	33	88	42	-	-	5	0.350	1.66	16
34.45	301.1	208.2	208.2	301.0	1.8	-4.3	0.6	6	clean SAND to silty SAND	125	5.0	42	60	35	91	43	-	-	5	0.350	1.53	16
34.61	290.1	200.4	200.4	290.0	1.5	-3.8	0.5	6	clean SAND to silty SAND	125	5.0	40	58	33	90	43	-	-	5	0.350	1.50	16
34.78	314.6	217.1	217.1	314.6	1.9	-3.9	0.6	6	clean SAND to silty SAND	125	5.0	43	63	36	93	43	-	-	5	0.350	1.52	16
34.94	306.9	211.5	211.5	306.9	2.2	-3.8	0.7	6	clean SAND to silty SAND	125	5.0	42	61	36	92	43	-	-	5	0.350	1.58	16
35.11	282.4	194.3	194.3	282.4	1.7	0.3	0.6	6	clean SAND to silty SAND	125	5.0	39	56	33	89	42	-	-	5	0.350	1.55	16
35.27	315.3	216.7	216.7	315.3	1.5	-1.9	0.5	6	clean SAND to silty SAND	125	5.0	43	63	35	93	43	-	-	5	0.350	1.46	16
35.43	299.6	205.6	205.6	299.5	2.5	-3.3	0.9	6	clean SAND to silty SAND	125	5.0	41	60	35	91	43	-	-	5	0.350	1.63	16
35.60	278.6	191.0	191.0	278.5	1.8	-3.6	0.7	6	clean SAND to silty SAND	125	5.0	38	56	32	88	42	-	-	5	0.350	1.58	16
35.76	276.8	189.5	191.3	276.7	2.3	-3.4	0.9	6	clean SAND to silty SAND	125	5.0	38	55	33	88	42	-	-	5	0.350	1.66	16
35.93	301.2	205.9	234.0	301.2	4.8	-2.0	1.6	6	clean SAND to silty SAND	125	5.0	41	60	38	91	43	-	-	9	0.350	1.84	16
36.09	266.6	182.1	228.0	266.6	5.5	-3.1	2.1	6	clean SAND to silty SAND	125	5.0	36	53	35	87	42	-	-	12	0.350	1.96	16
36.26	339.3	231.4	231.4	339.2	2.2	-3.2	0.7	6	clean SAND to silty SAND	125	5.0	46	68	38	95	43	-	-	5	0.350	1.52	16
36.42	445.7	303.6	303.6	445.6	2.2	-4.4	0.5	6	clean SAND to silty SAND	125	5.0	61	89	48	95	44	-	-	5	0.350	1.35	16
36.58	251.5	171.1	185.2	251.5	2.7	-0.7	1.1	6	clean SAND to silty SAND	125	5.0	34	50	31	85	42	-	-	7	0.350	1.77	16
36.75	251.3	170.7	170.7	251.3	1.4	-0.1	0.6	6	clean SAND to silty SAND	125	5.0	34	50	29	85	42	-	-	5	0.350	1.57	16
36.91	274.8	186.5	186.5	274.8	1.5	0.1	0.6	6	clean SAND to silty SAND	125	5.0	37	55	31	88	42	-	-	5	0.350	1.55	16
37.08	277.3	187.9	187.9	277.3	1.5	-3.4	0.5	6	clean SAND to silty SAND	125	5.0	38	55	31	88	42	-	-	5	0.350	1.53	16
37.24	271.0	183.4	183.4	270.9	1.6	-2.9	0.6	6	clean SAND to silty SAND	125	5.0	37	54	31	87	42	-	-	5	0.350	1.57	16
37.40	263.7	178.2	181.2	263.6	2.2	-3.5	0.8	6	clean SAND to silty SAND	125	5.0	36	53	31	86	42	-	-	6	0.350	1.67	16
37.57	262.0	176.9	186.2	262.0	2.5	-0.3	1.0	6	clean SAND to silty SAND	125	5.0	35	52	31	86	42	-	-	7	0.350	1.72	16
37.73	256.3	172.8	172.8	256.3	0.9	0.6	0.4	6	clean SAND to silty SAND	125	5.0	35	51	28	85	42	-	-	5	0.350	1.46	16
37.90	223.3	150.4	150.9	223.3	1.4	-1.2	0.6	6	clean SAND to silty SAND	125	5.0	30	45	26	80	41	-	-	5	0.350	1.65	16
38.06	227.0	152.7	196.1	227.0	4.4	-1.4	2.0	5	silty SAND to sandy SILT	120	3.0	51	76	30	81	41	-	-	13	0.200	1.99	16
38.22	227.2	152.6	195.3	227.2	4.3	-0.4	1.9	6	clean SAND to silty SAND	125	5.0	31	45	30	81	41	-	-	13	0.350	1.98	16
38.39	303.7	203.8	219.8	303.7	3.8	-0.1	1.3	6	clean SAND to silty SAND	125	5.0	41	61	37	91	42	-	-	7	0.350	1.76	16
38.55	507.8	340.3	340.3	507.7	4.0	-1.1	0.8	6	clean SAND to silty SAND	125	5.0	68	100	55	95	45	-	-	5	0.350	1.46	16
38.72	454.3	304.1	304.1	454.4	3.9	4.2	0.9	6	clean SAND to silty SAND	125	5.0	61	91	50	95	44	-	-	5	0.350	1.52	16
38.88	343.3	229.5	229.5	343.4	3.2	3.6	1.0	6	clean SAND to silty SAND	125	5.0	46	69	40	94	43	-	-	5	0.350	1.64	16
39.04	374.6	250.2	250.2	374.7	2.2	3.9	0.6	6	clean SAND to silty SAND	125	5.0	50	75	41	95	43	-	-	5	0.350	1.47	16
39.21	286.3	190.9	199.0	286.3	2.8	2.5	1.0	6	clean SAND to silty SAND	125	5.0	38	57	34	88	42	-	-	6	0.350	1.71	16
39.37	218.5	145.6	165.7	218.6	2.6	1.6	1.2	6	clean SAND to silty SAND	125	5.0	29	44	27	79	41	-	-	9	0.350	1.84	16
39.54	216.0	143.7	157.3	216.0	2.0	-2.1	1.0	6	clean SAND to silty SAND	125	5.0	29	43	26	79	41	-	-	8	0.350	1.78	16
39.70	202.5	134.6	134.6	202.5	0.9	-1.3	0.5	6	clean SAND to silty SAND	125	5.0	27	41	23	77	40	-	-	5	0.350	1.61	16
39.86	131.2	87.1	109.2	131.2	1.3	-0.2	1.0	6	clean SAND to silty SAND	125	5.0	17	26	17	62	38	-	-	12	0.350	1.96	16
40.03	122.0	80.9	91.5	122.1	0.6	2.7	0.5	6	clean SAND to silty SAND	125	5.0	16	24	15	60	37	-	-	9	0.350	1.83	16
40.19	133.8	88.6	109.8	133.8	1.3	-0.8	1.0	6	clean SAND to silty SAND	125	5.0	18	27	17	63	38	-	-	12	0.350	1.95	16
40.36	159.7	105.6	121.8	159.8	1.4	2.0	0.9	6	clean SAND to silty SAND	125	5.0	21	32	20	69	39	-	-	9	0.350	1.86	16
40.52	133.2	88.0	114.7	133.3	1.5	5.2	1.2	6	clean SAND to silty SAND	125	5.0	18	27	17	63	38	-	-	13	0.350	2.00	16
40.68	137.1	90.5	115.9	137.1	1.5	0.0	1.1	6	clean SAND to silty SAND	125	5.0	18	27	18	64	38	-	-	13	0.350	1.99	16
40.85	134.8	88.8	120.9	134.7	1.8	-0.9	1.4	5	silty SAND to sandy SILT	120	3.0	30	45	18	63	38	-	-	14	0.200	2.04	16
41.01	138.0	90.9	117.2	138.0	1.6	0.8	1.2	6	clean SAND to silty SAND	125	5.0	18	28	18	64	38	-	-	13	0.350	1.99	16
41.18	136.1	89.5	126.3	136.1	2.0	2.1	1.5	5	silty SAND to sandy SILT	120	3.0	30	45	18	63	38	-	-	15	0.200	2.07	16
41.34	149.9	98.5	127.7	149.9	1.9	-0.1	1.3	6	clean SAND to silty SAND	125	5.0	20	30	19	66	38	-	-	13	0.350	2.00	16
41.50	198.1	130.0	137.1	198.1	1.4	-2.4	0.7	6	clean SAND to silty SAND	125	5.0	26	40	23	76	40	-	-	7	0.350	1.73	16
41.67	161.6	105.9	120.7	161.6	1.3	1.2	0.8	6	clean SAND to silty SAND	125	5.0	21	32	20	69	39	-	-	9	0.350	1.84	16
41.83	157.4	103.1	122.0	157.5	1.5	3.8	1.0	6	clean SAND to silty SAND	125	5.0	21	31	19	68	39	-	-	10	0.350	1.89	16
42.00	176.0	115.1	125.5	176.1	1.2	3.3	0.7	6	clean SAND to silty SAND	125	5.0	23	35	21	72	39	-	-	8	0.350	1.78	16
42.16	204.6	133.6	156.1	204.5	2.5	-2.1	1.2	6	clean SAND to silty SAND	125	5.0	27	41	25	77	40	-	-	10	0.350	1.88	16
42.32	266.4	173.8	182.2	266.4	2.5	-0.8	0.9	6	clean SAND to silty SAND	125	5.0	35	53	31	85	41	-	-	6	0.350	1.72	16
42.49	222.0	144.6	144.6	222.0	1.1	1.0	0.5	6	clean SAND to silty SAND	125	5.0	29	44	25	79	41	-	-	5	0.350	1.62	16
42.65	203.1	132.2	134.7	203.2	1.2	3.0	0.6	6	clean SAND to silty SAND	125	5.0	26	41	23	76	40	-	-	6	0.350	1.67	16
42.82	221.2	143.8	156.5	221.2	2.0	0.2	0.9	6	clean SAND to silty SAND	125	5.0	29	44	26	79	40	-	-	8	0.350	1.77	16
42.98	224.2	145.6	160.2	224.2	2.2	-0.2	1.0	6	clean SAND to silty SAND	125	5.0	29	45	26	79	41	-	-	8	0.350	1.79	16
43.15	240.6	156.0	156.5	240.6	1.6	2.2	0.7	6	clean SAND to silty SAND	125	5.0	31	48	27	82	41	-	-	5	0.350	1.65	16
43.31	201.7	130.6	148.0	201.6	2.0	-1.9	1.0	6	clean SAND to silty SAND	125	5.0	26	40	24	76	40	-	-	9	0.350	1.83	16
43.47	180.3	116.7	143.9	180.2	2.3	-5.3	1.3	6	clean SAND to silty SAND	125	5.0	23	36	22	72	39	-	-	11	0.350	1.94	16
43.64	184.1	119.0	128.1	184.0	1.3	-1.9	0.7	6	clean SAND to silty SAND	125	5.0	24	37	21	73	39	-	-	7	0.350	1.76	16
43.80	218.8	141.3	141.3	218.7	1.2	-3.6	0.6	6	clean SAND to silty SAND	125	5.0	28	44	24	78	40	-	-	5	0.350	1.64	16
43.97	251.3	162.0	162.0	251.2	1.4	-3.2	0.6	6	clean SAND to silty SAND	125	5.0	32	50	28	83	41	-	-	5	0.350	1.59	16
44.13	180.3	116.2	125.8	180.5	1.2	6.4	0.7	6	clean SAND to silty SAND	125	5.0	23	36	21	72	39	-	-	7	0.350	1.77	16
44.29	188.9	121.6	125.5	189.1	1.0	7.9	0.6	6	clean SAND to silty SAND	125	5.0	24	38	21	73	39	-	-	6	0.350	1.69	16
44.46	188.1	120.9	130.7	188.2	1.3	3.7	0.7	6	clean SAND to silty SAND	125	5.0	24	38	22	73	39	-	-	7	0.350	1.76	16
44.62	196.9	126.4	126.4	197.1	0.8	8.2	0.4	6	clean SAND to silty SAND	125	5.0	25	39	22	75	40	-	-	5	0.350	1.62	16
44.79	216.7	139.0	141.8	216.8	1.3	1.2	0.6	6	clean SAND to silty SAND	125	5.0	28	43	24	78	40	-	-	6	0.350	1.67	16
44.95	219.3	140.4	145.6	219.4	1.5	5.8	0.7	6	clean SAND to silty SAND	125	5.0	28	44	25	78	40	-	-	6	0.350	1.70	16
45.11	220.9	141.3	156.8	221.0	2.2	4.5	1.0	6	clean SAND to silty SAND	125	5.0	28	44	26	78	40	-	-	8	0.350	1.80	16
45.28	242.5	155.0	155.0	242.5	1.5	1.2	0.6	6	clean SAND to silty SAND	125	5.0	31	48	27	81	41	-	-	5	0.350	1.64	16
45.44	237.2	151.5	152.6	237.3	1.5	2.6	0.6	6	clean SAND to silty SAND	125	5.0	30	47	26	81	41	-	-	5	0.350	1.66	16
45.61	241.6	154.1	157.3	241.6	1.7	0.7	0.7	6	clean SAND to silty SAND	125	5.0	31	48	27	81	41	-	-	6	0.350	1.68	16
45.77	222.0	141.4	145.1	222.1	1.4	8.2	0.7	6	clean SAND to silty SAND	125	5.0	28	44	25	78	40	-	-	6	0.350	1.68	16
45.93	225.2	143.3	152.9	225.2	1.8	2.0	0.8	6	clean SAND to silty SAND	125	5.0	29	45	26	79	40	-	-	7	0.350	1.74	16
46.10	236.1	150.0	152.0	236.1	1.5	3.6	0.7	6	clean SAND to silty SAND	125	5.0	30	47	26	80	41	-	-	5	0.350	1.66	16
46.26	256.5	162.9	177.5	256.5	2.7	1.0	1.1	6	clean SAND to silty SAND	125	5.0	33	51	29	83	41	-	-	8	0.350	1.78	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

College of the Siskiyous McCloud Hall Renovation

Project ID: Mid Pacific Engineering
Data File: SDF(107).cpt
CPT Date: 6/16/2023 11:02:13 AM
GW During Test: 29 ft

Sounding ID: CPT-01
Project No: 05040-03
Cone/Rig: DDG1596

Depth ft	qc PS tsf	* qcln PS -	* q1ncs PS -	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato -	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60	SPT R-N 60	* SPT IcN1 60	* Rel Den -	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic -	* D50 - mm	* Ic SBT Indx	* Nk -
46.43	292.3	185.4	193.2	292.3	2.8	1.1	1.0	6	clean SAND to silty SAND	125	5.0	37	58	33	87	42	-	-	6	0.350	1.71	16
46.59	309.8	196.2	215.1	309.8	4.0	0.3	1.3	6	clean SAND to silty SAND	125	5.0	39	62	36	89	42	-	-	8	0.350	1.79	16
46.75	285.6	180.7	184.7	285.8	2.4	9.5	0.9	6	clean SAND to silty SAND	125	5.0	36	57	32	87	42	-	-	6	0.350	1.68	16
46.92	265.0	167.5	167.5	265.2	1.8	9.8	0.7	6	clean SAND to silty SAND	125	5.0	34	53	29	84	41	-	-	5	0.350	1.64	16
47.08	257.6	162.6	162.6	257.6	1.5	1.3	0.6	6	clean SAND to silty SAND	125	5.0	33	52	28	83	41	-	-	5	0.350	1.60	16
47.25	258.9	163.3	165.3	259.1	1.9	7.9	0.7	6	clean SAND to silty SAND	125	5.0	33	52	28	83	41	-	-	5	0.350	1.66	16
47.41	224.3	141.3	147.1	224.4	1.6	3.5	0.7	6	clean SAND to silty SAND	125	5.0	28	45	25	78	40	-	-	6	0.350	1.70	16
47.57	214.7	135.1	147.3	214.9	1.8	8.6	0.9	6	clean SAND to silty SAND	125	5.0	27	43	24	77	40	-	-	8	0.350	1.78	16
47.74	212.9	133.8	155.9	213.1	2.5	11.5	1.2	6	clean SAND to silty SAND	125	5.0	27	43	25	77	40	-	-	10	0.350	1.87	16
47.90	198.4	124.6	143.6	198.8	2.1	16.2	1.1	6	clean SAND to silty SAND	125	5.0	25	40	23	74	39	-	-	9	0.350	1.86	16
48.07	193.7	121.5	131.6	193.9	1.4	12.2	0.7	6	clean SAND to silty SAND	125	5.0	24	39	22	73	39	-	-	7	0.350	1.77	16
48.23	219.8	137.7	145.5	220.0	1.6	10.5	0.7	6	clean SAND to silty SAND	125	5.0	28	44	24	78	40	-	-	7	0.350	1.73	16
48.39	188.9	118.2	129.7	189.1	1.4	11.8	0.8	6	clean SAND to silty SAND	125	5.0	24	38	21	73	39	-	-	8	0.350	1.79	16
48.56	180.1	112.6	120.2	180.4	1.1	15.5	0.6	6	clean SAND to silty SAND	125	5.0	23	36	20	71	39	-	-	7	0.350	1.74	16
48.72	169.8	106.1	111.2	170.0	0.8	12.0	0.5	6	clean SAND to silty SAND	125	5.0	21	34	19	69	39	-	-	6	0.350	1.72	16
48.89	173.2	108.1	115.7	173.5	1.0	10.8	0.6	6	clean SAND to silty SAND	125	5.0	22	35	19	70	39	-	-	7	0.350	1.75	16
49.05	171.1	106.7	132.4	171.3	2.0	10.3	1.2	6	clean SAND to silty SAND	125	5.0	21	34	21	69	39	-	-	12	0.350	1.95	16
49.22	191.6	119.3	129.6	191.9	1.4	12.0	0.7	6	clean SAND to silty SAND	125	5.0	24	38	22	73	39	-	-	8	0.350	1.77	16
49.38	205.3	127.7	132.0	205.5	1.2	7.8	0.6	6	clean SAND to silty SAND	125	5.0	26	41	22	75	40	-	-	6	0.350	1.69	16
49.54	177.7	110.4	116.4	178.2	0.9	22.9	0.5	6	clean SAND to silty SAND	125	5.0	22	36	20	70	39	-	-	7	0.350	1.72	16
49.71	179.3	111.3	128.8	179.5	1.7	11.7	0.9	6	clean SAND to silty SAND	125	5.0	22	36	21	71	39	-	-	10	0.350	1.87	16
49.87	186.6	115.7	123.2	186.9	1.1	13.5	0.6	6	clean SAND to silty SAND	125	5.0	23	37	21	72	39	-	-	7	0.350	1.74	16
50.04	188.8	116.9	122.7	189.2	1.1	19.8	0.6	6	clean SAND to silty SAND	125	5.0	23	38	21	72	39	-	-	6	0.350	1.72	16
50.20	289.5	179.1	179.1	289.6	1.7	5.6	0.6	6	clean SAND to silty SAND	125	5.0	36	58	30	86	41	-	-	5	0.350	1.57	16
50.36	224.7	138.9	151.7	224.8	2.0	5.4	0.9	6	clean SAND to silty SAND	125	5.0	28	45	25	78	40	-	-	8	0.350	1.78	16
50.53	254.3	157.0	174.3	254.5	2.8	7.2	1.1	6	clean SAND to silty SAND	125	5.0	31	51	29	82	41	-	-	8	0.350	1.80	16
50.69	193.4	119.3	134.2	193.7	1.7	16.1	0.9	6	clean SAND to silty SAND	125	5.0	24	39	22	73	39	-	-	9	0.350	1.82	16
50.86	195.8	120.7	127.0	196.0	1.2	8.7	0.6	6	clean SAND to silty SAND	125	5.0	24	39	21	73	39	-	-	7	0.350	1.72	16
51.02	187.1	115.2	128.4	187.2	1.5	7.8	0.8	6	clean SAND to silty SAND	125	5.0	23	37	21	72	39	-	-	8	0.350	1.81	16
51.18	162.2	99.7	111.0	162.4	1.0	14.0	0.7	6	clean SAND to silty SAND	125	5.0	20	32	18	67	38	-	-	8	0.350	1.81	16
51.35	164.4	101.0	121.2	164.7	1.6	17.3	1.0	6	clean SAND to silty SAND	125	5.0	20	33	19	67	38	-	-	11	0.350	1.91	16
51.51	175.5	107.7	113.8	175.8	0.9	16.4	0.5	6	clean SAND to silty SAND	125	5.0	22	35	19	69	39	-	-	7	0.350	1.73	16
51.68	191.7	117.5	141.6	192.0	2.3	16.7	1.2	6	clean SAND to silty SAND	125	5.0	24	38	22	72	39	-	-	11	0.350	1.92	16
51.84	202.7	124.1	151.3	202.9	2.7	12.0	1.3	6	clean SAND to silty SAND	125	5.0	25	41	24	74	39	-	-	11	0.350	1.93	16
52.00	182.4	111.6	131.4	182.7	1.8	15.1	1.0	6	clean SAND to silty SAND	125	5.0	22	36	21	71	39	-	-	10	0.350	1.89	16
52.17	233.8	142.9	159.4	234.0	2.4	9.9	1.0	6	clean SAND to silty SAND	125	5.0	29	47	26	79	40	-	-	8	0.350	1.81	16
52.33	255.7	156.1	162.1	255.9	2.0	8.7	0.8	6	clean SAND to silty SAND	125	5.0	31	51	27	82	41	-	-	6	0.350	1.70	16
52.50	175.1	106.8	124.8	175.3	1.6	9.7	0.9	6	clean SAND to silty SAND	125	5.0	21	35	20	69	38	-	-	10	0.350	1.88	16
52.66	191.0	116.4	134.6	191.4	1.9	19.2	1.0	6	clean SAND to silty SAND	125	5.0	23	38	22	72	39	-	-	10	0.350	1.86	16
52.82	191.6	116.6	124.8	191.9	1.2	13.5	0.6	6	clean SAND to silty SAND	125	5.0	23	38	21	72	39	-	-	7	0.350	1.75	16
52.99	187.7	114.1	119.0	187.9	1.0	11.0	0.5	6	clean SAND to silty SAND	125	5.0	23	38	20	71	39	-	-	6	0.350	1.71	16
53.15	183.0	111.2	118.7	183.2	1.1	9.8	0.6	6	clean SAND to silty SAND	125	5.0	22	37	20	70	39	-	-	7	0.350	1.74	16
53.32	191.8	116.4	120.1	192.1	1.0	14.0	0.5	6	clean SAND to silty SAND	125	5.0	23	38	20	72	39	-	-	6	0.350	1.69	16
53.48	199.1	120.7	126.7	199.3	1.2	13.1	0.6	6	clean SAND to silty SAND	125	5.0	24	40	21	73	39	-	-	6	0.350	1.72	16
53.64	216.1	130.9	144.5	216.4	1.9	16.3	0.9	6	clean SAND to silty SAND	125	5.0	26	43	24	76	40	-	-	8	0.350	1.80	16
53.81	240.5	145.5	165.3	240.8	2.8	14.0	1.2	6	clean SAND to silty SAND	125	5.0	29	48	27	79	40	-	-	9	0.350	1.84	16
53.97	248.4	150.1	174.4	248.7	3.3	14.3	1.3	6	clean SAND to silty SAND	125	5.0	30	50	28	80	40	-	-	10	0.350	1.87	16
54.14	252.7	152.6	177.3	252.9	3.4	12.2	1.4	6	clean SAND to silty SAND	125	5.0	31	51	29	81	40	-	-	10	0.350	1.87	16
54.30	290.5	175.3	185.7	290.8	2.9	12.3	1.0	6	clean SAND to silty SAND	125	5.0	35	58	31	86	41	-	-	7	0.350	1.73	16
54.46	258.4	155.7	166.6	258.6	2.4	11.0	0.9	6	clean SAND to silty SAND	125	5.0	31	52	28	82	40	-	-	7	0.350	1.75	16
54.63	258.6	155.7	155.7	258.8	1.1	10.0	0.4	6	clean SAND to silty SAND	125	5.0	31	52	26	82	40	-	-	5	0.350	1.55	16
54.79	290.5	174.7	174.7	290.7	1.7	10.0	0.6	6	clean SAND to silty SAND	125	5.0	35	58	30	85	41	-	-	5	0.350	1.59	16
54.96	264.9	159.2	163.1	265.1	2.0	9.6	0.8	6	clean SAND to silty SAND	125	5.0	32	53	28	82	41	-	-	6	0.350	1.68	16
55.12	234.0	140.5	159.4	234.2	2.6	10.4	1.1	6	clean SAND to silty SAND	125	5.0	28	47	26	78	40	-	-	9	0.350	1.84	16
55.28	255.6	153.3	158.6	255.7	1.9	9.6	0.8	6	clean SAND to silty SAND	125	5.0	31	51	27	81	40	-	-	6	0.350	1.70	16
55.45	257.8	154.5	165.3	258.0	2.3	8.8	0.9	6	clean SAND to silty SAND	125	5.0	31	52	28	81	40	-	-	7	0.350	1.75	16
55.61	256.1	153.3	168.2	256.2	2.6	8.5	1.0	6	clean SAND to silty SAND	125	5.0	31	51	28	81	40	-	-	8	0.350	1.79	16
55.78	215.1	128.6	145.0	215.2	2.1	9.1	1.0	6	clean SAND to silty SAND	125	5.0	26	43	24	75	39	-	-	9	0.350	1.83	16
55.94	208.7	124.6	124.6	208.9	0.8	11.4	0.4	6	clean SAND to silty SAND	125	5.0	25	42	21	74	39	-	-	5	0.350	1.61	16
56.11	223.8	133.6	134.6	224.0	1.2	8.9	0.5	6	clean SAND to silty SAND	125	5.0	27	45	23	77	40	-	-	5	0.350	1.66	16
56.27	208.8	124.5	155.9	208.9	3.0	8.2	1.5	6	clean SAND to silty SAND	125	5.0	25	42	24	74	39	-	-	12	0.350	1.96	16
56.43	198.9	118.5	135.6	199.1	1.9	8.2	1.0	6	clean SAND to silty SAND	125	5.0	24	40	22	73	39	-	-	9	0.350	1.85	16
56.60	189.3	112.7	133.5	189.5	2.0	9.2	1.1	6	clean SAND to silty SAND	125	5.0	23	38	21	71	39	-	-	10	0.350	1.90	16
56.76	242.0	143.9	147.9	242.3	1.6	12.1	0.7	6	clean SAND to silty SAND	125	5.0	29	48	25	79	40	-	-	6	0.350	1.68	16
56.93	219.6	130.4	145.1	219.8	2.0	10.9	0.9	6	clean SAND to silty SAND	125	5.0	26	44	24	76	39	-	-	8	0.350	1.81	16
57.09	218.4	129.6	130.5	218.7	1.1	11.4	0.5	6	clean SAND to silty SAND	125	5.0	26	44	22	76	39	-	-	5	0.350	1.66	16
57.25	186.2	110.4	116.8	186.4	1.0	11.1	0.6	6	clean SAND to silty SAND	125	5.0	22	37	20	70	38	-	-	7	0.350	1.73	16
57.42	157.5	93.3	105.0	157.7	1.0	12.3	0.6	6	clean SAND to silty SAND	125	5.0	19	31	17	65	38	-	-	9	0.350	1.83	16
57.58	138.4	81.9	124.0	138.6	2.3	11.9	1.7	5	silty SAND to sandy SILT	120	3.0	27	46	17	60	37	-	-	17	0.200	2.13	16
57.75	152.8	90.3	132.3	153.0	2.5	12.5	1.7	5	silty SAND to sandy SILT	120	3.0	30	51	18	64	37	-	-	16	0.200	2.11	16
57.91	187.2	110.6	169.1	187.5	4.3	14.1	2.3	5	silty SAND to sandy SILT	120	3.0	37	62	23	70	38	-	-	17	0.200	2.14	16
58.07	310.5	183.2	205.2	310.8	4.2	14.0	1.4	6	clean SAND to silty SAND	125	5.0	37	62	34	87	41	-	-	9	0.350	1.82	16
58.24	271.7	160.2	180.3	272.0	3.3	12.4	1.2	6	clean SAND to silty SAND	125	5.0	32	54	29	83	41	-	-	9	0.350	1.83	16
58.40	192.0	113.1	148.6	192.3	3.0	14.5	1.6	6	clean SAND to silty SAND	125	5.0	23	38	22	71	39	-	-	13	0.350	2.01	16
58.57	159.9	94.1	125.6	160.1	2.1	13.1	1.4	6	clean SAND to silty SAND	125	5.0	19	32	19	65	38	-	-	14	0.350	2.03	16
58.73	151.5	89.1	104.8	151.8	1.1	13.2	0.8	6	clean SAND to silty SAND	125	5.0	18	30	17	63	37	-	-	10	0.350	1.89	16
58.89	145.5	85.4	101.6	145.7	1.1	13.2	0.8	6	clean SAND to silty SAND	125	5.0	17	29	16	62	37	-	-	10	0.350	1.90	16
59.06	142.5	83.6	100.0	142.8	1.1	14.8	0.8	6	clean SAND to silty SAND	125	5.0	17	28	16	61	37	-	-	11	0.350	1.91	16
59.22	133.6	78.3	99.8	133.9	1.2	15.7	0.9	6	clean SAND to silty SAND	125	5.0	16	27	15	59	36	-	-	12	0.350	1.98	16
59.39	125.3	73.4	92.7	125.7	1.0	18.3	0.8	6	clean SAND to silty SAND	125	5.0	15	25	14	57	36	-	-	12	0.350	1.97	16
59.55	137.0	80.2	107.9	137.4	1.5	16.9	1.2	6	clean SAND to silty SAND	125	5.0	16	27	16	60	37	-	-	14	0.350	2.03	16
59.71	135.3	79.1	124.2	135.5	2.3	13.5	1.8	5	silty SAND to sandy SILT	120	3.0	26	45	17	59	36	-	-	18	0.200	2.16	16
59.88	158.4	92.5	128.3	158.6	2.3	14.3	1.5	5	silty SAND to sandy SILT	120	3.0	31	53	19	64	37	-	-	15	0.200	2.06	16
60.04	113.9	66.5	107.7	114.2	1.7	14.1	1.6	5	silty SAND to sandy SILT	120	3.0	22	38	14	54	35	-	-	18	0.200	2.18	16
60.21	59.3	22.4	-	59.8	1.4	27.1	2.5	4	clayy SILT to silty CLAY	115	2.0	11	30	6	-	-	4.0	6.6	40	0.070	2.69	15
60.37	43.9	16.6	-	47.1	1.0	162.7	2.6	4	clayy SILT to silty CLAY	115	2.0	8	22	5	-	-	2.9	4.8	47	0.070	2.81	15
60.53	43.5	16.4	-	47.8	1.2	219.8	3.0	3	silty CLAY to CLAY	115	1.5	11	29	5	-	-	2.9	4.7	49	0.005	2.85	15
60.70	49.6	18.7	-	52.7	1.3	159.4	2.8	4	clayy SILT to silty CLAY	115	2.0	9	25	5	-	-	3.3	5.4	45	0.070	2.79	15
60.86	51.3	19.4	-	54.0	1.4	137.5	2.9	4	clayy SILT to silty CLAY	115	2.0	10	26	5	-	-	3.4	5.6	45	0.070	2.78	15
61.03	51.9	19.6	-	55.2	1.2	167.0	2.5	4	clayy SILT to silty CLAY	115	2.0	10	26	5	-	-	3.5	5.7	43	0.070	2.74	15
61.19	53.3	20.1	-	55.8	1.2	125.6	2.4	4	clayy SILT to silty CLAY	115	2.0	10	27	5	-	-	3.6	5.8	41	0.070	2.72	15
61.35	48.8	18.4	-	52.1	1.1	167.6	2.5	4	clayy SILT to silty CLAY	115	2.0	9	24	5	-	-	3.3	5.3	44	0.070	2.76	15
61.52	47.8	18.0	-	51.9	1.1	211.8	2.5	4	clayy SILT to silty CLAY	115	2.0	9	24	5	-	-	3.2	5.2	44	0.070	2.77	15
61.68	48.6	18.4	-	52.7	1.2	209.5	2.7	4	clayy SILT to silty CLAY	115	2.0	9	24	5	-	-	3.2	5.3	45	0.070	2.79	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

College of the Siskiyous McCloud Hall Renovation

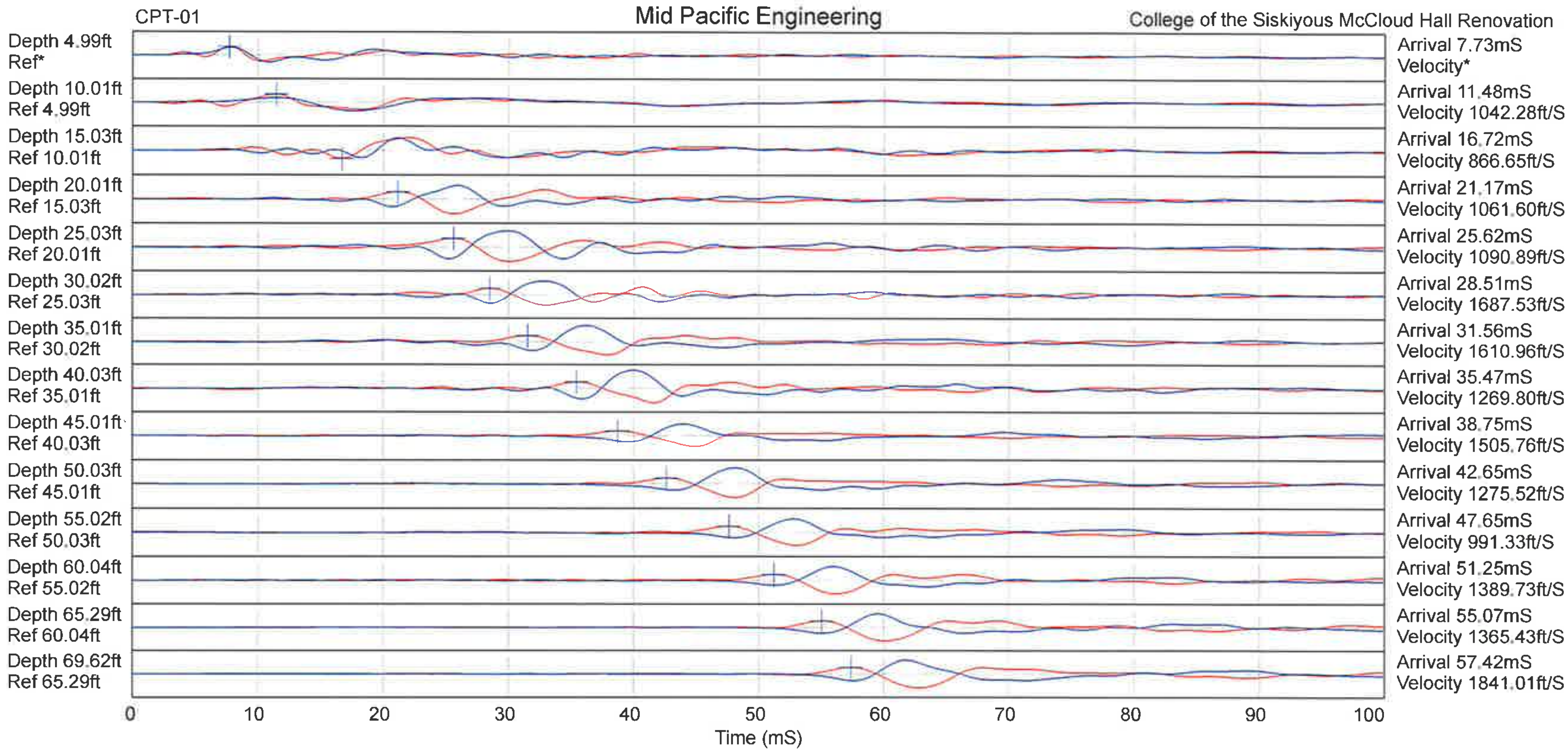
Project ID: Mid Pacific Engineering
Data File: SDF(107).cpt
CPT Date: 6/16/2023 11:02:13 AM
GW During Test: 29 ft

Sounding ID: CPT-01
Project No: 05040-03
Cone/Rig: DDG1596

Depth ft	qc PS tsf	* qcln PS -	qlncs PS -	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato	Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60	SPT R-N 60	* SPT IcN1 60	* Rel Den	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic	* D50 - mm	* Ic SBT Indx	* Nk -
61.85	56.6	21.3	-	60.3	1.4	190.2	2.7	4	clayy SILT to silty CLAY	115	2.0	11	28	6	-	-	3.8	6.2	42	0.070	2.73	15
62.01	64.3	24.3	-	69.1	2.1	247.1	3.4	4	clayy SILT to silty CLAY	115	2.0	12	32	7	-	-	4.3	7.1	43	0.070	2.75	15
62.17	71.6	27.0	-	76.0	3.2	222.6	4.8	3	silty CLAY to CLAY	115	1.5	18	48	8	-	-	4.9	7.9	46	0.005	2.80	15
62.34	88.4	33.4	-	93.0	5.5	232.8	6.5	3	silty CLAY to CLAY	115	1.5	22	59	10	-	-	6.0	9.9	48	0.005	2.83	15
62.50	131.6	49.7	-	136.3	8.0	236.2	6.3	3	silty CLAY to CLAY	115	1.5	33	88	13	-	-	9.1	9.9	40	0.005	2.70	15
62.67	173.2	65.4	-	175.2	10.6	100.2	6.3	9	very stiff fine SOIL	120	1.0	65	100	17	-	-	6.0	9.9	36	0.250	2.62	30
62.83	197.8	113.9	270.8	198.9	10.5	53.1	5.4	9	very stiff fine SOIL	120	1.0	100	100	27	-	-	6.9	9.9	27	0.250	2.42	30
63.00	194.5	111.9	275.7	195.5	10.8	49.3	5.6	9	very stiff fine SOIL	120	1.0	100	100	26	-	-	6.8	9.9	28	0.250	2.44	30
63.16	177.9	102.3	252.2	180.6	9.2	141.0	5.3	9	very stiff fine SOIL	120	1.0	100	100	24	-	-	6.2	9.9	28	0.250	2.44	30
63.32	152.4	87.5	212.8	158.0	6.8	289.9	4.6	4	clayy SILT to silty CLAY	115	2.0	44	76	21	-	-	10.6	9.9	28	0.070	2.43	15
63.49	129.3	74.2	181.0	133.0	5.0	189.7	4.0	4	clayy SILT to silty CLAY	115	2.0	37	65	17	-	-	8.9	9.9	28	0.070	2.43	15
63.65	97.5	36.8	-	105.3	4.2	399.6	4.5	4	clayy SILT to silty CLAY	115	2.0	18	49	10	-	-	6.7	9.9	40	0.070	2.69	15
63.82	89.3	33.7	-	97.6	4.0	424.3	4.6	3	silty CLAY to CLAY	115	1.5	22	60	9	-	-	6.1	9.8	42	0.005	2.72	15
63.98	85.6	32.3	-	93.5	3.9	400.4	4.8	3	silty CLAY to CLAY	115	1.5	22	57	9	-	-	5.8	9.4	43	0.005	2.74	15
64.14	85.0	32.1	-	92.7	3.8	394.9	4.7	3	silty CLAY to CLAY	115	1.5	21	57	9	-	-	5.8	9.3	43	0.005	2.74	15
64.31	82.7	31.2	-	90.8	3.7	411.8	4.7	3	silty CLAY to CLAY	115	1.5	21	55	9	-	-	5.6	9.0	43	0.005	2.75	15
64.47	82.9	31.3	-	90.5	3.7	384.2	4.6	3	silty CLAY to CLAY	115	1.5	21	55	9	-	-	5.7	9.0	43	0.005	2.75	15
64.64	87.4	33.0	-	94.5	3.7	362.4	4.4	3	silty CLAY to CLAY	115	1.5	22	58	9	-	-	6.0	9.5	41	0.005	2.71	15
64.80	86.2	32.5	-	92.9	3.8	337.9	4.6	3	silty CLAY to CLAY	115	1.5	22	57	9	-	-	5.9	9.4	42	0.005	2.73	15
64.96	83.2	31.4	-	89.7	5.4	332.5	6.9	3	silty CLAY to CLAY	115	1.5	21	55	9	-	-	5.7	9.0	50	0.005	2.87	15
65.13	82.5	31.1	-	88.5	4.5	307.4	5.7	3	silty CLAY to CLAY	115	1.5	21	55	9	-	-	5.6	8.9	47	0.005	2.81	15
65.29	81.5	30.7	-	87.6	3.9	312.9	5.0	3	silty CLAY to CLAY	115	1.5	20	54	9	-	-	5.6	8.8	45	0.005	2.78	15
65.46	90.8	34.3	-	94.3	3.5	179.2	4.0	4	clayy SILT to silty CLAY	115	2.0	17	45	9	-	-	6.2	9.8	39	0.070	2.67	15
65.62	84.0	31.7	-	89.9	3.3	300.6	4.2	4	clayy SILT to silty CLAY	115	2.0	16	42	9	-	-	5.7	9.0	41	0.070	2.71	15
65.78	81.3	30.7	-	87.8	3.1	330.1	4.0	4	clayy SILT to silty CLAY	115	2.0	15	41	8	-	-	5.5	8.7	41	0.070	2.71	15
65.95	80.4	30.3	-	87.2	2.8	349.0	3.6	4	clayy SILT to silty CLAY	115	2.0	15	40	8	-	-	5.5	8.6	40	0.070	2.69	15
66.11	82.2	31.0	-	89.0	3.0	350.9	3.9	4	clayy SILT to silty CLAY	115	2.0	16	41	8	-	-	5.6	8.8	40	0.070	2.70	15
66.28	85.8	32.4	-	93.1	4.5	374.0	5.5	3	silty CLAY to CLAY	115	1.5	22	57	9	-	-	5.9	9.2	45	0.005	2.79	15
66.44	96.0	36.2	-	104.9	5.7	455.0	6.2	3	silty CLAY to CLAY	115	1.5	24	64	10	-	-	6.6	9.9	45	0.005	2.79	15
66.60	128.2	48.4	-	136.5	6.3	426.4	5.1	4	clayy SILT to silty CLAY	115	2.0	24	64	13	-	-	8.8	9.9	37	0.070	2.64	15
66.77	130.2	49.1	-	134.8	5.9	234.1	4.7	4	clayy SILT to silty CLAY	115	2.0	25	65	13	-	-	9.0	9.9	36	0.070	2.61	15
66.93	119.9	45.3	-	124.2	5.1	220.7	4.4	4	clayy SILT to silty CLAY	115	2.0	23	60	12	-	-	8.3	9.9	36	0.070	2.61	15
67.10	115.8	43.7	-	120.2	5.4	226.3	4.9	4	clayy SILT to silty CLAY	115	2.0	22	58	11	-	-	8.0	9.9	38	0.070	2.65	15
67.26	106.8	40.3	-	112.6	5.9	296.7	5.8	3	silty CLAY to CLAY	115	1.5	27	71	11	-	-	7.3	9.9	42	0.005	2.73	15
67.42	105.7	39.9	-	112.4	6.7	344.7	6.6	3	silty CLAY to CLAY	115	1.5	27	70	11	-	-	7.3	9.9	45	0.005	2.78	15
67.59	110.4	41.7	-	115.3	6.2	251.0	5.8	3	silty CLAY to CLAY	115	1.5	28	74	11	-	-	7.6	9.9	42	0.005	2.72	15
67.75	107.3	40.5	-	111.3	5.0	203.8	4.9	3	silty CLAY to CLAY	115	1.5	27	72	11	-	-	7.4	9.9	39	0.005	2.68	15
67.92	133.1	74.9	191.8	134.7	5.6	82.8	4.3	4	clayy SILT to silty CLAY	115	2.0	37	67	18	-	-	9.2	9.9	29	0.070	2.46	15
68.08	143.3	80.6	149.8	144.6	3.6	65.4	2.6	5	silty SAND to sandy SILT	120	3.0	27	48	18	60	36	-	-	21	0.200	2.27	16
68.24	131.0	73.6	169.2	132.2	4.5	57.5	3.5	4	clayy SILT to silty CLAY	115	2.0	37	66	17	-	-	9.0	9.9	26	0.070	2.40	15
68.41	101.7	38.4	-	102.9	5.9	60.6	6.0	3	silty CLAY to CLAY	115	1.5	26	68	11	-	-	7.0	9.9	44	0.005	2.76	15
68.57	83.9	31.7	-	88.7	5.6	244.1	7.1	3	silty CLAY to CLAY	115	1.5	21	56	9	-	-	5.7	8.8	50	0.005	2.87	15
68.74	305.9	171.5	218.6	310.1	6.3	210.1	2.1	5	silty SAND to sandy SILT	120	3.0	57	100	33	85	41	-	-	12	0.200	1.98	16
68.90	479.4	268.6	274.8	480.0	5.9	25.8	1.2	6	clean SAND to silty SAND	125	5.0	54	96	47	95	43	-	-	6	0.350	1.68	16
69.07	494.4	276.7	305.7	494.9	8.7	28.0	1.8	6	clean SAND to silty SAND	125	5.0	55	99	50	95	43	-	-	8	0.350	1.80	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing



Hammer to Rod String Distance (ft): 5.83
* = Not Determined

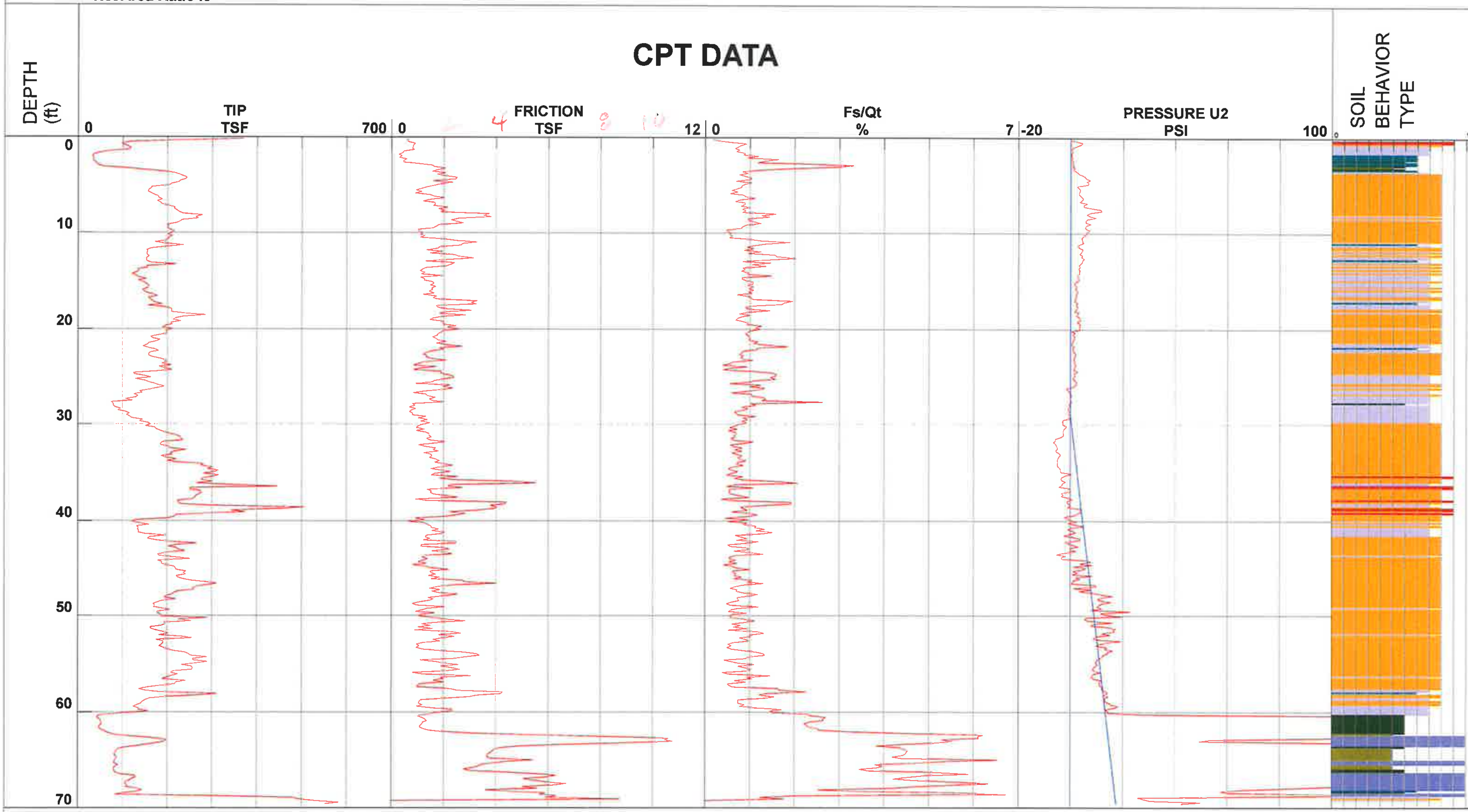
COMMENT:

Mid Pacific Engineering

Project	College of the Siskiyous McCloud Hall Renov	Operator	JM-GM	Filename	SDF(107).cpt
Job Number	05040-03	Cone Number	DDG1596	GPS	
Hole Number	CPT-01	Date and Time	6/16/2023 11:02:13 AM	Maximum Depth	69.55 ft
EST GW Depth During Test	29.00 ft				

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 15cm²

S*Soil behavior type and SPT based on data from UBC-1983

College of the Siskiyous McCloud Hall Renovation

Project ID: Mid Pacific Engineering
Data File: SDF(108).cpt
CPT Date: 6/16/2023 12:22:51 PM
GW During Test: 29 ft

Sounding ID: CPT-02
Project No: 05040-03
Cone/Rig: DDG1596

Depth ft	qc PS tsf	* qcln PS	q1ncs PS	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60	SPT R-N 60	* SPT IcN1 60	* Rel Den	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic	* D50 mm	* Ic SBT Indx	* Nk -
0.33	14.3	22.9	-	14.3	0.6	0.2	4.5	3	silty CLAY to CLAY	115	1.5	15	10	7	-	-	1.0	9.9	47	0.005	2.82	15
0.49	18.0	28.8	-	18.0	0.6	0.3	3.5	4	clayy SILT to silty CLAY	115	2.0	14	9	8	-	-	1.3	9.9	39	0.070	2.67	15
0.66	24.6	39.4	115.4	24.6	0.7	0.3	3.0	4	clayy SILT to silty CLAY	115	2.0	20	12	10	-	-	1.7	9.9	32	0.070	2.53	15
0.82	32.6	52.3	115.5	32.6	0.8	0.4	2.4	5	silty SAND to sandy SILT	120	3.0	17	11	12	46	48	-	-	25	0.200	2.37	16
0.98	69.8	111.9	128.8	69.8	0.7	0.6	0.9	6	clean SAND to silty SAND	125	5.0	22	14	21	71	48	-	-	9	0.350	1.86	16
1.15	75.2	120.6	137.6	75.2	0.7	0.7	1.0	6	clean SAND to silty SAND	125	5.0	24	15	22	73	48	-	-	9	0.350	1.84	16
1.31	57.8	92.6	124.9	57.8	0.8	0.5	1.4	5	silty SAND to sandy SILT	120	3.0	31	19	18	64	48	-	-	14	0.200	2.03	16
1.48	50.2	80.5	126.4	50.2	0.9	0.4	1.8	5	silty SAND to sandy SILT	120	3.0	27	17	17	60	48	-	-	18	0.200	2.16	16
1.64	47.6	76.3	135.6	47.6	1.1	0.4	2.3	5	silty SAND to sandy SILT	120	3.0	25	16	17	58	48	-	-	20	0.200	2.24	16
1.80	53.9	86.5	128.8	53.9	0.9	0.5	1.7	5	silty SAND to sandy SILT	120	3.0	29	18	18	62	48	-	-	16	0.200	2.12	16
1.97	39.3	63.1	110.6	39.3	0.7	0.5	1.8	5	silty SAND to sandy SILT	120	3.0	21	13	14	52	46	-	-	20	0.200	2.23	16
2.13	38.8	62.2	98.8	38.8	0.5	0.6	1.4	5	silty SAND to sandy SILT	120	3.0	21	13	13	51	46	-	-	18	0.200	2.17	16
2.30	36.1	57.9	89.8	36.1	0.4	0.5	1.2	5	silty SAND to sandy SILT	120	3.0	19	12	12	49	45	-	-	17	0.200	2.15	16
2.46	35.1	56.3	90.1	35.1	0.4	0.5	1.3	5	silty SAND to sandy SILT	120	3.0	19	12	12	48	45	-	-	18	0.200	2.17	16
2.62	33.8	54.2	77.8	33.8	0.3	0.4	0.9	5	silty SAND to sandy SILT	120	3.0	18	11	11	47	44	-	-	15	0.200	2.09	16
2.79	29.0	46.5	73.5	29.0	0.3	0.4	0.9	5	silty SAND to sandy SILT	120	3.0	15	10	10	42	43	-	-	18	0.200	2.16	16
2.95	26.0	41.8	75.7	26.1	0.3	0.3	1.2	5	silty SAND to sandy SILT	120	3.0	14	9	9	38	43	-	-	21	0.200	2.25	16
3.12	27.3	43.8	77.0	27.3	0.3	0.3	1.2	5	silty SAND to sandy SILT	120	3.0	15	9	9	40	43	-	-	20	0.200	2.23	16
3.28	29.9	47.9	82.5	29.9	0.4	0.4	1.2	5	silty SAND to sandy SILT	120	3.0	16	10	10	43	43	-	-	20	0.200	2.22	16
3.45	31.4	50.4	86.9	31.4	0.4	0.6	1.3	5	silty SAND to sandy SILT	120	3.0	17	10	11	44	43	-	-	20	0.200	2.22	16
3.61	34.6	55.6	84.0	34.7	0.4	0.6	1.1	5	silty SAND to sandy SILT	120	3.0	19	12	11	48	43	-	-	17	0.200	2.13	16
3.77	35.5	56.9	83.1	35.5	0.3	0.6	1.0	5	silty SAND to sandy SILT	120	3.0	19	12	12	48	43	-	-	16	0.200	2.10	16
3.94	38.5	61.7	78.0	38.5	0.2	0.6	0.6	6	clean SAND to silty SAND	125	5.0	12	8	12	51	43	-	-	12	0.350	1.97	16
4.10	39.6	63.5	86.8	39.6	0.4	0.6	0.9	6	clean SAND to silty SAND	125	5.0	13	8	13	52	43	-	-	14	0.350	2.05	16
4.27	38.8	62.3	81.9	38.8	0.3	0.5	0.8	6	clean SAND to silty SAND	125	5.0	12	8	12	51	43	-	-	13	0.350	2.01	16
4.43	40.4	64.8	109.7	40.4	0.7	0.5	1.7	5	silty SAND to sandy SILT	120	3.0	22	13	14	53	43	-	-	19	0.200	2.21	16
4.59	41.4	66.4	146.9	41.4	1.3	0.5	3.1	5	silty SAND to sandy SILT	120	3.0	22	14	15	53	43	-	-	25	0.200	2.37	16
4.76	55.5	89.0	137.5	55.5	1.1	0.7	2.0	5	silty SAND to sandy SILT	120	3.0	30	19	19	63	44	-	-	17	0.200	2.15	16
4.92	57.4	92.1	134.3	57.4	1.0	0.5	1.8	5	silty SAND to sandy SILT	120	3.0	31	19	19	64	44	-	-	16	0.200	2.10	16
5.09	67.1	107.6	133.2	67.1	0.8	0.6	1.2	6	clean SAND to silty SAND	125	5.0	22	13	21	69	44	-	-	12	0.350	1.95	16
5.25	72.4	116.2	142.6	72.4	0.9	0.8	1.3	6	clean SAND to silty SAND	125	5.0	23	14	22	72	45	-	-	11	0.350	1.94	16
5.41	67.8	108.7	139.3	67.8	1.0	0.8	1.4	6	clean SAND to silty SAND	125	5.0	22	14	21	70	44	-	-	13	0.350	1.99	16
5.58	70.7	113.3	142.0	70.7	1.0	0.8	1.4	6	clean SAND to silty SAND	125	5.0	23	14	22	71	44	-	-	12	0.350	1.96	16
5.74	59.7	95.8	111.5	59.8	0.5	0.7	0.8	6	clean SAND to silty SAND	125	5.0	19	12	18	66	43	-	-	10	0.350	1.87	16
5.91	50.8	81.4	122.6	50.8	0.8	0.6	1.7	5	silty SAND to sandy SILT	120	3.0	27	17	17	60	42	-	-	17	0.200	2.13	16
6.07	53.1	85.2	136.6	53.1	1.1	0.5	2.0	5	silty SAND to sandy SILT	120	3.0	28	18	18	62	42	-	-	18	0.200	2.17	16
6.23	67.8	107.4	150.1	67.8	1.2	0.7	1.8	5	silty SAND to sandy SILT	120	3.0	36	23	22	69	44	-	-	15	0.200	2.07	16
6.40	75.9	118.7	169.3	75.9	1.6	0.8	2.1	5	silty SAND to sandy SILT	120	3.0	40	25	24	73	44	-	-	15	0.200	2.08	16
6.56	106.1	163.8	194.4	106.1	1.7	1.0	1.6	6	clean SAND to silty SAND	125	5.0	33	21	31	83	45	-	-	10	0.350	1.90	16
6.73	114.9	175.2	185.2	114.9	1.1	1.2	1.0	6	clean SAND to silty SAND	125	5.0	35	23	31	86	46	-	-	7	0.350	1.73	16
6.89	135.9	204.6	204.6	135.9	1.0	1.4	0.8	6	clean SAND to silty SAND	125	5.0	41	27	35	91	46	-	-	5	0.350	1.60	16
7.05	143.2	212.9	239.0	143.2	2.3	1.6	1.6	6	clean SAND to silty SAND	125	5.0	43	29	39	92	46	-	-	9	0.350	1.82	16
7.22	176.8	259.8	277.0	176.8	2.6	1.8	1.5	6	clean SAND to silty SAND	125	5.0	52	35	46	95	47	-	-	7	0.350	1.74	16
7.38	197.6	287.1	295.2	197.7	2.6	2.0	1.3	6	clean SAND to silty SAND	125	5.0	57	40	50	95	48	-	-	6	0.350	1.69	16
7.55	223.8	321.5	321.5	223.9	2.6	2.3	1.2	6	clean SAND to silty SAND	125	5.0	64	45	55	95	48	-	-	5	0.350	1.61	16
7.71	236.4	335.9	335.9	236.5	2.2	2.5	0.9	6	clean SAND to silty SAND	125	5.0	67	47	56	95	48	-	-	5	0.350	1.51	16
7.87	257.0	361.2	361.2	257.1	2.4	2.5	0.9	6	clean SAND to silty SAND	125	5.0	72	51	59	95	48	-	-	5	0.350	1.50	16
8.04	255.2	354.9	354.9	255.3	2.3	2.5	0.9	6	clean SAND to silty SAND	125	5.0	71	51	58	95	48	-	-	5	0.350	1.50	16
8.20	270.1	371.7	371.7	270.2	2.4	2.7	0.9	6	clean SAND to silty SAND	125	5.0	74	54	61	95	48	-	-	5	0.350	1.47	16
8.37	287.9	392.1	392.1	288.0	2.3	3.2	0.8	6	clean SAND to silty SAND	125	5.0	78	58	63	95	48	-	-	5	0.350	1.43	16
8.53	264.6	356.8	356.8	264.7	2.4	3.6	0.9	6	clean SAND to silty SAND	125	5.0	71	53	59	95	48	-	-	5	0.350	1.49	16
8.69	270.4	361.1	361.1	270.4	2.4	3.7	0.9	6	clean SAND to silty SAND	125	5.0	72	54	59	95	48	-	-	5	0.350	1.48	16
8.86	264.4	349.7	349.7	264.5	2.0	4.0	0.8	6	clean SAND to silty SAND	125	5.0	70	53	57	95	48	-	-	5	0.350	1.44	16
9.02	244.9	320.8	320.8	245.0	1.6	4.0	0.7	6	clean SAND to silty SAND	125	5.0	64	49	51	95	48	-	-	5	0.350	1.41	16
9.19	270.7	351.4	351.4	270.8	3.0	4.5	1.1	6	clean SAND to silty SAND	125	5.0	70	54	59	95	48	-	-	5	0.350	1.57	16
9.35	235.6	303.1	303.1	235.7	2.2	4.1	0.9	6	clean SAND to silty SAND	125	5.0	61	47	51	95	47	-	-	5	0.350	1.55	16
9.51	243.5	310.5	314.9	243.6	3.3	4.2	1.3	6	clean SAND to silty SAND	125	5.0	62	49	54	95	47	-	-	5	0.350	1.67	16
9.68	233.5	295.1	294.2	233.5	2.8	4.4	1.2	6	clean SAND to silty SAND	125	5.0	59	47	51	95	47	-	-	5	0.350	1.64	16
9.84	234.5	293.8	293.8	234.5	2.8	4.5	1.2	6	clean SAND to silty SAND	125	5.0	59	47	51	95	47	-	-	5	0.350	1.64	16
10.01	209.6	260.4	260.4	209.7	1.7	4.6	0.8	6	clean SAND to silty SAND	125	5.0	52	42	44	95	47	-	-	5	0.350	1.55	16
10.17	206.7	254.7	254.7	206.8	1.7	5.3	0.8	6	clean SAND to silty SAND	125	5.0	51	41	43	95	46	-	-	5	0.350	1.56	16
10.34	200.2	244.6	244.6	200.3	1.5	5.3	0.7	6	clean SAND to silty SAND	125	5.0	49	40	41	95	46	-	-	5	0.350	1.54	16
10.50	197.2	239.1	239.1	197.3	1.7	5.5	0.9	6	clean SAND to silty SAND	125	5.0	48	39	41	95	46	-	-	5	0.350	1.59	16
10.66	188.1	226.2	241.6	188.2	2.5	5.4	1.3	6	clean SAND to silty SAND	125	5.0	45	38	40	94	46	-	-	7	0.350	1.74	16
10.83	189.6	226.3	237.2	189.8	2.3	5.5	1.2	6	clean SAND to silty SAND	125	5.0	45	38	40	94	46	-	-	6	0.350	1.72	16
10.99	197.8	234.3	247.2	197.9	2.5	5.6	1.3	6	clean SAND to silty SAND	125	5.0	47	40	42	95	46	-	-	7	0.350	1.73	16
11.16	192.0	225.6	232.1	192.1	2.1	5.5	1.1	6	clean SAND to silty SAND	125	5.0	45	38	40	94	46	-	-	6	0.350	1.69	16
11.32	195.4	228.0	228.2	195.5	1.9	5.6	1.0	6	clean SAND to silty SAND	125	5.0	46	39	39	94	46	-	-	5	0.350	1.65	16
11.48	192.1	222.5	232.5	192.2	2.2	5.7	1.2	6	clean SAND to silty SAND	125	5.0	44	38	39	93	45	-	-	6	0.350	1.71	16
11.65	188.6	216.9	226.3	188.7	2.1	5.8	1.1	6	clean SAND to silty SAND	125	5.0	43	38	38	93	45	-	-	6	0.350	1.71	16
11.81	172.3	196.7	205.7	172.4	1.8	5.8	1.1	6	clean SAND to silty SAND	125	5.0	39	34	35	89	45	-	-	6	0.350	1.71	16
11.98	174.0	197.2	208.1	174.1	1.9	5.7	1.1	6	clean SAND to silty SAND	125	5.0	39	35	35	89	45	-	-	7	0.350	1.73	16
12.14	160.1	180.2	190.2	160.2	1.6	5.6	1.0	6	clean SAND to silty SAND	125	5.0	36	32	32	86	44	-	-	7	0.350	1.73	16
12.30	155.4	173.7	186.4	155.5	1.6	5.5	1.1	6	clean SAND to silty SAND	125	5.0	35	31	31	85	44	-	-	7	0.350	1.75	16
12.47	148.6	165.0	181.6	148.7	1.7	5.9	1.1	6	clean SAND to silty SAND	125	5.0	33	30	30	84	44	-	-	8	0.350	1.79	16
12.63	152.9	168.7	192.4	153.0	2.1	5.9	1.4	6	clean SAND to silty SAND	125	5.0	34	31	31	84	44	-	-	9	0.350	1.84	16
12.80	144.2	158.0	172.9	144.3	1.5	5.6	1.1	6	clean SAND to silty SAND	125	5.0	32	29	29	82	44	-	-	8	0.350	1.78	16
12.96	152.6	166.2	176.7	152.7	1.5	5.7	1.0	6	clean SAND to silty SAND	125	5.0	33	31	30	84	44	-	-	7	0.350	1.74	16
13.12	133.8	144.7	164.4	133.9	1.6	5.8	1.2	6	clean SAND to silty SAND	125	5.0	29	27	27	79	43	-	-	9	0.350	1.84	16
13.29	134.3	144.3	174.5	134.4	2.0	5.6	1.5	6	clean SAND to silty SAND	125	5.0	29	27	28	79	43	-	-	11	0.350	1.92	16
13.45	135.0	144.2	167.3	135.1	1.7	5.6	1.3	6	clean SAND to silty SAND	125	5.0	29	27	27	79	43	-	-	10	0.350	1.87	16
13.62	148.9	158.1	178.9	149.0	1.9	5.7	1.3	6	clean SAND to silty SAND	125	5.0	32	30	29	82	43	-	-	9	0.350	1.83	16
13.78	145.5	153.5	164.6	145.6	1.3	5.7	0.9	6	clean SAND to silty SAND	125	5.0	31	29	28	81	43	-	-	7	0.350	1.75	16
13.94	145.6	152.7	168.1	145.7	1.5	5.7	1.1	6	clean SAND to silty SAND	125	5.0	31	29	28	81	43	-	-	8	0.350	1.79	16
14.11	144.0	150.2	167.0	144.1	1.6	5.7	1.1	6	clean SAND to silty SAND	125	5.0	30	29	27	80	43	-	-	8	0.350	1.81	16
14.27	156.9	162.6	178.0	157.0	1.7	5.7	1.1	6	clean SAND to silty SAND	125	5.0	33	31	29	83	43	-	-	8	0.350	1.78	16
14.44	158.7	163.6	163.6	158.8	1.0	5.8	0.6	6	clean SAND to silty SAND	125	5.0	33	32	28	83	43	-	-	5	0.350	1.61	16
14.60	158.1	162.1	163.5	158.3	1.1	5.8	0.7	6	clean SAND to silty SAND	125	5.0	32	32	28	83	43	-	-	5	0.350	1.66	16
14.76	158.9	161.9	181.3	159.0	1.9	5.7	1.2	6	clean SAND to silty SAND	125	5.0	32	32	30	83	43	-	-	9	0.350	1.82	16
14.93	153.8	155.8	202.9	153.9	3.2	5.9	2.1	5	silty SAND to sandy SILT	120	3.0	52	51	31	82	43	-	-	13	0.200	2.00	16
15.09	167.4	168.7	192.8	167.4	2.3	4.7	1.4	6	clean SAND to silty SAND	125	5.0	34	33	31	84	44	-	-	9	0.350	1.85	16
15.26	156.8	157.2	189.6	156.9	2.5	4.6	1.6	6	clean SAND to silty SAND	125	5.0	31	31	30	82	43	-	-	11	0.350	1.92	16
15.42	147.9	147.5	179.3	148.0	2.3	4.6	1.6	6	clean SAND to silty SAND	125	5.0	29	30	28	80	43	-	-	11	0.350	1.93	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

College of the Siskiyous McCloud Hall Renovation

Project ID: Mid Pacific Engineering
Data File: SDF(108).cpt
CPT Date: 6/16/2023 12:22:51 PM
GW During Test: 29 ft

Sounding ID: CPT-02
Project No: 05040-03
Cone/Rig: DDG1596

Depth ft	qc PS tsf	* qcln PS -	qlncs PS -	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60	SPT R-N 60	* SPT IcN1 60	* Rel Den	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic -	D50 - mm	* Ic SBT Indx	Nk - -
15.58	141.3	140.1	170.8	141.4	2.1	4.5	1.5	6	clean SAND to silty SAND	125	5.0	28	28	27	78	43	-	-	11	0.350	1.93	16
15.75	140.4	138.5	165.4	140.5	1.9	4.4	1.4	6	clean SAND to silty SAND	125	5.0	28	28	26	78	42	-	-	11	0.350	1.91	16
15.91	133.1	130.6	167.8	133.1	2.3	4.3	1.7	6	clean SAND to silty SAND	125	5.0	26	27	26	76	42	-	-	13	0.350	1.99	16
16.08	141.3	137.9	157.9	141.4	1.6	4.5	1.2	6	clean SAND to silty SAND	125	5.0	28	28	26	78	42	-	-	9	0.350	1.85	16
16.24	138.9	134.9	154.7	139.0	1.6	4.4	1.1	6	clean SAND to silty SAND	125	5.0	27	28	25	77	42	-	-	9	0.350	1.85	16
16.40	137.2	132.6	155.1	137.3	1.7	4.5	1.2	6	clean SAND to silty SAND	125	5.0	27	27	25	76	42	-	-	10	0.350	1.88	16
16.57	119.9	115.3	141.6	120.0	1.5	4.6	1.3	6	clean SAND to silty SAND	125	5.0	23	24	22	72	41	-	-	11	0.350	1.94	16
16.73	116.9	111.8	137.1	117.0	1.4	4.3	1.2	6	clean SAND to silty SAND	125	5.0	22	23	21	71	41	-	-	11	0.350	1.94	16
16.90	110.8	105.4	139.9	110.9	1.7	4.2	1.5	6	clean SAND to silty SAND	125	5.0	21	22	21	69	41	-	-	13	0.350	2.02	16
17.06	100.2	95.0	121.7	100.3	1.2	4.1	1.2	6	clean SAND to silty SAND	125	5.0	19	20	19	65	40	-	-	13	0.350	1.99	16
17.23	105.8	99.7	131.1	105.9	1.5	4.3	1.4	6	clean SAND to silty SAND	125	5.0	20	21	20	67	40	-	-	13	0.350	2.01	16
17.39	103.3	96.9	130.2	103.4	1.5	4.2	1.5	5	silty SAND to sandy SILT	120	3.0	32	34	19	66	40	-	-	14	0.200	2.03	16
17.55	115.9	108.2	129.3	116.0	1.2	4.3	1.1	6	clean SAND to silty SAND	125	5.0	22	23	21	70	41	-	-	11	0.350	1.91	16
17.72	129.8	120.6	154.6	129.8	2.0	4.2	1.6	6	clean SAND to silty SAND	125	5.0	24	26	24	73	41	-	-	13	0.350	1.99	16
17.88	135.0	124.9	148.9	135.1	1.7	4.3	1.2	6	clean SAND to silty SAND	125	5.0	25	27	24	74	42	-	-	10	0.350	1.90	16
18.05	127.0	117.0	152.7	127.1	2.0	4.0	1.6	6	clean SAND to silty SAND	125	5.0	23	25	23	72	41	-	-	13	0.350	2.00	16
18.21	118.2	108.4	162.7	118.3	2.6	4.1	2.2	5	silty SAND to sandy SILT	120	3.0	36	39	22	70	41	-	-	17	0.200	2.12	16
18.37	120.7	110.1	149.4	120.7	2.0	3.7	1.7	5	silty SAND to sandy SILT	120	3.0	37	40	22	70	41	-	-	14	0.200	2.04	16
18.54	132.3	120.2	163.2	132.4	2.5	3.7	1.9	5	silty SAND to sandy SILT	120	3.0	40	44	24	73	41	-	-	14	0.200	2.04	16
18.70	134.0	121.2	175.2	134.1	3.0	3.7	2.2	5	silty SAND to sandy SILT	120	3.0	40	45	25	73	41	-	-	16	0.200	2.09	16
18.87	154.6	139.3	174.1	154.7	2.5	3.8	1.7	6	clean SAND to silty SAND	125	5.0	28	31	27	78	42	-	-	12	0.350	1.96	16
19.03	160.1	143.6	165.9	160.2	2.0	3.9	1.3	6	clean SAND to silty SAND	125	5.0	29	32	27	79	42	-	-	10	0.350	1.86	16
19.19	123.8	110.5	148.7	123.9	2.1	4.1	1.7	5	silty SAND to sandy SILT	120	3.0	37	41	22	70	41	-	-	14	0.200	2.03	16
19.36	123.4	109.7	136.7	123.5	1.6	3.9	1.3	6	clean SAND to silty SAND	125	5.0	22	25	21	70	41	-	-	12	0.350	1.96	16
19.52	124.7	110.4	139.0	124.8	1.7	3.8	1.3	6	clean SAND to silty SAND	125	5.0	22	25	21	70	41	-	-	12	0.350	1.97	16
19.69	122.0	107.6	148.4	122.1	2.1	3.7	1.8	5	silty SAND to sandy SILT	120	3.0	36	41	22	69	41	-	-	14	0.200	2.06	16
19.85	133.2	117.0	147.5	133.3	1.9	3.7	1.4	6	clean SAND to silty SAND	125	5.0	23	27	23	72	41	-	-	12	0.350	1.97	16
20.01	137.5	120.3	139.9	137.6	1.5	3.7	1.1	6	clean SAND to silty SAND	125	5.0	24	28	23	73	41	-	-	10	0.350	1.87	16
20.18	165.2	143.9	165.0	165.3	2.0	3.8	1.2	6	clean SAND to silty SAND	125	5.0	29	33	27	79	42	-	-	9	0.350	1.85	16
20.34	164.3	142.5	162.7	164.4	1.9	3.8	1.2	6	clean SAND to silty SAND	125	5.0	29	33	26	79	42	-	-	9	0.350	1.85	16
20.51	167.7	144.9	163.4	167.8	1.9	3.6	1.1	6	clean SAND to silty SAND	125	5.0	29	34	27	79	42	-	-	9	0.350	1.83	16
20.67	191.3	164.6	189.8	191.4	2.7	4.1	1.4	6	clean SAND to silty SAND	125	5.0	33	38	31	83	43	-	-	9	0.350	1.86	16
20.83	254.5	218.1	236.0	254.6	3.4	4.6	1.4	6	clean SAND to silty SAND	125	5.0	44	51	39	93	44	-	-	7	0.350	1.77	16
21.00	232.1	198.1	228.6	232.2	3.9	4.4	1.7	6	clean SAND to silty SAND	125	5.0	40	46	37	90	43	-	-	9	0.350	1.86	16
21.16	204.1	173.5	204.3	204.1	3.3	4.3	1.6	6	clean SAND to silty SAND	125	5.0	35	41	33	85	43	-	-	10	0.350	1.89	16
21.33	224.0	189.7	208.5	224.1	2.9	4.2	1.3	6	clean SAND to silty SAND	125	5.0	38	45	34	88	43	-	-	8	0.350	1.79	16
21.49	254.0	214.3	223.4	254.1	2.8	4.8	1.1	6	clean SAND to silty SAND	125	5.0	43	51	38	92	44	-	-	6	0.350	1.71	16
21.65	214.2	180.0	189.3	214.3	2.1	4.7	1.0	6	clean SAND to silty SAND	125	5.0	36	43	32	86	43	-	-	7	0.350	1.72	16
21.82	222.0	185.8	194.5	222.1	2.2	4.7	1.0	6	clean SAND to silty SAND	125	5.0	37	44	33	87	43	-	-	6	0.350	1.71	16
21.98	225.6	188.1	203.7	225.7	2.7	4.9	1.2	6	clean SAND to silty SAND	125	5.0	38	45	34	88	43	-	-	7	0.350	1.77	16
22.15	235.4	195.6	206.8	235.5	2.6	5.0	1.1	6	clean SAND to silty SAND	125	5.0	39	47	35	89	43	-	-	7	0.350	1.73	16
22.31	237.1	196.3	206.7	237.2	2.6	5.1	1.1	6	clean SAND to silty SAND	125	5.0	39	47	35	89	43	-	-	7	0.350	1.72	16
22.47	238.7	196.9	211.9	238.8	2.9	5.0	1.2	6	clean SAND to silty SAND	125	5.0	39	48	35	89	43	-	-	7	0.350	1.76	16
22.64	237.5	195.1	195.1	237.6	1.6	5.1	0.7	6	clean SAND to silty SAND	125	5.0	39	47	33	89	43	-	-	5	0.350	1.58	16
22.80	235.6	192.9	192.9	235.7	1.3	5.1	0.6	6	clean SAND to silty SAND	125	5.0	39	47	32	89	43	-	-	5	0.350	1.53	16
22.97	250.6	204.5	204.5	250.7	1.0	5.3	0.4	6	clean SAND to silty SAND	125	5.0	41	50	33	91	43	-	-	5	0.350	1.43	16
23.13	242.3	196.9	196.9	242.4	1.4	5.2	0.6	6	clean SAND to silty SAND	125	5.0	39	48	33	89	43	-	-	5	0.350	1.54	16
23.30	253.1	205.0	205.0	253.2	1.3	5.2	0.5	6	clean SAND to silty SAND	125	5.0	41	51	34	91	43	-	-	5	0.350	1.48	16
23.46	238.4	192.4	192.4	238.5	1.6	5.1	0.7	6	clean SAND to silty SAND	125	5.0	38	48	33	89	43	-	-	5	0.350	1.58	16
23.62	222.9	179.2	180.4	223.0	1.8	4.9	0.8	6	clean SAND to silty SAND	125	5.0	36	45	31	86	43	-	-	5	0.350	1.65	16
23.79	217.9	174.6	179.1	218.0	1.8	5.0	0.8	6	clean SAND to silty SAND	125	5.0	35	44	31	85	43	-	-	6	0.350	1.68	16
23.95	205.5	164.1	171.4	205.6	1.8	4.8	0.9	6	clean SAND to silty SAND	125	5.0	33	41	29	83	42	-	-	6	0.350	1.71	16
24.12	220.3	175.3	177.7	220.4	1.7	5.0	0.8	6	clean SAND to silty SAND	125	5.0	35	44	30	86	43	-	-	5	0.350	1.66	16
24.28	250.8	198.9	198.9	250.9	1.5	5.3	0.6	6	clean SAND to silty SAND	125	5.0	40	50	33	90	43	-	-	5	0.350	1.54	16
24.44	233.4	184.5	190.1	233.5	2.1	5.2	0.9	6	clean SAND to silty SAND	125	5.0	37	47	32	87	43	-	-	6	0.350	1.69	16
24.61	232.6	183.2	212.4	232.7	3.7	5.2	1.6	6	clean SAND to silty SAND	125	5.0	37	47	34	87	43	-	-	10	0.350	1.87	16
24.77	255.0	200.2	239.5	255.1	4.9	5.8	1.9	6	clean SAND to silty SAND	125	5.0	40	51	38	90	43	-	-	11	0.350	1.91	16
24.94	289.4	226.4	260.2	289.5	5.2	6.4	1.8	6	clean SAND to silty SAND	125	5.0	45	58	42	94	44	-	-	9	0.350	1.86	16
25.10	383.2	298.8	298.8	383.3	3.6	7.6	1.0	6	clean SAND to silty SAND	125	5.0	60	77	50	95	45	-	-	5	0.350	1.56	16
25.26	351.8	273.5	273.5	352.0	2.9	8.7	0.8	6	clean SAND to silty SAND	125	5.0	55	70	46	95	45	-	-	5	0.350	1.54	16
25.43	290.8	225.3	225.3	291.0	1.6	7.8	0.5	6	clean SAND to silty SAND	125	5.0	45	58	37	94	44	-	-	5	0.350	1.47	16
25.59	227.3	175.6	175.6	227.5	1.6	6.9	0.7	6	clean SAND to silty SAND	125	5.0	35	45	30	86	42	-	-	5	0.350	1.64	16
25.76	187.1	144.0	152.1	187.2	1.5	5.8	0.8	6	clean SAND to silty SAND	125	5.0	29	37	26	79	41	-	-	7	0.350	1.73	16
25.92	182.6	140.1	155.1	182.8	1.8	5.5	1.0	6	clean SAND to silty SAND	125	5.0	28	37	26	78	41	-	-	8	0.350	1.80	16
26.08	132.4	101.3	127.9	132.5	1.6	4.9	1.2	6	clean SAND to silty SAND	125	5.0	20	26	20	67	39	-	-	12	0.350	1.97	16
26.25	119.5	91.1	129.9	119.5	1.9	4.8	1.6	5	silty SAND to sandy SILT	120	3.0	30	40	18	64	39	-	-	15	0.200	2.08	16
26.41	103.7	78.8	125.0	103.8	1.9	4.8	1.8	5	silty SAND to sandy SILT	120	3.0	26	35	17	59	38	-	-	18	0.200	2.17	16
26.58	108.8	82.4	112.0	108.9	1.3	4.8	1.2	5	silty SAND to sandy SILT	120	3.0	27	36	16	61	38	-	-	14	0.200	2.04	16
26.74	116.6	88.1	124.3	116.7	1.7	4.8	1.5	5	silty SAND to sandy SILT	120	3.0	29	39	18	63	39	-	-	15	0.200	2.07	16
26.90	133.3	100.4	159.5	133.4	3.1	4.8	2.3	5	silty SAND to sandy SILT	120	3.0	33	44	21	67	39	-	-	18	0.200	2.17	16
27.07	123.3	92.6	160.9	123.4	3.2	4.6	2.6	5	silty SAND to sandy SILT	120	3.0	31	41	20	64	39	-	-	20	0.200	2.23	16
27.23	121.9	91.3	139.1	122.0	2.3	4.5	1.9	5	silty SAND to sandy SILT	120	3.0	30	41	19	64	39	-	-	17	0.200	2.14	16
27.40	138.9	103.7	133.8	139.0	1.9	4.6	1.4	6	clean SAND to silty SAND	125	5.0	21	28	20	68	39	-	-	13	0.350	1.99	16
27.56	118.3	88.1	121.6	118.4	1.7	4.4	1.4	5	silty SAND to sandy SILT	120	3.0	29	39	18	63	39	-	-	15	0.200	2.06	16
27.72	116.5	86.5	100.6	116.6	0.8	4.3	0.7	6	clean SAND to silty SAND	125	5.0	17	23	16	62	38	-	-	10	0.350	1.87	16
27.89	98.4	72.8	94.6	98.5	0.9	4.1	0.9	6	clean SAND to silty SAND	125	5.0	15	20	14	57	37	-	-	13	0.350	2.00	16
28.05	89.7	66.2	114.1	89.8	1.6	4.1	1.8	5	silty SAND to sandy SILT	120	3.0	22	30	14	53	37	-	-	20	0.200	2.22	16
28.22	101.7	74.9	108.6	101.8	1.4	3.9	1.4	5	silty SAND to sandy SILT	120	3.0	25	34	15	57	37	-	-	16	0.200	2.10	16
28.38	115.1	84.4	109.3	115.1	1.2	3.8	1.1	6	clean SAND to silty SAND	125	5.0	17	23	17	61	38	-	-	13	0.350	2.00	16
28.54	119.7	87.6	107.3	119.8	1.1	3.9	0.9	6	clean SAND to silty SAND	125	5.0	18	24	17	63	38	-	-	11	0.350	1.94	16
28.71	128.6	93.8	100.3	128.6	0.6	4.0	0.5	6	clean SAND to silty SAND	125	5.0	19	26	17	65	39	-	-	7	0.350	1.75	16
28.87	126.2	91.8	103.4	126.2	0.8	3.9	0.6	6	clean SAND to silty SAND	125	5.0	18	25	17	64	39	-	-	9	0.350	1.83	16
29.04	124.3	90.3	99.4	124.4	0.7	3.7	0.5	6	clean SAND to silty SAND	125	5.0	18	25	16	64	39	-	-	8	0.350	1.79	16
29.20	120.3	87.3	94.5	120.4	0.5	3.8	0.4	6	clean SAND to silty SAND	125	5.0	17	24	16	63	38	-	-	7	0.350	1.77	16
29.36	120.6	87.3	99.1	120.7	0.7	3.7	0.6	6	clean SAND to silty SAND	125	5.0	17	24	16	63	38	-	-	9	0.350	1.84	16
29.53	113.5	82.1	99.9	113.5	0.9	3.6	0.8	6	clean SAND to silty SAND	125	5.0	16	23	16	60	38	-	-	11	0.350	1.93	16
29.69	114.5	82.7	103.2	114.6	1.0	3.7	0.9	6	clean SAND to silty SAND	125	5.0	17	23	16	61	38	-	-	12	0.350	1.96	16
29.86	108.9	78.5	99.4	109.0	1.0	3.8	0.9	6	clean SAND to silty SAND	125	5.0	16	22	15	59	38	-	-	12	0.350	1.97	16
30.02	114.3	82.3	98.2	114.4	0.8	3.9	0.7	6	clean SAND to silty SAND	125	5.0	16	23	16	61	38	-	-	10	0.350	1.90	16
30.19	127.0	91.3	104.0	127.0	0.8	3.5	0.7	6	clean SAND to silty SAND	125	5.0	18	25	17	64	39	-	-	9	0.350	1.84	16
30.35	133.6	95.9	108.6	133.7	0.9	3.4	0.7	6	clean SAND to silty SAND	125	5.0	19	27	18	66	39	-	-	9	0.350	1.83	16
30.51	140.1	100.5	118.7	140.2	1.3	3.5	0.9	6	clean SAND to silty SAND	125	5.0	20	28	19	67	39	-	-	10	0.350	1.89	16
30.68	150.2	107.6	121.2	150.3	1.2	3.6	0.8	6	clean SAND to silty SAND	125	5.0	22	30	20	69	39	-	-	9	0.350	1.83	16
30.84	169.0	120.9	135.7	169.1	1.5	3.8	0.9	6	clean SAND to silty SAND	125	5.0	24	34	22	73	40	-	-	9	0.350	1.82	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

College of the Siskiyous McCloud Hall Renovation

Project ID: Mid Pacific Engineering
Data File: SDF(108).cpt
CPT Date: 6/16/2023 12:22:51 PM
GW During Test: 29 ft

Sounding ID: CPT-02
Project No: 05040-03
Cone/Rig: DDG1596

Depth ft	qc PS tsf	* qcln PS -	qlncs PS -	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato -	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60	SPT R-N 60	* SPT IcN1 60	* Rel Den -	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic	D50 - mm	Ic SBT Indx	Nk -
31.01	188.5	134.6	140.7	188.6	1.3	4.0	0.7	6	clean SAND to silty SAND	125	5.0	27	38	24	77	41	-	-	6	0.350	1.71	16
31.17	216.2	154.2	160.0	216.3	1.7	4.2	0.8	6	clean SAND to silty SAND	125	5.0	31	43	27	81	41	-	-	6	0.350	1.70	16
31.33	233.8	166.5	171.8	233.9	1.9	4.3	0.8	6	clean SAND to silty SAND	125	5.0	33	47	29	84	42	-	-	6	0.350	1.69	16
31.50	245.4	174.6	178.1	245.5	2.0	4.7	0.8	6	clean SAND to silty SAND	125	5.0	35	49	30	85	42	-	-	6	0.350	1.67	16
31.66	278.3	197.7	197.7	278.4	1.6	5.2	0.6	6	clean SAND to silty SAND	125	5.0	40	56	33	89	43	-	-	5	0.350	1.54	16
31.83	293.1	207.9	207.9	293.2	1.6	5.2	0.6	6	clean SAND to silty SAND	125	5.0	42	59	34	91	43	-	-	5	0.350	1.50	16
31.99	284.2	201.3	212.4	284.3	3.2	5.2	1.1	6	clean SAND to silty SAND	125	5.0	40	57	36	90	43	-	-	7	0.350	1.73	16
32.15	259.2	183.4	195.1	259.3	2.7	4.9	1.1	6	clean SAND to silty SAND	125	5.0	37	52	33	87	42	-	-	7	0.350	1.74	16
32.32	272.7	192.7	201.3	272.8	2.8	5.0	1.0	6	clean SAND to silty SAND	125	5.0	39	55	34	89	42	-	-	6	0.350	1.71	16
32.48	291.0	205.3	211.6	291.1	2.9	4.9	1.0	6	clean SAND to silty SAND	125	5.0	41	58	36	91	43	-	-	6	0.350	1.69	16
32.65	301.2	212.2	212.2	301.3	2.3	5.1	0.8	6	clean SAND to silty SAND	125	5.0	42	60	36	92	43	-	-	5	0.350	1.60	16
32.81	284.3	200.0	211.1	284.4	3.1	5.1	1.1	6	clean SAND to silty SAND	125	5.0	40	57	36	90	43	-	-	7	0.350	1.73	16
32.97	331.8	233.1	234.8	331.9	3.4	5.7	1.0	6	clean SAND to silty SAND	125	5.0	47	66	40	95	43	-	-	5	0.350	1.66	16
33.14	347.0	243.5	243.5	347.1	3.4	5.5	1.0	6	clean SAND to silty SAND	125	5.0	49	69	42	95	44	-	-	5	0.350	1.63	16
33.30	365.5	256.1	256.1	365.7	3.0	6.2	0.8	6	clean SAND to silty SAND	125	5.0	51	73	43	95	44	-	-	5	0.350	1.55	16
33.47	355.5	248.7	248.7	355.6	3.1	6.3	0.9	6	clean SAND to silty SAND	125	5.0	50	71	42	95	44	-	-	5	0.350	1.58	16
33.63	378.7	264.7	264.7	378.9	3.0	7.2	0.8	6	clean SAND to silty SAND	125	5.0	53	76	44	95	44	-	-	5	0.350	1.54	16
33.79	391.5	273.3	281.1	391.7	5.0	7.1	1.3	6	clean SAND to silty SAND	125	5.0	55	78	48	95	44	-	-	6	0.350	1.69	16
33.96	408.2	284.5	297.0	408.4	5.8	7.7	1.4	6	clean SAND to silty SAND	125	5.0	57	82	50	95	44	-	-	6	0.350	1.71	16
34.12	402.4	280.1	280.1	402.6	3.3	9.2	0.8	6	clean SAND to silty SAND	125	5.0	56	80	47	95	44	-	-	5	0.350	1.53	16
34.29	374.0	260.0	260.0	374.1	3.1	9.1	0.8	6	clean SAND to silty SAND	125	5.0	52	75	44	95	44	-	-	5	0.350	1.55	16
34.45	401.2	278.6	282.2	401.4	4.9	9.9	1.2	6	clean SAND to silty SAND	125	5.0	56	80	48	95	44	-	-	5	0.350	1.66	16
34.61	390.8	271.0	279.6	391.0	5.0	9.4	1.3	6	clean SAND to silty SAND	125	5.0	54	78	48	95	44	-	-	6	0.350	1.69	16
34.78	431.4	298.7	319.3	431.6	7.0	10.6	1.6	6	clean SAND to silty SAND	125	5.0	60	86	53	95	44	-	-	7	0.350	1.75	16
34.94	520.7	360.1	360.1	521.0	6.6	14.4	1.3	6	clean SAND to silty SAND	125	5.0	72	100	61	95	45	-	-	5	0.350	1.61	16
35.11	545.7	376.9	396.8	546.0	9.7	16.8	1.8	6	clean SAND to silty SAND	125	5.0	75	100	67	95	46	-	-	7	0.350	1.72	16
35.27	468.7	323.3	360.6	469.1	9.6	16.2	2.1	6	clean SAND to silty SAND	125	5.0	65	94	59	95	45	-	-	8	0.350	1.81	16
35.43	425.7	293.3	312.4	426.1	6.7	20.3	1.6	6	clean SAND to silty SAND	125	5.0	59	85	52	95	44	-	-	7	0.350	1.74	16
35.60	459.5	316.1	316.1	459.9	4.6	18.9	1.0	6	clean SAND to silty SAND	125	5.0	63	92	53	95	45	-	-	5	0.350	1.56	16
35.76	491.8	337.9	337.9	492.1	4.1	17.4	0.8	6	clean SAND to silty SAND	125	5.0	68	98	55	95	45	-	-	5	0.350	1.48	16
35.93	433.4	297.4	297.4	433.7	3.8	18.0	0.9	6	clean SAND to silty SAND	125	5.0	59	87	49	95	44	-	-	5	0.350	1.53	16
36.09	428.7	293.8	293.8	429.1	3.5	19.1	0.8	6	clean SAND to silty SAND	125	5.0	59	86	49	95	44	-	-	5	0.350	1.51	16
36.26	398.8	272.9	272.9	399.1	3.2	16.7	0.8	6	clean SAND to silty SAND	125	5.0	55	80	45	95	44	-	-	5	0.350	1.53	16
36.42	385.6	263.6	263.6	386.0	2.8	15.8	0.7	6	clean SAND to silty SAND	125	5.0	53	77	44	95	44	-	-	5	0.350	1.51	16
36.58	363.3	248.0	248.0	363.6	1.7	14.9	0.5	6	clean SAND to silty SAND	125	5.0	50	73	40	95	44	-	-	5	0.350	1.40	16
36.75	326.9	222.9	222.9	327.2	1.6	13.8	0.5	6	clean SAND to silty SAND	125	5.0	45	65	36	93	43	-	-	5	0.350	1.44	16
36.91	316.7	215.6	215.6	316.9	2.3	13.5	0.7	6	clean SAND to silty SAND	125	5.0	43	63	36	92	43	-	-	5	0.350	1.57	16
37.08	285.9	194.4	194.4	286.1	2.2	12.6	0.8	6	clean SAND to silty SAND	125	5.0	39	57	33	89	42	-	-	5	0.350	1.63	16
37.24	304.4	206.8	206.8	304.5	2.4	4.2	0.8	6	clean SAND to silty SAND	125	5.0	41	61	35	91	43	-	-	5	0.350	1.61	16
37.40	336.1	228.0	228.0	336.2	2.5	4.6	0.7	6	clean SAND to silty SAND	125	5.0	46	67	38	94	43	-	-	5	0.350	1.56	16
37.57	320.6	217.2	217.2	320.7	2.7	4.6	0.8	6	clean SAND to silty SAND	125	5.0	43	64	37	93	43	-	-	5	0.350	1.61	16
37.73	293.9	198.9	198.9	294.0	2.2	4.5	0.8	6	clean SAND to silty SAND	125	5.0	40	59	34	90	42	-	-	5	0.350	1.61	16
37.90	273.3	184.7	184.7	273.4	1.8	4.0	0.7	6	clean SAND to silty SAND	125	5.0	37	55	31	87	42	-	-	5	0.350	1.60	16
38.06	262.4	177.1	177.1	262.5	1.6	4.0	0.6	6	clean SAND to silty SAND	125	5.0	35	52	30	86	42	-	-	5	0.350	1.59	16
38.22	258.4	174.2	174.2	258.4	1.4	3.8	0.5	6	clean SAND to silty SAND	125	5.0	35	52	29	85	42	-	-	5	0.350	1.56	16
38.39	272.9	183.7	183.7	273.0	1.6	4.0	0.6	6	clean SAND to silty SAND	125	5.0	37	55	31	87	42	-	-	5	0.350	1.57	16
38.55	253.0	170.1	170.1	253.1	1.5	3.8	0.6	6	clean SAND to silty SAND	125	5.0	34	51	29	85	42	-	-	5	0.350	1.59	16
38.72	267.4	179.6	179.6	267.4	1.5	3.9	0.6	6	clean SAND to silty SAND	125	5.0	36	53	30	86	42	-	-	5	0.350	1.56	16
38.88	250.8	168.3	168.3	250.9	1.6	3.9	0.6	6	clean SAND to silty SAND	125	5.0	34	50	29	84	41	-	-	5	0.350	1.61	16
39.04	247.4	165.8	183.1	247.5	2.9	4.1	1.2	6	clean SAND to silty SAND	125	5.0	33	49	30	84	41	-	-	8	0.350	1.80	16
39.21	257.6	172.4	189.1	257.7	3.0	4.1	1.2	6	clean SAND to silty SAND	125	5.0	34	52	31	85	42	-	-	8	0.350	1.79	16
39.37	283.2	189.3	208.4	283.3	3.6	5.7	1.3	6	clean SAND to silty SAND	125	5.0	38	57	34	88	42	-	-	8	0.350	1.79	16
39.54	308.2	205.8	205.8	308.3	2.6	5.3	0.9	6	clean SAND to silty SAND	125	5.0	41	62	35	91	42	-	-	5	0.350	1.64	16
39.70	323.3	215.6	266.6	323.4	7.3	5.6	2.3	6	clean SAND to silty SAND	125	5.0	43	65	41	92	43	-	-	12	0.350	1.95	16
39.86	364.2	242.6	269.8	364.3	6.0	6.0	1.7	6	clean SAND to silty SAND	125	5.0	49	73	44	95	43	-	-	8	0.350	1.81	16
40.03	349.4	232.4	254.3	349.5	5.2	6.3	1.5	6	clean SAND to silty SAND	125	5.0	46	70	42	95	43	-	-	8	0.350	1.78	16
40.19	398.6	264.8	271.9	398.8	4.9	10.0	1.2	6	clean SAND to silty SAND	125	5.0	53	80	46	95	44	-	-	6	0.350	1.68	16
40.36	358.5	237.9	248.8	358.6	4.4	10.1	1.2	6	clean SAND to silty SAND	125	5.0	48	72	42	95	43	-	-	6	0.350	1.71	16
40.52	331.2	219.5	227.9	331.4	3.7	9.7	1.1	6	clean SAND to silty SAND	125	5.0	44	66	39	93	43	-	-	6	0.350	1.70	16
40.68	355.2	235.1	235.1	355.4	3.1	9.6	0.9	6	clean SAND to silty SAND	125	5.0	47	71	40	95	43	-	-	5	0.350	1.61	16
40.85	370.9	245.3	331.4	371.1	11.8	9.7	3.2	8	stiff SAND to clayy SAND	115	5.0	49	74	49	95	43	-	-	14	0.250	2.04	16
41.01	420.1	277.5	336.5	420.3	10.6	10.4	2.5	8	stiff SAND to clayy SAND	115	5.0	55	84	53	95	44	-	-	11	0.250	1.92	16
41.18	453.2	299.1	332.0	453.4	8.7	12.3	1.9	6	clean SAND to silty SAND	125	5.0	60	91	55	95	44	-	-	8	0.350	1.80	16
41.34	550.3	362.7	385.5	550.5	9.9	13.1	1.8	6	clean SAND to silty SAND	125	5.0	73	100	65	95	45	-	-	7	0.350	1.74	16
41.50	592.2	389.9	405.8	592.8	10.2	31.8	1.7	6	clean SAND to silty SAND	125	5.0	78	100	69	95	45	-	-	6	0.350	1.70	16
41.67	596.1	392.0	401.0	596.7	9.6	33.1	1.6	6	clean SAND to silty SAND	125	5.0	78	100	68	95	45	-	-	6	0.350	1.68	16
41.83	464.1	304.8	327.1	464.9	7.8	41.6	1.7	6	clean SAND to silty SAND	125	5.0	61	93	55	95	44	-	-	7	0.350	1.75	16
42.00	411.4	269.9	275.5	412.0	5.0	26.5	1.2	6	clean SAND to silty SAND	125	5.0	54	82	47	95	44	-	-	6	0.350	1.67	16
42.16	419.5	274.9	274.9	419.9	3.9	21.7	0.9	6	clean SAND to silty SAND	125	5.0	55	84	46	95	44	-	-	5	0.350	1.57	16
42.32	386.0	252.6	252.6	386.3	3.3	18.8	0.8	6	clean SAND to silty SAND	125	5.0	51	77	43	95	43	-	-	5	0.350	1.57	16
42.49	388.6	254.0	256.8	388.9	4.3	17.9	1.1	6	clean SAND to silty SAND	125	5.0	51	78	44	95	43	-	-	5	0.350	1.66	16
42.65	377.9	246.8	290.2	378.2	7.9	16.8	2.1	6	clean SAND to silty SAND	125	5.0	49	76	46	95	43	-	-	10	0.350	1.89	16
42.82	413.5	269.7	298.5	413.8	7.3	17.4	1.8	6	clean SAND to silty SAND	125	5.0	54	83	49	95	44	-	-	8	0.350	1.80	16
42.98	420.7	274.1	286.3	421.0	5.8	18.7	1.4	6	clean SAND to silty SAND	125	5.0	55	84	48	95	44	-	-	6	0.350	1.71	16
43.15	354.8	230.9	238.4	355.2	4.0	21.9	1.1	6	clean SAND to silty SAND	125	5.0	46	71	41	95	43	-	-	6	0.350	1.69	16
43.31	330.4	214.8	214.8	330.8	2.8	18.3	0.9	6	clean SAND to silty SAND	125	5.0	43	66	37	92	43	-	-	5	0.350	1.62	16
43.47	324.0	210.4	210.4	324.3	2.3	16.5	0.7	6	clean SAND to silty SAND	125	5.0	42	65	36	92	42	-	-	5	0.350	1.58	16
43.64	309.1	200.5	208.3	309.4	3.2	16.1	1.0	6	clean SAND to silty SAND	125	5.0	40	62	35	90	42	-	-	6	0.350	1.70	16
43.80	330.5	214.1	215.7	330.8	3.1	15.9	1.0	6	clean SAND to silty SAND	125	5.0	43	66	37	92	43	-	-	5	0.350	1.66	16
43.97	344.0	222.6	223.2	344.3	3.3	16.4	1.0	6	clean SAND to silty SAND	125	5.0	45	69	39	93	43	-	-	5	0.350	1.65	16
44.13	432.0	279.2	279.2	432.4	3.4	18.0	0.8	6	clean SAND to silty SAND	125	5.0	56	86	46	95	44	-	-	5	0.350	1.52	16
44.29	393.9	254.2	254.2	394.2	2.9	19.1	0.7	6	clean SAND to silty SAND	125	5.0	51	79	42	95	43	-	-	5	0.350	1.53	16
44.46	330.8	213.3	212.6	331.1	3.0	15.0	0.9	6	clean SAND to silty SAND	125	5.0	43	66	37	92	42	-	-	5	0.350	1.64	16
44.62	338.6	218.1	218.1	338.9	2.1	15.0	0.6	6	clean SAND to silty SAND	125	5.0	44	68	36	93	43	-	-	5	0.350	1.53	16
44.79	330.1	212.4	212.4	330.4	1.8	14.5	0.6	6	clean SAND to silty SAND	125	5.0	42	66	35	92	42	-	-	5	0.350	1.50	16
44.95	354.5	227.8	227.8	354.8	2.3	14.9	0.7	6	clean SAND to silty SAND	125	5.0	46	71	38	94	43	-	-	5	0.350	1.52	16
45.11	326.7	209.7	209.7	327.0	2.8	14.2	0.9	6	clean SAND to silty SAND	125	5.0	42	65	36	91	42	-	-	5	0.350	1.63	16
45.28	301.3	193.2	193.2	301.6	2.4	13.4	0.8	6	clean SAND to silty SAND	125	5.0	39	60	33	89	42	-	-	5	0.350	1.64	16
45.44	317.4	203.3	203.3	317.7	2.2	13.2	0.7	6	clean SAND to silty SAND	125	5.0	41	63	34	90	42	-	-	5	0.350	1.58	16
45.61	299.0	191.3	201.1	299.2	3.1	12.5	1.0	6	clean SAND to silty SAND	125	5.0	38	60	34	88	42	-	-	6	0.350	1.72	16
45.77	315.3	201.5	201.5	315.6	1.8	12.8	0.6	6	clean SAND to silty SAND	125	5.0	40	63	33	90	42	-	-	5	0.350	1.52	16
45.93	308.4	196.9	196.9	308.7	2.0	12.7	0.7	6	clean SAND to silty SAND	125	5.0	39	62	33	89	42	-	-	5	0.350	1.57	16
46.10	333.0	212.3	212.3	333.2	2.0	12.7	0.6	6	clean SAND to silty SAND	125	5.0	42	67	35	92	42	-	-	5	0.350	1.52	16
46.26	314.2	200.1	212.8	314.4	3.6	12.0	1.2	6	clean SAND to silty SAND	125	5.0	40	63	36	90	42	-	-	7	0.350	1.74	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

College of the Siskiyous McCloud Hall Renovation

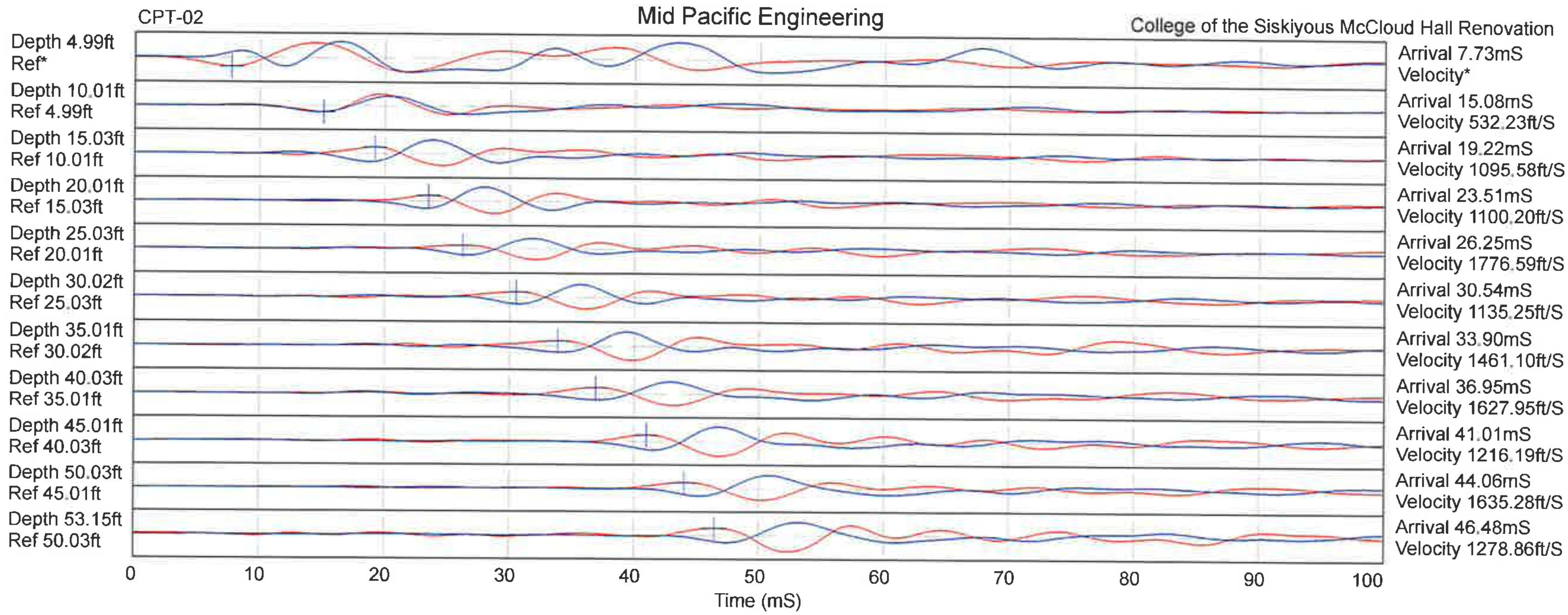
Project ID: Mid Pacific Engineering
Data File: SDF(108).cpt
CPT Date: 6/16/2023 12:22:51 PM
GW During Test: 29 ft

Sounding ID: CPT-02
Project No: 05040-03
Cone/Rig: DDG1596

Depth ft	qc PS tsf	* qcln PS -	qlncs PS -	* qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato -	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60	SPT R-N 60	* SPT IcN1 60	* Rel Den	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic	* D50 - mm	* Ic SBT Indx	Nk - -
46.43	287.5	182.9	194.7	287.7	3.0	11.6	1.1	6	clean SAND to silty SAND	125	5.0	37	58	33	87	42	-	-	7	0.350	1.74	16
46.59	315.4	200.5	201.7	315.6	2.8	12.2	0.9	6	clean SAND to silty SAND	125	5.0	40	63	35	90	42	-	-	5	0.350	1.65	16
46.75	310.5	197.1	209.0	310.8	3.5	11.9	1.1	6	clean SAND to silty SAND	125	5.0	39	62	35	89	42	-	-	7	0.350	1.73	16
46.92	314.4	199.3	199.3	314.6	2.4	11.8	0.8	6	clean SAND to silty SAND	125	5.0	40	63	34	90	42	-	-	5	0.350	1.62	16
47.08	303.4	192.2	192.2	303.6	2.3	11.5	0.8	6	clean SAND to silty SAND	125	5.0	38	61	33	89	42	-	-	5	0.350	1.63	16
47.25	298.4	188.8	188.8	298.6	1.9	11.7	0.6	6	clean SAND to silty SAND	125	5.0	38	60	32	88	42	-	-	5	0.350	1.57	16
47.41	314.1	198.5	198.5	314.4	1.5	12.0	0.5	6	clean SAND to silty SAND	125	5.0	40	63	33	90	42	-	-	5	0.350	1.49	16
47.57	324.4	204.8	204.8	324.6	1.3	12.0	0.4	6	clean SAND to silty SAND	125	5.0	41	65	33	91	42	-	-	5	0.350	1.44	16
47.74	265.7	167.6	167.6	265.9	1.6	11.3	0.6	6	clean SAND to silty SAND	125	5.0	34	53	29	84	41	-	-	5	0.350	1.61	16
47.90	272.9	171.9	171.9	273.1	1.7	11.0	0.6	6	clean SAND to silty SAND	125	5.0	34	55	29	85	41	-	-	5	0.350	1.60	16
48.07	299.9	188.7	188.7	300.1	1.8	11.4	0.6	6	clean SAND to silty SAND	125	5.0	38	60	32	88	42	-	-	5	0.350	1.57	16
48.23	335.1	210.7	210.7	335.3	2.2	12.1	0.7	6	clean SAND to silty SAND	125	5.0	42	67	35	92	42	-	-	5	0.350	1.55	16
48.39	296.6	186.3	186.3	296.8	1.4	11.0	0.5	6	clean SAND to silty SAND	125	5.0	37	59	31	88	42	-	-	5	0.350	1.51	16
48.56	278.1	174.5	174.5	278.4	1.8	10.9	0.7	6	clean SAND to silty SAND	125	5.0	35	56	30	85	41	-	-	5	0.350	1.62	16
48.72	282.5	177.0	177.0	282.7	1.2	11.2	0.4	6	clean SAND to silty SAND	125	5.0	35	56	29	86	41	-	-	5	0.350	1.49	16
48.89	243.2	152.2	152.2	243.4	0.9	10.7	0.4	6	clean SAND to silty SAND	125	5.0	30	49	25	81	41	-	-	5	0.350	1.52	16
49.05	256.1	160.2	166.2	256.3	2.0	10.4	0.8	6	clean SAND to silty SAND	125	5.0	32	51	28	83	41	-	-	6	0.350	1.70	16
49.22	257.0	160.5	185.3	257.2	3.5	10.5	1.4	6	clean SAND to silty SAND	125	5.0	32	51	30	83	41	-	-	9	0.350	1.86	16
49.38	277.4	173.1	188.3	277.6	3.1	11.1	1.1	6	clean SAND to silty SAND	125	5.0	35	55	31	85	41	-	-	8	0.350	1.77	16
49.54	331.2	206.5	206.5	331.5	2.2	12.1	0.7	6	clean SAND to silty SAND	125	5.0	41	66	35	91	42	-	-	5	0.350	1.56	16
49.71	369.0	229.8	229.8	369.3	3.0	12.1	0.8	6	clean SAND to silty SAND	125	5.0	46	74	39	94	43	-	-	5	0.350	1.59	16
49.87	328.5	204.3	220.7	328.7	4.1	11.4	1.3	6	clean SAND to silty SAND	125	5.0	41	66	37	91	42	-	-	7	0.350	1.76	16
50.04	287.0	178.3	210.7	287.2	4.7	10.9	1.7	6	clean SAND to silty SAND	125	5.0	36	57	34	86	41	-	-	10	0.350	1.89	16
50.20	304.7	189.1	205.8	304.9	3.7	10.9	1.2	6	clean SAND to silty SAND	125	5.0	38	61	34	88	42	-	-	8	0.350	1.77	16
50.36	311.5	193.1	205.3	311.7	3.4	10.8	1.1	6	clean SAND to silty SAND	125	5.0	39	62	34	89	42	-	-	7	0.350	1.74	16
50.53	258.7	160.2	231.5	258.8	7.1	10.2	2.8	5	silty SAND to sandy SILT	120	3.0	53	86	33	83	41	-	-	16	0.200	2.09	16
50.69	265.5	164.3	198.5	265.7	4.4	9.8	1.7	6	clean SAND to silty SAND	125	5.0	33	53	31	83	41	-	-	11	0.350	1.92	16
50.86	273.0	168.8	220.3	273.2	6.0	10.2	2.2	5	silty SAND to sandy SILT	120	3.0	56	91	33	84	41	-	-	13	0.200	2.00	16
51.02	388.1	239.7	267.0	388.4	6.4	12.2	1.7	6	clean SAND to silty SAND	125	5.0	48	78	44	95	43	-	-	8	0.350	1.81	16
51.18	478.1	294.9	327.2	478.4	9.0	15.5	1.9	6	clean SAND to silty SAND	125	5.0	59	96	54	95	44	-	-	8	0.350	1.80	16
51.35	391.9	241.6	287.8	392.3	8.5	18.7	2.2	6	clean SAND to silty SAND	125	5.0	48	78	46	95	43	-	-	10	0.350	1.90	16
51.51	371.4	228.7	258.3	371.8	6.3	19.0	1.7	6	clean SAND to silty SAND	125	5.0	46	74	42	94	43	-	-	9	0.350	1.83	16
51.68	346.7	213.2	225.9	347.0	4.1	14.8	1.2	6	clean SAND to silty SAND	125	5.0	43	69	38	92	42	-	-	7	0.350	1.73	16
51.84	257.8	158.4	175.9	258.1	2.9	16.1	1.1	6	clean SAND to silty SAND	125	5.0	32	52	29	82	41	-	-	8	0.350	1.81	16
52.00	246.2	151.1	158.7	246.4	2.0	14.0	0.8	6	clean SAND to silty SAND	125	5.0	30	49	27	81	40	-	-	6	0.350	1.72	16
52.17	250.5	153.6	169.1	250.8	2.6	14.8	1.1	6	clean SAND to silty SAND	125	5.0	31	50	28	81	41	-	-	8	0.350	1.79	16
52.33	287.0	175.8	189.6	287.3	3.1	16.8	1.1	6	clean SAND to silty SAND	125	5.0	35	57	32	86	41	-	-	7	0.350	1.76	16
52.50	289.9	177.4	189.5	290.3	3.0	16.3	1.1	6	clean SAND to silty SAND	125	5.0	35	58	32	86	41	-	-	7	0.350	1.74	16
52.66	417.2	255.0	255.0	417.5	1.4	19.4	0.3	7	grvly SAND to dense SAND	130	6.0	42	70	40	95	43	-	-	5	1.000	1.31	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing



Hammer to Rod String Distance (ft): 5.83
* = Not Determined

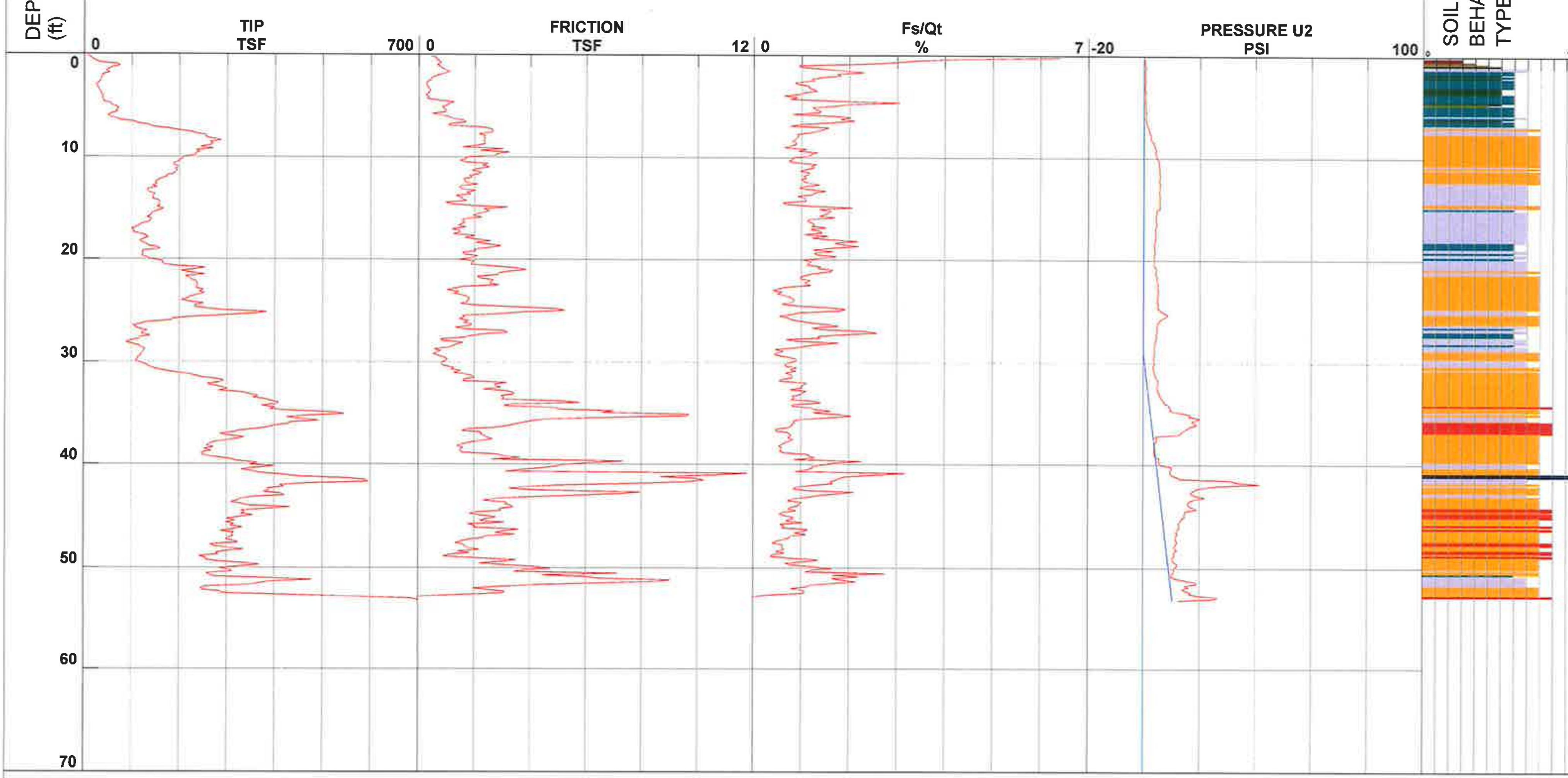
COMMENT:

Mid Pacific Engineering

Project	College of the Siskiyous McCloud Hall Renov	Operator	JM-GM	Filename	SDF(108).cpt
Job Number	05040-03	Cone Number	DDG1596	GPS	
Hole Number	CPT-02	Date and Time	6/16/2023 12:22:51 PM	Maximum Depth	53.15 ft
EST GW Depth During Test	29.00 ft				

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm²

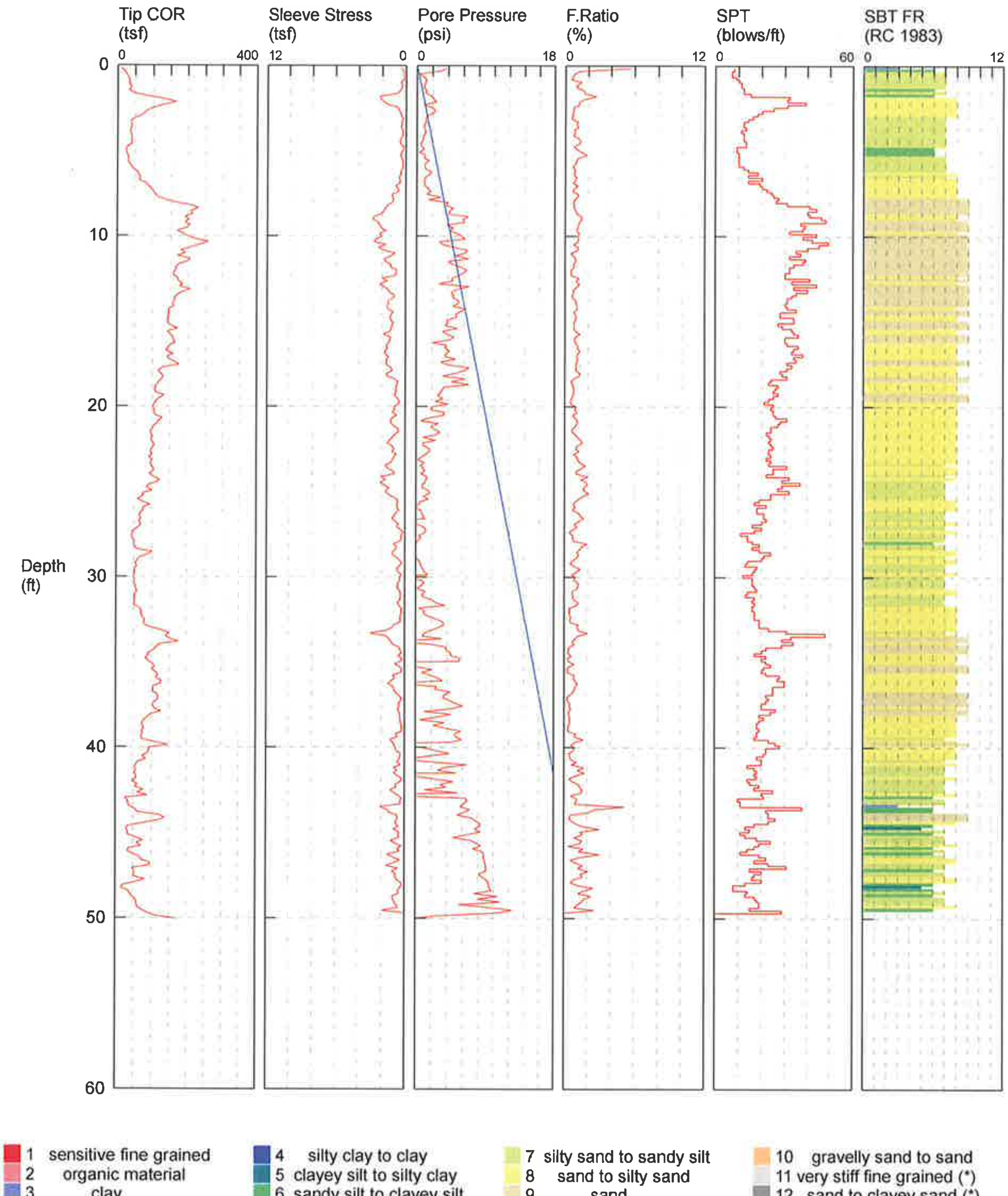
S*Soil behavior type and SPT based on data from UBC-1983

SOUNDING

SOUNDING
CUSTOMER: Taber Drilling
OPERATOR: David
CONE ID: DDG1570
LOCATION:

JOB NUMBER:
HOLE NUMBER: CPT-1
TEST DATE: 6/18/2024 9:01:12 AM
COMMENT: Auto Enhance On
COMMENT: Filter On

COMMENT:
GPS (LAT,LON,ALT): 0.00,0.00,0.0
LOCATION:
LOCATION:
LOCATION:



*SBT/SPT CORRELATION: UBC-1983

SOUNDING

SOUNDING
CUSTOMER: Taber Drilling
OPERATOR: David
CONE ID: DDG1570
LOCATION:

JOB NUMBER:
HOLE NUMBER: CPT-2
TEST DATE: 6/18/2024 10:57:37 AM
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COMMENT: Filter On

COMMENT:
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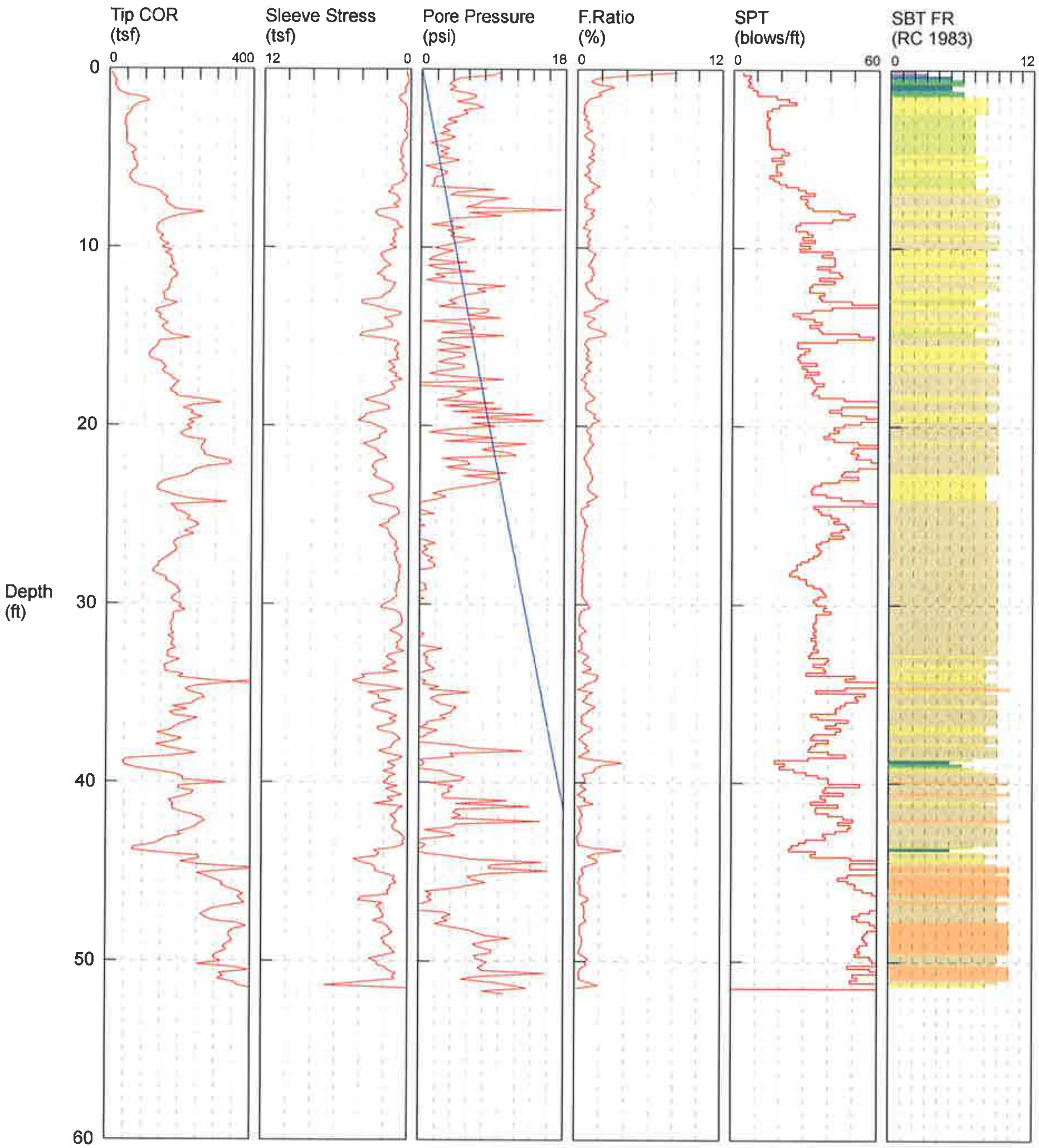
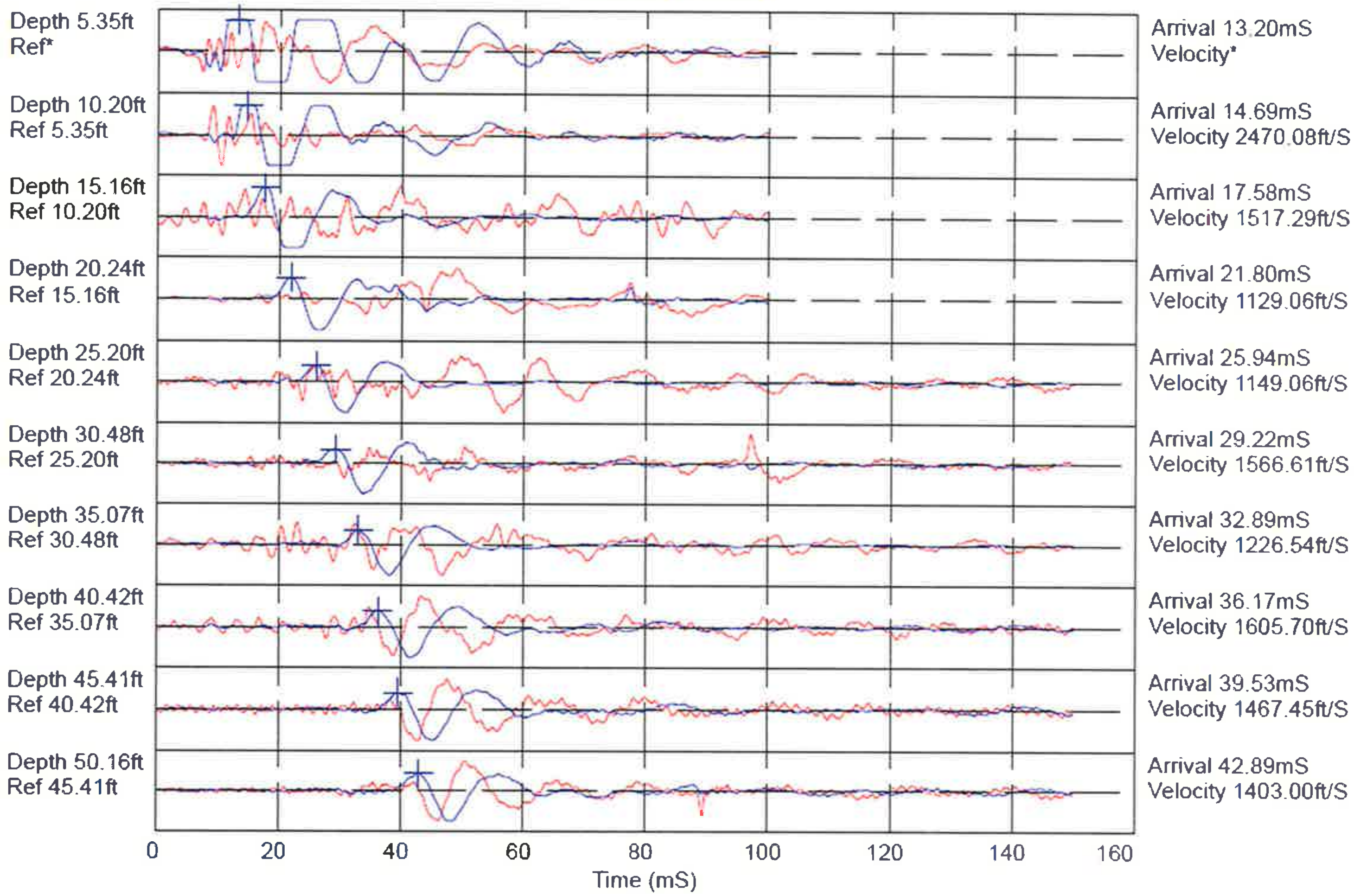
LOCATION:



1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

SEISMIC TEST



Hammer to Rod String Distance (ft): 6.56
* = Not Determined

COMMENT:

APPENDIX D

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                    ************************
                    *                      *
                    *   E Q S E A R C H    *
                    *                      *
                    *     Version 3.00     *
                    *                      *
                    ************************

                        ESTIMATION OF
                   PEAK ACCELERATION FROM
                 CALIFORNIA EARTHQUAKE CATALOGS


JOB NUMBER: 0042-0000
                                                  DATE: 07-11-2024

JOB NAME: COS McCloud Hall

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  5.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  41.4137
   SITE LONGITUDE:  122.3898

SEARCH DATES:
           START DATE:   1800
           END DATE:   2021

SEARCH RADIUS:
           62.0 mi
           99.8 km

ATTENUATION RELATION:   3) Boore et al. (1997) Horiz. - NEHRP D (250)
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   ASSUMED SOURCE TYPE:  DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   0  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:        Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  0.0
```

EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
MGI	41.2500	123.2500	06/03/1950	230 0.0	0.0	5.00	0.035	V	46.0(74.0)
T-A	40.7500	122.9200	01/26/1859	420 0.0	0.0	5.00	0.031	V	53.5(86.1)
T-A	40.7500	122.9200	01/12/1861	9 0 0.0	0.0	5.00	0.031	V	53.5(86.1)
GSG	40.6240	122.4060	11/26/1998	194953.8	23.0	5.20	0.034	V	54.5(87.7)
DMG	41.2000	123.5000	05/02/1945	194754.0	0.0	5.00	0.029	V	59.4(95.7)

****

-END OF SEARCH- 5 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2021

LENGTH OF SEARCH TIME: 222 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 46.0 MILES (74.0 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 5.2

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.035 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
-a-value= 1.647
b-value= 0.000
beta-value= 0.000

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	5	0.02252
4.5	5	0.02252
5.0	5	0.02252

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                         ***********************
                         *                     *
                         *    E Q F A U L T    *
                         *                     *
                         *    Version 3.00     *
                         *                     *
                         ***********************
```

DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 04050-03

DATE: 07-11-24

JOB NAME: COS McCloud Hall

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\CGSFLTE.DAT

SITE COORDINATES:
   SITE LATITUDE: 41.4137
   SITE LONGITUDE: 122.3900

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 3) Boore et al. (1997) Horiz. - NEHRP D (250)
   UNCERTAINTY (M=Median, S=Sigma): M   Number of Sigmas: 0.0
   DISTANCE MEASURE: cd_2drp
   SCOND: 0
   Basement Depth: .15 km   Campbell SSR: Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\CGSFLTE.DAT

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
RATE FOR NE CA 5	19.9(32.0)	7.3	0.183	VIII
CEDAR MTN. - MAHOGANY MTN.	26.5(42.6)	7.1	0.161	VIII
HAT CREEK-MacARTHUR-MAYFIELD	35.9(57.8)	7.2	0.134	VIII
RATE FOR NE CA 4	41.7(67.1)	7.3	0.104	VII
GILLEM - BIG CRACK	45.5(73.2)	6.6	0.082	VII

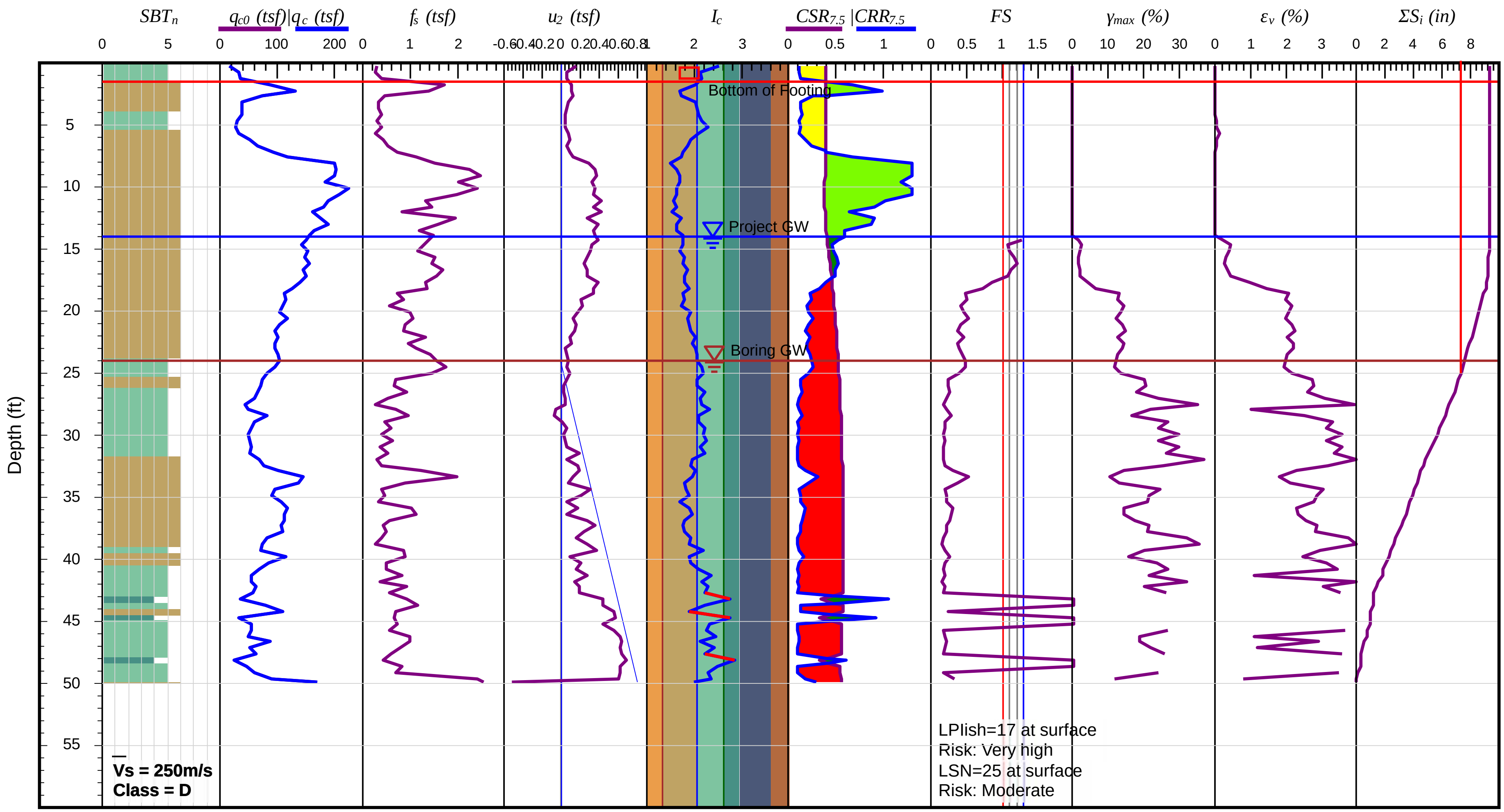
****

-END OF SEARCH- 5 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE RATE FOR NE CA 5 FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 19.9 MILES (32.0 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.1831 g

APPENDIX E



Sensitive fine grained
Organic soils - peats
Clay to silty clay
Silty clay to clayey silt
Sandy silt to silty sand
Silty sand to clean sand
Dense sand to gravelly sand
Clayey sand to very stiff sand
Very stiff fine grained *
* Overconsolidated or cemented

Silt Correction:
UCLA method

Earthquake & Groundwater Information:
Magnitude = 9.34
Max. Acceleration = 0.379 g
Project GW = 14 ft
Maximum Settlement = 9.38 in
Settl. at Bottom of Footing = 9.38 in

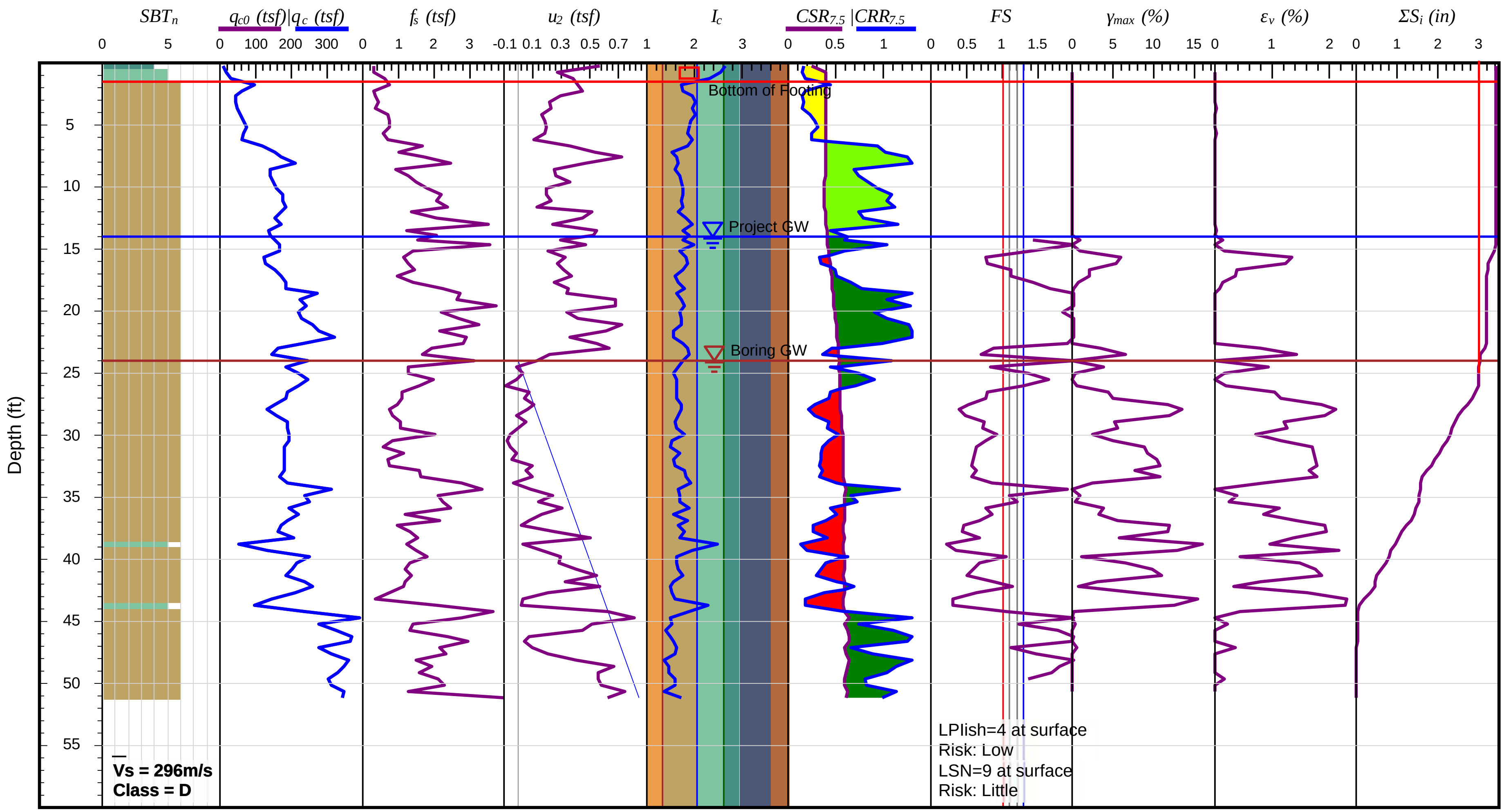
Liquefaction: Robertson (2009)
Settl.: [dry] Yi (2022); [sat] Robertson (2009)
Lateral spreading: Zhang et al (2004)
M correction:
σv correction: Idriss & Boulanger (2008)
Stress reduction: Blake (1996)

MPE
MID PACIFIC ENGINEERING, INC.

Seismic Settlement Potential - CPT Data					
Project:	COS Theater Arts and McCloud Hall Canopy				
Location:	800 College Drive, Weed, CA				
Project No.:	05040-03	CPT No.:	CPT-1(new)	Figure:	1

R:\05000-00 through 05099-00\05040-03 - COS Theater-Arts and McCloud Hall Renovation\Theater Arts and McCloud Hall Canopy\GeoSuite\GeoSuite_05040-03_D-3&CPT-1(new).csv

Prepared at 7/19/2024 1:49:46 PM



Sensitive fine grained
Organic soils - peats
Clay to silty clay
Silty clay to clayey silt
Sandy silt to silty sand
Silty sand to clean sand
Dense sand to gravelly sand
Clayey sand to very stiff sand
Very stiff fine grained *

* Overconsolidated or cemented

Silt Correction:
UCLA method

Earthquake & Groundwater Information:
Magnitude = 9.34
Max. Acceleration = 0.379 g
Project GW = 14 ft
Maximum Settlement = 3.42 in
Settl. at Bottom of Footing = 3.42 in

Liquefaction: Robertson (2009)
Settl.: [dry] Yi (2022); [sat] Robertson (2009)
Lateral spreading: Zhang et al (2004)
M correction:
σv correction: Idriss & Boulanger (2008)
Stress reduction: Blake (1996)

MPE
MID PACIFIC ENGINEERING, INC.

Seismic Settlement Potential - CPT Data			
Project:	COS Theater Arts and McCloud Hall Canopy		
Location:	800 College Drive, Weed, CA		
Project No.: 05040-03	CPT No.: CPT-2(new)	Figure:	2

R:\05000-00 through 05099-00\05040-03 - COS Theater-Arts and McCloud Hall Renovation\Theater Arts and McCloud Hall Canopy\GeoSuite\GeoSuite_05040-03_D-3&CPT-2(new).csv

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APPENDIX F

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APPENDIX G

THEORY AND METHODOLOGY OF LIQUEFACTION AND SEISMIC SETTLEMENT

LIQUEFACTION POTENTIAL

Liquefaction is a process in which strong ground shaking causes saturated soils to lose their strength and behave as a fluid. Ground failure associated with liquefaction can result in severe damage to structures. Soil types susceptible to liquefaction include sand, silty sand, sandy silt and silt, as well as soils having a plasticity index (PI) less than 7 (Boulanger and Idriss, 2006). Loose soils with a PI less than 12 and moisture content greater than 85 percent of the liquid limit are also susceptible to liquefaction (Bray and Sancio, 2006). For sandy soils, the geologic conditions for increased susceptibility to liquefaction are: 1) shallow groundwater (generally less than 50 feet in depth), 2) the presence of unconsolidated sandy alluvium, typically Holocene in age, and 3) strong ground shaking. All three of these conditions must be present for liquefaction to occur.

For clayey soils, recent studies indicate that deposits of clays and plastic silts (i.e., cohesive soils) have also experienced failure during earthquakes (Idriss and Boulanger, 2008). This kind of failure is called cyclic softening. "The term cyclic softening is used in reference to strength loss and deformation in clays and plastic silts, while the term liquefaction is used in reference to strength loss and deformation in saturated sands and other cohesionless soils. As such, the terms cyclic softening and liquefaction can also be used in reference to the engineering procedures that have been developed for these respective soil types" (Idriss and Boulanger, 2008).

Liquefaction potential can usually be evaluated based on the SPT, CPT or shear wave velocity data and using the simplified procedure described by Seed and Idriss (1971, 1982), Seed and others (1985), modified in the 1996 National Center for Earthquake Engineering Research (NCEER) and 1998 NCEER/National Science Foundation (NSF) workshops (Youd and Idriss, 2001), and as recently summarized by Idriss and Boulanger (2008). The method of evaluating liquefaction potential consists of comparing the cyclic stress ratio (CSR) developed in the soil by the earthquake motion to cyclic resistance ratio (CRR), which will cause liquefaction of the soil for a given number of cycles. In the simplified procedure, the CSR developed in the soil is calculated from a formula that incorporates ground surface acceleration, total and effective stresses in the soil at different depths (which in turn are related to the location of the groundwater table), non-rigidity of the soil column and a number of simplifying assumptions.

For sandy soils, the CRR that will cause liquefaction is related to the relative density of the soil, expressed in terms of SPT blowcounts (N1)60 (Seed and Idriss, 1982; Seed and others, 1985; Youd and Idriss, 2001; Idriss and Boulanger, 2008), cone penetration resistance (qc1N) (Robertson and Wride, 1998; Youd and Idriss, 2001; Idriss and Boulanger, 2008) or shear wave velocity (Vs1) (Andrus and Stokoe, 2000; Youd and Idriss, 2001; Andrus and others, 2004), all normalized for an effective overburden pressure of 1 ton per square foot and corrected to equivalent clean sand resistance. For clayey soils, the CRR is related to cyclic undrained shear strength ratio, s_u/σ_{vc}' (Idriss and Boulanger, 2008). All of these methods are incorporated into a liquefaction and seismic settlement program, GeoSuite©, version 2.4 (Yi, 2018).

Seismic Settlement

Prediction of seismic-induced settlement is also very important. Seismic-induced settlement includes settlement that occurs both in dry sands and saturated sands (California Geological Survey, 2008). Severe seismic shaking may cause dry sands to densify, resulting in settlement expressed at the ground surface. Seismic settlement in dry soils generally occurs in loose sands and silty sands, with cohesive and fine-grained soils being less prone to significant settlement. For saturated soils, significant settlement is anticipated if the soils exhibit liquefaction during seismic shaking.

The methods for evaluating seismic settlement in saturated sands can generally be classified into two groups. The method for the first group was developed during the 1970s and 1980s, generally based on the relationship between cyclic stress ratio, $(N_1)_{60}$, and volumetric strain (Silver and Seed, 1971; Lee and Albaisa, 1974; and Tokimatsu and Seed, 1987). The method for the second group was developed in the early 1990s with the paper by Ishihara and Yoshimine (1992) as the first publication in the category, modified and improved by various researchers (Robertson and Wride, 1998; Yoshimine et al., 2006; Idriss and Boulanger, 2008; and Yi, 2010), and is generally based on the relationship between volumetric strain and the factor of safety for liquefaction. Idriss and Boulanger (2008) modified the methods to incorporate both SPT and CPT data. Yi (2010) modified the methods to incorporate shear wave velocity data.

Research related to the estimation of dry sand settlement during earthquake excitation was initiated in the early 1970s by Silver and Seed (1971), followed by the works of several researchers (Seed and Silver, 1972; Pyke et al., 1975; Tokimatsu and Seed, 1987; and Pradel, 1998). A simplified method of evaluating earthquake-induced settlements in dry, sandy soils based on the Tokimatsu and Seed procedure has been developed by Pradel (1998) and is recommended by Martin and Lew (1999) as one of the standard methods for the estimation of earthquake-induced settlements of dry sands in California.

In recent years, serious research was performed by the University of California, Los Angeles (Duku et al. 2008; Yee et al. 2014; Stewart, 2014), and a new volumetric strain material model (VSMM) was proposed. The new UCLA VSMM was developed based on a series of laboratory test results and is able to consider the effects of overburden pressure, fines contents and degree of saturation. This new model was utilized for a new based-isolated new hospital, Loma Linda University Medical Center Campus Transformation Project, and approved by California's Office of Statewide Health Planning and Development (OSHPD). All of these methods generally utilize SPT data. Utilizing the test results of Silver and Seed (1971), Yi extended the application of the procedures for both CPT (Yi, 2010a) and V_s data (Yi, 2010b, 2010c). These methods are also incorporated into a liquefaction and seismic settlement program, GeoSuite©, version 2.5 (Yi, 2020).

SURFACE MANIFESTATION OF LIQUEFACTION

Ishihara (1985) published a paper containing observations on the protective effect that an upper layer of non-liquefied material had against the manifestation of liquefaction at the ground surface. The paper contained graphs that plotted thickness of the upper non-liquefied layer (H_1) and the thickness of underlying liquefied material (H_2). The maximum acceleration is 400 to 500 gal in Ishihara's graph. The term "surface manifestation" is utilized to describe liquefaction-induced surface damage.

A quantitative method using an index called the liquefaction potential index (LPI) was developed and presented by Iwasaki (1978, 1982). The LPI is defined as:

$$\mathrm{LPI} = \int_0^{20} \mathrm{F_1\,W(z)dz}$$

where $W(z) = 10 - 0.5z$, $F_1 = 1 - FS$ for $FS < 1.0$, $F_1 = 0$ for $FS > 1.0$ and z is the depth below the ground surface in meters. The LPI presents the risk of liquefaction damage as a single value with the following indicators of liquefaction-induced damage:

LPI Range and Damage	
LPI Range	Damage
LPI = 0	Liquefaction risk is very low.
0 < LPI ≤ 5	Liquefaction risk is low.
5 < LPI ≤ 10	Liquefaction risk is medium.
10 < LPI ≤ 15	Liquefaction risk is high.
LPI > 15	Liquefaction risk is very high.

The original liquefaction potential index (LPI) was improved by Maurer et al (2015) by assessing liquefaction hazard utilizing the Ishihara (1985) boundary curves for liquefaction surface effects. The new index is named Ishihara-inspired index, LPI_{ISH}.

$$\mathrm{LPI}_{ISH} = \int_0^{20} F(FS)\frac{25.56}{z}\,\mathrm{dz}$$

where

$$F(FS) = \begin{cases} 1 - FS \; if \; FS \leq 1 \; \cap \; H_1 \cdot m(FS) \leq 3 \\ 0 \; otherwise \end{cases}$$

and

$$m(FS) = \exp\left(\frac{5}{25.56(1 - FS)}\right) - 1$$

The most recent development for quantitative descriptions of liquefaction-induced surface damage, called "liquefaction vulnerability," was made by Tonkin & Taylor (2013) after the Christchurch earthquakes occurred between 2010 and 2011 and was based on field observations and analyses of approximately 7,500 cone penetrometer test (CPT) investigations. A new index, the liquefaction severity number (LSN), was proposed and defined as:

$$\mathrm{LSN} = \int \frac{\varepsilon_\mathrm{v}}{\mathrm{z}}\,\mathrm{dz}$$

where ε_v is the calculated volumetric densification strain in the subject layer from Zhang et al. (2002) and z is the depth to the layer of interest in meters below the ground surface. The typical behaviors of sites with a given LSN are summarized in following table.

LSN Ranges and Observed Land Effects	
LSN Range	**Predominant Performance**
0 – 10	Little to no expression of liquefaction, minor effects
10 – 20	Minor expression of liquefaction, some sand boils
20 – 30	Moderate expression of liquefaction, with sand boils and some structural damage
30 – 40	Moderate to severe expression of liquefaction, settlement can cause structural damage
40 – 50	Major expression of liquefaction, undulations and damage to ground surface, severe total and differential settlement of structures
>50	Severe damage, extensive evidence of liquefaction at surface, severe total and differential settlements affecting structures, damage to services

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