Prepared for Target Corporation

DRAFT GEOTECHNICAL INVESTIGATION
PROPOSED TARGET STORE
LA MADRONA DRIVE AND
SILVERWOOD DRIVE
SCOTTS VALLEY, CALIFORNIA

September 16, 2008
File No.: 94335

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September 16, 2008
Project No. 94335

Mr. John Dewes
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submitted via e-mail *john.dewes@target.com*

SUBJECT: Draft Geotechnical Investigation Report for Proposed Target Store, La Madrona Drive and Silverwood Drive, Scotts Valley, California

Dear Mr. Dewes:

Kleinfelder is pleased to present this draft report summarizing our preliminary geotechnical investigation report for the proposed Target store located northwest of the intersection of La Madrona Drive and Silverwood Drive in Scotts Valley, California. The enclosed report provides a description of the investigation performed and our geotechnical recommendations for the project. Our services were provided in accordance with our proposal dated May 2, 2008, File No. 01201PROP (SJO8P104). Our investigation and this report have been prepared in accordance with the Target Developer Guide, Edition 2.8, dated January 1, 2008.

We appreciate the opportunity of providing our services to you on this project and trust this report meets your needs at this time. As a draft, we have also provided a copy to Loren Braun directly as well. We await comments and any questions you or Loren may have. If you have any questions concerning the information presented, please contact this office at (408) 586-7611, or Mark Klaver at (916) 366-1701

Sincerely,
KLEINFELDER WEST, INC.

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PROPOSED TARGET STORE
LA MADRONA DRIVE AND
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1 EXECUTIVE SUMMARY

Kleinfelder West, Inc. (Kleinfelder) has completed a subsurface exploration and geotechnical report for use in design and construction of the proposed Scotts Valley Target store to be located at the northwest corner of the intersection of La Madrona Drive and Silverwood Drive in Scotts Valley, California. This site is shown on the Site Vicinity Map, Plate 1. Our geotechnical investigation and this report were conducted and prepared in accordance with the Target Developer Guide, Ed. 2.8, dated January 1, 2008. A total of twenty-nine borings, five test pits and a seismic refraction survey were completed as part of our investigation.

Based on the results of our study, the site is geotechnically suitable for the proposed construction subject to our recommendations. Key design items are summarized below, and are discussed in greater detail in the body of this report.

1.1. PROJECT DESCRIPTION

Based on the preliminary design drawings, the project will include construction of a regular Target store (Type P09), covering approximately 150,000 square feet, a two-level parking structure, and tiered retaining walls varying from 8 to 12 feet in height. The split-level parking structure will include construction of a 12 feet high retaining structure near the middle of the parking area. Tiered retaining wall systems with up to four walls are planned for the proposed slopes along the western, eastern, and southern perimeters of the project. Other proposed improvements include a depressed loading dock, and two driveways.

According to the Grading & Drainage Plan prepared by C2G/Civil Consultants Group, dated November 12, 2007, the preliminary design plans call for significant grading of the site with cuts and fills on the order of 25 to 30 feet (see Plate 2). Grading of the site will create a cut-to-fill transition beneath the building pad that will require fills of up to 25 feet beneath the eastern portion of the store. Cut and fill slopes in the range of 20 to 45 feet in height are also planned and will include tiered retaining wall systems. The highest cut slope, up to 45 feet in height, is planned along the base of the western natural slope

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that ascends almost 175 feet from the design pad grade to the crest of an adjacent ridgeline. The finish floor elevation of the store and the upper parking level will lie at an elevation of approximately 618 feet. The lower parking level will rest at an elevation of approximately 606 feet.

1.2. SUBSURFACE CONDITIONS

The proposed Target Store will be constructed on an undeveloped parcel located in the central portion of the Santa Cruz Mountains. Geologic conditions in the local area are often complex, created by movement associated with the San Andreas fault system over the last 25 million years. The site is underlain by surficial soils and three geologic formations including the Santa Cruz Mudstone, Santa Margarita Sandstone, and quartz diorite bedrock. The surficial soils are typically only a few feet thick, but can be over 10 feet thick in localized areas. Along the western portion of the site, a few shallow debris flow deposits are present along the steeper portions of the natural slope. Santa Margarita Sandstone underlies most of the site and is composed of permeable poorly-graded sand that is mined in the local area for construction purposes and also acts as an aquifer in other parts of the surrounding region. The sandstone overlies quartz diorite bedrock, which is an intrusive igneous rock that is closely related to granite. The quartz diorite is relatively impermeable, and is very hard. Groundwater is present within the sandstone in a perched condition where it overlies the underlying impermeable bedrock.

1.3. KEY CONCLUSIONS AND RECOMMENDATIONS

The primary geotechnical concerns for this site are:

1) the potential for differential settlement;

The proposed grading will create a cut-to-fill transition beneath the proposed building. This transition, if not taken into consideration, can create intolerable amounts of differential settlement beneath the building pad. In order to lessen the impact that differential settlement may have, we recommend that a minimum of 3 feet of engineered fill be placed beneath the foundation and slab of the proposed building.

2) the rippability of the underlying bedrock (quartz diorite);

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The underlying bedrock (quartz diorite) is very hard, and based on the results of our seismic refraction (rippability) survey is non-rippable and may require blasting or the use of special excavation equipment, where encountered above proposed grades. We identified an area in the northwest portion of the project, where non-rippable bedrock may be encountered above the proposed grade of the upper level parking lot and possibly the adjacent slope.

3) the stability of the proposed slopes and tiered retaining wall systems;

Based on the results of our slope stability analyses, the proposed slope and retaining wall systems are globally stable if recommendations discussed in this report are utilized. All retaining wall systems should include a keyway system as recommended in this report and as shown on Plates G -1 and G -2. Kleinfelder should be involved with future design efforts including review of future retaining wall plans. Please note that installation of subdrainage is vital for long-term performance of these walls, and should be incorporated to future designs and plans.

4) the control of perched groundwater conditions;

Perched groundwater is present in the subsurface and will require some form of control in order to reduce future seepage from occurring during the lifetime of the development. In an effort to mitigate this problem, we recommend installation of subdrain along the sandstone and bedrock contact during grading and installation of subdrains beneath the building pad, and possibly the lower level parking area.

5) the debris flow potential of the western slope and related building clearance.

Based on the current grading plan, the northeast corner of the store (adjacent to the main entrance) does not meet the building setback requirements of Section 1805.3.2 of the 2007 California Building Code (CBC). In order to comply with this section of the CBC, the building foundation will have to be embedded at least 10 feet below the current pad elevation of about 618 feet. Detailed structural engineering and geotechnical analyses will be required to design foundations and retaining structures for this portion of the building. A variance from this section of the code could be requested from the governing agency, but will require our review of future foundation and retaining

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wall plans and calculations. We should review the design of future retaining wall designs for this area. Please note that installation of subdrainage is vital for long-term performance of these walls, and should be incorporated to future designs and plans.

Based on the current design, the distance between the western building wall and the toe of the adjacent proposed slope and retaining wall varies from 8 to 10 feet. This distance is less than that required by Section 1805.3.1 and Figure 1805.3.1 of the 2007 CBC. According to Section 1805.3.1, the building should be setback 15 feet from the base of the proposed slope. A variance from the code to alter the setback and clearance distance can normally be requested from the governing agency. This typically requires a letter or report from a geotechnical consultant regarding the stability of the design and its long term performance. One of the main issues regarding long term performance is the impact that surface drainage and slope movement may have on the building. In this regard, the upper portions of the western slope have a low potential for generating shallow slope failures, or debris flows. As such, we would recommend that mitigation measures, such as deflection walls or reinforced debris fences, be placed along the top of the proposed slope.

This is an executive summary of findings and should not be relied upon without consulting the attached report for a more detailed description of the geotechnical evaluation performed by Kleinfelder, Inc. for Target Corporation. It is subject to the limitations included in Section 5 of our report.

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2 INTRODUCTION

Kleinfelder was retained by Target Corporation to conduct a geotechnical investigation at the site for the proposed Target Store development in Scotts Valley, California. The proposed store will be located at the northwest corner of La Madrona Drive and Silverwood Drive. A site vicinity map is presented on Plate 1. Our services were provided in accordance with our proposal dated May 2, 2008, File No. 01201PROP(SJO8P104) and conducted in accordance with the Target Developer Guide, Edition 2.8, dated January 1, 2008.

2.1. SITE DESCRIPTION

The proposed Target Store will be constructed on an undeveloped parcel that encompasses approximately 17 acres in the central portion of the Santa Cruz Mountains. According to development plans, approximately 10 acres of the site will be used for the proposed store and adjacent parking areas. The site is bounded on the north by a Hilton Hotel, La Madrona Drive to the east, Silverwood Drive to the south, and an undeveloped ridgeline to the west. The majority of the site is covered with various types of grasses and brush along with small groves of trees. The ridgeline area, which is located outside the planned development area, is covered with thick groves of trees and underbrush. Notable man-made features within the limits of the proposed development include a concrete pad and scattered piles of debris, which are both located in the southeast portion of the site.

The surface of the site slopes downward to the east toward La Madrona Drive at slight to moderate gradients that vary from about 10% to 45% (approximately 10Horizontal:1Vertical to 2H:1V). The steeper slopes occur along the western limit of the site where they ascend toward the adjacent ridgeline. Site elevations within the limits of the proposed development vary from approximately 590 feet along the east to 660 feet along the west. The crest of the western ridgeline, which is located outside the limits of the proposed development, reaches an elevation of approximately 790 feet.

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2.2. PROJECT DESCRIPTION

Based on the preliminary design drawings, the project will include construction of a regular Target store (Type P09), covering approximately 150,000 square feet, a two-level parking structure, and tiered retaining walls varying from 8 to 12 feet in height. The split-level parking structure will include construction of a 12 feet high retaining structure near the middle of the parking area. Tiered retaining wall systems with up to four walls are planned for the proposed slopes along the western, eastern, and southern perimeters of the project. Other proposed improvements include a depressed loading dock, and two driveways.

According to the Grading & Drainage Plan prepared by C2G/Civil Consultants Group, dated November 12, 2007, the preliminary design plans call for significant grading of the site with cuts and fills on the order of 25 to 30 feet (see Plate 2). Grading of the site will create a cut-to-fill transition beneath the building pad that will require fills of up to 25 feet beneath the eastern portion of the store. Cut and fill slopes in the range of 20 to 45 feet in height are also planned and will include tiered retaining wall systems. The highest cut slope, up to 45 feet in height, is planned along the base of the western natural slope that ascends almost 175 feet from the design pad grade to the crest of the ridgeline. The finish floor elevation of the store and the upper parking level will lie at an elevation of approximately 618 feet. The lower parking level will rest at an elevation of approximately 606 feet.

Based on the Target Developer Guide, Edition 2.8 and considering California climate typical interior column loads of 80 kips (dead plus half live loads) are anticipated, with maximum column loads of 140 kips. Typical perimeter wall loads of 2.1 kips per lineal foot (D.L.+L.L./2) with maximum bearing wall loads of 3.1 kips per lineal foot (D.L.+L.L./2) are also anticipated. Concrete floors will be designed to support a load of 125 pounds per square foot (psf), with intermediate point loads of up to 60 kips. Pavement is anticipated to be asphalt concrete with a 10-year to 20-year design life, corresponding to traffic indices of 4.5, 5.5 and 6.3. The proposed building location is illustrated on Plate 2.

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Information for the construction of the project was based on a review of the 2008 Target Developer Guide (Edition 2.8) and preliminary information and plans prepared by DES Architects/Engineers of Redwood City, California, which included the Grading and Drainage Plan prepared by C2G/Civil Consultants Group, dated November 12, 2007. Additional details of the planned construction, including architectural details, particular structural details, and retaining wall plans or specifications, were not available at the time of our investigation.

The above is our understanding of the project. Should the actual project differ from that described above, we will need to review our report recommendations for applicability.

2.3. PURPOSE AND SCOPE OF SERVICES

The purpose of our geotechnical investigation was to explore and evaluate the subsurface soil and groundwater conditions at the location of the proposed Target Store site.. This information was then used to develop geotechnical recommendations for site design including seismic site conditions. The information contained in this report is intended to be used by the project design team to evaluate the structural and civil engineering implications posed by the geotechnical constraints. Kleinfelder's investigation included obtaining information to address the potential corrosivity of the near-surface soils and earthwork construction considerations.

Kleinfelder's scope of our services for this project was presented in our proposal dated May 2, 2008, File No. 01201PROP(SJO8P104). A summary description of the scope of work performed for this investigation is presented below:

- Twenty-nine (29) Soil Borings – Twenty-seven small diameter (27) and two large diameter borings were drilled, with fifteen (15) within in the proposed Target store area
- Five (5) test pits
- A seismic refraction (rippability) survey
- Laboratory testing
- Design analysis, including slope stability
- Preparation of this written report regarding the Target Store

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2.4. PREVIOUS GEOTECHNICAL STUDIES

A previous geotechnical study was performed for the site by Treadwell & Rollo (T&R) in 2001. Their study was conducted for a proposed office building and included seven small diameter borings varying from approximately 9 to 24 feet in depth. Two of the borings are located within the limits of the proposed Target Store. Piezometers were installed in three of the borings by T&R and were recently accessed by LFR, Inc. Groundwater level measurements were recorded by LFR, Inc. and submitted to us for our review.

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3 SITE INVESTIGATION

3.1. FIELD INVESTIGATION

Prior to the start of our field investigation, Underground Services Alert (USA) was contacted to locate utilities within the pertinent street rights-of-way adjacent to the site. As required by local ordinance, a drilling permit was obtained from the Scotts Valley Water District (Permit No. 06062008). Excess soil cuttings generated during our drilling operations were left on-site adjacent to the borings. Boreholes were backfilled in accordance with the permit requirements. Prior to field exploration we performed daily on-site safety meetings that included all field personnel present.

The boring, test pit and seismic survey locations were estimated by our field professional based on visual sightings and/or measurements from existing site features. The elevations of the borings were estimated based on existing grading plans by C2G/Civil Consultants Group. As such, the locations and elevations of the borings, test pits and seismic survey should be considered accurate only to the degree implied by the methods used. The approximate location of the borings, test pits and seismic survey are depicted on the Preliminary Geotechnical Map (Plate 2).

3.2. SOIL BORINGS

The auger borings were performed by Britton Exploration of Los Gatos, California using a rubber track-mounted limited access drill rig capable of utilizing up to 8-inch diameter hollow-stem continuous flight augers and smaller 4-inch solid flight augers. Due to the stiff soil and rock conditions, solid 4-inch diameter flight augers were used for most of the borings. The twenty-seven borings (designated B-1 through B-27) were drilled at the approximate locations shown on the accompanying grading plan, Plate 2. They ranged from approximately 5 to 30 feet in depth below the existing ground surface. Our project geologist and engineer selected the specific boring locations, boring depths, and sampling intervals.

The borings were logged by our field geologist on a full-time basis and soil and rock samples were obtained from the borings at selected intervals. The soil and rock

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encountered in each boring was visually classified in the field, and a continuous log was recorded for each boring. Soil and rock classifications made in the field from auger cuttings and samples were modified in the laboratory, if needed, after further examination and testing. Soil and bedrock materials were classified in general accordance with the Unified Soil Classification System and the Engineering Geology Field Manual by the U.S. Department of the Interior, Bureau of Reclamation, respectively (see Plate A-1). Logs of the borings are presented on Plates A-2 through A-28 (Appendix A). Groundwater levels were measured at each boring location during or immediately after drilling.

Relatively undisturbed samples of the subsurface materials were obtained using 3-inch outside diameter (O.D.) and 2.5-inch inside diameter (I.D.) California sampler and disturbed samples were obtained using a 2-inch O.D. and 1.375-inch I.D. Standard Penetration Sampler (SPT). The samplers were driven 18 inches using a 140-pound hammer falling 30 inches operated using a semi-automatic trip-hammer. The blow counts were recorded for successive 6-inch penetration intervals. The number of blows required to drive the last 12 inches at each depth sampled was recorded as the Penetration Resistance (blows/foot) on the boring logs. After the samplers were withdrawn from the test borings, the sampler tubes or samples were removed, examined for logging purposes, labeled, and sealed to retain the natural moisture content for laboratory testing. Prior to sealing the samples, strength characteristics of the cohesive soil samples recovered were evaluated using a hand-held pocket penetrometer. The results of these tests are shown adjacent to the samples on the boring logs.

3.2.1. Bucket Auger Borings

Two large-diameter bucket auger borings were performed by Tri-Valley Drilling of Ventura, California using a truck-mounted bucket auger drill rig capable of drilling borings from 12- to 30-inch in diameter. Borings for this project were approximately 24-inch diameter and drilled to depths of approximately 24 to 37 feet.

The borings were logged at the surface by our field geologist on a full-time basis and soil and rock samples were obtained from the borings at selected intervals. The soil

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and rock encountered in each boring was visually classified in the field, and a continuous log was recorded for each boring. Soil and rock classifications made in the field from auger cuttings and samples were modified in the laboratory, if needed, after further examination and testing. Soil and bedrock materials were classified in general accordance with the Unified Soil Classification System and the Engineering Geology Field Manual by the U.S. Department of the Interior, Bureau of Reclamation, respectively (see Plate A-1). Logs of the borings are presented on Plates A-29 and A-30 (Appendix A). Groundwater levels were measured at each boring location during or immediately after drilling.

Relatively undisturbed samples of the subsurface materials were obtained using 3-inch outside diameter (O.D.) and 2.5-inch inside diameter (I.D.) split-spoon sampler. The samplers were driven approximately 12 inches by the Kelly bar, which is a telescoping bar used to perform the normal drilling operations. Driving weights varied depending upon depth. Driving weights of 3450 and 2050 pounds were used for samples collected in the upper 30 feet and from 30 to 60 feet, respectively. The number of blows required to drive the 12 inches at each depth sampled was recorded on the boring logs. After the samplers were withdrawn from the test borings, the sampler tubes or samples were removed, examined for logging purposes, labeled, and sealed to retain the natural moisture content for laboratory testing. Prior to sealing the samples, strength characteristics of the cohesive soil samples recovered were evaluated using a hand-held pocket penetrometer. The results of these tests are shown adjacent to the samples on the boring logs.

Upon completion of surface logging and sampling, each boring was downhole logged in order to directly observe the subsurface geologic conditions. Each boring was downhole logged by a Geologist with training in Confined Space Entry in accordance with CalOSHA Regulations. Downhole logging procedures were performed in accordance with CalOSHA requirements and Kleinfelder's downhole logging procedures manual. Structural and lithologic characteristics of the underlying soil and bedrock units were measured and described, and recorded on the boring logs. These data were used in our evaluation and engineering analyses, and our depicted on the Preliminary Geotechnical Map (Plate 2) and Geologic Cross-Sections (Plate 3).

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3.2.2. Test Pits

Five test pits were excavated along the western portion of the site using a rubber-tired backhoe. Keith's Excavating Company of Gilroy, California excavated the test pits using a rubber-tired backhoe. Test pits were excavated with a 3-foot wide bucket to a depth of about 5 feet and varied in length from about 20 to 40 feet. Each test pit was logged by our field geologist. Soil and bedrock materials were classified in general accordance with the Unified Soil Classification System and the Engineering Geology Field Manual by the U.S. Department of the Interior, Bureau of Reclamation, respectively. Upon the completion of logging, each test pit was backfilled with the materials removed during excavation. These materials were tamped back into place and wheel-rolled, but were not compacted. The test pits are located in proposed areas of deep cuts. As such, the backfill placed in them will be exhumed during future grading operations. Logs of each test pit are presented on Plates B-1 though B- 3 (Appendix B).

3.2.3. Seismic Refraction Survey

To evaluate rock rippability for the proposed Target store, we conducted a seismic refraction survey consisting of two 220-foot-long geophone lines (SR-1 and SR-2). The location of the seismic-refraction survey lines are depicted as one continuous line on Plate 2. Graphic interpretation of the seismic-refraction analyses is presented on Plate 4.

The two seismic-refraction lines were laid out near the southwestern portion of the property where the deeper cuts are planned. In the area of the survey, the ground surface slopes gently to the south toward La Madrona Drive. The geophysical survey was conducted using a 12-channel seismograph and geophone array. Each of the two seismic-refraction lines consisted of an array of twelve, 14 Hz vertical geophones equally spaced over a spread of 220 feet. The two lines were laid consecutively with overlap to cover a distance of 420 feet. The recording instrument was a 12-channel, Geometrics S-12 seismograph. Energy was applied to the earth along a five-point shot array at each line with a ten-pound sledgehammer fitted with a trigger mechanism that actuated the seismograph-receiving window. Surface profiles along the seismic lines were derived from the grading plan (see Plate 2). Data were reduced using "SeisImage," a software program developed by Geometrics Inc. of San Jose, California.

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A seismic refraction survey consists of inducing shear waves from an energy source such as an explosive shot or sledgehammer blow into the earth along an array of signal receivers (geophones). The shock waves enter the earth at the shot point as omni-directional P-waveforms. The velocity with which the waves move through the earth is dependent on the density and strength parameters of the earth materials it encounters. Shallow, relatively slow velocity soil and weathered or fractured rock will transmit the wave to the closest geophones first. Waves within faster and deeper velocity materials will overtake waves in slower materials and register at geophones farther away from the shot point before the slower waves arrive. Interpreting the resulting shear wave's first arrival times is used to develop a numerical and graphic model of subsurface conditions. The "layers" shown on Plate 4 are velocity layers and reflect interpreted zones of relatively consistent velocities and may not represent actual rock contacts or other physical features.

3.3. EXPLORATION BY OTHERS

A previous geotechnical study was performed for the site by Treadwell & Rollo (T&R) in 2001. Their study was conducted for a proposed office building and included seven 6-inch diameter hollow-stem auger borings, which were drilled by Exploration Geoservices, Inc. on April 30 and May 1, 2001. The borings varied in depth from approximately 9 to 24 feet. Two of the borings were drilled within the footprint of the proposed Target Store. Logs of these borings are presented in Appendix C.

According to Treadwell & Rollo (2001), piezometers were installed in three of the borings, which are depicted as TR-2P, TR-5P and TR-6P on the accompanying Preliminary Geotechnical Map (Plate 2). Materials used to construct the piezometers included 2-inch diameter PVC well casing, with slotted casing extending from approximately 5 feet below the ground surface to near the bottom of the boring. Solid casing was used in the upper 5 feet. The annulus between the slotted casing and the borehole was backfilled with No. 2/12 sand, which was capped with approximately 1-foot of bentonite. The remaining annulus near the surface was backfilled with neat cement and capped with a 3-foot "stovepipe" well box (Treadwell & Rollo, 2001). Groundwater level measurements were recorded by T&R and presented in their report.

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These measurements, in addition to more recent measurements recorded by LFR, Inc., were reviewed during our evaluation.

3.4. LABORATORY TESTING

Laboratory tests were performed on selected soil samples to evaluate some of their physical characteristics. As mentioned above, initial classifications made in the field were changed as appropriate, based on the laboratory test results. The description of the subsurface conditions and classifications presented on the boring logs reflect the changes made as a result of the laboratory tests.

The laboratory testing program included the measurement of moisture content and dry density, Atterberg Limits, particle size analyses, Resistance Values (R-values), direct shear, one dimensional swell, Unconsolidated-Undrained triaxial, unconfined compressive strength, and maximum dry density and optimum moisture content (Proctors) on selected samples. The laboratory test results are presented on the individual boring logs. In addition, the Atterberg Limit chart, particle size analyses, triaxial compression, unconfined compression, direct shear, one-dimensional swell, compaction, and (R)-value tests are presented in graphical format on Plates D-1 through D-14 in Appendix D.

3.5. CORROSION TESTING

Corrosion testing was performed on three samples of the subsurface soils from borings B-10, B-14, and B-21 to assist in evaluating the corrosive potential of the soil. The corrosivity testing and evaluation were performed by CERCO Analytical of Pleasanton, California using ASTM test methods, as described in CERCO Analytical's report and results presented in Appendix E.

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4 GEOLOGY

4.1. REGIONAL GEOLOGY

The site is located in the central portion of the Santa Cruz Mountains, which are part of the Coast Range geomorphic province of California. The Coast Ranges are a series of discontinuous northwest trending mountain ranges, ridges, and intervening valleys characterized by complex folding and faulting. One of the major structural features within the Coast Ranges is the Salinian Block, which extends about 400 miles from Ventura County to Bodega Bay. The general geologic framework of this portion of the Santa Cruz Mountains is illustrated in studies by Brabb (1997), as well as in studies by Stanley (1985), Clark (1981), Pulver (1979), and Clark and Rietman (1973).

Geologic and geomorphic structures within the Santa Cruz Mountains are dominated by the San Andreas fault (SAF), a right-lateral strike-slip fault that extends from the Gulf of California in Mexico, to Cape Mendocino, on the Coast of Humboldt County in northern California. Movement along the SAF system has been ongoing for about the last 25 million years. In the San Francisco Bay Area, movement across this plate boundary is concentrated on the SAF; however, it is also distributed, to a lesser extent across a number of other faults that include the Hayward, Calaveras, and San Gregorio among others. Together, these faults are referred to as the SAF system.

Basement rocks west of the SAF are generally granitic, while to the east they consist of a chaotic mixture of highly deformed marine sedimentary, submarine volcanic and metamorphic rocks of the Franciscan Complex. Both are typically Jurassic to Cretaceous in age (205-65 million years old). Overlying the basement rocks are Cretaceous (about 140 to 65 million years old) marine, as well as Tertiary (about 65 to 1.8 million years old) marine and non-marine sedimentary rocks with some continental volcanic rock. The inland valleys, as well as the structural depression within which the San Francisco Bay is located, are filled with unconsolidated to semi-consolidated deposits of Quaternary age (about the last 1.8 million years). Continental surficial deposits (alluvium, colluvium, and landslide deposits) consist of unconsolidated to semi-

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consolidated sand, silt, clay, and gravel while the Bay deposits typically consist of very soft organic rich silt and clay (Bay Mud) or sand.

4.2. LOCAL GEOLOGY AND SUBSURFACE CONDITIONS

The site is situated within Scotts Valley, which is located along the western side of the rugged Santa Cruz Mountains. The San Andreas fault zone cuts through this portion of the Santa Cruz Mountains, and separates the range into distinct structural blocks underlain by various types of basement rocks. Southwest of the San Andreas, where the site is located, the basement rocks in the local area are composed of Cretaceous age granitic rocks that are overlain by younger Tertiary sedimentary rocks and Quaternary age surficial deposits.

Various structural blocks are recognized in this portion of the Santa Cruz Mountains, including the La Honda Basin (Stanley, 1985), which is a small part of the much larger Salinian Block. The La Honda Basin, which lies on the northern portion of the Salinian Block, is also bounded by faults and extends about 70 miles from San Juan Bautista north to Montara Mountain. Notable faults within the La Honda Basin include the east bounding San Andreas Fault, the Zayante-Vergeles Fault, the Ben Lomond Fault, the Butano Fault, and the San Gregorio Fault on the west. The 1989 Loma Prieta earthquake occurred about eight miles east of the site along a strand of the San Andreas fault system, between the Zayante-Vergeles and San Andreas fault.

The site is underlain by five main geologic units, which include three bedrock units and two surficial soil units. Quartz diorite of Cretaceous age (Brabb, 1997) is the oldest bedrock unit and underlies the entire site at varies depths. It is overlain by Miocene age sandstone of the Santa Margarita Sandstone along the eastern two-thirds of the site. Along the western portion of the site, the quartz diorite is overlain by Quaternary age colluvial soil. The Santa Margarita Sandstone is overlain by Quaternary age slopewash deposits, which for this study are defined as a combination of colluvial soils and debris flow deposits shed from the steeper slopes bounding the western portion of the property. The Miocene age Santa Cruz Mudstone overlies the Santa Margarita Sandstone along the very western perimeter of the site and underlies the adjoining ridgeline. The approximate distribution of these units are shown on Plate 2 (attached),

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the Preliminary Geotechnical Map. The general subsurface conditions underlying the proposed improvements are depicted on our geologic cross-sections (Plate 3). Following are brief descriptions of these units:

Colluvial Soil (Map Symbol: Qcol): The colluvial soils mantle the eastern one-half of the site along the more gently sloping portions of the ground surface. For the most part, these soils directly overlie the quartz diorite bedrock, but also mantle the easterly extent of the Santa Margarita Sandstone. The colluvial soils are composed of dense, brown to dark brown clayey sand with variable amounts of silt and gravel. The upper few inches of the soils are loose and dry and prone to erosion by wind and water when lacking vegetation. This soil layer varies from about 2 to 4 feet in thickness where observed in our borings.

Slopewash (Map Symbol: Qsw): The slopewash deposits are defined as a combination of colluvial soils and debris flow deposits shed from the steeper slopes bounding the western portion of the property. These deposits mantle the western half of the site where they directly overlie the Santa Margarita Sandstone. These deposits are composed of layers of clayey sand, lean clay, and clayey gravel with angular to subangular clasts varying from about ½-inch to 3 inches, with occasional larger clasts up to 10 inches. The deposits vary from about 3 feet to up to 13 feet in thickness. The majority of this unit is located within the cut portion of the site and will be removed by grading.

Santa Cruz Mudstone (Map Symbol: Tsc): The Santa Cruz Mudstone is the youngest of the bedrock units and conformably overlies the Santa Margarita Sandstone. Where exposed, the mudstone appears to be relatively flat lying, dipping only a few degrees to the north. This unit is composed of poorly bedded, weak, yellowish brown mudstone with closely spaced fractures. We anticipate that this unit will be exposed along the western perimeter of the site near the top of the proposed cut slope.

Santa Margarita Sandstone (Map Symbol: Tsm): This sandstone unit underlies about two-thirds of the site and overlies the quartz diorite. The contact between the sandstone and quartz diorite is classified as a nonconformable contact that represents a significant hiatus on the order of 90 million years between the formation of the quartz

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diorite bedrock and the deposition of the overlying sandstone. The contact between these two units is undulatory and varies in depth across the site. The sandstone is friable and classified as a very weak rock based on its lack of cement. For the purposes of this report, the sandstone has been described as a soil and is classified as a dense to very dense poorly graded sand with variable amounts of clay and gravel. The sandstone is massive, obtains a maximum thickness of about 40 feet and pinches out along the eastern portion of the site. In the Scotts Valley area, the sand is mined for construction purposes and also acts as a groundwater aquifer. The sand is permeable and perched groundwater was observed near the lower portions of the unit in some areas. In localized areas, the perched groundwater seeps through this unit and near the ground surface.

Quartz Diorite (Map Symbol: Kqd): The bedrock underlying the site is composed of quartz diorite, which is a type of intrusive igneous rock closely related to granite. The rock is moderately weathered near the surface, but becomes slightly weathered and very strong within the upper one to two feet. For the most part, the top of the bedrock lies below the proposed pad grade elevation of 618 feet. However, it was encountered above this elevation in the northwestern portion of the site (see Plate 2).

4.3. LANDSLIDES

Landslides are deposits that involve the movement of a mass of soil and/or rock and debris down slope. Landslides are generally classified by the type of movement and type of material (Cruden and Varnes, 1996). Landslides are also commonly divided into surficial and deep-seated types of deposits, where surficial landslides incorporate the surficial soils and near-surface weathered rock, and deep-seated slides involve larger masses that fail along planes of weakness at greater depths. Evidence for deep-seated landslides was not observed at the site, and regional landslide maps (Pulver, 1979) do not show any landslides within the site boundaries. However, signs of surficial landslide deposits, which normally encompass the upper 5 feet of the surficial soils, are present. Shallow near vertical scarps from 1 to 3 feet high occur in some areas along the upper portions of the western perimeter slope. These scarps are commonly associated with shallow debris flow deposits, probably on the order of 5 feet in thickness. The

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slopewash deposits encountered along the western boundary appear to be associated with previous debris flow activity.

Debris flows commonly occur in mountainous areas during the rainy season, especially during seasons with above average rainfall. Regional landslide studies by Nilsen et al. (1976) and Ellen and Wieczorek (1988) conducted during seasons with above average rainfall, indicate that the site was not impacted by debris flows during the rainy seasons of 1968-69, 1972-73 and 1982. A possible debris flow was observed in historical aerial photographs, dated October 18, 1989, along the western slope below the tree line in the area of the proposed cut slope. This particular feature appeared to be a few feet wide, extending downslope on the order of about 20 to 30 feet.

4.4. GROUNDWATER

Groundwater was observed in eleven of our exploratory borings during our investigation and in three of the borings during the Treadwell & Rollo investigation in 2001. In general, groundwater was encountered within the underlying sandstone, commonly near the base of the contact between the sandstone and underlying quartz diorite. Groundwater found within the sandstone is considered to be in a perched condition, as it is underlain by relatively impermeable bedrock.

Recorded groundwater elevations from the two studies vary from approximately 592 to 628 feet and are summarized in Table 1. The highest recorded elevation of 628 feet is from a measurement taken from TR-6P on May 15, 2008. This reading from the piezometer in TR-6P, however, is in question as the measured depth is only 6 inches above the bottom of the boring. As noted in Table 1, groundwater was not encountered in TR-6P when it was drilled and was not recorded during subsequent measurements until 2008. It's quite possible that the 2008 reading encountered water that accumulated in the bottom of the piezometer's PVC casing over the last seven years. Assuming this to be the case, then the highest recorded elevation would be 623 feet, which is still above the elevation of the proposed building pad.

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TABLE 1 – SUMMARY OF GROUNDWATER MEASUREMENTS

Boring Data			Groundwater Measurements									
			5/1/2001		5/18/2001		6/14/2001		5/15/2008		6/2008	
Boring No.	**Surface Elevation (feet)**	**Total Depth (feet)**	**Depth (feet)**	**Elevation (feet)**	**Depth (feet)**	**Elevation (feet)**	**Depth (feet)**	**Elevation (feet)**	**Depth (feet)**	**Elevation (feet)**	**Depth (feet)**	**Elevation (feet)**
TR-1	619	19	5	614								
TR-2P	621	24	5	616	6	615	9	612	4	617		
TR-3	652	24	NE	NE								
TR-4	603	9	NE	NE								
TR-5P	614	20	13	601	11	603	11	603	12	602		
TR-6P	652	24	NE	NE	NE	NE	NE	NE	23.5	628.5		
TR-7	605	14	NE	NE								
7	644	29									21	623
8	641	27									26	615
9	633	26									25	608
10	624	18									18	606
14	628	20									16	612
15	627	24									24	603
16	640	31									18	622
19	613	29									21	592
20	622	20									17	605
BA-1	645	37									27	618
BA-2	635	24									23	612

NE – Not Encountered

Table only includes measurements from borings where groundwater was encountered.

The groundwater measurements shown in Table 1 were all recorded in the months of May or June, and may not represent the highest groundwater levels at the site. Slightly higher groundwater levels were used in our stability analyses for the proposed slopes.

4.5. FAULTS AND SEISMICITY

The site is situated within the San Francisco Bay Area, which is characterized by numerous active faults and moderate to high seismic activity. Based on the information provided in Bryant and Hart (2007) the site is not located within a State-designated, Earthquake Fault Rupture Hazard Zone where site-specific studies addressing the potential for surface fault rupture are required and no known active faults traverse the site. Based on the map of known active faults (ICBO, 1998), the Zayante-Vergeles fault is the closest fault, located approximately 5 miles northeast of the site. The San

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Andreas fault is located approximately 8 miles northeast of the site. This portion of the San Andreas fault ruptured during the 1906 earthquake. Numerous other faults associated with the greater San Andreas fault system lie within 62 miles (100 kilometers) of the site and include the Sargent, Monterey Bay, San Gregorio, Monte Vista-Shannon, Hayward, Calaveras, Great Valley, and Concord fault zones. Other notable faults located near the site include the Ben Lomond and Butano faults, which are located approximately 1-1/2 and 7-1/2 miles to the southwest and northeast, respectively. The Ben Lomond Fault is considered inactive, while the activity of the Butano Fault is somewhat in question.

The project site and its vicinity are located in an area traditionally characterized by moderate to high seismic activity. A number of large earthquakes have occurred in the greater Bay Area during historic time (since 1800). Some of the significant regional earthquake events include: the 1906 (M7.9) San Francisco earthquake, the 1989 (M6.9) Loma Prieta earthquake, the 1838 (M7.0) San Francisco Peninsula earthquake, the 1911 (M6.5) Calaveras fault earthquake, the 1868 (M7.0) Hayward earthquake, the 1858 (M6.3) San Jose earthquake, and the 1980 (M5.9) Livermore earthquake. The epicenter for the 1989 Loma Prieta earthquake occurred less than 10 miles from the site.

A recent publication prepared by the U.S. Geological Survey regarding earthquake probabilities in the Bay Area (Working Group on California Earthquake Probabilities, 2003) concludes that there is a 62 percent chance that one of the major faults within the Bay Area will experience a major (M6.7+) earthquake during the period of 2003-2032. As has been demonstrated recently by the 1989 M6.9 Loma Prieta earthquake, the 1994 M6.7 Northridge earthquake, and the 1995 M6.9 Kobe earthquake, earthquakes of this magnitude range can cause severe ground shaking and significant damage to modern urban areas. Seismic design criteria for building design are presented in Section 5 of this report.

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5 CONCLUSIONS AND RECOMMENDATIONS

5.1. CONCLUSIONS

Based on the results of our investigation, it is our opinion that development of the site is geotechnically feasible with respect to the site-specific geotechnical issues. This conclusion is based on the assumption that the recommendations presented in this report will be incorporated in the design and during construction of this project. The primary geotechnical concerns for this site are: 1) the potential for differential settlement; 2) the rippability of the underlying bedrock (quartz diorite); 3) the stability of the proposed slopes and tiered retaining wall systems; 4) the control of perched groundwater conditions; and 5) the debris flow potential of the western slope and related building clearance. Subsequent sections of this report evaluate these and other geotechnical issues and provide preliminary development recommendations.

It should be noted that soil and groundwater conditions can deviate from those conditions encountered at the exploration locations. If significant variations in the subsurface conditions are encountered during construction, it may be necessary for Kleinfelder to review the recommendations presented herein, and recommend adjustments as necessary.

5.2. 2007 CBC SEISMIC PARAMETERS

Based on the subsurface conditions, the site is classified as Site Class C as presented in Table 1613.5.2 and Section 1613.5.5 of the 2007 CBC. Site Class C is defined as very dense soil and soft rock with shear wave velocities between 1,200 feet/sec and 2,500 feet/sec, SPT-N > 50 blows/foot, or Su > 2,000 psf for the upper 100 feet. This site class is equivalent to Soil Profile Type S_C according to Table 16-J of the 2001 CBC.

The Maximum Considered Earthquake (MCE) mapped spectral accelerations for 0.2 second and 1 second periods (S_S and S_1) were estimated using Section 1613.5 of 2007

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California Building Code (CBC) and the ground motion parameter calculator developed by the U.S. Geological Survey (USGS, 2007)[1]. The site coordinates are

Latitude: 37.0335 N Longitude: 122.0236 W

The mapped acceleration values and associated soil amplification factors (F_a and F_v) based on 2007 CBC are presented in Table 2 below. Corresponding design spectral accelerations (S_{DS} and S_{D1}), based on site class C, are also presented in Table 2.

TABLE 2
SEISMIC PARAMETERS BASED ON 2007 CBC

Parameter	Value	2007 CBC Reference
S_S	1.500g	Section 1613.5.1
S_1	0.617g	Section 1613.5.1
Site Class	C	Table 1613.5.2
Fa	1.0	Table 1613.5.3(1)
Fv	1.3	Table 1613.5.3(2)
S_{MS}	1.500g	Section 1613.5.3
S_{M1}	0.803g	Section 1613.5.3
S_{DS}	1.0g	Section 1613.5.4
S_{D1}	0.535g	Section 1613.5.4

According to Section 1802.2.7 of 2007 CBC, PGA can be estimated using a site-specific study. Alternately, Design Earthquake (DE) PGA can be taken as $S_{DS}/2.5$, where S_{DS} is determined using Section 1613. Therefore, PGA (0.40g) can be used for DE level analyses. Maximum Considered Earthquake (MCE) PGA can be taken as $S_{MS}/2.5$, where S_{MS} is determined using Section 1613. Therefore, PGA (0.60g) and spectral accelerations presented in Table 2 can be used in MCE level analyses.

[1] http://earthquake.usgs.gov/research/hazmaps/design/

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5.3. LIQUEFACTION

Soil liquefaction is a phenomenon in which saturated, generally granular soils undergo a substantial loss in strength due to excess build-up of pore water pressure during cyclic loading such as that induced by earthquakes. The primary factors affecting the liquefaction potential of soil include: (1) intensity and duration of seismic shaking, (2) soil type and relative density, (3) overburden pressure, and (4) depth to water. Soils most susceptible to liquefaction are generally clean, loose, fine-grained sands that are saturated and uniformly graded. Under certain seismic shaking conditions, silty and clayey soils of low plasticity have also been known to liquefy. The occurrence of liquefaction is generally limited to saturated (submerged) soils located within about 50 feet of the ground surface.

The site lies within the USGS Felton quadrangle, which has not been mapped by the California Geologic Survey as part of its ongoing effort to map landslide and liquefaction related hazards throughout the San Francisco Bay Area. The site is underlain by medium dense clayey sand surficial soils that overlie dense to very dense poorly graded sand (sandstone) and quartz diorite bedrock. Perched groundwater conditions are present in localized areas at depths varying from about 5 to 25 feet. Based on these subsurface conditions the potential for liquefaction is considered low at this site due mainly to the very dense nature of the underlying sandstone.

5.4. POTENTIAL FOR DIFFERENTIAL SETTLEMENT

According to the proposed grading plan, the Target store building and parking garage will be constructed over a cut-to-fill transition. Based on these conditions, there is a potential for unacceptable differential settlement between foundations in rock versus engineered fill in the building and garage areas. This potential differential settlement can be mitigated by overexcavating the surficial soils and bedrock materials and placing a minimum of three (3) feet of engineered fill beneath the foundation and slab areas. Details for overexcavation are provided in the Earthwork section of this report.

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5.5. BEDROCK HARDNESS AND RIPPABILITY

The bedrock materials underlying the project site are composed of hard quartz diorite. Exploratory excavations in this material encountered refusal in the upper few feet. Based on the information obtained from on-site borings, hard bedrock will be encountered in the cut portions of the project. In particular, two borings (B-17 and B-18) encountered bedrock at elevations above 618 feet, which is the proposed pad grade. Other areas not covered by our exploration may also encounter bedrock during grading.

In order to address the rippability of the bedrock, we conducted a seismic refraction survey along the southwestern portion of the site. A seismic refraction survey consists of inducing shear waves from an energy source such as an explosive shot or sledgehammer blow into the earth along an array of signal receivers (geophones). The speed with which rock transmits these waves is controlled by its strength and degree of consolidation. These characteristics also materially affect the rock's rippability. Conditions that are favorable for seismic-wave transmission and therefore *unfavorable* for rippability include:

- Massive or homogeneous rock units
- Absence of planes of structural weakness
- High degree of cementation
- High compressive strength
- High rock quality designation (RQD)

Rock conditions that are *favorable* for rippability include:

- Presence of fractures, faults, and planes of weakness
- Weathering
- Brittleness
- High degree of stratification or lamination
- Loose cementation
- Low compressive strength
- Low rock quality designation (RQD)

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In evaluating the seismic-refraction velocities with respect to rippability, we used Caterpillar Tractor Company, Handbook of Rippability for heavy-duty ripper performance. The table provided by Caterpillar Tractor Company (see Plate 4) is for a large track bulldozer (D9) with a single ripper hook. This rippability rating is used as an indicator of the relative difficulty anticipated in excavating rock at the site and should be adjusted based on the equipment selected by the contractor for this project. It should be expected that even where rocks at this site are within the rippable range shown on the seismic profile and chart using the D9 described above, harder areas may be encountered.

The seismic velocity-layer profile (Plate 4) shows a thin layer of slow-transmission (300 ft/sec and easily excavatable) soil along the upper portion of the section. Below the soil veneer more dense material is encountered. The velocity of this material suggests that it is not saturated (below the water table) but may be moist. This material should also be easily excavatable with conventional earth-moving equipment. The irregular and undulatory velocity contact with the lower layer suggests an irregular bedrock contact. However, because groundwater is encountered at differing depths in the exploratory borings, it is inferred that some of the water is held in perched layers. The varying water content of the material near the lower velocity contact may be partially responsible for the irregular surface. The rock that lies below the lower velocity contact (greater than 11,000 ft/sec) is, according to the Caterpillar chart, not rippable. Equipment heavier that a single-ripper D9 or blasting may be needed to excavate rock associated with the high velocity layer near the bottom of the seismic profile.

It is important to note that the operator's experience, working condition of excavation equipment and the selection of excavation tools used will be critical factors in the excavatability of rock. During construction, modifications to tool selection or replacement of equipment being used may be necessary to improve performance and production rates. It is recommended that the contractor who uses the rippability data in this report visit the site to observe soil and bedrock conditions. It is recommended that the contractor have options available in order to deal with differing soil and bedrock conditions.

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5.6. SLOPE STABILITY

Slope stability analyses were performed to evaluate the global stability of the proposed cut and fill slopes and associated tiered retaining wall systems. This means that the combined geometry of the slopes and walls were evaluated and not the independent stability of the retaining wall structures. Additional stability analyses will be required by the wall designer in order to assess the stability of the retaining structures.

As part of our analyses, geologic cross-sections were developed through selected portions of the slopes and were used to evaluate their stability. The Factor of Safety determined by slope stability analyses relies heavily upon the geologic model used in the analyses and the strength parameters of the various geologic units. The elevation of the groundwater table is also a critical factor. Variations in these factors were considered during our analyses.

We analyzed the stability of the proposed slope and wall configurations for both static and seismic conditions. Our slope stability analysis also included developing representative soil-strength parameters and subsurface cross-sections under static and pseudo-static (seismic-load) conditions utilizing horizontal seismic coefficients. We also modeled the temporary cut (backcut) during the construction phase under static condition for the western perimeter slope. A brief discussion of these items is presented below.

5.6.1. Soil Strength Parameters

Our slope stability analysis utilized four different soil and rock units. These soil and rock units used in our model include engineered fill, Santa Cruz Mudstone, Santa Margarita Sandstone, and Quartz Diorite. Subsurface Cross-Sections B-B' and D-D' were used in our slope stability analyses (see Plate 3). In our opinion, these cross-sections represent portions of the proposed design where critical design and subsurface conditions are present. The strength parameters used in our slope stability analyses are shown in Table 3 below, and on the individual stability runs presented in Appendix F. The strength parameters were selected based on laboratory test data, and our engineering judgment.

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TABLE 3
SLOPE STABILITY ANALYSES SOIL PARAMETERS

Unit No.	Unit Description	Unit Weight (pcf)	Total Stress	
			Cohesion, C (psf)	Friction Angle, (degress)
1	Santa Cruz Mudstone	120	700	23
2	Engineered Fill	120	100	32
3	Santa Margarita Sandstone	120	700	34
4	Quartz Diorite	130	4000	0

5.6.2. Static Analysis

Using the subsurface profiles presented on Cross-Sections B-B' and D-D' (Plate 3), we performed static slope stability analysis using the limit equilibrium computer program SLOPE/W, developed by Geo-Slope International, Ltd., and the conventional Mohr-Coulomb constitutive model. The objective of our analysis was to evaluate the global stability of the combined slopes and retaining walls during construction and after construction and whether the proposed slopes would yield factors of safety (FOS) greater than about 1.3 and 1.5, respectively, under static conditions. According to current standards of practice used in geotechnical engineering for the state of California, FOS values of 1.5 and higher are indicative of stable slopes after construction under static conditions (SCEC, 2002). Also FOS values higher than 1.3 are recommended to have a stable slope during construction.

We used Spencer method in our analyses. In this method, the computer program was allowed to search for the circular failure surface corresponding to the lowest FOS for the pertinent slope.

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In our model, we assumed that engineered fill generated from on-site materials will be used to re-grade the slope.

Our static slope stability analysis results are presented in Appendix F, and are summarized in Table 4 below.

TABLE 4
STATIC SLOPE STABILITY ANALYSIS RESULTS

FOS (Static Conditions)	Remarks
1.4	B-B', Western Wall, During Construction (Temporary Condition)
1.6	B-B', Western Wall, After Construction
1.9	B-B', Eastern Wall, After Construction
1.7	D-D', After Construction

5.6.3. Pseudo-Static (Seismic) Analyses

SCEC (2002) recommends using a screening procedure that is based on the pseudo-static approach to assess whether or not slopes are overall stable under seismic conditions. As part of this procedure, the anticipated maximum horizontal acceleration (PGA) associated with the Design Earthquake (DE), the anticipated earthquake mode magnitude, and earthquake mode distance are used to obtain the horizontal seismic coefficient (K_H). If the slope has a FOS value greater than 1 after K_H is applied, then it passes the screen (i.e., it is considered stable under seismic conditions) and no further analysis is required. If the FOS is lower than 1 after K_H is applied, then additional and more robust analyses need to be performed to assess whether or not the slope is stable from a seismic stand point.

As discussed in Section 5.2 and based on seismic information available online from the United States Geological Survey (USGS, 2007), we estimate the PGA to be about 0.40g, the mode magnitude to be about M 7.9, and the mode distance to be about 13 km to the site. Based on these values and using Figure 11.1 (5 cm threshold) in SCEC (2002), we estimate a K_H of about 0.26 for the site.

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Our seismic slope stability analysis results are presented in Appendix F, and are summarized in Table 5 below.

TABLE 5
SEISMIC SLOPE STABILITY ANALYSIS RESULTS

FOS (Seismic Conditions)	Remarks
1.1	B-B', Western Wall, After Construction
1.4	B-B', Eastern Wall, After Construction
1.2	D-D', After Construction

Based on the results presented in Tables 4 and 5, the combined slopes and retaining walls are globally stable considering that keyways will be constructed at the toe and recommendations in this report are followed. To add to the stability of the wall other options can also be utilized such as gravity walls or stiff concrete walls founded on drilled piers that are embedded into the underlying bedrock. We should be involved with future design efforts including review of future retaining wall plans.

Please note that our stability analyses only included the global stability of the retaining walls and slopes and did not include the reinforcement design (i.e., geogrids), sliding, or overturning stability of the walls. Final design of the retaining walls should be reviewed by us before construction.

5.6.4. Keyways and Slope Surface Compaction

Keyways excavated into competent bedrock will be required at the base of all proposed cut and fill slopes to be constructed on slope surfaces inclining at 5:1 (H:V) or steeper. The keys should be excavated to a minimum depth of 3 feet into competent materials and have a minimum width equal to one-half of the slope height, or 15 feet, whichever is greater. The bottoms of the keys should be tilted back at a minimum of 2 percent towards the heel of the key. Internal backdrains will be required in the keyways to prevent entrapment of irrigation water and rainwater in the key bottoms. Typical details for construction of the backdrains are shown on Plates G-1, -2, and -3, Appendix G.

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The finish surfaces of all fill slopes should be compacted to a minimum relative compaction of 90 percent. Final surface compaction should be achieved by overfilling the slopes during construction, backrolling the overfilled slope surfaces at vertical intervals not exceeding 4 to 5 feet, and then trimming the slopes back to the compacted inner core. Where this procedure may not be practical, surface compaction should be obtained by backrolling during construction to achieve at least 90 percent relative compaction within 6 to 8 inches of the finish surfaces. This initial back-rolling should be performed at vertical intervals not exceeding 4 to 5 feet. Final surface compaction should then be achieved by rolling the slope surface with a cable-lowered sheepsfoot and then re-rolling with a grid roller. During final surface compaction, it is critical that the moisture content of the surface soils be maintained at near optimum moisture content or slightly higher.

5.6.5. Footing Setback from Descending Slope Surface

According to the grading plan, the proposed building foundation will be located from 8 to 10 feet from the top of the uppermost retaining wall along the eastern and southern sides of the building. The proposed height of the descending southern slope varies from approximately 20 to 26 feet in height and for the descending eastern slope from approximately 9 to 26 feet. According to Section 1805.3.2 and Figure 1805.3.1 of the 2007 CBC, the horizontal distance between the footing and top of the adjacent slope should be one-third the height of the slope. Based on the maximum proposed slope height of 26 feet, the building should be setback a minimum of 8 feet from the top of the descending slope. However, Section 1805.3.2 also stipulates that "*Where the slope is steeper than 1 unit vertical in 1 unit horizontal (100-percent slope), the required setback shall be measured from an imaginary plane 45 degrees (0.79 rad) to the horizontal, projected upward from the toe of the slope.*" These criteria are met for most of the building's foundation except for the northeast corner (see Cross-Section D-D'). In this area, the building foundation will need to be embedded a minimum of approximately 10 feet below the proposed grade.

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5.7. GROUNDWATER AND SUBDRAINAGE

Perched groundwater is present in localized areas across the site and will require control during and after construction. Our investigation was performed after a two year period of successive drought conditions, and as such, it's quite likely that groundwater levels across the site are typically higher during seasons of average or higher rainfall. In addition, significant portions of the underlying sandstone will be left-in-place after grading and will continue to accumulate moisture overtime. This moisture will perch on top of the underlying bedrock and migrate through the sandstone, eventually finding avenues to the surface within the developed area.

To mitigate the potential build-up of hydrostatic pressures below compacted fills due to infiltration of surface waters, subdrains should be installed along the exposed contact between the sandstone and quartz diorite bedrock. The approximate location of this subdrain is shown on Plate 2. The actual location of the subdrain and outlet(s) will be based on the exposed field conditions. Subdrains should be constructed in accordance with Plate G-3, Appendix G.

We also recommend installation of subslab drainage systems beneath the proposed store and the lower level of the proposed parking area, and that all retaining structures be provided with drainage systems.

5.8. LANDSLIDES AND BUILDING CLEARANCE FROM ASCENDING SLOPES

Based on our evaluation, it appears that shallow debris flows have occurred along the western perimeter slope in the past. Factors that influence the occurrence of debris flows in a given area are the steepness (gradient) of the slope, the type of soils and rock underlying the slope, and the physical characteristics of the slope face (Hollingsworth and Kovacs, 1981). Based on a simplified method of predicting debris flow occurrence by Hollingsworth and Kovacs (1981), it is our opinion that the western perimeter slope has a low potential for generating debris flows. This is mostly due to the lack of swales and gullies on the slope that tend to concentration surficial water flow during periods of heavy rain.

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Although the potential for debris flows to impact the western slope and the proposed store is considered low, we suggest that some form of debris flow mitigation be considered due to the fact that the western building wall is proposed to be only 8 to 10 feet from the toe of the proposed slope. This distance is less than that required by Section 1805.3.1 and Figure 1805.3.1 of the 2007 CBC. According to Section 1805.3.1, the building should be setback 15 feet from the base of the proposed slope. Possible mitigation options include deflection walls and debris fences along the top of the proposed cut slope. Additional geotechnical studies in this area may be necessary to assist project designers.

5.9. SITE DEMOLITION

Existing structures located on the site will have to be demolished prior to construction. In addition to removal of existing structures, the following items should be considered.

5.9.1. Existing Improvements

As part of the demolition process, any existing foundations should be removed. Excavations from removal of foundations, underground utilities or other below ground obstructions should be cleaned of loose soil and deleterious material, and backfilled with compacted engineered fill. All fills should be compacted per the recommendations in Exhibit 1 of Appendix H.

5.9.2. Existing Utilities

Active or inactive utilities within the construction area should be protected, relocated, or abandoned. Pipelines 2 inches in diameter or less may be left in place beneath the planned building. Pipelines between 2 and 6 inches in diameter may be left in place within the limits of the building provided they are filled with sand/cement slurry and capped at both ends. Pipelines larger than 6 inches in diameter within the planned building should be removed. Active utilities to be reused should be carefully located and protected during demolition and during construction.

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5.9.3. Monitoring Well Abandonment

The three monitoring wells installed by Treadwell & Rollo should be abandoned in accordance with local and state regulations prior to earthwork construction. The Scotts Valley Water District is the local agency that oversees well installation and destruction, and should be contacted for applicable abandonment procedures.

5.9.4. Existing Vegetation

Roots over 1 inch in diameter and over 3 feet in length should be removed within the building footprints and areas for planned improvements and exported offsite.

5.9.5. Bucket Auger Backfill

The two bucket auger borings (BA-1 and BA-2) drilled for the project, were backfilled with concrete in accordance with local permit requirements. These borings are approximately 26 inches in diameter and vary from 24 to 37 feet in depth. The approximate locations of these borings are shown on Plate 2 and should be marked in the field prior to the commencement of grading. Concrete exhumed from the borings should be either disposed of offsite or crushed into particles with a maximum size of 3 inches and mixed with on-site materials prior to placement in engineered fills.

5.10. EARTHWORK

All earthwork and grading should be performed in accordance with the following recommendations prepared by this firm as well as all applicable requirements of the City of Scotts Valley. Grading should also be performed in accordance with applicable provisions of the attached "Standard Grading Specifications" prepared by this firm (see Appendices G and H).

Site preparation and grading for this project should be performed in accordance with the site specific recommendations provided herein. A summary of soil compaction recommendations for this project is presented in Exhibit 1, Appendix H. Additional earthwork recommendations are presented in related sections of this report.

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5.10.1. Site Preparation, Remedial Removals and Fill Placement

Prior to the start of grading and subgrade preparation operations, the site should first be cleared and stripped to remove all surface vegetation, organic laden topsoil, piles of existing debris, and debris generated during the demolition of existing concrete pavement and other structures. Stripping to a minimum depth of approximately 3 inches is expected to remove a majority of loose and organic laden surficial material in most areas. If significant amounts of organics are encountered below this depth, additional stripping may be required. Stripped topsoil may be stockpiled, if practical, for later use in landscaping areas; however, this material should not be reused for engineered fill.

Upon completion of the stripping operations, all existing surficial soils in areas to receive compacted fill should be removed to underlying competent bedrock. Similar removals should also be performed in areas of shallow cut where surficial soils or highly weathered bedrock materials are not removed in their entirety.

Following stripping and remedial removal of surficial soils, the upper 12 inches of the areas of the site to receive fill or below new structures should be scarified to a minimum depth of 12 inches, moisture-conditioned, and recompacted as indicated on Exhibit 1 (Appendix H). Scarification and recompaction should extend laterally a minimum of 5 feet beyond the limits of structures, and 2 feet beyond flatwork, where achievable. Following stripping and excavation to reach building subgrade, additional excavation may be required to provide for the recommended engineered fill below foundations and floor slabs. Overcavation and recompaction should extend below all new roads or primary drive aisles. Overexcavation is not necessary in parking areas for light vehicular traffic. In these areas, we recommend that the subgrade soils be scarified to a depth of 12 inches, moisture conditioned, and recompacted. Soft areas of loose soil or organic soils extending below subgrade may be encountered which may require overexcavation. Unit prices for overexcavation and replacement with compacted fills should be obtained during bidding.

All fills should be compacted in lifts of 8-inch maximum uncompacted thickness. A summary of compaction requirements for the project is presented in Exhibit 1 (Appendix

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H). Laboratory maximum dry density and optimum moisture content relationships should be evaluated based on ASTM Test Designation D 1557 (latest edition).

All site preparation and fill placement should be observed by a Kleinfelder representative. It is important that during the stripping and scarification process our representative be present to observe whether any undesirable material is encountered in the construction area and whether exposed soils are similar to those encountered during our field investigation.

5.10.2. Benching

Fills placed against natural slope surfaces inclining at 5:1, horizontal to vertical or steeper, and against temporary backcut slopes associated with construction of stabilization fills or retaining structures should be placed on a series of level benches excavated into competent bedrock. These benches should be provided at vertical intervals of approximately 3 to 5 feet. Typical benching details are shown on Plate G-1, Appendix G.

5.10.3. Fill Material

Except for organic laden soil, the on-site soil is suitable for use as general engineered fill if it is free of deleterious matter. Maximum particle size for fill material should be limited to 3 inches, with at least 90 percent by weight passing the 1-inch sieve. Where imported material is required, it is recommended that it be granular in nature, adhere to the above gradation recommendations and conform to the following minimum criteria:

Plasticity Index	15 or less
Liquid Limit	less than 30%
Percent Soil Passing #200 Sieve	8% to 40%

All on-site or import fill material should be compacted to the recommendations provided for engineered fill in Exhibit 1.

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5.10.4. Weather/Moisture Considerations

Based on our experience in the area, grading during the rainy season may be difficult due to the type of soil at the site. If earthwork operations and construction for this project are scheduled to be performed during the rainy season or in areas containing saturated soils, provisions may be required for drying of soil or providing admixtures to the soil prior to compaction. If desired, we can provide recommendations for wet weather earthwork and alternatives for drying the soil prior to compaction. Conversely, additional moisture may be required during dry months. Water trucks should be made available in sufficient numbers to provided adequate water during earthwork operations.

It is also recommended that any landscape watering in the area, if present, be stopped at least two weeks prior to the start of grading activities at the site. If site grading is performed during the rainy months, the site soils could become very wet and difficult to compact without undergoing significant drying. This may not be feasible without delaying the construction schedule. For this reason, drier import soils could be required or lime treating may be needed if construction takes place during winter months.

5.10.5. Excavation, Backfill, and Utility Trenches

We anticipate that excavation for foundations and utility trenches can be made with either a backhoe or trencher, or similar earthwork equipment. Excavations deeper than 4 feet deep should be sloped back at 1:1 (horizontal to vertical) or be shored or braced for safety. Excavations should not extend below a 1:1 (horizontal to vertical) plane extending down from any adjacent footings. All excavations should be checked by our representative during construction to allow any modifications.

During wet weather, earthen berms or other methods should be used to prevent runoff water from entering all excavations. Runoff water and/or groundwater encountered within excavations should be collected and disposed outside the construction limits.

Utility excavations should be located such that a 2:1 (H to V) line extended up from the pipe does not pass below a foundation element. This is recommended to reduce the risk of undermining foundation support if future excavation and repair is needed.

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All excavations must comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing this information solely as a service to our client. Under no circumstances should the information provided be interpreted to mean that Kleinfelder is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations).

At the time of this geotechnical investigation, groundwater was encountered as shallow as 5 feet below the ground surface. However, the actual depth at which groundwater may be encountered in trenches and excavations may vary. As a minimum, provisions should be made to ensure that conventional sump pumps used in typical trenching and excavation projects are available during construction in case groundwater is found to be higher than observed during our investigation, and/or if substantial runoff water accumulates within the excavations as a result of wet weather conditions.

5.11. BUILDING FOUNDATIONS

Based on our investigation, the loads for the proposed building can be supported by isolated or continuous shallow footings. Footings should be supported on 3 feet of engineered fill where the bottom 1 foot should be scarified and recompacted in place. The recommended allowable soil bearing pressures, depth of embedment, and width of footings are presented in Table 5.

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TABLE 5
FOUNDATION BEARING CAPACITY RECOMMENDATIONS

Footing Type	Allowable Bearing Pressure (psf)*	Minimum Embedment (in)**	Minimum Width (in)
Isolated Footing	4,000	18	18
Continuous Footing	4,000	18	12

* Pounds per square foot, dead plus live load. Includes a factor of safety (FS) of 3.
** Below lowest adjacent grade defined as bottom of capillary break on the interior and finish grade at the exterior.

Allowable soil bearing pressures may be increased by one-third for transient loads such as wind and seismic loads. Where footings are located adjacent to below-grade structures or near major underground utilities, the footings should extend below a 2:1 (horizontal to vertical) plane projected upward from the structure footing or bottom of the underground utility to avoid surcharging the below grade structure and underground utility with building loads. Also, where utilities cross the perimeter footings line, the trench backfill should consist of a vertical barrier of impervious type of material or lean concrete, as explained in the "Earthwork" section of this report.

It is critical that footing excavations not be allowed to dry before placing concrete. If shrinkage cracks appear in the footing excavations, the excavations should be thoroughly moistened to close all cracks prior to concrete placement. The footing excavations should be monitored by a representative of Kleinfelder for compliance with appropriate moisture control and to confirm the adequacy of the bearing materials. Kleinfelder should also be present during the overexcavation.

5.11.1. Estimated Settlements

Total static settlement of an individual foundation will vary depending on the plan dimensions of the foundation and the actual load supported. Based on the assumed maximum loads and the allowable bearing pressure, total and differential settlements between similarly loaded adjacent footings up to 50 feet apart are estimated to be on the order of about 1 and 1/2 inch, respectively.

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5.11.2. Lateral Resistance

Lateral load resistance may be derived from passive resistance along the vertical sides of the footings, friction acting at the base of the footing, or a combination of the two. An allowable passive earth pressure of 400 psf per foot of depth may be used for design. A coefficient of friction value of 0.4 between the base of the footings and the engineered fill soils can be used for sliding resistance using the dead load forces. Friction and passive resistance may be combined without reduction. We recommend that the first foot of soil cover be neglected in the passive resistance calculations if the ground surface is not protected from erosion or disturbance by a slab, pavement or in some similar manner.

5.12. SLABS-ON-GRADE

5.12.1. Interior

Concrete slabs-on-grade will include building interior floor slabs. All interior slabs should be supported on a minimum of 12 inches of engineered fill over properly prepared subgrade soils, as described in the "Earthwork" section of this report.

Where the risk of moisture penetration through interior floor slabs is to be reduced, the slab should be constructed on a layer of capillary break material covered by a continuous impermeable membrane vapor barrier. The capillary break material should be at least 4 inches thick, and should consist of free-draining crushed rock or gravel graded such that 100 percent will pass the 1-inch sieve and none will pass the No. 4 sieve. The impermeable membrane should consist of a 20-mil polyethylene sheeting or similar moisture barrier. Lapped joints and perforations in the vapor barrier should be kept to a minimum, and should be sealed. To provide protection for the membrane during construction, Target may elect to place 2 inches of slightly moistened clean fine sand on top of the membrane prior to placement of the floor slab concrete. This protective sand layer must not be allowed to become saturated with water prior to placement of the concrete to reduce the potential for future slab moisture transmission concerns. Where crushed rock is used as the capillary break material, seating of the

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rock with a vibratory plate compactor may aid in reducing the potential for damage to the vapor barrier as the reinforcing steel and the concrete are placed.

It should be emphasized that we are not floor moisture proofing experts. While the current industry standard is to place a vapor barrier over a gravel layer as described above, this system may not be completely effective in preventing floor slab moisture problems. These systems typically will not necessarily assure that floor slab moisture transmission rates will meet floor-covering manufacturing standards and that indoor humidity levels be appropriate to inhibit mold growth. The design and construction of such systems are totally dependent on the proposed use and design of the proposed building. All elements of building design and function should be considered in the slab-on-grade floor design. Building design and construction may have a greater role in perceived moisture problems since sealed buildings/rooms or inadequate ventilation may produce excess moisture in a building and affect indoor air quality.

5.12.2. Exterior

Where exterior flatwork is to be constructed, it should be supported on a minimum of 12 inches of engineered fill on properly prepared subgrade. The subgrade should be prepared by scarifying the surface to a minimum depth of 12 inches. The scarified soil should then be moisture conditioned and recompacted as specified in the “Earthwork” section of this report. For more uniform support, 4 inches of sand or gravel can be used beneath the flatwork. Where exterior flatwork will be subjected to vehicle loading, a minimum of 6 inches of Caltrans Class 2 Aggregate Base should be placed beneath the flatwork. Flatwork should not be attached to the building as cracking could result in the event of differential movement between the building and the flatwork.

5.12.3. Floor Subdrain

The perched groundwater conditions at the site could allow groundwater to accumulate and pond beneath the proposed building pad and floor over time. In order to mitigate this condition, we recommend the installation of an under slab subdrain system. This subdrain system would be installed after the building pad has been brought to grade, but before construction of the concrete building slab. The subdrain system should consist of

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trench drains spaced approximately 40 feet on-center, generally parallel to La Madrona Dive. Each trench drain should be a minimum of 18 inches deep, 12 inches wide, and consist of a 4-inch diameter perforated pipe surrounded by 4 inches of Class 2 permeable or ¾ inch drain rock wrapped with filter fabric. The drains should be tied into the area drain system along the building perimeter.

5.13. CORROSION

The corrosivity testing and evaluation was performed by CERCO Analytical of Pleasanton, California using ASTM test methods, as described in CERCO Analytical's report and results presented in Appendix E.

Based upon the resistivity measurement, the samples tested are classified as "moderately corrosive" by CERCO Analytical. They recommend that all buried iron, steel, cast iron, ductile iron, galvanized steel, and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion. Since we are not corrosion specialists, a corrosion testing firm should be contacted for specific design details, if necessary.

The above are general discussions. A more detailed corrosion investigation may include more or fewer concerns, and should be directed by a corrosion expert. Soils actually in contact with concrete should be sampled and tested for sulfate content during construction and the concrete mixes used should comply with the requirements of the 2007 California Building Code (CBC) based on these results. Consideration should also be given to soils in contact with concrete that will be imported to the site during construction, such as topsoil and landscaping materials. For instance, any imported soil materials should not be any more corrosive than the on-site soils and should not be classified more corrosive than "moderately corrosive." Also, on-site cutting and filling may result in soils contacting concrete that were not anticipated at the time of this investigation.

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5.14. RETAINING WALLS

Retaining walls should be designed to resist lateral pressures caused by water, soil and external surface loads. The magnitude of the lateral pressures will depend on whether or not the walls will be allowed to move, the type of backfill and its method of placement (retaining walls), excavation and shoring procedures, the magnitude of external loads, the design water level elevation, and back drainage provisions.

In addition to the static loading of the walls due to earth and surcharge pressures, the retaining walls will be subjected to short-term lateral loading during a seismic event. The structural engineer should check the structural integrity of the retaining walls for a combination of static and seismic (as required by code) lateral loading. The average total (moist) unit weight of the backfill soil may be assumed to be 120 pounds per cubic foot.

For design of unrestrained (yielding) walls, where the backfill is level or inclined and composed of on-site soils, an equivalent fluid pressure as shown in Table 7 can be used:

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TABLE 7
SOIL PRESSURE (UNRESTRAINED WALLS)

Backfill Inclination	Equivalent Fluid Pressure (psf)
0	40
4:1	45
3:1	50
2:1	55

5.14.1. Seismic-Induced Wall Pressures

For flexible retained heights, the seismic pressure distribution may be considered to be rectangular. The resultant of this force may be assumed to be at 1/2 the height of the wall. For level backfill conditions, a maximum pressure of 8H pounds per square foot for flexible walls and 18 H for stiff walls, where H is the height of the wall in feet may be used for design for engineered backfill. These pressures have been obtained by using a seismic coefficient equal to ½ PGA. This pressure is in addition to the static pressures presented above and may be considered as an ultimate load in design.

5.14.2. Additional Surcharge Loads

For surcharge loads imposed on the wall(s), a rectangular distribution with a uniform pressure equal to one-third of the surcharge pressure should be used for unrestrained wall(s) (active earth pressure condition). Additional analyses during design may be needed to evaluate the effects of non-uniform surcharge loads such as point loads, line loads, or other such presently undefined surcharge loads. In that case, we should be consulted for supplemental geotechnical recommendations.

Care must be taken during the compaction operation not to over stress the wall. Heavy construction equipment should be maintained a distance of at least 3 feet away from the walls while the backfill is being placed. Hand-operated compaction equipment should be used to compact the backfill soils within a 3-foot-wide zone adjacent to the walls.

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Kleinfelder should be contacted when development plans are finalized so we can review wall and backfill conditions.

5.14.3. Wall Foundations

Wall foundations should be designed in accordance with the building foundation design recommendations presented in this report and reinforced in accordance with local codes and structure considerations. Lateral resistance will depend on the wall foundations, as discussed previously.

5.14.4. Wall Drainage

Water pressures can accumulate behind walls in response to shallow groundwater table, irrigation, rainfall and runoff or other factors. If retaining walls do not include full wall drainage, hydrostatic pressures should be included in the design. Walls may be designed without hydrostatic pressures if they are fully drained. Wall drainage should consist of either a prefabricated drainage material or a layer of drain rock. With either system, a mechanism (such as a drain pipe) should be installed to move the water from behind the wall to a storm drain system.

Prefabricated drainage material (such as Miradrain® or an approved alternate) may be used behind retaining walls. Prefabricated drainage material should be installed in accordance with the manufacturer's recommendations.

As an alternative to prefabricated drainage material, a drain rock layer may be used. The drain rock layer should 1 to 2 feet thick and extend to within 1 foot of the ground surface. Four-inch diameter perforated plastic pipe should be installed (with the perforations facing down) along the base of the walls on a 4 inch thick bed of drain rock. The pipe should be sloped to drain by gravity to a sump or other drainage facility. Weep holes may also be used. The weep holes should be a minimum of 3 inches in diameter located at no more then 10 feet apart, and a screen placed at the back of the holes if drain rock is used.

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Drain rock should conform to Caltrans Class 2 permeable material. Alternatively, locally available, clean, 1/2 to 3/4-inch maximum size crushed rock or gravel could be used, provided it is encapsulated in a non-woven geotextile filter fabric, such as Mirafi® 140N or an approved alternative. A 1-foot thick cap of clayey soil should be placed over the drain rock to inhibit surface water infiltration.

Even with the back drain system, localized wet spots may occur in the walls. If this is undesirable, then the wall should be waterproofed. If this is a concern, consideration should be given to consulting with a waterproofing expert.

5.15. CONCRETE PAVEMENT

Portland cement concrete pavements are typically better able to resist the intense stresses induced in pavements by the turning motions of vehicles - particularly delivery and garbage trucks. Concrete pavements should be used in areas frequented by such vehicles as well as in driveway and entry aprons. Concrete pavement sections presented in the table below are based on current Portland Cement Association (PCA) design procedures and the assumptions listed below. These assumptions should be reviewed by the project Owner, Architect, and/or Civil Engineer to evaluate their suitability for this project. Changes in the assumptions will affect the corresponding pavement section.

- Modulus of subgrade reaction = 150 psi/in
- Modulus of rupture of concrete = 550 psi
- Aggregate Interlock Joints
- No concrete shoulders
- 20-year design life
- Load Safety Factor = 1.0

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TABLE 8
RECOMMENDED PORTLAND CEMENT CONCRETE PAVEMENT SECTIONS

Proposed Use	Average Daily Truck Traffic (ADTT)	Portland Cement Concrete		Aggregate Base	
		(feet)	(inches)	(feet)	(inches)
Light Duty	15	0.55	7.0	0.50	6.0
Heavy Duty	30	0.65	7.5	0.50	6.0

Portland cement concrete pavement sections provided above are contingent on the following recommendations being implemented during construction.

- All pavement subgrades should be prepared as recommended in the SITE PREPARATION and ENGINEERED FILL sections of this report.
- Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils are not allowed to become wet.
- Concrete pavement should have a minimum 28 day compressive strength of 4,000 psi. Concrete slumps should be from 3 to 4 inches. The concrete should be properly cured in accordance with PCA recommended procedures and vehicular traffic should not be allowed for 3 days (automobile traffic) or 7 days (truck traffic).
- To help offset plastic shrinkage, concrete pavement may be reinforced with at least No. 3 bars, 24 inches on-center, each way or 6x6-W2.9xW2.9 wire mesh (located 1/3 of the slab thickness from the top of the slab).
- Construction and/or control joint spacing should not exceed 12 feet.
- Thickened edges should be used along outside edges of concrete pavements. Edge thickness should be at least 2 inches greater than the concrete pavement thickness and taper to the actual concrete pavement thickness 36 inches inward from the edge. Integral curbs may be used in lieu of thickened edges.

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- Overfinishing of concrete pavements should be avoided. Typically, a broom or burlap drag finish should be used.

The above pavement recommendations should be incorporated into project plans and specifications by the project architect and/or engineer. These recommendations are not intended to be used as a specification for construction.

5.16. PAVEMENTS

Based on the surface soil encountered in our investigation and soil tests we used R-value of 9 for subgrade soil in our analysis. A factor of safety of 0.2 feet was used in the methods outline in Chapter 19 of the CalTrans Design Manual. In accordance with the Target Developer Guide, Traffic indices of 4.5 and 5.5 were chosen for the design of Light Duty Pavement sections in customer auto areas for 10-year and 20-year life span and Traffic Indices of 5.5 and 6.3 were chosen for the design of Heavy Duty Asphalt Pavement for 10-year and 20-year life span in truck thorough fare and loading dock areas. The recommended pavement sections are presented in Table 9.

TABLE 9
RECOMMENDED FLEXIBLE PAVEMENT SECTIONS
SUPPORTED ON COMPACTED ON-SITE SOILS (R-VALUE = 9)

Pavement Description	Traffic Index	Asphalt Concrete		Aggregate Base	
		(feet)	(inches)	(feet)	(inches)
Light Duty – 10-year design	4.5	0.20	2.5	0.70	8.5
Light Duty – 20-year design	5.5	0.25	3.0	0.90	11.0
Heavy Duty - 10-year design	5.5	0.25	3.0	0.90	11.0
Heavy Duty - 20-year design	6.3	0.30	3.5	1.10	13.0

The anticipated traffic pavement sections presented above should be reviewed by the project Civil Engineer in consultation with the owner during the development of the final grading and paving plans. We have made our pavement designs based on the pavement subgrade soil consisting of existing on-site surface material consisting of

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gravelly/sandy clay. If site grading exposes soil other than that utilized in our analysis, we should perform additional tests to confirm or revise the recommended pavement sections to reflect the actual field conditions.

Subgrade preparation should extend a minimum of 2 feet laterally beyond the face of the curb (or edge of pavement if there is no curb) and consist of scarifying, moisture conditioning, and compacting as recommended in Exhibit 1. Compacted pavement subgrade should be non-yielding. Removal and subsequent replacement of some material (i.e., areas of excessively wet materials, unstable subgrade, or pumping soils) may be required to obtain the minimum compaction to the recommended depth.

Asphalt concrete should comply with the specifications presented in Section 39 of the CalTrans Standard Specifications, latest edition. Class 2 Aggregate Base materials should conform with Section 26 of the CalTrans Standard Specifications, latest edition. ASTM test procedures should be used to assess the percent relative compaction of the pavement subgrade soils, aggregate base and asphalt concrete.

Pavement surface should be sloped at a minimum of 2 percent and drainage gradients maintained to carry all surface water off the site due to the slightly porous or permeable nature of asphalt concrete. Surface water ponding should not be allowed anywhere on the site during or after construction.

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6 ADDITIONAL SERVICES

The review of plans and specifications and field observations and testing performed during construction by Kleinfelder are an integral part of the conclusions and recommendations made in this report. If Kleinfelder is not retained for these services, the client will be assuming Kleinfelder's responsibility for any potential claims that may arise during or after construction. The required tests, observations, and consultation by Kleinfelder prior to and during construction include, but are not limited to:

- Review of plans and specifications, especially those for retaining walls;
- Observations of site grading, including stripping, removal of existing materials, and engineered fill construction;
- Geologic mapping during construction, especially in areas of proposed slopes in order to compare the assumed conditions presented in this report with the exposed field conditions;
- Observations of site improvement operations and testing to evaluate adequacy of improvement; and
- In-place density testing of fills, backfills, and finished subgrades.

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7 LIMITATIONS

The services provided under this contract as described in this report include professional opinions and judgments based on the data collected. These services have been performed according to generally accepted geotechnical engineering practices that exist in the San Francisco Bay Area at the time the report was written. No other warranty is expressed or implied. This report is issued with the understanding that the owner chooses the risk he wishes to bear by the expenditures involved with the construction alternatives and scheduling that is chosen.

The conclusions and recommendations of this report are for the proposed new Target store project at Scotts Valley, California, as described in the text of this report. The conclusions and recommendations in this report are invalid if:

- The proposed project, as described, changes;
- The proposed building is relocated;
- The report is used for adjacent or other property;
- The Additional Services section of this report is not followed;
- If changes of grades occur between the issuance of this report and construction; or
- Any other change is implemented that materially alters the project from that proposed at the time this report was prepared.

The conclusions and recommendations presented in this report are based on information obtained from the following:

- The subsurface explorations performed for this investigation.
- The observations of our geologist and geotechnical engineer.
- The results of laboratory tests.
- Our experience in the area.

The boring logs do not provide a warranty as to the conditions that may exist at the entire site. The extent and nature of subsurface soil, bedrock and groundwater variations may not become evident until construction begins. It is possible that

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variations in soil and bedrock conditions between borings could exist between or beyond the points of exploration or that groundwater elevations may change, both of which may require additional studies, consultation, and possible design revisions. If conditions are encountered in the field during construction which differ from those described in this report, our firm should be contacted immediately to provide any necessary revisions to these recommendations.

It is the client's responsibility to see that all parties to the project including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety, including the Additional Services and Limitations sections.

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Historical Aerial Photographs

Source: Pacific Aerial Surveys

Date	Flight No.	Line No.	Photo No.
07-07-1992	AV4230	21	106, 107
10-18-1989	AV3661	21	5, 6
02-04-1982	AV2050	11	40, 41
11-12-1975	AV1215	11	40, 41

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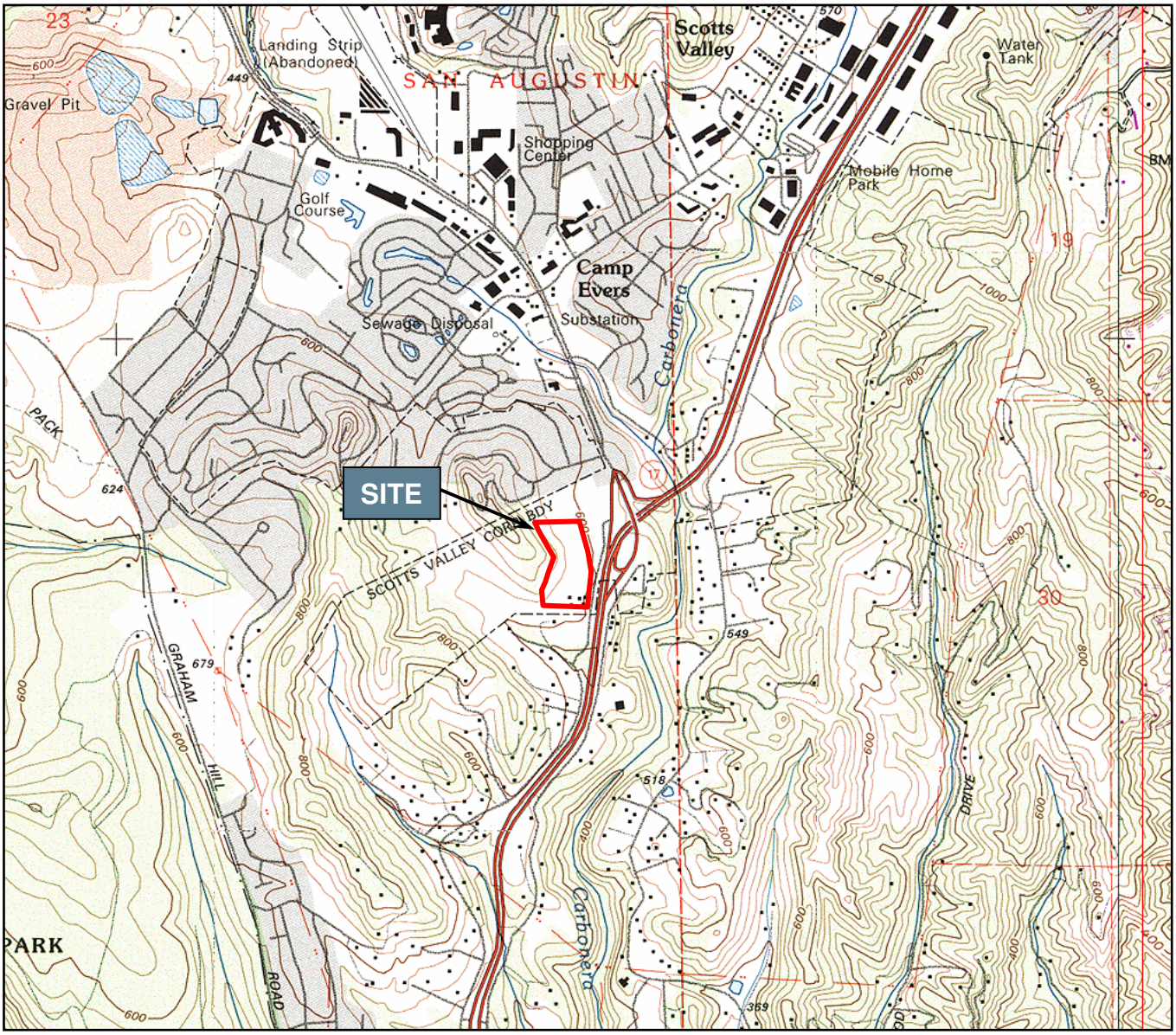
PLATES



2000 1000 0 2000

Approximate Scale (feet)

N

Base: U.S. Geological Survey, Felton 7½-minute quadrangle

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PROJECT NO:	94335
DRAWN:	August 2008
DRAWN BY:	DS
CHECKED BY:	PK
FILE NAME:	

SITE VICINITY MAP

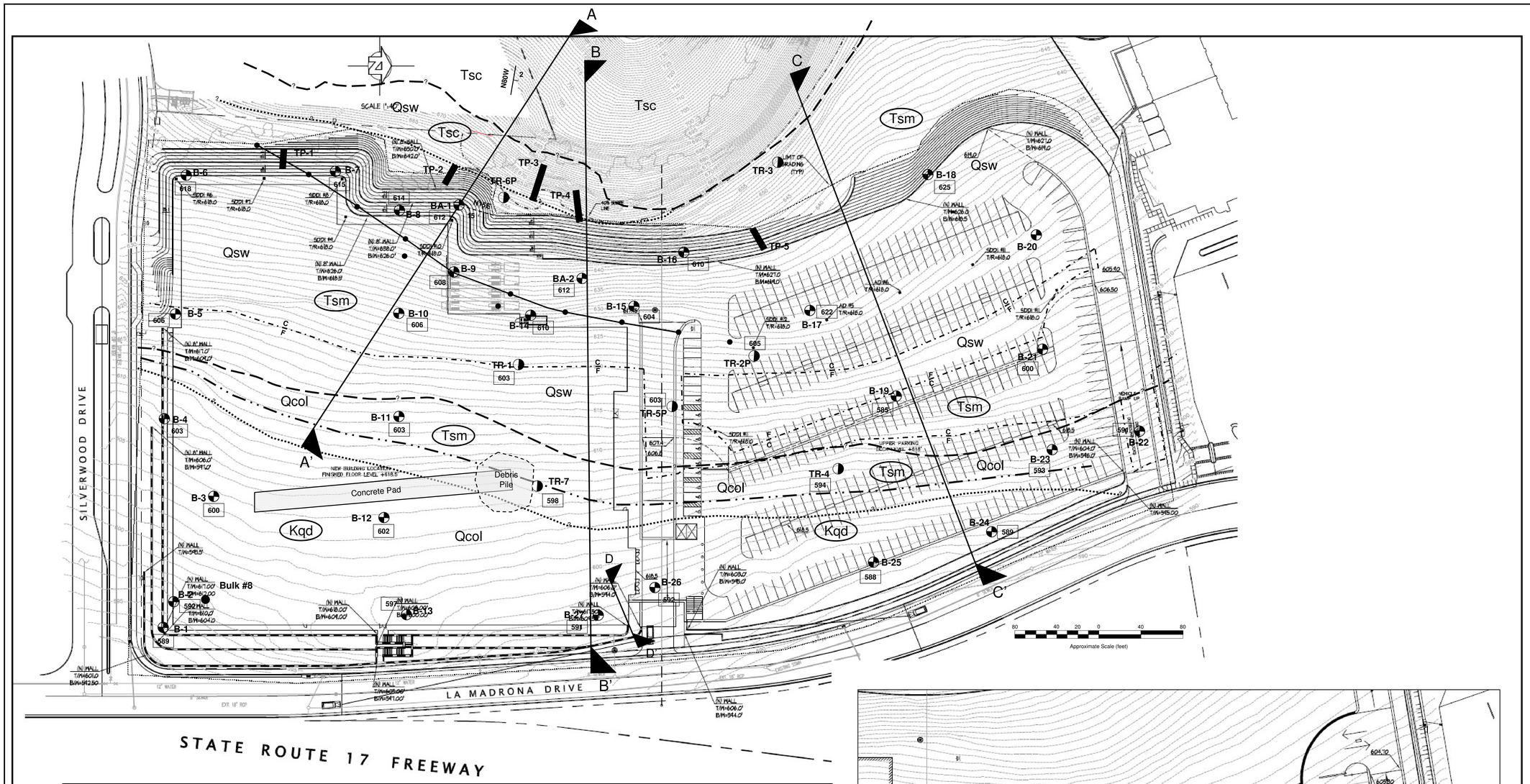
Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

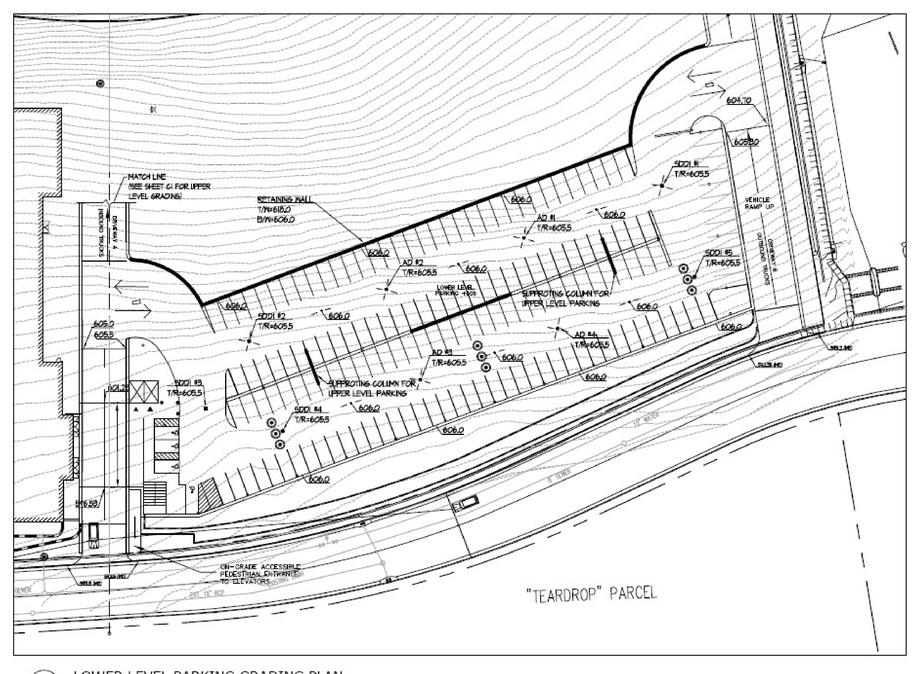
PLATE

1

Library file: L:\2008\library\projects\94335*.ppt

PLOTTED:8 August 2008, 10:27 AM





1 LOWER LEVEL PARKING GRADING PLAN

Scale: 1:40

EXPLANATION

EARTH UNITS

Qcol	Colluvial Soil (Quaternary)
Qsw	Slopewash (Quaternary)
Tsc	Santa Cruz Mudstone (Miocene) (Circled Where Buried)
Tsm	Santa Margarita Sandstone (Miocene) (Circled Where Buried)
Kqd	Quartz Diorite (Cretaceous) (Circled Where Buried)

GEOLOGIC SYMBOLS

Geologic Contact (Approximate Location, Queried Where Uncertain, Dotted Where Buried)

Bedding Attitude (Dashed Where Subsurface) — 2 / N80W

MAP SYMBOLS

B-27	Exploratory Boring – Approximate Location (Kleinfelder – This Investigation)
BA-2	Exploratory Bucket Auger Boring – Approximate Location (Kleinfelder – This Investigation)
TR-7	Exploratory Boring – Approximate Location (Previous Investigation by Treadwell & Rollo)
TP-5	Exploratory Test Pit (Kleinfelder – This Investigation)
	Seismic Refraction Line – Approximate Location (Kleinfelder – This Investigation – Showing Shot Locations)
A A'	Geologic Cross-Section
602	Approximate Elevation to Top of Quartz Diorite (Bedrock) In Feet
C F	Cut/Fill Line
	Proposed Subdrain (Actual Location to Be Determined in Field)

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Base Map: Grading and Drainage Plan, Prepared by DES Architects/Engineers, dated November 12, 2007.

PRELIMINARY
NOT FOR CONSTRUCTION

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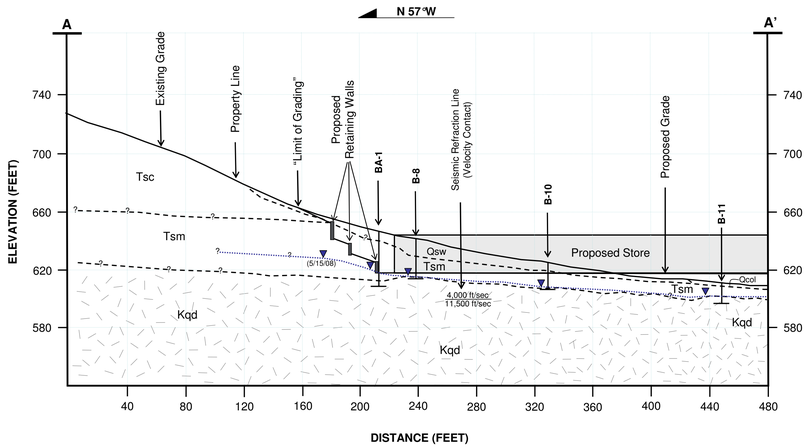
DRAWN BY:	DS
CHECKED BY:	PK
FILE NAME:	

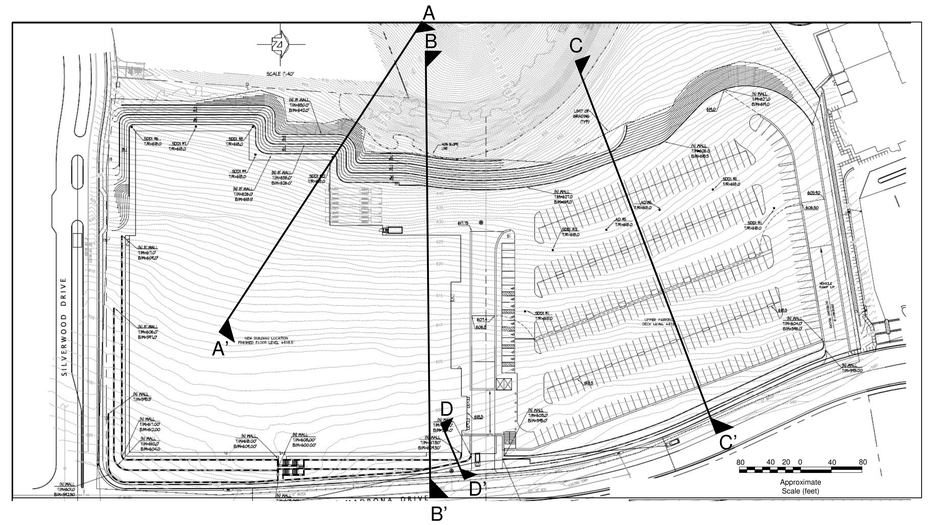
PRELIMINARY GEOTECHNICAL MAP

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

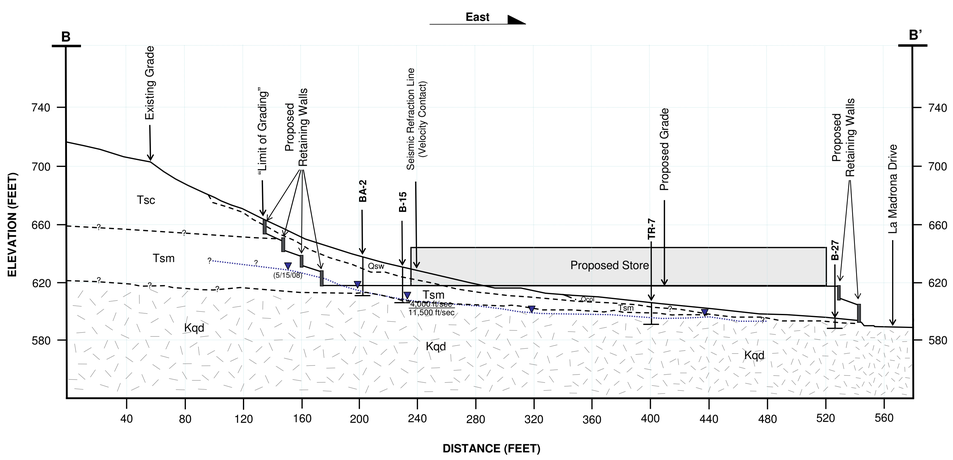
PLATE **2**

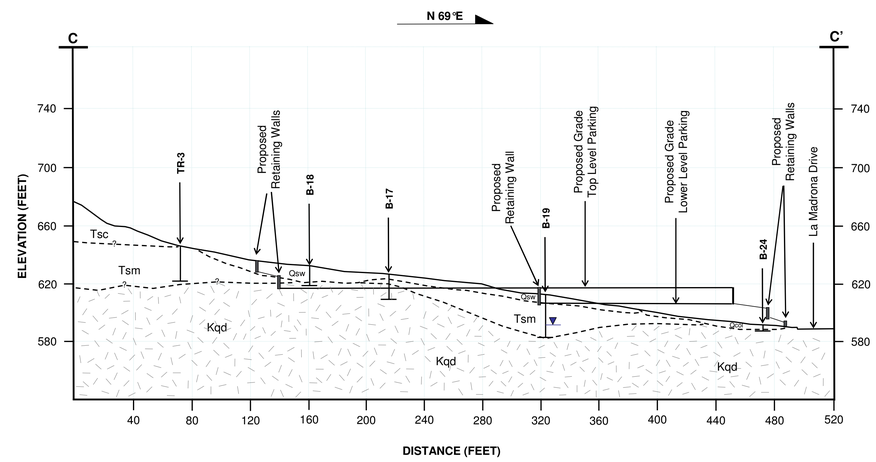
PLOTTED:25 August 2008, 10:27 AM





CROSS-SECTION LOCATION MAP





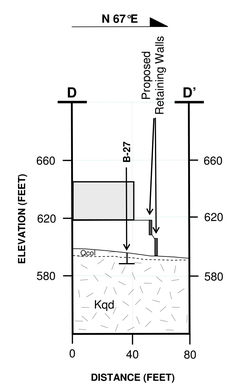
EXPLANATION

EARTH UNITS

Qcol	Colluvial Soil (Quaternary)
Qsw	Slopewash (Quaternary)
Tsc	Santa Cruz Mudstone (Miocene/Pliocene) (Circled Where Buried)
Tsm	Santa Margarita Sandstone (Miocene/Pliocene) (Circled Where Buried)
Kqd	Quartz Diorite (Cretaceous)

SYMBOLS

⊥	Exploratory Boring (B and BA borings by Kleinfelder, TR by Treadwell & Rollo)
▼	Groundwater Level (queried where uncertain, showing date measured)



Approximate Scale (feet)
Both Horizontal and Vertical

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GEOLOGIC CROSS-SECTIONS

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE 3

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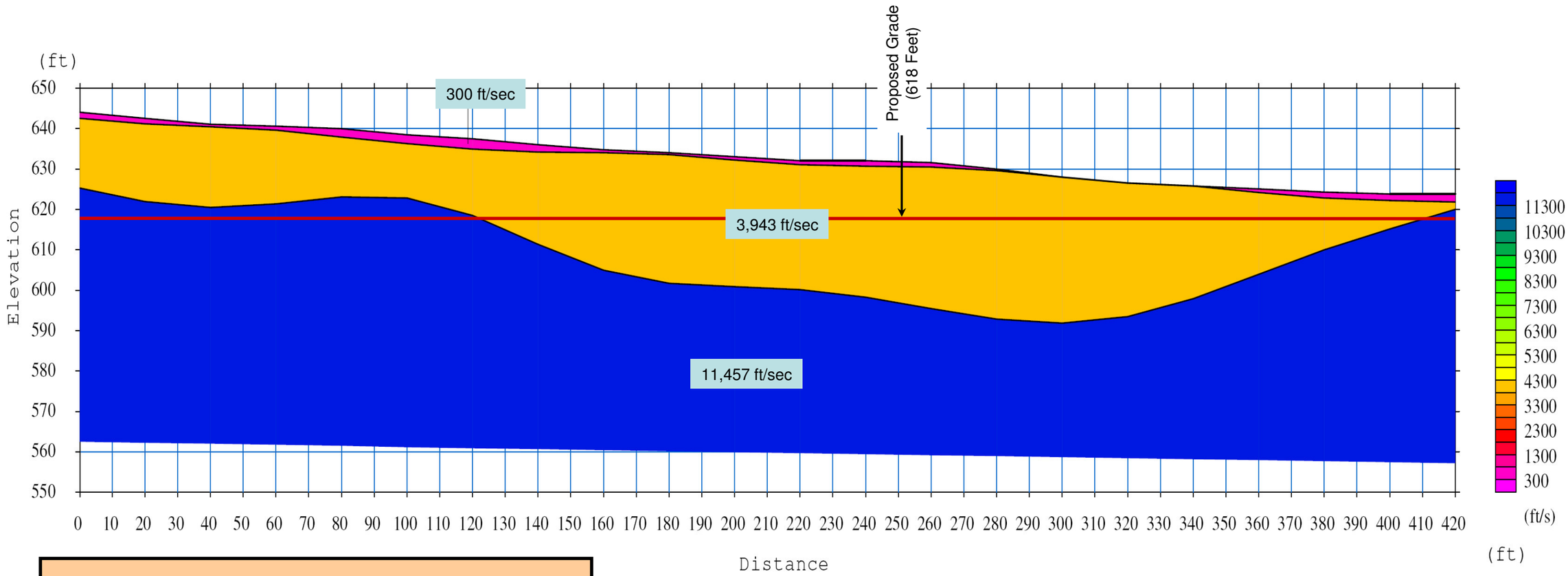

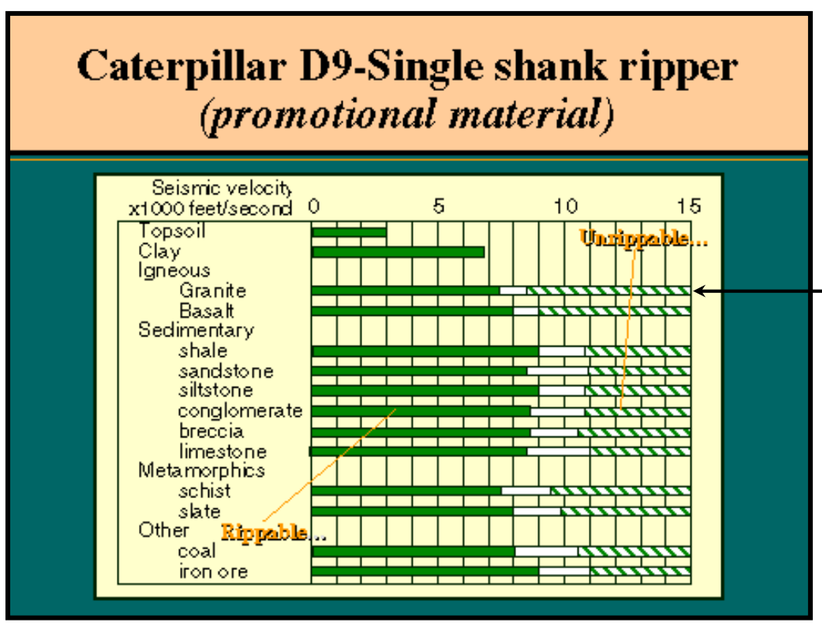

Quartz Diorite

Original in Color

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CHECKED BY:	DS
FILE NAME: 11 x17 Plates	

SEISMIC REFRACTION CROSS-SECTION

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE
4

PLOTTED: 5 September 2008, 10:27 AM

APPENDIX A

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	ID	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY	GW		Well-graded gravels or gravel with sand, little or no fines.
		GP		Poorly-graded gravels or gravel with sand, little or no fines.
		GM		Silty gravels, silty gravel with sand mixture.
		GC		Clayey gravels, clayey gravel with sand mixture.
	SAND AND SANDY	SW		Well-graded sands or gravelly sands, little or no fines.
		SP		Poorly-graded sands or gravelly sands, little or no fines.
		SM		Silty sand.
		SC		Clayey sand.

MAJOR DIVISIONS		LTR	ID	DESCRIPTION
FINE GRAINED SOILS	SILTS AND CLAYS	ML		Inorganic silts and very fine sands, rock flour or clayey silts with slight plasticity.
		CL		Inorganic lean clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
		OL		Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS	MH		Inorganic elastic silts, micaceous or diatomaceous or silty soils.
		CH		Inorganic fat clays (high plasticity).
		OH		Organic clays of medium high to high plasticity.
HIGHLY ORGANIC SOILS		Pt		Peat and other highly organic soils.

Physical Properties Criteria for Rock Descriptions

FRACTURE SPACING

VERY WIDELY FRACTURED	Greater than 6.0 feet
WIDELY FRACTURED	2.0 to 6.0 feet
MODERATELY FRACTURED	8.0 inches to 2.0 feet
CLOSELY FRACTURED	2.5 to 8.0 inches
INTENSELY FRACTURED	0.75 to 2.5 inches
CRUSHED	Less than 0.75 inches

BEDDING OR LAYERING

VERY THICK OR MASSIVE	Greater than 4.0 feet
THICK	2.0 to 4.0 feet
THIN	0.2 to 2.0 feet
VERY THIN	0.05 to 0.2 feet
LAMINATED	0.01 to 0.05 feet
THINLY LAMINATED	Less than 0.01 feet

WEATHERING

FRESH - No visible sign of rock material weathering; perhaps slight discoloration on major discontinuity surfaces.

SLIGHTLY WEATHERED - Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker than in its fresh condition.

MODERATELY WEATHERED - Less than half of the rock material is decomposed and/or disintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones.

HIGHLY WEATHERED - More than half of the rock material is decomposed and/or distintegrated to a soil. Fresh or discolored rock is present either as a discontinuous framework or as corestones.

COMPLETELY WEATHERED - All rock material is decomposed and/or disintegrated to a soil. The original mass structure is still largely intact.

STRENGTH

PLASTIC - Can be remolded with hands.

FRIABLE - Can be crumbled between fingers or peeled by pocket knife.

WEAK - Can be peeled by a knife with difficulty, shallow indentations made by firm blow with point of geological hammer.

MEDIUM STRONG - Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer.

STRONG - Specimen requires more than one blow of geological hammer to fracture it.

VERY STRONG - Specimen withstands several blows of geological hammer without breaking.

EXTREMELY STRONG - Specimen can only be chipped with a geological hammer.

$$\text{RQD (Rock Quality Designation)} = \frac{\text{(Length of Solid Core Pieces 4" or Longer)}}{\text{(Total Length of Core Run)}} \times 100$$

Key to Test Data

Bulk Sample

Standard Penetration Split Spoon Sampler 2.0 inch O.D., 1.4 inch I.D.

Modified California Sampler 2.5 inch O.D., 2.0 inch I.D.

Shelby Tube 3.0 inch O.D.

Continuous Rock Core

California Sampler, 3.0 inch O.D., 2.5 inch I.D.

Pitcher Barrel

101 Method (Modified Pitcher Barrel)

0745, 5/31 — Approximate water level first observed in boring. Time recorded in reference to a 24-hour clock.

0800, 5/31 — Approximate water level observed in boring following drilling. Time recorded in reference to a 24-hour clock.

PEN Pocket Penetrometer reading, in tsf

TV:Su Torvane shear strength, in ksf

LL	LIQUID LIMIT
PI	PLASTICITY INDEX
%-#200	SIEVE ANALYSIS (MINUS #200 SCREEN)
R-Value	RESISTANCE VALUE
SE	SAND EQUIVALENT
C	COHESION (PSF)
PHI	FRICTION ANGLE
TX	TRIAXIAL SHEAR
CONSOL	CONSOLIDATION
DS	DIRECT SHEAR

Notes: Blow counts represent the number of blows a 140-pound hammer falling 30 inches required to drive a sampler through the last 12 inches of an 18 inch penetration, unless otherwise noted.

The lines separating strata on the logs represent approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

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PROJECT NO. 94335/ field

ROCK AND SOIL LEGEND

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-1

8/26/2008 3:14:13 PM

Date Completed: 6/9/08

Drilling method: 4" Solid Stem Auger

Logged By: R. Roatch

Hammer Wt: 140 lbs., 30" drop

Total Depth: Approximately 19.0 ft

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 593 feet (MSL))
		38		8.3		Passing -#200=34% LL=31; PI=12 Passing -#200=21%	>4.5	**CLAYEY SAND (SC)** -light olive-brown, dry to moist, dense, fine to coarse sand, trace subangular fine gravel (Colluvial Soil)
5		22	107	17.8	2.48 @ 14.9%	TX UU	>4.5	**Quartz Diorite** -very light gray with iron oxide staining, moderately weathered, weak to moderately strong
		28					>4.5	-slightly to moderately weathered, moderately strong to strong
10		44					>4.5	
		50/3.5"						
15								
		50/1"						
20								Bottom of boring at 19 feet (refusal) Groundwater not encountered Boring backfilled with grout
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B- 1

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-2

U:\GINT\PROJECTS\94335.GPJ

8/26/2008 3:15:17 PM

Date Completed: 6/9/08

Drilling method: 4" Solid Stem Auger

Logged By: R. Roatch

Hammer Wt: 140 lbs., 30" drop

Total Depth: Approximately 14.0 ft

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 595 feet (MSL))
		38				Passing -#200=40% LL=31; PI=11	>4.5	**CLAYEY SAND (SC)** - dark brown, moist, medium dense, low plasticity, fine sand, some medium to coarse sand (Colluvial Soil)
				7.2		LL=0; PI=0		**POORLY GRADED SAND WITH CLAY (SP-SC)** - dark brown, moist, medium dense, fine to coarse sand
5		46	121	8.5				**QUARTZ DIORITE** -light gray with yellow-brown staining, slightly to moderately weathered, moderately strong to strong
		89				SA Passing -#200=13%		-strong to very strong
10		72						
		50/0.5"						
15								Bottom of boring at 14 feet (refusal) Groundwater not encountered Boring backfilled with grout
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B- 2

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-3

U:\GINT\PROJECTS\94335.GPJ

8/26/2008 3:15:25 PM

Date Completed: 6/9/08

Drilling method: 4" Solid Stem Auger

Logged By: R. Roatch

Hammer Wt: 140 lbs., 30" drop

Total Depth: Approximately 19.0 ft

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 604 feet (MSL)
		12	106	9.8			3.5	**SANDY LEAN CLAY (CL)** - dark brown, moist, firm, low to medium plasticity, fine sand (Colluvial Soil)
5		41	120	9.3				**Quartz Diorite** - light gray to gray, slightly to moderately weathered, moderately strong to strong
		66	116	12.9	2.83 @ 5.2%	TX UU		
10								
		50/4"						-iron-oxide staining
15								
		50/1.5"						
20								Bottom of boring at 19 feet Groundwater not encountered Boring backfilled with grout
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B- 3

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-4

U:\GINT\PROJECTS\94335.GPJ

8/26/2008 3:15:28 PM

Date Completed: 6/9/08

Logged By: R. Roatch

Total Depth: Approximately 11.0 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 606 feet (MSL)
		29				Passing #200=22%	>4.5	**CLAYEY SAND WITH GRAVEL (SC)** -dark brown, dry to moist, dense, low plasticity, fine to coarse sand, angular gravel up to 1" (Colluvial Soil)
5		42						**QUARTZ DIORITE** - light gray, slightly to moderately weathered, moderately strong to strong
		59						
10		50/3"						
15								Boring terminated at 11 feet due to refusal Groundwater not encountered Boring backfilled with grout
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B- 4

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-5

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8/26/2008 3:15:36 PM

Date Completed: 6/9/08

Drilling method: 4" Solid Stem Auger

Logged By: R. Roatch

Hammer Wt: 140 lbs., 30" drop

Total Depth: Approximately 18.0 ft

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 617 feet (MSL))
		17	96	24.2			3.0	**LEAN CLAY (CL)** - very dark gray, moist, firm, some fine sand, trace angular mudstone clasts from coarse sand to fine gravel (Slopewash)
5		40				Passing -#200=15%		**CLAYEY SAND (SC)** - light gray with iron oxide staining, moist, dense, fine to medium sand (Santa Margarita Sandstone)
		15						
10		39						
		50/1.5"						**QUARTZ DIORITE** - light gray, moderately to highly weathered, weak to moderately strong -strong
15		50/4"						
20								Bottom of boring at 18 feet (refusal) Groundwater not encountered Boring backfilled with grout
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B- 5

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-6

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8/26/2008 3:15:44 PM

Date Completed: 6/9/08

Logged By: R. Roatch

Total Depth: Approximately 19.8 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 638 feet (MSL))
		32	95	24.7		Consol/ Swell	>4.5	**CLAYEY SAND/ SANDY LEAN CLAY (SC/CL)** dark brown, moist, hard, low to medium plasticity, fine to medium sand (Slopewash)
5		37	106	18.8			>4.5	**SANDY LEAN CLAY (CL)** - very dark brown, moist, hard, fine to coarse sand, some angular gravel up to 1/2 inch
		70						**POORLY GRADED SAND WITH CLAY (SP-SC)** - olive-brown, moist, very dense, fine to medium sand (Santa Margarita Sandstone)
10		55						
		50/3.5"						
15								**Quartz Diotrite (?)** - drilling became difficult
		50/1"		4.3				
20								Bottom of boring at 19.8 feet (refusal) Groundwater not encountered Boring backfilled with grout
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B- 6

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-7

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8/26/2008 3:15:51 PM

Date Completed: 6/9/08

Logged By: R. Roatch

Total Depth: Approximately 28.6 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 644 feet (MSL))
		16				LL=23; PI=6	>4.5	**SANDY SILTY LEAN CLAY (CL-ML)** - dark brown, dry, very hard, very low plasticity, fine sand, rootlets (Slopewash)
5		32					>4.5	-coarse sand, angular gravel up tp 3/4"
		12						**CLAYEY SAND (SC)** -grey-brown and olive-brown, moist, loose, fine to medium sand (Santa Margarita Sandstone)
10		13						
		50/5"		11.9		SA Passing -#200=14%		**SILTY SAND (SM)** - light yellow-brown, moist, very dense, fine to medium sand
15								
		50/5"		16.5				
20			0800 6/9/2008					
		74				Passing -#200=11%		**POORLY GRADED SAND WITH SILT** -light yellow- brown, wet, very dense, fine to medium sand
25								
								Quartz Diorite (?) - drilling became difficult
		50/0.5"						
30								Bottom of boring at 28.6 feet (refusal) Groundwater encountered at 21 feet Boring backfilled with grout
35								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B- 7

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-8

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8/26/2008 3:16:35 PM

Date Completed: 6/10/08

Logged By: R. Roatch

Total Depth: Approximately 27.0 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 641 feet (MSL))
		28					>4.5	**SANDY LEAN CLAY WITH GRAVEL (CL)** - dark brown, moist, very hard, low to medium plasticity, fine to coarse sand, fine angular mudstone gravel (Slopewash)
5		24	105	14.6			>4.5	-brown, grades more sand
		33				Passing -#200=65%	>4.5	
10		40						
								CLAYEY SAND (SC) - brown, moist, medium dense, low plasticity, iron oxide staining, fine to medium sand, angular red-yellow and pale brown mudstone clasts (Slopewash)
		28						**POORLY GRADED SAND (SP)** - olive-brown, moist, medium dense to dense, fine to medium sand (Santa Margarita Sandstone)
15								
		50/5.5"						
20								
		50/2"				Passing -#200=14%		**CLAYEY SAND (SC)** - olive-brown, moist, very dense, fine to medium sand
25			0934 6/10/2008					-iron oxide staining
								-wet
								QUARTZ DIORITE (?) - drilling became difficult
								Bottom of boring at 27 feet (refusal)
								Groundwater encountered at 25.5 feet
								Boring backfilled with grout
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B- 8

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-9

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8/26/2008 3:17:20 PM

Date Completed: 6/10/08

Logged By: R. Roatch

Total Depth: Approximately 26.0 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 633 feet (MSL))
		23					>4.5	**CLAYEY SAND (SC)** -dark brown, moist, dense, fine to medium sand, trace coarse sand (Slopewash)
5		64						**CLAYEY SAND WITH GRAVEL (SC)** -light gray and brown, moist, very dense, fine to medium sand (Santa Margarita Sandstone)
		71						
		82						
10								**POORLY GRADED SAND WITH CLAY (SP-SC)** - light gray to pale brown, moist, very dense, fine to medium sand
		56		10.2		Passing -#200=11%		
15								
		76		18.4				-wet
20								
		50/4"						
25			▽ 1117 6/10/2008					**QUARTZ DIORITE** - moderately weathered
								Bottom of boring at 26 feet (refusal) Groundwater encountered at 25 feet Boring backfilled with grout
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B- 9

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-10

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8/26/2008 3:17:28 PM

Date Completed: 6/10/08

Logged By: R. Roatch

Total Depth: Approximately 18.1 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 624 feet (MSL)
		37				LL=25; PI=12	>4.5	**CLAYEY SAND WITH GRAVEL (SC)** - brown, moist, very dense, low plasticity, fine to medium sand, light brown angular mudstone gravel up to 1/2" (Slopewash)
5		50/6"	110	8.8			>4.5	
		88/11"				Passing -#200=9%		**POORLY GRADED SAND WITH CLAY (SP-SC)** -light brown, moist, dense, fine to medium sand (Santa Margarita Sandstone)
								-grades less clay
10		51						
15		55						-wet
		50/1"	1242 6/10/2008					
20								Bottom of boring at 18.1 feet (refusal) Groundwater encountered at 18 feet Boring backfilled with grout
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-10

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-11

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8/26/2008 3:17:36 PM

Date Completed: 6/10/08

Drilling method: 4" Solid Stem Auger

Logged By: R. Roatch

Hammer Wt: 140 lbs., 30" drop

Total Depth: Approximately 12.6 ft

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 612 feet (MSL)
		21		6.0				**CLAYEY SAND (SC)** -brown, moist, medium dense, fine to medium sand (Colluvial Soil)
5		69						**POORLY GRADED SAND WITH CLAY (SP-SC)** -light brown, moist, dense, fine to medium sand, some iron oxide staining (Santa Margarita Sandstone)
		49						-medium dense
10		46						**QUARTZ DIORITE (?)** - drilling became difficult
		50/.5"						Bottom of boring at 12.6 feet (refusal) Groundwater not encountered Boring backfilled with grout
15								
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-11

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-12

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8/26/2008 3:17:43 PM

Date Completed: 6/10/08

Drilling method: 4" Solid Stem Auger

Logged By: R. Roatch

Hammer Wt: 140 lbs., 30" drop

Total Depth: Approximately 10.2 ft

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 604 feet (MSL)
		44						**QUARTZ DIORITE** -light gray with iron oxide staining, moderately weathered, moderatly strong
5		31						
		42						
10		50/2.5"						
								Bottom of boring at 10.2 feet (refusal) Groundwater not encountered Boring backfilled with grout
15								
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-12

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-13

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8/26/2008 3:17:50 PM

Date Completed: 6/10/08

Logged By: R. Roatch

Total Depth: Approximately 13.6 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 600 feet (MSL)
		22					4.0	**SANDY LEAN CLAY (CL)** -dark brown, moist, low plasticity, firm to hard, trace gravel, fine to medium sand (Colluvial Soil)
5		34						**QUARTZ DIORITE** -light gray with iron oxide staining, moderately weathered, moderately strong
		77						-becomes stronger
10		50/4.5"						
		50/1"						Bottom of boring at 13.6 feet (refusal) Groundwater not encountered Boring backfilled with grout
15								
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-13

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-14

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8/26/2008 3:17:57 PM

Date Completed: 6/11/08

Logged By: R. Roatch

Total Depth: Approximately 20.0 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 628 feet (MSL))
		19					>4.5	**SANDY LEAN CLAY/ CLAYEY SAND (CL/SC)** - brown, moist, low plasticity, hard/ medium dense, fine to medium sand (Slopewash)
5		40		35.8			>4.5	
		59				LL=62; PI=21		**GRAVELLY ELASTIC SILT WITH SAND (MH)** -light brown, moist, hard to very hard, high plasticity, angular mudstone clasts up to 1.5 inch (Slopewash)
10		78						
		50/5"						**POORLY GRADED SAND WITH CLAY (SP-SC)** -light brown, moist, very dense, fine to medium sand (Santa Margarita Sandstone)
15			0805 6/11/2008					
		50/2.5"						**QUARTZ DIORITE** -highly weathered to moderately weathered, moderately strong to strong
20								Bottom of boring at 20 feet (refusal) Groundwater encountered at 16 feet Boring backfilled with grout
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-14

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-15

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8/26/2008 3:18:05 PM

Date Completed: 6/11/08

Logged By: R. Roatch

Total Depth: Approximately 23.6 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 627 feet (MSL))
		20				LL=34; PI=18	>4.5	**SANDY LEAN CLAY (CL)** - dark brown, dry to moist, hard, fine to medium sand, trace angular gravel up to 1/4", medium plasticity, rootlets (Slopewash)
		41					>4.5	
5								**POORLY GRADED GRAVEL WITH CLAY (GP-GC)** - brown and olive, moist, medium dense, angular gravel up to 1.5" (Slopewash)
		82						**POORLY GRADED SAND WITH CLAY (SP-SC)** -brown, moist, dense, fine to medium sand (Santa Margarita Sandstone)
		51						
10								-grades less clay
15		52						
		84	0920 6/11/2008					-wet
		82						
20								
		50/1"						**QUARTZ DIORITE** -light gray, slightly weathered
25								Bottom of boring at 23.6 feet (refusal) Groundwater encountered at 23.6 feet Boring backfilled with grout
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-15

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-16

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8/26/2008 3:18:12 PM

Date Completed: 6/11/08

Logged By: R. Roatch

Total Depth: Approximately 31.0 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 640 feet (MSL)
		32				LL=54; PI=34	>4.5	**SANDY FAT CLAY (CH)** -dark brown, moist, hard, high plasticity, fine to medium sand, some coarse sand, fine gravel, gravel angular mudstone (Slopewash)
5		56						**POORLY GRADED SAND WITH CLAY (SP-SC)** -brown and light brown, moist, dense, angular mudstone gravel up to 3/4" (Santa Margaritia Sandstone)
		50/6"				Passing -#200=7%		-light brown, very dense, fine to medium sand
10		86						
		91/10.5"		12.2				
15								
			1052 6/11/2008					-wet
20		50/5"						
25		50/5"						-iron oxide staining
30		50/4.5"						
								QUARTZ DIORITE -light gray with iron oxide staining, moderately weathered
								Bottom of boring at 31 feet (refusal)
								Groundwater encountered at 18 feet
								Boring backfilled with grout
35								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-16

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-17

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8/26/2008 3:18:55 PM

Date Completed: 6/11/08

Logged By: C. Buzzone

Total Depth: Approximately 18.6 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 628 feet (MSL))
		38						**SANDY LEAN CLAY (CL)** -mottled red-brown and dark brown, dry, very hard, fine to coarse sand, medium plasticity (Slopewash)
5		39						**POORLY GRADED SAND (SP)** -yellow-brown, moist, medium dense, fine to coarse sand (Santa Margarita Sandstone)
		50/4.5"						**QUARTZ DIORITE** -light gray with iron oxide staining, moderately weathered, moderately strong to strong
10		54						
15		50/6"				Passing #200=15%		
20		50/1"						Bottom of boring at 18.6 feet Groundwater not encountered Boring backfilled with grout
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-17

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-18

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8/26/2008 3:19:44 PM

Date Completed: 6/11/08

Logged By: C. Buzzone

Total Depth: Approximately 13.6 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 635 feet (MSL)
		42						**SILTY SAND (SM)** -light brown, dry, loose, fine sand (Slopewash)
						LL=23; PI=8 Passing -#200=29%		**CLAYEY SAND (SC)** -mottled red and dark brown, dry, dense, low plasticity, fine to coarse sand
5		43						-mottled gray and yellow, trace fine gravel
								POORLY GRADED SAND WITH CLAY (SP-SC) -mottled light brown and yellow-brown, dry, dense, fine to medium sand
		57						**POORLY GRADED SAND WITH CLAY (SP-SC)** -mottled gray and yellow-brown, moist, dense, fine to coarse sand, fine gravel composed of angular mudstone clasts, coarse gravel and cobble quartz diorite clasts (Slopewash)
10		52						**QUARTZ DIORITE** -light gray with iron oxide staining, moderately to slightly weathered, moderately strong to strong
		50/0.5"						
15								Bottom of boring at 13.6 feet (refusal) Groundwater not encountered Boring backfilled with grout
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-18

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-19

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8/26/2008 3:19:51 PM

Date Completed: 6/11/08

Logged By: C. Buzzone

Total Depth: Approximately 29.0 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated 613 feet (MSL))
		17						**SILTY LEAN CLAY WITH SAND (CL-ML)** -light brown, dry, hard, fine sand
5		34	116	13.7				**SANDY LEAN CLAY (CL)** -red-brown, dry, hard, fine to medium sand, fine gravel composed of angular mudstone (Slopewash)
		62				Passing -#200=25%		**CLAYEY SAND (SC)** -light brown, moist, dense, fine to medium sand (Santa Margarita Sandstone)
10		50	113	10.8				**POORLY GRADED SAND (SP)** -light brown, moist, dense, fine to medium sand
15		56						-yellow-brown to light brown, very dense
20		50/6"						-light brown, grades more coarse sand
			1430 6/11/2008					
25		63						-wet
30		50/6"						**QUARTZ DIORITE** -light gray, moderately weathered
35								Bottom of boring at 29 feet Grounwater encountered at 21 feet Boring backfilled with grout

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-19

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-20

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8/26/2008 3:20:33 PM

Date Completed: 6/11/08

Logged By: C. Buzzone

Total Depth: Approximately 19.5 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 622 feet (MSL)
		35						**SILTY SAND WITH GRAVEL (SM)** - light brown, dry, medium dense, fine to coarse sand, fine gravel (Slopewash)
								CLAYEY SAND (SC) -dark brown, moist, medium dense, fine to coarse sand
5		44						**POORLY GRADED SAND WITH CLAY (SP-SC)** - mottled gray and brown, moistm dense, fine to coarse sand, trace fine gravel composed of angular mudstone clasts (Slopewash)
		50/5"						**POORLY GRADED SAND WITH CLAY (SP-SC)** -yellow-brown, moist, very dense, fine to coarse sand (Santa Margarita Sandstone)
10		81		12.2		Passing -#200=10%		
		50/6"						-gray, trace clay content
15								
			1540 6/11/2008					
		50/6"						- red-brown, wet, very dense, fine to medium sand
20								Bottom of boring at 19.5 feet Groundwater encountered at 17 feet Boring backfilled with grout
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-20

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-21

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8/26/2008 3:21:30 PM

Date Completed: 6/12/08

Logged By: R. Roatch

Total Depth: Approximately 14.0 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 614 feet (MSL)
		9	90	21.8	0.72 @ 5.0%		3.3	**SANDY LEAN CLAY/ CLAYEY SAND (CL/SC)** -black, moist, firm/ loose, fine to medium sand, low to medium plasticity, rootlets (Topsoil)
5		10				Passing -#200=23%	2.0	**CLAYEY SAND (SC)** -yellow-brown, moist, firm, fine to medium sand, trace angular fine gravel composed of mudstone (Slopewash)
		31						**POORLY GRADED SAND WITH CLAY (SP-SC)** - brown, moist, loose, trace iron oxide staining (Santa Margarita Sandstone) -light brown, dense
10		30						-red-brown, iron oxide staining
15								Bottom of boring at 14 feet (refusal) Groundwater not encountered Boring backfilled with grout
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-21

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-22

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8/26/2008 3:21:37 PM

Date Completed: 6/12/08

Logged By: R. Roatch

Total Depth: Approximately 8.6 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 599 feet (MSL)
		22	106	14.7			>4.5	**SANDY LEAN CLAY (CL)** - black moist, hard, fine to medium sand, low plasticity, rootlets (Colluvial Soil)
5		83						**POORLY GRADED SAND WITH CLAY (SP-SC)** - light brown, moist, medium sand, very dense, iron oxide staining (Santa Margarita Sandstone)
		58						-red-brown
		50/1"						
10								Bottom of boring at 8.6 feet (refusal) Groundwater not encountered Boring backfilled with grout
15								
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-22

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-23

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8/26/2008 3:21:45 PM

Date Completed: 6/12/08

Logged By: R. Roatch

Total Depth: Approximately 9.8 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 602 feet (MSL)
		25					>4.5	**SANDY LEAN CLAY (CL)** - dark brown, moist, hard, fine to medium sand, low plasticity, rootlets (Colluvial Soil)
5		29						**POORLY GRADED SAND WITH CLAY (SP-SC)** - brown, moist, dense, fine to coarse sand (Santa Margarita Sandstone)
		46						-gray
		76/9"						-red-brown, iron oxide staining
10								**QUARTZ DIORITE** - light gray with iron oxide staining, moderately weathered
								Bottom of boring at 9.8 feet (refusal) Groundwater not encountered Boring backfilled with grout
15								
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-23

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-24

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8/26/2008 3:21:53 PM

Date Completed: 6/12/08

Logged By: R. Roatch

Total Depth: Approximately 4.3 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 593 feet (MSL)
		15					>4.5	**SANDY LEAN CLAY/ CLAYEY SAND (CL/SC)** - dark brown, moist, firm to hard/ loose to medium dense, fine to medium sand, low plasticity, rootlets (Colluvial Soil)
		50/3"						**QUARTZ DIORITE** - light gray with iron oxide staining, moderately weathered
5								Bottom of boring at 4.3 feet (refusal) Groundwater not encountered Boring backfilled with grout
10								
15								
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-24

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-25

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8/26/2008 3:22:00 PM

Date Completed: 6/12/08

Logged By: R. Roatch

Total Depth: Approximately 4.7 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 592 feet (MSL)
		37				LL=22; PI=9	>4.5	**SANDY LEAN CLAY (CL)** - dark brown to black, dry to moist, very hard, fine to medium sand, low plasticity, rootlets (Colluvial Soil)
5		50/2"						**QUARTZ DIORITE** - gray with iron oxide staining, moderately weathered
								Bottom of boring at 4.7 feet (refusal)
								Groundwater not encountered
								Boring backfilled with grout
10								
15								
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-25

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-26

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8/26/2008 3:22:07 PM

Date Completed: 6/12/08

Logged By: R. Roatch

Total Depth: Approximately 5.5 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 596 feet (MSL)
		21					>4.5	**SANDY LEAN CLAY/ CLAYEY SAND (CL/SC)** - black, moist, very hard/ medium dense, fine to medium sand, low plasticity, rootlets (Colluvial Soil)
5		85/11"						**QUARTZ DIORITE** - light gray, moderately weathered, moderately strong
								Bottom of boring at 5.5 feet (refusal) Groundwater not encountered Boring backfilled with grout
10								
15								
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-26

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-27

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Date Completed: 6/12/08

Logged By: R. Roatch

Total Depth: Approximately 7.0 ft

Drilling method: 4" Solid Stem Auger

Hammer Wt: 140 lbs., 30" drop

Notes:

Depth,ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated 595 feet (MSL)
		31					>4.5	**SANDY LEAN CLAY (CL)** - black, dry to moist, low to medium plasticity, very hard, fine to medium sand, rootlets (Colluvial Soil)
5		47 50/5"						**QUARTZ DIORITE** - light gray with iron oxide staining, moderately to slightly weathered, moderately strong to strong
10								Bottom of boring at 7 feet (refusal) Groundwater not encountered Boring backfilled with grout
15								
20								
25								
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. B-27

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-28

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8/26/2008 3:22:22 PM

Date Completed: 6/19/08

Logged By: R. Roatch

Total Depth: Approximately 37.0 ft

Drilling method: 24" Bucket Auger

Hammer Wt: 3,400 lbs 0 to 30 ft, 2,050 lbs 30 to 60 ft

Notes: Hammer Weight is weight of Kelly bar

Surface Elevation: Estimated 645 feet (MSL)

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								TOPSOIL
								POORLY GRADED SAND WITH CLAY (SP-SC)- olive brown, damp, dense, no-plasticity, medium to coarse grain sand (Slopewash)
5		0				Passing #200=17%		**CLAYEY SAND (SC)**- brown, moist, dense, fine to medium grained, few gravel size mudstone clasts - mottled brown and light brown, very moist (Slopewash)
								POORLY GRADED SAND (SP)- light brown, moist to very moist, dense, diminishing clay content - Santa Margarita Sandstone (Tsm) - increased clay content, trace 3/4" black gravels - @ 9.7' Bedding: N15E, 10SE, sharp, planar contact
10		7		14.6				**CLAYEY SAND (SC)**- brown, very moist (Tsm)
								- @ 11.5' Bedding: N20W, 31SW, undulatory contact, bottom of brown sand
								POORLY GRADED SAND (SP)- light brown, clean - 6" zone of black mineralization, fine to coarse gravels, discontinuous iron oxide staining
15		13	107	13.7		DS Ø = 35° C = 510 psf		- 4" thick band of fine gravel sized iron oxide nodules, iron oxide stained - olive grey - light grey sandstone, fine to coarse, very moist
20		13						- 5" thick zone of iron oxide banding, nearly horizontal, discontinuous lens - massive sandstone, mottled olive with light grey
25								- fine gravel sized quarts and/or feldspars
								- water seepage from NW wall; only about 1/3 of hole - free water, strong iron oxide staining/banding continuing to lower contact - iron oxide banding in sandstone is near horizontal
30								

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PROJECT NO. 94335/ field

LOG OF BORING NO. BA-1

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-29

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Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		15						- granite rip-up clasts - materials becomes hard to drill - @ 33' Contact between sandstone and quartz diorite, irregular and undulatory.
35								**QUARTZ DIORITE (Kqd)**- slightly to moderately weathered quartz diorite
								Notes: - downhole logged to 34 feet - backfilled with concrete
40								
45								
50								
55								
60								

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PROJECT NO. **94335/ field**

LOG OF BORING NO. BA-1

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-29
(cont'd)

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8/26/2008 3:22:29 PM

Date Completed:	**6/20/08**	*Drilling method:*	**24" Bucket Auger**
Logged By:	**R. Roatch**	*Hammer Wt:*	**3,450 lbs 0 to 30 ft**
Total Depth:	**Approximately 24.0 ft**	*Notes:*	

Depth,ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated 635 feet (MSL)**
								TOPSOIL
								SILTY LEAN CLAY WITH GRAVEL (CL-ML)- dark, brown, firm to hard, moist, gravel to cobble size clasts of mudstone, angular to very angular, slight easterly imbrication of clasts, random distribution (Slopewash)
5		3						- clay lined fractures on ped faces, trace sandstone clasts - gravel - cobble size clasts, clast supported, conglomerate bed
								POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC)- brown, moist, low plasticity, medium dense, angular clasts of siltstone up to 1" (Slopewash) - small pockets of mudstone - gravel - cobble size clasts with trace of sandstone
10		11						- @ 8.2' - 10.6' contact: general orientation N68W, 35~45 NE @ 8.2', south wall top of contact, undulatory, fine gravel to cobble size angular siltstone clasts with sandy clay matrix, 1"-1.5" iron oxide, band below contact
								POORLY GRADED SAND WITH CLAY (SP-SC)- light brown, moist, very dense, no plasticity, medium to coarse grained, iron oxide stained (Tsm)
15		10						- @ 10.6' north wall bottom of contact: poorly graded sand (SP), light grey to grey with prominent iron oxide staining, moist, dense (Tsm) - small specks of black mineralization, significant iron oxide banding and staining
20		12						- grades into grey sandstone, dark olive, wavey contact, undulatory, low clay content, sand and gravels with increase in black mineralization, - band of black mineralization and iron oxide staining, banding is near horizontal, increase in coarse sand content, moist to very moist
								- area of heavy oxidation, yellow/orange - significant increase in seepage
								- @ 22.5' contact between Tsm above and Kqd below
25								Notes: - downhole logged to 24 feet - backfilled with concrete
30								

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PROJECT NO. *94335/ field*

LOG OF BORING NO. BA-2

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

A-30

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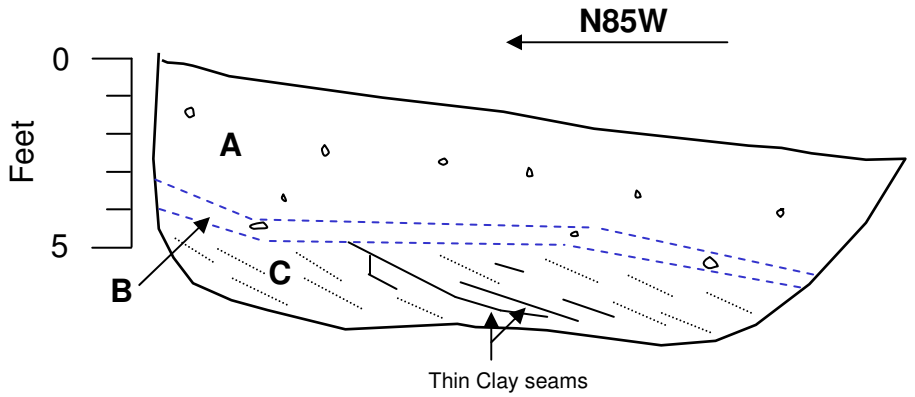
APPENDIX B

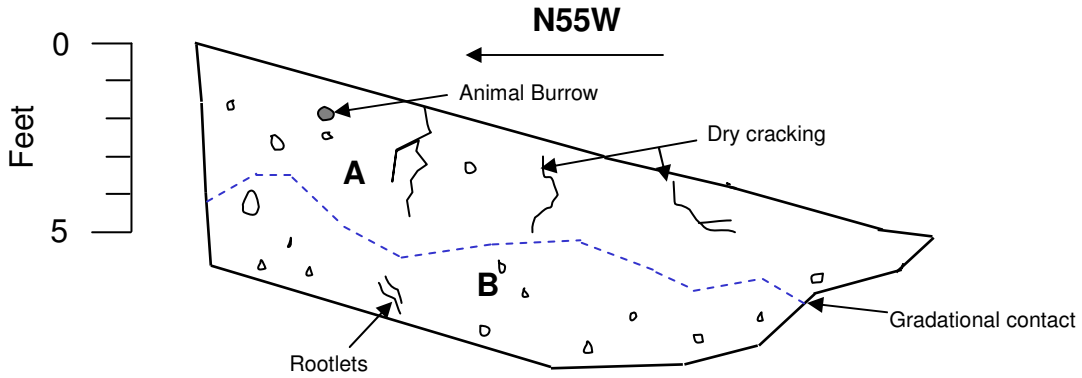
TP-1



Scale – 1:1 (Horizontal to Vertical)

A – Lean Clay with Sand (CL), black, moist, hard, blocky soil structure, wavy lower contact, rootlets medium-grained sand (Slopewash).
B – Lean Clay (CL), black, moist, hard, trace medium-grained sands, trace silt stone angular gravels. (Slopewash).
C – Poorly Graded Sand with Trace Clay (SP), gray and red-brown, moist, dense, fine- to medium-grained arkosic sand, iron oxide stained, (Santa Margarita Sandstone).

TP-2



Scale – 1:1 (Horizontal to Vertical)

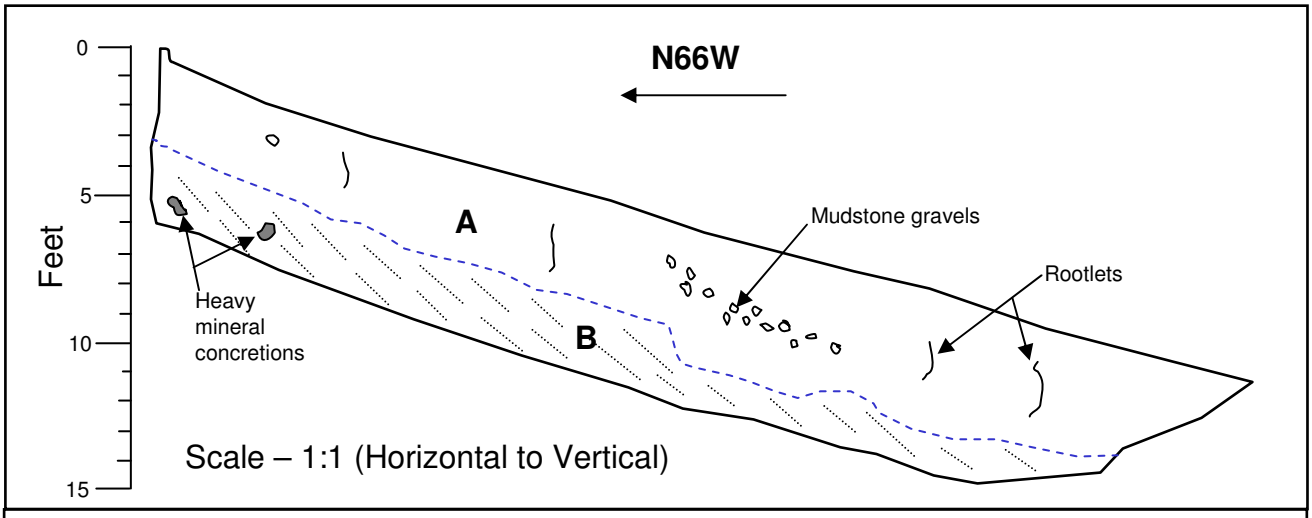
A – Sandy Lean Clay (CL), dark brown to black, dry to slightly moist, hard, rootlets, dry cracked to 3´, angular siltstone gravels, fine to medium course sands, contact is gradational (Slopewash).
B – Clayey Sand with Gravel (SC), brown, moist, dense, angular silt stone clasts up to 1", Rootlets, (Slopewash)

KLEINFELDER Bright People. Right Solutions.	PROJECT NO: 94335	TEST PIT LOGS TP-1 and TP-2	PLATE
	DRAWN:		
	DRAWN BY: RR		B-1
	CHECKED BY: DS	Proposed Target Store La Madrona Drive and Silverwood Drive Scotts Valley, California	
	FILE NAME:		

Library file: L:\2008\library\projects\94335*.ppt

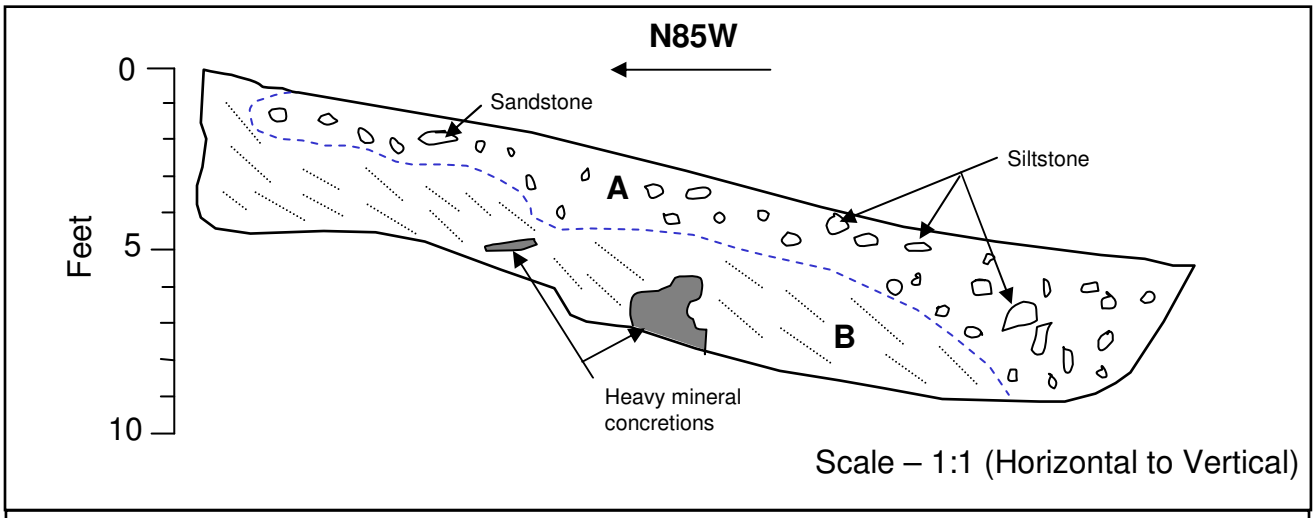
PLOTTED:25 August 2008, 10:27 AM

TP-3



A – Poorly Graded Sand with Clay (SP-SC), brown, moist, dense, numerous roots, fine grained sand, some angular mudstone gravels, (Slopewash).
B – Poorly Graded Sand with Clay (SP-SC), brown, moist, dense, medium grained sand, some heavy mineral concretions, (Santa Margarita Sandstone)

TP-4



A – Poorly Graded Gravel with Clay (GP-GC), brown and white, moist, dense, angular cobbles of mostly mudstone and some trace sandstone, cobbles up to 10", thin heavy mineral concretions along contact, (Slopewash)
B – Poorly Graded Sand with Clay (SP-SC), brown, moist, dense, medium grained sand, large heavy mineral concretions, (Santa Margarita Sandstone)

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PROJECT NO:	94335
DRAWN:	
DRAWN BY:	RR
CHECKED BY:	DS
FILE NAME:	

TEST PIT LOGS
TP-3 and TP-4

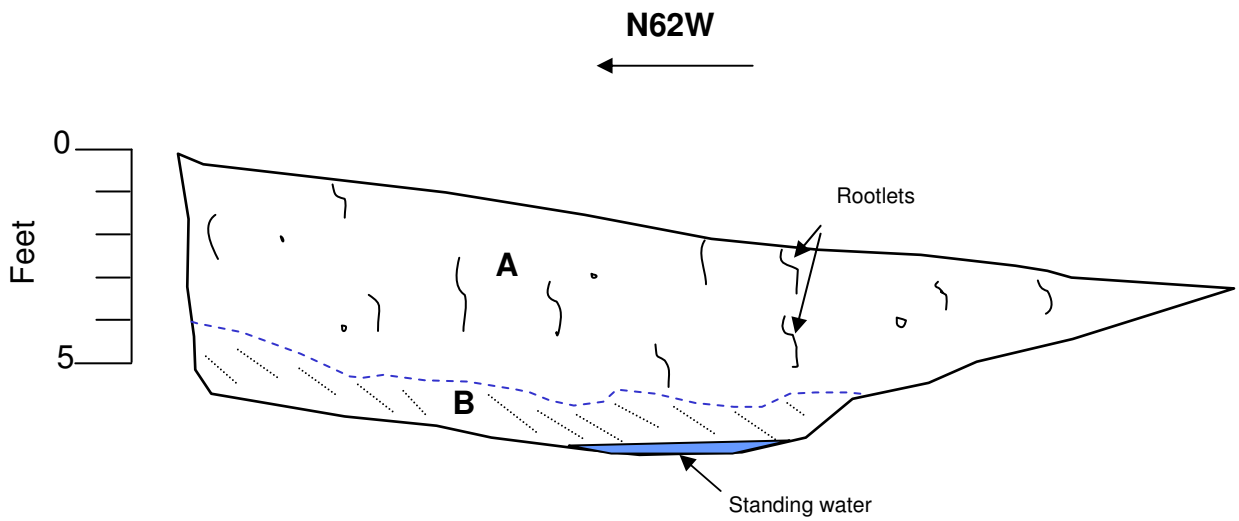
Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE
B-2

Library file: L:\2008\library\projects\94335*.ppt

PLOTTED:25 August 2008, 10:27 AM

TP-5



Scale – 1:1 (Horizontal to Vertical)

A – Sandy Lean Clay (CL), dark brown, dry to moist, dense, fine-grained sand, abundant roots, lower contact abrupt, trace angular mudstone gravels (Slopewash).
B – Poorly graded sand with clay (SP-SC), brown, moist, dense, medium grained sand, (Santa Margarita Sandstone).

KLEINFELDER Bright People. Right Solutions.	PROJECT NO: 94335	TEST PIT LOGS	PLATE
	DRAWN:	TP-5	B-3
	DRAWN BY: RR		
	CHECKED BY: DS	Proposed Target Store	
	FILE NAME:	La Madrona Drive and Silverwood Drive	
		Scotts Valley, California	

Library file: L:\2008\library\projects\94335*.ppt

PLOTTED:25 August 2008, 10:27 AM

APPENDIX C

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions		Symbols	Typical Names
Coarse-Grained Soils (more than half of soil > no. 200 sieve size	Gravels (More than half of coarse fraction > no. 4 sieve size)	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (More than half of coarse fraction < no. 4 sieve size)	SW	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
Fine -Grained Soils (more than half of soil < no. 200 sieve size)	Silts and Clays LL = < 50	ML	Inorganic silts and clayey silts of low plasticity, sandy silts, gravelly silts
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	Silts and Clays LL = > 50	MH	Inorganic silts of high plasticity
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic silts and clays of high plasticity
Highly Organic Soils		PT	Peat and other highly organic soils

GRAIN SIZE CHART

Classification	Range of Grain Sizes	
	U.S. Standard Sieve Size	Grain Size In Millimeters
Boulders	Above 12"	Above 305
Cobbles	12" to 3"	305 to 76.2
Gravel	3" to No. 4	76.2 to 4.76
coarse	3" to 3/4"	76.2 to 19.1
fine	3/4" to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
coarse	No. 4 to No. 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.074
Silt and Clay	Below No. 200	Below 0.074

SAMPLE DESIGNATIONS/SYMBOLS

- Sample taken with split-barrel sampler other than Standard Penetration Test sampler. Darkened area indicates soil recovered
- Classification sample taken with Standard Penetration Test sampler
- Undisturbed sample taken with thin-walled tube
- Disturbed sample
- Sampling attempted with no recovery
- Core sample
- Analytical laboratory sample
- Sample taken with Direct Push sampler

- Unstabilized groundwater level
- Stabilized groundwater level

SAMPLER TYPE

- C — Core barrel
- CA — California split-barrel sampler with 2.5-inch outside diameter and a 1.93-inch inside diameter
- D&M — Dames & Moore piston sampler using 2.5-inch outside diameter, thin-walled tube
- O — Osterberg piston sampler using 3.0-inch outside diameter, thin-walled Shelby tube
- PT — Pitcher tube sampler using 3.0-inch outside diameter, thin-walled Shelby tube
- S&H — Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter
- SPT — Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch outside diameter and a 1.5-inch inside diameter
- ST — Shelby Tube (3.0-inch outside diameter, thin-walled tube) advanced with hydraulic pressure

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GATEWAY SOUTH
Scotts Valley, California

Treadwell&Rollo

CLASSIFICATION CHART

Date 05/11/01	Project No. 3119.01	Figure A-9

I FRACTURING

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

II HARDNESS

1. **Soft** - reserved for plastic material alone.
2. **Low hardness** - can be gouged deeply or carved easily with a knife blade.
3. **Moderately hard** - can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visibly after the powder has been blown away.
4. **Hard** - can be scratched with difficulty; scratch produced a little powder and is often faintly visible.
5. **Very hard** - cannot be scratched with knife blade; leaves a metallic streak.

III STRENGTH

1. **Plastic** or very low strength.
2. **Friable** - crumbles easily by rubbing with fingers.
3. **Weak** - an unfractured specimen of such material will crumble under light hammer blows.
4. **Moderately strong** - specimen will withstand a few heavy hammer blows before breaking.
5. **Strong** - specimen will withstand a few heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.
6. **Very strong** - specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.

IV WEATHERING

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

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

ADDITIONAL COMMENTS:

V CONSOLIDATION OF SEDIMENTARY ROCKS:

usually determined from unweathered samples. Largely dependent on cementation.

U = unconsolidated
P = poorly consolidated
M = moderately consolidated
W = well consolidated

VI BEDDING OF SEDIMENTARY ROCKS

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

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GATEWAY SOUTH
Scotts Valley, California

Treadwell&Rollo

PHYSICAL PROPERTIES CRITERIA FOR ROCK DESCRIPTIONS

Date 05/11/01	Project No. 3119.01	Figure A-10

DRAFT

PROJECT: GATEWAY SOUTH
Scotts Valley, California

Log of Boring B-1

Boring location: See Site Plan, Figure 2

Logged by: T. Rubeo

Date started: 4/30/01 | Date finished: 4/30/01

Drilling method: 6-inch-O.D. hollow-stem augers

Hammer weight/drop: 140 lbs./30 inches | Hammer type: Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT).

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION (Surface Elevation: +617 feet[2])	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1					CLAYEY SAND (SC) dark brown, loose, moist, with organics						
2	S&H		9								
3											
4	S&H		4	SC	grades olive -gray, wet						
5					Particle Size Analysis, see Figure B-1 (5/01/01, 9:00 a.m.)				38.9	16.7	
6	SPT		16		medium dense				36.0	22.4	
7											
8					SAND (SP) yellow-brown, very dense, wet, medium-grained, trace clay						
9	SPT		74								
10											
11											
12				SP							
13											
14	SPT		48		brown, dense, wet						
15											
16					DIORITE orange, black and white, strong, hard, moderately weathered						
17											
18											
19	SPT		50/1"								
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

COLLUVIUM

Boring terminated at a depth of 18.6 feet.
Boring backfilled with grout.
Groundwater encountered at a depth of 5.0 feet.

[1] S&H blow counts converted using a factor of 0.6.
[2] Elevation based on Mean Sea Level (MSL).

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Project No.: 3119.01 | Figure: A-1

TEST GEOTECH LOG 311901.GPJ T&R.GDT 6/29/01

DRAFT

PROJECT: GATEWAY SOUTH
Scotts Valley, California

Log of Boring B-2P

Boring location: See Site Plan, Figure 2
Date started: 4/30/01 | Date finished: 4/30/01
Drilling method: 6-inch-O.D. hollow-stem augers
Hammer weight/drop: 140 lbs./30 inches | Hammer type: Safety
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT).

Logged by: T. Rubeo

Surface Elevation: +624 feet[2]

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1–2	S&H		10	SP-SC	SAND with CLAY (SP-SC) dark brown, loose to medium dense, moist, with organics						
3–4	S&H		10								
5–6	SPT		61		brown, wet, medium grained (05/01/01, 11:40 a.m.) (04/30/01, 12:45 p.m.) SAND with SILT (SP-SM) light brown, very dense, wet						
9–10	SPT		50/4"	SP-SM	Particle Size Analysis, see Figure B-1				7.5	12.9	
14–15	SPT		50/3"								
17–18					DIORITE orange-black and white, moderately strong, highly weathered, moderately hard						
19–20	SPT		50/3"								
23–24	SPT		50/2"		white and black, slightly weathered, hard						

COLLUVIUM

Boring terminated at a depth of 23.6 feet.
Boring backfilled converted to piezometer.
Water encountered at a depth of 4.5 feet.

[1] S&H blow counts converted using a factor of 0.6.
[2] Elevation based on Mean Sea Level (MSL).

Treadwell&Rollo

Project No.: 3119.01 | Figure: A-2

TEST GEOTECH LOG 311901.GPJ T&R.GDT 6/29/01

DRAFT

PROJECT:	GATEWAY SOUTH Scotts Valley, California	Log of Boring B-3	PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: T. Rubeo

Date started: 4/30/01 | Date finished: 4/30/01

Drilling method: 6-inch-O.D. hollow-stem augers

Hammer weight/drop: 140 lbs./30 inches | Hammer type: Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT).

Surface Elevation: +650 feet[2]

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1					SAND (SP) dark brown with orange mottling, medium dense, moist, medium-grained, trace organics						
2	S&H		11								
3											
4	S&H		28		light brown, no organics, medium dense, to dense						
5											
6	SPT		54		very dense, fine- to medium-grained					7.4	
7											
8											
9	SPT		67		gray-brown, medium-grained						
10											
11											
12				SP							
13											
14	SPT		50/5"		trace clay						
15											
16											
17											
18											
19	SPT		50/5"		orange mottling, wet						
20											
21											
22											
23											
24	SPT		50/6"		yellow-brown, wet						
25											
26											
27											
28											
29											
30											

Boring terminated at a depth of 24.0 feet.
Boring backfilled with grout.
Groundwater not encountered at time of drilling.

[1] S&H blow counts converted using a factor of 0.6.
[2] Elevation based on Mean Sea Level (MSL).

Treadwell&Rollo

Project No.: 3119.01 | Figure: A-3

TEST GEOTECH LOG 311901.GPJ T&R.GDT 6/25/01

DRAFT

PROJECT:	GATEWAY SOUTH Scotts Valley, California	**Log of Boring B-4**	PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: T. Rubeo

Date started: 4/30/01 | Date finished: 4/30/01

Drilling method: 6-inch-O.D. hollow-stem augers

Hammer weight/drop: 140 lbs./30 inches | Hammer type: Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT).

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION (Surface Elevation: +608 feet[2])	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1–2	S&H		16	SC-CL	CLAYEY SAND/SANDY CLAY (SC/CL) dark brown, medium dense and stiff, moist COLLUVIUM						
3–4	S&H		35	SP	SAND (SP) gray-brown, dense, moist, trace silt						
5–6	SPT		62	SP	light brown, very dense						
8–9	SPT		50/1"		drilling refusal (bedrock?)						

Boring terminated at a depth of 9.0 feet.
Boring backfilled with grout.
Groundwater not encountered at time of drilling.

[1] S&H blow counts converted using a factor of 0.6.
[2] Elevation based on Mean Sea Level (MSL).

Treadwell&Rollo

Project No.: 3119.01 | Figure: A-4

TEST GEOTECH LOG 311901.GPJ T&R.GDT 6/29/01

DRAFT

PROJECT: GATEWAY SOUTH
Scotts Valley, California

Log of Boring B-5P

Boring location: See Site Plan, Figure 2

Logged by: T. Rubeo

Date started: 4/30/01 | Date finished: 4/30/01

Drilling method: 6-inch-O.D. hollow-stem augers

Hammer weight/drop: 140 lbs./30 inches | Hammer type: Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT).

Surface Elevation: +610 feet[2]

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1–2	S&H		28	CL	SANDY CLAY (CL) dark brown with orange spots, very stiff, moist, with some angular gravel LL = 36, PI = 15; see Figure B-2 (COLLUVIUM)					25.2	
3–4	S&H		33	SC	CLAYEY SAND with GRAVEL (SC) gray-brown, dense, moist						
5–6	SPT		50/6"	SC	very dense						
8–9	SPT		80	SP	SAND (SP) brown, very dense, wet, coarse-grained						
12–13					DIORITE orange and black, hard, moderately strong to strong, deeply weathered (05/01/01, 10:15 a.m.) (05/01/01, 11:30 a.m.)						
14–15	SPT		50/3"								
16–18					ANDESITE gray, very fine-grained, with mica inclusions, moderately strong to strong, hard, little weathering						
19–20	SPT		50/0.5"								

Boring terminated at a depth of 20.0 feet.
Boring backfilled converted to piezometer.
Water encountered at a depth of 5.0 feet.

[1] S&H blow counts converted using a factor of 0.6.
[2] Elevation based on Mean Sea Level (MSL).

Treadwell&Rollo

Project No.: 3119.01 | Figure: A-5

TEST GEOTECH LOG 311901.GPJ T&R.GDT 6/25/01

DRAFT

PROJECT:	GATEWAY SOUTH Scotts Valley, California	Log of Boring B-6P	PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Logged by: T. Rubeo

Date started: 5/1/01 | Date finished: 5/1/01

Drilling method: 6-inch-O.D. hollow-stem augers

Hammer weight/drop: 140 lbs./30 inches | Hammer type: Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT).

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION (Surface Elevation: +645 feet[2])	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1–2	S&H		5	SM	SILTY SAND (SM) dark brown, loose, moist, some organics COLLUVIUM						
3–4	S&H		16	SP	SAND (SP) brown, medium dense, moist						
5–6	SPT		48		light brown, dense						
9–10	SPT		92/ 11"		brown, very dense						
13–14	SPT		83/ 10"		brown with black seams						
19–20	SPT		50/ 6"		wet						
23–24	SPT		50/ 3"								

Boring terminated at a depth of 24.25 feet.
Boring backfilled converted to piezometer.
Groundwater not encountered at time of drilling..

[1] S&H blow counts converted using a factor of 0.6.
[2] Elevation based on Mean Sea Level (MSL).

Treadwell&Rollo

Project No.: 3119.01 | Figure: A-6

TEST GEOTECH LOG 311901.GPJ T&R.GDT 6/29/01

DRAFT

PROJECT:	GATEWAY SOUTH Scotts Valley, California	Log of Boring B-7	PAGE 1 OF 1

Boring location: See Site Plan, Figure 2

Date started: 5/1/01 | Date finished: 5/1/01

Drilling method: 6-inch-O.D. hollow-stem augers

Hammer weight/drop: 140 lbs./30 inches | Hammer type: Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT).

Logged by: T. Rubeo

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION (Surface Elevation: +603 feet[2])	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1				SP-SM	SAND with SILT (SP-SM) gray-brown, medium dense, wet						
2	S&H		14								
3											
4	S&H		40		dense, moist, iron-oxide staining, trace clay						
5											
6	SPT		47		with gravel [weathered sandstone]						
7											
8					ANDESITE gray, with mica inclusions, moderately weathered, weak to moderately strong						
9	SPT		50/2"								
10											
11											
12											
13											
14	SPT		50/1"								
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

Boring terminated at a depth of 14.0 feet.
Boring backfilled with grout.
Groundwater not encountered at time of drilling.

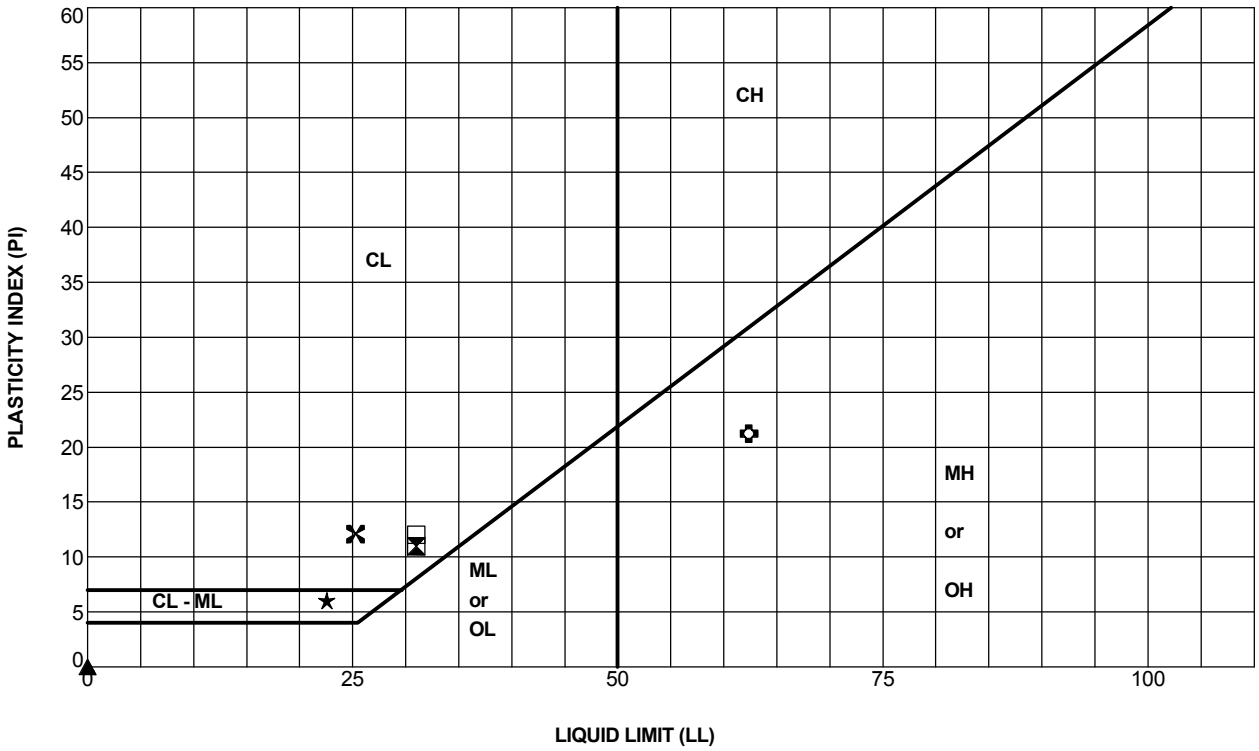
[1] S&H blow counts converted using a factor of 0.6.
[2] Elevation based on Mean Sea Level (MSL).

Treadwell&Rollo

Project No.: 3119.01 | Figure: A-7

TEST GEOTECH LOG 311901.GPJ T&R.GDT 6/29/01

APPENDIX D



SYMBOL	BORING	DEPTH, ft	LL	PL	PI	SAMPLE DESCRIPTION
□	B- 1	2.5	31	19	12	Light Olive-Brown Clayey Sand
⧗	B- 2	1.5	31	20	11	Dark Brown Clayey Sand
▲	B- 2	2.0	NP	NP	NP	Dark Brown Poorly Graded Sand With Clay
★	B- 7	2.0	23	17	6	Dark Brown Sandy Silty Lean Clay
✕	B-10	3.0	25	13	12	Brown Clayey Sand With Gravel
✿	B-14	8.0	62	41	21	Light Brown Gravelly Elastic Silt With Sand

Unified Soil Classification

Fine Grained Soil Groups

Symbol	LL < 50	Symbol	LL > 50
ML	Inorganic clayey silts to very fine sands of slight plasticity	MH	Inorganic silts and clayey silts of high plasticity
CL	Inorganic clays of low to medium plasticity	CH	Inorganic clays of high plasticity
OL	Organic silts and organic silty clays of low plasticity	OH	Organic clays of medium to high plasticity, organic silts

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318 (DRY PREP)

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO. 94335/ field

ATTERBERG LIMITS*

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-1

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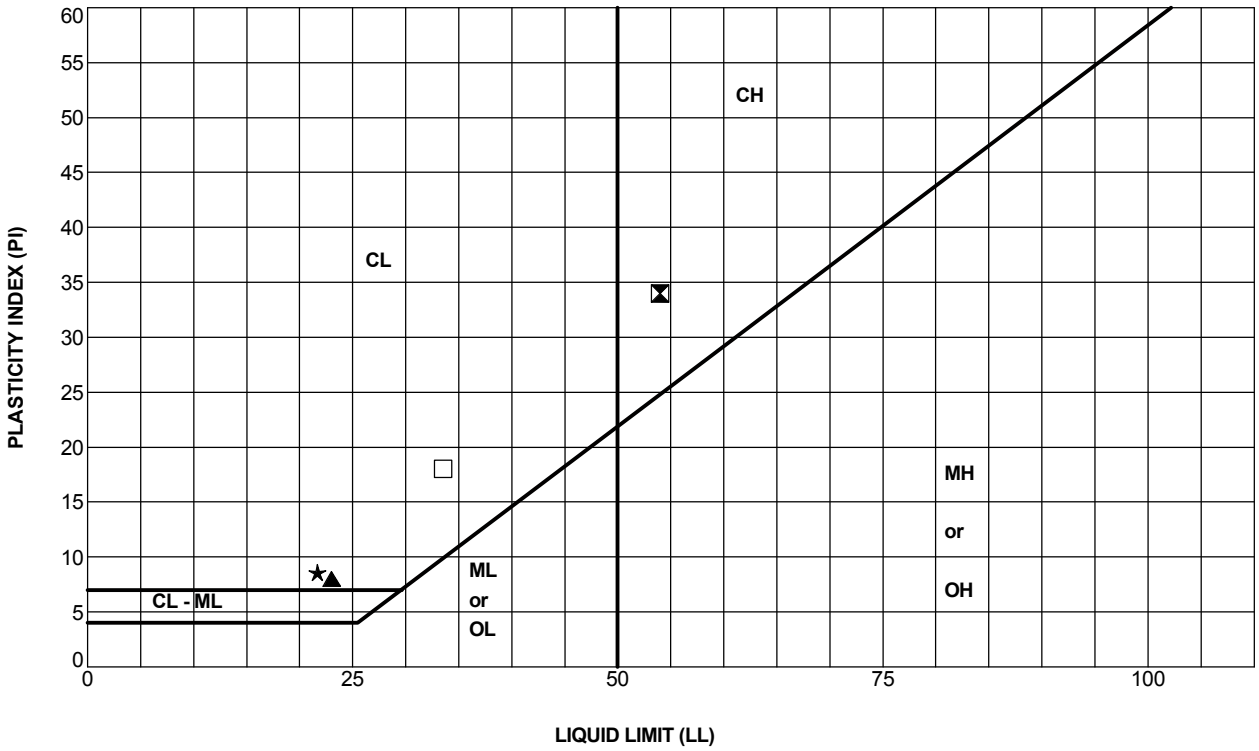

SYMBOL	BORING	DEPTH, ft	LL	PL	PI	SAMPLE DESCRIPTION
□	B-15	2.0	34	16	18	Dark Brown Sandy Lean Clay
⊠	B-16	3.0	54	20	34	Dark Brown Sandy Fat Clay
▲	B-18	2.8	23	15	8	Mottled Red and Dark Brown Clayey Sand
★	B-25	3.0	22	13	9	Dark Brown to Black Sandy Lean Clay

Unified Soil Classification

Fine Grained Soil Groups

Symbol	LL < 50	Symbol	LL > 50
ML	Inorganic clayey silts to very fine sands of slight plasticity	MH	Inorganic silts and clayey silts of high plasticity
CL	Inorganic clays of low to medium plasticity	CH	Inorganic clays of high plasticity
OL	Organic silts and organic silty clays of low plasticity	OH	Organic clays of medium to high plasticity, organic silts

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318 (DRY PREP)

KLEINFELDER
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PROJECT NO. 94335/ field

ATTERBERG LIMITS*

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-2

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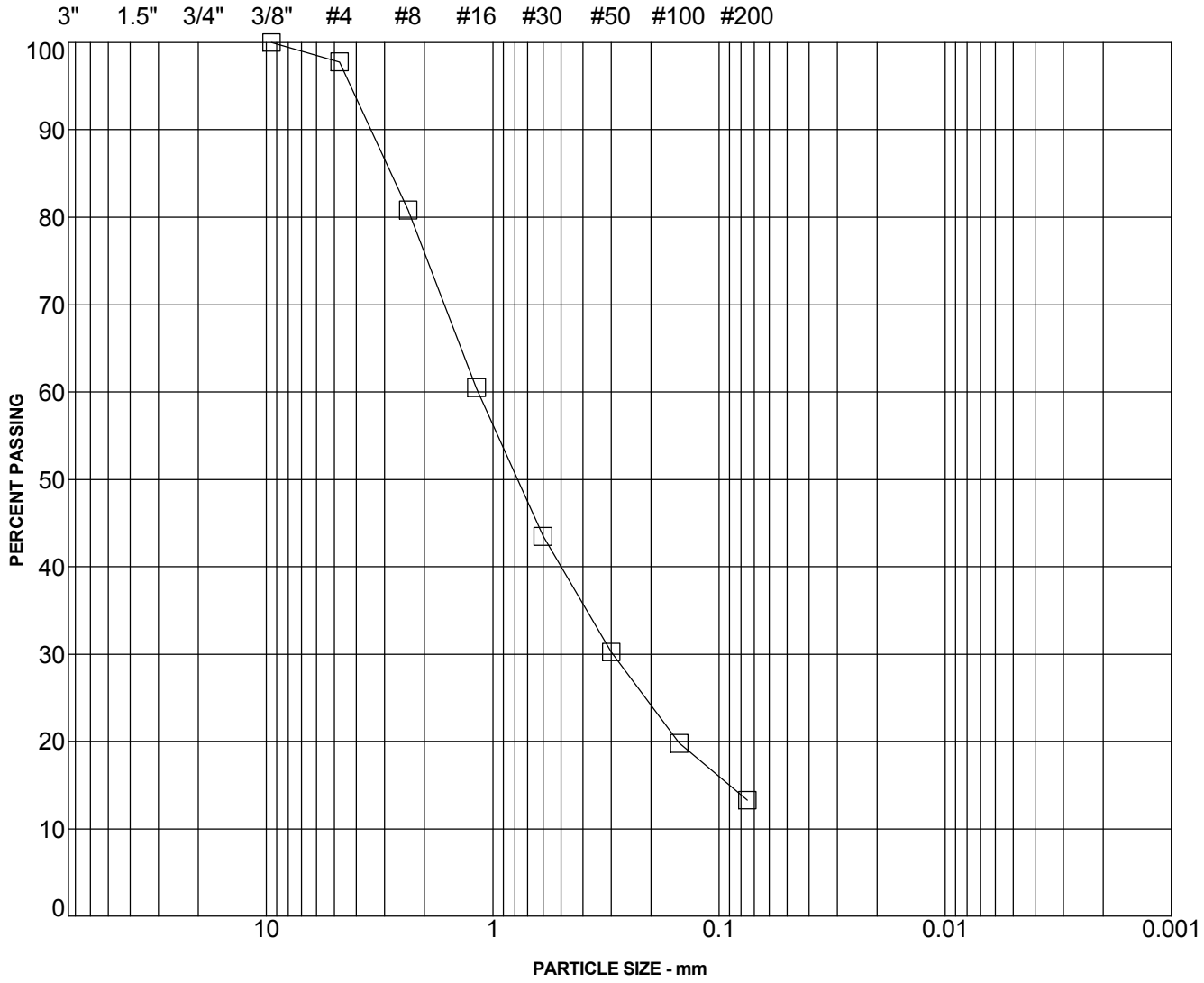
SIEVE ANALYSIS	HYDROMETER



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

SYMBOL	BORING	DEPTH, ft	SAMPLE DESCRIPTION
□	B- 2	6.5	Quartz Diorite

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

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PROJECT NO. 94335/ field

PARTICLE SIZE ANALYSIS*

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-3

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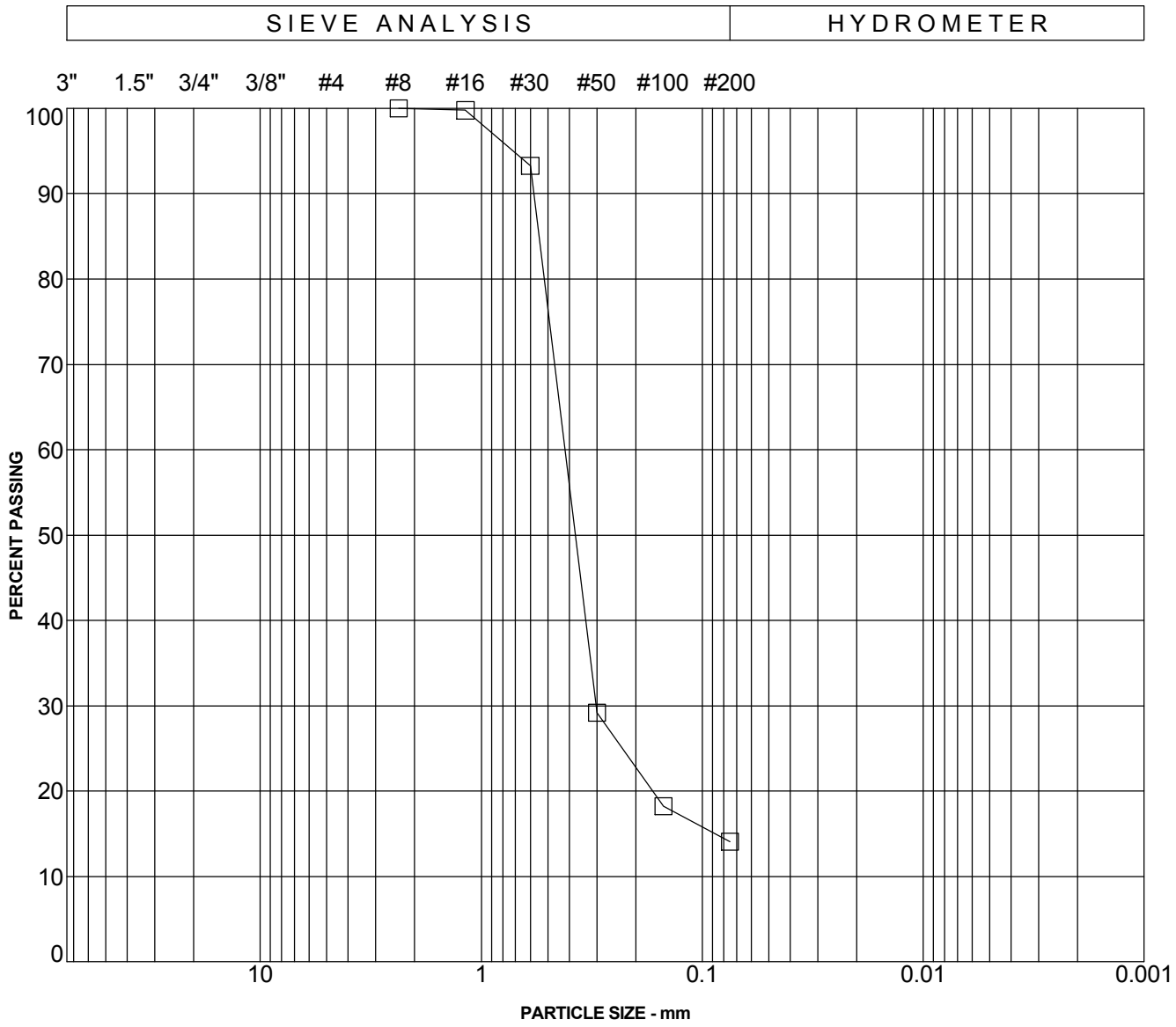

GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

SYMBOL	BORING	DEPTH, ft	SAMPLE DESCRIPTION
□	B- 7	13.5	Light Yellow-Brown Silty Sand

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

KLEINFELDER
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PROJECT NO. 94335/ field

PARTICLE SIZE ANALYSIS*

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-4

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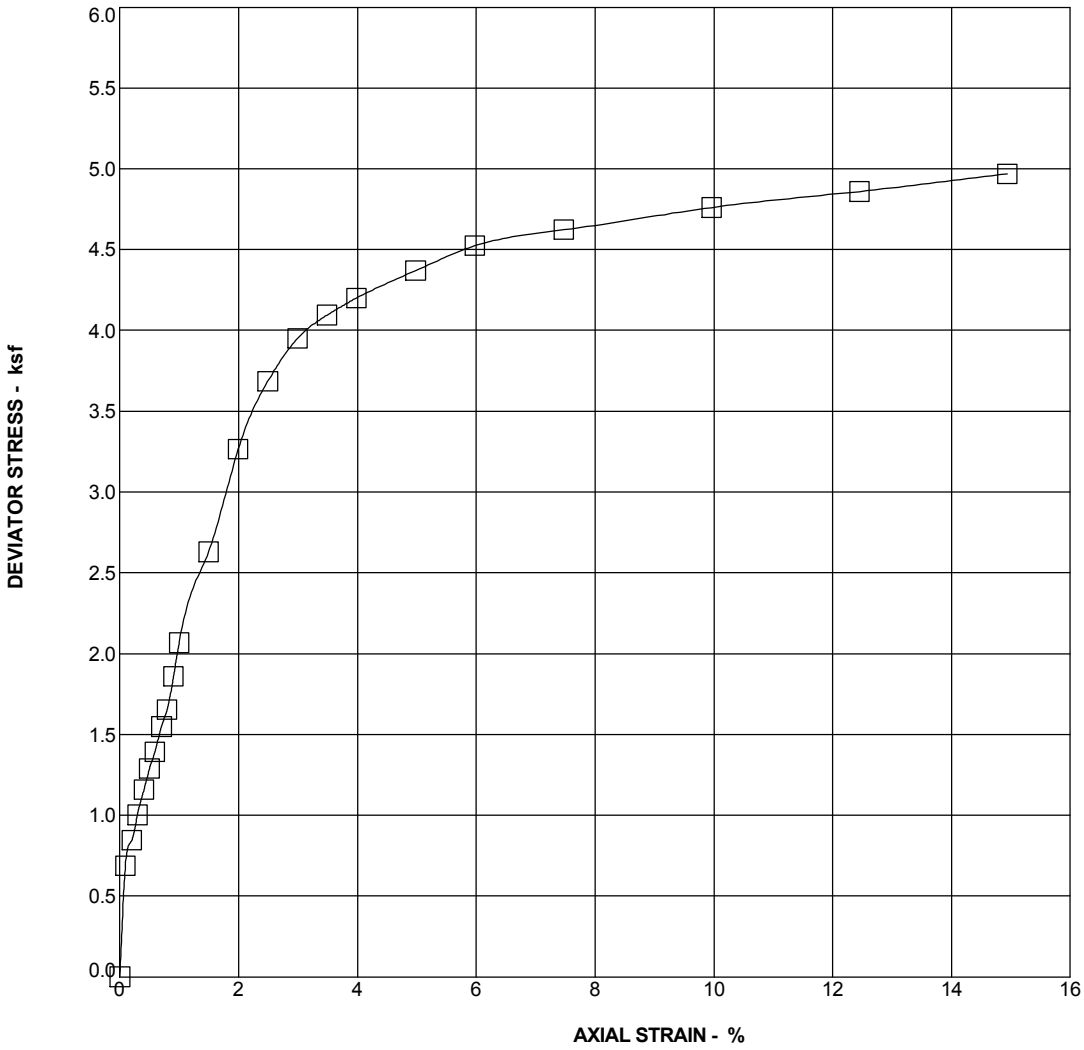

BORING NO.	B- 1	**DRY DENSITY - pcf**	107
DEPTH - ft	6.0	**WATER CONTENT - %**	17.8
SAMPLE DESCRIPTION	Very Light Gray Quartz Diorite		
CONFINING STRESS - ksf	0.7		

MAXIMUM DEVIATOR STRESS= 4.97 ksf at 14.9 % STRAIN

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2850

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PROJECT NO. *94335/ field*

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION*

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-5

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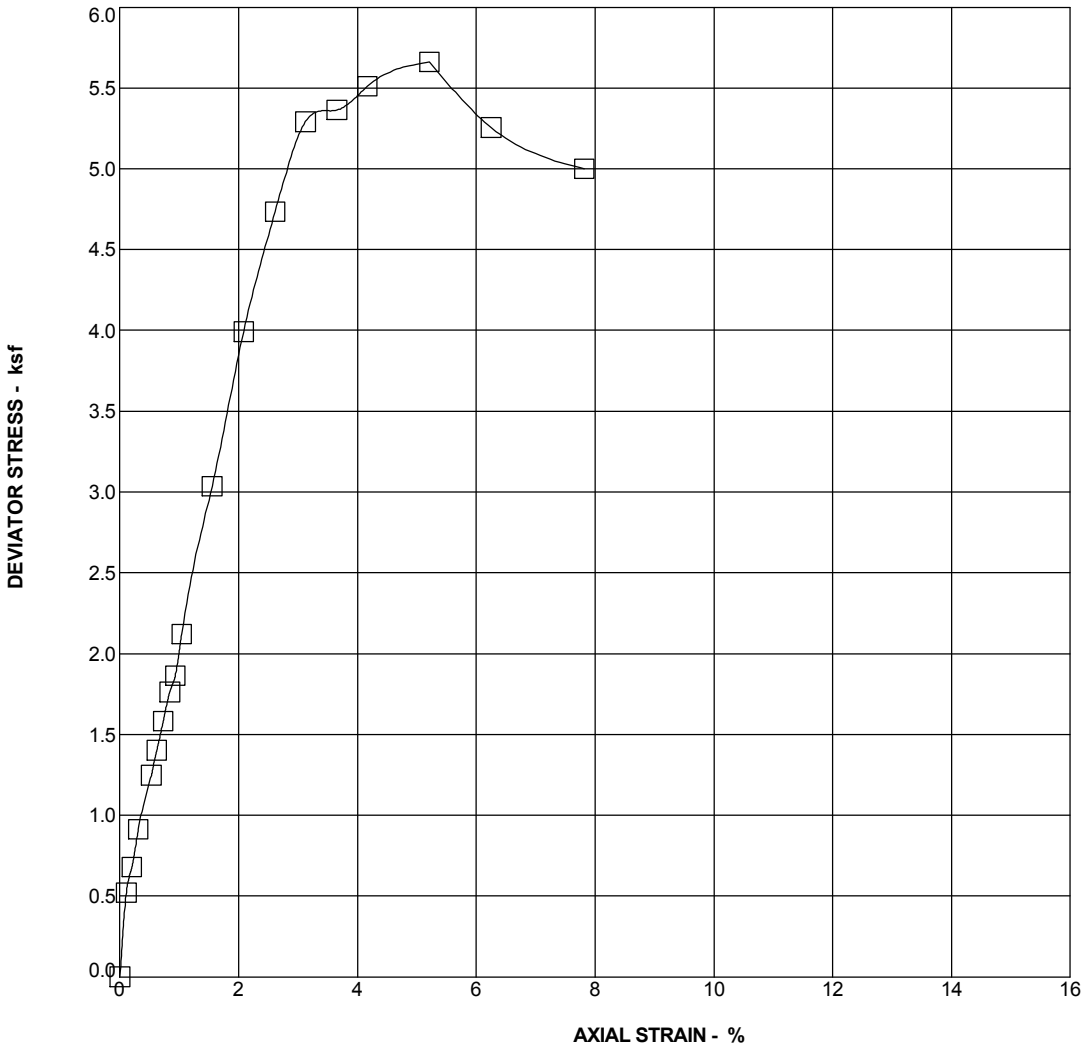

BORING NO.	B- 3	**DRY DENSITY - pcf**	116
DEPTH - ft	8.0	**WATER CONTENT - %**	12.9
SAMPLE DESCRIPTION	Light Gray to Gray Quartz Diorite		
CONFINING STRESS - ksf	1.0		

MAXIMUM DEVIATOR STRESS= 5.66 ksf at 5.2 % STRAIN

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2850

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PROJECT NO. *94335/ field*

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION*

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-6

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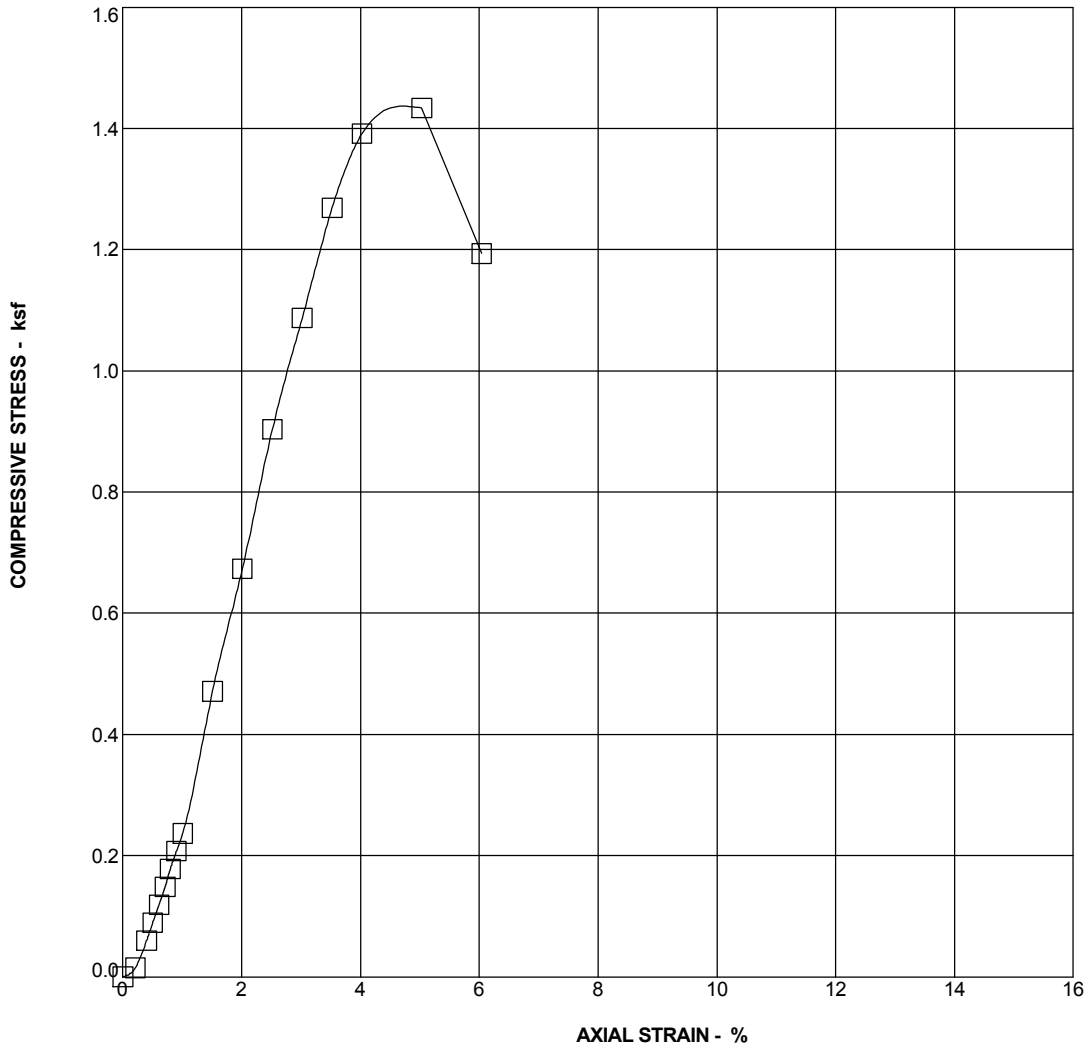

BORING NO.	B-21	**DRY DENSITY - pcf**	90
DEPTH - ft	3	**WATER CONTENT - %**	21.8
SAMPLE DESCRIPTION	Black Sandy Lean Clay/ Clayey Sand		

MAXIMUM COMPRESSIVE STRESS= 1.43 ksf at 5.0 % STRAIN

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2166

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PROJECT NO. 94335/ field

UNCONFINED COMPRESSION*

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-7

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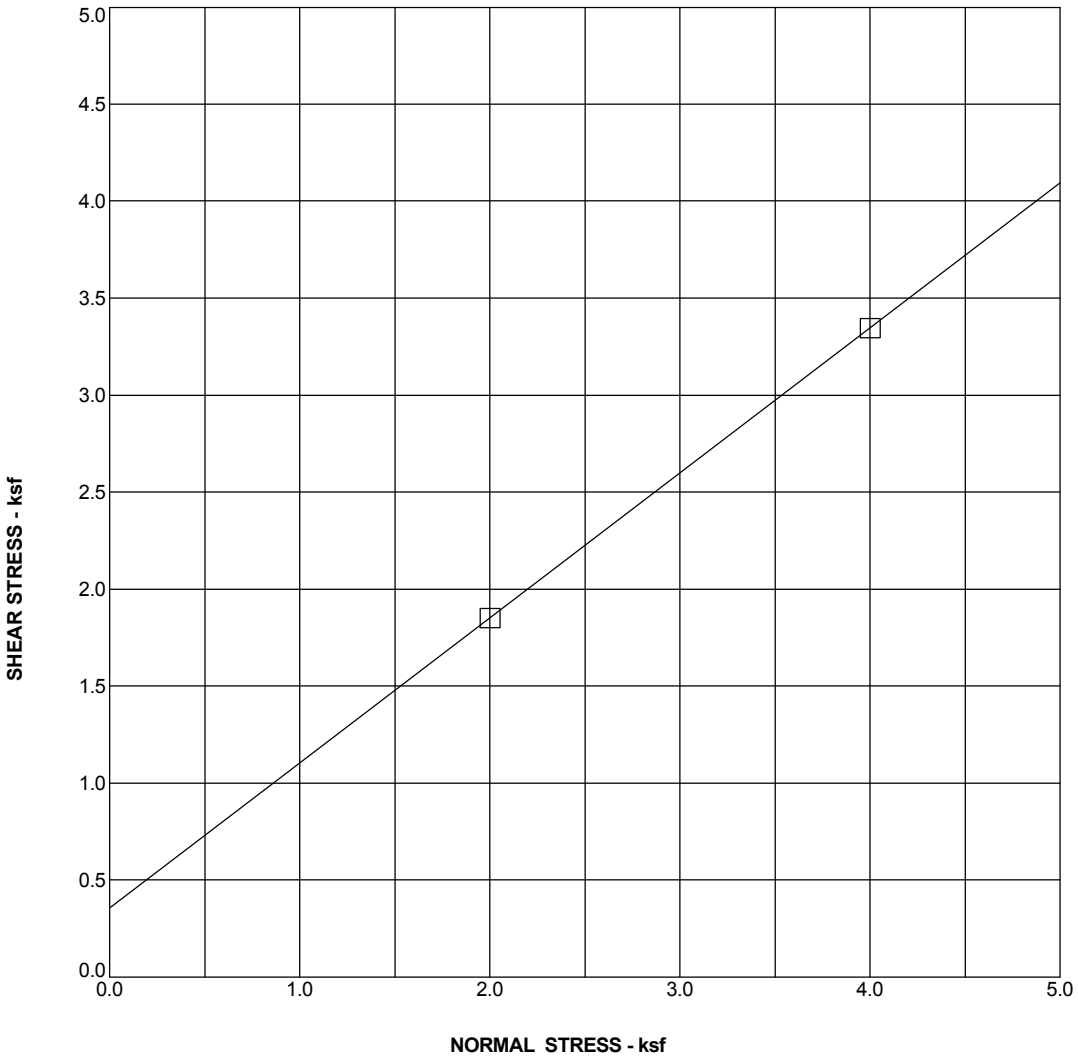

BORING NO: BA-1

TEST TYPE: CD/WET/STAGED

DEPTH: 15.5 ft

RATE OF SHEAR: .004 in/min.

SAMPLE DESCRIPTION: Light Brown Poorly Graded Sand

DRY DENSITY - pcf	107		
INITIAL WATER CONTENT - %	14		
FINAL WATER CONTENT - %	18		
NORMAL STRESS - psf	2000	4000	
MAXIMUM SHEAR - psf	1850	3345	

FRICTION ANGLE = 35 degrees

COHESION= 0.51 ksf

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080 (MODIFIED FOR STAGED TEST)

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PROJECT NO. *94335/ field*

DIRECT SHEAR*

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-8

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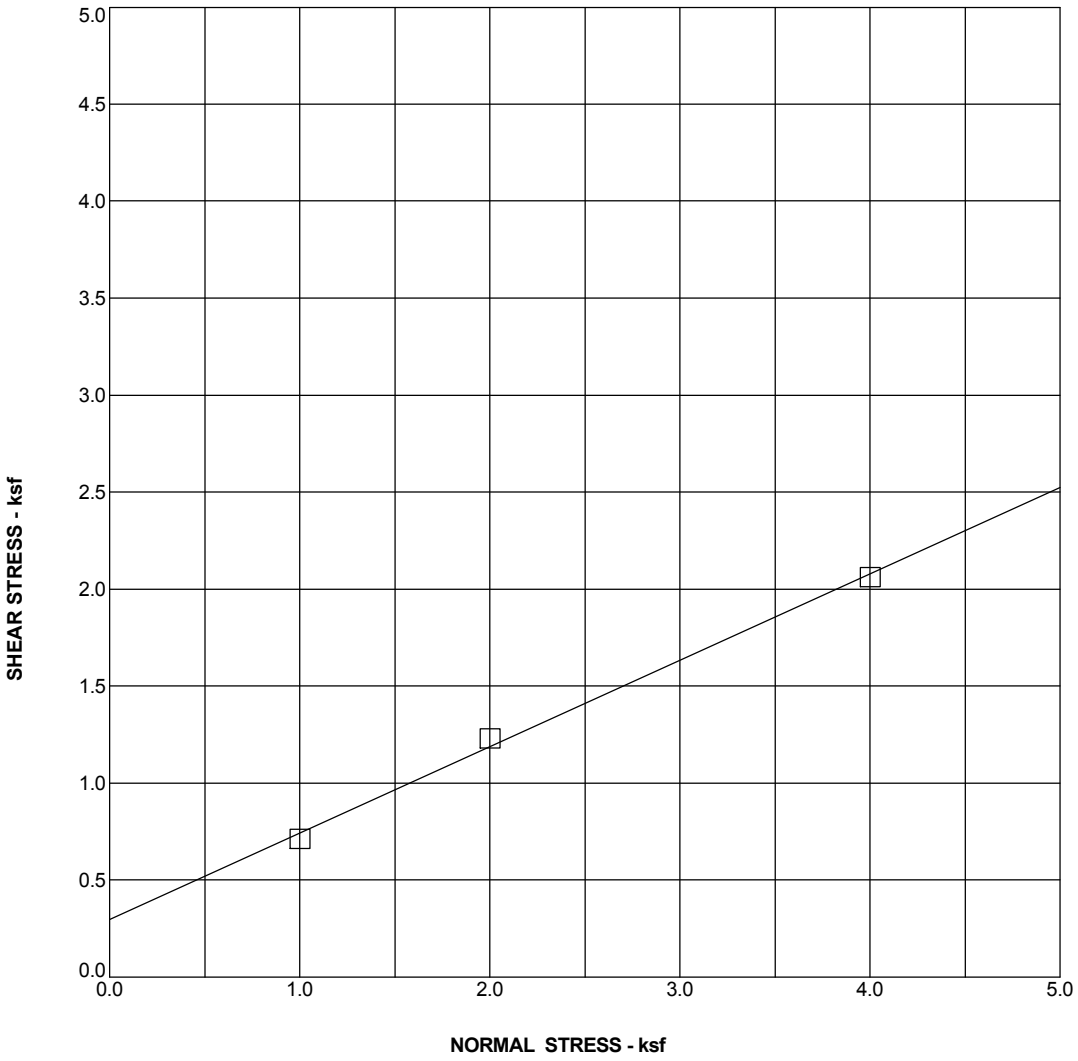

BORING NO: Bulk #3

TEST TYPE: CD/WET/STAGED

DEPTH: 1.0 ft

RATE OF SHEAR: .002 in/min.

SAMPLE DESCRIPTION: Very Dark Grayish Brown Silty Sand

DRY DENSITY - pcf	107		
INITIAL WATER CONTENT - %	9		
FINAL WATER CONTENT - %	16		
NORMAL STRESS - psf	1000	2000	4000
MAXIMUM SHEAR - psf	711	1230	2062

FRICTION ANGLE = 24 degrees

COHESION= 0.30 ksf

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080 (MODIFIED FOR STAGED TEST)

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PROJECT NO. 94335/ field

DIRECT SHEAR*

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-9

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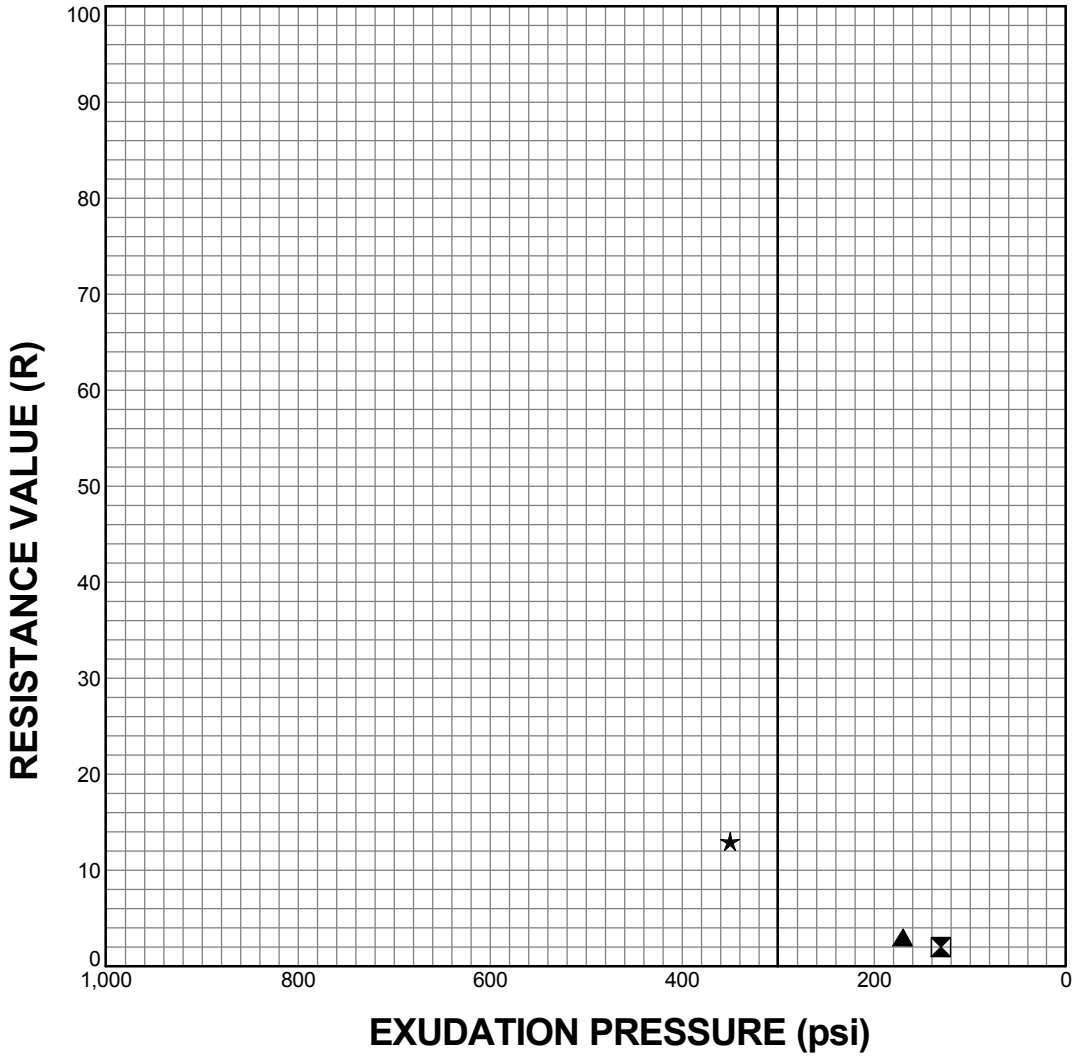

SPECIMEN NO.	⧗	▲	★
MOISTURE CONTENT (%)	16.2	14.4	11.7
DRY DENSITY (PCF)	109.9	113.3	118.9
EXUDATION PRESSURE (PSI)	130	170	350
EXPANSION PRESSURE (PSF)	0	17	52
RESISTANCE VALUE (R)	2	3	13

Date Received: 6/23/2008

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(Bulk #5)	Dark Brown Sandy Silt	---	49 psf	**9**

NOTE: See Plate 2 for location

ASTM D 2844, Cal Test 301

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PROJECT NO. 94335/ field

RESISTANCE VALUE TEST DATA

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-10

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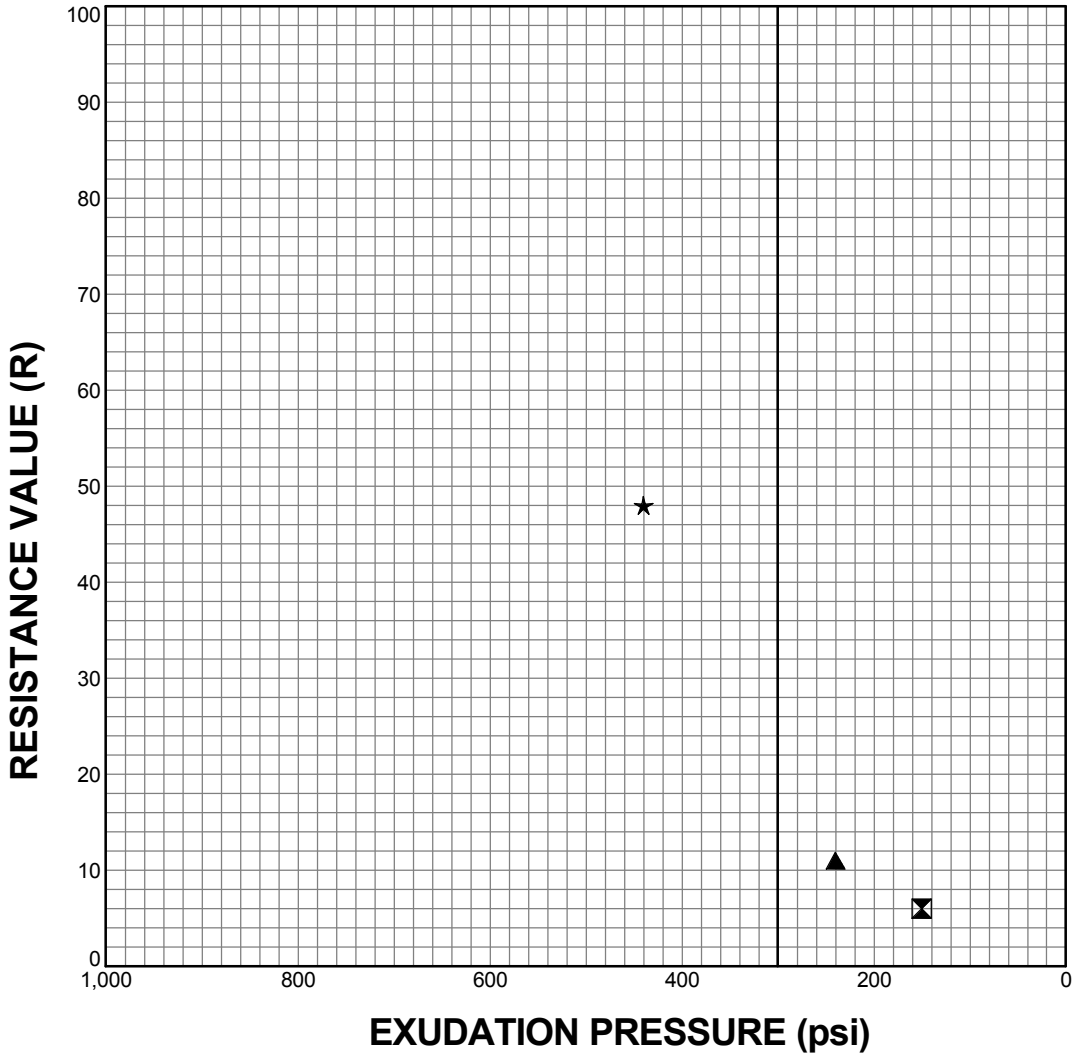

SPECIMEN NO.	⧗	▲	★
MOISTURE CONTENT (%)	17.4	15.5	13.7
DRY DENSITY (PCF)	106.2	110.6	113.2
EXUDATION PRESSURE (PSI)	150	240	440
EXPANSION PRESSURE (PSF)	56	78	208
RESISTANCE VALUE (R)	6	11	48

Date Received: 6/23/2008

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(Bulk #6 & #1 (mixed 50-50))	Dark Brown Sandy Silt	---	108 psf	**18**

NOTE: See Plate 2 for location

ASTM D 2844, Cal Test 301

KLEINFELDER
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PROJECT NO. 94335/ field

RESISTANCE VALUE TEST DATA

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-11

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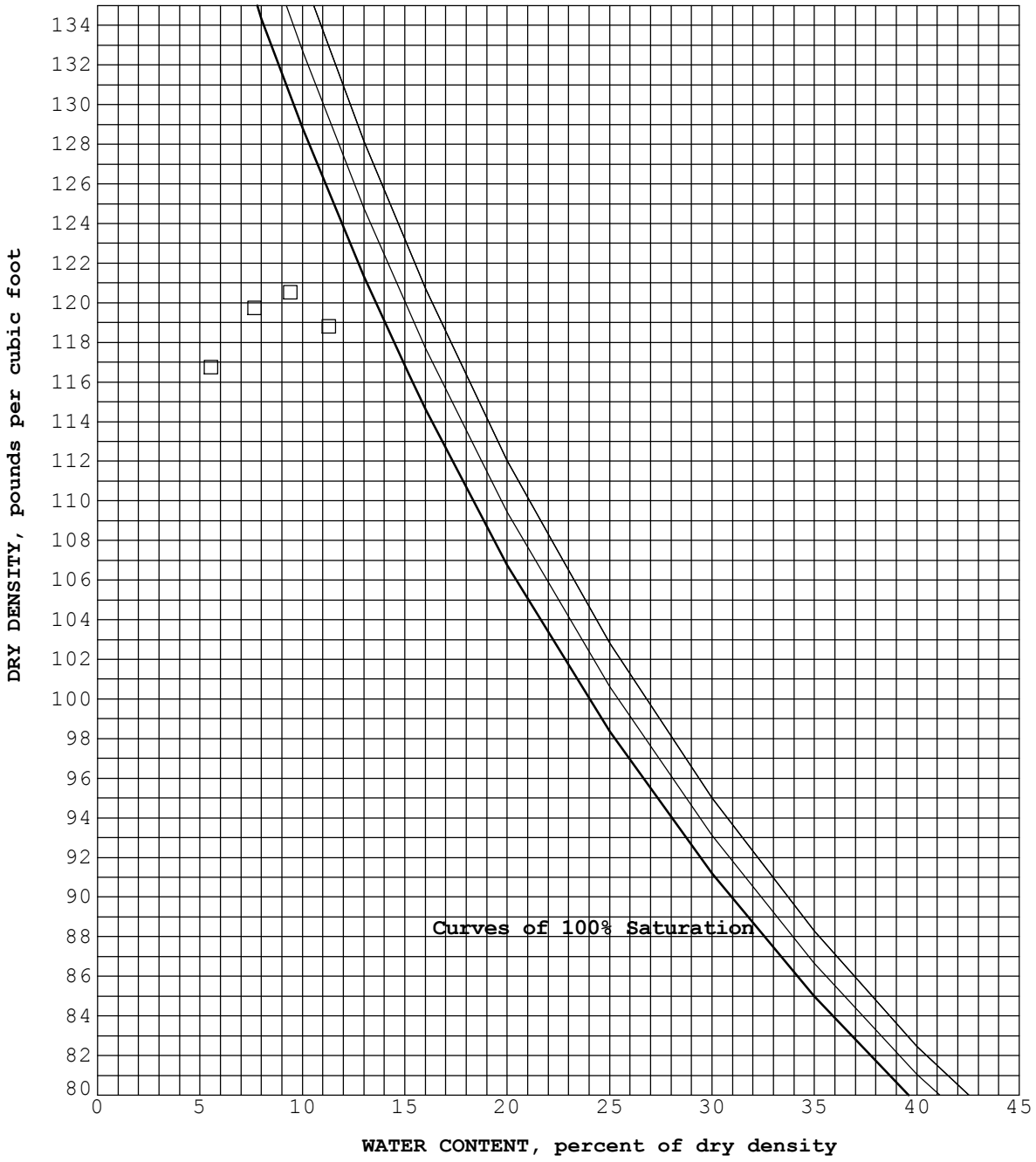

TEST DESCRIPTION

TEST METHOD: ASTM D-1557B

4 Mold

SAMPLE NUMBER: Bulk #3

DEPTH: 1.0 ft.

SAMPLE DESCRIPTION: Very Dark Grayish Brown Silty Sand

Date Received: 6/23/08

NOTES: See Plate 2 for location

MAXIMUM DRY DENSITY: 121.5 pcf

OPTIMUM WATER CONTENT: 8.5 %

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PROJECT NO. **94335/ field**

COMPACTION DIAGRAM

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

D-12

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APPENDIX E

California State Certified Laboratory No.2153

C E R C O
analytical, inc.

3942-A Valley Avenue
Pleasanton, CA 94566-4715
925.462.2771 • Fax: 925.462.2775
www.cercoanalytical.com

2 July, 2008

Job No.0806200
Cust. No.10781

Mr. Parham Khoshbari
Kleinfelder
2011 North Capitol Ave
San Jose, CA 95132

Subject: Project No.: 94335
Project Name: Scotts Valley, CA
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Khoshkbari:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on June 25, 2008. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, all samples are classified as "moderately corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations range from none detected to 19 mg/kg. Because the chloride ion concentrations are less than 300 mg/kg, they are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations range from none detected to 52 mg/kg and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soils range from 5.3 to 5.4 which does present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures. Any soils with a pH of <6.0 is considered to be corrosive to buried iron, steel, mortar-coated steel and reinforced concrete structures. Therefore, corrosion prevention measures need to be considered for structures to be placed in this acidic soil.

The redox potentials range from 450 to 460-mV, which are indicative of aerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

Cheryl McMillan for

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

California State Certified Laboratory No.2153

CERCO analytical, inc.
3942-A Valley Avenue
Pleasanton, CA 94566-4715
925.462.2771 • Fax: 925.462.2775
www.cercoanalytical.com

Client: Kleinfelder
Client's Project No.: 94335
Client's Project Name: Scotts Valley, CA
Date Sampled: 24-Jun-08
Date Received: 25-Jun-08
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 1-Jul-2008

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
0806200-001	B10-2A	450	5.4	-	6,300	-	16	52
0806200-002	B14-2B	460	5.3	-	7,200	-	N.D.	N.D.
0806200-003	B21-1B	450	5.4	-	3,800	-	19	17

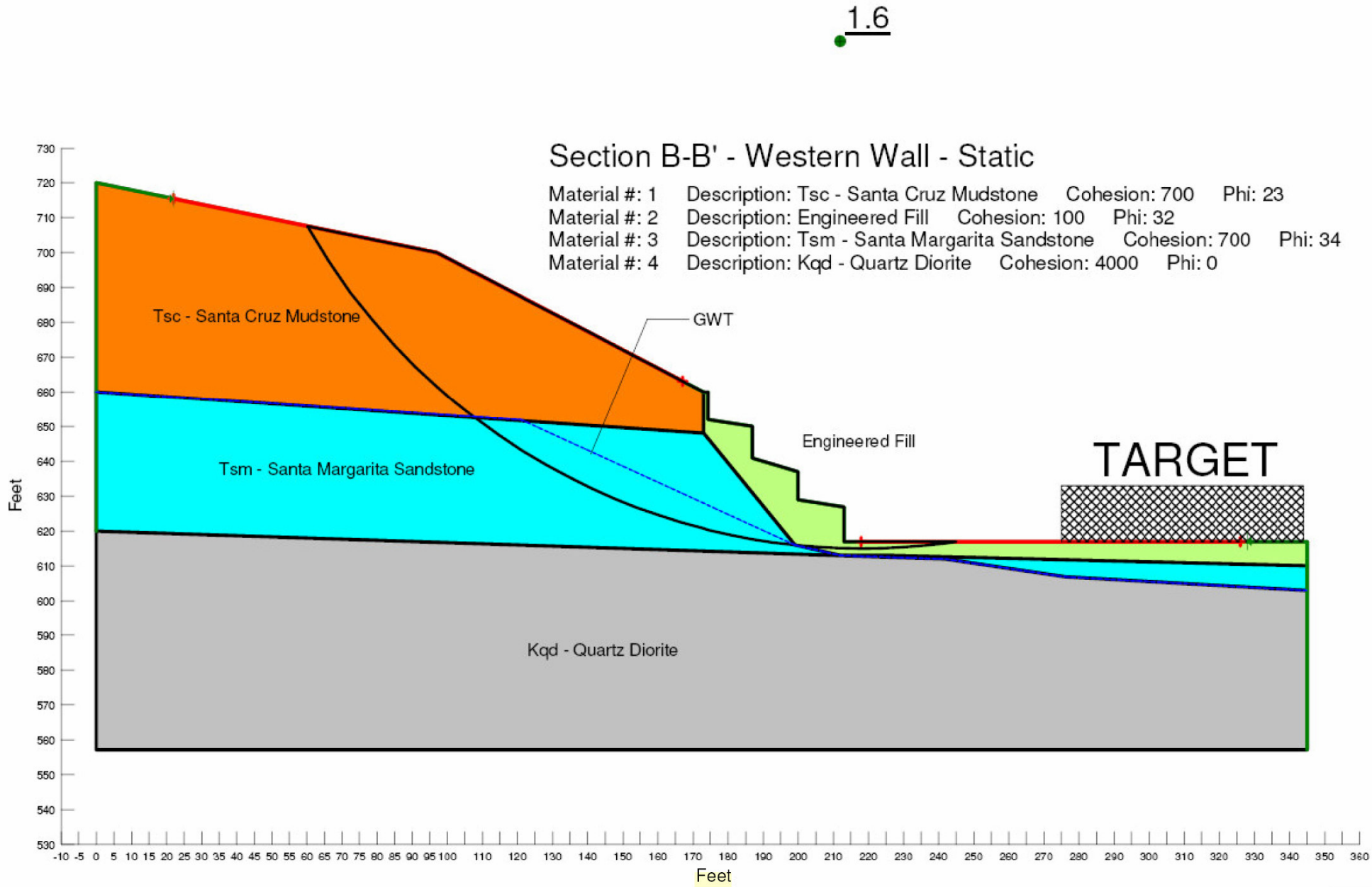
Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Detection Limit:	-	-	10	-	50	15	15
Date Analyzed:	1-Jul-2008	1-Jul-2008	-	1-Jul-2008	-	1-Jul-2008	1-Jul-2008

Cheryl McMillen
Laboratory Director

* Results Reported on "As Received" Basis
N.D. - None Detected

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

APPENDIX F



KLEINFELDER
Bright People. Right Solutions.

PROJECT NO:	94335
DRAWN:	August 2008
DRAWN BY:	DS
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FILE NAME:	

SLOPE STABILITY ANALYSIS

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE
F-1

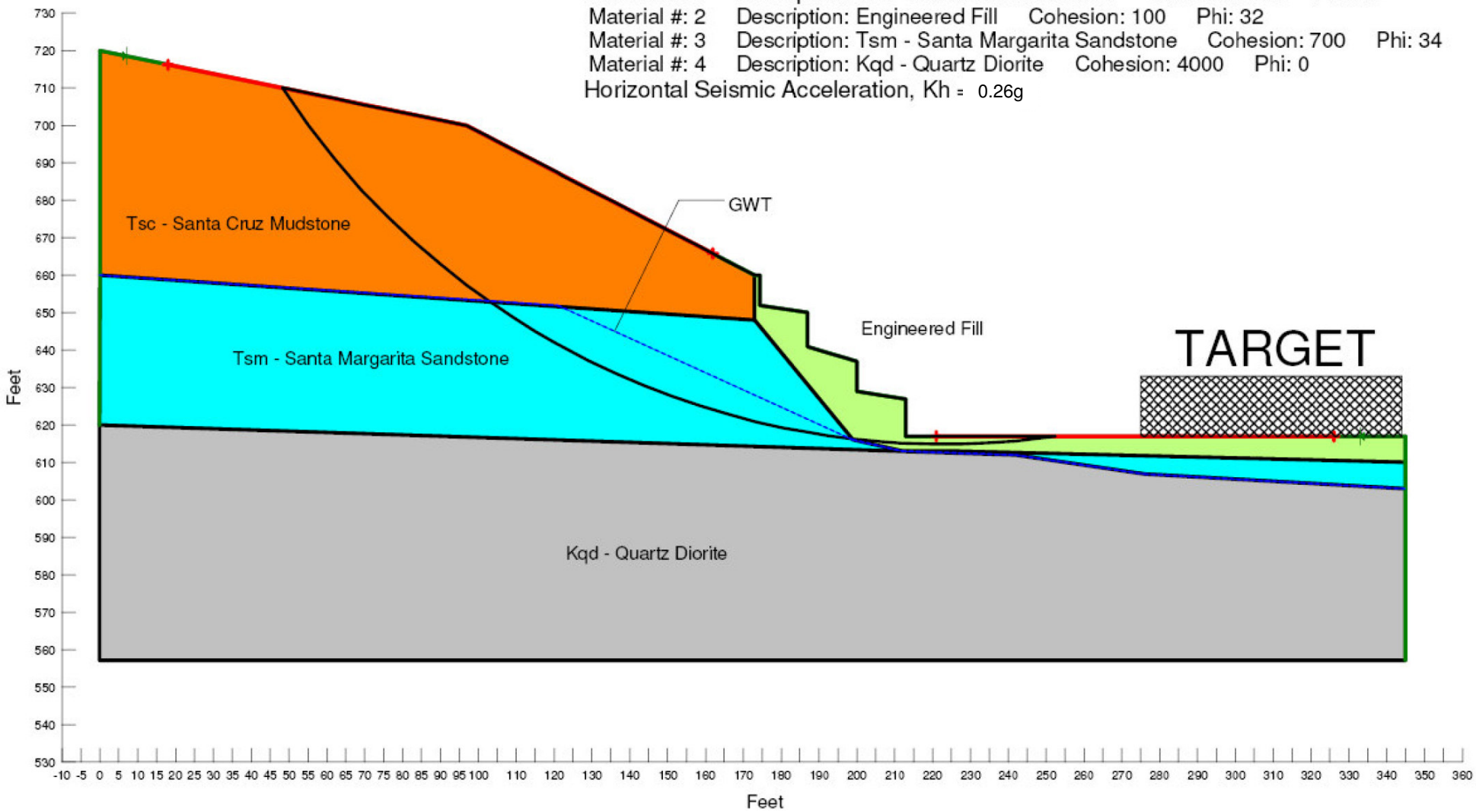
Library file: L:\2008\library\projects\94335*.ppt

PLOTTED:25 August 2008, 10:27 AM

1.1

Section B-B' – Western Wall – Seismic

Material #: 1 Description: Tsc - Santa Cruz Mudstone Cohesion: 700 Phi: 23
Material #: 2 Description: Engineered Fill Cohesion: 100 Phi: 32
Material #: 3 Description: Tsm - Santa Margarita Sandstone Cohesion: 700 Phi: 34
Material #: 4 Description: Kqd - Quartz Diorite Cohesion: 4000 Phi: 0
Horizontal Seismic Acceleration, Kh = 0.26g



KLEINFELDER Bright People. Right Solutions.	PROJECT NO: 94335	SLOPE STABILITY ANALYSIS	PLATE
	DRAWN: August 2008		F-2
	DRAWN BY: DS		
	CHECKED BY: PK	Proposed Target Store La Madrona Drive and Silverwood Drive Scotts Valley, California	
	FILE NAME:		

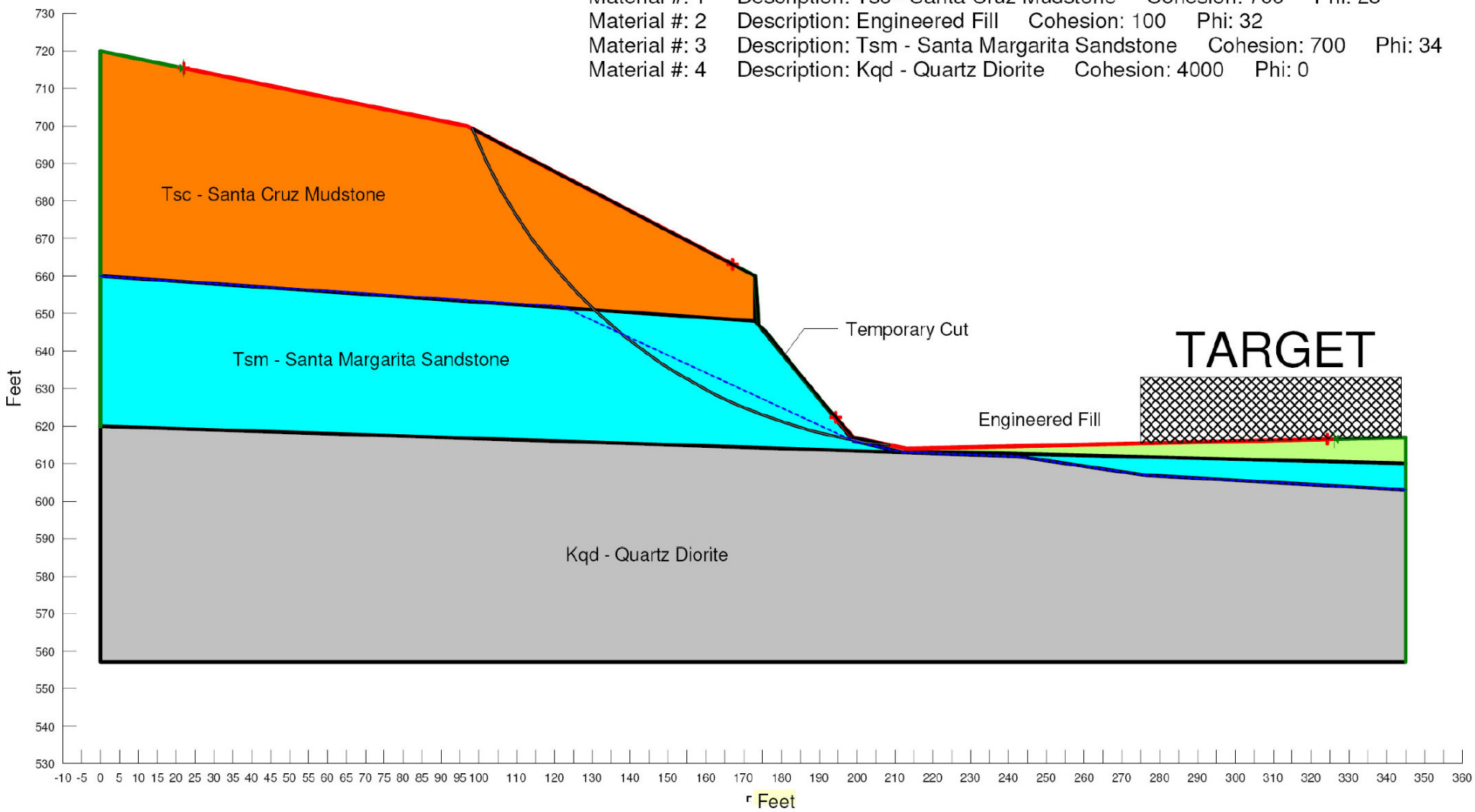
Library file: L:\2008\library\projects\94335*.ppt

PLOTTED:25 August 2008, 10:27 AM

1.4

Section B-B' – Western Wall – Temporary Condition

Material #: 1 Description: Tsc - Santa Cruz Mudstone Cohesion: 700 Phi: 23
Material #: 2 Description: Engineered Fill Cohesion: 100 Phi: 32
Material #: 3 Description: Tsm - Santa Margarita Sandstone Cohesion: 700 Phi: 34
Material #: 4 Description: Kqd - Quartz Diorite Cohesion: 4000 Phi: 0



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FILE NAME:	

SLOPE STABILITY ANALYSIS

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

F-3

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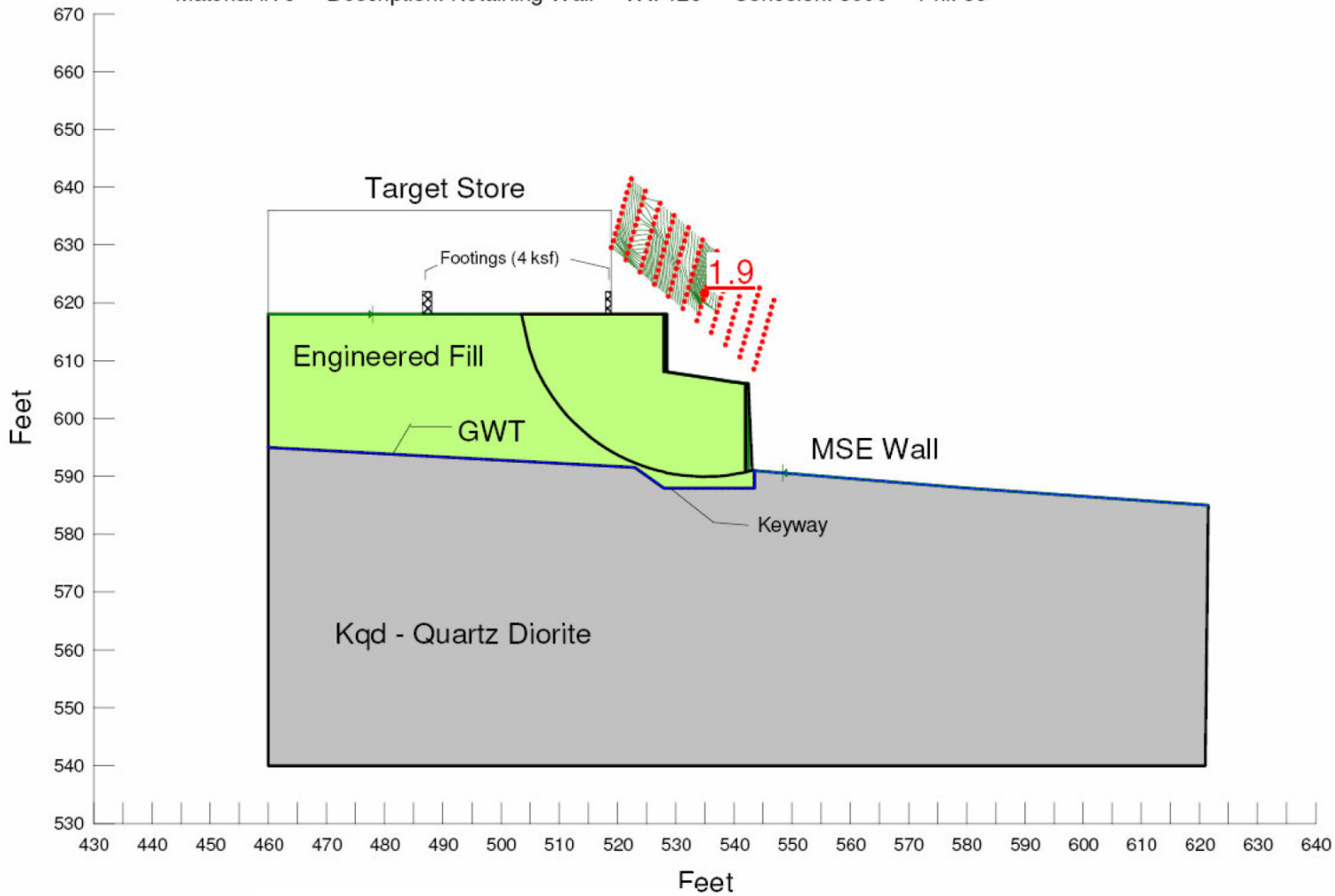
Section B-B' - Eastern Wall - Static

Material #: 1 Description: Tsc - Santa Cruz Mudstone Wt: 130 Cohesion: 700 Phi: 23
Material #: 2 Description: Engineered Fill Wt: 125 Cohesion: 100 Phi: 32
Material #: 3 Description: Tsm - Santa Margarita Sandstone Wt: 125 Cohesion: 700 Phi: 34
Material #: 4 Description: Kqd - Quartz Diorite Wt: 130 Cohesion: 4000 Phi: 0
Material #: 5 Description: Retaining Wall Wt: 125 Cohesion: 6000 Phi: 38



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FILE NAME:	

SLOPE STABILITY ANALYSIS

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

F-4

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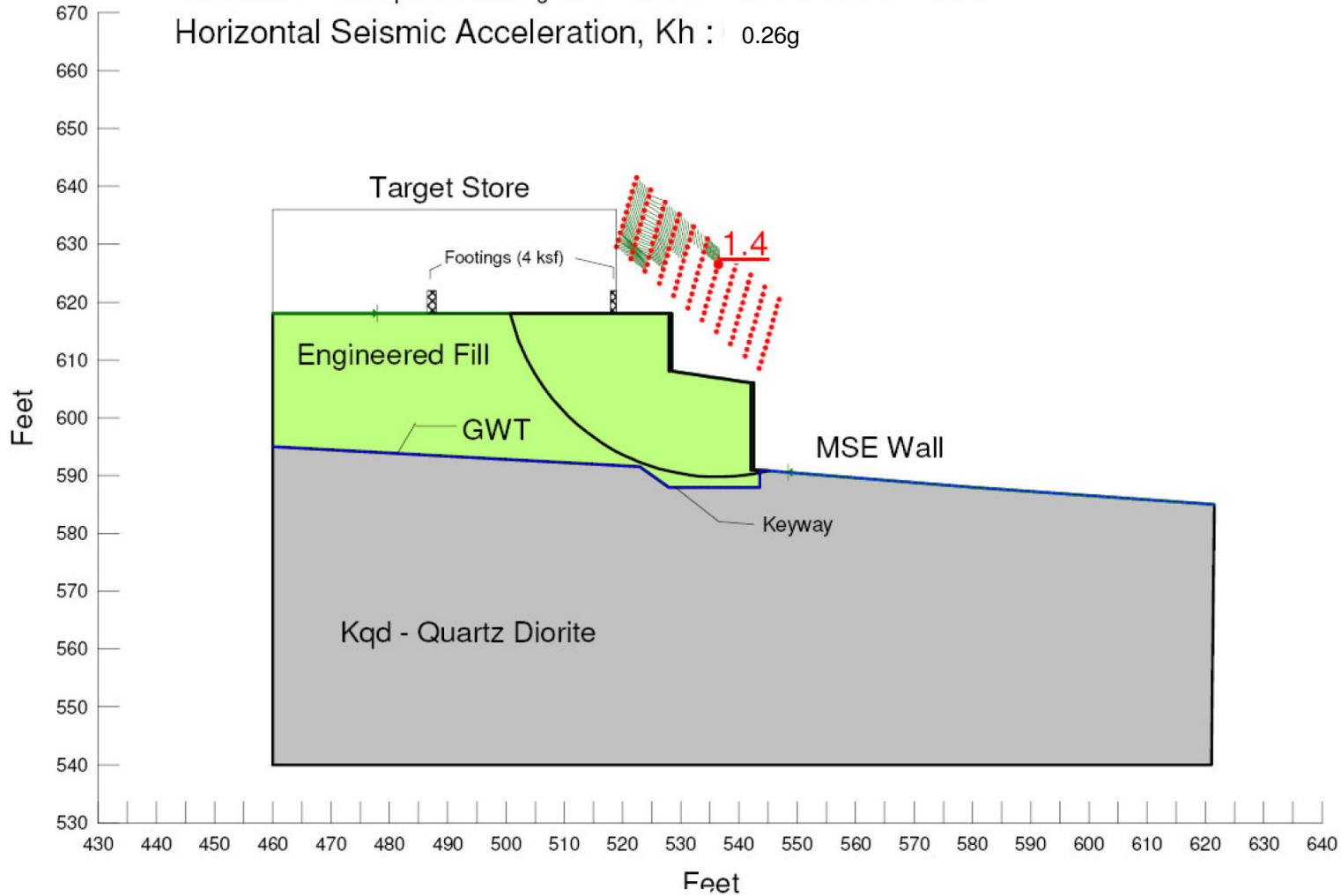
Section B-B' - Eastern Wall - Seismic

Material #: 1 Description: Tsc - Santa Cruz Mudstone Wt: 130 Cohesion: 700 Phi: 23
Material #: 2 Description: Engineered Fill Wt: 125 Cohesion: 100 Phi: 32
Material #: 3 Description: Tsm - Santa Margarita Sandstone Wt: 125 Cohesion: 700 Phi: 34
Material #: 4 Description: Kqd - Quartz Diorite Wt: 130 Cohesion: 4000 Phi: 0
Material #: 5 Description: Retaining Wall Wt: 125 Cohesion: 6000 Phi: 38

Horizontal Seismic Acceleration, Kh : 0.26g



KLEINFELDER Bright People. Right Solutions.	PROJECT NO: 94335	SLOPE STABILITY ANALYSIS	PLATE
	DRAWN: August 2008		F-5
	DRAWN BY: DS		
	CHECKED BY: PK	Proposed Target Store La Madrona Drive and Silverwood Drive Scotts Valley, California	
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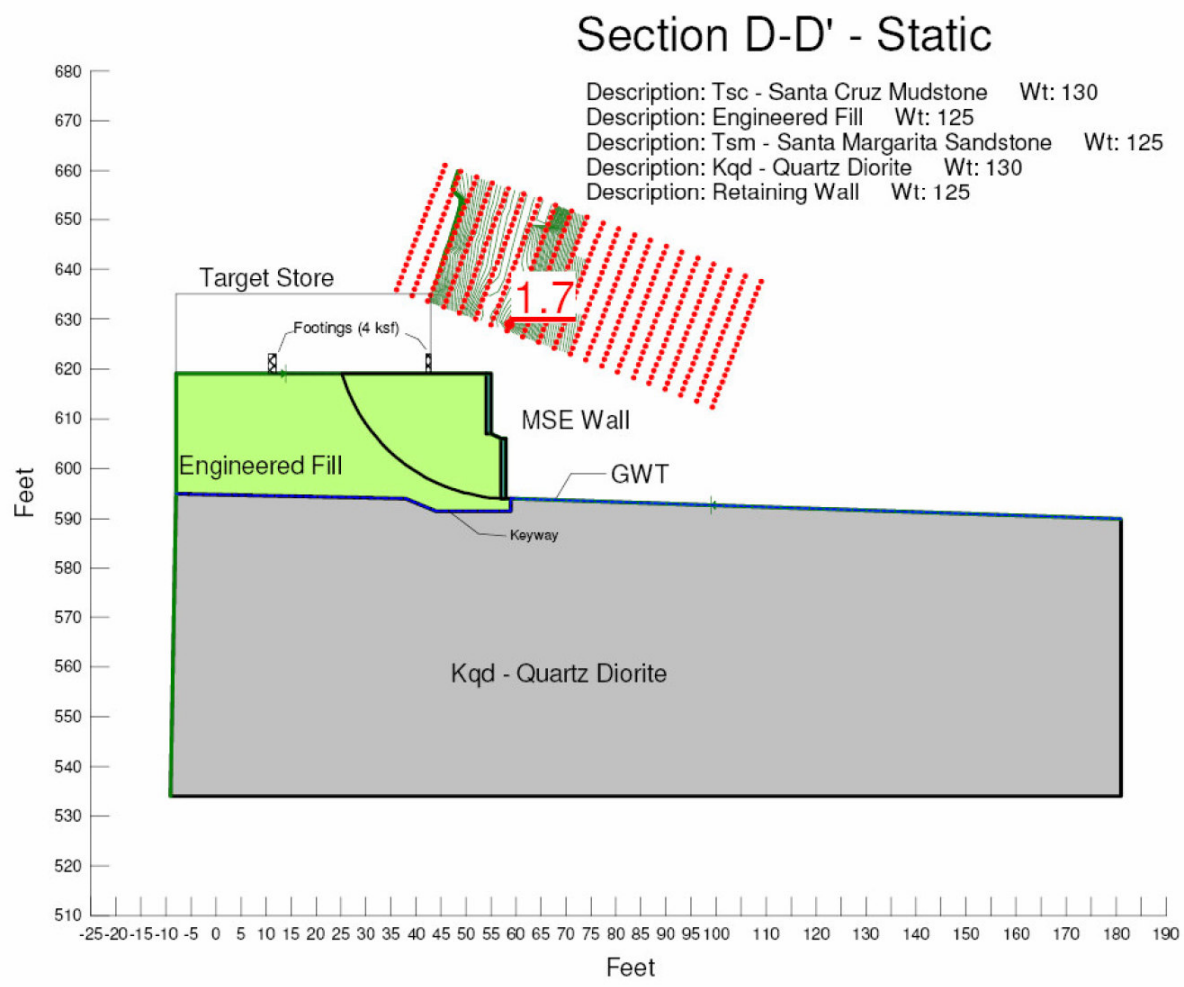

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SLOPE STABILITY ANALYSIS

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

F-6

Library file: L:\2008\library\projects\94335*.ppt

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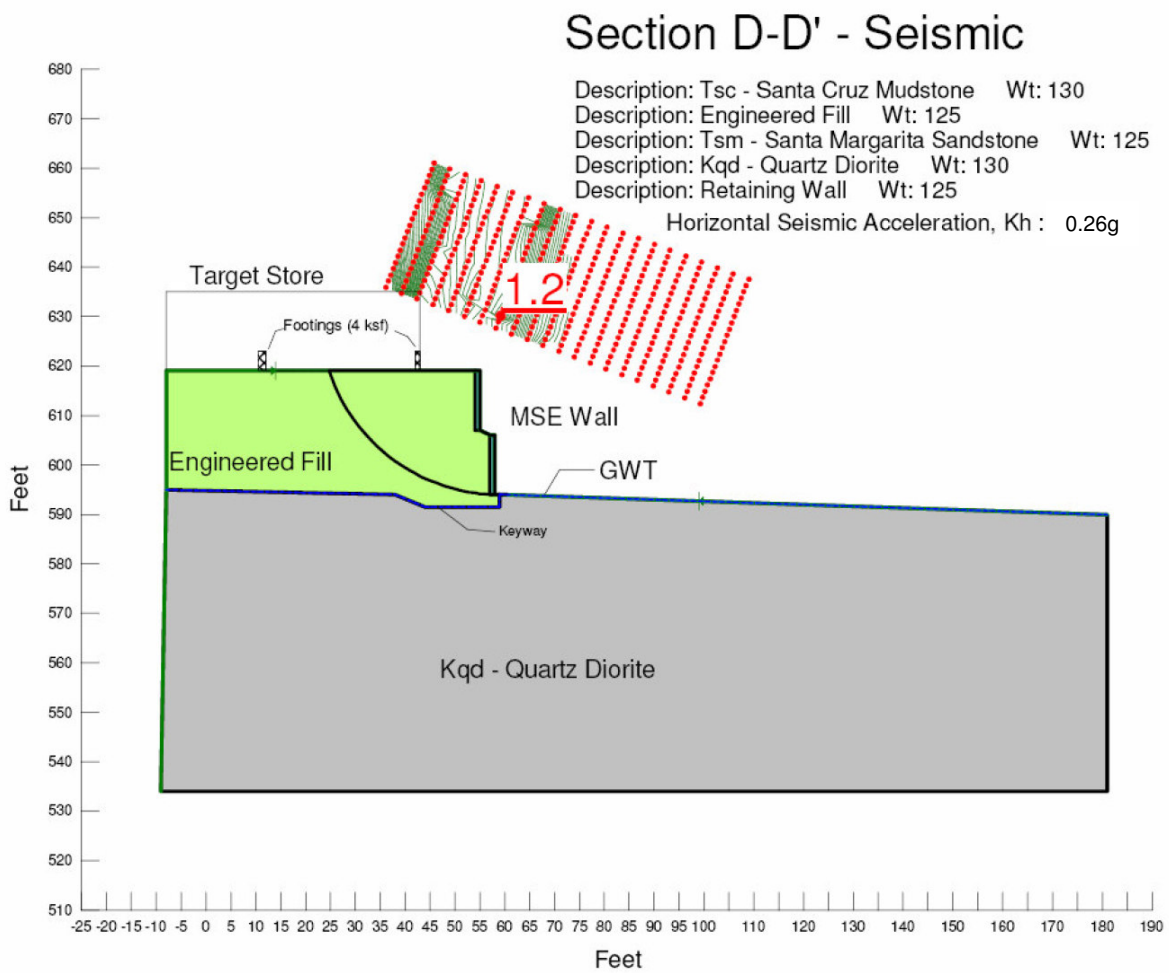

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SLOPE STABILITY ANALYSIS

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

F-7

Library file: L:\2008\library\projects\94335*.ppt

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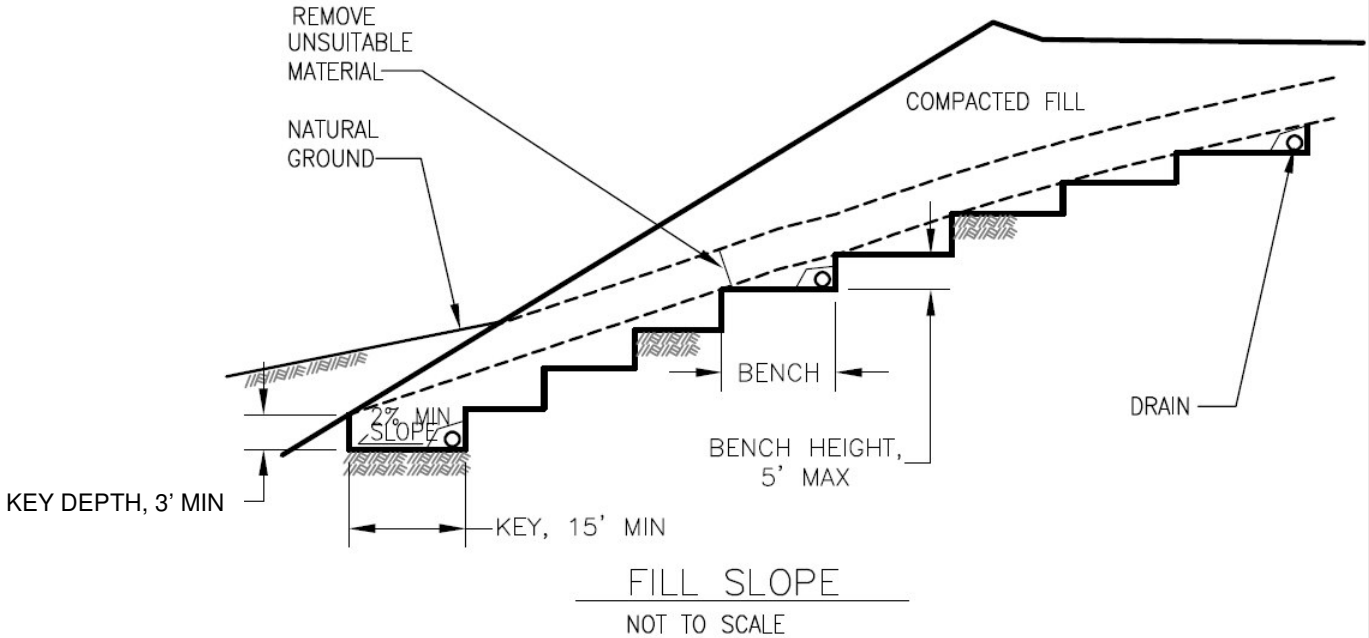
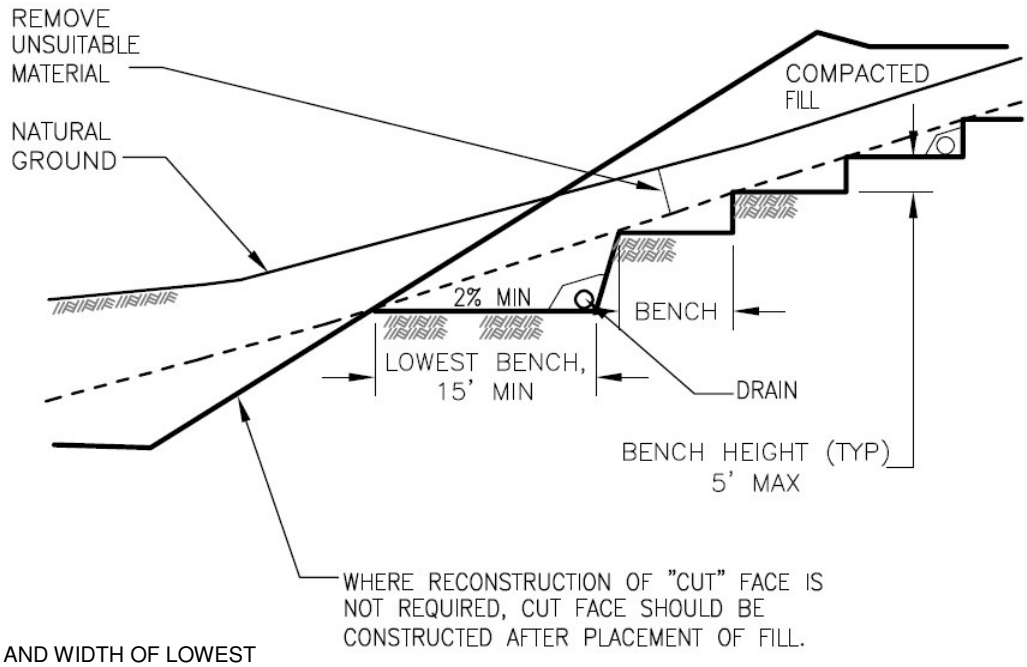
APPENDIX G



FILL SLOPE

NOT TO SCALE



FILL–OVER–CUT–SLOPE

NOT TO SCALE

NOTES:

1. DEPTH AND WIDTH OF LOWEST BENCH OR KEY ARE SUBJECT TO CHANGE BASED ON FIELD CONDITIONS.

2. INSTALL DRAINS AT ALL KEYS, AND BENCHES AT 25 FEET MAXIMUM VERTICAL INCREMENTS. ADDITIONATAL DRAINS MAY BE REQUIRED AT THE DISCRETION OF THE GEOTECHNICAL CONSULTANT.

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BENCHING DETAILS

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

G-1

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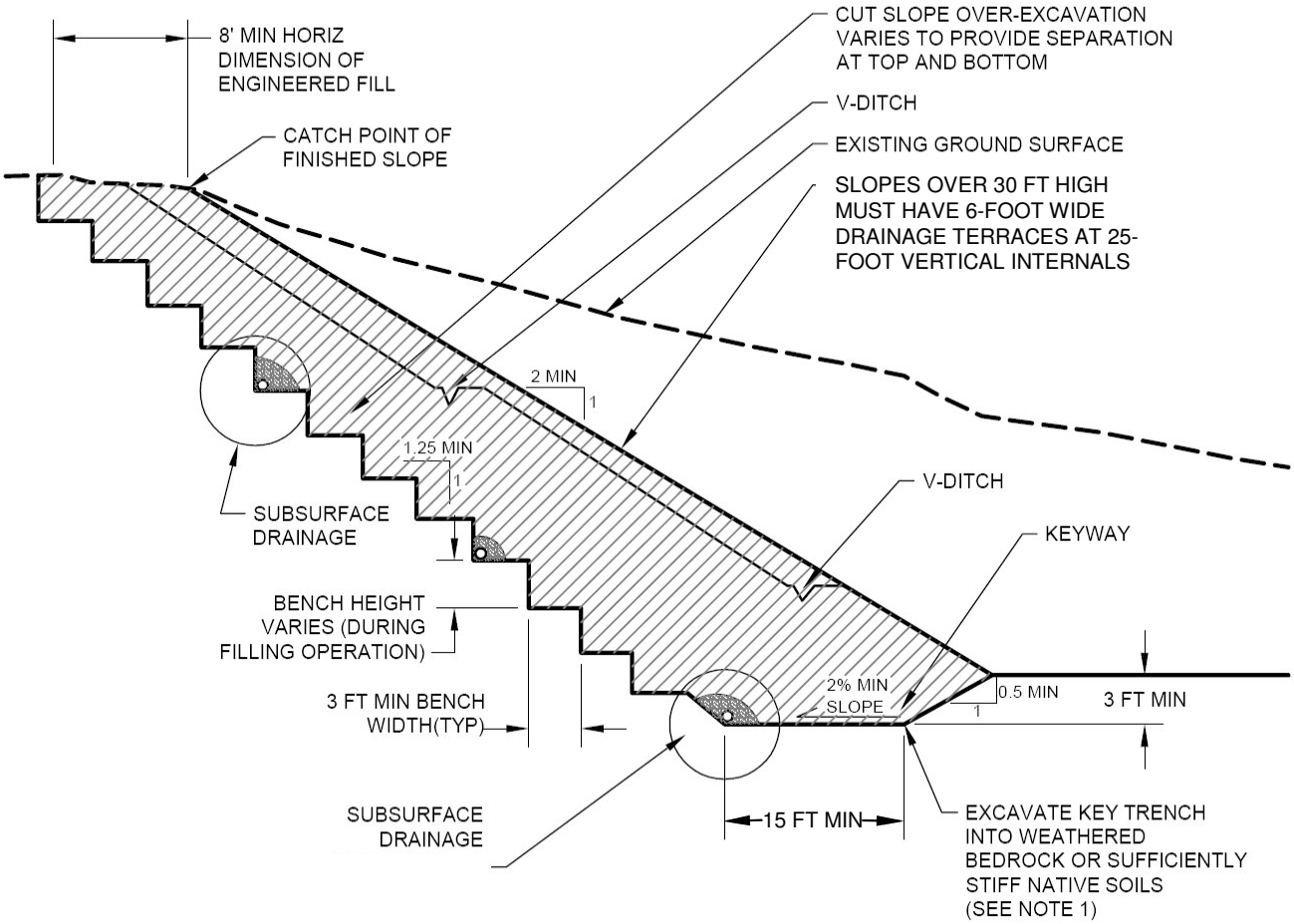

NOTES:

1. DRAWING NOT TO SCALE.
2. FINAL BENCHING AND KEYWAY EXCAVATION DEPTHS AND DETAILS SUBJECT TO EVAULATION OF FIELD CONDITIONS.
3. DIMENSIONS AND LOCATIONS OF DRAINAGE TERRACES ARE APPROXIMATE. ACTUAL LOCATIONS TO BE BASED ON LOCAL ORDINANCES.
4. V-DITCH SPECIFICATIONS TO BE BASED ON LOCAL ORDINANCES.
5. DRAIN PIPES AND V-DITCHES TO DRAIN TO AN APPROPRIATE DISCHARGE FACILITY.
6. INSTALL CLEANOUTS AT BOTH ENDS AND A MINIMUM OF 400 FEET, IF PRACTICAL.

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TYPICAL KEYWAY AND BUTTRESS FILL DETAIL

Proposed Target Store
La Madrona Drive and Silverwood Drive
Scotts Valley, California

PLATE

G-2

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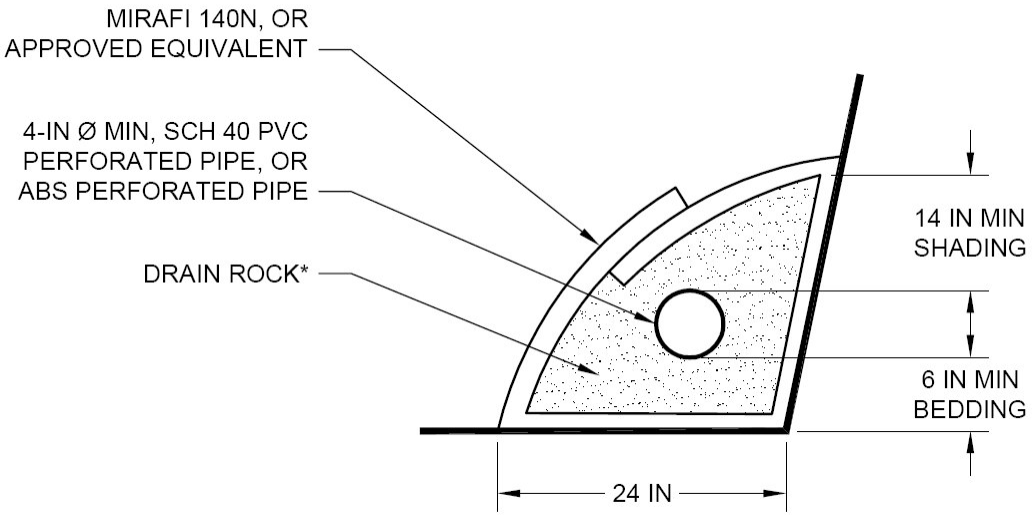
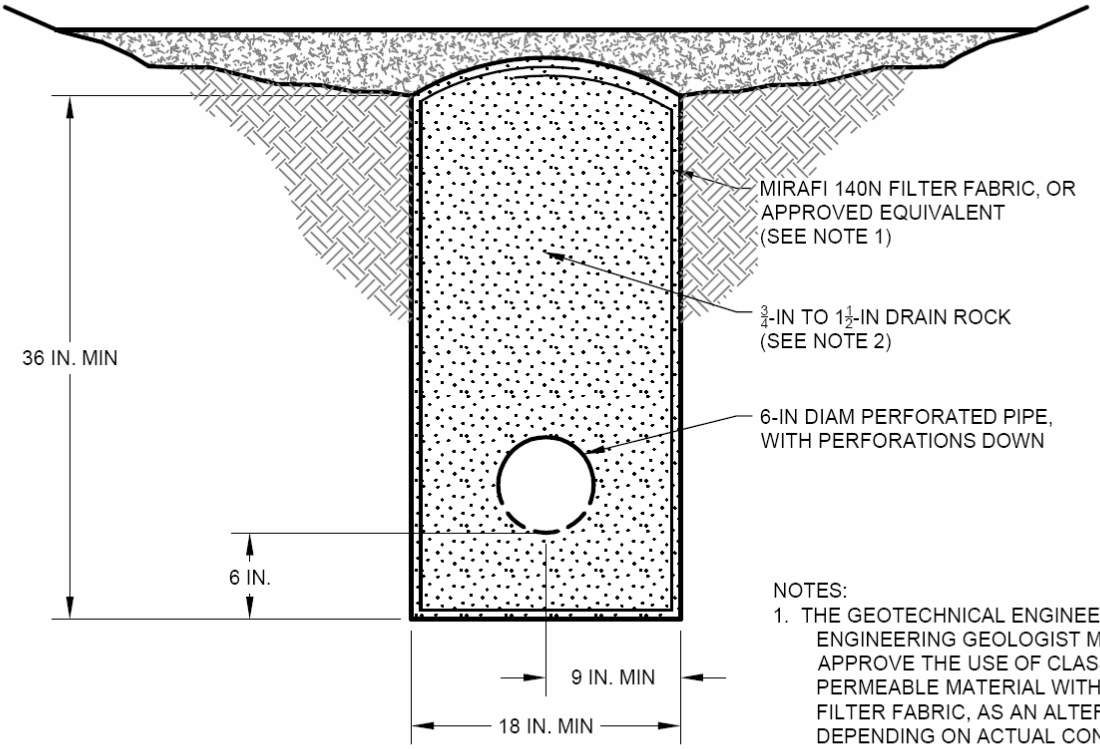


TYPICAL KEYWAY AND BENCH SUBDRAIN



TYPICAL TRENCH SUBDRAIN

NOTES:

1. THE GEOTECHNICAL ENGINEER/ ENGINEERING GEOLOGIST MAY APPROVE THE USE OF CLASS 2 PERMEABLE MATERIAL WITHOUT FILTER FABRIC, AS AN ALTERNATIVE, DEPENDING ON ACTUAL CONDITIONS ENCOUNTERED.
2. DRAIN ROCK SHOULD BE CLEAN AND FREE DRAINING.
3. DRAWING IS NOT TO SCALE.

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TYPICAL SUBDRAIN DETAILS

Proposed Target Store
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PLATE

G-3

Library file: L:\2008\library\projects\94335*.ppt

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APPENDIX H

EXHIBIT 1
SUMMARY OF COMPACTION RECOMMENDATIONS

Area	Compaction Recommendation [1,2,3]
General Engineered Fill	Compact to a minimum of 90 percent compaction at a minimum of 2 percent over the optimum moisture content.
Imported "Non-Expansive" Fill [4]	Compact to a minimum of 90 percent compaction at near the optimum moisture content.
Trenches [5]	Compact to a minimum of 90 percent compaction at a minimum of 2 percent over the optimum moisture content.
Exterior Flatwork [6]	Compact to a minimum of 90 percent compaction at a minimum of 2 percent over the optimum moisture content. Where exterior flatwork is exposed to vehicular traffic, compact upper 12 inches of subgrade to a minimum of 92 percent relative compaction at a minimum of 2 percent over the optimum moisture content. Compact baserock to a minimum of 95 percent compaction at near the optimum moisture content.
Parking and Access Driveways [6]	Compact upper 12 inches of subgrade to a minimum of 92 percent relative compaction at a minimum of 2 percent over the optimum moisture content. Compact baserock to a minimum of 95 percent compaction at near the optimum moisture content.

Notes:

1. All compaction requirements refer to relative compaction as a percentage of the laboratory standard described by ASTM D-1557. All lifts to be compacted shall be a maximum of 8 inches loose thickness, unless otherwise recommended.
2. All compacted surfaces should be firm, stable, and unyielding under compaction equipment.
3. Where fills are deeper than 7 feet, the portion below 7 feet should be compacted to a minimum of 95 percent.
4. Includes Building Pad
5. In landscaping areas, this percent compaction in trenches may be reduced to 85 percent.
6. Depths are below finished subgrade elevation.

DRAFT

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