GEOTECHNICAL INVESTIGATION

SANTEE AUTO CENTER
SANTEE, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

CAMERON BROS.
CONSTRUCTION COMPANY, INC.
SANTEE, CALIFORNIA

APRIL 13, 2023
PROJECT NO. G2332-11-01

Project No. G2332-11-01
April 13, 2023

Cameron Bros. Construction Company, Inc.
10580 Prospect Avenue, Suite 200
Santee, California 92071

Attention: Mr. Jim Moxham

Subject: GEOTECHNICAL INVESTIGATION
SANTEE AUTO CENTER
SANTEE, CALIFORNIA

Dear Mr. Moxham:

In accordance with your authorization, we are pleased to submit the results of our geotechnical investigation for the proposed commercial project located on Mission Gorge Road in Santee, California. The accompanying report presents the results of our study and conclusions and recommendations pertaining to the geotechnical aspects of the proposed project. The site is considered suitable for the proposed development provided the recommendations of this report are followed.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Kenneth W. Haase
CEG 2775

Shawn Foy Weedon
GE 2714

KWH:SFW:am

(e-mail) Addressee

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GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation for the development of the proposed Santee Auto Center located on the south side of Mission Gorge Road in Santee, California (see Vicinity Map).

Vicinity Map

The purpose of this geotechnical investigation is to evaluate the surface and subsurface soil conditions and general site geology, and to identify geotechnical constraints that may impact development of the property including faulting and seismic shaking based on the 2022 CBC seismic design criteria. In addition, the purpose of this report is to provide recommendations for remedial grading, shallow foundations, preliminary pavement design, concrete slab-on-grade, concrete flatwork, retaining walls and lateral loads. The scope of this investigation also included a review of the *Site Plan for: Santee Auto Center*, prepared by Rick Engineering Company, dated December 16, 2022 (Job #19644) and readily available published and unpublished geologic literature (see *List of References*).

We performed a field investigation in January 2019 that included excavating 24 exploratory backhoe trenches to a maximum depth of approximately 11 feet. In June 2020, we excavated 29 exploratory excavator trenches in the eastern portion of the site. In addition, in 2022 we performed removals in the eastern portion of the site to help evaluate the depth of rippable granitic rock as shown by the elevations indicated on the grading plan (See Geologic Map, Figure 1). An approximate rough grade of 370 to 372 feet MSL was achieved on the eastern portion of the site during the previous grading operations. Appendix A presents the trench logs and other details of the field investigations. We tested selected soil

samples obtained during the field investigation to evaluate pertinent physical and chemical properties for engineering analyses and to assist in providing recommendations for site grading. Details of the laboratory tests and a summary of the test results are presented in Appendix B.

2. SITE AND PROJECT DESCRIPTION

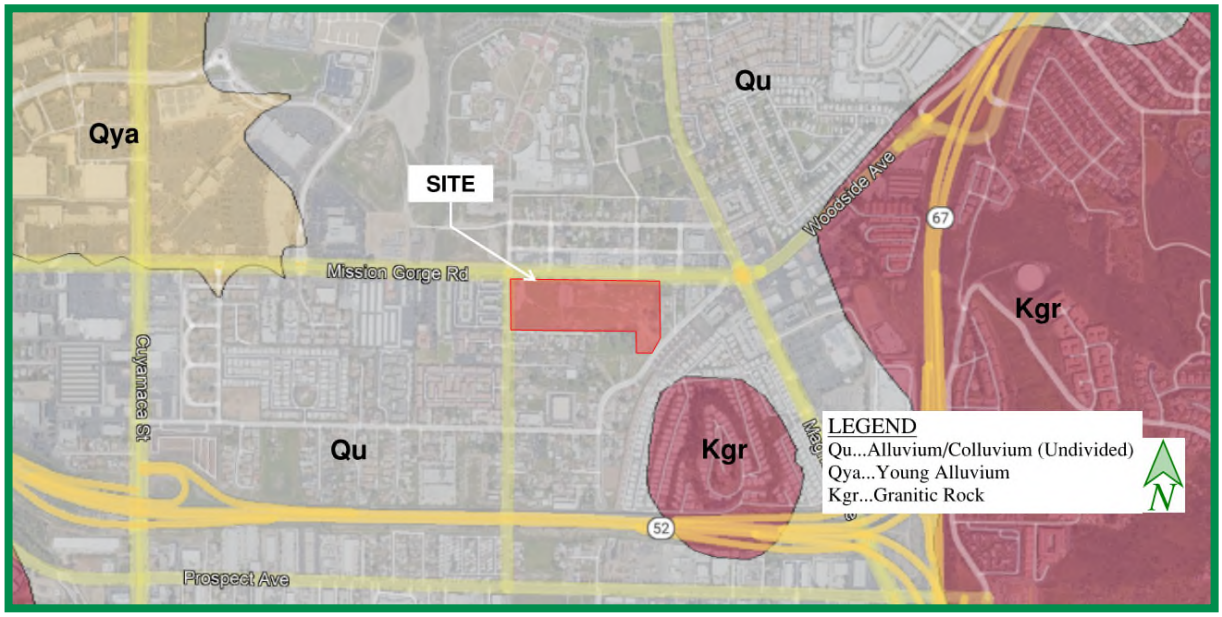
The roughly 13-acre site is bordered on the north by Mission Gorge Road, the west by Cottonwood Avenue, the south by unimproved Happy Lane and residential homes, the east by Railroad Avenue and an apartment complex and single-family residence. The site was formerly an elementary school containing single story buildings, driveways and parking lots, ball fields and landscaping. A single-story building is still present on the northwest corner of the site that was used by the Santee Chamber of Commerce. Most of the site slopes gently to the west from the southern projection of Edgemoor Drive to the west property line with an elevation difference of about 15 feet. Elevations range from a low of approximately 351 feet Mean Sea Level (MSL) at the northwest corner of the site to a high of 372 feet MSL in the southeast corner of the site. An approximately 10-foot-high stockpile of soil, with approximate dimensions of 300 feet by 225 feet is present in the central portion of the site. This stockpiled material was generated from excavations of surficial soils and rippable granitic rock in the eastern portion of the site. A stockpile of oversize rock is present on the southeast portion of the site that is not shown on the image below. We understand oversize rock will be export from the site and will not be placed within fill areas. The Existing Site Map shows the current site configuration as provided by Recon Environmental, Inc.

Existing Site Map (Provided by Recon Environmental Inc.)

Based on a review of the grading plan, we understand the planned development will consist of constructing an automotive sales center including a parts and sales shop, showroom and collision repair shop along with associated parking, utilities and landscaping. The finish grade elevations of the proposed buildings range from 357 feet MSL in the western area of the site to 371 feet MSL in the eastern portion of the site. Access with be from several entrances along Mission Gorge Road, Cottonwood Avenue, and Railroad Avenue. If development plans change from those described herein, Geocon Incorporated should be contacted for review of the plans and possible revisions to this report.

3. GEOLOGIC SETTING

The site is located in the eastern portion of the coastal plain within the southern portion of the Peninsular Ranges Geomorphic Province of southern California. The Peninsular Ranges is a geologic and geomorphic province that extends from the Imperial Valley to the Pacific Ocean and from the Transverse Ranges to the north and into Baja California to the south. The coastal plain of San Diego County is underlain by a thick sequence of relatively undisturbed and non-conformable sedimentary rocks that thicken to the west and range in age from Upper Cretaceous through the Pleistocene with intermittent deposition. The sedimentary units are deposited on bedrock Cretaceous to Jurassic age igneous and metavolcanic rocks. Geomorphically, the coastal plain is characterized by a series of 21, stair-stepped marine terraces (younger to the west) that have been dissected by west flowing rivers. The coastal plain is a relatively stable block that is dissected by relatively few faults consisting of the potentially active La Nacion Fault Zone and the active Rose Canyon Fault Zone. The Peninsular Ranges Province is also dissected by the Elsinore Fault Zone that is associated with and sub-parallel to the San Andreas Fault Zone, which is the plate boundary between the Pacific and North American Plates. The site is mapped as being underlain by undivided alluvium/colluvium. The Regional Geologic Map shows the geologic units in the area of the site.



Regional Geologic Map

4. SOIL AND GEOLOGIC CONDITIONS

During our field investigation, we encountered surficial soil (consisting of undocumented fill, topsoil, and young alluvium). We also encountered Older Alluvium and Granitic Rock. The occurrence, distribution, and description of each unit encountered is shown on the Geologic Map, Figure 1, and on the trench logs in Appendix A. The Geologic Cross-Section, Figure 2, shows the approximate subsurface relationship between the geologic units. We prepared the geologic cross-section using interpolation between exploratory excavations and observations; therefore, actual geotechnical conditions may vary from those illustrated and should be considered approximate. The surficial soil and formational units are described herein in order of increasing age.

4.1 Undocumented Fill (Qudf)

We encountered undocumented fill to depths ranging from 1 to 3 feet on the western portion of the site and up to 8 feet in the eastern portion of the site. We expect the undocumented fill extends across most of the site and is associated with previous mass grading for the former school. The undocumented fill is generally composed of loose, dry to moist, clayey and silty, fine to medium sand and sandy clay. The undocumented fill generally possesses a “very low” to “low” expansion potential (expansion index of 50 or less). The undocumented fill is considered unsuitable for additional fill or structural loads in its present condition. Remedial grading of the undocumented fill will be required as discussed herein. The undocumented fill can be used for the proposed fill provided it is generally free of vegetation and debris.

4.2 Topsoil (unmapped)

We encountered localized areas of topsoil exposed near the surface with a thickness of 1 to 3 feet and consists of loose, damp to moist, silty, fine to medium sand. The topsoil generally has a “very low” to “low” expansion potential (expansion index of 50 or less). The topsoil is considered unsuitable for additional fill or structural loads in its present condition. Remedial grading of the topsoil will be required as discussed herein. The topsoil can be used for the proposed fill provided it is generally free of vegetation.

4.3 Young Alluvium (Qya)

We encountered Holocene-age young alluvium below the topsoil and undocumented fill on most of the site west of the southern projection of Edgemoor Drive to a maximum depth of 6 feet. The young alluvium generally consists of loose to medium dense, damp to moist, silty and clayey, fine to medium sand and sandy clay. The young alluvium generally has a “very low” to “low” expansion potential (expansion index of 50 or less). The young alluvium is considered unsuitable for additional fill or structural loads in its present condition. Remedial grading of the topsoil will be required as discussed herein. The alluvium can be used for the proposed fill provided it is generally free of vegetation.

4.4 Older Alluvium (Qoal)

We encountered Pleistocene-age older alluvium below the surficial soils on the western portion of the property to a maximum depth of 9.5 feet when granitic rock was encountered. The older alluvium generally consists of dense to very dense, occasionally cemented, sandy silt and silty, fine to medium sand. The older alluvium generally has a “very low” to “low” expansion potential (expansion index of 50 or less). The older alluvium is considered suitable for the support of fill or structural loads and can be used for compacted fill.

4.5 Granitic Rock (Kgr)

Cretaceous-aged granitic rock of the Southern California Batholith exists below the surficial soils and older alluvium across the site and is exposed on the eastern portion of the site. The granitic rock exposed at grade is moderately weathered too moderately strong and is generally not rippable. Some rippable granitic rock is present below the surficial soils on the north and south sides of the eastern portion of the site. The granitic rock generally increases in strength with depth. Some surface and partially exposed boulders up to 10-foot diameter are present at existing grade in the eastern portion of the site. We expect the granitic rock below the upper weathered zone in the eastern portion of the site will require rock breaking to achieve finish grade and undercut elevations. The granitic rock is considered suitable for the support of fill or structural loads. The excavated granitic rock can be used for compacted fill; however, select grading of large rock and boulders will be required, if encountered.

5. GROUNDWATER

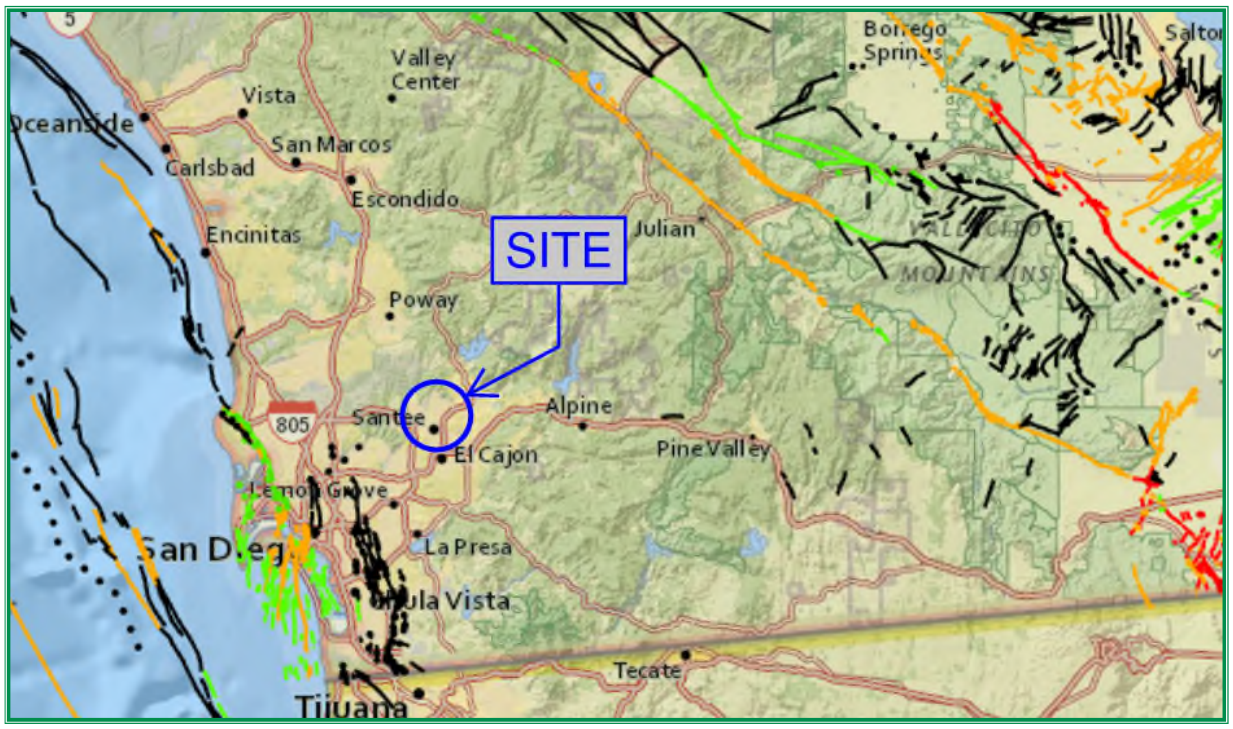
We did not encounter groundwater or seepage in our exploratory excavations. We do not expect groundwater would significantly affect project development as it is likely at least 50 feet below existing grades. It is not uncommon for groundwater or seepage conditions to develop where none previously existed due to the permeability characteristics of the geologic units encountered on site. During the rainy season, seepage conditions may develop that would require special consideration during grading operations. Groundwater elevations are dependent on seasonal precipitation, irrigation, and land use, among other factors, and vary as a result. Proper surface drainage will be critical to future performance of the project.

6. GEOLOGIC HAZARDS

6.1 Faulting and Seismicity

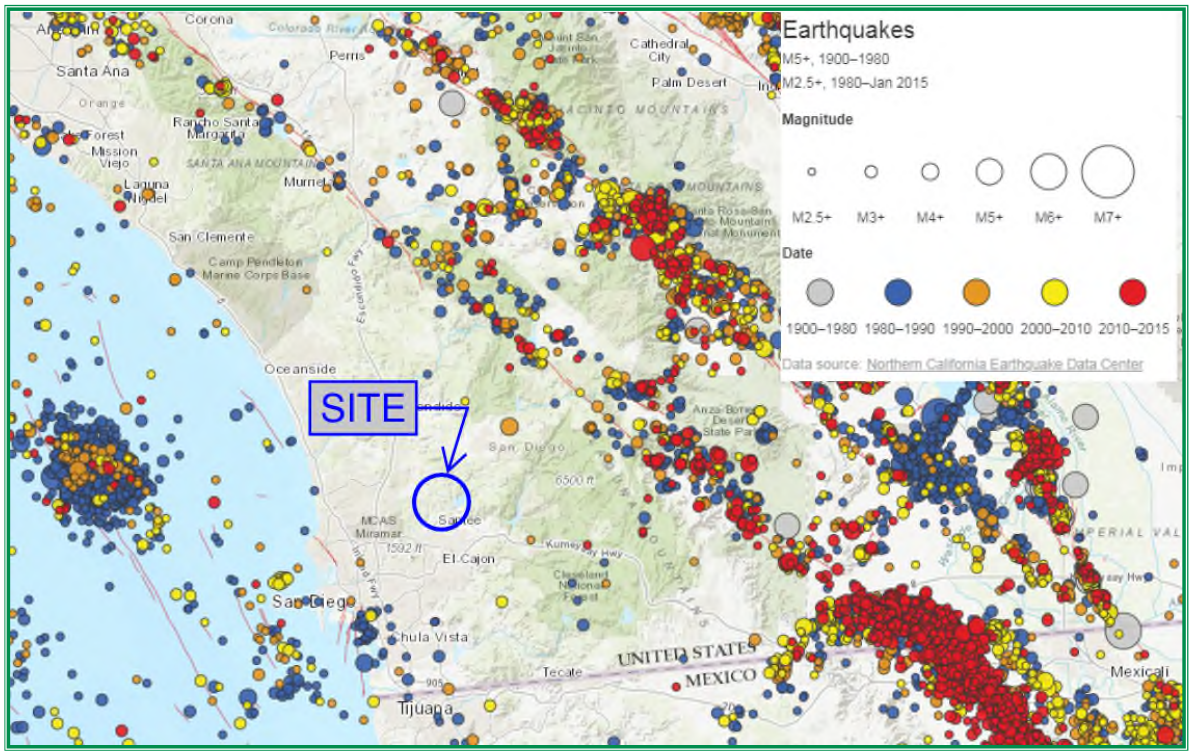
A review of the referenced geologic materials and our knowledge of the general area indicate that the site is not underlain by active, potentially active, or inactive faults. An active fault is defined by the California Geological Survey (CGS) as a fault showing evidence for activity within the last 11,700 years. The site is not located within a State of California Earthquake Fault Zone.

The USGS has developed a program to evaluate the approximate location of faulting for properties. The following figure shows the location of the existing faulting in the San Diego County and Southern California region. The fault traces are shown as solid, dashed, and dotted that represent well-constrained, moderately constrained and inferred, respectively. The fault line colors represent faults with ages less than 150 years (red), 15,000 years (orange), 130,000 years (green), 750,000 years (blue) (not shown on map) and 1.6 million years (black).



Faults in Southern California

The San Diego County and Southern California region is seismically active. The following figure presents the occurrence of earthquakes with a magnitude greater than 2.5 from the period of 1900 through 2015 according to the Bay Area Earthquake Alliance website.



Earthquakes in Southern California

6.2 Ground Rupture

Ground surface rupture occurs when movement along a fault is sufficient to cause a gap or rupture where the upper edge of the fault zone intersects the earth surface. The potential for ground rupture is negligible due to the absence of active faults at the subject site.

6.3 Tsunamis and Seiches

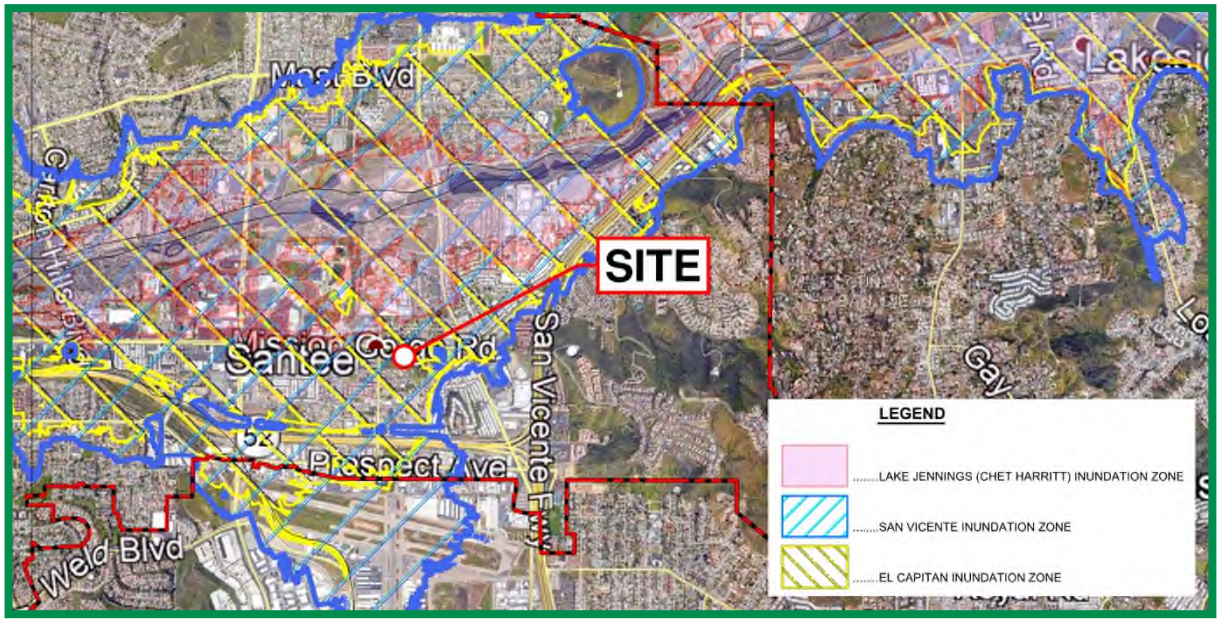
A tsunami is a series of long-period waves generated in the ocean by a sudden displacement of large volumes of water. The site is located approximately 17 miles from the Pacific Ocean at an elevation above approximately 351 feet Mean Sea Level (MSL). The risk of a tsunami impacting the site is considered negligible due to the large distance from the ocean and high elevation.

Seiches are standing wave oscillations of an enclosed water body after the original driving force has dissipated. Driving forces are typically caused by seismic ground shaking. The site is not located near a large body of water. Therefore, the risk of a seiche impacting the site is considered very low.

6.4 Dam Inundation

Based on our review of the City of Santee geotechnical/seismic hazard study, dam inundation is a potential geologic hazard to the site. The site is located approximately 4½ miles southeast of Lake

Jennings, 5½ miles southeast of the San Vicente reservoir and 10 miles southeast of the El Capitan reservoir. The *Dam/Reservoir Inundation Map, City of Santee*, prepared by Geocon Incorporated summarizes the inundation areas from the referenced dam/reservoirs. Based on review of the map, the site would be affected by an inundation from San Vicente and the El Captain Reservoir.



Dam/Reservoir Inundation Map

6.5 Liquefaction

Liquefaction typically occurs when a site is in a zone with seismic activity, on-site soils are cohesionless or silt/clay with low plasticity, groundwater is encountered, and soil relative densities are less than about 70 percent. If the four previous criteria are met, a seismic event could result in a rapid pore-water pressure increase from the earthquake-generated ground accelerations. Seismically induced settlement may occur whether the potential for liquefaction exists or not. Due to the lack of a near surface groundwater table and the dense nature of the proposed fill and underlying older alluvium and granitic rock, the potential for liquefaction and seismically induced settlement occurring at the site is considered negligible.

6.6 Landslides

Based on the examination of aerial photographs in our files and review of published geologic maps for the site vicinity, we opine landslides are not present at the property or at a location that could impact the subject site.

7. ROCK RIPPABILITY

The Geologic Map (Figure 1) and Geologic Cross-Section (Figure 2) presents the surface and subsurface geology in the eastern portion of the site. The rippability of granitic rock is variable and is generally limited to the depth of the weathered zone. The Geologic Cross-Section shows the approximate depth of the weathered zone based on observations performed during investigation. The cross section shows the original elevation for the eastern portion of the site prior to our investigation and current elevations subsequent to the removal of rippable weathered granitic rock in 2022. Most of the rippable rock material shown on the 2020 excavator trenches was removed in 2022. Therefore, the excavator trenches are not shown on the geologic cross-section. The depth of practical refusal within granitic rock during trenching operations, as shown on the Geologic Map (Figure 1) and trench logs (Appendix A), was based on time and effort using a 60,000- and 175,000-pound excavator equipped with a 36-inch-wide bucket with a ripper tooth.

We observed large boulders (up to 10 feet in diameter) at and below the surface during excavations in the eastern portion of the site. Several of the boulders were stockpiled within the southeastern portion of the site. We expect additional boulders of similar size to be encountered during grading and trenching operations within the eastern portion the site. We expect that granitic rock present below the weathered zone will require rock breaking to achieve undercut pad elevations and utility trench elevations. Proposed cuts in hard rock areas can be expected to generate oversized rock fragments (rocks greater than 12 inches in dimension). These boulders will require export or need to be crushed prior to placement during grading operations.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 General

8.1.1 From a geotechnical engineering standpoint, we opine the site is suitable for the development of the planned retail project provided the recommendations presented herein are implemented in design and construction of the project.

8.1.2 We encountered surficial soil (consisting of undocumented fill, topsoil and young alluvium) with a thickness of up to approximately 6 feet. The surficial soil is comprised predominantly of silty to clayey, fine to medium sand and sandy clay. The surficial soils are considered unsuitable for support of additional fill and/or structural loads and will require remedial grading as discussed herein.

8.1.3 Excavation of the surficial soil and completely weathered zone of the granitic rock will generally be possible with medium to heavy effort using conventional, heavy-duty equipment during grading and trenching operations. Very difficult excavations should be expected in the older alluvium and moderately weathered portions of the granitic rock that may require rock-breaking equipment. Granitic rock below the weathered zone, shown on the Geologic Cross-Section (Figure 2), in the eastern portion of the site will require rock-breaking equipment to achieve the proposed underground utility flowline of approximately 364 to 366 MSL.

8.1.4 We did not encounter groundwater during the field investigation and groundwater is not expected to adversely impact the proposed project. However, wet conditions and seepage could affect proposed construction if grading and trenching operations occur during or shortly after a rain event and water is allowed to temporarily pond on the site.

8.1.5 The proposed buildings can be supported on conventional shallow footings founded in properly compacted fill as recommended herein after remedial grading operations.

8.2 Earthwork Grading Factors

8.2.1 Estimates of bulking and shrinkage factors are based on empirical judgments comparing the material in its natural state as encountered in the exploratory excavations to a compacted state. Variations in natural soil density and in compacted fill density render shrinkage value estimates very approximate. As an example, the contractor can compact the fill to a dry density of 90 percent or higher of the laboratory maximum dry density. Thus, the contractor has an approximately 10 percent range of control over the fill volume. Bulking of rock units is a function of rock density, structure, overburden pressure, and the physical behavior of blasted material. Based on our experience, the shrinkage and bulking factors presented in

Table 8.2 can be used as a basis for estimating how much the on-site soil may shrink or swell (bulk) when excavated from their natural state and placed as compacted fill. Please note that these estimates are for preliminary quantity estimates only. Due to the variations in the actual shrinkage/bulking factors, a balance area that can also accommodate rock should be provided to accommodate these variations.

TABLE 8.2
SHRINKAGE AND BULK FACTORS

Soil Unit	Shrink/Bulk Factor
Undocumented Fill (Qudf)	10-15% shrink
Topsoil (unmapped)	10-15% shrink
Young Alluvium (Qya)	10-15% shrink
Older Alluvium (Qoal)	1-3% Bulk
Weathered Rippable Granitic Rock (Kgr)	4-8% bulk
Unweathered Non-Rippable Granitic Rock	10-15% Bulk

8.3 Excavation and Soil Characteristics

8.3.1 The soil encountered in the field investigation is "non-expansive" and "expansive" (expansion index of 20 or less and greater than 20, respectively) as defined by 2022 California Building Code (CBC) Section 1803.5.3. Table 8.3 presents soil classifications based on the expansion index. Based on the results of our laboratory testing presented in Appendix B, we expect the on-site materials will possess a "very low" to "low" expansion potential (EI of 50 or less) in accordance with ASTM D 4829.

TABLE 8.3
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	ASTM D 4829 Expansion Classification	2022 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

8.3.2 We performed laboratory tests on a sample of the site materials to evaluate the percentage of water-soluble sulfate content. Results from the laboratory water-soluble sulfate content tests are presented in Appendix B and indicate that the on-site materials at the locations tested

possess “S0” sulfate exposure to concrete structures as defined by 2022 CBC Section 1904 and ACI 318-14 Chapter 19. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

8.3.3 Geocon Incorporated does not practice in the field of corrosion engineering design. Therefore, further evaluation by a corrosion engineer may be performed if improvements that could be susceptible to corrosion are planned.

8.3.4 Excavation of existing surficial soils will require medium to heavy effort using conventional heavy-duty equipment during grading and trenching operations. Excavation within the older alluvium and moderately weathered portions of the granitic rock will require heavy to very heavy effort and may require rock-breaking equipment. Granitic rock below the weathered zone in the eastern portion of the site will require rock-breaking equipment and potential blasting to achieve underground utility flowline of approximately 364 to 366 feet MSL.

8.4 Seismic Design Criteria – 2022 California Building Code

8.4.1 Table 8.4.1 summarizes summarizes site-specific design criteria obtained from the 2022 California Building Code (CBC; Based on the 2021 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. We used the computer program *U.S. Seismic Design Maps*, provided by the Structural Engineers Association (SEA) to calculate the seismic design parameters. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.2.2 of the 2022 CBC and Table 20.3-1 of ASCE 7-16. . The values presented herein are for the risk-targeted maximum considered earthquake (MCE_R).

TABLE 8.4.1
2022 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2022 CBC Reference
Site Class	C	Section 1613.2.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	0.768g	Figure 1613.2.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.283g	Figure 1613.2.1(2)
Site Coefficient, F_A	1.200	Table 1613.2.3(1)
Site Coefficient, F_V	1.500*	Table 1613.2.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	0.921g	Section 1613.2.3 (Eqn 16-36)
Site Class Modified MCE_R Spectral Response Acceleration – (1 sec), S_{M1}	0.424g*	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.614g	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.283g*	Section 1613.2.4 (Eqn 16-39)

8.4.2 Table 8.4.2 presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

TABLE 8.4.2
ASCE 7-16 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-16 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.329g	Figure 22-7
Site Coefficient, F_{PGA}	1.200	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.395g	Section 11.8.3 (Eqn 11.8-1)

8.4.3 Conformance to the criteria in Tables 8.4.1 and 8.4.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

8.4.4 The project structural engineer and architect should evaluate the appropriate Risk Category and Seismic Design Category for the planned structures. The values presented herein assume

a Risk Category of II and resulting in a Seismic Design Category C. Table 8.4.3 presents a summary of the risk categories in accordance with ASCE 7-16.

TABLE 8.4.3
ASCE 7-16 RISK CATEGORIES

Risk Category	Building Use	Examples
I	Low risk to Human Life at Failure	Barn, Storage Shelter
II	Nominal Risk to Human Life at Failure (Buildings Not Designated as I, III or IV)	Residential, Commercial and Industrial Buildings
III	Substantial Risk to Human Life at Failure	Theaters, Lecture Halls, Dining Halls, Schools, Prisons, Small Healthcare Facilities, Infrastructure Plants, Storage for Explosives/Toxins
IV	Essential Facilities	Hazardous Material Facilities, Hospitals, Fire and Rescue, Emergency Shelters, Police Stations, Power Stations, Aviation Control Facilities, National Defense, Water Storage

8.5 Grading

8.5.1 Grading should be performed in accordance with the recommendations presented herein, with the *Recommended Grading Specifications* contained in Appendix C, and the City of Santee Grading Ordinance; however, the recommendations of this section should take precedence over Appendix C. Earthwork should be observed, and compacted fill tested by representatives of Geocon Incorporated.

8.5.2 Prior to commencing grading, a preconstruction conference should be held at the site with the owner or developer, grading contractor, city inspector, civil engineer, and geotechnical engineer in attendance. Special soil handling requirements can be discussed at that time.

8.5.3 Site preparation should begin with the removal of vegetation and debris and the demolition of the existing building, former building slabs and footings, and remnant parking lot and hardscape improvements. The depth of removal should be such that material to be used as fill is generally free of organic matter. Material generated during stripping operations should be exported from the site. The demolition should include buried footings, underground utilities to be abandoned and existing retaining walls.

8.5.4 The existing undocumented fill, topsoil, and young alluvium should be removed across the site to expose the underlying older alluvium or granitic rock and replaced with properly

compacted fill. We expect the remedial grading depths to be from 1 to 6.5 feet from existing grades. Deeper removals may be required if saturated or loose fill soil is encountered. A representative of Geocon should be on-site during removals to evaluate the limits of the remedial grading. In addition, building pads with formational cut-fill transitions and pads underlain by formational materials should be undercut a minimum of 3 feet or 1 foot below proposed foundations (whichever results in a deeper removal) and properly compacted fill should be placed. The undercuts should be at least 5 feet laterally outside of the proposed buildings/foundations. In addition, the rock materials should be undercut a minimum of 2 feet below proposed utilities. Fill should not be placed on the property until we have observed the removals. Table 8.5.1 provides a summary of the grading recommendations.

TABLE 8.5.1
SUMMARY OF GRADING RECOMMENDATIONS

Area	Remedial Grading Excavation Recommendations
Site Development	Remove and Dispose Vegetation, Debris and Any Existing Buildings/Foundations and Utilities
	Excavation and Recompact of Surficial Soils (Excavations Should Expose Competent Older Alluvium and/or Granitic Rock)
Proposed Building Areas	Excavate Surficial Soil to Expose Older Alluvium or Granitic Rock
	Undercut Upper 3 Feet of Formational Materials Below Finish Grade
	Undercut At Least 1 Foot Below Proposed Foundations
	Perform Undercuts at Least 10 Feet Laterally Outside of Buildings/Foundations
Exposed Bottoms of Remedial Grading	Scarify Upper 12 Inches

8.5.5 Existing soil generally free of deleterious debris can be reused as compacted fill when placed in layers to the design finish-grade elevations. Fill and backfill soil should be compacted to a dry density of at least 90 percent of laboratory maximum dry density near to slightly above optimum moisture content as determined by ASTM Test Procedure D 1557. Rocks larger than 12 inches should not be placed in fill areas. The upper 12 inches of fill beneath the vehicular pavement areas should be moisture conditioned and compacted to a dry density of at least 95 percent of the laboratory maximum dry density shortly before paving operations shortly before paving.

8.5.6 Import fill (if necessary) should consist of the characteristics presented in Table 8.5.2. Geocon Incorporated should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to determine its suitability as fill material.

TABLE 8.5.2
SUMMARY OF IMPORT FILL RECOMMENDATIONS

Soil Characteristic	Values
Expansion Potential	"Very Low" to "Low" (Expansion Index of 50 or less)
Particle Size	Maximum Dimension Less Than 3 Inches
	Generally Free of Debris

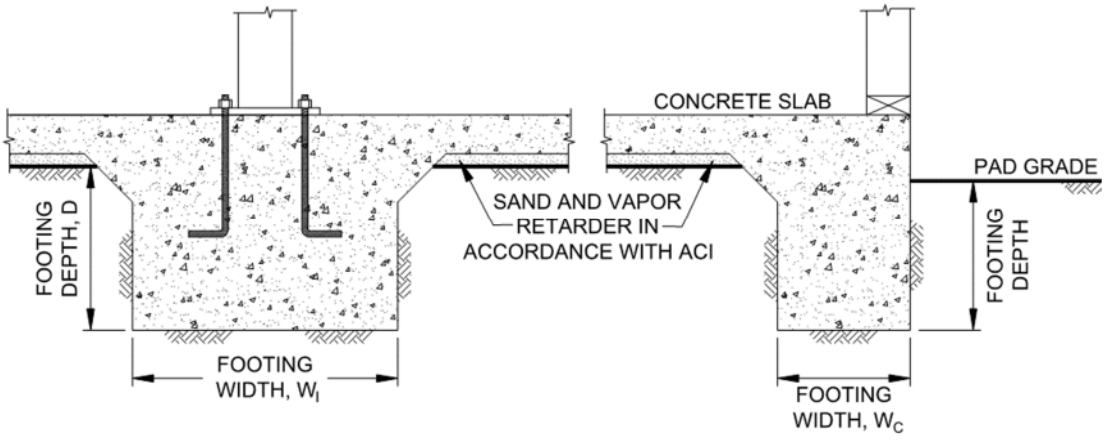
8.6 Shallow Foundations and Concrete Slabs-On-Grade

8.6.1 The proposed structures can be supported on a shallow foundation system founded in the compacted fill. Foundations for the structure should consist of continuous strip footings and/or isolated spread footings. Table 8.6.1 provides a summary of the foundation design recommendations.

TABLE 8.6.1
SUMMARY OF FOUNDATION RECOMMENDATIONS

Parameter	Value
Minimum Continuous Foundation Width, W_C	12 inches
Minimum Isolated Foundation Width, W_I	24 inches
Minimum Foundation Depth, D	24 Inches Below Lowest Adjacent Grade
Minimum Steel Reinforcement	4 No. 5 Bars, 2 at the Top and 2 at the Bottom
Allowable Bearing Capacity	2,500 psf
Bearing Capacity Increase	500 psf per Foot of Depth
	500 psf per Foot of Width
Maximum Allowable Bearing Capacity	4,000 psf
Estimated Total Settlement	1 Inch
Estimated Differential Settlement	½ Inch in 40 Feet
Footing Size Used for Settlement	10-Foot Square
Design Expansion Index	50 or less

8.6.2 The foundations should be embedded in accordance with the recommendations herein and the Wall/Column Footing Dimension Detail. The embedment depths should be measured from the lowest adjacent pad grade for both interior and exterior footings. Footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.



Wall/Column Footing Dimension Detail

8.6.3 The bearing capacity values presented herein are for dead plus live loads and may be increased by one-third when considering transient loads due to wind or seismic forces.

8.6.4 Concrete slabs-on-grade for the structures should be constructed in accordance with Table 8.6.2 based on geotechnical conditions. The structural engineer should review proposed slab loading to check if additional concrete slab thickness or steel reinforcement will be required.

TABLE 8.6.2
MINIMUM CONCRETE SLAB-ON-GRADE RECOMMENDATIONS

Parameter	Value
Minimum Concrete Slab Thickness	5 inches
Minimum Steel Reinforcement	No. 4 Bars 18 Inches on Center, Both Directions
Typical Slab Underlayment	3 to 4 Inches of Sand/Gravel/Base
Design Expansion Index	50 or less

8.6.5 Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (ACI 302.2R-06). In addition, the membrane should be installed in accordance with manufacturer's recommendations and ASTM requirements and installed in a manner that prevents puncture. The vapor retarder used should be specified by the project architect or developer based on the type of floor covering that will be installed and if the structure will possess a humidity-controlled environment.

8.6.6 The bedding sand thickness should be determined by the project foundation engineer, architect, and/or developer. It is common to have 3 to 4 inches of sand in the southern California region. However, we should be contacted to provide recommendations if the bedding sand is thicker than 6 inches. The foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plans.

8.6.7 Concrete slabs should be provided with adequate crack-control joints, construction joints and/or expansion joints to reduce unsightly shrinkage cracking. The design of joints should consider criteria of the American Concrete Institute (ACI) when establishing crack-control spacing. Crack-control joints should be spaced at intervals no greater than 12 feet. Additional steel reinforcing, concrete admixtures and/or closer crack control joint spacing should be considered where concrete-exposed finished floors are planned.

8.6.8 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisturized to maintain a moist condition as would be expected in any such concrete placement.

8.6.9 The foundation and concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting expected loads.

8.6.10 The recommendations of this report are intended to reduce the potential for cracking of slabs and foundations due to expansive soil, differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals where re-entrant slab corners occur.

8.6.11 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

8.7 Concrete Flatwork

8.7.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations presented in Table 8.7. The recommended steel reinforcement would help reduce the potential for cracking.

TABLE 8.7
MINIMUM CONCRETE FLATWORK RECOMMENDATIONS

Expansion Index, EI	Minimum Steel Reinforcement* Options	Minimum Thickness
EI $\leq$ 90	6x6-W2.9/W2.9 (6x6-6/6) welded wire mesh	4 Inches
	No. 3 Bars 18 inches on center, Both Directions	

* In excess of 8 feet square.

8.7.2 The subgrade soil should be properly moisturized and compacted prior to the placement of steel and concrete. The subgrade soil should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content in accordance with ASTM D 1557.

8.7.3 Even with the incorporation of the recommendations of this report, the exterior concrete flatwork has a potential to experience some uplift due to expansive soil beneath grade. The steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork. Additionally, flatwork should be structurally connected to the curbs, where possible, to reduce the potential for offsets between the curbs and the flatwork.

8.7.4 Concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted, and the moisture content of subgrade soil should be verified prior to placing concrete. Base materials will not be required below concrete improvements.

8.7.5 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or

minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

8.7.6 The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs because of differential movement. However, even with the incorporation of the recommendations presented herein, slabs-on-grade will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

8.8 Cast-In-Drilled-Hole (CIDH) Piles – Shade Structures

8.8.1 We understand that cast-in-drilled-hole (CIDH) piles may be used for foundation support of shade structures. The foundation recommendations herein are for CIDH piles and assume that the piles will extend into the existing fill or formational materials. Hard rock drilling may be encountered if structures are planned in the eastern portion of the site.

8.8.2 The CIDH piles can be designed to develop support by end bearing and skin friction within the fill materials using the design parameters presented in Table 8.8. These allowable values possess a factor of safety of at least 2.

TABLE 8.8
SUMMARY OF CIDH PILE RECOMMENDATIONS

Parameter	Value
Minimum Pile Diameter	18 Inches
Minimum Pile Spacing	3 Times Pile Diameter
Estimated Foundation Embedment Depth	5 Feet
Allowable End Bearing Capacity	4,000 psf
Allowable Skin Friction Capacity	200 psf (Fill Materials)
Estimated Total Settlement	½ Inch
Estimated Differential Settlement	½ Inch in 40 Feet

8.8.3 The allowable downward capacity may be increased by one-third when considering transient wind or seismic loads. Single pile uplift capacity can be taken as 75 percent of the allowable downward skin friction capacity.

8.8.4 If pile spacing is at least three times the maximum dimension of the pile, no reduction in axial capacity for group effects is considered necessary. If piles are spaced between 2 and 3 pile diameters (center to center), the single pile axial capacity should be reduced by 25 percent. Geocon Incorporated should be contacted to provide single-pile capacity if piles are spaced closer than 2 diameters.

8.8.5 The existing materials may contain gravel and cobble and may possess very dense/strong rock zones; therefore, the drilling contractor should expect difficult drilling conditions during excavations for the piles. Because a significant portion of the CIDH piles capacity will be developed by end bearing, the bottom of the borehole should be cleaned of loose cuttings prior to the placement of steel and concrete. Experience indicates that backspinning the auger does not remove loose material and a flat cleanout plate is necessary. Concrete should be placed within the excavation as soon as possible after the auger/cleanout plate is withdrawn to reduce the potential for discontinuities or caving.

8.8.6 Pile settlement of CIDH piles is expected to be on the order of ½ inch. Settlements should be essentially complete shortly after completion of the building superstructure.

8.8.7 We can provide a lateral pile capacity analysis using the *LPILE* computer program once the pile type, size, and approximate length has been provided. The total capacity of pile groups should be considered less than the sum of the induvial pile capacities for pile spacing of less than 8D (where D is pile diameter) for lateral loads parallel to the pile group and 3D for loads perpendicular to the pile group. The reduction in capacity is based on pile spacing and positioning and can result in group efficiency on the order of 50 percent of the sum of single-pile capacities. We can evaluate the lateral capacity of pile groups using the *GROUP* computer program, if requested

8.9 Retaining Walls

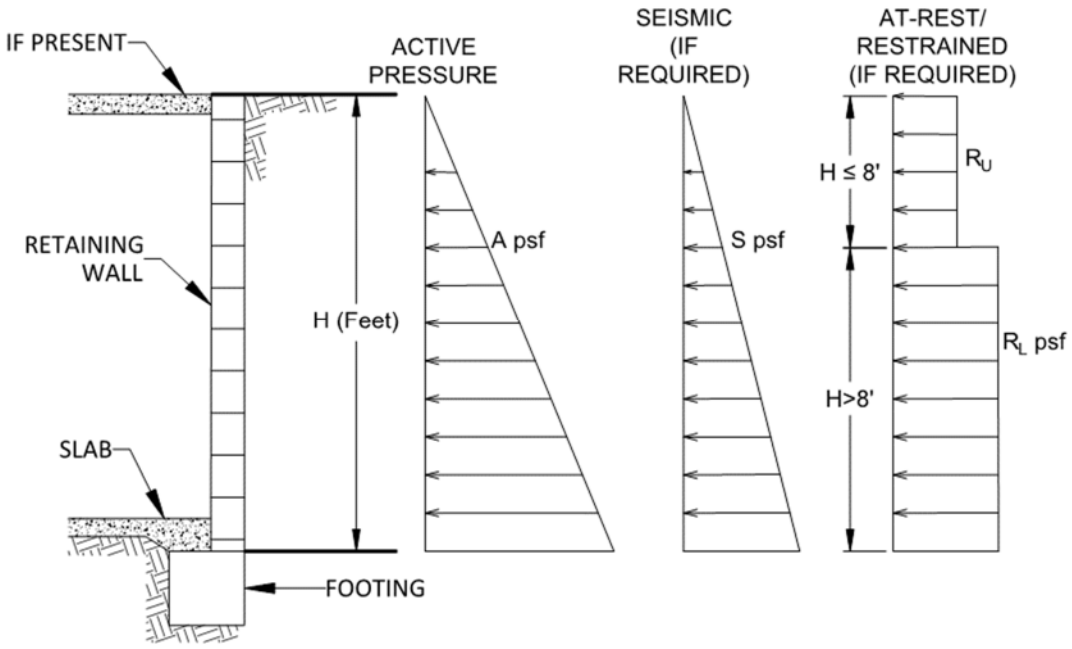
8.9.1 Retaining walls should be designed using the values presented in Table 8.9.1. Soil with an expansion index (EI) of greater than 50 should not be used as backfill material behind retaining walls.

TABLE 8.9.1
RETAINING WALL DESIGN RECOMMENDATIONS

Parameter	Value
Active Soil Pressure, A (Fluid Density, Level Backfill)	35 pcf
Active Soil Pressure, A (Fluid Density, 2:1 Sloping Backfill)	50 pcf
Seismic Pressure, S	12H psf
At-Rest/Restrained Walls Additional Uniform Pressure (0 to 8 Feet High)	7H psf
At-Rest/Restrained Walls Additional Uniform Pressure (8+ Feet High)	13H psf
Expected Expansion Index for the Subject Property	EI≤50

H equals the height of the retaining portion of the wall

8.9.2 The project retaining walls should be designed as shown in the Retaining Wall Loading Diagram.



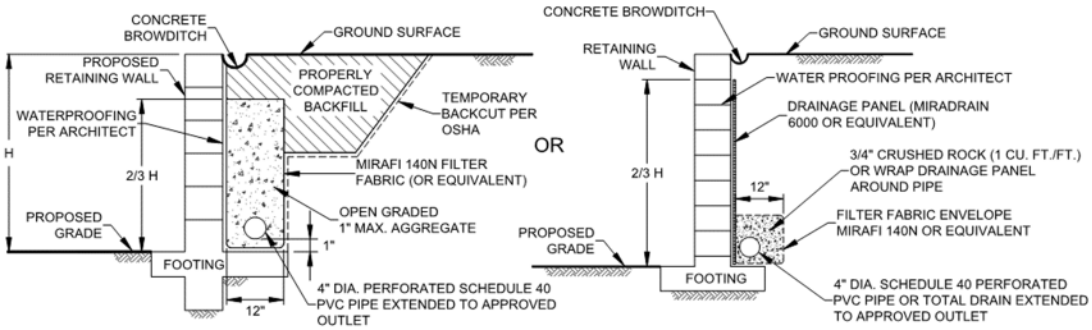
Retaining Wall Loading Diagram

8.9.3 Unrestrained walls are those that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall. Where walls are restrained from movement at the top (at-rest condition), an additional uniform pressure should be applied to the wall. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to 2 feet of fill soil should be added.

8.9.4 The structural engineer should determine the Seismic Design Category for the project in accordance with Section 1613 of the 2022 CBC or Section 11.6 of ASCE 7-16. For structures assigned to Seismic Design Category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 1803.5.12 of the 2022 CBC. The seismic load is dependent on the retained height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall..

8.9.5 Retaining walls should be designed to ensure stability against overturning sliding, and excessive foundation pressure. Where a keyway is extended below the wall base with the intent to engage passive pressure and enhance sliding stability, it is not necessary to consider active pressure on the keyway.

8.9.6 Drainage openings through the base of the wall (weep holes) should not be used where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The recommendations herein assume a properly compacted granular (EI of 50 or less) free draining backfill material with no hydrostatic forces or imposed surcharge load. The retaining wall should be properly drained as shown in the Typical Retaining Wall Drainage Detail. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.



Typical Retaining Wall Drainage Detail

8.9.7 In general, wall foundations should be designed in accordance with Table 8.9.2. The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, retaining wall foundations should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

TABLE 8.9.2
SUMMARY OF RETAINING WALL FOUNDATION RECOMMENDATIONS

Parameter	Value
Minimum Retaining Wall Foundation Width	12 Inches
Minimum Retaining Wall Foundation Depth	12 Inches
Minimum Steel Reinforcement	Per Structural Engineer
Allowable Bearing Capacity	2,500 psf
Estimated Total Settlement	1 Inch
Estimated Differential Settlement	½ Inch in 40 Feet

8.9.8 The recommendations presented herein are generally applicable to the design of rigid concrete or masonry retaining walls. If other types of walls (such as mechanically stabilized earth [MSE] walls, soil nail walls, or soldier pile walls) are planned, Geocon Incorporated should be consulted for additional recommendations.

8.9.9 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The retaining walls and improvements above the retaining walls should be designed to incorporate an appropriate amount of lateral deflection as determined by the structural engineer.

8.9.10 Soil contemplated for use as retaining wall backfill, including import materials, should be identified in the field prior to backfill. At that time, Geocon Incorporated should obtain samples for laboratory testing to evaluate its suitability. Modified lateral earth pressures may be necessary if the backfill soil does not meet the required expansion index or shear strength. City or regional standard wall designs, if used, are based on a specific active lateral earth pressure and/or soil friction angle. In this regard, on-site soil to be used as backfill may or may not meet the values for standard wall designs. Geocon Incorporated should be consulted to assess the suitability of the on-site soil for use as wall backfill if standard wall designs will be used.

8.10 Lateral Loading

8.10.1 Table 8.10 should be used to help design the proposed structures and improvements to resist lateral loads for the design of footings or shear keys. The allowable passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

TABLE 8.10
SUMMARY OF LATERAL LOAD DESIGN RECOMMENDATIONS

Parameter	Value
Passive Pressure Fluid Density	350 pcf
Coefficient of Friction (Concrete and Soil)	0.35
Coefficient of Friction (Along Vapor Barrier)	0.2 to 0.25*

* Per manufacturer's recommendations.

8.10.2 The passive and frictional resistant loads can be combined for design purposes. The lateral passive pressures may be increased by one-third when considering transient loads due to wind or seismic forces.

8.11 Preliminary Pavement Recommendations

8.11.1 We calculated the flexible pavement sections in general conformance with the *Caltrans Method of Flexible Pavement Design* (Highway Design Manual, Section 608.4) using an estimated Traffic Index (TI) of 5.0, 5.5, 6.0 and 7.0 for parking stalls, driveways, medium truck traffic areas and heavy truck traffic areas, respectively. The project civil engineer and owner should review the pavement designations to determine appropriate locations for pavement thickness. The final pavement sections for the parking lot should be based on the R-Value of the subgrade soil encountered at final subgrade elevation. We assumed an R-Value of 10 and 78 for the subgrade soil and base materials, respectively, for the purposes of this preliminary analysis. Table 8.11.1 presents the preliminary flexible pavement sections.

TABLE 8.11.1
PRELIMINARY FLEXIBLE PAVEMENT SECTION

Location	Assumed Traffic Index	Assumed Subgrade R-Value	Asphalt Concrete (Inches)	Class 2 Aggregate Base (Inches)
Parking stalls for automobiles and light-duty vehicles	5.0	10	3	9
Driveways for automobiles and light-duty vehicles	5.5	10	3	11
Medium truck traffic areas	6.0	10	3.5	12
Driveways for heavy truck and fire-truck traffic	7.0	10	4	15

8.11.2 Prior to placing base materials, the upper 12 inches of the subgrade soil should be scarified, moisture conditioned as necessary, and recompacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content as determined by ASTM D 1557. Similarly, the base material should be compacted to a dry

density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Asphalt concrete should be compacted to a density of at least 95 percent of the laboratory Hveem density in accordance with ASTM D 2726.

8.11.3 Base materials should conform to Section 26-1.02B of the *Standard Specifications for The State of California Department of Transportation (Caltrans)* with a ¾-inch maximum size aggregate. Asphalt concrete should conform to Section 203-6 of the *Standard Specifications for Public Works Construction (Greenbook)*.

8.11.4 The base thickness can be reduced if a reinforcement geogrid is used during the installation of the pavement. Geocon should be contact for additional recommendations if alternate design parameters are requested.

8.11.5 A rigid Portland cement concrete (PCC) pavement section should be placed in roadway aprons and cross gutters. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330-21 *Commercial Concrete Parking Lots and Site Paving Design and Construction – Guide*. Table 8.11.2 provides the traffic categories and design parameters used for the calculations for 20-year design life.

TABLE 8.11.2
TRAFFIC CATEGORIES

Traffic Category	Description	Reliability (%)	Slabs Cracked at End of Design Life (%)
A	Car Parking Areas and Access Lanes	60	15
B	Entrance and Truck Service Lanes	60	15
D	80-Kip Heavy Duty Trucks	75	15
E	Garbage or Fire Truck Lane	75	15

8.11.6 We used the parameters presented in Table 8.11.3 to calculate the pavement design sections. We should be contacted to provide updated design sections, if necessary.

TABLE 8.11.3
RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value
Modulus of subgrade reaction, k	50 pci
Modulus of rupture for concrete, M_R	500 psi
Concrete Compressive Strength	3,000 psi
Traffic Category, TC	A and C
Average daily truck traffic, ADTT	10 and 100

8.11.7 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 8.11.4.

TABLE 8.11.4
RIGID VEHICULAR PAVEMENT RECOMMENDATIONS

Traffic Category	Trucks Per Day	Portland Cement Concrete, T (Inches)
A = Car Parking Areas and Access Lanes	10	6
B = Entrance and Truck Service Lanes	50	6½
D = Heavy Duty Trucks	50	7½
E = Garbage or Fire Truck Lanes	5	7½

8.11.8 The PCC vehicular pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content.

8.11.9 Adequate joint spacing should be incorporated into the design and construction of the rigid pavement in accordance with Table 8.11.5.

TABLE 8.11.5
MAXIMUM JOINT SPACING

Pavement Thickness, T (Inches)	Maximum Joint Spacing (Feet)
$4<T<5$	10
$5\leq T<6$	12.5
$6\leq T$	15

8.11.10 The rigid pavement should also be designed and constructed incorporating the parameters presented in Table 8.11.6.

TABLE 8.11.6
ADDITIONAL RIGID PAVEMENT RECOMMENDATIONS

Subject	Value
Thickened Edge	1.2 Times Slab Thickness Adjacent to Structures
	1.5 Times Slab Thickness Adjacent to Soil
	Minimum Increase of 2 Inches
	4 Feet Wide
Crack Control Joint Depth	Early Entry Sawn = T/6 to T/5, 1.25 Inch Minimum
	Conventional (Tooled or Conventional Sawing) = T/4 to T/3
Crack Control Joint Width	¼-Inch for Sealed Joints and Per Sealer Manufacturer's Recommendations
	$^{1}/_{16}$- to $^{1}/_{4}$-Inch is Common for Unsealed Joints

8.11.11 Reinforcing steel will not be necessary within the concrete for geotechnical purposes except for dowels at construction joints as discussed herein.

8.11.12 To control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab. Crack-control joints should be sealed with an appropriate sealant to prevent the migration of water through the control joint to the subgrade materials. The depth of the crack-control joints should be determined by the referenced ACI report.

8.11.13 To provide load transfer between adjacent pavement slab sections, a butt-type construction joint should be constructed. The butt-type joint should be thickened by at least 20 percent at the edge and taper back at least 4 feet from the face of the slab.

8.11.14 Concrete curb/gutter should be placed on soil subgrade compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Cross-gutters that receives vehicular should be placed on subgrade soil compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Base materials should not be placed below the sidewalks, curb/gutter, or cross-gutters so water is not able to migrate from the adjacent parkways to the pavement sections. Where flatwork is located directly adjacent to the curb/gutter, the concrete flatwork should be structurally connected to the curbs to help reduce the potential for offsets between the curbs and the flatwork.

8.12 Preliminary Concrete Paver Recommendations

8.12.1 We calculated the concrete paver section in general conformance with the *Caltrans Method of Flexible Pavement Design* (Highway Design Manual, Section 608.4) using an estimated Traffic Index (TI) of 5.0, 5.5 and 6.0 and for parking stalls, driveways, medium truck traffic areas, respectively. Based on the Interlocking Concrete Pavement Institute (ICPI), the pavers should possess a minimum thickness of 3⅛ inches overlying 1 to 1½ inch of sand. We used an equivalent asphalt concrete section equal to the thickness of the pavers of approximately 3 inches in accordance with Interlocking Concrete Pavement Institute (ICPI) *Tech Spec Number 4*. In addition, the pavers should be installed in a pattern appropriate for vehicular traffic. Table 8.12.1 presents two options for the paver underlayment: compacted base materials or aggregate.

TABLE 8.12.1
PERMEABLE PAVER PAVEMENT SECTION

Location	Traffic Index (TI)	Assumed Subgrade R-Value	Equivalent Paver Asphalt Concrete Thickness (inches)	Option 1		Option 2
				Estimated Sand Thickness (inches)	Base Materials (inches)	ASTM C 33 Aggregate
Parking Stalls for Automobiles and Light-Duty Vehicles	5.0	10	3	1 -1½	9	3" Sand / 3" #8 / 7" #57
Driveways for Automobiles and Light-Duty Vehicles	5.5	10	3	1 -1½	11	3" Sand / 3" #8 / 9" #57
Medium Truck Traffic Areas	6.0	10	3	1 -1½	13	3" Sand / 3" #8 / 11" #57

8.12.2 Class 2 base, crushed aggregate base (CAB) or rigid pavement (with thicknesses described herein) should be placed below the pavers. The Class 2 base, CAB or rigid pavement can be replaced by aggregate in accordance with ASTM C 33 and the civil engineer/manufacturer's recommendations.

8.12.3 The aggregate presented in Option 2 shown in Table 8.12.1 should be in conformance with ASTM C33 as shown in Table 8.12.2.

TABLE 8.12.2
AGGREGATE GRADATION LIMITS PER ASTM C33

Sieve Size	Percent Passing Sieves		
	Choker Sand	No. 8	No. 57
1.5 Inches	--	--	100
1 Inch	--	--	95-100
0.5 Inch	--	100	25-60
0.375 Inch	100	85-100	--
No. 4	95-100	10-30	0-10
No. 8	80-100	0-10	0-5
No. 16	50-85	0-5	--
No. 30	25-60	--	--
No. 50	5-30	--	--
No. 100	0-10	--	--
No. 200	0-3	--	--

8.12.4 Prior to placing base/aggregate materials, the subgrade soil should be scarified, moisture conditioned as necessary, and recompacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content as determined by ASTM D 1557. The depth of compaction should be at least 12 inches. Similarly, the base materials should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content.

8.12.5 The pavers should be installed and maintained in accordance with the manufacturer's recommendations. The future owners should be made aware and responsible for the maintenance program. In addition, pavers tend to shift vertically and horizontally during the life of the pavement and should be expected. The pavers should be placed tightly adjacent to each other and the spacing between the paver units should be filled with appropriate filler. A polymer sand (Poly-Sand) can be used on the decorative, non-storm water quality paver area to help prevent water infiltration.

8.12.6 The pavers normally require a concrete border to prevent lateral movement from traffic. The concrete border surrounding the pavers should be embedded at least 6 inches into the subgrade to reduce the potential for water migration to the adjacent landscape areas and pavement areas. Side liners are not necessary if the concrete borders are installed as discussed herein.

8.12.7 The performance of pavement is highly dependent on providing positive surface drainage away from the edge of the pavement. Ponding of water on or adjacent to the pavement will likely result in pavement distress and subgrade failure. Drainage from landscaped areas should be directed to controlled drainage structures. Landscape areas adjacent to the edge of pavements are not recommended due to the potential for surface or irrigation water to infiltrate the underlying permeable aggregate base and cause distress. Where such a condition cannot be avoided, consideration should be given to incorporating measures that will significantly reduce the potential for subsurface water migration into the aggregate base. If planter islands are planned, the perimeter curb should extend at least 6 inches below the level of the base materials.

8.13 Site Drainage and Moisture Protection

8.13.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion, and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2022 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure. Appendix C present our recommendations for the storm water management design of the property.

8.13.2 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

8.13.3 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. We recommend that area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes be used. In addition, where landscaping is planned adjacent to the pavement, we recommend construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base materials.

8.14 Grading and Foundation Plan Review

8.14.1 Geocon Incorporated should review the grading and foundation plans for the project prior to final design submittal to check conformance with this report and whether additional analysis and/or recommendations are required.

8.15 Testing and Observation Services During Construction

8.15.1 Geocon Incorporated should provide geotechnical testing and observation services during the grading operations, foundation construction, utility installation, retaining wall backfill and pavement installation. Table 8.15 presents the typical geotechnical observations we would expect for the proposed improvements.

TABLE 8.15
EXPECTED GEOTECHNICAL TESTING AND OBSERVATION SERVICES

Construction Phase	Observations	Expected Time Frame
Grading	Base of Removal	Part Time
	Geologic Logging	Part Time to Full Time
	Fill Placement and Soil Compaction	Full Time
Foundations	Foundation Excavation Observations	Part Time to Full Time
Utility Backfill	Fill Placement and Soil Compaction	Part Time to Full Time
Retaining Wall Backfill	Fill Placement and Soil Compaction	Part Time to Full Time
Subgrade for Sidewalks, Curb/Gutter and Pavement	Soil Compaction	Part Time
Pavement Construction	Base Placement and Compaction	Part Time
	Asphalt Concrete Placement and Compaction	Full Time

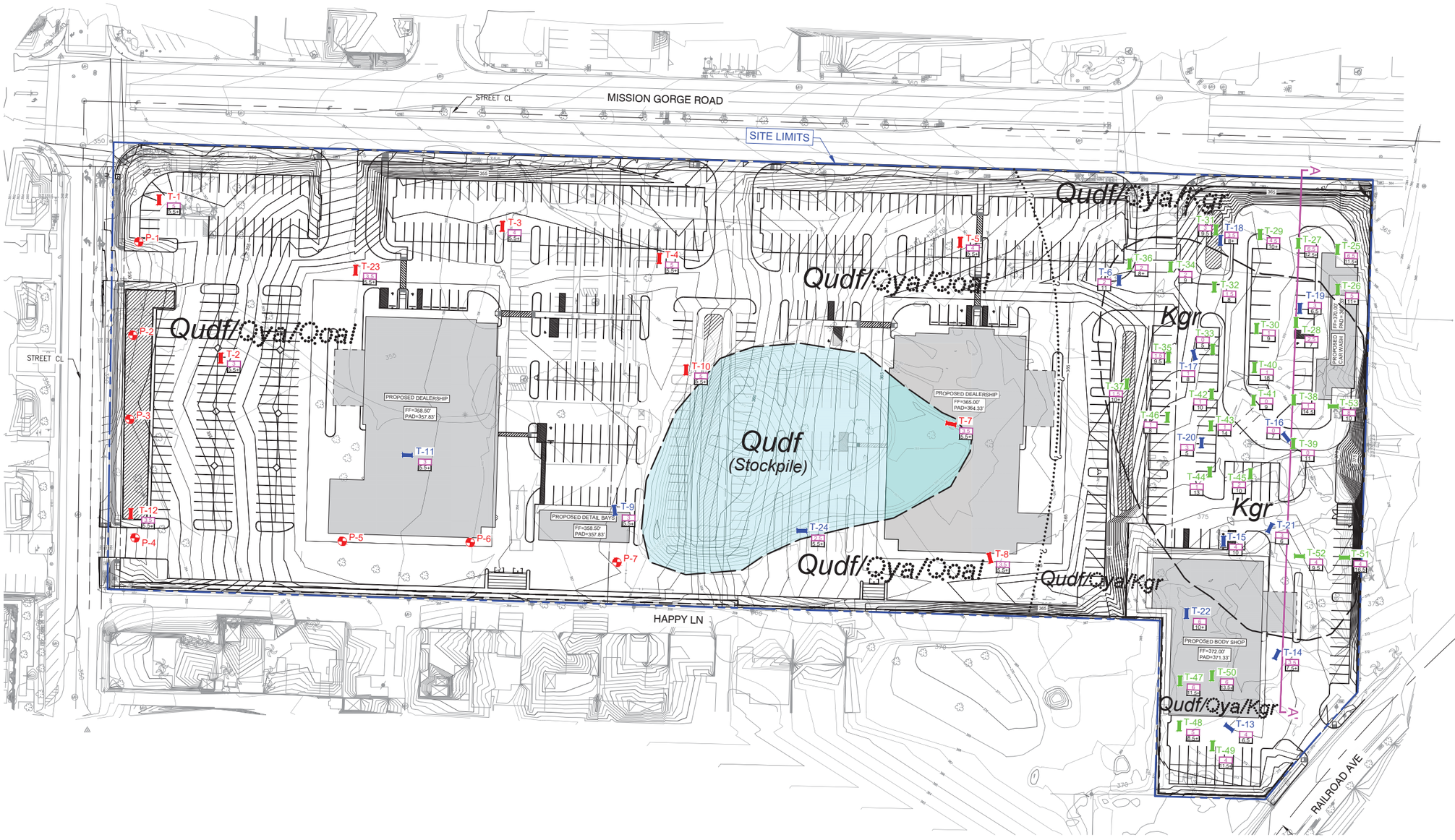
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.



GRAPHIC SCALE
0' 25' 50' 75' 100' 150' 200'
SCALE 1"=50' (on 36x24)

GEOCON LEGEND

- Qudf ..... UNDOCUMENTED FILL
- Qya ..... YOUNG ALLUVIUM (Dotted Where Buried)
- Qoal ..... OLDER ALLUVIUM (Dotted Where Buried)
- Kgr ..... GRANITIC ROCK (Dotted Where Buried)
- ..... APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried, Queried Where Uncertain)
- T-23 ..... APPROX. LOCATION OF RUBBER TIRE BACKHOE TRENCH (2019)
- T-24 ..... APPROX. LOCATION OF EXCAVATOR TRENCH (2019)
- T-53 ..... APPROX. LOCATION OF EXCAVATOR TRENCH (2020; Material Encountered in Trenches Above 370' MSL was Removed in 2022)
- 5 / 10+ ..... APPROX. DEPTH OF REMEDIAL GRADING (In Feet) / APPROX. DEPTH OF REFUSAL (+ Indicates Termination Before Refusal, in Feet)
- P-7 ..... APPROX. LOCATION OF AARDVARK PERMEAMETER TEST (2021)

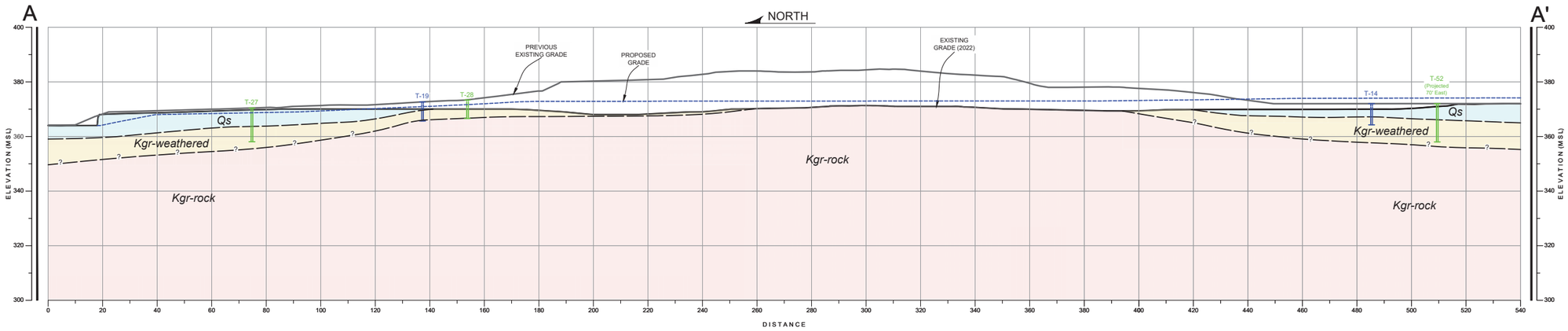
GEOLOGIC MAP

SANTEE AUTO CENTER
SANTEE, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858.558-6900 - FAX 858.558-6159

SCALE	DATE
1" = 50'	04 - 13 - 2023
PROJECT NO. G2332 - 11 - 01	FIGURE 1
SHEET 1 OF 1	

Plotted:04/13/2023 12:47PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2332-11-01 (Former Santee Elem School)\SHEETS\G2332-11-01 Geo Map.40.dwg



GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

- Qs ..... SURFICIAL SOILS
- Kgr-weathered ..... WEATHERED GRANITIC ROCK
- Kgr-rock ..... HARD GRANITIC ROCK
- ? ..... APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- T-21 ..... APPROX. LOCATION OF EXCAVATOR TRENCH (2019)
- T-52 ..... APPROX. LOCATION OF EXCAVATOR TRENCH (2020)

GEOLOGIC CROSS - SECTION

SANTEE AUTO CENTER
SANTEE, CALIFORNIA

GEOCON INCORPORATED
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6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858.558-6900 - FAX 858.558-6159

SCALE	DATE
1" = 20'	04 - 13 - 2023
PROJECT NO.	FIGURE
G2332 - 11 - 01	2
SHEET 1 OF 1	

Plotted:04/13/2023 12:50PM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2332-11-01 (Former Santee Elem School)\SHEETS\G2332-11-01 XSection.40.dwg

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

Fieldwork for our investigation included a subsurface exploration and soil sampling. The Geologic Map, Figure 1 presents the locations of the exploratory trenches. Trench logs and an explanation of the geologic units encountered are presented in figures following the text in this appendix. We located the trenches in the field using a measuring tape and/or existing reference points. Therefore, actual trench locations may deviate slightly. We performed a portion of field investigation on January 30, 2019, that consisted of 24 exploratory trenches to a maximum depth of approximately 11 feet below existing grade. The trenches were excavated using a rubber tire backhoe and an XCMG XE210CU, 47,000-pound excavator. We obtained bulk samples from the exploratory trenches for laboratory testing. Logs of the trenches are presented on Figures A-1 through A-24.

We also observed trenches performed by TC Construction between June 2, 2020, and June 12, 2020. The trenches were excavated using a Link Belt 400 LX (60,000 pounds) and 800 LX (175,000 pounds). Trench locations were determined and performed by TC to determine the feasibility of excavation within the granitic rock in the eastern portion of the site. The trenches were excavated and subsequently a Geocon Inc. representative would log areas of the trenches on a regular basis. We did not observe the trenching on a full-time basis. We logged 29 locations across 9 excavations to a maximum depth of approximately 18 feet below existing grade. Logs of the trenches are presented on Figures A-25 through A-53. Based on a review of the existing elevations in the eastern portion of the site where these trenches were performed, the material generally above an elevation of 370 feet MSL was removed.

In addition, in 2022 we observed removals in the eastern portion of the site to determine the depth of rippable granitic rock as shown by the elevations indicated on the grading plan as shown on the Geologic Map, Figure 1. A Link Belt 800 LX (175,000 pounds) was utilized during removals by TC Construction. Most of the rippable material logged in 2020 from the excavator trenches in the eastern portion of the site was removed in 2022.

We visually examined the soil conditions encountered within the trenches, classified, and logged in general accordance with the Unified Soil Classification System (USCS). The logs depict the general soil and geologic conditions encountered and the depth at which we obtained the samples.

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P 1** ELEV. (MSL.) **352'** DATE COMPLETED **09-24-2021** EQUIPMENT **INGERSOLL RAND A-300 W/4.5" AUGER** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					4" **ASPHALT**			
				SC	**UNDOCUMENTED FILL (Qudf)** Loose, moist, dark brown, Clayey, fine to medium SAND			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Clayey, fine to medium SAND			
4				ML	**OLDER ALUVIUM (Qoal)** Dense, damp, brown, Sandy SILT			
6					BORING TERMINATED AT 6 FEET No groundwater encountered			

Figure A-54,
Log of Boring P 1, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P 2** ELEV. (MSL.) **352.5'** DATE COMPLETED **09-24-2021** EQUIPMENT **INGERSOLL RAND A-300 W/4.5" AUGER** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					4" **ASPHALT**			
				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, fine to medium Sandy CLAY			
4				ML	**OLDER ALLUVIUM (Qoal)** Dense, damp, light brown, fine Sandy SILT			
					BORING TERMINATED AT 5 FEET No groundwater encountered			

Figure A-55,
Log of Boring P 2, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P 3** ELEV. (MSL.) **354'** DATE COMPLETED **09-24-2021** EQUIPMENT **INGERSOLL RAND A-300 W/4.5" AUGER** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, damp, reddish brown, Silty, fine to medium SAND			
2				ML	**YOUNG ALLUVIUM (Qya)** Medium dense, damp, reddish brown, fine Sandy SILT			
4				ML	**OLDER ALLUVIUM (Qoal)** Dense, damp, light reddish brown, fine Sandy SILT			
6					BORING TERMINATED AT 6 FEET No groundwater encountered			

Figure A-56,
Log of Boring P 3, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P 4** ELEV. (MSL.) **354'** DATE COMPLETED **09-24-2021** EQUIPMENT **INGERSOLL RAND A-300 W/4.5" AUGER** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, damp, light brown, Silty, fine to medium SAND			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Clayey, fine to medium SAND			
4				ML	**OLDER ALLUVIUM (Qoal)** Dense, damp, light reddish brown, fine Sandy SILT			
					BORING TERMINATED AT 5.5 FEET No groundwater encountered			

Figure A-57,
Log of Boring P 4, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P 5** ELEV. (MSL.) **354'** DATE COMPLETED **09-24-2021** EQUIPMENT **INGERSOLL RAND A-300 W/4.5" AUGER** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, damp, brown, Silty, fine SAND			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Clayey, fine SAND			
4				ML	**OLDER ALLUVIUM (Qoal)** Dense, damp, light brown, fine Sandy SILT			
					BORING TERMINATED AT 5.5 FEET No groundwater encountered			

Figure A-58,
Log of Boring P 5, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P 6** ELEV. (MSL.) **355'** DATE COMPLETED **09-24-2021** EQUIPMENT **INGERSOLL RAND A-300 W/4.5" AUGER** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, damp, light brown, Silty, fine to medium SAND			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, damp, reddish brown, Silty, fine SAND			
4				ML	**OLDER ALLUVIUM (Qoal)** Dense, damp, light brown, fine Sandy SILT			
6					BORING TERMINATED AT 6 FEET No groundwater encountered			

Figure A-59,
Log of Boring P 6, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING P 7** ELEV. (MSL.) **357'** DATE COMPLETED **09-24-2021** EQUIPMENT **INGERSOLL RAND A-300 W/4.5" AUGER** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, reddish brown, Silty, fine SAND			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, damp, reddish brown, Clayey, fine to medium SAND			
4				SM	**OLDER ALLUVIUM (Qoal)** Dense, damp, light brown, Silty, fine to medium SAND			
					BORING TERMINATED AT 5.5 FEET No groundwater encountered			

Figure A-60,
Log of Boring P 7, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

TRENCH T 1

ELEV. (MSL.) **353'** DATE COMPLETED **01-30-2019**

EQUIPMENT **BACKHOE** BY: **J. LANCASTER**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	T1-1			SC	**UNDOCUMENTED FILL (Qudf)** Loose, moist, dark brown, Clayey, fine to medium SAND; trace organics			
2				CL	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Sandy CLAY			
4				ML	**OLDER ALLUVIUM (Qoal)** Dense to very dense, damp, dark brown, Sandy SILT			
					TRENCH TERMINATED AT 5.5 FEET Groundwater not encountered			

Figure A-1,
Log of Trench T 1, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 2 ELEV. (MSL.) 354' DATE COMPLETED 01-30-2019 EQUIPMENT BACKHOE BY: J. LANCASTER	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist to wet, dark brown, Silty, fine to medium SAND; some organics			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Clayey, fine to medium SAND			
				ML	**OLDER ALLUVIUM (Qoal)** Dense to very dense, damp, dark brown, Sandy SILT			
					TRENCH TERMINATED AT 3.5 FEET Groundwater not encountered			

Figure A-2,
Log of Trench T 2, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 3 ELEV. (MSL.) 355' DATE COMPLETED 01-30-2019 EQUIPMENT BACKHOE BY: J. LANCASTER	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T3-1			SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, gray, Silty, fine to medium SAND; trace organics			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Clayey, fine to medium SAND -Becomes reddish brown			
4				ML	**OLDER ALLUVIUM (Qoal)** Dense to very dense, damp, dark reddish brown, Sandy SILT			
					TRENCH TERMINATED AT 5 FEET Groundwater not encountered			

Figure A-3,
Log of Trench T 3, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 4 ELEV. (MSL.) 360' DATE COMPLETED 01-30-2019 EQUIPMENT BACKHOE BY: J. LANCASTER MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, grayish brown, Silty, fine to medium SAND; trace organics			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Clayey, fine to medium SAND			
4					-Becomes medium to coarse grained			
6	T4-1			ML	**OLDER ALLUVIUM (Qoal)** Dense to very dense, damp, dark reddish brown, Sandy SILT			
8					-Becomes medium dense and clayey sand			
10		+ +			**GRANITIC ROCK (Kgr)** Completely weathered, weak, olive yellowish brown, fine- to coarse-grained GRANITIC ROCK TRENCH TERMINATED AT 10 FEET Groundwater not encountered			

Figure A-4,
Log of Trench T 4, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 5 ELEV. (MSL.) 363' DATE COMPLETED 01-30-2019 EQUIPMENT BACKHOE BY: J. LANCASTER	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T5-1			SM	**UNDOCUMENTED FILL (Qudf)** Loose, damp, dark grayish brown, Silty, fine to medium SAND; trace organics			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Clayey, fine to medium SAND			
4				ML	**OLDER ALLUVIUM (Qoal)** Dense to very dense, damp, dark bluish black, Sandy SILT			
					GRANITIC ROCK (Kgr) Weak, light grayish brown, completely weathered GRANITIC ROCK			
					TRENCH TERMINATED AT 5.5 FEET Groundwater not encountered			

Figure A-5,
Log of Trench T 5, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 6 ELEV. (MSL.) 372' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine SAND			
				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, damp, reddish brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
4								
6								
8								
10								
					TRENCH TERMINATED AT 11 FEET Groundwater not encountered			

Figure A-6,
Log of Trench T 6, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 7 ELEV. (MSL.) 362' DATE COMPLETED 01-30-2019 EQUIPMENT BACKHOE BY: J. LANCASTER	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T7-1			CL	**UNDOCUMENTED FILL (Qudf)** Loose, moist, dark reddish brown, Sandy CLAY; trace organics			
2				CL	**YOUNG ALLUVIUM (Qya)** Medium dense, damp, reddish brown, Sandy CLAY			
4	T7-2			ML	**OLDER ALLUVIUM (Qoal)** Dense to very dense, damp, reddish brown, Sandy SILT			
		+ +			**GRANITIC ROCK (Kgr)** Moderately weak, dark grayish to olive brown, highly weathered GRANITIC ROCK			
					TRENCH TERMINATED AT 5 FEET Groundwater not encountered			

Figure A-7,
Log of Trench T 7, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 8 ELEV. (MSL.) 364' DATE COMPLETED 01-30-2019 EQUIPMENT BACKHOE BY: J. LANCASTER	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SC	**UNDOCUMENTED FILL (Qudf)** Loose, damp, light yellowish brown, Clayey, fine to coarse SAND; trace organics			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark brown, Clayey, fine to medium SAND			
4	T18-1			ML	**OLDER ALLUVIUM (Qoal)** Dense to very dense, damp, dark reddish brown, Sandy SILT			
		+ +			**GRANITIC ROCK (Kgr)** Moderately weak, dark grayish to olive brown, highly weathered GRANITIC ROCK			
					TRENCH TERMINATED AT 5.5 FEET Groundwater not encountered			

Figure A-8,
Log of Trench T 8, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 9 ELEV. (MSL.) 357' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, reddish brown, Silty, fine SAND			
				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Clayey, fine SAND			
2				SM	Medium dense, moist, light reddish brown, Silty, fine to medium SAND			
				SM	**OLDER ALLUVIUM (Qoal)** Very dense, damp, light brown, Silty, fine to medium SAND			
4								
					GRANITIC ROCK (Kgr) Weak, olive brown, completely weathered GRANITIC ROCK			
6								
					TRENCH TERMINATED AT 7.5 FEET Groundwater not encountered			

Figure A-9,
Log of Trench T 9, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2332-11-01

TRENCH T 10

ELEV. (MSL.) **359'** DATE COMPLETED **01-30-2019**

EQUIPMENT **BACKHOE** BY: **J. LANCASTER**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry, grayish brown, Silty, fine to medium SAND; trace organics			
2	T10-1			CL	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark brown, Sandy CLAY -Becomes reddish brown			
4								
6	T10-2			ML	**OLDER ALLUVIUM (Qoal)** Very dense, moist, bluish black, Sandy SILT -Becomes dense			
					TRENCH TERMINATED AT 7.5 FEET Groundwater not encountered			

Figure A-10,
Log of Trench T 10, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 11 ELEV. (MSL.) 355' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine SAND; some roots			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Clayey, fine SAND			
4				SM	**OLDER ALLUVIUM (Qoal)** Dense, damp, light reddish brown, Silty, fine SAND			
6					**GRANITIC ROCK (Kgr)** Weak, reddish brown, completely weathered GRANITIC ROCK			
8					TRENCH TERMINATED AT 8 FEET Groundwater not encountered			

Figure A-11,
Log of Trench T 11, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 12 ELEV. (MSL.) 354' DATE COMPLETED 01-30-2019 EQUIPMENT BACKHOE BY: J. LANCASTER	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, dark reddish brown, Silty, fine to medium SAND; trace organics			
	T12-1			SM	**YOUNG ALLUVIUM (Qya)** Medium dense, damp, reddish brown, Silty, fine to medium SAND			
2								
				ML	**OLDER ALLUVIUM (Qoal)** Dense, damp, light reddish brown, Sandy SILT			
4								
6				SM	Medium dense, damp, light brown, Silty, fine to medium SAND			
		+ + + + + +			**GRANITIC ROCK (Kgr)** Weak, olive brown, completely weathered GRANITIC ROCK			
8					TRENCH TERMINATED AT 8.5 FEET Groundwater not encountered			

Figure A-12,
Log of Trench T 12, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 13 ELEV. (MSL.) 371' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Silty, fine to coarse SAND			
4					**GRANITIC ROCK (Kgr)** Weak, olive brown, completely weathered GRANITIC ROCK			
6					-Becomes moderately weathered			
					TRENCH REFUSAL AT 6.5 FEET Groundwater not encountered			

Figure A-13,
Log of Trench T 13, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 14 ELEV. (MSL.) 371' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown to grayish brown, Silty, fine to medium SAND; little gravel			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Silty, fine SAND			
4					**GRANITIC ROCK (Kgr)** Weak, light brown, completely weathered GRANITIC ROCK			
6					-Becomes highly weathered			
					TRENCH TERMINATED AT 7.5 FEET Groundwater not encountered			

Figure A-14,
Log of Trench T 14, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 15 ELEV. (MSL.) 374' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T15-1			SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND; some gravel			
2					-Boulder 18-inch diameter			
4					-Becomes medium dense **GRANITIC ROCK (Kgr)** Weak, light olive brown, completely weathered GRANITIC ROCK			
6					-Becomes highly weathered			
8								
10					-Becomes moderately weathered TRENCH REFUSAL AT 10 FEET Groundwater not encountered			

Figure A-15,
Log of Trench T 15, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 16 ELEV. (MSL.) 384' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	T16-1				**GRANITIC ROCK (Kgr)** Weak, olive brown, completely weathered GRANITIC ROCK			
2					-Becomes highly weathered			
4								
6					-Becomes moderately weathered			
					TRENCH REFUSAL AT 7 FEET Groundwater not encountered			

Figure A-16,
Log of Trench T 16, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 17** ELEV. (MSL.) **376'** DATE COMPLETED **01-30-2019** EQUIPMENT **XE 210CU** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, brown, completely weathered GRANITIC ROCK			
4								
6					-Becomes moderately weathered			
8					TRENCH REFUSAL AT 8 FEET Groundwater not encountered			

Figure A-17,
Log of Trench T 17, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 18 ELEV. (MSL.) 371' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine SAND			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, brown, Silty, fine to medium SAND			
4					**GRANITIC ROCK (Kgr)** Weak, brown, completely weathered GRANITIC ROCK			
6					-Becomes highly weathered			
8					TRENCH TERMINATED AT 8 FEET Groundwater not encountered			

Figure A-18,
Log of Trench T 18, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 19 ELEV. (MSL.) 372' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, brown, Silty, fine to medium SAND			
2					-Becomes reddish brown			
4					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
6					-Becomes moderately weathered			
					TRENCH REFUSAL AT 6.5 FEET Groundwater not encountered			

Figure A-19,
Log of Trench T 19, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 20 ELEV. (MSL.) 380' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND -Boulder 12-inch diameter			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
4								
					TRENCH REFUSAL AT 5 FEET Groundwater not encountered			

Figure A-20,
Log of Trench T 20, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 21 ELEV. (MSL.) 378' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Medium dense, moist, brown, Silty, fine to coarse SAND; some roots			
2								
4					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
6					-Becomes moderately weathered TRENCH REFUSAL AT 6 FEET Groundwater not encountered			

Figure A-21,
Log of Trench T 21, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 22 ELEV. (MSL.) 372' DATE COMPLETED 01-30-2019 EQUIPMENT XE 210CU BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, damp, brown, Silty, fine SAND			
4					-Becomes light reddish brown; some roots			
6					**GRANITIC ROCK (Kgr)** Weak, olive brown, completely weathered GRANITIC ROCK			
8					-Becomes highly weathered			
10					TRENCH TERMINATED AT 10 FEET Groundwater not encountered			

Figure A-22,
Log of Trench T 22, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 23 ELEV. (MSL.) **354'** DATE COMPLETED **01-30-2019** EQUIPMENT **BACKHOE** BY: **J. LANCASTER**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, damp, dark reddish brown, Silty, fine to medium SAND; some organics			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Silty, fine to medium SAND			
4				SM	**OLDER ALLUVIUM (Qoal)** Dense, damp, reddish brown, Silty, fine to medium SAND			
6								
8					**GRANITIC ROCK (Kgr)** Weak, olive brown, completely weathered GRANITIC ROCK TRENCH TERMINATED AT 8 FEET Groundwater not encountered			

Figure A-23,
Log of Trench T 23, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 24 ELEV. (MSL.) 361' DATE COMPLETED 01-30-2019 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC	**UNDOCUMENTED FILL (Qudf)** Loose, wet, olive brown, Clayey, fine SAND; roots			
2				SC	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Clayey, fine SAND			
				SM	**OLD ALLUVIUM (Qoal)** Medium dense, moist, dark reddish brown, Silty, fine SAND			
4					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
					TRENCH TERMINATED AT 5 FEET Groundwater not encountered			

Figure A-24,
Log of Trench T 24, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 25 ELEV. (MSL.) 369' DATE COMPLETED 06-02-2020 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry to damp, brown, Silty, fine to coarse SAND; gravel and cobble up to 6-inch diameter			
2								
				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Silty, fine to medium SAND			
4								
6								
					GRANITIC ROCK (Kgr) Weak, light brown, completely weathered GRANITIC ROCK			
8								
10					-Becomes highly weathered			
					TRENCH TERMINATED AT 11.5 FEET Groundwater not encountered			

Figure A-25,
Log of Trench T 25, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 26 ELEV. (MSL.) 371' DATE COMPLETED 06-02-2020 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, dry to damp, Silty, fine to coarse SAND; gravel and cobble up to 6-inch diameter			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Silty, fine to medium SAND			
4								
6					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
8								
10					-Becomes highly weathered			
					TRENCH TERMINATED AT 11 FEET Groundwater not encountered			

Figure A-26,
Log of Trench T 26, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 27** ELEV. (MSL.) **370'** DATE COMPLETED **06-02-2020** EQUIPMENT **LINK BELT 460 LX (2' Bucket w/ single shank)** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine SAND			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Silty, fine to medium SAND			
4								
6								
8					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
10								
12					-Becomes highly weathered			
					TRENCH TERMINATED AT 12.5 FEET Groundwater not encountered			

Figure A-27,
Log of Trench T 27, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 28 ELEV. (MSL.) 372' DATE COMPLETED 06-02-2020 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine SAND			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, brown, Silty, fine to medium SAND			
4					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
6					-Becomes highly weathered			
					PRACTICAL REFUSAL AT 7 FEET Groundwater not encountered			

Figure A-28,
Log of Trench T 28, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 29 ELEV. (MSL.) 371' DATE COMPLETED 06-02-2020 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine SAND			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Silty, fine to medium SAND			
4					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
6								
8					-Becomes highly weathered			
10					TRENCH TERMINATED AT 10 FEET Groundwater not encountered			

Figure A-29,
Log of Trench T 29, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 30 ELEV. (MSL.) 372' DATE COMPLETED 06-02-2020 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
4								
6					-Becomes moderately weathered			
8								
					PRACTICAL REFUSAL AT 9 FEET Groundwater not encountered			

Figure A-30,
Log of Trench T 30, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 31 ELEV. (MSL.) 371' DATE COMPLETED 06-03-2020 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine SAND			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, reddish brown, Silty, fine to medium SAND			
4					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
6								
8					-Becomes highly weathered			
					PRACTICAL REFUSAL AT 9.5 FEET Groundwater not encountered			

Figure A-31,
Log of Trench T 31, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 32 ELEV. (MSL.) 372' DATE COMPLETED 06-03-2020 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
4								
6					-Becomes highly weathered			
8					PRACTICAL REFUSAL AT 8 FEET Groundwater not encountered			

Figure A-32,
Log of Trench T 32, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 33 ELEV. (MSL.) 376' DATE COMPLETED 06-03-2020 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0		+ +			**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
2		+ +			-Becomes highly weathered			
4		+ +						
					PRACTICAL REFUSAL AT 5 FEET Groundwater not encountered			

Figure A-33,
Log of Trench T 33, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 34 ELEV. (MSL.) 372' DATE COMPLETED 06-03-2020 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
4								
6								
8					-Becomes highly weathered			
					PRACTICAL REFUSAL AT 9 FEET Groundwater not encountered			

Figure A-34,
Log of Trench T 34, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 35 ELEV. (MSL.) 378' DATE COMPLETED 06-03-2020 EQUIPMENT LINK BELT 460 LX (2' Bucket w/ single shank) BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
4					-Becomes highly weathered			
6								
8								
					PRACTICAL REFUSAL AT 9.5 FEET Groundwater not encountered			

Figure A-35,
Log of Trench T 35, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 36 ELEV. (MSL.) 370' DATE COMPLETED 06-05-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine SAND			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, damp, reddish brown, Silty, fine to medium SAND			
4					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
6					-Becomes highly weathered			
8					TRENCH TERMINATED AT 8 FEET Groundwater not encountered			

Figure A-36,
Log of Trench T 36, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 37 ELEV. (MSL.) 372' DATE COMPLETED 06-05-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
8					-Becomes highly weathered			
10					TRENCH TERMINATED AT 10 FEET Groundwater not encountered			

Figure A-37,
Log of Trench T 37, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 38 ELEV. (MSL.) 384' DATE COMPLETED 06-05-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
4					-Becomes highly weathered			
6					-Becomes moderately weathered			
8					-Boulders up to 8 feet in diameter			
10								
12								
14								
					PRACTICAL REFUSAL AT 14.5 FEET Groundwater not encountered			

Figure A-38,
Log of Trench T 38, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 39** ELEV. (MSL.) **383'** DATE COMPLETED **06-05-2020** EQUIPMENT **LINK BELT 800 LX** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, highly weathered GRANITIC ROCK			
2					-Becomes moderately weathered			
4								
6								
8								
10								
					PRACTICAL REFUSAL AT 11 FEET Groundwater not encountered			

Figure A-39,
Log of Trench T 39, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 40 ELEV. (MSL.) 380' DATE COMPLETED 06-08-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
10					-Becomes moderately weathered			
18					PRACTICAL REFUSAL AT 18 FEET Groundwater not encountered			

Figure A-40,
Log of Trench T 40, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 41 ELEV. (MSL.) 380' DATE COMPLETED 06-08-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
2					-Becomes highly weathered			
4								
6								
8								
					PRACTICAL REFUSAL AT 9 FEET Groundwater not encountered			

Figure A-41,
Log of Trench T 41, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 42** ELEV. (MSL.) **380'** DATE COMPLETED **06-08-2020** EQUIPMENT **LINK BELT 800 LX** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, highly weathered GRANITIC ROCK			
4					-Becomes moderately weathered			
6					-Boulders up to 8 feet in diameter			
8								
10					PRACTICAL REFUSAL AT 10 FEET Groundwater not encountered			

Figure A-42,
Log of Trench T 42, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 43 ELEV. (MSL.) 381' DATE COMPLETED 06-09-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, highly weathered GRANITIC ROCK			
4								
6								
8								
10					-Becomes moderately weathered			
12								
14					PRACTICAL REFUSAL AT 14 FEET Groundwater not encountered			

Figure A-43,
Log of Trench T 43, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 44 ELEV. (MSL.) 380' DATE COMPLETED 06-09-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
4					-Becomes highly weathered			
6					-Boulders up to 8 feet in diameter			
8								
10					-Becomes moderately weathered			
12								
					PRACTICAL REFUSAL AT 13 FEET Groundwater not encountered			

Figure A-44,
Log of Trench T 44, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 45 ELEV. (MSL.) 383' DATE COMPLETED 06-11-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, highly weathered GRANITIC ROCK			
4								
6								
8								
					-Becomes moderately weathered			
10					PRACTICAL REFUSAL AT 10 FEET Groundwater not encountered			

Figure A-45,
Log of Trench T 45, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 46 ELEV. (MSL.) 381' DATE COMPLETED 06-11-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
4								
6					-Becomes moderately weathered			
8					PRACTICAL REFUSAL AT 8 FEET Groundwater not encountered			

Figure A-46,
Log of Trench T 46, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 47 ELEV. (MSL.) 370' DATE COMPLETED 06-11-2020 EQUIPMENT LINK BELT 400 LX BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2								
4				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Silty, fine to coarse SAND			
6					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
8								
10								
					TRENCH TERMINATED AT 11.5 FEET Groundwater not encountered			

Figure A-47,
Log of Trench T 47, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 48 ELEV. (MSL.) 369' DATE COMPLETED 06-11-2020 EQUIPMENT LINK BELT 400 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2								
4				SM	-3"-4" Concrete slab **YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Silty, fine to coarse SAND			
6					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
8								
					TRENCH TERMINATED AT 8.5 FEET Groundwater not encountered			

Figure A-48,
Log of Trench T 48, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 49 ELEV. (MSL.) 370' DATE COMPLETED 06-11-2020 EQUIPMENT LINK BELT 400 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2					-3" Asphalt concrete section			
				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Silty, fine to coarse SAND			
4					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
6					-Becomes highly weathered			
8								
10								
					TRENCH TERMINATED AT 11.5 FEET Groundwater not encountered			

Figure A-49,
Log of Trench T 49, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 50 ELEV. (MSL.) 371' DATE COMPLETED 06-11-2020 EQUIPMENT LINK BELT 400 LX BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, brown, Silty, fine to medium SAND			
2								
4				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, moist, dark reddish brown, Silty, fine to coarse SAND			
6					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
8								
10					-Becomes highly weathered			
12								
					TRENCH TERMINATED AT 13.5 FEET Groundwater not encountered			

Figure A-50,
Log of Trench T 50, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 51 ELEV. (MSL.) 386' DATE COMPLETED 06-12-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Medium dense, moist, brown, Silty, fine to coarse SAND; some roots			
2								
				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, damp, brown, Silty, fine SAND			
4					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
6								
8					-Boulder up to 5 feet diameter			
					-Becomes highly weathered			
10								
12								
14								
16								
					PRACTICAL REFUSAL AT 16.5 FEET Groundwater not encountered			

Figure A-51,
Log of Trench T 51, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 52 ELEV. (MSL.) 380' DATE COMPLETED 06-12-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**UNDOCUMENTED FILL (Qudf)** Medium dense, moist, brown, Silty, fine to coarse SAND; some roots			
2				SM	**YOUNG ALLUVIUM (Qya)** Medium dense, damp, brown, Silty, fine SAND			
4					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, completely weathered GRANITIC ROCK			
6					-Becomes highly weathered			
8								
					PRACTICAL REFUSAL AT 9.5 FEET Groundwater not encountered			

Figure A-52,
Log of Trench T 52, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2332-11-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 53 ELEV. (MSL.) 382' DATE COMPLETED 06-12-2020 EQUIPMENT LINK BELT 800 LX BY: K. HAASE	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED FILL (Qudf)** Loose, moist, dark brown, Silty, fine to medium SAND			
2								
4								
6								
8					**GRANITIC ROCK (Kgr)** Weak, light grayish brown, highly weathered GRANITIC ROCK			
10					TRENCH TERMINATED AT 10 FEET Groundwater not encountered			

Figure A-53,
Log of Trench T 53, Page 1 of 1

G2332-11-01.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL
... STANDARD PENETRATION TEST
... DRIVE SAMPLE (UNDISTURBED)
... DISTURBED OR BAG SAMPLE
... CHUNK SAMPLE
... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

APPENDIX B

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with generally currently accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. We tested selected soil samples for maximum dry density and optimum moisture content, shear strength, expansion index, water-soluble sulfate content, and resistance value (R-Value) characteristics. The following tables present the results of our laboratory tests.

SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS ASTM D 1557

Sample No.	Depth (feet)	Description (Geologic Unit)	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
T5-1	0.5-3	Reddish brown, Silty, fine SAND (Qudf and Qya)	131.7	8.6

SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS ASTM D 3080

Sample No.	Depth (feet)	Geologic Unit	Dry Density (pcf)	Moisture Content (%)		Peak [Ultimate[1]] Cohesion (psf)	Peak [Ultimate[1]] Angle of Shear Resistance (degrees)
				Initial	Final		
T5-1[2]	0.5-3	Qudf/Qya	119.4	8.4	14.2	475 [375]	33 [33]

1 Ultimate at end of test at 0.2 inch deflection.
2 Sample remolded to approximately 90 percent of the laboratory maximum dry density at near optimum moisture content.

SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS ASTM D 4829

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	2022 CBC Expansion Classification	ASTM Soil Expansion Classification
	Before Test	After Test				
T1-1	9.6	17.2	111.0	31	Expansive	Low
T7-1	9.5	17.1	111.5	12	Non-Expansive	Very Low
T8-1	14.0	28.5	94.0	33	Expansive	Low

SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Depth (feet)	Geologic Unit	Water-Soluble Sulfate (%)	Sulfate Exposure Class
T1-1	0.5-5.5	Qudf/Qya	0.027	S0

SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS
ASTM D 2844

Sample No.	Depth (feet)	Description (Geologic Unit)	R-Value
T1-1	0.5-5.5	Dark brown, Sandy CLAY (Qudf/Qya)	9
T7-1	0.5-3.5	Reddish brown, Sandy CLAY (Qudf/Qya)	34

APPENDIX C

APPENDIX C

RECOMMENDED GRADING SPECIFICATIONS

FOR

SANTEE AUTO CENTER
SANTEE, CALIFORNIA

PROJECT NO. G2332-11-01

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9

and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition.

4. CLEARING AND PREPARING AREAS TO BE FILLED

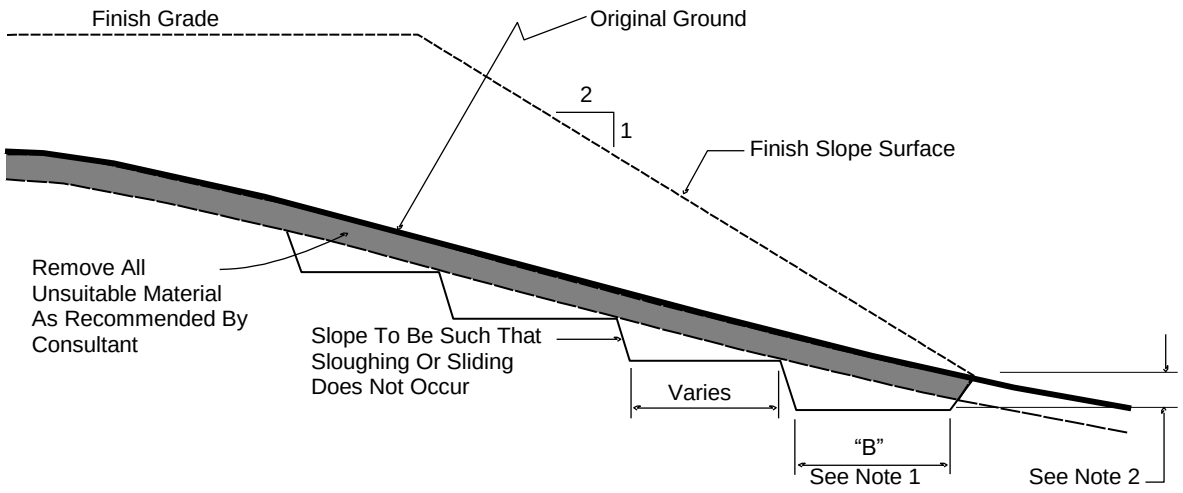
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES:

(1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection

variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

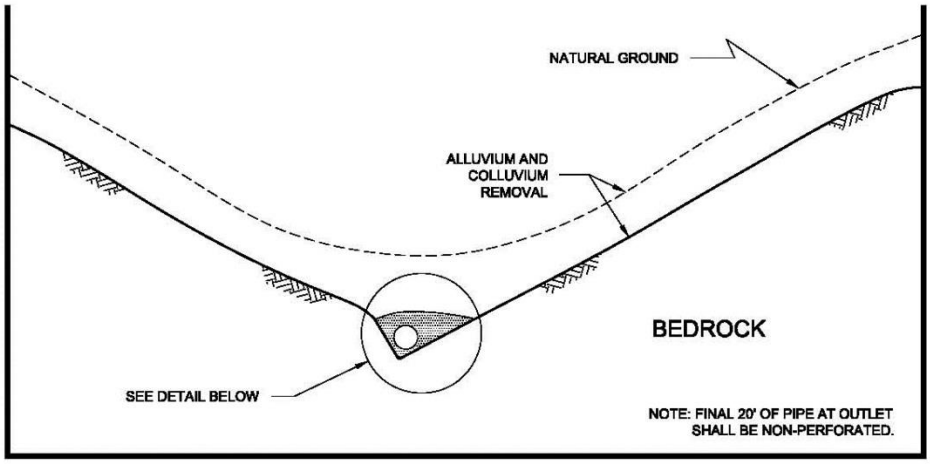
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

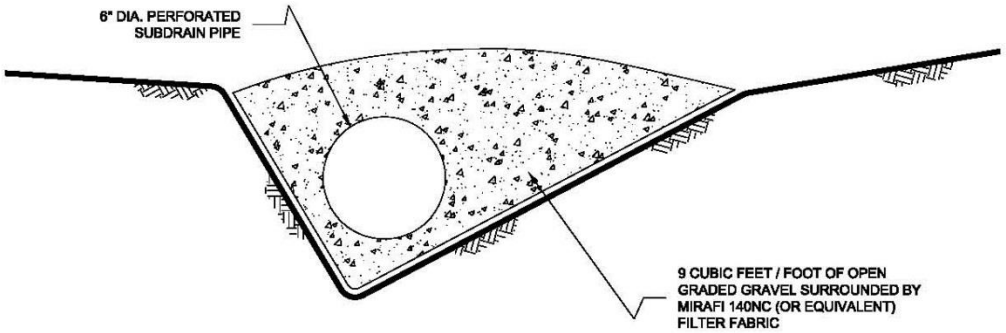
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

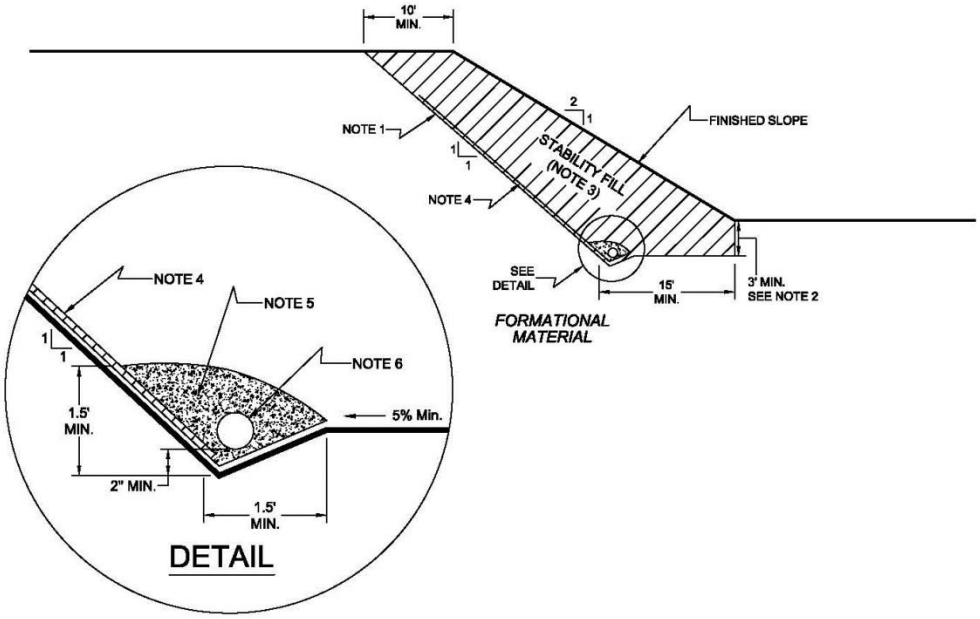
1.....6-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS
IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2.....6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS
LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

NO SCALE

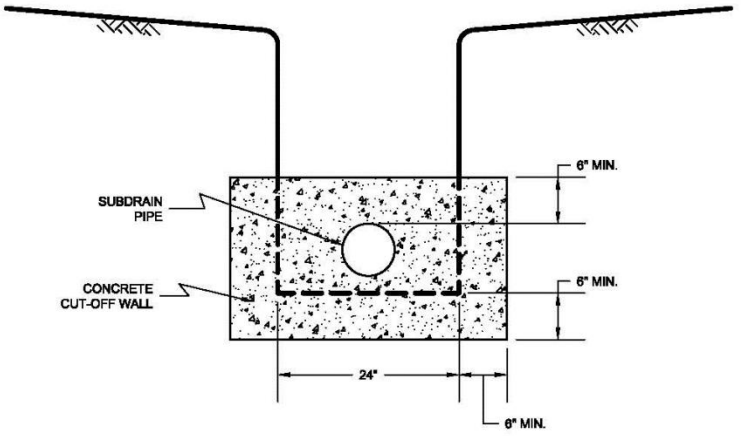
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

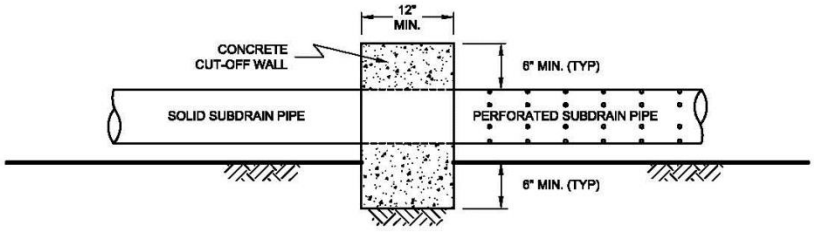
TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW

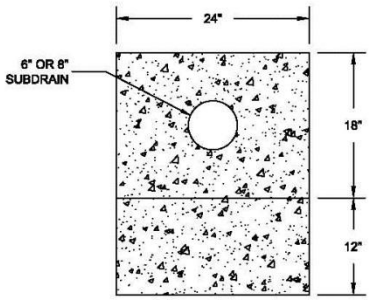


NO SCALE

7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

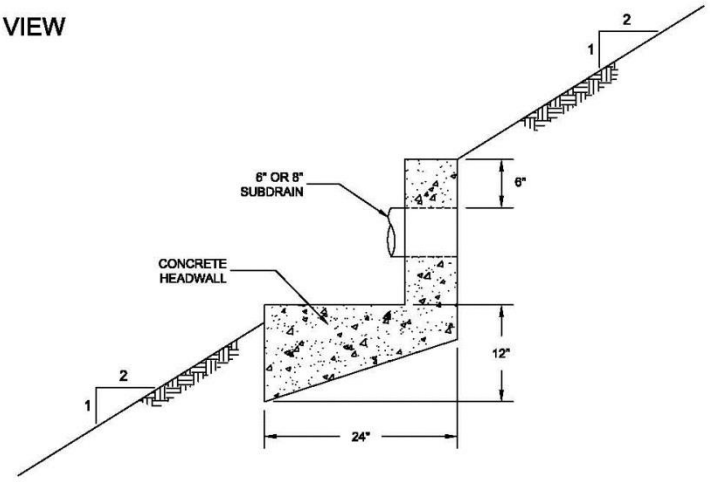
TYPICAL HEADWALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW



NOTE: HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop*.

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

LIST OF REFERENCES

1. *2022 California Building Code, California Code of Regulations, Title 24, Part 2, based on the 2021 International Building Code,* prepared by California Building Standards Commission, dated July 2022.

2. *ACI 318-19, Commentary on Building Code Requirements for Structural Concrete,* prepared by the American Concrete Institute, dated May 2019.

3. *ACI 330-21, Commercial Concrete Parking Lots and Site Paving Design and Construction,* prepared by the American Concrete Institute, dated May 2021.

4. American Society of Civil Engineers (ASCE), *ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures,* 2017.

5. California Department of Conservation, Division of Mines and Geology, *Probabilistic Seismic Hazard Assessment for the State of California,* Open File Report 96-08, 1996.

6. County of San Diego, San Diego County Multi Jurisdiction Hazard Mitigation Plan, San Diego, California – Final Draft, dated 2017.

7. Geocon, Incorporated, *Geotechnical/Seismic Hazard Study for the Safety Element of the Santee General Plan, City of Santee, County of San Diego, California,* dated October 31, 2002 (Project No. 06828-32-01).

8. Geocon, Incorporated, *Geotechnical/Seismic Hazard Study for the Safety Element of the Santee General Plan, City of Santee, County of San Diego, California,* dated March 29, 2021 (Project No. G2647-52-01).

9. Historical Aerial Photos. http://www.historicaerials.com

10. Jennings, C. W., 1994, California Division of Mines and Geology, *Fault Activity Map of California and Adjacent Areas,* California Geologic Data Map Series Map No. 6.

11. Todd, Victoria R., *Preliminary Geologic Map of the El Cajon 30' x 60' Quadrangle, Southern California,* USGS, Open File Report 2004-1361, Scale 1:100,000, 2004.

12. Special Publication 117A, *Guidelines For Evaluating and Mitigating Seismic Hazards in California 2008,* California Geological Survey, Revised and Re-adopted September 11, 2008

13. Unpublished Geotechnical Reports and Information, Geocon Incorporated.

14. USGS computer program, *Seismic Hazard Curves and Uniform Hazard Response Spectra,* http://earthquake.usgs.gov/research/hazmaps/design/.