CORNERSTONE EARTH GROUP

TYPE OF SERVICES	Design Level Geotechnical Investigation and Geologic Hazard Evaluation
PROJECT NAME	Monte Verde Elementary School Modular Classrooms
LOCATION	2551 Saint Cloud Drive San Bruno, California
CLIENT	South San Francisco Unified School District
PROJECT NUMBER	1517-2-1
DATE	October 31, 2025

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Client Address	**398 B Street** **South San Francisco, CA**
Project Number	**1517-2-1**
Date	**October 31, 2025**

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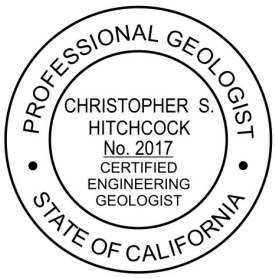

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CORNERSTONE EARTH GROUP

Type of Services	**Geotechnical Investigation and Geologic Hazard Evaluation**
Project Name	**Monte Verde Elementary School Modular Classrooms**
Location	**2551 Saint Cloud Drive** **San Bruno, California**

SECTION 1: INTRODUCTION

This geotechnical report and geologic hazard evaluation was prepared for the sole use of South San Francisco Unified School District for the Monte Verde Elementary School Modular Classrooms project in San Bruno, California. The location of the site is shown on the Vicinity Map, Figure 1. For our use, we were provided with the following documents:

- A Geotechnical Engineering and Geologic Hazards Study titled, "Monte Verde Elementary School New Modular Classrooms 2551 St. Cloud Drive San Bruno California 94066", prepared by Geosphere Consultants Inc., dated June 1, 2012.
- A topographic survey titled, "Topographic and Boundary Survey Monte Verde Elementary School 2551 St. Cloud Drive San Bruno California 94066", prepared by Underwood & Rosenblum, Inc., dated July 31, 2012, datum unknown.
- A set of plans including Architectural, Civil, Structural, Electrical, and Plumbing sheets, titled, "Monte Verde Elementary School Site Work SSFUSD Measure J Classroom Replacement 2551 St. Cloud Drive San Bruno California 94066", prepared by HKIT Architects, dated February 15, 2013
- Site Plan titled, "Site Option 2C", MVES TK, dated 09/25/2025

1.1 PROJECT DESCRIPTION

The project site is located at the Monte Verde Elementary School at 2551 Saint Cloud Drive in San Bruno, California. We have discussed the site with you, reviewed relatively recent aerial photographs of the site, visited the site, and reviewed the provided site plans. We understand that a new DSA PC modular structure is planned for the campus. It is a relocatable building for the purposes of applying DSA's regulations and interpretations. We understand that the new structure will have a footprint of approximately 1,350 square feet and will be located in the

existing kindergarten yard. No retaining walls or earthwork of the adjacent slope are currently planned. Appurtenant utilities, landscaping and other improvements necessary for site development are also planned.

Structural loads are not currently known for the proposed structure; however, structural loads are expected to be typical of similar-type structures. Grading plans are not available at this time; however, we assume grading will be minor with cuts and fills on the order of 1 to 2 feet.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated September 26, 2025, and consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, engineering analysis to prepare recommendations for a new PC modular structure, and preparation of this report. Brief descriptions of our exploration and laboratory programs are presented below.

1.3 EXPLORATION PROGRAM

Field exploration consisted of five borings drilled on September 20, 2025 with truck-mounted, hollow-stem auger drilling equipment. The borings were drilled to depths ranging from 9 to 30 feet below the ground surface. The borings were backfilled with cement grout in accordance with local requirements; exploration permits were obtained where required by local jurisdictions.

The approximate locations of our exploratory borings are shown on the Site Plan, Figure 2. Refer to Appendix A for details regarding our field program.

1.4 PREVIOUS EXPLORATION PROGRAM

Previous field exploration was performed in April 2012 by Geosphere Consultants, Inc. for new classroom structures, which consisted of five borings using truck-mounted hollow stem auger drilling equipment. The approximate locations of the previous explorations are also shown on the Site Plan, Figure 2. Refer to Appendix C for copies of the previous exploration logs.

1.5 LABORATORY TESTING PROGRAM

In addition to visual classification of samples, the laboratory program focused on obtaining data for foundation design and seismic ground deformation estimates. Testing included moisture contents, dry densities, grain size analyses, and Plasticity Index tests. Refer to Appendix B for details regarding our laboratory program.

1.6 ENVIRONMENTAL SERVICES

Environmental services were not requested for this project. If environmental concerns are determined to be present during future evaluations, the project environmental consultant should review our geotechnical recommendations for compatibility with the environmental concerns.

SECTION 2: REGIONAL SETTING

2.1 GEOLOGICAL SETTING

The San Francisco peninsula is a relatively narrow band of rock at the north end of the Santa Cruz Mountains separating the Pacific Ocean from San Francisco Bay. It represents one mountain range in a series of northwesterly-aligned mountains forming the Coast Ranges geomorphic province of California that stretches from the Oregon border nearly to Point Conception. In the San Francisco Bay area, most of the Coast Ranges have developed on a basement of tectonically mixed Cretaceous- and Jurassic-age (70 to 200 million years old) rocks of the Franciscan Complex. Locally, these basement rocks are capped by younger sedimentary and volcanic rocks. Most of the Coast Ranges are covered by younger surficial deposits that reflect geologic conditions for approximately the last million years.

Lateral and vertical movement on the many splays of the San Andreas Fault system and other secondary faults has produced the dominant northwest-oriented structural and topographic trend seen throughout the Coast Ranges today. This trend reflects the boundary between two of the Earth's major tectonic plates: the North American plate to the east and the Pacific plate to the west.

The San Andreas Fault system is approximately 40 miles wide in the Bay area and extends from the San Gregorio fault at the coastline to the Coast Ranges-Central Valley blind thrust at the western edge of the Great Central Valley. The San Andreas Fault is the dominant structure in the system, nearly spanning the length of California, and capable of producing the highest magnitude earthquakes. Many other sub-parallel or branch faults within the San Andreas system are equally active and nearly as capable of generating large earthquakes. Right-lateral movement dominates these faults, but an increasingly large amount of thrust faulting resulting from compression across the system is now being identified as well.

The kindergarten play area on the western edge of the school is located approximately 1,050 feet east of the San Andreas Fault. Distances from the site to other nearby active faults are provided in Table 1. Geology of Monte Verde Elementary School and vicinity is shown in Figure 3, Vicinity Geologic Map (a partial reproduction of that of Bonilla, 1998). The vast majority of the site is situated on Plio-Pleistocene Merced Formation bedrock (map symbol QTm), but a small portion of the site along the northeastern edge is mapped as Pleistocene slope debris and ravine fill (map symbol Qsr).

2.2 REGIONAL SEISMICITY

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within 100 kilometers of the site. The eastern margin of the broad fault zone associated with the Serra fault is located approximately 0.6 miles (1.0 km) east of the project site. Although initially zoned under the Alquist-Priolo act by the California Geological Survey (CGS), the Serra fault is not considered active based on the absence of documented Holocene surface displacement (Smith, 1981). However, more recent

paleoseismic studies suggest late Pleistocene and possibly Holocene activity on the Serra fault (Hengesh et al., 1996).

The range of distances to significant faults is a result of variations in how a source measures distance to a fault. The fault distances presented in Table 1A are based on USGS fault and fold database for the faults our Certified Engineering Geologist considered significant. The fault distances presented in Table 1B are based on the 2014 USGS fault model from the online Unified Hazard Tool (UHT). The seismic characteristics of some faults vary along its length so different segments of the same fault could be listed separately in the table. We have presented two different fault sources to provide a comprehensive look at the faults considered significant to the project site. At this time, the USGS 2014 fault model is only available in the UHT format and we are not aware of an option for a full fault distance search. Therefore, our Certified Engineering Geologist has compiled a list of faults considered geologically significant within 100 km (Table 1A). We have also included the faults considered significant in the UHT (Table 1B).

Table 1A: Approximate Fault Distances within 100-Kilometers

Fault Name	Distance	
	(miles)	(kilometers)
San Andreas (1906)	0.5	0.8
San Gregorio	5.5	8.9
Monte Vista-Shannon	17.7	28.4
Hayward (Total Length)	18.3	29.4
Calaveras	28.0	45.0
Concord-Green Valley	31.5	50.7
Rogers Creek	31.9	51.4
Greenville	37.4	60.1
West Napa	38.3	61.6
Sargent	44.6	71.8
Zayante-Vergeles	46.2	74.4
Monterey Bay – Tularcitos	58.9	94.8

Table 1B: Approximate Fault Distances (USGS 2014 via UHT)

Fault Name	Distance (miles)	Distance (kilometers)
San Andreas (Peninsula)	0.2	0.4
Pilarcitos	4.0	6.4
San Gregorio (North)	5.7	9.1

While seismologists cannot predict earthquake events, geologists from the U.S. Geological Survey have recently updated (in 2015) earlier estimates from their 2014 Uniform California Earthquake Rupture Forecast (Version 3; UCERF3) publication. The estimated probability of one or more magnitude 6.7 earthquakes (the size of the destructive 1994 Northridge earthquake) expected to occur somewhere in the San Francisco Bay Area has been revised (increased) to 72 percent for the period 2014 to 2043 (Aagaard et al., 2016). The faults in the region with the highest estimated probability of generating damaging earthquakes between 2014 and 2043 are the Hayward (33%), Calaveras (26%), and San Andreas Faults (22%). In this 30-year period, the probability of an earthquake of magnitude 6.7 or larger occurring is 22 percent along the San Andreas Fault and 33 percent for the Hayward Fault. A regional fault map is presented as Figure 4, illustrating the relative distances of the site to significant fault zones.

SECTION 3: SITE CONDITIONS

3.1 RECENT SITE HISTORY AND AIR PHOTO REVIEW

We reviewed historic aerial imagery provided online by the UC Santa Barbara Aerial Photography Library, Environmental Data Resources (EDR, edrnet.com), Historic Aerials (historicaerials.com), and Google Earth. The earliest photos (1943) show the site was undeveloped land. Development of the immediate vicinity of the school likely began prior to 1965, as the main roads adjacent to the project site, but no residential buildings, are visible on 1943 aerial imagery. Refer to Appendix E for historic aerial imagery provided from EDR. As part of development of the school, grading modified the original land with fill placed in historic drainage channels/creek tributaries crossing the northwestern, northern and southeastern edges of the campus. Development of the main school campus included grading and fill placement.

A summary of pertinent surface changes at and near the site is as follows:

- 1943: The project site appears as an undeveloped field and adjacent hillside. The beginning of two drainage channels/tributaries of Twelvemile Creek are observed crossing the southeastern and northwestern edges of the future campus.
- 1956: The neighborhood to southeast, south of Evergreen Drive appears to be under development.
- 1963: The residential neighborhood track to the southwest and northwest are constructed. The residential tract to the north appears under construction with Saint Cloud Drive and Shannon Drive in place. The hillslope along the southwestern boundary of the school is first observed and the school campus appears to have undergone general grading although no structures are yet observed.
- 1968: The central portion of Monte Verde School's campus has been constructed where the existing buildings A, B, and C are currently located, and the project site appears to

be a paved surface. The residential track to the northeast is constructed, Monte Verde Park is visible to the southeast.

- 1993: Additional surface improvements appear throughout the Monte Verde Elementary School campus, including the construction of Building G.
- 2002: Buildings I and H appears on the south side of the project site, and the paved play area has been extended to the southwest
- 2025: No pertinent surface changes were observed to the project site.

LiDAR data downloaded, processed, and reviewed for this study was obtained from San Mateo County and consists of LiDAR point cloud data with a point density of 4 pts/m2 collected and originally processed in 2017 (County of San Mateo, 2017). The LiDAR data are useful for evaluation of the coarse geomorphology of the site, but the landscape has been extensively modified by grading for development.

3.2 SURFACE DESCRIPTION

The site is bounded by Saint Cloud Drive to the northwest, Shannon Drive and a residential development to the northeast, a public park to the southeast, and a residential development to the southwest. Based on review of the provided topographic plan, campus grades range from Elev. 499 feet MSL (Datum unknown) at the top of the slope along the southern edge of the site, to approximately Elev. 423 feet MSL (Datum unknown) near the intersection of Shannon Drive and St Cloud Drive. Slopes line the northeast, southeast, and southwest sides of the campus. Elevations within the existing Kindergarten Playground, where the proposed PC modular is currently planned, range from approximately 454 feet at the southern edge of the yard along the toe of existing slope to 450 feet along the northern edge of the play yard. The slope adjacent to the Kindergarten Playground ranges from approximately Elev. 453 up to 496.5 feet.

Our Certified Engineering Geologist visited the site on October 10, 2025 to examine site conditions. The original topography of the site has been modified and surficial deposits are covered by buildings, playgrounds, roadway pavement, sidewalks, and landscaping.

Sidewalks and pavement along Saint Cloud Drive and Shannon Drive do not show evidence of damage or distress from earth movement. The proposed structure are located in a paved courtyard within the Kindergarten Playground within the larger school campus. Surface pavements generally consisted of 1½ to 2½ inches of asphalt concrete over 4 to 6 inches of aggregate base. Based on visual observations, the existing pavements are in fair condition with minimal utility trenches, patchwork, or distress observed. No exposures of native soil or rock were observed in the immediate vicinity of the project site.

3.3 SITE GEOLOGY AND SUBSURFACE CONDITIONS

Mapping by Bonilla (1998) shows the site underlain by shallow bedrock of the Merced Formation (geologic unit ‘QTm’; Figure 3). A portion of the school consists of Quaternary slope

ravine deposits (map symbol ‘Qsr’) covering bedrock. Based on interpretation of geotechnical borings compiled for liquefaction hazard analyses and integration of Quaternary geologic mapping by Witter et al. (2006), CGS (2021) confirmed the mapping of Bonilla (1998), with the site delineated as Merced Formation bedrock (geologic unit ‘QTm’) with minimal associated liquefaction hazard.

Below the surface pavements our explorations generally encountered existing undocumented fill underlain by interbedded native soils, and/or Quaternary deposits to the maximum depths explored during this investigation. A more detailed description of the subsurface conditions is presented in the following sections.

3.3.1 Undocumented Fills

Based on our review of the subsurface conditions noted in the prior geotechnical report and in our own investigation, the fills range from less than a foot up to approximately12 feet in thickness and generally consisted of medium dense to dense clayey sand with variable amounts of gravel. “Undocumented fill” is generally considered to be soil and debris, typically of unknown origin, placed at a site without proper documentation regarding its source, quality, or compaction levels. Records of how such fills were placed, or if they meet currently accepted compaction standards, were not available. If such records are available they should be provided for our review.

“Undocumented fill" is generally considered a soil material that has been placed at a site without proper documentation regarding its source, quality, or compaction levels, meaning there is no record of how it was placed or if it meets currently accepted compaction standards.

3.3.2 Alluvial Soils and Quaternary Deposits

Below the undocumented fills or where no fill is currently located, the native alluvial soils generally consisted of very stiff sandy lean clays to dense sands to a depth of about 13 to 18½ feet below existing site grades.

Beneath the ground surface, Exploratory Boring EB-1 encountered alluvial soils consisting of very stiff sandy lean clay to a depth of 13 feet overlying moderately hard silty sandstone of the Merced Formation to the terminal depth of about 24 feet. Beneath approximately 12 feet of undocumented fill, Boring EB-2 encountered alluvial soils consisting of dense clayey sand with gravel to a depth of 18½ feet. These alluvial soils overly the Merced Formation to the terminal depth of about 29 feet. Exploratory Borings EB-3 and EB-4 did not encounter alluvial soils with both borings encountering moderately hard bedrock of the Merced Formation near the ground surface to their terminal depths of about 9 feet below existing site grades. Beneath the undocumented fill, Boring EB-5 encountered alluvial soil consisting of very stiff sandy lean clay and dense clayey sand with gravel to a depth of 23 feet below site grades. Beneath the alluvial soils, Boring EB-5 encountered moderately strong silty sandstone (QTm) to the maximum boring depth of 30 feet below existing site grades.

Generalized cross sections of the project area are presented graphically in Figures 6 and 7.

3.3.3 Previous Field Exploration by Others

Five borings were previously advanced by Geosphere in 2012 to depths ranging from 15 to 50 feet below the ground surface. Borings B-1, B-2, and B-3 were drilled near the central portion of the school and Borings B-4 and B-5 were drilled west of the existing Kindergarten playground, near the project site.

Cemented sands interpreted as highly weathered bedrock was encountered in Borings B-4 and B-5 at shallow depths. Very dense, well-graded sand was encountered from 34 to 50 feet in Boring B-2. About 2 feet of very stiff sandy clay fill was encountered in Boring B-3.

3.3.4 Plasticity/Expansion Potential

We performed one Plasticity Index (PI) test on a representative sample. The test result was used to evaluate the expansion potential of surficial soils. The results of the surficial PI test indicated a PI of 12, indicating low expansion potential to wetting and drying cycles.

3.3.5 In-Situ Moisture Contents

Laboratory testing indicated that the in-situ moisture contents within the upper 10 feet range from 8 to 22 percent, indicating approximately 3 percent below to 10 percent over the estimated laboratory optimum moisture.

3.4 GROUNDWATER

Groundwater was not encountered in our borings during drilling; however, the borings were not left open but were immediately backfilled when the boring was completed. Groundwater was encountered in previous Boring B-2 performed by Geosphere at a depth of 18 feet; however, based on our review of the logs samples below 20 feet did not appear saturated. The water in B-2 was interpreted to be consisted with a perched groundwater condition.

Groundwater is mapped at the northern corner of the school campus as having a historic high groundwater depth of 2 feet, related to a historic channel that was mapped as extending up to the northern corner of the school campus (CGS, 2021).

As with all hillside or sloping environments, there is a potential for temporary perched water conditions, especially in winter months. It is not uncommon for water to be perched at the top of bedrock or geologic formations, which underlie surficial soils. These occurrences are considered to be localized seepage emerging from the bedrock and overlying soils rather than a laterally continuous groundwater table. Fluctuations in groundwater levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors.

For our liquefaction analysis, we evaluated a historic high groundwater depth of 2 feet.

3.5 CORROSION SCREENING

We tested two samples collected at depths of 3½ feet for resistivity, pH, soluble sulfates, and chlorides. The laboratory test results are summarized in Table 2.

Table 2: Summary of Corrosion Test Results

Sample Location	Depth (feet)	Soil pH[1]	Resistivity[2] (ohm-cm)	Chloride[3] (mg/kg)	Sulfate[4,5] (mg/kg)
EB-1	3½	6.7	2,278	16	54
EB-2	3½	7.5	3,463	4	23

Notes: [1]ASTM G51
[2]ASTM G57 - 100% saturation
[3]ASTM D3427/Cal 422 Modified
[4]ASTM D3427/Cal 417 Modified
[5]1 mg/kg = 0.0001 % by dry weight

Many factors can affect the corrosion potential of soil including moisture content, resistivity, permeability, and pH, as well as chloride and sulfate concentration. Typically, soil resistivity, which is a measurement of how easily electrical current flows through a medium (soil and/or water), is the most influential factor. In addition to soil resistivity, chloride and sulfate ion concentrations, and pH also contribute to affecting corrosion potential.

3.5.1 Preliminary Soil Corrosion Screening

Based on the laboratory test results summarized in Table 2 and published correlations between resistivity and corrosion potential, the soils may be considered moderately corrosive to buried metallic improvements (Chaker and Palmer, 1989).

In accordance with the 2022 CBC Section 1904A.1, alternative cementitious materials for different exposure categories and classes shall be determined in accordance with ACI 318-19 Table 19.3.1.1, Table R19.3.1, and Table 19.3.2.1. Based on the laboratory sulfate test results, a cement type restriction is not required, although, in our opinion, it is generally a good idea to include some sulfate resistance and to maintain a relatively low water-cement ratio. We have summarized applicable exposure categories and classes from ACI 318-19, Table 19.3.1.1 below in Table 3.

Table 3: ACI 318-19 Table 19.3.1.1 Exposure Categories and Classes

Freezing and Thawing (F)	Sulfate (S, soil)	In Contact with Water (W)	Corrosion Protection of Reinforcement (C)
F0[1]	S0[2]	W1[3]	C1[4]

1 (F0) “Concrete not exposed to freezing-and-thawing cycles” (ACI 318-19)
2 (S0) “Water soluble sulfate in soil, percent by mass” (ACI 318-19)
3 (W1) “Concrete in contact with water where low permeability is required” (ACI 318-19)
4 (C1) “Concrete exposed to moisture but not to an external source of chlorides” (ACI 318-19)

We recommend the structural engineer and a corrosion engineer be retained to confirm the above information and provide additional recommendations, as needed.

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT SURFACE RUPTURE

As discussed above several significant faults are located within 25 kilometers of the site. The site is not located within a State-designated Alquist Priolo Earthquake Fault Zone. As shown in Figure 4, no known surface expression of fault traces is thought to cross the site.

Located approximately 1,050 feet west of Monte Verde Elementary School, the active Peninsula section of the San Andreas Fault is mapped along San Andreas Lake and Crystal Springs Reservoirs. This portion of the San Andreas fault ruptured during the 1906 San Francisco earthquake (Lawson and others, 1908) and is zoned by CGS under the Alquist-Priolo Earthquake Fault Zoning Act. As noted above, although initially zoned, the Serra fault is not considered active by CGS.

The site is not within the state-designated boundaries of an Alquist Priolo Earthquake Fault Zone, but is located between the mapped traces of the San Andreas and Serra faults. We observed no geomorphic or tonal evidence in the pre-development aerial photos or available lidar that would suggest the presence of surface faulting across the site. During our site reconnaissance we did not observe evidence for fault surface rupture; therefore, in our opinion fault surface rupture hazard is not a significant hazard at the site.

4.2 ESTIMATED GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. A site modified peak ground acceleration (PGA_M) was determined in accordance with the 2025 California Building Code (CBC) and Section 21.5 of ASCE 7-16. Therefore, we recommend a site-specific MCE_G peak ground acceleration, PGA_M, of 1.26g for this project.

4.3 LIQUEFACTION POTENTIAL

The site is not located within a State-designated Liquefaction Hazard Zone (CGS, South San Francisco 7.5-Minute Quadrangle, 2021). No observable occurrences of catastrophic ground failure (i.e., ground rupture, sand boils, lateral spreading) have been recorded in the vicinity of the site within records compiled by Lawson et al. (1908), Youd and Hoose (1978), Holzer et al. (1998), Knudsen et al. (2000) and the California Geological Survey (2019). In addition, the site is within a zone mapped as having a very low liquefaction potential by the USGS (Witter et al., 2006). However, due to the deeper fills and potential for a historic drainage channel, we screened the site for liquefaction during our site exploration by retrieving samples from the site, performing visual classification on sampled materials, and performing various tests to further classify the soil properties.

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 1998). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 4 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

As discussed in the "Subsurface" section above, several clayey sand layers were encountered below the high groundwater depth of 2 feet. Following the liquefaction analysis framework in the 2008 monograph, *Soil Liquefaction During Earthquakes* (Idriss and Boulanger, 2008), incorporating updates in *CPT and SPT Based Liquefaction Triggering Procedures* (Boulanger and Idriss, 2014), and in accordance with CDMG Special Publication 117A guidelines (CDMG, 2008) for quantitative analysis, these layers were analyzed for liquefaction triggering and potential post-liquefaction settlement. These methods compare the ratio of the estimated cyclic shaking (Cyclic Stress Ratio - CSR) to the soil's estimated resistance to cyclic shaking (Cyclic Resistance Ratio - CRR), providing a factor of safety against liquefaction triggering. Factors of safety less than or equal to 1.3 are considered to be potentially liquefiable and capable of post-liquefaction re-consolidation (i.e. settlement).

The soil's CRR is estimated from the in-situ measurements obtained from correlated field SPT blow counts ("N" value). SPT "N" values obtained from hollow-stem borings EB-2 and EB-5 were used in our analyses. Borings EB-1, EB-3, and EB-4 were not evaluated as they primarily encountered lean clays and Merced Formation silty sandstone. The "N" values are corrected for effective overburden stresses (C_N), taking into consideration both the groundwater level at the time of exploration and the design groundwater, and stress reduction versus depth factors. For overburden stress correction, C_N, we used the published equation from Idriss and Boulanger (2008). The "N" values are also corrected for fines content, hammer efficiency, boring diameter, rod length, and sampler type (with or without liners). For fines content, N_{CS} we performed washed sieve tests on sandy layers encountered in our borings and used the fines content in published equations from Idriss and Boulanger (2008). For hammer efficiency, C_E, the drill rigs used for Borings EB-2 used a downhole safe-T hammer with an efficiency of 61 percent, giving the field "N" values a correction factor of 1.01 for the borings. For boring diameter correction, C_B, we used a value of 1.0 based on the relationships published by Skempton (1986) for Borings EB-2, as they were drilled with 8-inch hollow-stem augers with an inner diameter of approximately 4 inches. For the rod length correction, C_R, we used published relationships for variable rod lengths, of 0.75 for the rod lengths used to sample the sand layers ranging from 2 feet to 18½ feet as a down-hole hammer was used without additional rod. For sampler correction, C_S, based on standard of practice, a correction factor of 0.6 was applied to samples taken with a Modified California sampler in order to convert to SPT "N" values.

Soils that have corrected SPT blow counts greater than 30 blows per foot are considered too dense to liquefy and have been excluded from our analysis. The sandy soils encountered in our explorations had corrected SPT blow counts between about 30 to 49. Therefore, we anticipate

that total and differential seismic settlements will be low. The blow count corrections of borings EB-2 and EB-5 are presented in Appendix C.

4.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically, lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form.

There are no open faces within a distance considered susceptible to lateral spreading and the potential for liquefaction induced settlement is low; therefore, in our opinion, the potential for lateral spreading to affect the site is low.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose unsaturated sandy soils can settle during strong seismic shaking. As the soils encountered at the site were predominantly stiff to very stiff clays and medium dense to dense sands above the high groundwater depth, in our opinion, the potential for significant differential seismic settlement affecting the proposed improvements is low.

4.6 LANDSLIDING

At this time, grading plans have not been provided. The proposed alternative modular locations are located on relatively flat portions of the school grounds. According to the CGS, a portion of the school lies within a CGS designated Landslide hazard zone. The portions of the site that are mapped as a Landslide hazard zone are the slopes lining the southwest and northeast sides of the site, including slopes adjacent to the proposed modular location. The proposed footprint of the modular structure is not within the Landslide hazard zone, and no earthwork operations are planned within the hazard zone.

Published geologic maps show no landslides mapped at or immediately upslope of the site (Brabb and Pampeyan, 1972; Bonilla, 1998; County of San Mateo Planning Department, 1997, Brabb et al., 1998) and the California Geological Survey (2021). CGS (2021) shows possible landslides north and east of the site. Landslide susceptibility mapping by the Association of Bay Area Governments (ABAG) indicates the site is within a “Few Landslides” landslide hazard area. Landslide susceptibility mapping by the Association of Bay Area Governments (ABAG) indicates the site is within a “Few Landslides” landslide hazard area.

Review of historical aerial imagery combined with interpretation of available LiDAR data documented the absence of geomorphic features typically associated with landsliding. Additionally, we did not observe any features during our site reconnaissance indicative of slope failure or instability. It is our opinion that landslides do not extend beneath or immediately adjacent to the proposed modular structures and that the adjacent slope is stable.

4.7 FLOODING

Based on our internet search of the Federal Emergency Management Agency (FEMA) flood map public database, the site is located within Zone X, an area of minimal flood hazard. We recommend the project civil engineer be retained to confirm this information and verify the base flood elevation, if appropriate.

The Department of Water Resources (DWR), Division of Safety of Dams (DSOD) compiled a database of Dam Failure Inundation Hazard Maps (DSOD, 2015). The generalized hazard maps were prepared by dam owners as required by the State Office of Emergency Services; they are intended for planning purposes only. Based on our review of these maps, the site is not located within a dam failure inundation area.

4.8 TSUNAMI/SEICHE

The site is well inland (over three miles) from the San Francisco Bay shoreline and is located over 450 feet above mean sea level. Therefore, the potential for inundation due to tsunami is considered low.

Seiches are waves in an enclosed body of water, such as a lake or water reservoir, that may be caused by an earthquake as a result of fault displacement in the basin bottom, large landslides failing into the basin, or from periodic oscillation or sloshing of the water. There are no enclosed bodies of water in the immediate vicinity of the school site.

4.9 VOLCANIC ERUPTION

In collaboration with the California Governor's Office of Emergency Services and the California Geological Survey, the US Geological Survey published a Volcanic Threat Assessment report which provides a broad perspective on California's exposure to volcanic hazards (Mangan et al., 2019). The school campus is located several hundred miles from the nearest potentially or historically active areas of volcanic activity (which include the Clear Lake volcanic field and Long Valley volcanic area). San Mateo County is not one of the counties identified with elevated volcanic hazards (Mangan et al., 2019). Volcanic eruption hazard for the school site therefore is very low.

4.10 NATURALLY OCCURRING ASBESTOS

Naturally occurring asbestos (NOA) is the geologic occurrence of six types of naturally occurring asbestos minerals including chrysotile, crocidolite, amosite, asbestiform tremolite, asbestiform actinolite, and asbestiform anthophyllite (CGS, 2002). Ultramafic rock such as serpentine and greenstone can contain NOA. When this material is disturbed in connection with construction or grading, asbestos-containing dust can be generated. Medical studies have shown a potential connection between environmental exposure to these naturally occurring types of asbestos and cancer.

No site-specific hazard for NOA is identified in the immediate vicinity of the school in published regional mapping of asbestos hazard for the State of California developed jointly by the USGS and CGS (Gosen and Clinkenbeard, 2011). Based on our review of geologic maps, the Site is located well north from the nearest ultramafic rock outcrop that may contain NOA, mapped as Serpentinite (geologic unit 'sp') by Brabb et al (1998) approximately 4 miles south of the site near the south end of San Andreas Reservoir. The Department of Toxic Substances Control (DTSC) 2004 interim guidance document titled *Naturally Occurring Asbestos (NOA) at School Sites* recommends soil sampling when a proposed school site is located within a 10-mile radius of an NOA geologic formation. Thus, we recommend that sampling for NOA be conducted at the site prior to earthwork activities by the project environmental consultant.

SECTION 5: CONCLUSIONS

5.1 SUMMARY

From a geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project design. Descriptions of each concern with brief outlines of our recommendations follow the listed concerns.

- Undocumented fill and redevelopment considerations
- Potential for perched and shallow groundwater

5.1.1 Undocumented Fill and Redevelopment Considerations

As discussed, Borings EB-2 and EB-5 encountered approximately 9 to 12 feet of undocumented fills. Based on our review of historic aerials, the deeper depths of undocumented fill appear to be a result of initial site grading development including the infill of drainage channels that crossed through the site. Fills from the drainage channels do not appear to extend into the proposal modular footprint, however, additional undocumented fill may be present within the proposed footprint from the existing play structure within the Kindergarten Playground. Existing undocumented fills are typically variable in consistency and density and if left in place can often result in total and differential settlements.

Typically to mitigate the potential for settlement due to undocumented fill, we would recommend all undocumented fills be fully removed and replaced as engineered fill beneath planned foundations. However, based on review of our exploratory borings, the undocumented fill appears to be medium dense to dense and likely have been placed with some compaction effort. As such, we have provided a value engineer option which does not require a complete rework of all the undocumented fill and instead provides a uniform fill thickness of engineered fill beneath shallow foundations. Please refer to the "Earthwork" section below for further recommendations.

If observation and testing records are available for the existing fill materials, they should be provided for our review. At this time, we understand records are not available.

5.1.2 Potential for Perched and Shallow Groundwater

As mentioned above, groundwater was not encountered within our borings but was encountered at 20 feet in one of the previous explorations by Geosphere. Our experience with similar sites in the vicinity indicates that shallow perched groundwater conditions could significantly impact grading and underground construction. These impacts typically consist of potentially wet and unstable subgrade, difficulty achieving compaction, and difficult underground utility installation. Dewatering and shoring of utility trenches may be required in some isolated areas of the site. Detailed recommendations addressing this concern are presented in the "Earthwork" section of this report.

5.2 PLANS AND SPECIFICATIONS REVIEW

We recommend that we be retained to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction.

5.3 CONSTRUCTION OBSERVATION AND TESTING

As site conditions may vary significantly between the explorations performed during this investigation, we also recommend that a Cornerstone representative be present to provide geotechnical observation and testing during earthwork and foundation construction. This will allow us to form an opinion and prepare a letter at the end of construction regarding contractor compliance with project plans and specifications, and with the recommendations in our report. We will also be allowed to evaluate any conditions differing from those encountered during our investigation and provide supplemental recommendations as necessary. For these reasons, the recommendations in this report are contingent of Cornerstone providing observation and testing during construction. Contractors should provide at least 48-hour notice when scheduling our field personnel.

SECTION 6: EARTHWORK

6.1 SITE DEMOLITION

All existing improvements not to be reused for the current development, including all foundations, flatwork, pavements, utilities, and other improvements should be demolished and removed from the site. Recommendations in this section apply to the removal of these improvements, which are currently present on the site, prior to the start of mass grading or the construction of new improvements for the project.

Cornerstone should be notified prior to the start of demolition and should be present on at least a part-time basis during all backfill and mass grading as a result of demolition. Occasionally, other types of buried structures (wells, cisterns, debris pits, etc.) can be found on sites with prior development. If encountered, Cornerstone should be contacted to address these types of structures on a case-by-case basis.

6.1.1 Demolition of Existing Slabs, Foundations and Pavements

All slabs, foundations, and pavements should be completely removed from within planned building areas. Special care should be taken during the demolition and removal of existing floor slabs, foundations, utilities and pavements to minimize disturbance of the subgrade. Excessive disturbance of the subgrade, which includes either native or previously placed engineered fill, resulting from demolition activities can have serious detrimental effects on planned foundation and paving elements.

6.1.2 Abandonment of Existing Utilities

All utilities should be completely removed from within planned building areas. For any utility line to be considered acceptable to remain within building areas, the utility line must be completely backfilled with grout or sand-cement slurry (sand slurry is not acceptable), the ends outside the building area capped with concrete, and the trench fills either removed and replaced as engineered fill with the trench side slopes flattened to at least 1:1, or the trench fills are determined not to be a risk to the structure. Sand-cement slurry should have a minimum compressive strength of 75 psi.

The assessment of the level of risk posed by the particular utility line will determine whether the utility may be abandoned in place or needs to be completely removed. The contractor should assume that all utilities will be removed from within building areas unless provided written confirmation from both the owner and the geotechnical engineer.

Utilities extending beyond the building area may be abandoned in place provided the ends are plugged with concrete, they do not conflict with planned improvements, and that the trench fills do not pose significant risk to the planned surface improvements.

The risk for owners associated with abandoning utilities in place include the potential for future differential settlement of existing trench fills, and/or partial collapse and potential ground loss into utility lines that are not completely filled with grout.

6.2 SITE CLEARING AND PREPARATION

The site should be stripped of all surface vegetation, and surface and subsurface improvements to be removed within the proposed development area. Demolition of existing improvements is discussed in the prior paragraphs. Surface vegetation and topsoil should be stripped to sufficient depth to remove all material greater than 3 percent organic content by weight.

6.3 MITIGATION OF UNDOCUMENTED FILLS

As discussed in the “Conclusions” section, up to 12 feet of undocumented fill was encountered during our site investigation. The deeper depths of undocumented fill appear to be a result of initial site grading that included the infill of several unnamed drainage channels that started in or crossed through the school campus, as shown in historic aerial photographs included in Appendix E. Fills from the drainage channels does not appear to extend into the proposal

modular footprint, however, additional undocumented fill may be present within the proposed footprint from the existing play structure within the Kindergarten Playground. Based on review of exploratory boring EB-2 blow counts and samples collected, the fills consist of medium dense to dense clayey sand with gravel and appear to have been placed with compaction effort. If observation and testing records are available for the existing fill materials, they should be provided for our review.

Typically, we would recommend all undocumented fills be fully removed and replaced as engineered fill beneath planned foundations, however, based on our review of the consistency of the fills encountered in EB-2, we have provided a value engineer option which does not require a complete rework of all the undocumented fill and instead provides a uniform fill thickness of engineered fill beneath shallow foundations.

As a value engineer alterative, we recommend that each individual footing be compacted to a minimum relative compaction of 90 percent, resulting in a minimum of 12 inches of engineered fill beneath all new foundations. We also recommend that the upper 12 inches of any new slabs-on-grade be re-worked in place. We recommend that a Cornerstone representative review the existing fill conditions across the proposed modular structure footprint in the field following site demolition to confirm the limited value engineer mitigation is still appropriate. At that time, additional exploration, such as test pits, may be recommended to further evaluate the existing undocumented fills.

Provided the fills meet the “Material for Fill” requirements below, the fills may be reused when backfilling the excavations. Based on review of the samples collected from our borings, it appears that the fill may be reused. If materials are encountered that do not meet the requirements, such as debris, wood, trash, those materials should be screened out of the remaining material and be removed from the site. Backfill of excavations should be placed in lifts and compacted in accordance with the “Compaction” section below.

Fills extending into planned pavement and flatwork areas may be left in place provided they are determined to be a low risk for future differential settlement and that the upper 12 inches of fill below pavement subgrade is re-worked and compacted as discussed in the “Compaction” section below.

6.4 TEMPORARY CUT AND FILL SLOPES

The contractor is responsible for maintaining all temporary slopes and providing temporary shoring where required. Temporary shoring, bracing, and cuts/fills should be performed in accordance with the strictest government safety standards. Based on our site exploration, the clayey sands encountered in the upper 10 feet shall be classified as OSHA Soil Type C materials.

Excavations performed during site demolition and fill removal should be sloped at 3:1 (horizontal:vertical) within the upper 5 feet below building subgrade. Actual excavation inclinations should be reviewed in the field during construction, as needed. All temporary excavations should be sloped in accordance with OSHA soil classification requirements.

6.5 SUBGRADE PREPARATION

After site clearing and demolition is complete, and prior to backfilling any excavations resulting from fill removal or demolition, the excavation subgrade and subgrade within areas to receive additional site fills, slabs-on-grade and/or pavements should be scarified to a depth of 12 inches, moisture conditioned and compacted in accordance with the “Compaction” section below.

Due to the sandy soils likely to be encountered at the subgrade elevation, we recommend that subgrade compaction and proof rolling be performed within 24 hours of capillary break layer or slab-on-grade construction.

6.6 WET SOIL STABILIZATION GUIDELINES

Native soil and fill materials, especially soils with high fines contents such as clays and silty soils, can become unstable due to high moisture content, whether from high in-situ moisture contents or from winter rains. As the moisture content increases over the laboratory optimum, it becomes more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

As discussed in the “Subsurface” section in this report, the in-situ moisture contents are approximately 3 percent below to 10 percent over the estimated laboratory optimum moisture in the upper 10 feet of the soil profile. The contractor should anticipate drying the soils as needed, prior to reusing them as fill. In addition, repetitive rubber-tire loading may locally de-stabilize oversaturated soils.

There are several methods to address potential unstable soil conditions and facilitate fill placement and trench backfill. Some of the methods are briefly discussed below. Implementation of the appropriate stabilization measures should be evaluated on a case-by-case basis according to the project construction goals and the site conditions.

6.6.1 Scarification and Drying

The subgrade may be scarified to a depth of 6 ½ inches and allowed to dry to near optimum conditions, if sufficient dry weather is anticipated to allow sufficient drying. More than one round of scarification may be needed to break up the soil clods.

6.6.2 Removal and Replacement

As an alternative to scarification, the contractor may choose to over-excavate the unstable soils and replace them with dry on-site or import materials. A Cornerstone representative should be present to provide recommendations regarding the appropriate depth of over-excavation, whether a geosynthetic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

6.7 MATERIAL FOR FILL

6.7.1 Re-Use of On-site Soils

On-site soils with an organic content less than 3 percent by weight may be reused as general fill. General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2½ inches in diameter. Minor amounts of oversize material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

It may be possible to reuse some of the site strippings as part of the engineered fill. Strippings should be spread thinly over a section of on-site materials, and thoroughly blended by disking in two directions, resulting in a material that does not exceed 3 percent organic content by weight. The stripping layer thickness will depend on the stripping organic content and the disking depth capabilities. A Cornerstone representative should collect samples of the blended material to check the organic content prior to approving the mix for use and approving the mixing operation.

6.7.2 Potential Import Sources

Non-expansive material should be inorganic with a Plasticity Index (PI) of 15 or less and not contain recycled asphalt concrete where it will be used within the habitable building areas. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material is derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾-inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant's review. The potential import source should also not be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

6.8 COMPACTION REQUIREMENTS

All fills, and subgrade areas where fill, slabs-on-grade, and pavements are planned, should be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open-

graded materials such as crushed rock should be placed in lifts no thicker than 18 inches and consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from a Cornerstone representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization are provided in the "Wet Soil Stabilization Guidelines" section of this report.

Table 4: Compaction Requirements

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
General Fill (within upper 5 feet)	On-Site Soils	90	>1
General Fill (below a depth of 5 feet)	On-Site Soils	95	>1
Trench Backfill	On-Site Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Soils	95	>1
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Flatwork Subgrade	On-Site Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base[3]	90	Optimum
Pavement Subgrade	On-Site Soils	95	>1
Pavement Aggregate Base	Class 2 Aggregate Base[3]	95	Optimum
Asphalt Concrete	Asphalt Concrete	95 (Marshall)	NA

[1]Relative compaction based on maximum density determined by ASTM D1557 (latest version)
[2]Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
[3]Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)

6.9 TRENCH BACKFILL

Utility lines constructed within public right-of-way should be trenched, bedded and shaded, and backfilled in accordance with the local or governing jurisdictional requirements. Utility lines in private improvement areas should be constructed in accordance with the following requirements unless superseded by other governing requirements.

All utility lines should be bedded and shaded to at least 6 inches over the top of the lines with crushed rock (⅜-inch-diameter or greater) or well-graded sand and gravel materials conforming to the pipe manufacturer's requirements. Open-graded shading materials should be consolidated in place with vibratory equipment and well-graded materials should be compacted to at least 90 percent relative compaction with vibratory equipment prior to placing subsequent backfill materials.

General backfill over shading materials may consist of on-site native materials provided they meet the requirements in the “Material for Fill” section, and are moisture conditioned and compacted in accordance with the requirements in the “Compaction” section.

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the “foundation plane of influence,” an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence, or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

6.10 SURFACE DRAINAGE

Surface runoff should not be allowed to flow over the top of or pond at the top or toe of engineered slopes or retaining walls. Ponding should also not be allowed on or adjacent to building foundations, slabs-on-grade, or pavements. Hardscape surfaces should slope at least 2 percent towards suitable discharge facilities; landscape areas should slope at least 3 percent towards suitable discharge facilities. Roof runoff should be directed away from building areas in closed conduits, to approved infiltration facilities, or on to hardscaped surfaces that drain to suitable facilities. Retention, detention, or infiltration facilities should be spaced at least 10 feet from buildings, and preferably at least 5 feet from slabs-on-grade or pavements. These facilities are not recommended where stormwater infiltration may affect slopes at lower elevations on or adjacent to the site. However, if slopes are not present at lower elevations that could potentially be affected, and if retention, detention, or infiltration facilities are located within these zones, we recommend that these treatment facilities meet the requirements in the Storm Water Treatment Design Considerations section of this report.

Upslope sources of water should be evaluated. If upslope irrigation is present or planned, additional surface and subsurface drainage, or construction of drained buttress fills may be needed to protect site improvements. We should be consulted if this issue will affect the project.

6.11 LANDSCAPE CONSIDERATIONS

We recommend greatly reducing the amount of surface water infiltrating these soils near foundations and exterior slabs-on-grade. This can typically be achieved by:

- Using drip irrigation
- Avoiding open planting within 3 feet of the building perimeter or near the top of existing slopes
- Regulating the amount of water distributed to lawns or planter areas by using irrigation timers
- Selecting landscaping that requires little or no watering, especially near foundations.

We recommend that the landscape architect consider these items when developing landscaping plans.

SECTION 7: CBC SEISMIC DESIGN CRITERIA

7.1 SEISMIC DESIGN CRITERIA

We understand that the project structural design will be based on the 2022 California Building Code (CBC), which provides criteria for the seismic design of buildings in Chapter 16. The "Seismic Coefficients" used to design buildings are established based on a series of tables and figures addressing different site factors, including the site geology and soil profile in the upper 100 feet below grade and mapped spectral acceleration parameters based on distance to the controlling seismic source/fault system.

Our explorations generally encountered medium dense to dense sands and very stiff clay deposits overlying sandstone bedrock to a depth of 30 feet, the maximum depth explored. Based on our borings and review of local geology, the site is underlain by shallow alluvial soils underlain by shallow rock with typical SPT "N" values above 50 blows per foot. Therefore, we have classified the site as Soil Classification C. The mapped spectral acceleration parameters S_s and S_1 were calculated using the OSHPD web-based program *Seismic Design Maps*, located at https://seismicmaps.org, based on the site coordinates presented below and the site classification. The table below lists the various factors used to determine the seismic coefficients and other parameters.

Table 5: CBC Site Categorization and Site Coefficients

Classification/Coefficient	Design Value
Site Class	C
Site Latitude	37.636058°
Site Longitude	-122.451863°
0.2-second Period Mapped Spectral Acceleration[1], S_S	2.46g
1-second Period Mapped Spectral Acceleration[1], S_1	1.03g
Short-Period Site Coefficient – Fa	1.2
Long-Period Site Coefficient – Fv	1.4
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	2.95g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	1.44g
0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS}	1.97g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1}	0.96g
Mapped MCE Geometric Mean Peak Ground Acceleration – PGA_M	1.26g
Site Coefficient Based on PGA and Site Class - F_{PGA}	1.2

SECTION 8: FOUNDATIONS

8.1 SUMMARY OF RECOMMENDATIONS

The proposed modular building may be supported on shallow foundations provided the recommendations in the "Earthwork" section and the sections below are followed.

8.2 SHALLOW FOUNDATIONS

8.2.1 CONVENTIONAL SHALLOW FOOTINGS

Conventional shallow footings should bear on engineered fill, be at least 12 inches wide, and extend at least 12 inches below the lowest adjacent grade. Lowest adjacent grade is defined as the deeper of the following: 1) bottom of the adjacent interior slab-on-grade, or 2) finished exterior grade, excluding landscaping topsoil. As discussed above, due to the potential for undocumented fill beneath the existing play structure and the fills encountered within Boring EB-2 in the vicinity of the proposed modular structure, we recommend the bottom of all footings be compacted to a minimum of 90 percent relative compaction.

Footings constructed to the above dimensions and in accordance with the "Earthwork" recommendations of this report are capable of supporting a maximum ultimate bearing pressure of 6,000 psf. Appropriate minimum factors of safety should be applied to the ultimate bearing pressure for dead, dead plus live, and all loads, respectively. The ultimate pressure is a net value; the weight of the footing may be neglected for the portion of the footing extending below grade (typically, the full footing depth). Top and bottom mats of reinforcing steel should be included in continuous footings to help span irregularities and differential settlement.

8.2.1 Footing Settlement

Structural loads were not provided to us at the time this report was prepared; therefore, we assumed the typical loading in the following table.

Table 6: Assumed Structural Loading

Foundation Area	Range of Assumed Loads
Isolated Column Footing	25 to 50 kips
Perimeter Strip Footing	1 to 2 kips per lineal foot

Based on the above loading and the allowable bearing pressures presented above, we estimate that the total static footing settlement may be on the order of ½-inch or less, with about ¼-inch of post-construction differential settlement between adjacent foundation elements. In addition, we estimate that differential seismic movement will be less than ½ inch, resulting in a total estimated differential footing movement of up to about ½-inch between foundation elements, assumed to be on the order of 30 feet. As our footing loads were assumed, we recommend we

be retained to review the final footing layout and loading, and verify the settlement estimates above.

8.2.2 Lateral Loading

Lateral loads may be resisted by friction between the bottom of footing and the supporting subgrade, and also by passive pressures generated against footing sidewalls. An ultimate frictional resistance of 0.40 applied to the footing dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 400 pcf may be used in design. The structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate values above. Where footings are adjacent to landscape areas without hardscape, the upper 12 inches of soil should be neglected when determining passive pressure capacity.

8.2.3 Conventional Shallow Footing Construction Considerations

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

Footing excavations should be filled as soon as possible or be kept moist until concrete placement by regular sprinkling to prevent desiccation. A Cornerstone representative should observe all footing excavations prior to placing reinforcing steel and concrete. If there is a significant schedule delay between our initial observation and concrete placement, we may need to re-observe the excavations.

SECTION 9: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

9.1 INTERIOR SLABS-ON-GRADE

As the Plasticity Index (PI) of the surficial soils is 12 or less, proposed conventional slabs-on-grade may be supported on subgrade scarified, moisture conditioned, and prepared in accordance with the recommendations in the "Earthwork" section of this report. If moisture-sensitive floor coverings are planned, the recommendations in the "Interior Slabs Moisture Protection Considerations" section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to near optimum moisture content.

The structural engineer should determine the appropriate slab reinforcement for the loading requirements and considering the expansion potential of the underlying soils. For unreinforced concrete slabs, ACI 302.1R recommends limiting control joint spacing to 24 to 36 times the slab thickness in each direction, or a maximum of 18 feet.

9.3 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS

The following general guidelines for concrete slab-on-grade construction where floor coverings are planned are presented for the consideration by the developer, design team, and contractor. These guidelines are based on information obtained from a variety of sources, including the American Concrete Institute (ACI) and are intended to reduce the potential for moisture-related problems causing floor covering failures, and may be supplemented as necessary based on project-specific requirements. The application of these guidelines or not will not affect the geotechnical aspects of the slab-on-grade performance.

- Place a minimum 15-mil vapor retarder conforming to ASTM E 1745, Class C requirements or better directly below the concrete slab; the vapor retarder should extend to the slab edges and be sealed at all seams and penetrations in accordance with manufacturer's recommendations and ASTM E 1643 requirements. A 4-inch-thick capillary break, consisting of crushed rock should be placed below the vapor retarder and consolidated in place with vibratory equipment. The mineral aggregate shall be of such size that the percentage composition by dry weight as determined by laboratory sieves will conform to the following gradation:

Sieve Size	Percentage Passing Sieve
1"	100
¾"	90 – 100
No. 4	0 – 10
No. 200	0 – 5

- The concrete water:cement ratio should be 0.45 or less. Mid-range plasticizers may be used to increase concrete workability and facilitate pumping and placement.

- Water should not be added after initial batching unless the slump is less than specified and/or the resulting water:cement ratio will not exceed 0.45.

- Polishing the concrete surface with metal trowels is not recommended.

- Where floor coverings are planned, all concrete surfaces should be properly cured.

- Water vapor emission levels and concrete pH should be determined in accordance with ASTM F1869-98 and F710-98 requirements and evaluated against the floor covering manufacturer's requirements prior to installation.

9.4 EXTERIOR FLATWORK

Exterior concrete flatwork subject to pedestrian traffic only should be at least 4 inches thick and supported 4 inches of Class 2 aggregate base overlying subgrade prepared in accordance with the “Earthwork” recommendations of this report.. Flatwork that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the “Vehicular Pavements” section below.

To help reduce the potential for uncontrolled shrinkage cracking, adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Flatwork should be isolated from adjacent foundations or retaining walls.

SECTION 10: VEHICULAR PAVEMENTS

10.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Procedure 608 of the Caltrans Highway Design Manual, estimated traffic indices for various pavement-loading conditions, and on a design R-value of 5. The design R-value was chosen based on engineering judgement considering the variable and expansive soil conditions.

Table 7: Asphalt Concrete Pavement Recommendations

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base[1] (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	7.5	10.0
4.5	2.5	9.5	12.0
5.0	3.0	10.0	13.0
5.5	3.0	12.0	15.0
6.0	3.5	13.0	16.5
6.5	4.0	14.0	18.0

1 – Caltrans Class 2 aggregate base; minimum R-value of 78; subgrade R-value of 5

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will use the pavements.

Asphalt concrete pavements constructed on expansive subgrade where the adjacent areas will not be irrigated for several months after the pavements are constructed may experience longitudinal cracking parallel to the pavement edge. These cracks typically form within a few feet of the pavement edge and are due to seasonal wetting and drying of the adjacent soil. The cracking may also occur during construction where the adjacent grade is allowed to significantly dry during the summer, pulling moisture out of the pavement subgrade. Any cracks that form should be sealed with bituminous sealant prior to the start of winter rains. One alternative to reduce the potential for this type of cracking is to install a moisture barrier at least 24 inches deep behind the pavement curb.

10.2 PORTLAND CEMENT CONCRETE

The Portland Cement Concrete (PCC) pavement recommendations outlined below are based on methods presented in American Concrete Pavement Association (ACPA, 2006). We have provided a few pavement alternatives as an anticipated Average Daily Truck Traffic (ADTT) was not provided.

The following table presents minimum PCC pavements thicknesses for various traffic loading categories and the anticipated maximum Average Daily Truck Traffic (ADTT).

Table 8: PCC Pavement Recommendations

Traffic Category	Minimum PCC Thickness[1] (inches)	Class 2 Aggregate Base (inches)
Maximum ADTT = 10	5.5	6.0
Maximum ADTT = 30	6.0	6.0

1 – Subgrade design R-Value = 5

The PCC thicknesses above are based on a concrete compressive strength of at least 3,500 psi, supporting the PCC on at least 6 inches of Class 2 aggregate base compacted as recommended in the “Earthwork” section, and laterally restraining the PCC with curbs or concrete shoulders. Adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Due to the moderately expansive surficial soils present, we recommend that the construction and expansion joints be dowelled.

10.3 PAVEMENT CUTOFF

Surface water penetration into the pavement section can significantly reduce the pavement life, due to the native expansive clays. While quantifying the life reduction is difficult, a normal 20-year pavement design could be reduced to less than 10 years; therefore, increased long-term maintenance may be required.

It would be beneficial to include a pavement cut-off, such as deepened curbs, redwood-headers, or “Deep-Root Moisture Barriers” that are keyed at least 4 inches into the pavement subgrade. This will help limit the additional long-term maintenance.

SECTION 11: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of South San Francisco Unified School District specifically to support the design of the Monte Verde Elementary School Modular Classrooms project in San Bruno, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Recommendations in this report are based upon the soil and groundwater conditions encountered during our subsurface exploration. If variations or unsuitable conditions are encountered during construction, Cornerstone must be contacted to provide supplemental recommendations, as needed.

South San Francisco Unified School District may have provided Cornerstone with plans, reports and other documents prepared by others. South San Francisco Unified School District understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or their representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone’s control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

SECTION 12: REFERENCES

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Table: Aerial Photographs Reviewed for This Study

Flight	Date	Scale	Photo Numbers	Type
DDB-1943	1-1-1943	1:20,000	Frames 2B-182	Black and White, vertical angle
GS-CP	1-1-1946	1:23,600	Frame 3-3	Black and White, vertical angle
CAS-65-130	5-1-1965	1:12,000	Frame 1-19	Black and White, vertical angle
CAS-65-130	5-1-1965	1:12,000	Frame 10-23	Black and White, vertical angle
CAS-65-130	5-1-1965	1:12,000	Frame 10-24	Black and White, vertical angle
HM-2001-USA	1-1-2001	1:10,800	Frame 3042-78	Color, vertical angle
HM-2001-USA	1-1-2001	1:10,800	Frame 3042-79	Color, vertical angle

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Vicinity Map

Monte Verde Elementary School
Modular Classrooms
San Bruno, CA

Project Number	1517-2-1
Figure Number	Figure 1
Date	September 2025
Drawn By	RRN

Geologic Symbols

Af	Artificial fill (Historic)
Qsr	Slope Debris and ravine fill (Pleistocene)
QTm	Merced Formation (Pleistocene and Pliocene)
—?—	Contact - dashed where approximate, dotted where concealed

Shannon Drive

Af/Qsr

Af/QTm

RETAINING WALL, S.C.D., S.S.D.

SCOUR AND PLUSH (E) U.G. STORM DRAIN PIPING, TYP.

REVISE EVA, PROVIDE TRAFFIC GRADE SD GRATE

CONC. PAVING AT ENTRANCES, TYP.

(E) PLAYGROUND TO REMAIN

PLAY GROUNDS

2 HR. WALL

ALIGN

SCOUR AND PLUSH (E) U.G. STORM DRAIN PIPING, TYP.

RETAINING WALL, S.C.D., S.S.D.

St. Cloud Drive

Turnberry Drive

Oakmont Drive

Approximate Site Boundary

Proposed modular location

A

A'

B

B'

EB-1

EB-2

EB-3

EB-4

EB-5

B-1

B-2

B-3

B-4

B-5

Legend

A A' Approximate location of cross section	Approximate location of exploratory boring (EB) (Cornerstone, 2025)
	Approximate location of previous boring (B) (Geosphere Consultants, Inc., 2012)

0 80 160

APPROXIMATE SCALE (FEET)

N

Base by Google Earth, dated 03/31/2024.
Overlay: Monte Verde Elementary School - Site Plan, Proposed TK Modular Buildings - Option 1 & Option 2, undated.

Project Number	1517-2-1
Figure Number	Figure 2
Drawn By	RRN
Date	October 2025

Site Plan and Geologic Map

Monte Verde Elementary School Modular Classrooms San Bruno, CA

CORNERSTONE EARTH GROUP

Shannon Drive

St. Cloud Drive

Turnberry Drive

Oakmont Drive

MULTI-USE BUILDING

ADMIN OFFICE

CLASSROOMS #5 - #9

CLASSROOMS #14 - #17

CLASSROOMS #20 - #22

CLASSROOMS #25 - #27

CLASSROOMS #3 - #5

KINDERGARTEN PLAYGROUND

PLAY STRUCTURE

PLAY GROUNDS

DENSE TREES

EB-1

EB-2

EB-3

EB-4

EB-5

B-1

B-2

B-3

B-4

B-5

A

A'

B

B'

Proposed modular location

Approximate Site Boundary

Legend

A A' Approximate location of cross section

Approximate location of exploratory boring (EB) (Cornerstone, 2025)

Approximate location of previous boring (B) (Geosphere Consultants, Inc., 2012)

N

0 80 160

APPROXIMATE SCALE (FEET)

Base by Google Earth, dated 03/31/2024.
Overlay by Underwood & Rosenblum, Inc., Topographic & Boundary Survey - Sheet 1, dated 07/31/2012.

Project Number 1517-2-1

Figure Number Figure 2A

Drawn By RRN

Date October 2025

Topographic Site Plan

Monte Verde Elementary School Modular Classrooms San Bruno, CA

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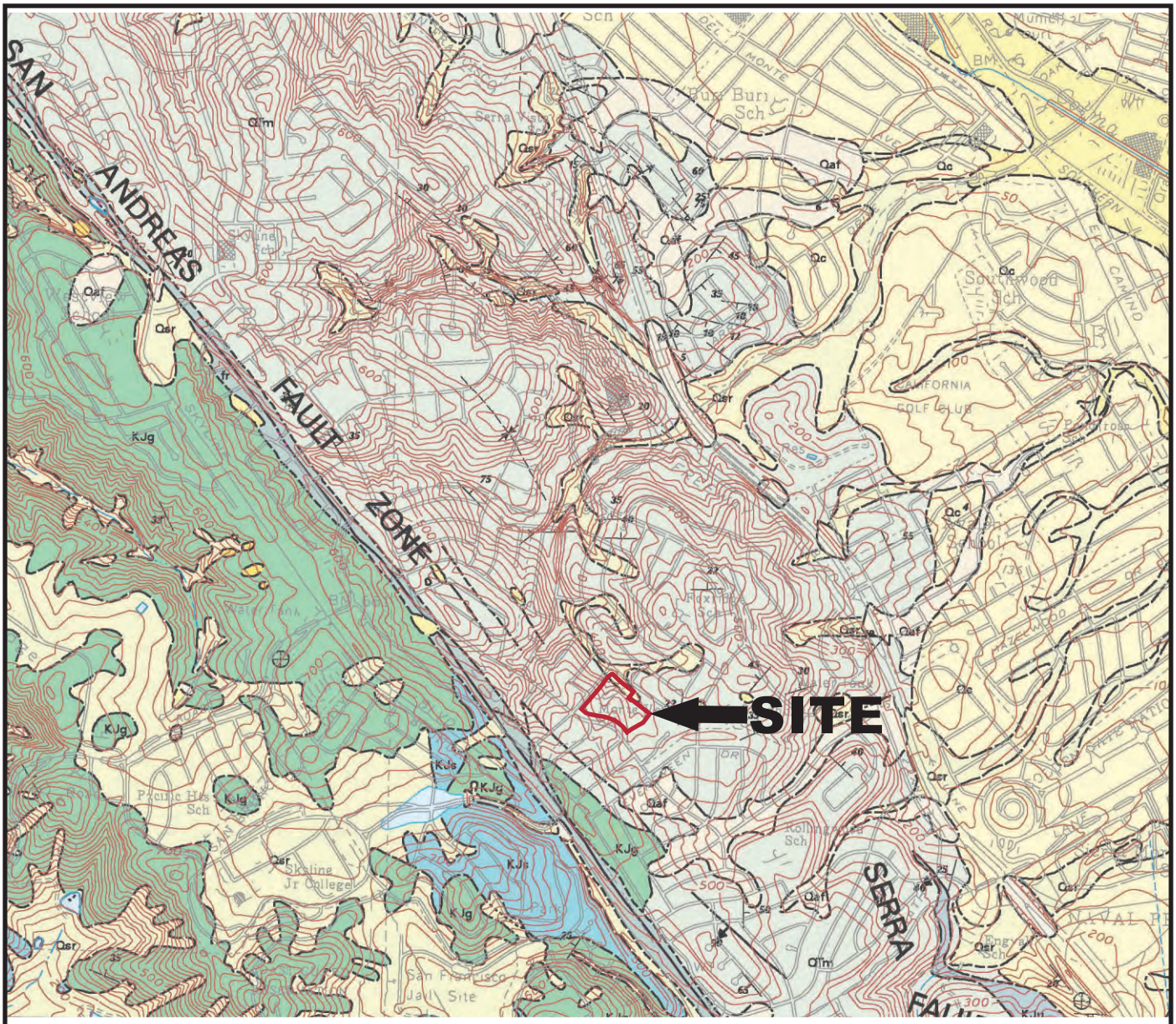

Geologic Units

Qaf	Artificial fill (Holocene)
Qsr	Slope debris and ravine fill (Pleistocene)
Qc	Colma Formation (Pleistocene)
QTm	Merced Formation (Pleistocene and Pliocene)
KJs	Sandstone and shale, Franciscan Complex (Cretaceous and Jurassic)
KJg	Greenstone, Franciscan Complex (Cretaceous and Jurassic)

Symbols

Contact - dashed where approximate, dotted where concealed

Fault - dashed where approximate, dotted where concealed

N

0 2000 4000

APPROXIMATE SCALE (FEET)

Base: USGS, Preliminary Geologic Map of the San Francisco South 7.5' Quadrangle and Part of the Hunters Point 7.5' Quadrangle, San Francisco Bay Area, California, by Bonilla, 1998

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Vicinity Geologic Map

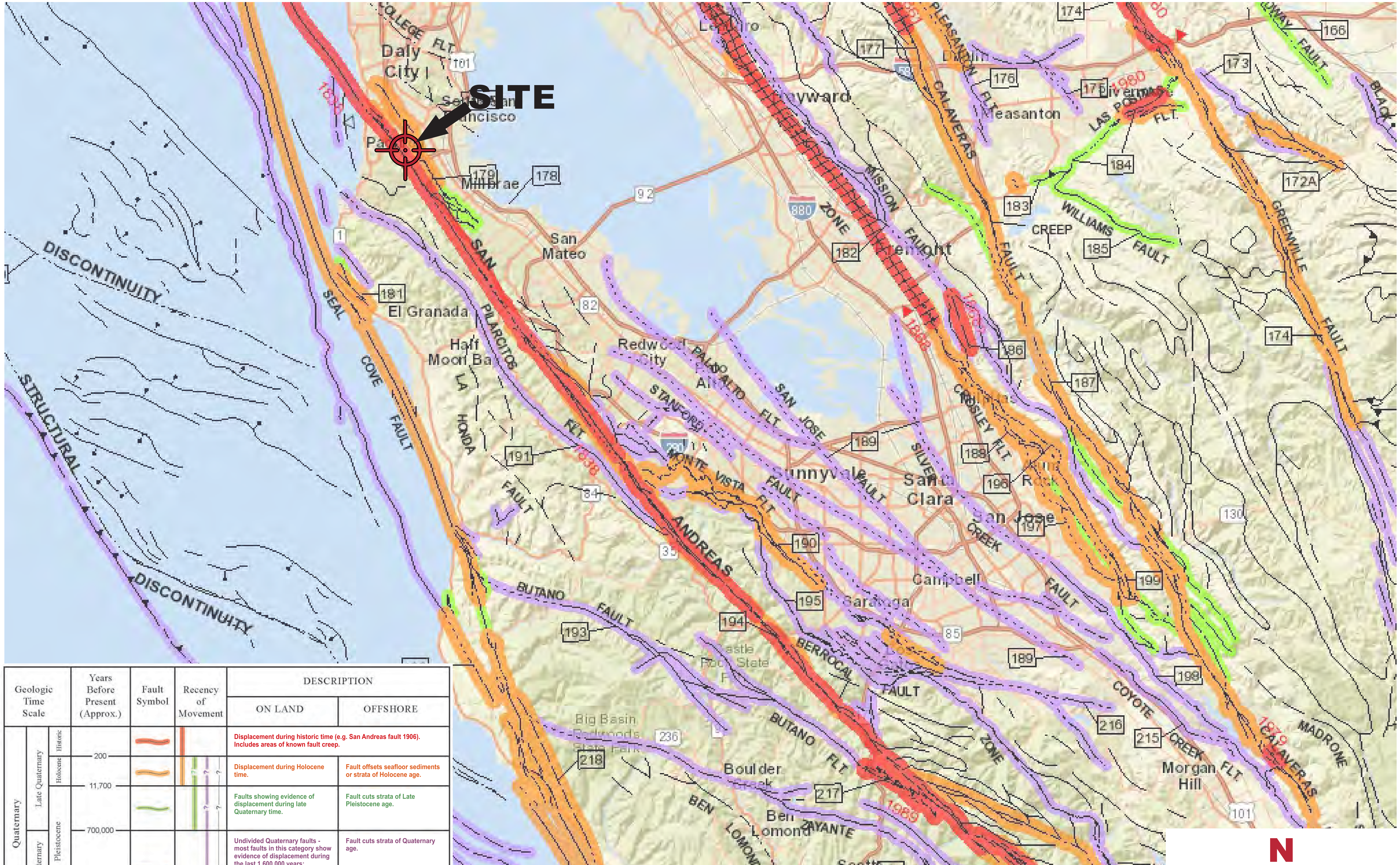
Monte Verde Elementary School
Modular Classrooms
San Bruno, CA

Project Number: 1517-2-1

Figure Number: Figure 3

Date: September 2025

Drawn By: RRN



Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION ON LAND	DESCRIPTION OFFSHORE
Quaternary	Late Quaternary	Historic				Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	200			Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene	11,700			Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary		700,000			Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Pilo-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			1,600,000 – 4.5 billion (Age of Earth)			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.

Base by California Geological Survey - 2010 Fault Activity Map of California (Jennings and Bryant, 2010)

Project Number 1517-2-1

Figure Number Figure 4

Drawn By RRN

Date September 2025

Regional Fault Map

Monte Verde Elementary School Modular Classrooms San Bruno, CA

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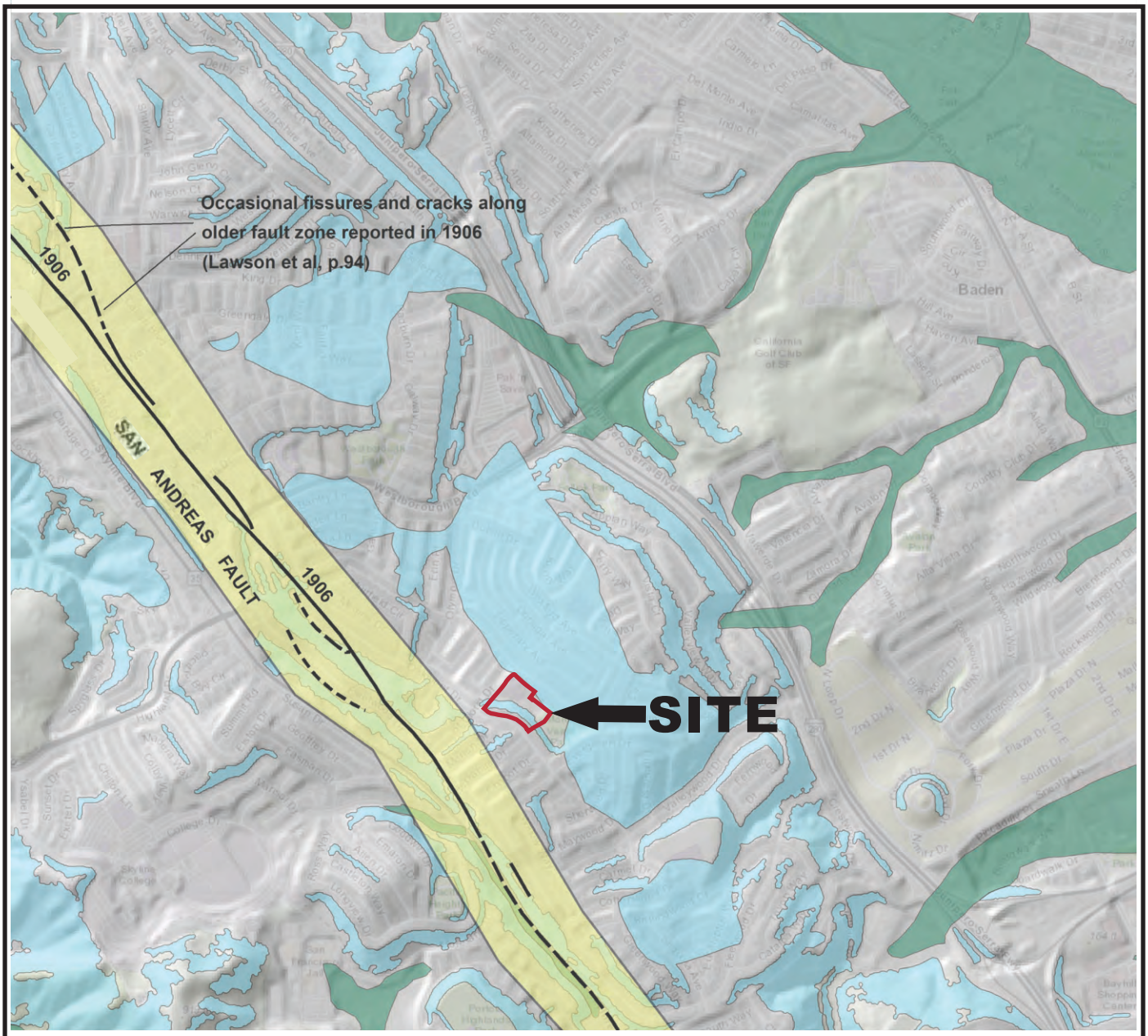

MAP EXPLANATION

EARTHQUAKE FAULT ZONES

Earthquake Fault Zones

Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

Active Fault Traces

1906

Faults considered to have been active during Holocene time and to have potential for surface rupture: Solid Line in Black where Accurately Located; Long Dash in Black where Approximately Located; Short Dash in Black where Inferred; Dotted Line in Black where Concealed; Query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

SEISMIC HAZARD ZONES

Liquefaction Zones

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

Earthquake-Induced Landslide Zones

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

N

0 2000 4000

APPROXIMATE SCALE (FEET)

Base: CGS, Earthquake Zones of Required Investigation San Francisco South Quadrangle, Earthquake Fault Zones - released 01/01/1982, Seismic Hazard Zones - released 09/23/2021.

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Vicinity CGS Hazard Zones

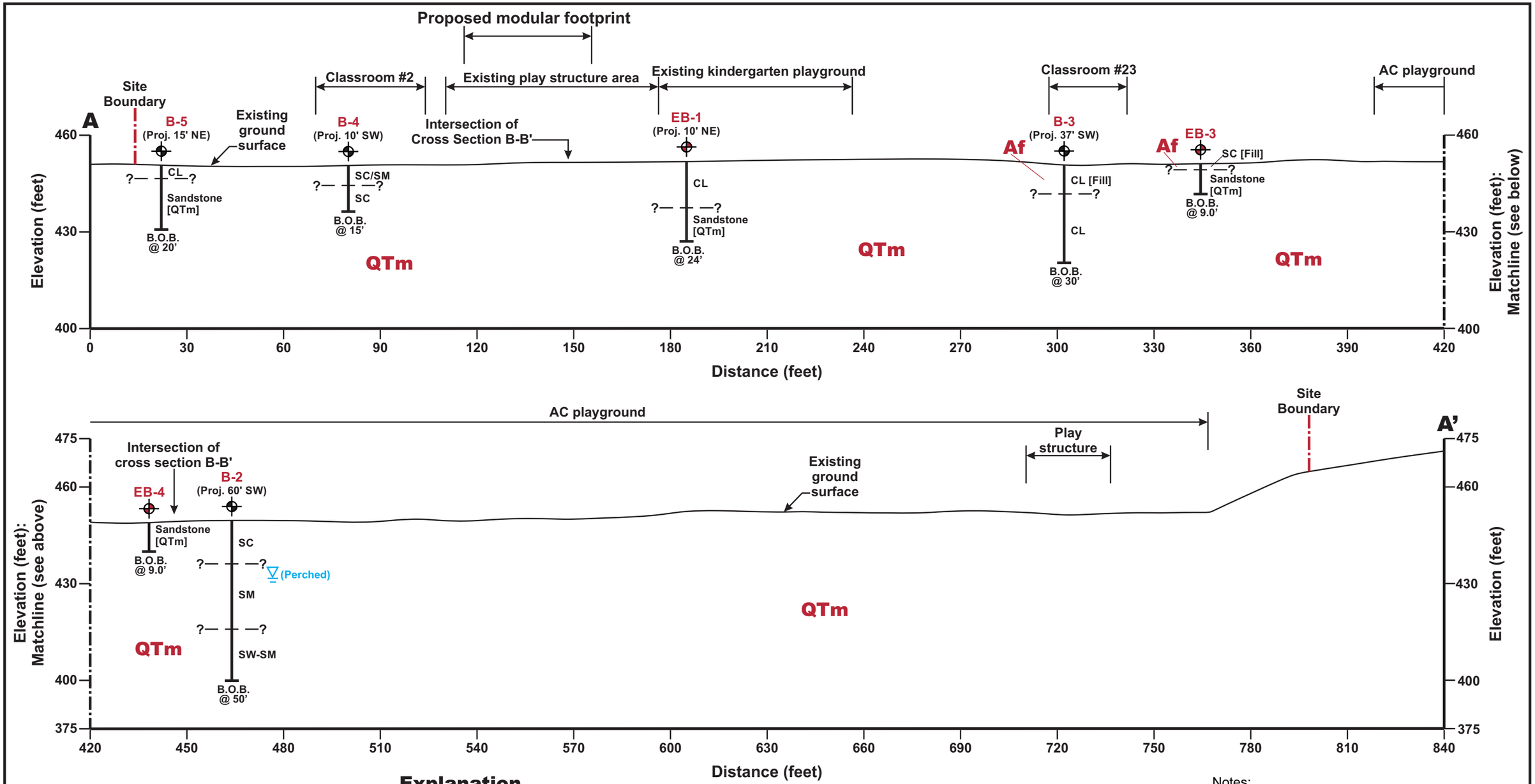
Monte Verde Elementary School
Modular Classrooms
San Bruno, CA

Project Number: 1517-2-1

Figure Number: Figure 5

Date: October 2025

Drawn By: RRN



Explanation

Symbols

CL	Lean Clay or sandy clay
SM	Silt
SC	Clayey Sand
SW-SM	Well Graded Sand with Silt
Sandstone [QTm]	Sandstone

Approximate ground water depth at time of drilling; actual depth may vary

Approximate location of exploratory boring (EB) (Cornerstone, 2025)

Approximate location of previous boring (B) (Geosphere Consultants, Inc., 2012)

Geologic Units

Af	Artificial fill
QTm	Merced Formation (Pleistocene and Pliocene)

Section A-A'

(View Looking North)
1"=30' H:V

Notes:
1) Surficial fills associated with existing pavements, landscaping or utilities are not shown.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2 for location of cross section.

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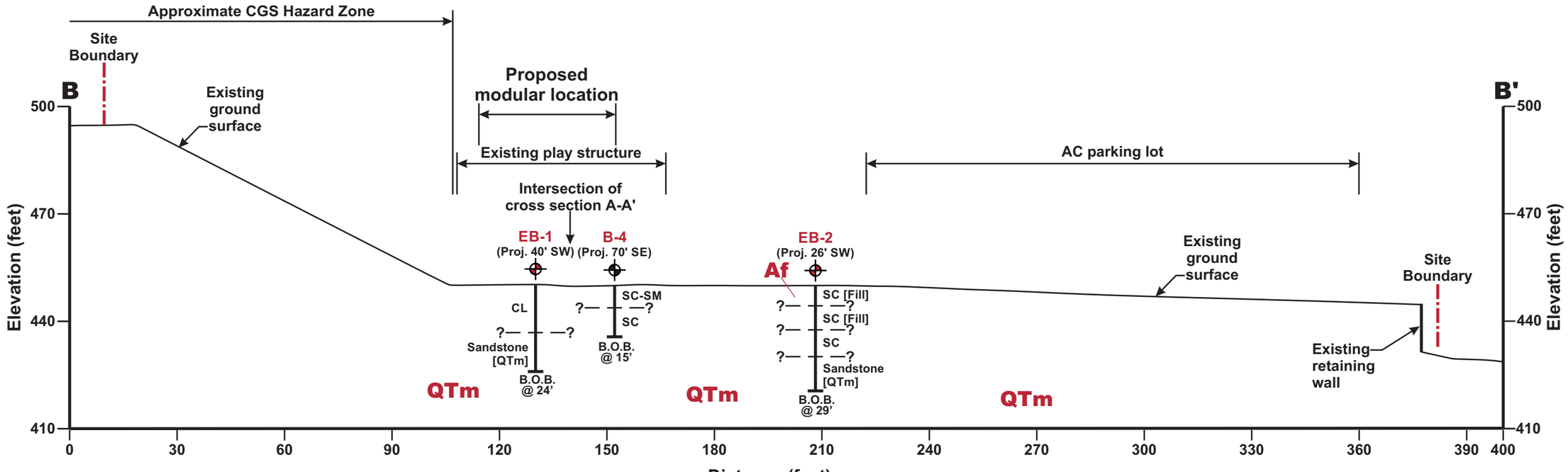
Geologic Cross Section A-A'

Monte Verde Elementary School
Modular Classrooms
San Bruno, CA

Project Number	1517-2-1
Figure Number	Figure 6
Date	October 2025
Drawn By	RRN



Section B-B’

(View Looking West)
1”=30’ H:V

Explanation

Symbols

CL	Lean Clay or sandy clay
SM	Silt
SC	Clayey Sand
SC-SM	Clayey Sand with Silt
Sandstone [QTm]	Sandstone
▽	Approximate ground water depth at time of drilling; actual depth may vary
⊕	Approximate location of exploratory boring (EB) (Cornerstone, 2025)
⊕	Approximate location of previous boring (B) (Geosphere Consultants, Inc., 2012)

Geologic Units

Af	Artificial fill
QTm	Merced Formation (Pleistocene and Pliocene)

Notes:
1) Surficial fills associated with existing pavements, landscaping or utilities are not shown.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2 for location of cross section.

CORNERSTONE EARTH GROUP

Geologic Cross Section B-B’

Monte Verde Elementary School
Modular Classrooms
San Bruno, CA

Project Number: 1517-2-1
Figure Number: Figure 7
Date: October 2025
Drawn By: RRN

APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using truck-mounted hollow-stem auger drilling equipment. Five 8-inch-diameter exploratory borings were drilled on September 20, 2025 to depths of 9 to 30 feet. The approximate locations of exploratory borings are shown on the Site Plan, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring logs, as well as a key to the classification of the soil and bedrock, are included as part of this appendix.

Boring locations were approximated using existing site boundaries, a hand held GPS unit, and other site features as references. Boring elevations were based on interpolation of plan contours. The locations and elevations of the borings should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-10)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI>4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

OTHER MATERIAL SYMBOLS

- Poorly-Graded Sand with Clay
- Clayey Sand
- Sandy Silt
- Artificial/Undocumented Fill
- Poorly-Graded Gravelly Sand
- Topsoil
- Well-Graded Gravel with Clay
- Well-Graded Gravel with Silt
- Sand
- Silt
- Well Graded Gravelly Sand
- Gravelly Silt
- Asphalt
- Boulders and Cobble

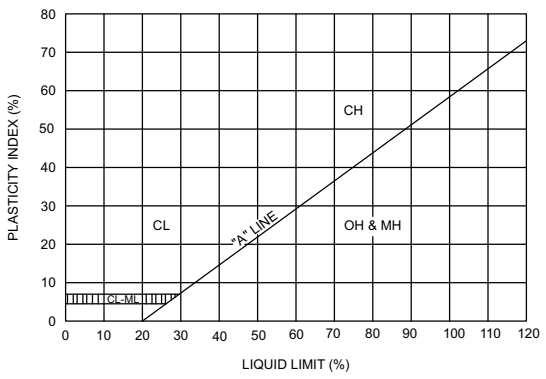
SAMPLER TYPES

- SPT
- Modified California (2.5" I.D.)
- Rock Core
- Shelby Tube
- No Recovery
- Grab Sample

ADDITIONAL TESTS

CA	-	CHEMICAL ANALYSIS (CORROSIVITY)	PI	-	PLASTICITY INDEX
CD	-	CONSOLIDATED DRAINED TRIAXIAL	SW	-	SWELL TEST
CN	-	CONSOLIDATION	TC	-	CYCLIC TRIAXIAL
CU	-	CONSOLIDATED UNDRAINED TRIAXIAL	TV	-	TORVANE SHEAR
DS	-	DIRECT SHEAR	UC	-	UNCONFINED COMPRESSION
PP	-	POCKET PENETROMETER (TSF)	(1.5)	-	(WITH SHEAR STRENGTH IN KSF)
(3.0)	-	(WITH SHEAR STRENGTH IN KSF)			
RV	-	R-VALUE	UU	-	UNCONSOLIDATED UNDRAINED TRIAXIAL
SA	-	SIEVE ANALYSIS: % PASSING #200 SIEVE			
▼	-	WATER LEVEL			

PLASTICITY CHART



PENETRATION RESISTANCE
(RECORDED AS BLOWS / FOOT)

SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5-1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

CORNERSTONE EARTH GROUP

LEGEND TO SOIL DESCRIPTIONS

Figure Number A-1

HARDNESS

Soft – Reserved for plastic material alone.
Low hardness – Can be gouged deeply or carved easily with a knife blade.
Moderately hard – Can be readily scratched by a knife blade: scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away.
Hard – Can be scratched with difficulty: scratch produces little powder and is often faintly visible.
Very hard – Cannot be scratched with knife blade: leaves a metallic streak.

STRENGTH

Plastic or very low strength.
Friable – Crumbles easily by rubbing with fingers.
Weak – An unfractured specimen of such material will crumble under light hammer blows.
Moderately strong – Specimen will withstand a few heavy hammer blows before breaking.
Strong – Specimen will withstand a few heavy ringing blows and will yield with difficulty only dust and small flying fragments.
Very strong – Specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.

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

Deep – Moderate to complete mineral decomposition: extensive disintegration: deep and thorough discoloration: many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.
Moderate – Slight change or partial decomposition of minerals: little disintegration: cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.
Little – No megascopic decomposition of minerals: little or no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains or fracture surfaces.
Fresh – Unaffected by weathering agents. No disintegration or discoloration. Fractures usually less numerous than joints.

FRACTURING

Intensity	Size of Pieces in Feet
Very little fractured	Greater than 4.0
Occasionally fractured	1.0 to 4.0
Moderately fractured	0.5 to 1.0
Closely fractured	0.1 to 0.5
Intensely fractured	0.05 to 0.1
Crushed	Less than 0.05

BEDDING OF SEDIMENTARY ROCKS

Splitting Property	Thickness	Stratification
Massive	Greater than 4.0 feet	very thick-bedded
Blocky	2.0 to 4.0 feet	thick-bedded
Slabby	0.2 to 2.0 feet	thin-bedded
Flaggy	0.05 to 0.2 feet	very thin-bedded
Shaly or Platy	0.01 to 0.05 feet	laminated
Papery	less than 0.01 feet	thinly laminated

BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME Monte Verde ES Modular Classrooms
PROJECT NUMBER 1517-2-1
PROJECT LOCATION 2551 St Cloud Drive, San Bruno, CA

DATE STARTED 9/20/25 **DATE COMPLETED** 9/20/25
GROUND ELEVATION 450 FT +/- **BORING DEPTH** 23.7 ft.
DRILLING CONTRACTOR Exploration Geoservices
LATITUDE 37.636139° **LONGITUDE** 122.452412°
DRILLING METHOD Mobile B-53B, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY PT
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
450.0	0	2½ inches asphalt concrete over 6 inches aggregate base						
449.7								
449.3		**Sandy Lean Clay (CL)** very stiff, moist, gray with reddish brown mottles, fine sand, low plasticity Liquid Limit = 25, Plastic Limit = 13	38	MC-1B	96	18	12	
			39	MC-2B	108	18		
	5		36	MC-3B	107	18		
			31	MC-4B	109	18		
437.0	10	**Silty Sandstone [QTm]** low hardness, weak, moderate to deep weathering, gray brown, fine to medium sand	66	MC-5B	108	19		43
	15							
			55	MC-6B	113	15		
	20							
426.3		color changes to bluish gray, becomes moderately hard, moderately strong, little weathering	50/2"	MC				
	25	Bottom of Boring at 23.7 feet.						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 9/25/25 13:10 - P:\DRAFTING\GINT FILES\1517-2-1 MONTE VERDE ES MODULAR.GPJ

BORING NUMBER EB-2

CORNERSTONE EARTH GROUP

PROJECT NAME Monte Verde ES Modular Classrooms
PROJECT NUMBER 1517-2-1
PROJECT LOCATION 2551 St Cloud Drive, San Bruno, CA

DATE STARTED 9/20/25 **DATE COMPLETED** 9/20/25
GROUND ELEVATION 450 FT +/- **BORING DEPTH** 28.9 ft.
DRILLING CONTRACTOR Exploration Geoservices
LATITUDE 37.636352° **LONGITUDE** 122.452409°
DRILLING METHOD Mobile B-53B, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY PT
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

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ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
450.0	0	2 inches asphalt concrete over 6 inches aggregate base						
449.7								
449.3		**Clayey Sand (SC) [Fill]** medium dense, moist, dark brown and brown mottled, fine sand, some fine gravel	42	MC-1B	109	16		
		color becomes brown with gray mottles	56	MC-2B	111	17		
445.0	5	**Clayey Sand with Gravel (SC) [Fill]** dense, moist, gray and brown mottled, fine to coarse sand, fine subangular to subrounded gravel	61	MC-3B	127	8		
		becomes medium dense	40	MC-4B	121	10		20
438.0	10	**Clayey Sand with Gravel (SC)** dense, moist, gray with reddish brown mottled, fine to coarse sand, fine subangular to subrounded gravel	51	MC-5B	123	12		
431.5	15	**Silty Sandstone [QTm]** moderately hard, moderately strong, moderate weathering, brown, fine to medium sand	50/3"	MC				
	20		50/3"	SPT-7		11		
424.0	25							

Continued Next Page

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

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BORING NUMBER EB-2

CORNERSTONE EARTH GROUP

PROJECT NAME Monte Verde ES Modular Classrooms

PROJECT NUMBER 1517-2-1

PROJECT LOCATION 2551 St Cloud Drive, San Bruno, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
424.0			**Silty Sandstone [QTm]** moderately hard, moderately strong, moderate weathering, brown, fine to medium sand							
421.1			Bottom of Boring at 28.9 feet.	50/4"	SPT					
	30									
	35									
	40									
	45									
	50									
	55									

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BORING NUMBER EB-3

CORNERSTONE EARTH GROUP

PROJECT NAME Monte Verde ES Modular Classrooms
PROJECT NUMBER 1517-2-1
PROJECT LOCATION 2551 St Cloud Drive, San Bruno, CA

DATE STARTED 9/20/25 **DATE COMPLETED** 9/20/25
GROUND ELEVATION 449 FT +/- **BORING DEPTH** 9 ft.
DRILLING CONTRACTOR Exploration Geoservices
LATITUDE 37.636079° **LONGITUDE** 122.451870°
DRILLING METHOD Mobile B-53B, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY PT
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

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ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
449.0	0	2½ inches asphalt concrete over 6 inches aggregate base						
448.7								
448.3		**Clayey Sand (SC) [Fill]** medium dense, moist, dark brown and brown mottled, fine sand, some fine gravel	50/6"	MC-1B	106	19		
447.5		**Silty Sandstone [QTm]** moderately hard, moderately strong, moderate weathering, brown with gray mottles, fine sand	50/6"	SPT-2		17		
	5		50/5"	SPT-3		15		
440.0		Bottom of Boring at 9.0 feet.	50/6"	SPT-4		14		
	10							
	15							
	20							
	25							

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 9/25/25 13:10 - P:\DRAFTING\GINT FILES\1517-2-1 MONTE VERDE ES MODULAR.GPJ

BORING NUMBER EB-4

CORNERSTONE EARTH GROUP

PROJECT NAME Monte Verde ES Modular Classrooms
PROJECT NUMBER 1517-2-1
PROJECT LOCATION 2551 St Cloud Drive, San Bruno, CA

DATE STARTED 9/20/25 **DATE COMPLETED** 9/20/25
GROUND ELEVATION 449 FT +/- **BORING DEPTH** 8.9 ft.
DRILLING CONTRACTOR Exploration Geoservices
LATITUDE 37.636032° **LONGITUDE** 122.451547°
DRILLING METHOD Mobile B-53B, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY PT
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

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ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
449.0	0	1½ inches asphalt concrete over 5 inches aggregate base						
448.8								
448.5		**Silty Sandstone [QTm]** moderately hard, moderately strong, moderate weathering, brown with gray mottles, fine sand	50/5"	MC-1	116	14		
			50/4"	SPT-2		13		
	5		50/3"	SPT				
440.1		Bottom of Boring at 8.9 feet.	50/4"	SPT-4		17		
	10							
	15							
	20							
	25							

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

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BORING NUMBER EB-5

CORNERSTONE EARTH GROUP

PROJECT NAME Monte Verde ES Modular Classrooms
PROJECT NUMBER 1517-2-1
PROJECT LOCATION 2551 St Cloud Drive, San Bruno, CA

DATE STARTED 9/20/25 **DATE COMPLETED** 9/20/25
GROUND ELEVATION 450 FT +/- **BORING DEPTH** 30 ft.
DRILLING CONTRACTOR Exploration Geoservices **LATITUDE** 37.636480° **LONGITUDE** 122.451336°
DRILLING METHOD Mobile B-53B, 8 inch Hollow-Stem Auger **GROUND WATER LEVELS:**
LOGGED BY PT ▽ **AT TIME OF DRILLING** Not Encountered
NOTES ▼ **AT END OF DRILLING** Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
450.0	0	1½ inches asphalt concrete over 4 inches aggregate base						
449.7								
449.3		**Clayey Sand (SC) [Fill]** medium dense, moist, brown with gray mottles, fine sand, some fine subangular to subrounded gravel	43	MC-1B	102	21		
			37	MC-2B	101	20		
	5		52	MC-3B	100	22		
441.0		**Sandy Lean Clay (CL)** very stiff, moist, dark brown, fine sand, trace organics, low plasticity	45	MC-4B	109	18		51
	10	some bluish gray mottles						
436.0		**Clayey Sand with Gravel (SC) [Qsr]** dense, moist, bluish gray and dark brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel	50/5"	MC-5B	116	15		
	15							
			60	MC-6B	130	9		
	20							
427.0		**Silty Sandstone [QTm]** moderately hard, moderately strong, moderate weathering, gray with brown mottles, fine to medium sand	50/6"	MC-7	117	14		
	25							
424.0		*Continued Next Page*						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 9/25/25 13:10 - P:\DRAFTING\GINT FILES\1517-2-1 MONTE VERDE ES MODULAR.GPJ

BORING NUMBER EB-5

CORNERSTONE EARTH GROUP

PROJECT NAME Monte Verde ES Modular Classrooms

PROJECT NUMBER 1517-2-1

PROJECT LOCATION 2551 St Cloud Drive, San Bruno, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
424.0			**Silty Sandstone [QTm]** moderately hard, moderately strong, moderate weathering, gray with brown mottles, fine to medium sand							
				50/6"	MC-8B	111	18			
420.0	30		Bottom of Boring at 30.0 feet.							
	35									
	40									
	45									
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 9/25/25 13:10 - P:\DRAFTING\GINT FILES\1517-2-1 MONTE VERDE ES MODULAR.GPJ

APPENDIX B: LABORATORY TEST PROGRAM

The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on 27 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

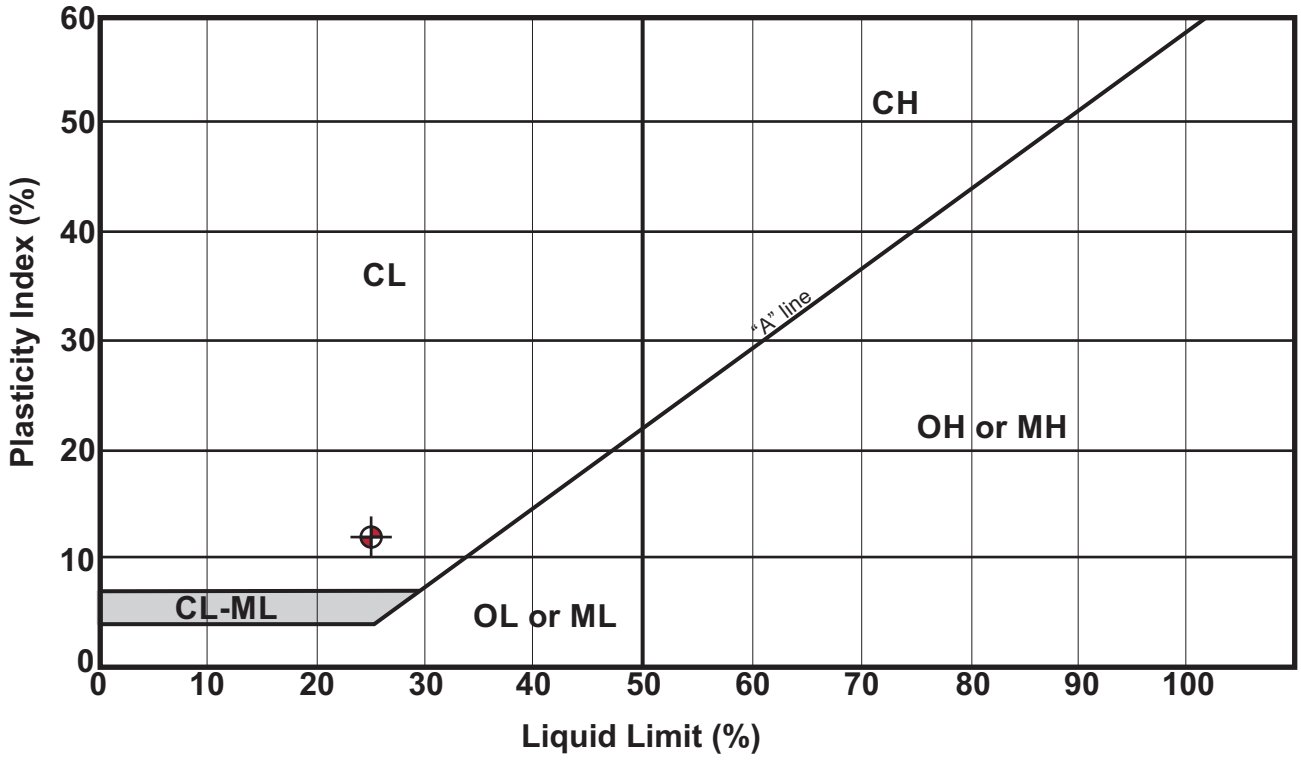
Dry Densities: In place dry density determinations (ASTM D2937) were performed on 21 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on three samples of the subsurface soils to aid in the classification of these soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Plasticity Index: One Plasticity Index determination (ASTM D4318) was performed on a sample of the subsurface soil to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of this test are shown on the boring log at the appropriate sample depth.

Corrosion: Soluble sulfate determinations (ASTM D4327), resistivity tests (ASTM G57), chloride determinations (ASTM D4327), and pH determinations (ASTM G51) were performed on two representative samples of the subsurface soils. Results of these tests are attached to this appendix.

Plasticity Index (ASTM D4318) Testing Summary



Symbol	Boring No.	Depth (ft)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Passing No. 200 (%)	Group Name (USCS - ASTM D2487)
⊕	EB-1	2.0	18	25	13	12	—	Sandy Lean Clay (CL)

Sample prepared in accordance with ASTM D421

CORNERSTONE EARTH GROUP

Plasticity Index Testing Summary

Monte Verde Elementary School
Modular Classrooms
San Bruno, CA

Project Number: 1517-2-1

Figure Number: Figure B1

Date: September 2025

Drawn By: FLL

Corrosivity Tests Summary

CORNERSTONE EARTH GROUP

Job Number	1517-2-1	Date Tested	10-23,24-25
Job Name	Monte Verde ES Modular Classroom	Tested By	BBA, FL
Location	2551 St. Cloud Dr, San Bruno, CA		

Sample I.D.			Soil Visual Description	Moisture Content	pH	Temp. at Testing	Resistivity (Ohm-cm) Corrected to 15.5 C°		Chloride Dry Wt.	Sulfate Dry Wt.
Boring	Sample No.	Depth, ft.		%		C°	As Received	Saturated	mg/kg	mg/kg
				ASTM D2216	ASTM G51		G57	ASTM G57	ASTM D4327	ASTM D4327
EB-1	2A	3.5	Gray Brown Sandy Lean Clay (CL)	16.8	6.7	23.2	-	2,278	16	54
EB-2	2A	3.5	Gray Brown Clayey Sand (SC) [Fill]	15.8	7.5	23.6	-	3,463	4	23

APPENDIX C: PREVIOUS FIELD EXPLORATION BY OTHERS

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BORING NUMBER B-1

CLIENT South San Francisco Unified School District
PROJECT NAME Monte Verde Elementary School
PROJECT NUMBER 91-02823-A
PROJECT LOCATION 2551 St. Cloud Drive, San Bruno, CA
DATE STARTED 4/4/12 **COMPLETED** 4/4/12
GROUND ELEVATION 452 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Exp Geoservices
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY RJW **CHECKED BY** GH
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**2.5" THICK ASPHALT CONCRETE :** **3" THICK AGGREGATE BASE :** (CL) **SANDY CLAY :** brown, moist, stiff to very stiff, fine grained. C=125 psf, Phi=34 degrees.	MC 1		4-7-8 (15)		107	18				
		becomes wet (adjacent to trench), stiff to very stiff.	MC 2		4-6-9 (15)		108	22				
5												
		(SC) **CLAYEY SAND :** dark gray/gray, moist, medium dense, fine grained.	SPT 3		7-9-11 (20)							
10												
			SPT 4		6-10-16 (26)							
15		Bottom of borehole at 15.0 feet.										

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BORING NUMBER B-2

CLIENT South San Francisco Unified School District
PROJECT NAME Monte Verde Elementary School
PROJECT NUMBER 91-02823-A
PROJECT LOCATION 2551 St. Cloud Drive, San Bruno, CA
DATE STARTED 4/4/12 **COMPLETED** 4/4/12
GROUND ELEVATION 452 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Exp Geoservices
GROUND WATER LEVELS:
DRILLING METHOD HSA
▽ **AT TIME OF DRILLING** 18.00 ft / Elev 434.00 ft Groundwater(Perched Water
LOGGED BY RJW **CHECKED BY** GH
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**3" THICK ASPHALT CONCRETE :**										
		5" THICK AGGREGATE BASE :										
		(SC) **CLAYEY SAND :** light brown, moist, medium dense, fine grained.	MC 1		5-4-7 (11)		111	16				
5			MC 2		8-12-16 (28)		104	14				
		becomes very dense.	MC 3		17-33-50 (83)							
10												
15		(SM) **SILTY FINE SAND :** dark brown, moist, very dense.										
		▽ Groundwater at 18 ft.										
20		(SM) **SILTY FINE SAND :** dark brown, wet, very dense.	SPT 4		16-50							31
25												

(Continued Next Page)

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BORING NUMBER B-2

CLIENT South San Francisco Unified School District **PROJECT NAME** Monte Verde Elementary School

PROJECT NUMBER 91-02823-A **PROJECT LOCATION** 2551 St. Cloud Drive, San Bruno, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
25		(SM) **SILTY FINE SAND :** dark brown, wet, very dense. *(continued)*										
30												
35		(SW-SM) **WELL GRADED SAND :** gray, moist to very moist, very dense, w/ some silt.	SPT 5		36-55							
40												
45												
50			SPT 6		31-75							

Bottom of borehole at 50.0 feet.

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BORING NUMBER B-3

CLIENT South San Francisco Unified School District
PROJECT NAME Monte Verde Elementary School
PROJECT NUMBER 91-02823-A
PROJECT LOCATION 2551 St. Cloud Drive, San Bruno, CA
DATE STARTED 4/4/12 **COMPLETED** 4/4/12
GROUND ELEVATION 452 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Exp Geoservices
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY RJW **CHECKED BY** GH
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**3" THICK ASPHALT CONCRETE :**										
		5" THICK AGGREGATE BASE :										
		(CL) **SANDY CLAY :** gray/olive brown, moist, very stiff, low plasticity. Fill.	MC 1		5-7-10 (17)		98	18	32	21	11	
		(CL) increase in medium grained sands, w/ gravels.										
5		becomes stiff to very stiff. Fill.	MC 2		5-5-10 (15)		116	14				
10		(CL) **SANDY CLAY :** grayish brown, moist, stiff to very stiff, medium plasticity, w/ fine grained sand.	MC 3		5-5-10 (15)		105	22				
15		**SANDY CLAY :** grayish brown orange, moist, very stiff, w/ increase in sand.	MC 4		4-8-10 (18)		111	20				
20		**SANDY CLAY :** grayish brown orange, very moist, very stiff, w/ fine grained sand.	MC 5		3-6-11 (17)		109	21				78
25												

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BORING NUMBER B-3

CLIENT South San Francisco Unified School District **PROJECT NAME** Monte Verde Elementary School

PROJECT NUMBER 91-02823-A **PROJECT LOCATION** 2551 St. Cloud Drive, San Bruno, CA

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
25		(CL) **SANDY CLAY :** grayish brown, moist, stiff to very stiff, medium plasticity, w/ fine grained sand. *(continued)*										
30		**SANDY CLAY :** brownish gray, moist, very stiff.	SPT 6		7-10-16 (26)							
		Bottom of borehole at 30.0 feet.										

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BORING NUMBER B-4

CLIENT South San Francisco Unified School District
PROJECT NAME Monte Verde Elementary School
PROJECT NUMBER 91-02823-A
PROJECT LOCATION 2551 St. Cloud Drive, San Bruno, CA
DATE STARTED 4/4/12 **COMPLETED** 4/4/12
GROUND ELEVATION 455 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Exp Geoservices
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY RJW **CHECKED BY** GH
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**4" THICK ASPHALT CONCRETE :**										
		5" THICK AGGREGATE BASE :										
		(SC) **CLAYEY SAND/SANDY CLAY :** gray, slightly moist, very dense, cemented, fine grained sand. becomes olive brown.	MC 1		28-49							
5		**SILTY SAND :** gray, slightly moist, very dense, cemented.	MC 2		33-50							
		(SC) **CLAYEY SAND :** gray, slightly moist, very dense, cemented.										
10		becomes moist, very dense, cemented.	SPT 3		41-60							
15			SPT 4		33-100							

Bottom of borehole at 15.0 feet.

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BORING NUMBER B-5

CLIENT South San Francisco Unified School District
PROJECT NAME Monte Verde Elementary School
PROJECT NUMBER 91-02823-A
PROJECT LOCATION 2551 St. Cloud Drive, San Bruno, CA
DATE STARTED 4/4/12 **COMPLETED** 4/4/12
GROUND ELEVATION 455 ft **HOLE SIZE** 8 inches
DRILLING CONTRACTOR Exp Geoservices
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY RJW **CHECKED BY** GH
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**6" THICK ASPHALT CONCRETE :**										
		3" THICK AGGREGATE BASE :										
		(CL) **SANDY CLAY :** grayish brown, moist, hard, cemented, w/ fine grained sand.	MC 1		23-39							
		SANDSTONE BEDROCK : gray, very dense.	MC 2		98							
5												
			SPT 3		50							
10												
15												
			SPT 4		50							
20		Bottom of borehole at 20.0 feet.										

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APPENDIX D: CORRECTED BLOWCOUNTS ANALYSIS

Boring	EB-2
Hammer Energy (%)	61.2
Borehole Inner Dia. (inches)	4
GW Depth (ft)	20
Avg. Unit Weight Above GW (pcf)	120
Avg. Unit Weight Below GW (pcf)	120
Mod Cal Sampler Correction	0.66
Liners used in SPT Sampler (yes/no)	no

Light Blue - User Input
Gray-Automatic Calculation

Mod Cal or SPT (mc/spt)	Sample Depth (ft)	$N_{Measured}$ (bpf)	Fines Content (%)	$N_{Corrected\ (SPT)}$ (bpf)	C_E	C_B	C_R Calc'd	C_R Override	C_R	C_S	N_{60} (bpf)	Effective Vertical Stress (psf)	C_N	$(N_1)_{60}$ (bpf)	N_{fines} (bpf)	$(N_1)_{60\text{-}cs}$ (bpf)
MC	3.0	56.0	20.0	37.0	1.02	1.00	0.75	0.75	0.75	1.0	28.3	360.0	1.6	45.1	4.5	49.5
MC	5.0	61.0	20.0	40.3	1.02	1.00	0.80	0.75	0.75	1.0	30.8	600.0	1.4	42.9	4.5	47.4
MC	8.5	40.0	20.0	26.4	1.02	1.00	0.85	0.75	0.75	1.0	20.2	1020.0	1.3	26.2	4.5	30.7
MC	13.5	51.0	20.0	33.7	1.02	1.00	0.85	0.75	0.75	1.0	25.7	1620.0	1.1	28.2	4.5	32.7

Boring	EB-5
Hammer Energy (%)	61.2
Borehole Inner Dia. (inches)	4
GW Depth (ft)	20
Avg. Unit Weight Above GW (pcf)	120
Avg. Unit Weight Below GW (pcf)	120
Mod Cal Sampler Correction	0.66
Liners used in SPT Sampler (yes/no)	no

Light Blue - User Input
Gray-Automatic Calculation

Mod Cal or SPT (mc/spt)	Sample Depth (ft)	$N_{Measured}$ (bpf)	Fines Content (%)	$N_{Corrected\ (SPT)}$ (bpf)	C_E	C_B	C_R Calc'd	C_R Override	C_R	C_S	N_{60} (bpf)	Effective Vertical Stress (psf)	C_N	$(N_1)_{60}$ (bpf)	N_{fines} (bpf)	$(N_1)_{60\text{-}cs}$ (bpf)
MC	3.0	37.0	20.0	24.4	1.02	1.00	0.75	0.75	0.75	1.0	18.7	360.0	1.7	31.8	4.5	36.2
MC	5.0	52.0	20.0	34.3	1.02	1.00	0.80	0.75	0.75	1.0	26.3	600.0	1.4	37.6	4.5	42.1
MC	18.5	60.0	20.0	39.6	1.02	1.00	0.95	0.75	0.75	1.0	30.3	2220.0	1.0	29.8	4.5	34.3

APPENDIX E: HISTORICAL AERIAL IMAGERY

INQUIRY #: 8156060.2

YEAR: 2022

= 500'

N

EDR

INQUIRY #: 8156060.2
YEAR: 1963
= 500'
N
EDR

INQUIRY #: 8156060.2

YEAR: 1946

= 500'

N

EDR

INQUIRY #: 8156060.2

YEAR: 1956

= 500'

N

EDR