Appendix A to EIR Appendix N:

Hydrology Analysis
Vesting Tentative Tract Map 17845
Rancho La Habra

Prepared for

CalAtlantic Homes

March 2017

Hunsaker & Associates

Appendix A

Soils Report

August 19, 2015

Project No. 14057-01

Mr. Michael Battaglia
Standard Pacific Homes
15360 Barranca Parkway
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Subject: ***Preliminary Geotechnical Report for Proposed Westridge Residential Development, VTTM 17845, City of La Habra, California***

In accordance with your request and authorization, LGC Geotechnical, Inc. has prepared a preliminary geotechnical report for the proposed "Westridge" residential development generally located south of Imperial Highway and an adjacent commercial center between Beach Boulevard and Idaho Street within the City of La Habra, California. The purpose of our study was to evaluate the existing onsite geotechnical conditions and to confirm that the site can be developed from a geotechnical perspective.

Should you have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Respectfully Submitted,

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1.0 INTRODUCTION

1.1 Purpose and Scope of Services

This report presents the results of our preliminary geotechnical evaluation for the proposed "Westridge" residential development, Vesting Tentative Tract No. 17845, located in the City of La Habra, California. The preliminary grading plan by Hunsaker and Associates, Inc. (Hunsaker, 2015) was utilized as a base map for our Geotechnical Map (Sheet 1), and Geotechnical Cross-Sections (Sheets 2 & 3).

The purpose of our study was to evaluate the existing onsite geotechnical conditions and to confirm that the site can be developed from a geotechnical perspective. As part of this report, we have: 1) reviewed available geotechnical reports, geologic maps, and air photos pertinent to the site (Appendix A); 2) performed a subsurface geotechnical evaluation of the site; 3) prepared a geotechnical map of the site incorporating available geotechnical information; 4) prepared geotechnical cross-sections depicting the interpreted subsurface conditions of the site relative to the proposed design; 5) performed global slope stability analysis in support of the proposed design; and 6) prepared this summary report presenting our preliminary findings and conclusions for the proposed development.

The findings and conclusions presented herein should be considered preliminary and will need to be confirmed as part of a grading plan review report to be provided at a later date. It should be noted that LGC Geotechnical does not provide environmental consulting services.

1.2 Existing Conditions

The approximately 150-acre site is currently an 18-hole golf course at the location depicted on the Site Location Map, Figure 1 (Page 6). The golf course includes a clubhouse, associated parking areas and cart paths, a driving range, and three lake features. The irregular-shaped parcel is bound on the west by Beach Boulevard, to the north by existing commercial and residential located along Imperial Highway, to the east by Idaho Street, and to the south by existing residential Tracts 15031 and 15030. An existing street, Trevino Avenue, traverses the site and provides access to the clubhouse at the central portion of the site and gated access to the residential tracts south of the site.

The site has moderate relief, the lowest in the northern portion at an approximate elevation of 220 feet, the highest at the southeastern corner up to an approximate elevation of 470 feet. The existing residential tracts to the south of the site are generally at higher elevations and separated from the subject site by an ascending slope.

1.3 Project Description

The proposed development includes 280 lots consisting of multi and single-family residential and commercial pads, associated roadways, parks and open space areas. The commercial pads and associated parking areas are planned on approximately 3 acres at the north/central portion of the site. The development will include a water quality basin located in the western portion of the site with a maximum design water elevation of 208 feet above sea level (Hunsaker, 2015). Four Mechanically Stabilized Earth (MSE) retaining walls up to approximately 13 feet in height are proposed within the

development including a mid-slope MSE retaining wall up to approximately 12 feet in height. In addition, numerous conventional retaining walls are proposed.

The maximum proposed cut and fill slopes are approximately 80 and 40 feet, respectively. The grading plan depicts planned cuts and fills (not including required remedial grading) up to approximately 55 and 35 feet, respectively. No changes are depicted at the existing central clubhouse, and minor changes depicted on the southern of two existing lake features near the clubhouse. The northern of the two lake features near the existing clubhouse and an existing lake feature at the western portion of the site are planned to be removed as part of the proposed development.

1.4 Background

The subject site is located within a portion of the former West Coyote Oil Field located along the southern boundary of La Habra. Petroleum production by Chevron and affiliated companies started in the region in the early 1900's and ceased in approximately 1995. As part of oil production activities, site topography was altered slightly with construction of oil extraction pads and roads throughout the hills (Continental, 2014). The transition from an oil field to a golf course was undertaken over several years with the involvement of various geotechnical and environmental consultants, as detailed below. Please note that the available reports and maps obtained from the City of La Habra documenting the geotechnical history of the site are incomplete in several cases, and some documents referenced within those reports were not available for review.

On October 1, 1968 while the site was still an active oil field, a fault ruptured offsite and to the east of the site near Idaho Street. Subsequent extensive fault trenching in 1970 by Converse, Davis, & Associates (Converse) allowed for detailed mapping of the approximately 3-inch, vertically offset, fault trace. The well-defined lineament was documented, evaluated, and became known as the "Unnamed West Coyote Hills Fault" as presented in the referenced Fault Evaluation Report and Supplemental Report published by California Department of Mines and Geology (CDMG, 1977 & 1978). CDMG, 1978, suggests that the probable cause of fault rupture was due to oil field operations (subsidence due to oil extraction and groundwater injection activities). The fault was assigned a State of California Alquist-Priolo Earthquake Fault Zone (CDMG, 1991). As is typical, the Earthquake Fault Zone extends well beyond the lineament of the fault in order to ensure that any potential fault splays are investigated by a geologist prior to construction of habitable structures within the Zone. The mapped lineament and the limits of the Earthquake Fault Zone are presented on the Geotechnical Map (Sheet 1).

Leighton and Associates (Leighton) performed a fault study of the region in the early 1990's by trenching the area of the subject site and the two proposed adjacent tracts to the south. Numerous existing inactive north-south trending faults that characterize the uplifted Coyote Hills geologic structure for this area are presented on a map and cross sections by Leighton (1992: Figures Only) that were reviewed as part of this study. Leighton also depicted the (offsite) location of the historically active Unnamed West Coyote Hills Fault as mapped by Converse, and a recommended structural setback extending 100 feet from either side of the lineament. None of the faults except the Unnamed West Coyote Hills Fault are considered to be active or potentially active.

A geotechnical field evaluation was performed in 1996 by Goffman, McCormick and Urban, Inc., (GMU, 1996: Text Only), as part of a grading plan review for the proposed golf course and adjacent Tracts 15030 and 15031 to the south. The field evaluation consisted of 60 test pits and 36 large-

diameter borings up to approximately 66 feet below grade. Although the geotechnical figures showing boring logs and locations were not available as part of our review of the original report of geotechnical studies by GMU, those figures were obtained from a subsequent response to comments report by another consulting firm. Geosoils, Inc. became the geotechnical consultant of record for construction of the Westridge Golf Course and responded to geotechnical review comments in the referenced report (Geosoils, 1997). Selected borings logged by GMU are presented herein on the Geotechnical Map, Sheet 1 (In Pocket), and boring logs in Appendix B.

During the period between the fault evaluation report by Leighton, 1992, and the geotechnical investigation by GMU, 1996, demolition of concrete features was reportedly ongoing at the site. Limited information is available regarding an approximate 25-foot-deep excavation where alternating layers of concrete rubble and soil was placed under observation and testing by Leighton, as described in GMU, 1996. The approximate location of the concrete disposal area is depicted on the Geotechnical Map, Sheet 1; however, the actual elevations and details regarding the material are not available.

The existing golf course was rough graded between 1997 and 1999 during grading of adjacent residential Tracts 15030 and 15031 under geotechnical observation and testing by GeoSoils, Inc. (1999). Grading of the golf course generally involved cuts and fills up to approximately 35 feet, greater in select areas of the westernmost portion of the site. Remedial grading included removal and stockpiling of crude oil-affected native soils. Buttress keyways were constructed for stabilization of ascending slopes to the south of the golf course, and smaller stabilization fill keyways were constructed for the 2:1 (H:V) slopes along the northern perimeter of the golf course. During grading, approximately nine ancient “major” and numerous “minor” northwest and northeast trending normal faults (typical for the region) were encountered and mapped by GeoSoils. Fault locations were generally as anticipated from the fault map presented in Leighton, 1992. As stated above, these faults were not considered active or potentially active and reportedly all residential lots exposing them were overexcavated and capped with a minimum of 5 feet of compacted fill, in order to minimize the potential for differential settlement (GeoSoils, 1999). Notably, as shown on the Geotechnical Map (Sheet 1), no faults were mapped by GeoSoils during grading that are within or adjacent to the State of California Earthquake Fault Zone (CDMG, 1991).

Grading of the golf course included placement of both structural fill (i.e., compacted fill with a required minimum relative compaction of 90 percent) and non-structural fill considered unsuitable for support of structures (i.e., fill placed with a required minimum relative compaction of 85 percent). Structural fill was reportedly placed along the southern perimeter of the golf course in support of the adjacent developments (Tracts 15030 and 15031), below structures and utility alignments across the golf course, and within adjacent perimeter slopes and roadways (Geosoils, 1997). Non-structural artificial fill was placed within the central area of the western portion of the subject site and within several small canyons at the eastern portion of the site. Removals of the near-surface weathered alluvial deposits were reportedly limited in these areas and not specifically removed to competent native soils prior to fill placement (Geosoils, 1999).

Three controlled zones called environmental Re-Use Areas (RUA) are located within non-structural artificial fill at the western half of the site, where specifically “diluted” crude oil-affected soils were placed under environmental observation and testing by Miller Brooks Environmental, Inc. (1999). As part of remedial grading activities, the affected soils were stockpiled, blended as necessary, and placed as artificial fill at specific locations in general accordance with project specifications. Evaluation of the crude oil-affected soils and potential impacts to future grading are being addressed by others.

Previously constructed keyways, geologic mapping by others, and limits of structural and non-structural artificial fill, concrete disposal and environmental Re-Use Areas (RUA) are presented on the Geotechnical Map, Sheet 1 (In Pocket).

In 2001, a geotechnical evaluation was performed for the adjacent commercial center located northwest of the site (Eberhart, 2001). The commercial center is approximately 57 acres with large retail stores and associated parking. The field evaluation consisted of 121 hollow-stem borings (mostly shallow) and two large-diameter borings excavated up to approximately 50 feet below grade. Select borings were reviewed as part of this study.

In 2003, a geotechnical evaluation was performed for a banquet room addition to the existing golf clubhouse by Pacific Geosoils, Inc. (2003). Two small-diameter hand-auger borings were drilled to depths of approximately 12 and 13 feet below existing grade. Pacific Geosoils reported that the subsurface soils in the area of the proposed construction consist of fill soils underlain by bedrock. The geotechnical report concluded that existing fill soils were unsuitable for support of foundations and recommended that the building addition be supported on drilled piers into site bedrock, in lieu of performing earthwork removals.

1.5 Subsurface Geotechnical Evaluation

During July 2014 and February 2015, LGC Geotechnical performed a subsurface geotechnical evaluation of the site consisting of the excavation of five large-diameter bucket auger borings, eighteen hollow-stem auger borings, and eleven Cone Penetration Test (CPT) soundings to evaluate onsite geotechnical conditions.

Five bucket auger borings (B-1 through B-5) were drilled by Al-Roy Drilling and Haven Geotechnical under subcontract to LGC Geotechnical. The maximum depth of the bucket auger borings was approximately 115 feet below existing grade. The bucket auger borings were excavated to evaluate the geologic structure of the bedrock materials and to obtain samples for laboratory testing. The large-diameter boreholes were surface logged during excavation and downhole logged by an engineering geologist in order to obtain structural geologic information. Borings were subsequently backfilled with cuttings and tamped.

Eighteen hollow-stem borings (HS-1 through HS-18) were drilled by 2R Drilling, Inc. under subcontract to LGC Geotechnical. The depth of the hollow-stem borings ranged from approximately 21.5 to 76.5 feet below existing grade. An LGC Geotechnical representative observed the drilling operations, logged the borings, and collected soil samples for laboratory testing. The borings were excavated using a limited access drill rig equipped with 8-inch-diameter hollow-stem augers. Driven soil samples were collected by means of the Standard Penetration Test (SPT) and Modified California Drive (MCD) sampler generally obtained at 5-foot vertical increments. The MCD is a split-barrel sampler with a tapered cutting tip and lined with a series of 1-inch-tall brass rings. The SPT sampler and MCD sampler were driven using a 140-pound automatic hammer falling 30 inches to advance the sampler a total depth of 18 inches or until refusal. The blow counts for each 6-inch increment of penetration were recorded on the boring logs. Bulk samples were also collected and logged at select depths for laboratory testing. At the completion of drilling, the borings were backfilled and tamped.

Eleven Cone Penetration Test (CPT) soundings (CPT-1A through CPT-11B) were performed by Kehoe Testing and Engineering, Inc. under subcontract to LGC Geotechnical. CPT soundings were pushed to depths ranging between approximately 5 to 69 feet below existing grade, to practical refusal. The CPT soundings were pushed using an electronic cone penetrometer in general accordance with the current ASTM standards (ASTM D5778 and ASTM D3441). The CPT equipment consisted of a cone penetrometer assembly mounted at the end of a series of hollow sounding rods. The interior of the cone penetrometer is instrumented with strain gauges that allow the simultaneous measurement of cone tip and friction sleeve resistance during penetration. The cone penetration assembly is continuously pushed into the soil by a set of hydraulic rams at a standard rate of 0.8 inches per second while the cone tip resistance and sleeve friction resistance are recorded at approximately every 2 inches and stored in digital form. A specially designed all-wheel drive 25-ton truck provides the required reaction weight for pushing the cone assembly.

The approximate locations of borings and CPT soundings are shown on the Geotechnical Map (Sheet 1). Boring and CPT logs are presented in Appendix B.

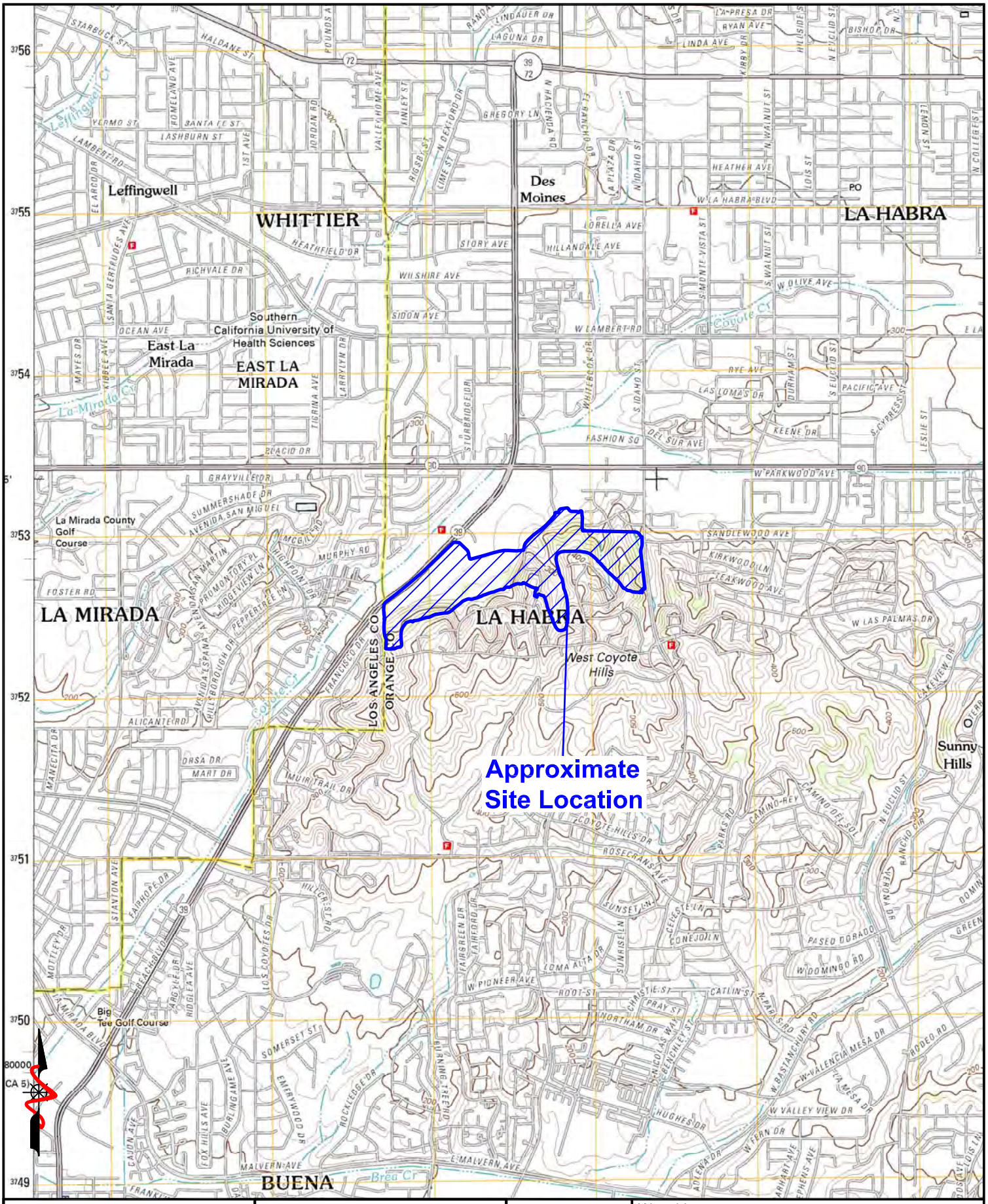
1.6 Laboratory Testing

Representative bulk and driven samples were retained for laboratory testing during our field evaluation. Laboratory testing included in-situ moisture content and in-situ dry density, Atterberg Limits, grain size analysis, consolidation, direct shear, expansion index, laboratory compaction and corrosion (sulfate, chloride, pH and minimum resistivity).

The following is a summary of the laboratory test results.

- Dry density of the samples collected ranged from approximately 95 pounds per cubic foot (pcf) to 134 pcf, with an average of 113 pcf. Field moisture contents ranged from approximately 1 percent to 26 percent, with an average of 13 percent.
- Twenty Atterberg Limit (liquid limit and plastic limit) tests were performed. Results indicated Plasticity Index values ranging from 1 to 48.
- Sixteen fines content tests were performed and indicated fines content (passing No. 200 sieve) of approximately 7 to 84 percent. According to the Unified Soils Classification System (USCS), eleven of the tested samples are classified as “coarse-grained” soil.
- Direct shear tests were performed on select driven samples and samples remolded to 90 percent relative compaction. The plots are provided in Appendix C.
- Consolidation tests were performed on select samples. The deformation versus vertical stress plots are provided in Appendix C.
- Three Expansion Index (EI) tests were performed. Results indicate EI values ranging from 15 to 37, corresponding to “Very Low” and “Low” expansion potential.
- Laboratory compaction testing of five bulk samples indicated maximum dry density values ranging from 115.0 to 140.0 pounds per cubic foot (pcf) and optimum moisture contents ranging from 5.5 to 14.5 percent.
- Corrosion testing indicated soluble sulfate contents ranging from approximately 0.01 to 0.05 percent, chloride contents ranging from approximately 33 to 175 parts per million (ppm), pH values ranging from 7.6 to 8.2, and minimum resistivity values ranging from 478 to 1,898 ohm-cm.

A summary of the results is presented in Appendix C. The moisture and dry density test results are presented on the boring logs in Appendix B.



LGC Geotechnical, Inc.	**FIGURE 1** **Site Location Map**	PROJECT NAME: Westridge PROJECT NO.: 14057-01 ENG. / GEOL.: DJB / KTM SCALE: Not to Scale DATE: August 2015

2.0 GEOTECHNICAL CONDITIONS

2.1 Regional Geology

The site is located at the eastern edge of the Los Angeles Basin, within the Peninsular Ranges Geomorphic Province. The Los Angeles Basin consists of a thick sequence of sedimentary deposits partially derived from erosion of the nearby hills and mountain ranges to the north and east of the subject site. The La Habra Heights are a portion of the northwest-trending hills north of the subject area that are bound along their south edge by the active Whittier Fault. The smaller Coyote Hills that underlie the subject site are also of tectonic origin. The Coyote Hills produced oil from structural traps created by faulting and the presence of an east-west domal anticline that coincides with the topographic crest of the hills to the south of the site. The site is located on the gently north-dipping homoclinal limb of the anticline. In general, the region has a complex geologic history influenced by periods of uplift, subsidence, sea level changes, folding, and faulting (Morton, 2004). No active or potentially active faults are known to specifically transect the site.

2.2 Site-Specific Geology

The subject site is located partially on alluvium deposits and partially within the uplifted bedrock that forms the low hills of the Coyote Hills geologic complex south of the site (Morton, 2004). The comparatively young alluvium locally incised a broad, very old alluvial fan that spans the La Habra area to the north. The local alluvium consists of interfingered deposits derived from upstream to the northeast and from the low hills ascending to the south of the site. The bedrock unit underlying the site consists of Quaternary San Pedro Formation, and two existing landslides derived from this material have been identified within the limits of the site. Also, both structural and non-structural artificial fills mantle portions of the site. A brief description of these geologic units is presented in the following sections (from youngest to oldest) and their approximate lateral extents are depicted on the site Geotechnical Map (Sheet 1).

2.2.1 Artificial Fill – Older (Map Symbol - Afo)

Older artificial fill soils encountered at the subject site are generally considered structural, reportedly having been placed in relatively thin lifts, at near optimum moisture content, and compacted with heavy construction equipment to achieve a minimum relative compaction of at least 90 percent (GeoSoils, 1999). Structural fill was placed at certain locations for support of golf course structures and utility alignments, along the southern perimeter of the site for support of adjacent tracts to the south, and along the northern perimeter in areas of 2:1 (H:V) slopes. The material consists of variable layers of silty clay to clayey sand with some gravel, generally moist to very moist, stiff to very stiff/dense.

2.2.2 Artificial Fill – Unsuitable (Map Symbol - Afu)

Unsuitable artificial fill soils were encountered within the western-central area of the subject site and within several small canyon fill areas within the eastern portion of the site as reported in GeoSoils, 1999. The unsuitable fill is considered non-structural and has a minimum relative compaction of 85 percent. Reportedly, the non-structural fill was placed directly on native soils with minimal remedial grading with the exception of areas graded for

environmental mitigation (GeoSoils, 1999). The material consists of variable layers of silty clay to clayey sand with some gravel, generally moist to very moist, stiff to very stiff/medium dense to dense. Environmental Re-Use Areas (RUA), aka crude oil affected soils, are located within this material; approximate limits depicted on the Geotechnical Map, Sheet 1 (Miller Brooks, 1999).

2.2.3 Quaternary Alluvium (Map Symbol – Qal)

Quaternary alluvium underlies the majority of the western portion of the site (GeoSoils, 1999), undifferentiated from colluvium observed by others within the smaller canyons of the Coyote Hills to the south. It generally consists of medium dense silty and clayey sands and stiff to very stiff sandy clays with minor amounts of gravel.

2.2.4 Quaternary Landslide Deposit (Map Symbol – Qls)

Several bedrock-block type landslides were encountered in the vicinity of the subject site during previous investigations and grading activities by others (Goffman, 1996; GeoSoils, 1997 and 1999). Two landslides were removed during grading of the adjacent tracts to the south and one on-site landslide at the western side of the site was stabilized with shear keyways and left in place. Another small, relatively thin landslide was identified in a boring by others at the northeastern edge of the site that was subsequently determined to have been left in place based on Cross-Section 7-7' (Sheet 2).

Where encountered, the landslide material was observed to be similar to the bedrock unit at the site, but highly fractured and weathered.

2.2.5 Quaternary San Pedro Formation (Map Symbol – Qsp)

The sedimentary bedrock unit that underlies the site is the Pleistocene-age Quaternary San Pedro Formation, derived from a shallow marine depositional environment. The formation is broken into four units that vary in dominant material type, variably exposed between the faults that intersect the site. The fossiliferous material generally consists of sandy siltstone and minor amounts of claystone interbedded with medium to coarse, weakly to well-cemented sandstone. The eastern portion of the site has more sandstone, while the central and western portions of the site have a more variable mix of interbedded siltstone, sandstone, and clayey siltstone.

2.3 Geologic Structure

Geologic structure of the bedrock is controlled by the east-west trending domal anticline that crests with the original topographic high of the Coyote Hills to the south of the site. Bedding from GeoSoils, 1999, and as observed during our recent site investigation, indicates a gentle, west-northwesterly dip within the western portion of the site and an east-northeasterly dip within the eastern portion of the site. Bedding attitudes vary due to localized folding and faulting. Bedding was noted to have zones of high-energy depositional environments producing rip-up clasts and other pre-lithification sedimentary structures. Bedrock cementation ranged from non-cemented siltstone and friable sandstone to well cemented layers up to 2 feet thick. Gypsum, manganese oxide and iron oxide were observed in the

upper weathered portion of site bedrock.

An inactive fault encountered at depth within LGC-B-4 was observed along a steeply-dipping, tight, clay-lined shear that marked a sharp change in material type and bedding inclination. The fault is consistent with the many ancient faults identified by others prior to and during grading of the golf course and residential tracts to the south (Leighton, 1992 & Geosoils, 1999). Geologic information collected by others is presented on the Geotechnical Map (Sheet1) along with the results of the recent subsurface investigation.

2.4 Groundwater

During our subsurface evaluation, groundwater was encountered at a depth of approximately 29 feet in HS-17 and as seepage at depth within the large-diameter borings LGC-B-4 and LGC-B-5. Groundwater was not encountered in the remaining hollow-stem borings to the maximum explored depth of approximately 76.5 feet below existing grade. Groundwater was encountered at 46 to 49 feet below existing grade within the alluvium to the north of the site as investigated and reported by Eberhart (2001) as part of construction of the commercial development to the north of the site. The referenced grading plan review report by GMU, 1996, stated that "subsurface flow was encountered at depths of about 20 feet within the older alluvium underlying the major valley bottom area."

Seasonal fluctuations of groundwater elevations should be expected over time. In general, groundwater levels fluctuate with the seasons and local zones of perched groundwater may be present within the near-surface deposits due to local seepage or during rainy seasons. Local perched groundwater conditions or surface seepage may develop once site development is completed and landscape irrigation commences.

2.5 Faulting and Seismic Hazards

The Coyote Hills region surrounding the subject site has a complex geologic history influenced by periods of uplift, gentle folding, and faulting (Morton, 2004). Former uses of the subject site included a working oil field that was active for many years, as described in detail in the section titled "Background" (Section 1.4). On October 1, 1968 while the site was still an active oil field, a fault ruptured just east of Idaho Street as defined by approximately 3-inches of vertical displacement.

Extensive fault trenching by Converse, Davis, & Associates in 1970 allowed detailed mapping of the fault trace including its lateral limits. The well-defined lineament was extensively documented and evaluated and became known as the "Unnamed West Coyote Hills Fault" as presented in the referenced Fault Evaluation Report and Supplemental Report (CDMG, 1977 & 1978). CDMG, 1978 suggests that the probable cause of fault rupture was due to oil field operations (subsidence due to oil extraction and groundwater injection activities). Refer to the Geotechnical Map, Sheet 1, for the location of Unnamed West Coyote Hills Fault with respect to the subject site.

Per the State Geologist, a fault is generally considered "active" if evidence of surface rupture in Holocene time (the last approximately 11,000 years) is present. The Unnamed West Coyote Hills Fault has been evaluated to be "historically active," because displacement has occurred within the last 200 years, therefore a State of California Earthquake Fault Zone was established for the fault. More specifically, a minimum 100-foot-wide structural setback zone was recommended on either side of the Unnamed West Coyote Hills Fault as it was determined that the fault had been accurately

located (CDMG, 1978 & Leighton, 1992). It is typical for an Earthquake Fault Zone to extend laterally well beyond the known trace. As shown on the Geotechnical Map (Sheet 1), the recommended setback is a total of 200 feet wide, while the "width" of the Earthquake Fault Zone is approximately 500 feet.

The previously existing oil field at the subject site was re-developed in the late 1990's into the Westridge Golf Course and adjacent residential communities to the south. These sites were rough graded under the observation and testing of GeoSoils (1997 &1999). The portion of the golf course that is included within the Earthquake Fault Zone was mapped by GeoSoils during grading at that time and no faults were reported there (Geosoils, 1999).

As shown on Sheet 1, proposed residential Lots 12, 28 and 29 are located within the limits of the State of California Earthquake Fault Zone. However, the proposed residential structures for all three lots are located at least 200 feet from the Unnamed West Coyote Hills Fault, significantly more than the previously recommended 100 foot structural setback (CDMG, 1978 & Leighton, 1992). Based on the information shown on Sheet 1 and our review of the referenced documents, it is our opinion that proposed Lots 12, 28 and 29 are not underlain by an active fault. However, those three lots will require verification geologic mapping prior to construction of habitable structures. Recommendations relative to verification mapping are presented in the section titled "Preliminary Recommendations."

Due to the distance from the proposed structures to the Unnamed West Coyote Hills Fault, the possibility of damage due to ground rupture is considered low, provided that the portion of development located within the limits of the Earthquake Fault Zone is verified to be lacking fault indicators in accordance with the current standards of practice, State of California guidelines, and City of La Habra guidelines.

Nearby active faults and corresponding monument magnitude are summarized in Table 1 below.

TABLE 1

Near Site Fault Parameters - Westridge VTTM 17845

Fault	Distance from Site (km)	Maximum Earthquake Magnitude (Mmax)
Puente Hills (Coyote Hills)	4.4	6.8*
Elsinore (Whittier Section)	5.2	6.9*
Puente Hills (Santa Fe Springs)	3.2	6.6*
Unnamed West Coyote Hills	<0.1	2.2 to 2.6**

* from Caltrans, 2015
** from CDMG, 1977

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the Southern California region, which may affect the site, include ground lurching and shallow ground rupture, soil liquefaction, and dynamic settlement. These secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependant on the distance between the site and causative fault and the onsite geology. A discussion of these secondary effects is provided in the following sections.

2.5.1 Liquefaction and Dynamic Settlement

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similar to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions coexist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose, near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential. In general, cohesive soils are not considered susceptible to liquefaction (Bray & Sancio, 2006). Effects of liquefaction on level ground include settlement, sand boils, and bearing capacity failures below structures. Dynamic settlement of dry loose sands can occur as the sand particles tend to settle and densify as a result of a seismic event.

A portion of the site is located within a State of California Seismic Hazard Zone (CDMG, 1998) for liquefaction potential; refer to Figure 2 (rear of text). The majority of the developed site will consist of compacted fill over dense/hard bedrock and is not considered susceptible to liquefaction. However, a portion of the site contains alluvial soils that may be susceptible to liquefaction depending primarily on their apparent density (e.g., loose to dense) and plasticity. The majority of the alluvial soils tested are considered to be cohesive and not considered to be susceptible to liquefaction based on their saturated moisture content compared to their Liquid Limit (Bray & Sancio, 2006).

Liquefaction potential was evaluated using the procedures outlined by Special Publication 117A (SCEC, 1999 & CGS, 2008). Based on the applicable seismic criteria (e.g., 2013 CBC), the data obtained from our field evaluation indicates that the site contains isolated sandy layers susceptible to liquefaction in the upper 50 feet. Based on the data obtained from our field evaluation, total seismic settlements are estimated to be on the order of 1 to 2 inches. Differential seismic settlement can be estimated as half of the total estimated settlement over a horizontal span of about 30 feet. Seismically induced settlements were estimated by using the procedure of Tokimatsu & Seed (1987). These methods are based on a relatively limited empirical data. Therefore, predictions of seismically-induced settlement should be considered approximate.

2.5.2 ***Lateral Spreading***

Lateral spreading is a type of liquefaction-induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluid mass, gravity plus the earthquake inertial forces may cause the mass to move downslope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements and such movement typically damages pipelines, utilities, bridges, and structures.

Due to the lack of an adjacent free face, the potential for lateral spreading is considered very low.

2.5.3 Earthquake Induced Landslide

A portion of the site is located within a State of California Seismic Hazard Zone (CDMG, 1998) for earthquake-induced landslide, as depicted on Figure 2 (rear of text). The hillside zones depicted on the seismic hazard potential map were originally delineated on the pre-existing topography of the region and are no longer applicable. The hillside grading performed in the late 1990's as reported in GeoSoils, 1999, specifically mitigated this seismic hazard potential. Remedial grading for the golf course and the existing residential tracts to the south consisted of buttress keyways and replacement fill slopes as evaluated during this phase of site investigation and presented on the Geotechnical Map and Cross Sections (Sheets 1 through 3). For this reason, potential for earthquake-induced landslide at the site is considered low.

2.6 Seismic Design Criteria

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2013 CBC. Since the site contains soils that are susceptible to liquefaction (refer to Section 2.6.1), ASCE 7 which has been adopted by the CBC requires that site soils be assigned Site Class "F" and a site-specific response spectrum be performed. However, in accordance with Section 20.3.1 of ASCE 7, if the fundamental periods of vibration of the planned structure are equal to or less than 0.5 second (anticipated for the planned residential structures), a site specific response spectrum is not required and ASCE 7/2013 CBC site class and seismic parameters may be used in lieu of a site-specific response spectrum. **It should be noted that the seismic parameters provided herein are not applicable for any structure having a fundamental period of vibration greater than 0.5 second.** Representative site coordinates of latitude 33.9146 degrees north and longitude -117.9640 degrees west were utilized in our analyses. The maximum considered earthquake (MCE) spectral response accelerations (S_{MS} and S_{M1}) and adjusted design spectral response acceleration parameters (S_{DS} and S_{D1}) for Site Class D are provided in Table 2 on the following page.

TABLE 2

Seismic Design Parameters

Selected Parameters from 2013 CBC, Section 1613 - Earthquake Loads	Seismic Design Values
Site Class per Chapter 20 of ASCE 7	D*
Risk-Targeted Spectral Acceleration for Short Periods (S_S)**	1.973g
Risk-Targeted Spectral Accelerations for 1-Second Periods (S_1)**	0.713g
Site Coefficient F_a per Table 1613.3.3(1)	1.0
Site Coefficient F_v per Table 1613.3.3(2)	1.5
Site Modified Spectral Acceleration for Short Periods (S_{MS}) for Site Class D [Note: $S_{MS} = F_aS_S$]	1.973g
Site Modified Spectral Acceleration for 1-Second Periods (S_{M1}) for Site Class D [Note: $S_{M1} = F_vS_1$]	1.070g
Design Spectral Acceleration for Short Periods (S_{DS}) for Site Class D [Note: $S_{DS} = (^2/_3)S_{MS}$]	1.315g
Design Spectral Acceleration for 1-Second Periods (S_{D1}) for Site Class D [Note: $S_{D1} = (^2/_3)S_{M1}$]	0.713g
Mapped Risk Coefficient at 0.2 sec Spectral Response Period, C_{RS} (per ASCE 7)	0.951
Mapped Risk Coefficient at 1 sec Spectral Response Period, C_{R1} (per ASCE 7)	0.970
PGA_M (Section 11.8.3 of ASCE 7)	0.760g

* Site Class F modified due to building period ≤ 0.5 second, refer to discussion above.

** From USGS, 2014

A deaggregation of the PGA based on a 2,475-year average return period indicates that an earthquake magnitude of 6.7 at a distance of approximately 4.9 km from the site would contribute the most to this ground motion (USGS, 2008).

2.7 Soil Shear Strength Parameters

The soil shear strength parameters utilized in our slope stability analysis are based on laboratory testing of the onsite materials, previous site shear parameters and published shear strength data (CDMG, 2001). Soil shear strength parameters were increased (less than composite peak strength values) for seismic loading conditions. Laboratory test results are provided in Appendix C.

TABLE 3

Soil Shear Strength Parameters for Static Slope Stability Analysis

Soil Type	**ϕ (Degrees)**	**Cohesion (psf)**
Qsp – Cross Bedding	32	300
Qsp - Along Bedding	27	200
Compacted Fill	30	150
Landslide Material	24	200
Alluvium	28	200

2.8 Global Slope Stability Analyses

Global slope stability analyses were performed on cross-sections (1-1' through 12-12') positioned throughout the site based on the proposed design profile. Slope stability analysis was performed using the computer program GSTABL7 with STEDwin version 2.005.3 (Gregory Geotechnical Software, 2013). Potential rotational and block failure modes were analyzed using Bishop's Modified Method and Janbu's Simplified Method, respectively. A minimum factor of safety of 1.5 is typically required for static loading conditions. Seismic slope stability analysis was performed in accordance with the County of Orange Grading Manual (1991). The County of Orange Grading Manual requires a horizontal seismic coefficient (Kh) of 0.15 with a minimum resulting factor of safety of 1.1.

Geogrid reinforcement (beyond requirements for local stability) is required for the planned mid-slope MSE retaining wall located below Lots 240 through 245 for adequate global factors of safety (Cross-Section 3A-3A').

For the proposed water quality basin depicted on Cross-Sections 1-1' and 2-2', slope stability analysis was performed for a "rapid draw-down" condition based on the peak water level. Based on preliminary information provided by the project civil engineer, the water quality basin will have a peak water storage elevation of approximately 208 feet above mean sea level.

Based on the proposed grading plan, slope stability analysis indicates a global factor of safety greater than 1.5 and 1.1 for static and pseudo-static (seismic) loading conditions, respectively. Slope stability analysis is provided in Appendix D.

Please note, the analysis conducted and presented within is to address the global stability of the site. Additional slope stability analysis will need to be performed once the rough grading plans have been prepared and more details are available regarding finalized slope and MSE wall configurations, etc. This additional analysis may include additional cross-sections and static and pseudo-static slope stability analysis.

2.9 Expansion Potential

Based on the results of previous nearby and current laboratory testing, site soils have a "Very Low" to "Very High" expansion potential. Final expansion potential of site soils should be determined at the completion of grading.

2.10 Soil Corrosivity

Although not corrosion engineers (LGC Geotechnical is not a corrosion consultant), several governing agencies in Southern California require the geotechnical consultant to determine the corrosion potential of soils on buried concrete and metal facilities. We therefore present the results of our testing with regard to corrosion for the use of the client and other consultants, as they determine necessary. Preliminary corrosion testing indicated soluble sulfate contents ranging from 0.01 to 0.05 percent, chloride contents ranging from 33 to 175 parts per million (ppm), pH values ranging from 7.6 to 8.2 and minimum resistivity values ranging from 478 to 1,898 ohm-cm. Sulfate testing from the adjacent tracts to the south indicated sulfate contents ranging from approximately 0.02 to 0.56 percent (GSI, 1999). Based on Caltrans Corrosion Guidelines (2012), soils are considered corrosive to structural elements if the pH is 5.5 or less, or the chloride concentration is 500 ppm or greater, or the sulfate concentration is 2,000 ppm (0.2 percent) or greater.

Based on preliminary and previous laboratory sulfate test results, the near-surface soils have a severity categorization of "Not Applicable" to "Severe" and are designated to classes "S0" and "S2" per ACI 318, Table 4.2.1 with respect to sulfates. Determination of design elements with respect to sulfates must be based on as-graded conditions.

2.11 Infiltration Potential

Based on our site evaluation and subsurface investigation, the majority of site soils (i.e., bedrock, fill and alluvium) are predominately fine-grained silts and clays that are known to have a very low permeability and therefore have very low infiltration rates. Within the majority of small and large-diameter borings excavated during our subsurface field work, no groundwater was encountered. Isolated seepage was observed at depth in several borings; however, no signs of surface infiltration were observed. Although we understand that the City of La Habra considers the geologic formation underlying the golf course to be a source of recharge to the City's groundwater basin (Malcolm Pirnie, 2010), it is our opinion that infiltration of surface water is not currently occurring through the surface of the golf course.

At the completion of grading, the proposed development will consist of either a thick cap of compacted fill (approximately 30 to 60 feet thick) over alluvium at the western half of the site or a thinner cap of compacted fill over bedrock at the eastern half of the site. Engineered fill is considered unacceptable for infiltration in accordance with the Orange County Technical Guidance Document "Section VII.1.6, Fill Condition," that states infiltration must extend to native soils below the fill (County of Orange, 2013). However, siltstone bedrock (native soils) below the engineered fill is also unacceptable for infiltration from a geotechnical standpoint. By definition, bedrock materials do not readily transmit water. The onsite bedrock materials are generally more than 50 percent fine-grained (i.e., clays and silts corresponding to hydrologic soil groups C and D) and bedrock structure includes numerous clayey siltstone interbeds that consist entirely of fine-grained material. The limited amount of water that does enter the bedrock may be transmitted laterally along bedding and through fractures to unknown locations. Deeply buried alluvium at the western portion of the site is also not a geotechnically acceptable medium for infiltration due to that portion of the site being located in a mapped State of California Seismic Hazard Zone for liquefaction as depicted on Figure 2, Seismic Induced Hazard Map (Rear of Text) (CDMG, 1998).

Purposeful infiltration of water to the subsurface at the subject site is neither feasible nor acceptable from a geotechnical standpoint given the onsite materials and the hillside nature of the site.

3.0 CONCLUSIONS

Based on the results of our subsurface evaluation and geotechnical review of the proposed plan, it is our opinion that the proposed improvements are feasible from a geotechnical standpoint, provided that the recommendations provided here and in future reports are incorporated during site grading and development. A summary of our geotechnical conclusions are as follows:

- The bedrock geologic unit mapped on the site is the Quaternary San Pedro Formation. Artificial fill placed during original grading of the existing golf site overlies alluvium and bedrock across the majority of the site.
- The site contains previously placed non-structural fill and near-surface alluvium soils that are not suitable for the proposed development in their present condition. Earthwork removals will be required as outlined in the recommendation section.
- Groundwater was encountered at a depth of approximately 29 feet in HS-17 and as seepage at depth within the large-diameter borings LGC-B-4 and LGC-B-5. Groundwater was not encountered in the remaining hollow-stem borings to the maximum explored depth of approximately 76.5 feet below existing grade. Design groundwater is estimated at 15 feet below site alluvium. While isolated seepage was observed within the sandy layers of the San Pedro Formation bedrock, it is not considered a groundwater table. Groundwater may be encountered during grading.
- A portion of the site is located in a State of California Seismic Hazard Zone for liquefaction potential (Figure 2, rear of text). The majority of the developed site will consist of compacted fill over dense/hard bedrock and not considered susceptible to liquefaction. However, a portion of the site contains alluvial soils that are generally considered susceptible to liquefaction depending on their apparent density and plasticity. Based on lab testing, the majority of site alluvial soils is cohesive and not considered susceptible to liquefaction. However, subsurface data indicates that relatively isolated sandy layers within alluvial soils are susceptible to liquefaction and dynamic settlement within the upper 50 feet. Total dynamic settlement is estimated to be on the order of 1 to 2 inches. Differential dynamic settlement can be estimated at half of the total settlement over a horizontal span of 30 feet.
- A portion of the site is located within a State of California Seismic Hazard Zone as having potential for earthquake-induced landslides (Figure 2, rear of text). This potential hazard has been generally mitigated with remedial grading measures including buttress keyways that were constructed during grading of the residential tracts south of the golf course.
- As shown on the Geotechnical Map, Sheet 1, proposed residential Lots 12, 28 and 29 are located within the limits of the State of California Earthquake Fault Zone. However, the proposed residential structures for all three lots are located at least 200 feet from the "Unnamed West Coyote Hills Fault," significantly more than the recommended 100-foot structural setback (CDMG, 1978 & Leighton, 1992). Based on our review of applicable documents, it is our opinion that proposed Lots 12, 28 and 29 are not underlain by an active fault. However, this will have to be verified during grading as detailed in the following "Preliminary Recommendations" section.
- Proposed increase of grades over existing alluvium in portions of the site is estimated to induce on the order of up to 2½ inches of settlement within the alluvium. Settlement of alluvial soils is estimated to take approximately 6 to 12 months after the completion of rough grading. These values should be further evaluated as part of the grading plan review report.
- Due to planned fill depths and/or significant increasing of grades over existing alluvium, settlement monitoring will be required at the completion of grading.
- The main seismic hazard that may affect the site is from ground shaking from one of the active regional faults. The subject site will likely experience strong seismic ground shaking during its design life.

- Based on the results of our evaluation and analysis provided herein, and provided our recommendations are properly implemented during construction, the proposed development of the site is not anticipated to significantly impact adjacent perimeter properties.
- Design fill slopes are anticipated to be both grossly and surficially stable, as long as they are constructed in accordance with our geotechnical recommendations and are properly landscaped and maintained throughout their design life.
- Existing native and cut slopes surrounding the development are anticipated to be grossly stable; however, minor surficial failures may occur.
- Global slope stability analysis indicates that (global) geogrid reinforcement is necessary in order to provide an adequate factor of safety for the proposed MSE walls located below Lots 240 through 245 (Cross-Section 3A-3A').
- From a geotechnical perspective, the existing onsite soils including existing fill are considered suitable material for use as general fill (with the exception of MSE wall backfill and conventional retaining wall backfill), provided that they are relatively free from rocks (larger than 8 inches in maximum dimension), construction debris, and significant organic material. Significant moisture conditioning will be required to obtain the required compaction. It should be noted that the site contains soils that are suitable for backfill of MSE and conventional retaining walls. However, select grading and/or stockpiling will be required. In addition, import of soils suitable for backfill of MSE and conventional retaining walls will also likely be required.
- Specific zones of crude oil-affected artificial fill will require evaluation and recommendations by a qualified environmental consultant. LGC Geotechnical is not an environmental consultant.
- Based on the results of previous nearby and current laboratory testing, site soils have a "Very Low" to "Very High" expansion potential. Mitigation measures will be required for any planned foundations and site improvements such as concrete flatwork to minimize the impacts of expansive soils. In addition, improvements located adjacent to slopes will be impacted by slope creep. Final expansion potential of site soils should be determined at the completion of grading.
- Site soils (i.e., bedrock, fill and alluvium) are predominately fine-grained silts and clays which have very low permeability and therefore have very low infiltration rates. It is our opinion that infiltration of surface water is not currently occurring. At the completion of grading, the proposed development will consist of either a thick cap of compacted fill over alluvium or a thin cap of compacted fill over bedrock and therefore purposeful infiltration of water is not feasible nor recommended from a geotechnical standpoint.

4.0 PRELIMINARY RECOMMENDATIONS

A grading plan review report based on the 40-scale rough grading plans should be prepared in order to provide updated geotechnical recommendations (as necessary) for the proposed development. Additional field work and laboratory testing may be required. Additional and/or modified geotechnical recommendations may also be required.

Based on our preliminary study, the following is a summary of our preliminary geotechnical recommendations.

- The majority of artificial fill placed for construction of the existing golf course is considered non-structural and is not suitable for support of the proposed residential/commercial development in its current condition. Removals of unsuitable material up to approximately 50 feet deep below existing grades are recommended for the western portion of the site and within several isolated small canyon areas at the eastern portion of the site, as noted on the Geotechnical Map, Sheet 1. The western portion of the site (Cross-Sections 1'1' through 5-5') is anticipated to require removal of non-structural fill and removal of approximately 5 feet of the underlying alluvium in order to expose competent material suitable for placement of structural fill. The smaller canyon areas at the eastern portion of the site are anticipated to require removal of localized alluvium (Cross-Sections 6-6', 7-7', and 8-8') and one area of relatively thin surficial landslide (Cross-Section 7-7') to expose competent bedrock. Estimated remedial grading profiles are depicted on the Cross-Sections, Sheets 2 & 3.
- As part of remedial grading, unsuitable soils should be removed to competent soils, temporarily stockpiled (where necessary) and replaced as properly compacted fill. Prior to placement as compacted fill, significant organic materials or other unsuitable materials shall be removed and properly exported offsite. Local conditions may be encountered during excavation that could require additional removals beyond the minimums presented herein in order to obtain an acceptable subgrade. The actual depths and lateral extents of grading should be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Preliminary estimated removals are shown on the Geotechnical Map (Sheet 1), and as estimated remedial profiles on Cross-Sections (Sheets 2 & 3).
- The soils within the re-use areas (RUA 1 through 3) shall be removed and replaced as properly compacted fill. The location of where these soils are placed and the thickness of the clean soil cap shall be determined by the project environmental consultant. The design cut slope potentially exposing RUA 3 (Cross-Section 1-1') should be provided with a compacted replacement fill slope consisting of clean soil as determined by the project environmental consultant.
- Stabilization fill keyways should be constructed for design cut slopes that are not undercut by remedial grading. Locations of recommended stabilization fill keyways are shown on the Geotechnical Map, Sheet 1. Design cut lots, or lots with less than 5 feet of design fill, should be overexcavated a minimum of 5 feet below respective pad grades.
- Proposed fill slopes should be constructed at a slope ratio of 2:1 (horizontal:vertical) or flatter.
- Fills placed deeper than 40 feet below proposed grade should be compacted to an increased minimum relative compaction of 93 percent relative compaction. Fill should be moisture-conditioned to be between optimum moisture content and 2 percent over optimum moisture content, per ASTM D1557.
- Materials from the concrete disposal area may be placed in general fill provided it is environmental suitable and crushed such that it is no larger than 8-inches in maximum dimension and well blended (i.e., no nesting and voids) into site fills. Any concrete material placed in MSE wall backfill areas should be crushed to meet gradation requirements of aggregate base per the latest edition of the Greenbook.
- Three lots at the eastern boundary of the site (Lots 12, 28 and 29) are located within the limits of the State of California Earthquake Fault Zone that encompasses the offsite, active Unnamed West Coyote

Hills Fault. During grading, the limits of the Earthquake Fault Zone should be staked by the project surveyor and the exposed bedrock carefully mapped by the project geologist. Proposed Lots 12, 28 and 29 are design cut areas requiring finished grade to be lowered by approximately 5 to 15 feet. Additional grading to expose bedrock in this area may be required. The City of La Habra's geotechnical reviewer should be notified to observe and confirm the geologic mapping. Due to previous grading that has occurred within the limits of the Earthquake Fault Zone, it's likely that soil horizons typically utilized for dating faults (to determine whether it's active or not) have already been removed. In the event that a fault splay deemed active is observed during grading within the limits of the Earthquake Fault Zone, a minimum 50-foot structural setback will be recommended.

- Settlement monuments should be installed promptly after the completion of grading within fill areas greater than approximately 40 feet below finish grade and where significant amount of fill is placed over left in place alluvium. Settlement monuments should be read by a licensed surveyor with an off-site benchmark. The survey readings should be obtained four times in the first two months, twice in the third month, and then once a month unless otherwise requested by the geotechnical consultant. Shallow footings and slab-on-grade foundations should be constructed after settlement monitoring data indicates future total settlements are within tolerable limits. Temporary surcharge loading may be used to decrease the settlement waiting period.
- Due to the height of the proposed fill slope and Mechanically Stabilized Earth (MSE) wall, additional geogrid reinforcement length (beyond local stability requirements to be determined by the MSE wall designer) will be required for adequate global stability factors of safety for the MSE wall located below Lots 240 through 245 (Cross-Sections 3-3' and 3A-3A'). Preliminary slope stability analysis indicates at least 6 layers of geogrid reinforcement lengths of 60 feet, with an allowable strength (after appropriate reduction factors are applied by the manufacturer) of approximately 3.3 kips per foot, spaced at a maximum vertical spacing of 2 feet, are required for adequate global factors of safety. Further refinement of the design for required global stability geogrid will occur during preparation of the 40-scale grading plan and with input from the MSE wall designer.
- MSE walls and conventional retaining walls should be backfilled with relatively sandy soils. Portions of the onsite soils are too fine-grained and therefore are not suitable for MSE and conventional retaining wall backfill. Therefore, select grading of on-site sandy soils and/or import of sandy soils meeting project recommendations will be required. Sandy soils should comprise the geogrid zone required for local stability as determined by the MSE wall designer. For conventional retaining walls, the sandy import zone should be a minimum of one-half the height of the retaining wall.
- Allowance in the earthwork volumes budget should be made for an estimated 5 to 10 percent reduction in volume of existing soils. It should be stressed that these values are only estimates and that an actual shrinkage factor would be extremely difficult to predetermine. Subsidence due to earthwork activities is expected to be on the order of 0.1 to 0.2 feet. These values are estimates only and exclude losses due to removal of vegetation or debris. The effective shrinkage of onsite soils will depend primarily on the type of compaction equipment and method of compaction used onsite by the contractor, and the accuracy of the topographic survey.
- Due to onsite expansive soils, mitigation measures such as stiffened and/or post-tensioned slab foundations are recommended. Pre-soaking of the subgrade soils will be required to reduce the potential impact of expansive soils.
- At completion of grading, additional testing will be required to confirm the characteristics of the fill materials including expansion potential and corrosivity characteristics. While LGC Geotechnical does not provide recommendations for corrosion, based on our experience typical mitigation measures include increased compressive strength for structural concrete, decreased water-to-cement ratio for structural concrete and/or encapsulation of post-tensioned cables.

- Due to liquefaction potential in portions of the site, stiffened and/or post-tensioned slab foundations are recommended.
- Due to site soils being predominately compacted fill and bedrock consisting of fine grained soils (silts and clays), the hillside nature of the site, and the presence of potentially liquefiable alluvial soils, we strongly recommend against the intentional infiltration of storm water.

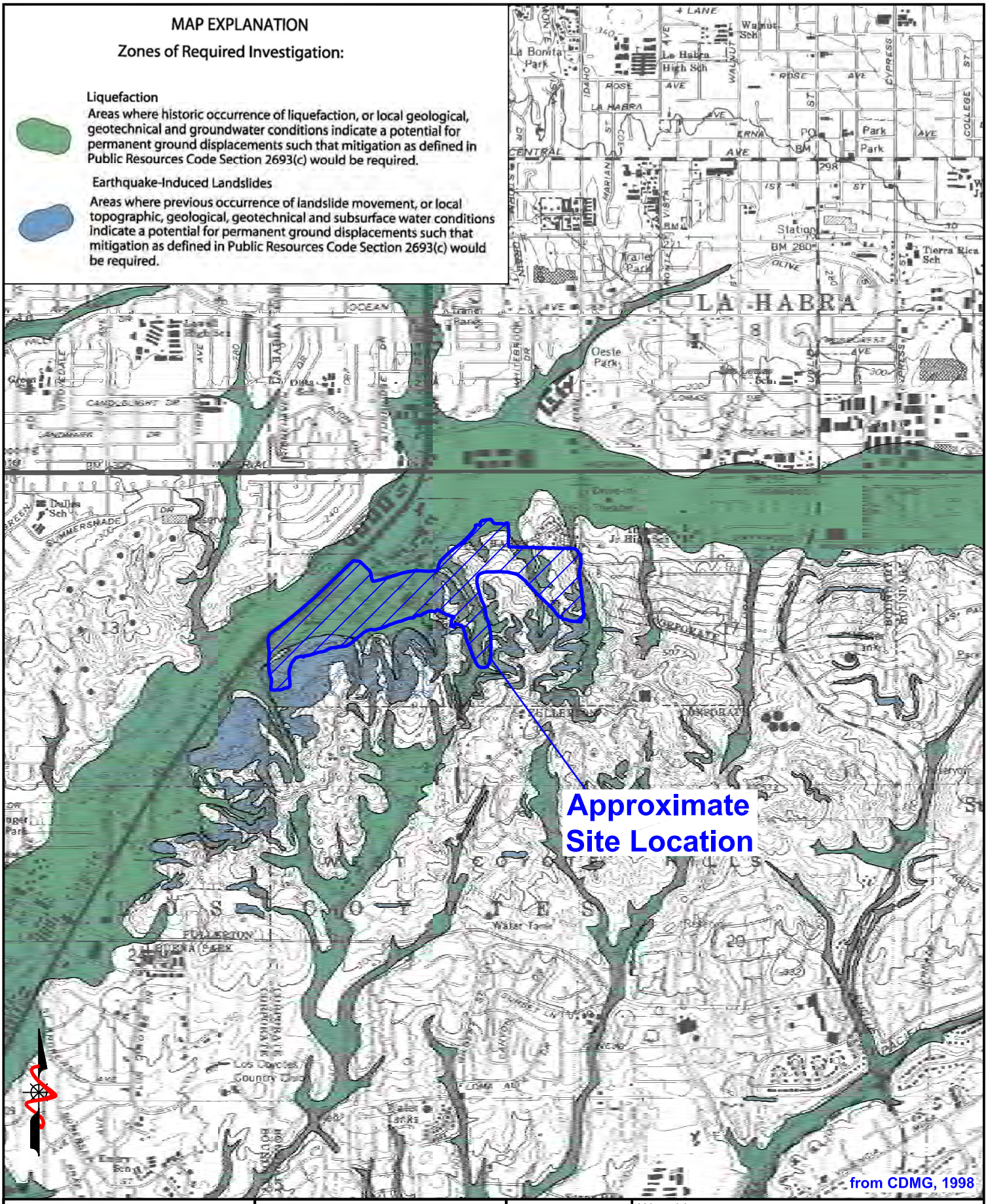
5.0 LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is based on data obtained from limited observations of the site, which have been extrapolated to characterize the site. While the scope of services performed is considered suitable to adequately characterize the site geotechnical conditions relative to the proposed development, no practical evaluation can completely eliminate uncertainty regarding the anticipated geotechnical conditions in connection with a subject site. Variations may exist and conditions not observed or described in this report may be encountered during grading and construction.

The findings of this report are valid as of the present date. However, changes in the conditions of a site can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. The findings and conclusions presented in this report can be relied upon only if LGC Geotechnical has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site. This report is intended exclusively for use by the client, any use of or reliance on this report by a third party shall be at such party's sole risk.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and modification.



LGC Geotechnical, Inc.

FIGURE 2
Seismic Induced Hazard Map

PROJECT NAME	Westridge
PROJECT NO.	14057-01
ENG. / GEOL.	DJB / KTM
SCALE	Not to Scale
DATE	August 2015

Appendix A
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APPENDIX A

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Appendix B
Logs of Exploratory Borings and CPT Soundings

Geotechnical Boring Log B-1

Date : 7/23/2014	Page 1 of 2	**Drilling Company :**	Alroy Drilling
Project Name :	Westridge	**Type of Rig :**	Earthdrill Bucket Auger
Project Number :	14057-01	**Drop :** 12"	**Hole Diameter :** 28"
Elevation of Top of Hole :	~ 323 ' MSL	**Drive Weight :**	0' to 23': #2400; 24' to 43': #1550; 44' to 62': #850
Hole Location :	See Geotechnical Map		

Logged by KTM

Sampled by KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0								**@ 0' to T.D. <u>Quaternary San Pedro Formation (Qsp)</u>**	
									@ 0' 3" of Asphalt Concrete over 6" of Aggregate Base	
320									@ 1' Silty fine SANDSTONE with scattered rip-up clasts of fine Sandy SILTSTONE, light orange brown and gray mottled, dry upper foot grades to slightly moist, dense, few angular rocks up to 2", oxidation stains	
	5		GB: N20E, 18NW	B-1					@ 5' B-1, Silty fine SANDSTONE to fine Sandy SILTSTONE, light brown, moist, moderately dense @ 6' General bedding on Sandy laminations, vague	EI CR
315									@ 7' SILTSTONE with Clay and Sand, light blue gray, moist, very stiff to slightly hard, non planar, scattered manganese nodules, angular concretions up to 2"; color varies to greenish gray, blue gray, and some orange brown, scattered fossil shells. Variable sand and clay content, decrease in oxidation with depth.	
	10			R-1	6	101.3	21.5		@ 10' SILTSTONE with fine Sand, light blue gray, slightly moist, dense	
310										
	15								@ 15' Increase sand content	
305										
	20			R-2	9	109.6	18.2	CL	@ 20' SILTSTONE with fine SAND, light blue gray, moist, very stiff to hard, few oxidation/fine sand lenses, low angle bedding	DS
300										
	25		GB: N50E, 13N						@ 25' General bedding, vague SAND laminations and oxidation banding, non-continuous, scattered shell fossils	
295			B: N10E, 12W						@ 28' Bedding on 3" thick concretion and sand laminations, slightly undulatory, not continuous around hole, soft sediment deformation	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 1/14/2015

Geotechnical Boring Log B-1

Date : 7/23/2014	Page 2 of 2	**Drilling Company :**	Alroy Drilling
Project Name :	Westridge	**Type of Rig :**	Earthdrill Bucket Auger
Project Number :	14057-01	**Drop :** 12"	**Hole Diameter :** 28"
Elevation of Top of Hole :	~ 323 ' MSL	**Drive Weight :**	0' to 23': #2400; 24' to 43': #1550; 44' to 62': #850
Hole Location :	See Geotechnical Map		

Logged by KTM

Sampled by KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30			R-3	11	104.1	21.1	CL	@ 30' SILTSTONE, blue gray, moist, very stiff to hard	DS AL
290										
	35			B-2					@ 34' Gradual increase in hardness, lacks oxidation, lacks defects, scattered manganese and few shells	
285										
	40			R-4	15	106.6	20.3	CL-ML	@ 40' SILTSTONE with trace fine Sand, moderately gray, moist, very stiff to hard, lacks structure, lacks oxidation, gradual increase in moisture with depth	DS
280									@ 42' Few fine SANDY laminations, very short, vague	
	45									
275									@ 48' End visual log.	
	50			R-5	26	106.1	19.7	CL-ML	@ 50' Same as above	
270									**Total Depth = 51.5'** **No Ground Water Encountered** **Backfilled with Cuttings and Capped with AC to 6 inches on 7/23/2014**	
	55									
265										

LGC Geotechnical, Inc.

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SAMPLE TYPES:

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R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log B-2

Date : 7/23/2014	Page 1 of 2	**Drilling Company :**	Haven Geotechnical Const. Inc.
Project Name : Westridge		**Type of Rig :**	Limited Access Bucket Auger
Project Number : 14057-01		**Drop :** N/A	**Hole Diameter :** 24"
Elevation of Top of Hole : ~ 325 ' MSL		**Drive Weight :** N/A	
Hole Location : See Geotechnical Map			

Logged by KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
325	0								**@ 0' to 14' <u>Quaternary Landslide Deposit (Qls)</u>**	
									@ 0' Extremely weathered fine Sandy SILTSTONE, very light brown, dry, slightly stiff, roots, iron oxide, manganese oxide, blocky	
			J: N79E, 73N						@ 3' Joint in fine Sandy SILTSTONE, light brown to light gray, slightly moist, stiff, Rootlets to 6'. Gradual increase in moisture and density with depth.	
320	5									
			B: N15W, 9W						@ 6' Bedding, thin SAND lens	
315	10									
			GB: N30E, 17W						@ 12' General bedding, broken concretion, lens	
									@ 13' Gypsum	
			RS: N35W, 12W						@ 14' Rupture surface attitude, thin SAND lens, Silty CLAY, and gypsum in a 3" thick zone, very moist, continuous, planar, oxidized.	
310	15								**@ 14' to T.D. <u>Quaternary San Pedro Formation (Qsp)</u>**	
									@14' Sandy SILTSTONE with Sand lenses, light gray, moist, very stiff	
			B: N5W, 7W						@ 17' Bedding, SAND lenses, minor cross bedding, laminations, thin SILTSTONE interbeds, oxidized, abundant gypsum, all SAND is fine grained, scattered concretions	
305	20									
			B: N10E, 13W							
									@ 23' Bedding, pebble conglomerate, beach sand crossbeds, shells, pebbles (rounded), quartz rich, moist, moderately dense, zones of cementation, soft sediment deformation, minor belling	
300	25									
									@ 27' Grades to fine Sandy SILTSTONE, light orangish brown, moist, dense, gypsum subplanar to 1/4", manganese oxide	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 1/14/2015

Geotechnical Boring Log B-2

Date : 7/23/2014	Page 2 of 2	**Drilling Company :**	Haven Geotechnical Const. Inc.
Project Name :	Westridge	**Type of Rig :**	Limited Access Bucket Auger
Project Number :	14057-01	**Drop :** N/A	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 325 ' MSL	**Drive Weight :**	N/A
Hole Location :	See Geotechnical Map		

Logged by KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
295	30		B: N15E, 5W						@ 30' Bedding.	
			B: N12E, 14W						@ 33' Bedding, interbedded SANDSTONE and SILTSTONE, light greenish gray with orange and light brown, moist, dense/very stiff, oxidation and gypsum stringers, laminations of micas, manganese oxide	
290	35								@ 35' Lenses of fine SAND in SILTSTONE, mottled orange and gray, very moist, very stiff, soft sediment deformation, manganese oxide nodules, iron oxide nodules, non-planar fractures lined with iron oxide	
285	40									
			J: N85W, vert.						@ 43' Short joint, iron oxide lined	
280	45									
			J: N85W, vert.						@ 48' Short joint, iron oxide lined. End visual log.	
275	50								**Total Depth = 50'** **No Ground Water Encountered** **Backfilled with Cuttings on 7/23/2014**	
270	55									

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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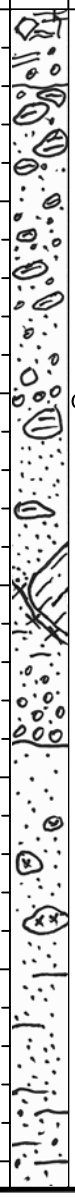
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log B-3

Date : 2/4/2015	Page 1 of 2	**Drilling Company :**	Haven Geotechnical Construction Inc.
Project Name :	Westridge	**Type of Rig :**	Limited Access Bucket Auger
Project Number :	14057-01	**Drop :** N/A	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 313 ' MSL	**Drive Weight :**	N/A
Hole Location :	See Geotechnical Map		

Logged by KTM

Sampled by N/A

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0								**@ 0' to T.D. <u>Quaternary San Pedro Formation (Qsp)</u>** @ 0' Sandy CLAY with scattered rounded Gravel: moderate brown, very moist, stiff; piece of wood, roots.	
310									@ 2' Pebbly SAND interfingered with SANDSTONE and SILTSTONE, CLAYSTONE rip-up clasts up to 10", light orange, brown, and light gray, very moist, dense, iron oxide, crystalline gypsum	
	5									
305			B: N50E, 12N						@ 8' Bedding attitude on oxidation banding. Approximately 70% fine to coarse SANDSTONE and 30% SILTSTONE/CLAYSTONE rip up clasts, gypsum crystals	
	10		GB: N75E, 16N						@ 10' General bedding attitude on cross-bedding within pebbly sandstone	
300										
	15								@ 14' North half of borewall is large SILTSTONE block, tightly next to Pebbly SANDSTONE, gypsum along contact and within siltstone. SANDSTONE coarsens downward, pebbles up to 3" in diameter, rounded	
295										
	20								@ 19' SANDSTONE with few Pebbles, light orange and faint gray mottling, slightly moist, dense, weakly cemented	
290									@ 23' Gray Siltstone concretions up to 1' in diameter, scattered small shells	
	25									
									@ 26' Concretion nodule, gypsum crystals	
285									@ 28' Sandy SILTSTONE with CLAY, light gray and orange mottled, very moist, very dense, iron oxide, manganese oxide	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 4/2/2015

Geotechnical Boring Log B-3

Date : 2/4/2015	Page 2 of 2	**Drilling Company :**	Haven Geotechnical Construction Inc.
Project Name :	Westridge	**Type of Rig :**	Limited Access Bucket Auger
Project Number :	14057-01	**Drop :** N/A	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 313 ' MSL	**Drive Weight :**	N/A
Hole Location :	See Geotechnical Map		

Logged by KTM

Sampled by N/A

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30			B-1				CL	@ 30' Bulk B-1. Fine Sandy SILTSTONE with trace CLAY, light orange and light gray mottled, very moist, dense, weakly cemented @ 33' Slight increase in clay content @ 34' End visual log. Concretion zone below as observed in tailings.	-200 AL DS MD
280										
	35								**Total Depth = 35'** **No Ground Water Encountered** **Backfilled with Cuttings on 2/4/2015**	
275										
	40									
270										
	45									
265										
	50									
260										
	55									
255										

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
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TEST TYPES:

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MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log B-4

Date : 2/11/2015	Page 1 of 4	**Drilling Company :**	Alroy Drilling
Project Name :	Westridge	**Type of Rig :**	EZ Bore
Project Number :	14057-01	**Drop :** 12 "	**Hole Diameter :** 28"
Elevation of Top of Hole :	~ 315 ' MSL	**Drive Weight :**	0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200
Hole Location :	See Geotechnical Map		

Logged by KTM

Sampled by KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0								**@ 0' to 30' <u>Unsuitable Artificial Fill (afu)</u>** 4" of grass over fine Sandy SILT and Silty fine SAND and Clayey SILT, light and dark brown mottled, moist, stiff/slightly dense layers, variable	
310	5									
305	10			R-1	2	111.4	16.8	SM-ML	@ 10' Fine Sandy SILT, light brown and dark gray mottled, moist, stiff, wood fragment	
									Increase sand content. Scattered pebbles and rootlets.	
300	15									
295	20			R-2	4	118.0	9.8	SM-ML	@ 20' Fine to medium SAND, light brown and light gray mottled, moist, dense	
290	25									

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

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MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 4/2/2015

Geotechnical Boring Log B-4

Date : 2/11/2015	Page 2 of 4	**Drilling Company :**	Alroy Drilling
Project Name :	Westridge	**Type of Rig :**	EZ Bore
Project Number :	14057-01	**Drop :** 12 "	**Hole Diameter :** 28"
Elevation of Top of Hole :	~ 315 ' MSL	**Drive Weight :**	0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200
Hole Location :	See Geotechnical Map		

Logged by KTM

Sampled by KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		C: N60W, 20NE	R-3	3	109.0	5.4	SM	**@30' to T.D. <u>Quaternary San Pedro Formation (Qsp)</u>** @ 30' Contact attitude, fill to bedrock contact in sample. Bedrock is SANDSTONE with Silt and some SILTSTONE, light orangish brown, slightly moist, dense. Zones of rounded cobbles and pebbles, crossbeds, moderately to highly weathered, few rootlets in upper portion	
			B: N62W, 10N to 28N							
285	35			B-1					@ 33' Bedding attitude, dip varies due to cross-bedding in sandstone	-200 AL DS MD
280	40			R-4	4	104.1	4.2	ML	@ 40' Fine SANDSTONE with Silt to Silty fine SANDSTONE, light orange brown and light gray mottled, slightly moist, very dense, oxidation banding, scattered nodules of white mineral.	DS AL
			B: N62E, 16NW							
275	45								@ 44' Bedding attitude on Siltstone bed, 1/4" thick, planar continuous, rootlets below is fine SANDSTONE with Silt, moist, dense, mottled iron oxide staining	
270	50			R-5	3	112.0	1.4	SM-ML	@ 50' Fine Sandy SILTSTONE to Silty fine SANDSTONE, light orange brown and light gray mottled, moist, dense	
			B: N20W, 47E						@ 52' Bedding attitude on SANDSTONE bed, soft sediment deformation, minor oxidation and shearing, scattered concretions, rounded pebbles @ 54' Abundant soft sediment deformation and rip-ups, truncated by fault	
265	55		F: N15W, 59E	GB-1					@ 55' Fault attitude (top at 53, bottom at 57'), planar, clay-lined shear (small grab sample GB-1). Few rootlets, hard white mineral. Below is CLAYSTONE with trace fine SAND, gray with light orange, moist, very stiff	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

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G	GRAB SAMPLE

TEST TYPES:

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S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log B-4

Date : 2/11/2015	Page 3 of 4	**Drilling Company :**	Alroy Drilling
Project Name :	Westridge	**Type of Rig :**	EZ Bore
Project Number :	14057-01	**Drop :** 12 "	**Hole Diameter :** 28"
Elevation of Top of Hole :	~ 315 ' MSL	**Drive Weight :**	0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200
Hole Location :	See Geotechnical Map		

Logged by KTM

Sampled by KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	60		J: N70E, 68W	R-6	5	102.1	23.3	CL	@ 60' Clayey SILTSTONE with trace fine Sand, light gray to brownish gray, moist, slightly hard, minor oxidation, slightly weathered. @ 61' Joint attitude, rough and manganese oxide lined	DS
260	65									
255	70			R-7	5	102.4	22.9		@ 70' Clayey SILTSTONE, moderate gray and orangish brown mottled, moist, slightly hard, iron oxide staining	DS
			J: N8W, 49N; B: N5E, 9W						@ 73' Joint attitude. Bedding attitude on vague laminations within massive strata	
250	75								@ 75' Becomes unoxidized light gray SILTSTONE with CLAY and fine SAND, light gray, very moist, very stiff, scattered shells	
245	80			R-8	7	106.3	21.8	SM-ML	@ 80' SILTSTONE with fine SAND, moderate gray, most, slightly hard to hard, fossiliferous with shells and burrow traces. @ 81' Seepage from east wall.	
240	85								@ 85' Grades to fine Sandy SILTSTONE with CLAY, very moist to wet zones, dense, very stiff	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
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TEST TYPES:

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EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log B-4

Date : 2/11/2015	Page 4 of 4	**Drilling Company :**	Alroy Drilling
Project Name :	Westridge	**Type of Rig :**	EZ Bore
Project Number :	14057-01	**Drop :** 12 "	**Hole Diameter :** 28"
Elevation of Top of Hole :	~ 315 ' MSL	**Drive Weight :**	0' to 24':#4800; 25' to 58':#3350; 59' to 86':#2045; 87' to115':#1200
Hole Location :	See Geotechnical Map		

Logged by KTM

Sampled by KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	90			R-9	14	107.3	20.7	SM-ML	@ 90' Sandy SILTSTONE with Clay, light gray, wet, slightly hard. Widely scattered tight, faint, non-planar fractures, few fossils, seepage	
235	95								@ 95' Increase sand content and decrease clay content. Fine Sandy SILTSTONE with trace Clay to Silty SANDSTONE, wet, hard	
230	100			R-10	16	106.1	21.4	SM-ML	@ 100' As above at 95'	
225	105								@ 105' Decrease fracturing. Bedrock generally fresh.	
220	110			R-11	15	103.8	22.8	SM-ML	@ 110' As above @ 95' @ 111' End visual log. @ 113' Standing water.	
215	115								**Total Depth = 115'** **Minor seepage @ 74' , Heavy seepage @ 85' to 113', Standing Groundwater Encountered @ 113'** **Backfilled with Cuttings and Tamped on 2/4/2015**	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log B-5

Date : 2/12/2015	Page 1 of 2	**Drilling Company :**	Haven Geotechnical Construction Inc.
Project Name :	Westridge	**Type of Rig :**	Limited Access Bucket Auger
Project Number :	14057-01	**Drop :** N/A	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 350 ' MSL	**Drive Weight :**	N/A
Hole Location :	See Geotechnical Map		

Logged by KTM

Sampled by KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0								**@ 0' to T.D. <u>Quaternary San Pedro Formation (Qsp)</u>** @ 0' Sandy SILTSTONE, light yellow and light gray, dry, dense, moderately weathered, iron oxide, fossil shells to 4".	
			B: N5W, 13W						@ 3' Bedding attitude on very thin silt lens	
			B: N20E, 14W						@ 4' Bedding attitude, very thin brown sandstone lens. Scattered manganese oxide and fossils	
345	5									
			B: N10W, 15W						@ 8' Bedding attitude on very thin interbeds, weakly cemented, iron oxide stained, moist, very dense/slightly hard with zones of well cemented. Rootlets in few fractures.	
340	10									
335	15		B: N30E, 12W						@ 15' Bedding attitude on 2" sandstone interbed, orangish brown and gray fine Sandy SILTSTONE and SANDSTONE interbeds, slightly moist, very dense/ hard, weakly cemented.	
			B: N32E, 18W						@ 18' Bedding attitude, brown, friable sandbed with cross laminations, 12" thick, overlies very hard concretion, mostly continuous around borehole.	
330	20								@ 20' Very thin, Clayey SILTSTONE interbed within SANDSTONE that indicates soft sediment deformation occurred	
325	25								@ 25' Concretion, 6" thick within friable sandstone. Below is Silty SANDSTONE with SILTSTONE interbeds, moist, slightly hard and dense to very dense, manganese oxide, iron oxide, soft sediment deformation, very tight.	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Last Edited: 2/17/2015

Geotechnical Boring Log B-5

Date : 2/12/2015	Page 2 of 2	**Drilling Company :**	Haven Geotechnical Construction Inc.
Project Name :	Westridge	**Type of Rig :**	Limited Access Bucket Auger
Project Number :	14057-01	**Drop :** N/A	**Hole Diameter :** 24"
Elevation of Top of Hole :	~ 350 ' MSL	**Drive Weight :**	N/A
Hole Location :	See Geotechnical Map		

Logged by KTM

Sampled by KTM

Elevation (ft)	Depth (ft)	Graphic Log	Attitudes	Sample Number	Blow Count	Dry Density(pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		B: N28E, 18W						@ 30' Bedding attitude. Clayey SILTSTONE with fine SAND, light gray, very moist, very stiff. Grades to fine Sandy SILTSTONE below.	
320	35		B: N10W, 10E						@ 33' Orange with mica laminations, SANDSTONE bed, 8" thick, iron oxide, moist to very moist, very dense. @ 34' Increase moisture, manganese oxide stained, fine Sandy SILTSTONE, light orange brown. @ 35' Bedding attitude, thin SILTSTONE interbed. Wet material but no visible free water	
									@ 38' Heavy seepage	
315	40								@ 41' End visual log	
310	45								**Total Depth = 45'** **Heavy Seepage Encountered at 38'** **Backfilled with Cuttings on 2/12/2015**	
305	50									
300	55									

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE
G	GRAB SAMPLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE

Geotechnical Boring Log Borehole HS-1

Date: 7/14/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~274' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 25' - <u>Unsuitable Artifical Fill (afu)</u>**	
			R-1	6 16 28	132.9	8.3	SC	@2.5' - Clayey SAND with Gravel, brownish orange, slightly moist, dense	
270	5								
265	10		R-2	13 10 14	121.4	12.4		@10' - Clayey SAND with Gravel, orangish light brown, moist, medium dense	
260	15								
255	20		R-3	5 5 7	116.4	8.0	SM	@20' - Silty SAND with Gravel, brown, moist, loose	
250	25							**@25' to 33' - <u>Quaternary Alluvium (Qal)</u>**	
		B-1							EI, CR
245	30		R-4	7 8 11	118.3	10.7		@29' - Clayey SILT with Gravel, orangish brown, slightly moist to moist, stiff; rootlets	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 7/17/2014

Geotechnical Boring Log Borehole HS-1

Date: 7/14/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~274' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30							**@33' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>**	
240									
	35		R-5	10 15 17	114.8	6.7	SM	@35' - Silty SAND with Gravel, orange and light brown, moist, medium dense	
235		B-2							
	40		R-6	12 17 18	108.2	5.6		@40' - Silty SAND, light brown to white, orange, mottled, slightly moist, medium dense	MD, DS
230									
	45		R-7	12 22 40	111.8	15.8		@45' - Silty SAND, orange, gray, white, mottled grading to homogeneous orange, very moist, dense	
225									
	50		R-8	13 20 29	99.4	24.6	CL	@50' - CLAY, light brown, very moist, hard; very thin Calcium Carbonate lens present	
220								Total Depth = 51.5' Groundwater Not Encountered Backfilled with Cuttings on 7/14/2014	
	55								
215									
	60								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-2

Date: 7/14/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~302' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 3

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 30' - <u>Unsuitable Artifical Fill (afu)</u>**	
300			R-1	20 50/6"	118.6	12.1	SM	@2.5' - Silty SAND with Gravel, light brown, orange, mottled, slightly moist, very dense	
	5								
295									
	10		R-2	18 25 37	114.6	14.8	CL-ML to SP	@10' - Silty CLAY grading to SAND, brown to gray, moist, hard/dense	
290									
	15								
285									
	20		R-3	10 16 37	115.8	15.7	SC	@20' - Clayey SAND with Gravel, orangish light brown, moist, dense	
280									
	25								
275									
	30								

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SAMPLE TYPES:
- B BULK SAMPLE
- R RING SAMPLE (CA Modified Sampler)
- G GRAB SAMPLE
- SPT STANDARD PENETRATION TEST SAMPLE
- GROUNDWATER TABLE

TEST TYPES:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- SA SIEVE ANALYSIS
- S&H SIEVE AND HYDROMETER
- EI EXPANSION INDEX
- CN CONSOLIDATION
- CR CORROSION
- AL ATTERBERG LIMITS
- CO COLLAPSE/SWELL
- RV R-VALUE
- -#200 % PASSING # 200 SIEVE

Last Edited: 7/17/2014

Geotechnical Boring Log Borehole HS-2

Date: 7/14/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~302' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 3

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-4	50/6"	106.6	10.0	SC	**@30'± to 50' - Possibly <u>Older Artificial Fill (afo)</u>**	
270								@30' - Clayey SAND with Gravel, moist, very dense	
	35	B-1							
265									
	40		R-5	30 22 50/5"	114.6	14.5		@40' - Clayey SAND with Gravel, grayish brown with some orange, moist, very dense, dark organic clasts	
260									
	45								
255								**@50' to 60' - <u>Quaternary Alluvium (Qal)</u>**	
	50		R-6	26 30 50/6"	117.2	14.5		@50' Clayey SAND with Gravel, orange, moist, very dense, rootlets present	
250									
	55		R-7	22 50/5"	118.3	10.5	SM	@55' - Silty SAND, grayish brown, moist, very dense, rootlets present	
245									
	60								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-2

Date: 7/14/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~302' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 3 of 3

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	60		R-8	20 40 50/5"			CL	**@60' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>** @60' - CLAY with Sand and Gravel, light brown to black and dark gray, moist, hard	
240									
	65	B-2	R-9	25 50/6"				@65' - Sandy CLAY with Gravel, gray with some orange mottling, very moist, dark organic clasts, hard	
235								@67' - Cuttings very wet, potential perched groundwater	
	70		R-10	13 20 30			SC	@70' - Clayey SAND, dark gray with white mottling, moist, dense, clasts of bluish gray clay	
230									
	75		R-11	16 30 50/6"			SC/ SP-SM	@75' - Clayey SAND, dark gray, moist to very moist, dense, dark organic clasts; distinct change to SAND with Silt, orange and light brown, very moist, very dense	
225								Total Depth = 76.5' Free Groundwater Not Encountered Backfilled with Cuttings on 7/14/2014	
	80								
220									
	85								
215									
	90								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-3

Date: 7/14/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~214' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 10' - Unsuitable Artifical Fill (afu)**	
210			R-1	12 16 26	115.3	12.9	SM	@2.5' - Silty SAND, dark brown, orangish brown, gray, mottled, moist, dense	
	5		R-2	14 20 20	109.3	18.0	SC	@5' - Clayey SAND with trace Gravel, brown, moist, medium dense to dense, rootlets present	
205								**@10' to T.D. - Quaternary Alluvium (Qal)**	
	10		R-3	5 9 9	118.1	11.6	CL	@10' - CLAY with trace Gravel, dark grayish brown, moist, stiff	AL CN
200									
	15	B-1	R-4	5 6 8	115.1	9.7		@15' - Sandy CLAY with Gravel, dark yellowish brown, slightly moist, stiff	AL CN
							SM	@17' - Silty SAND with Gravel, moist	MD DS
195									
	20		R-5	15 6 11	114.0	9.9	CL	@ 20' - Sandy CLAY with Gravel, orangish brown, slightly moist, stiff	
190									
	25		R-6	5 6 11	103.2	21.3		@ 25' - CLAY with Gravel, dark yellowish brown with gray lenses, very moist, stiff	AL CN
185								Total Depth = 26.5' Groundwater Not Encountered Backfilled with Cuttings on 7/14/2014	
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 7/17/2014

Geotechnical Boring Log Borehole HS-4

Date: 7/15/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~257' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to T.D. - Quaternary San Pedro Formation (Qsp)**	
255			R-1	22 40 42	115.3	12.9	ML	@2.5' - SILT with Sand, gray, light brown, orange, mottled, moist, hard	
	5		R-2	18 30 50/6"	109.3	18.0	CL-ML	@5' - Silty CLAY, gray, light brown, orange, mottled, slightly moist, hard	
250									
	10		R-3	18 37 48	105.7	20.7	CL	@10' - CLAY, dark gray, moist, hard	
245									
	15	B-1	R-4	15 30 40	106.0	21.1	ML	@15' - SILT with Sand, light brown, gray, orange, mottled, moist, hard	
240									
	20		R-5	30 50/6"	108.3	19.7	CL-ML	@20' - Silty CLAY with Sand, dark gray with some orange mottling, moist, hard	
235								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 7/15/2014	
	25								
230									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 7/17/2014

Geotechnical Boring Log Borehole HS-5

Date: 7/15/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~233' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 30' - <u>Older Artificial Fill (afo)</u>**	
230			R-1	22 25 35	121.9	7.1	SM	@2.5' - Silty SAND with Gravel, brown and light brown, dry to slightly moist, dense	
	5								
225									
	10		R-2	17 17 27	111.4	14.2	SC	@10' - Clayey SAND with trace Gravel, orange, light brown with a distinct change to gray and light brown half way through sample, moist, dense	
220									
	15								
215									
	20			38 50/5"				@20' - No Sample Recovery	
210			R-3	8 14 19	103.4	22.8	CL	@23' -CLAY with Sand, gray and orange mottled, moist, very stiff	
	25								
205			R-4	17 27 41	121.9	11.3	SC	@28' - Clayey SAND with black organic clasts and trace Gravel, blue gray, moist, dense to very dense	
	30								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 7/17/2014

Geotechnical Boring Log Borehole HS-5

Date: 7/15/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~233' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30							**@30' to T.D. - <u>Quaternary Alluvium (Qal)</u>**	
200			R-5	6 15 23	119.4	13.7	CL	@33' - CLAY with Sand, mottled brown, orange, and gray, moist, very stiff, organic clasts	
	35								
195			R-6	25 35 50/6"	120.1	13.7	SC-SM	@38' - Clayey Silty SAND with trace Gravel and organic clasts, brownish gray, moist, very dense	
	40							Total Depth = 39.5' Groundwater Not Encountered Backfilled with Cuttings on 7/15/2014	
190									
	45								
185									
	50								
180									
	55								
175									
	60								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-6

Date: 7/15/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~280' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 13' - Unsuitable Artifical Fill (afu)**	
			R-1	18 24 33	110.6	18.1	ML	@2.5' - SILT with trace gravel, gray, orange, light brown, mottled, very moist, hard, organic clasts, rootlets present	
275	5								
270	10		R-2	10 17 19	120.9	10.5	SC	@10' - Clayey SAND with Gravel, orange brown, slightly moist, medium dense, tile piece present	
								@13' to 28' - Quaternary Landslide Deposit (Qls)	
			R-3	5 11 16	115.0	13.2		@13' - Clayey SAND with Gravel, orange and brown, moist, medium dense	
265	15								
			R-4	9 14 18		12.7	CL	@18' - CLAY with Gravel, brown with white patches, moist, very stiff, sample disturbed	
260	20								
		B-1	R-5	6 7 9	113.6	10.6	SC	@23' - Clayey SAND with Gravel, brown with some orange, moist, medium dense	EI, CR
255	25								
								@28' to T.D. - Quaternary San Pedro Formation (Qsp)	
			R-6	9 11 16	104.2	10.3	ML	@28' - Sandy SILT, light orange, slightly moist, very stiff, rootlets present	
	30								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 7/17/2014

Geotechnical Boring Log Borehole HS-6

Date: 7/15/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~280' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30								
			R-7	8 21 37	111.0	12.1	ML	@33' - Sandy SILT, light orange, slightly moist, hard	
250	35							Total Depth = 34.5' Groundwater Not Encountered Backfilled with Cuttings on 7/15/2014	
245	40								
240	45								
235	50								
230	55								
	60								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-7

Date: 7/15/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~260' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>**	
			R-1	18 38 45	117.5	8.5	SM	@2.5' - Silty SAND and fine Gravel, orangish grayish brown, moist, very dense	
255	5		R-2	22 35 50/5"	116.7	4.0		@5' - Silty SAND with Gravel, mottled orange and light brown, slightly moist, very dense	
250	10		R-3	22 50/6"	105.3	4.3	SP	@10' - SAND with Gravel, mottled orange and light brown, moist, very dense	
245	15		R-4	30 25 42	105.6	4.4		@15' - SAND, slightly moist, light brown with some mottled orange, dense to very dense, trace organic material	
240	20		R-5	25 50/4"	107.2	5.4	SM	@20' - Silty SAND, orangish light brown, slightly moist, very dense	
								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 7/15/2014	
235	25								
	30								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 7/17/2014

Geotechnical Boring Log Borehole HS-8

Date: 7/16/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~310' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 20' - <u>Older Artificial Fill (afo)</u>**	
			R-1	50/5"	111.5	5.1	ML	@2.5' - Sandy SILT with Gravel, light brown, slightly moist, hard, roots and plant material present	
305	5								
300	10		R-2	24 26 29	114.2	12.2	CL	@10' - Sandy CLAY with Gravel, slightly moist, hard, black organic streaks	
295	15								
								@20' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>	
290	20		R-3	11 13 15	124.1	10.2	SC	@20' - Clayey SAND with fine Gravel, bluish, brownish, gray, slightly moist, medium dense	
			R-4	10 25 50/6"	118.9	11.8		@22' - Clayey SAND with fine Gravel, bluish, greenish gray, moist, very dense, black organic streaks	
								@24' - Rig Chatter	
285	25								
			R-5	12 21 22	124.8	3.4	SP-SM	@27' - SAND with Silt and medium to coarse Gravel, orange and light brown, slightly moist, dense	
	30							@28' - Significant Rig Chatter and gravel encountered in cuttings	

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 7/17/2014

Geotechnical Boring Log Borehole HS-8

Date: 7/16/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~310' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		SPT-1	23 12 9		9.5	SM	@30' - Silty SAND with Gravel, dark gray, moist, medium dense	
								Total Depth = 31.5' (Auger Refusal) Groundwater Not Encountered Backfilled with Cuttings on 7/16/2014	
280	35								
275	40								
270	45								
265	50								
260	55								
	60								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-9

Date: 7/16/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~330' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>**	
			R-1	17 17 18	104.4	10.2	SM	@2.5' - Silty SAND with Gravel, light brown, orange, mottled, moist, medium dense	
325	5		R-2	17 50/5"	112.7	3.5		@5' - Silty SAND with Gravel, light brown grades to brown, slightly moist, very dense, roots present in finer material	
320	10		R-3	50/6"	94.8	13.4	SP-SM	@10' - SAND with Silt and trace Gravel, light brown and orange mottled, very moist, very dense	
315	15			50/4"				@15' - No sample recovery	
								@18' - Rig Chatter	
310	20		R-4	18 26 30	102.7	12.6	CL	@20' - CLAY, light brown and light orange mottled, moist, hard	
								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 7/16/2014	
305	25								
	30								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 7/17/2014

Geotechnical Boring Log Borehole HS-10

Date: 7/16/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~330' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 25' - <u>Unsuitable Artifical Fill (afu)</u>**	
			R-1	20 22 50/5"	117.9	11.3	SM	@2.5' - Silty SAND with little Gravel, brown, very dense, rootlets present	
325	5								
320	10		R-2	18 28 30	118.6	10.9	CL	@10' - Sandy CLAY with Gravel, brown, slightly moist, hard	
315	15								
310	20		R-3	14 28 48	125.2	8.3	SC	@20' - Clayey SAND with little Gravel, dark brown, black organic streaks, slightly moist, very dense	
305	25							**@25' to 48' - <u>Quaternary Alluvium (Qal)</u>**	
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
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CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 7/17/2014

Geotechnical Boring Log Borehole HS-10

Date: 7/16/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~330' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-4	10 17 21	123.1	12.0	CL	@30' - CLAY with Gravel, brown, slightly moist, very stiff	
			R-5	10 15 20	122.1	12.3		@33' - Same as above	
300	35								
			R-6	12 23 27	121.1	12.5		@38' - Sandy CLAY with fine Gravel, mottled light brown and brown, slightly moist, hard	
295	40								
			R-7	6 10 15	118.4	12.5		@43' - Sandy CLAY with Gravel, brown, slightly moist, very stiff	
290	45								
			R-8	10 13 16	117.9	12.8	SC	**@48' to T.D. - <u>Quaternary San Pedro Formation (Qsp)</u>** @48' - Clayey SAND, mottled orange and light brown, Sand and Clay mottled, moist, medium dense	
285	50								
			R-9	13 15 10	109.6	4.3	SP-SM	@53' - SAND with Silt, mottled orange, light brown, slightly moist, medium dense	
280	55							Total Depth = 54.5' Groundwater Not Encountered Backfilled with Cuttings on 7/16/2014	
	60								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
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EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-11

Date: 7/31/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~249' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 35' - Unsuitable Artificial Fill (afu)**	
245									
	5								
240									
	10		R-1	12 26 25	126.4	9.3	CL	@10' - Sandy CLAY with Gravel, orangish brown, slightly moist to moist, hard	
235									
	15								
230									
	20		R-2	7 18 47	116.8	15.1	ML	@20' - Sandy SILT with Gravel, gray with brown and orange mottling present, moist, hard, dark organic streaks present	
225									
	25								
220									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 8/5/2014

Geotechnical Boring Log Borehole HS-11

Date: 7/31/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~249' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-3	20 20 50	122.6	4.2	SM	@30' - Silty SAND with Gravel, dark brown, slightly moist, very dense	
215									
	35		R-4	8 8 11	116.2	6.2	SM	**@35' to T.D. - <u>Quaternary Alluvium (Qal)</u>** @35' - Silty SAND with Gravel, brown, slightly moist, medium dense	-200
210									
	40		R-5	8 11 15	119.2	4.6	SC-SM	@40' - Silty Clayey SAND with trace Gravel, orangish brown, slightly moist, medium dense, white rootlet casts present	AL -200
205									
	45		R-6	8 12 16	119.9	6.5	SC	@45' - Clayey SAND with trace Gravel, orangish brown, slightly moist, medium dense, white rootlet casts present	
200									
	50		R-7	8 12 22	124.9	3.9		@50' - Clayey SAND with trace Gravel, orangish brown, slightly moist, medium dense, white rootlet casts present	
195								Total Depth = 51.5' Groundwater Not Encountered Backfilled with Cuttings on 7/31/2014	
	55								
190									
	60								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-12

Date: 7/31/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~230' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 35' - <u>Older Artificial Fill (afo)</u>**	
225	5								
220	10		R-1	12 20 34	114.7	12.4	SC to CL	@10' - Clayey SAND grading to Sandy CLAY, gray brown, moist, dense/hard, trace plant matter present	
215	15								
210	20		R-2	17 24 30	117.1	11.4	SM	@20' - Silty SAND, orange brown, slightly moist, dense	
205	25								
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 8/5/2014

Geotechnical Boring Log Borehole HS-12

Date: 7/31/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~230' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-3	16 36 46	124.6	9.6	SC to CL	@30' - Clayey SAND with Gravel grading to Sandy CLAY with Gravel, orangish grayish brown, slightly moist, very dense/hard	
200	35							**@35' to T.D. - <u>Quaternary Alluvium (Qal)</u>**	
195	40		R-4	5 11 16	115.7	14.8	CL	@40' - CLAY with Sand, dark brown to grayish brown, moist, very stiff	AL CN
190	45		R-5	5 9 12	109.3	18.7		@45' CLAY with Sand, yellowish brown, very moist, stiff to very stiff	
185	50		R-6	5 8 14	97.5	25.7		@ 50' - Lean CLAY with trace Gravel, olive gray with orange to red oxidation mottling, very moist, very stiff	AL CN
180	55		R-7	5 10 14	100.2	23.9		@55' - Same as above but lacks gravel	
	60							Total Depth = 56.5' Groundwater Not Encountered Backfilled with Cuttings on 7/31/2014	

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-13

Date: 7/31/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~234' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 14' - Unsuitable Artificial Fill (afu)**	
230									
	5								
225									
	10		R-1	12 21 30	114.6	15.1	CL	@10' - Sandy CLAY, orangish brown, moist, hard	
220								**@14' to 46' - Quaternary Alluvium (Qal)**	
	15		R-2	5 5 4	105.3	6.7	SM	@15' - Silty SAND with trace Gravel, brown, slightly moist, loose	AL -200
215									
	20		R-3	9 15 20	122.9	7.6	SC	@20' - Clayey SAND with some Gravel, brown, slightly moist, medium dense	
210									
	25		R-4	7 7 8	111.7	6.9	SM	@25' - Silty SAND with Gravel, light brown to brown, slightly moist, medium dense	-200
205									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 8/5/2014

Geotechnical Boring Log Borehole HS-13

Date: 7/31/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~234' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-5	7 11 14	118.7	6.8	ML	@30' - Sandy SILT with trace Gravel, brown, slightly moist, very stiff	
200	35		R-6	4 6 7	106.9	9.8	SM-SC	@35' - Silty Clayey SAND with some fine Gravel, brown, slightly moist, loose, white rootlet casts present	AL -200
195	40		R-7	7 11 28	116.4	9.0		@40' - Medium dense	-200
190	45		R-8	8 12 15	117.3	9.3	SM	@45' - Silty SAND with trace Gravel, light brown to brown, moist, medium dense, white rootlet casts **@46' to T.D. - Quaternary San Pedro Formation (Qsp)**	
185	50		R-9	12 35 50	115.8	10.7		@50' - SAND with trace Gravel, light brown to brown with orange oxidation nodules, moist, very dense	
180	55							Total Depth = 51.5' Groundwater Not Encountered Backfilled with Cuttings on 7/31/2014	
175	60								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-14

Date: 7/31/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~234' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							Approximately 4" of Asphalt Concrete over 5" of Aggregate Base **@0' to 15' - <u>Unsuitable Artificial Fill (afu)</u>**	
230									
	5		R-1	10 10 12	111.6	11.7	CL	@5' - Sandy Clay, orangish light brown to gray brown, moist, very stiff	
225									
	10		R-2	9 13 17	107.5	21.4		@10' - CLAY, dark olive gray with orange iron oxidation nodules, moist, very stiff	AL CN
220									
	15		R-3	13 23 25	122.7	8.5	SC	**@15' to T.D. - <u>Quaternary Alluvium (Qal)</u>** @15' - Clayey SAND with some Gravel, brown, moist, dense, iron oxidation nodules	
215									
	20		R-4	4 5 7	115.3	9.1	SC	@20' - Clayey SAND with trace Gravel, olive brown, moist, loose	AL CN
210									
	25		R-5	4 5 10	116.8	8.6		@25' - Clayey SAND with trace Gravel, brown to yellow brown, moist, medium dense, root traces and calcium carbonate present	
205									
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 8/5/2014

Geotechnical Boring Log Borehole HS-14

Date: 7/31/2014	**Drilling Company:** 2R
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~234' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-6	7 8 10	122.7	8.5	SC	@30' - Clayey SAND with trace Gravel, brown, slightly moist, medium dense, calcium carbonate present	
200									
	35		R-7	6 9 10	116.1	8.7		@35' - Rootlets present	
195									
	40		R-8	11 21 27	129.0	10.1	CL	@40' - Sandy CLAY with trace Gravel, brown, slightly moist, hard	
190									
	45		R-9	12 20 20	126.7	8.2	SC	@45' - Clayey SAND with trace fine Gravel, brown, slightly moist, dense	
185									
	50		R-10	11 16 20	119.3	12.3	CL	@50' - Sandy CLAY with trace Gravel, brown, moist, very stiff	
180	55							Total Depth = 51.5' Groundwater Not Encountered Backfilled with Cuttings and Capped with Asphalt Concrete Cold Patch on 7/31/2014	
175	60								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-15

Date: 2/3/2015	**Drilling Company:** 2R Drilling
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1						**@0' to 20' - Older Artificial Fill (afo)**	
260									
	5		R-1	12 26 50/3"	118.0	14.4	SC	@5' - Clayey SAND with some very fine Gravel, brown with dark brown and orange blebs, moist, very dense	
255									
	10		R-2	12 20 20	116.3	12.6	SP-SC	@10' - SAND with Clay and medium Gravel, yellow orange brown with gray clayey blebs, very moist to wet, medium dense	
250									
	15		R-3	12 16 25	102.8	22.0	SC	@15' - Clayey SAND with fine Gravels, medium brown with dark organic blebs and gray clayey blebs, very moist, dense	
245									
	20		R-4	16 33 45	124.2	7.6		**@20' to 26.5' - Quaternary Alluvium (Qal)** @20' - Clayey SAND with very fine to fine Gravel, orange and yellow matrix, moist to very moist, very dense; iron oxide nodules, rounded gravel	AL -200
240									
	25		R-5	16 25 31	119.2	13.4		@25' - Clayey SAND, medium brown with colorful clasts, moist to very moist, dense, iron oxide nodules	AL CN
235								**@26.5' to T.D. - Quaternary San Pedro Formation (Qsp)** @26.5' - Silty fine SAND, gray and orange mottling, micaceous	
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
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S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 2/19/2015

Geotechnical Boring Log Borehole HS-15

Date: 2/3/2015	**Drilling Company:** 2R Drilling
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~263' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-6	36 50/4"	100.2	12.6	SM	@30' - Silty SAND, gray and orange mottling, slightly moist to moist, very dense, micaceous	
230								Total Depth = 31.5' Groundwater Not Encountered Backfilled with Cuttings on 2/3/2015	
	35								
225									
	40								
220									
	45								
215									
	50								
210									
	55								
205									
	60								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

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MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-16

Date: 2/3/2015	**Drilling Company:** 2R Drilling
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~215' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 10' - Older Artificial Fill (afo)**	
210	5		R-1	19 25 27	121.9	9.6	SC	@5' - Clayey SAND with some Gravel, medium brown, moist, dense to very dense, blebs or sand, clay, and dark brown material	
205	10		R-2	6 7 10	110.7	12.6	SM	**@10' to 27' - Quaternary Alluvium (Qal)** @10' - Fine Silty SAND, brown to dark brown, moist, medium dense, homogeneous texture and rounded colorful sand	
200	15		R-3	12 14 18	109.8	11.0	CL	@15' - Sandy CLAY, orange brown, moist, dense, root cast	-200
195	20		R-4	7 9 15	111.7	16.4		@20' - CLAY, orange brown to medium dark brown, moist, trace gravel	CN AL
190	25		R-5	11 18 28	104.3	22.1		@25' - CLAY with Sand, reddish brown, moist, rounded clasts that coarsen with sample depth, white mineralization around clasts, iron oxide nodules	-200
	30							**@27' to T.D. - Quaternary San Pedro Formation** @27' - Clayey SILT, gray and orange mottling, iron oxide	

LGC Geotechnical, Inc.

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SAMPLE TYPES:

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R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

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AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 2/19/2015

Geotechnical Boring Log Borehole HS-16

Date: 2/3/2015	**Drilling Company:** 2R Drilling
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~215' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By CNJ
Sampled By CNJ
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-6	17 32 45	106.3	19.9	ML	@30' - SILT with Sand, dark orange and gray brown mottling, moist, hard, micaceous, iron oxide	
185	35		R-7	24 34 46	104.1	21.7		@35' - SILT with Sand, orange and gray brown mottling, moist to very moist, hard, micaceous, trace fossils, iron oxide	AL -200
180	40		R-8	20 40 45	98.2	26.2	ML-CL	@40' - Silty CLAY with fine Sand, orange and gray and brown mottling, very moist, hard, shells, micaceous	
175	45		R-9	38 50-5"		20.6		@45' - Silty CLAY, dark gray, moist to very moist, hard	
170	50		R-10	50/3"			ML	@50' - SILT with Sand, dark gray, hard, partial recovery	
								Total Depth = 51.5' Groundwater Not Encountered Backfilled with Cuttings on 2/3/2015	
165	55								
	60								

LGC Geotechnical, Inc.

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R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-17

Date: 2/4/2015	**Drilling Company:** 2R Drilling
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~208' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 3

Logged By ASR
Sampled By ASR
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							**@0' to 10' - Older Artificial Fill (afo)**	
205									
	5	B-1	R-1	12 19 35	112.3	19.0	CL	@5' - Sandy CLAY, light brown, moist, hard	AL DS -200 MD
200									
	10		R-2	12 24 22	114.8	9.7	ML	**@10' to 48' - Quaternary Alluvium (Qal)** @10' Sandy SILT, reddish light brown, moist, hard	
195									
	15		R-3	8 13 19	105.1	9.1	SM	@15' - Silty SAND, light brown, moist, medium dense	-200
190									
	20		R-4	4 6 7	99.0	26.3	CL	@20' - CLAY, yellowish brown, very moist, medium stiff	CN AL
185									
	25		R-5	5 8 14	110.4	18.2		@25' - CLAY, dark yellowish brown, moist, very stiff	CN AL
180									
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:
- B BULK SAMPLE
- R RING SAMPLE (CA Modified Sampler)
- G GRAB SAMPLE
- SPT STANDARD PENETRATION TEST SAMPLE
- ▽ GROUNDWATER TABLE

TEST TYPES:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- SA SIEVE ANALYSIS
- S&H SIEVE AND HYDROMETER
- EI EXPANSION INDEX
- CN CONSOLIDATION
- CR CORROSION
- AL ATTERBERG LIMITS
- CO COLLAPSE/SWELL
- RV R-VALUE
- -#200 % PASSING # 200 SIEVE

Last Edited: 2/19/2015

Geotechnical Boring Log Borehole HS-17

Date: 2/4/2015	**Drilling Company:** 2R Drilling
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~208' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 3

Logged By ASR
Sampled By ASR
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-6	5 13 22	107.4	21.2	SM	@30' - Silty SAND, light brown, very moist, medium dense	-200
175									
	35		R-7	16 33 50/5"	112.7	18.6		@35' - Silty SAND, light brown, wet, very dense	
170									
	40		R-8	11 15 20		18.5	SP-SM	@40' - SAND with Silt, light brown, wet, medium dense	-200
165									
	45		R-9	7 14 46	107.2	21.5	SC	@45' - Clayey SAND, light gray, wet, dense	
160								**@48' to T.D.' - <u>Quaternary San Pedro Formation (Qsp)</u>**	
	50		R-10	15 50/5"	111.9	18.2		@50' - Clayey SAND, light gray, wet, very dense	
155									
	55		R-11	17 50/5"	109.5	19.6	SM	@55' - Silty SAND, light gray, wet, very dense	
150									
	60								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-17

Date: 2/4/2015	**Drilling Company:** 2R Drilling
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~208' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 3 of 3

Logged By ASR
Sampled By ASR
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	60		R-12	21 29 36	128.1	9.8	SP-SM	@60' - SAND with Silt, wet, dense	
145									
	65		R-13	10 50/5"	133.7	7.7		@65' - SAND with Silt, wet, very dense, very rounded, shell fragment present	
140									
	70		SPT-1	32 50/3"		5.4		@70' - SAND with Silt, slightly moist, very dense	
135								Total Depth = 71' Groundwater Encountered at Approximately 29' Backfilled with Cuttings on 2/4/2015	
	75								
130									
	80								
125									
	85								
120									
	90								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-18

Date: 2/4/2015	**Drilling Company:** 2R Drilling
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~290' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By ASR
Sampled By ASR
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0	B-1						**@0' to 40' - Unsuitable Artificial Fill (afu)**	
285	5		R-1	11 17 12			SM	@5' - Silty SAND, dark gray, slight moist, stiff, dense	
280	10		R-2	7 10 12			CL	@10' - CLAY, dark gray, slightly moist, very stiff	
275	15		R-3	11 13 17				@15' - CLAY, dark gray, slightly moist to moist, very stiff	
270	20		R-4	11 13 14				@20' - CLAY with Sand, dark gray, slightly moist to moist, stiff	
265	25		R-5	19 24 33			SM	@25' - Silty SAND, dark gray, slightly moist to moist, dense	
	30								

LGC Geotechnical, Inc.

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 2/19/2015

Geotechnical Boring Log Borehole HS-18

Date: 2/4/2015	**Drilling Company:** 2R Drilling
Project Name: Westridge	**Type of Rig:** Limited Access Hollow Stem
Project Number: 14057-01	**Drop:** 30" **Hole Diameter:** 8"
Elevation of Top of Hole: ~290' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By ASR
Sampled By ASR
Checked By BTZ

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-6	8 12 17			SM	@30' - Silty SAND, dark gray, slightly moist to moist, medium dense	
260	35		R-7	18 38 44				@35' - Silty SAND, light gray, slight moist, dense to very dense	
255	40		R-8	26 50/5"	106.3	21.2	CL	**@40' to T.D. - Quaternary Landslide Deposit/Quaternary San Pedro Formation Undifferentiated (Qls/Qsp)** @40' - Silty fine SAND, light gray and brown, slightly moist, very dense, iron oxide staining	
250	45		R-9	38 50/5"	104.5	22.6	ML	@45' - SILT with Sand, light gray and brown, moist, very dense, iron oxide	
245	50		R-10	32 50/5"	100.3	25.0		@50' - SILT with Sand, light brown, moist, very dense	
240	55							Total Depth = 51.5' Groundwater Not Encountered Backfilled with Cuttings on 2/4/2015	
	60								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Kehoe Testing and Engineering
714-901-7270
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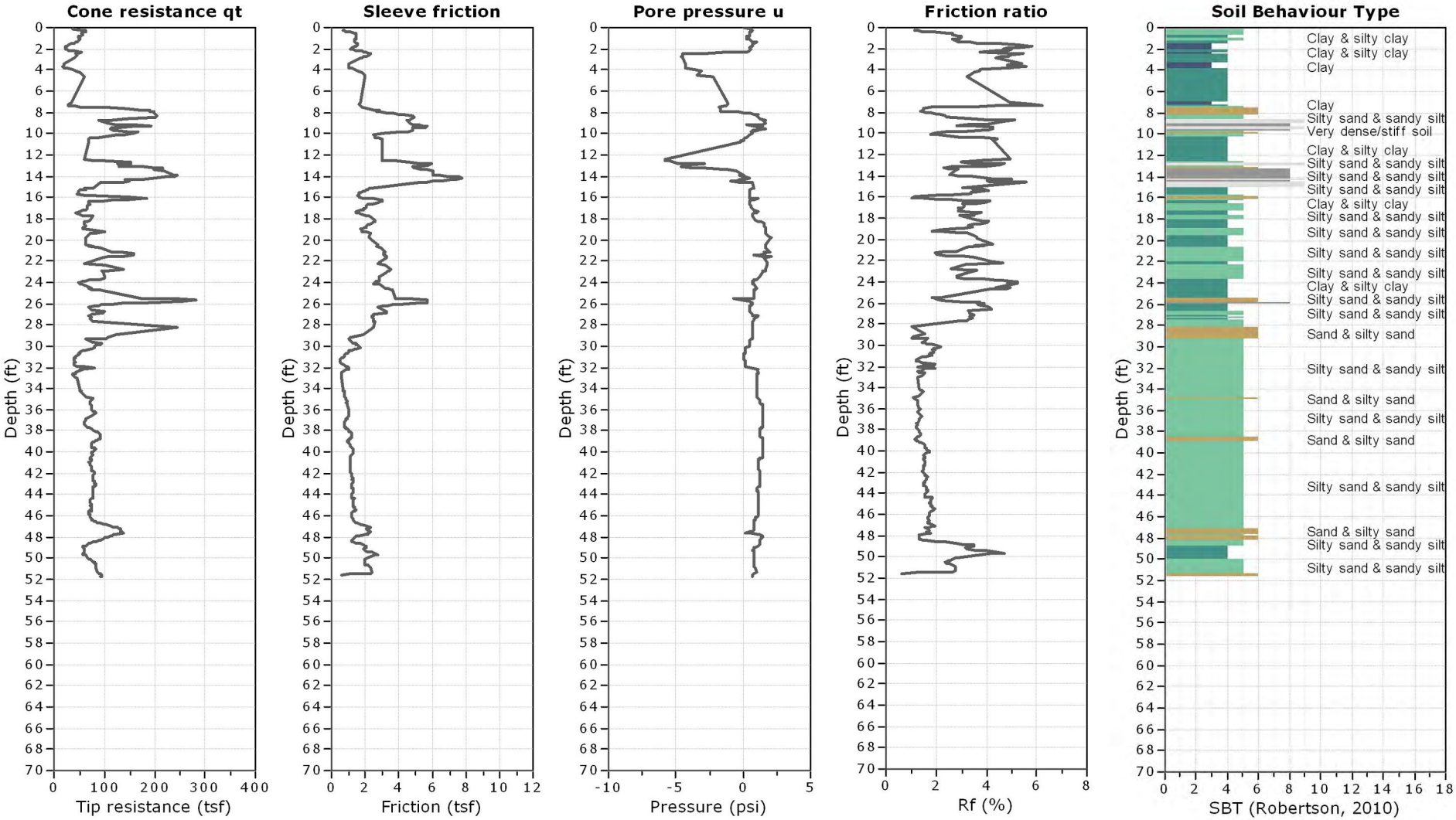
CPT: CPT-1A

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 51.74 ft, Date: 7/22/2014
Cone Type: Vertek



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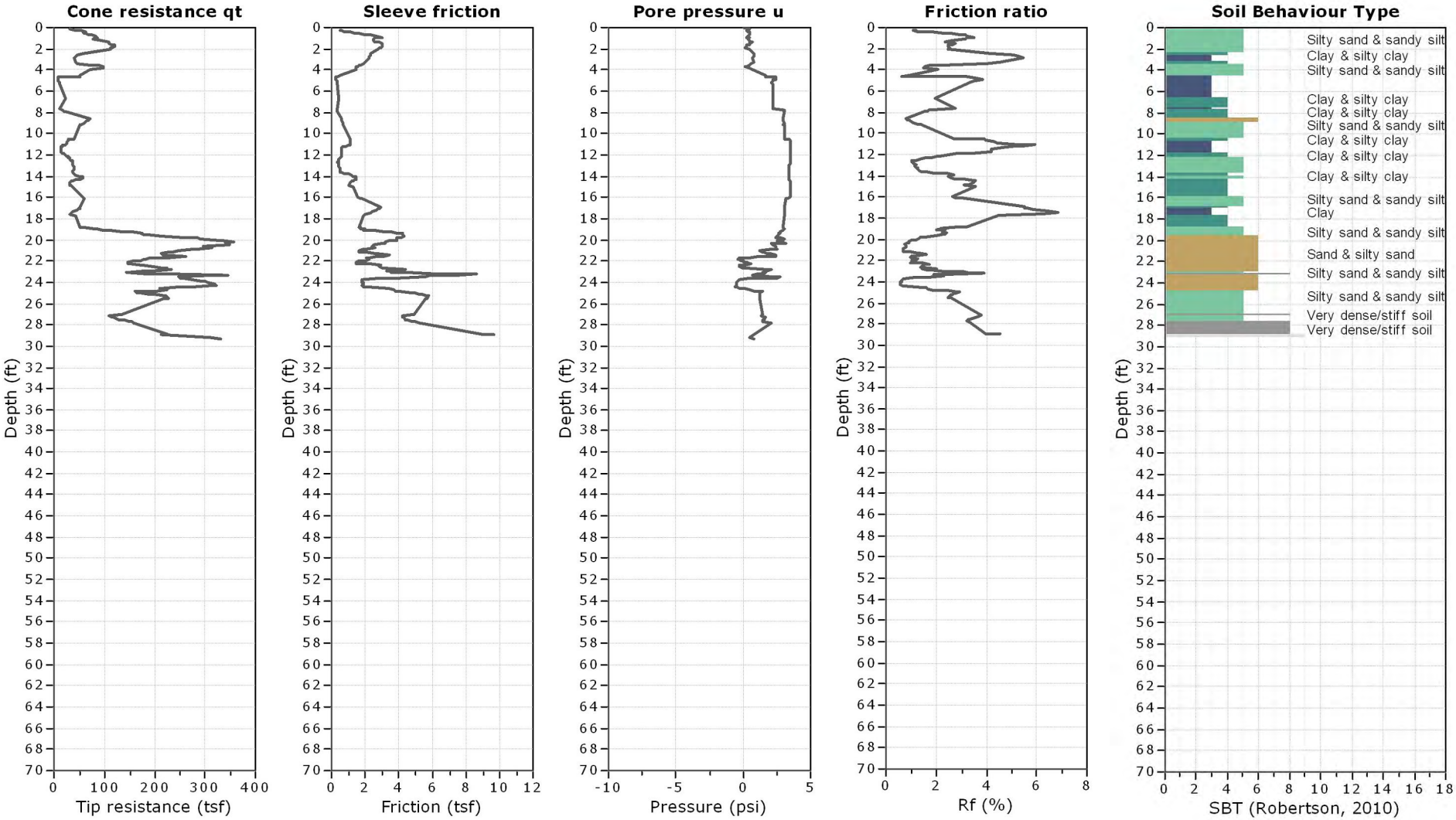
CPT: CPT-2

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 29.28 ft, Date: 7/22/2014
Cone Type: Vertek



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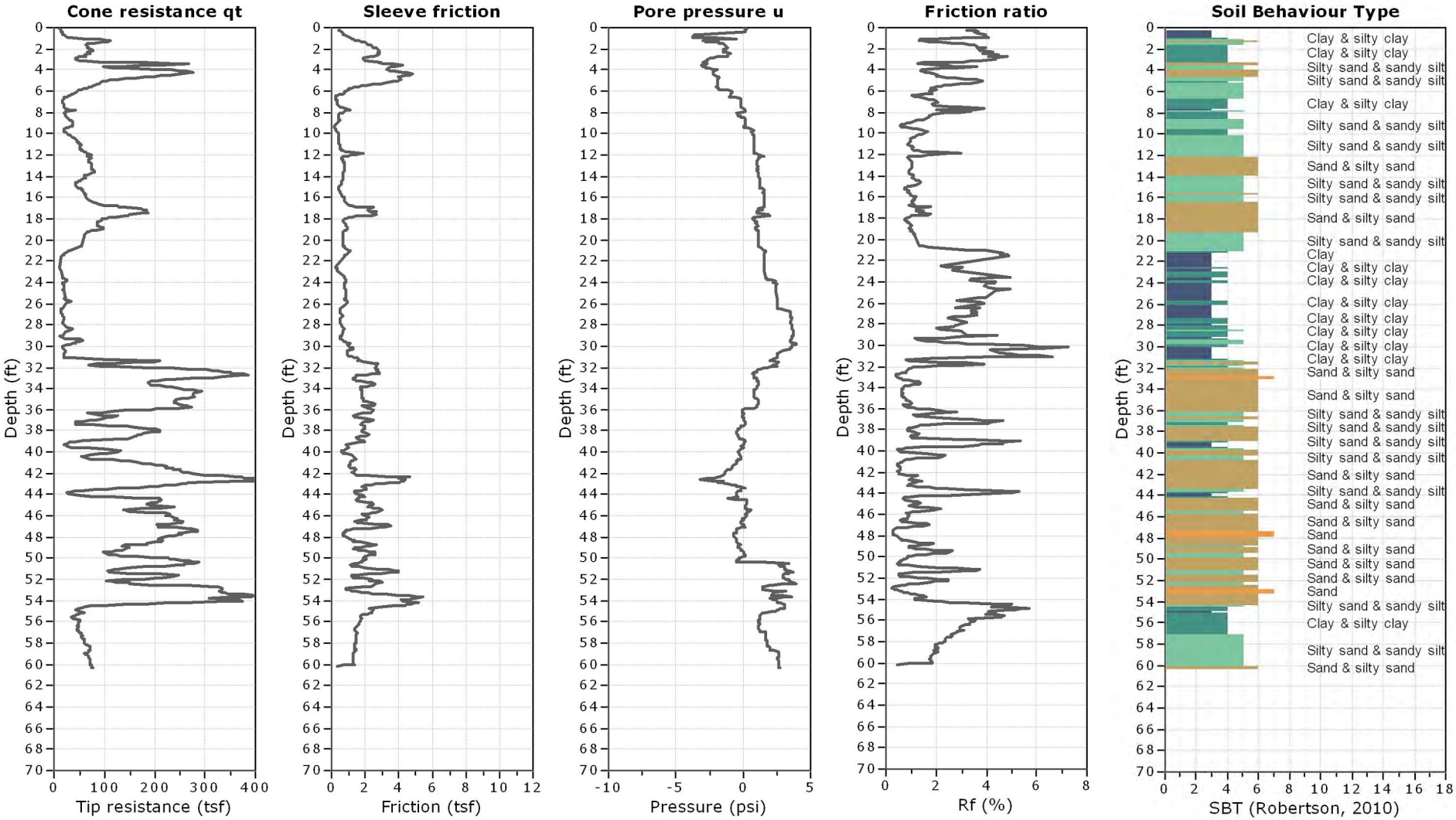
CPT: CPT-3

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 60.34 ft, Date: 7/22/2014
Cone Type: Vertek

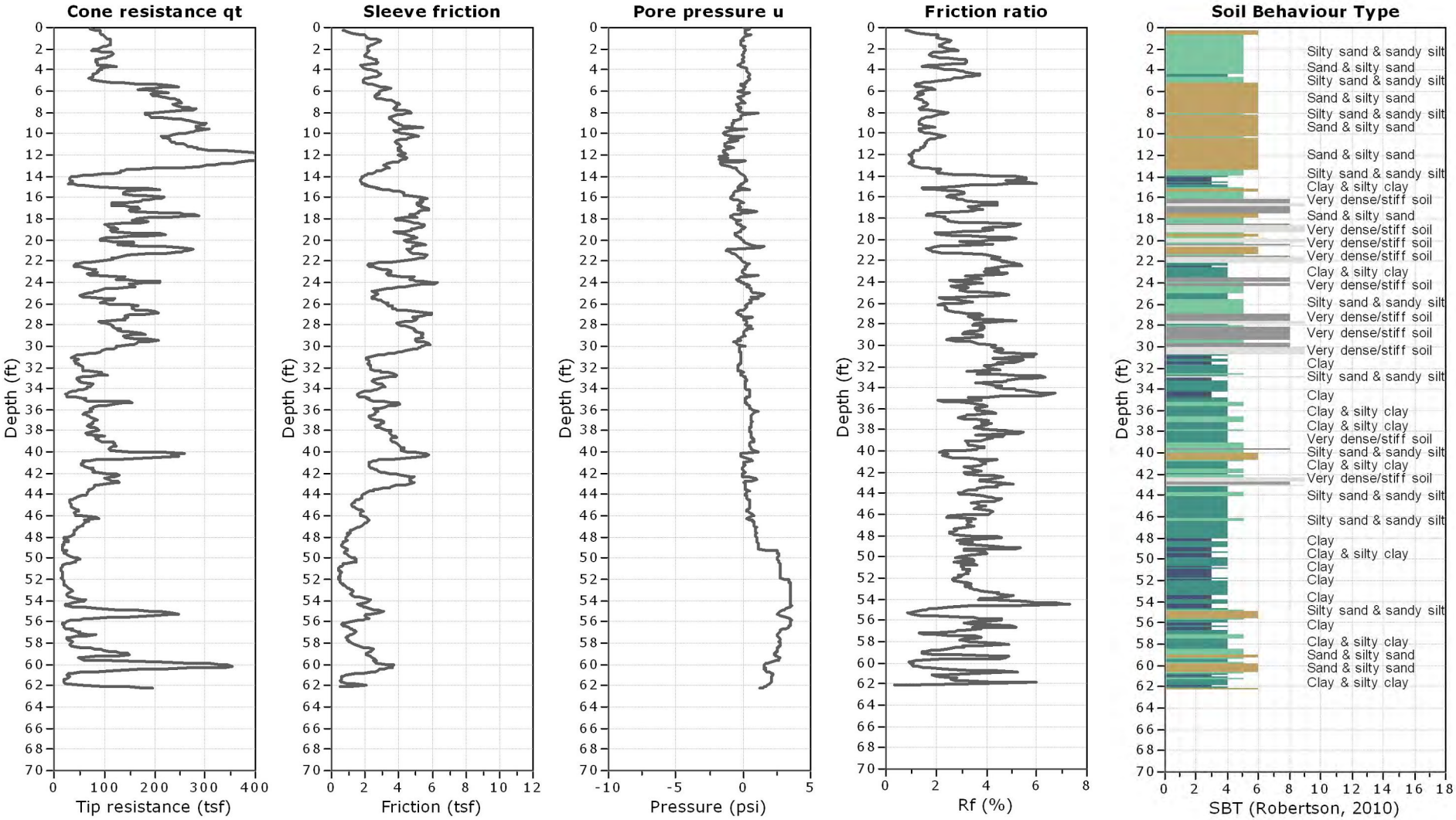


Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

CPT: CPT-4

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 62.25 ft, Date: 7/22/2014
Cone Type: Vertek



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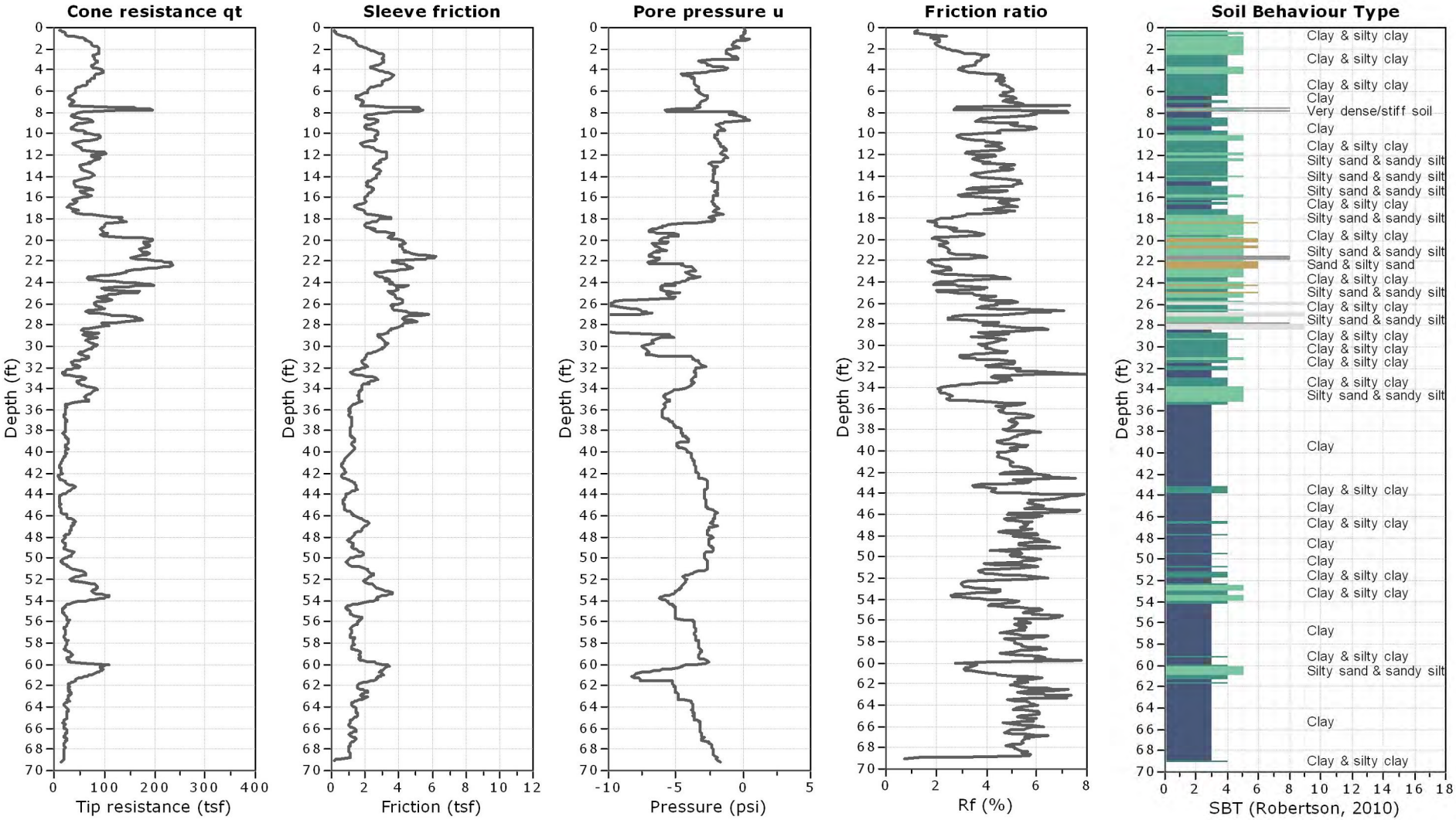
CPT: CPT-5

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 69.17 ft, Date: 7/22/2014
Cone Type: Vertek



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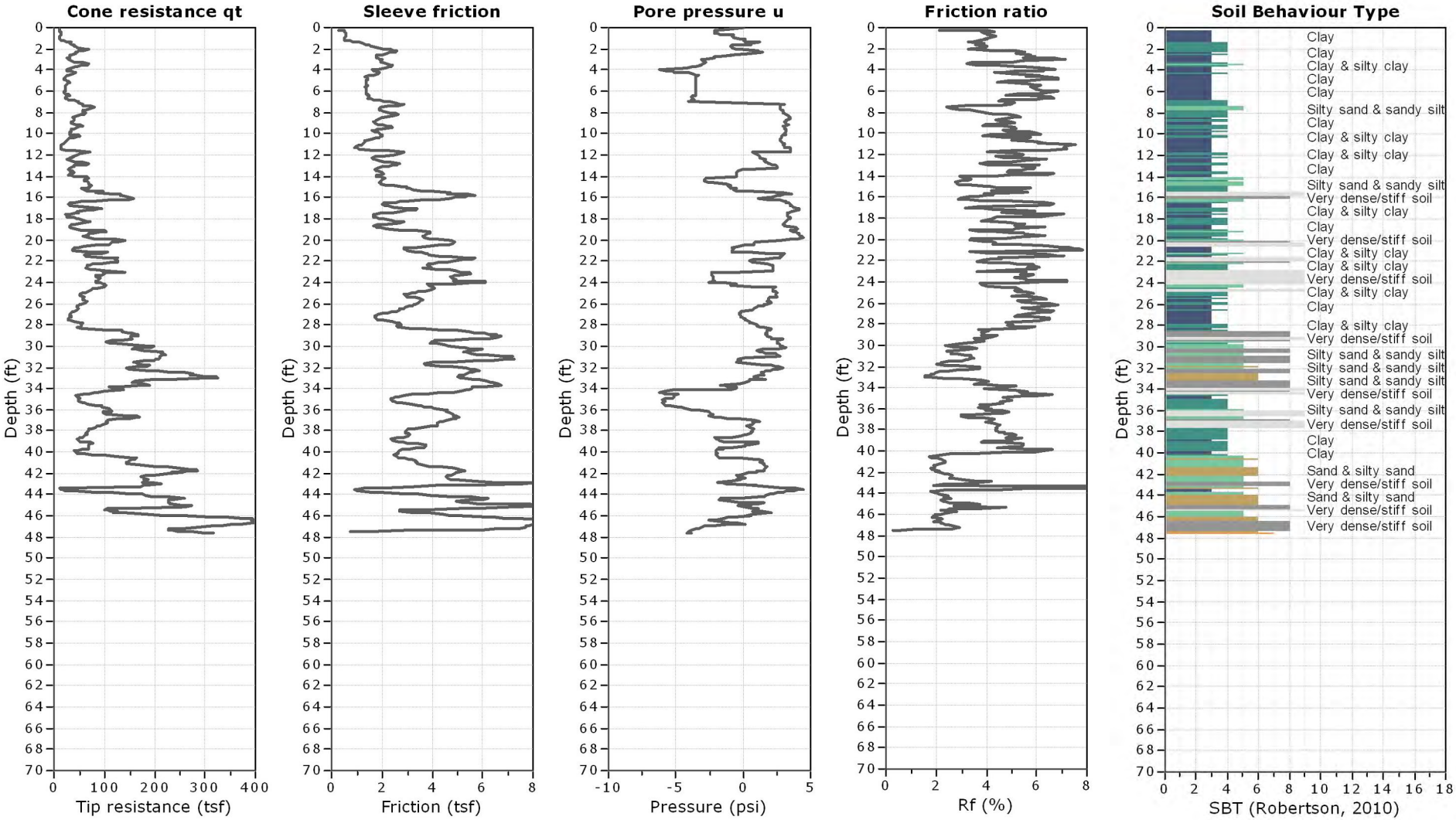
CPT: CPT-6

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 47.65 ft, Date: 7/22/2014
Cone Type: Vertek

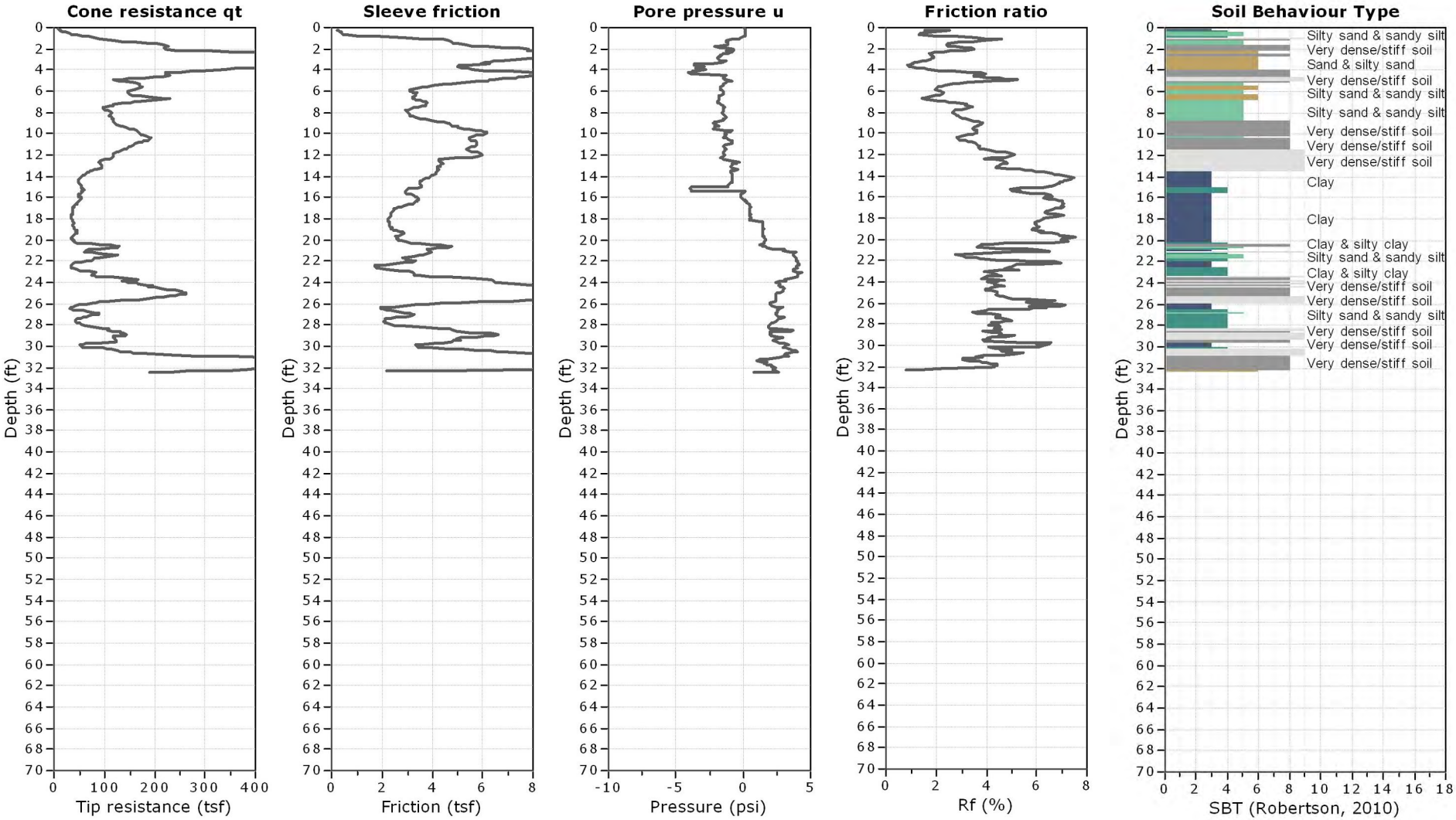


Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

CPT: CPT-7A

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 32.50 ft, Date: 7/23/2014
Cone Type: Vertek

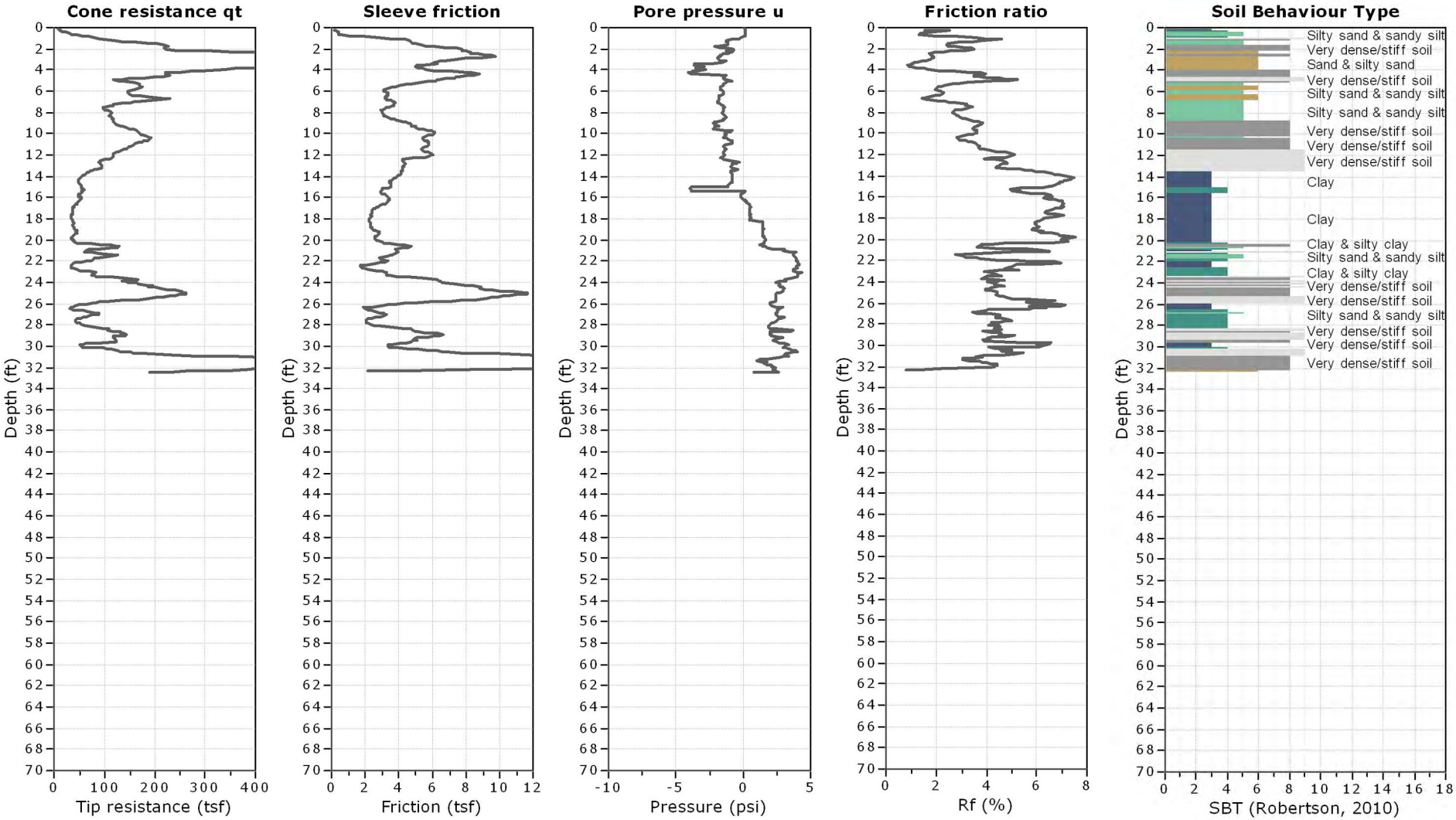


Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

CPT: CPT-8

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 32.50 ft, Date: 7/23/2014
Cone Type: Vertek



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rich@kehoetesting.com
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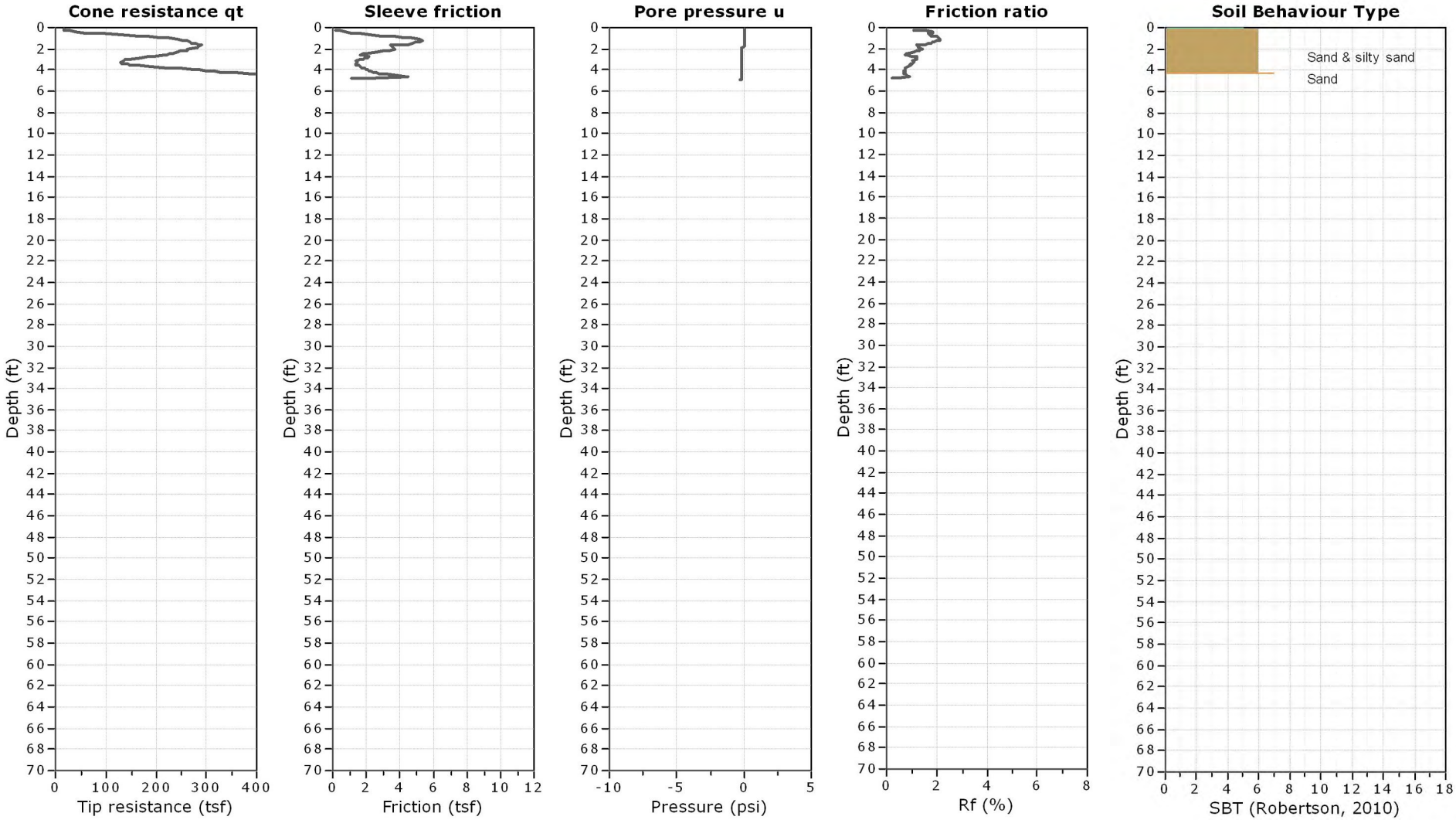
CPT: CPT-9A

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 4.96 ft, Date: 7/24/2014
Cone Type: Vertek



Kehoe Testing and Engineering
714-901-7270
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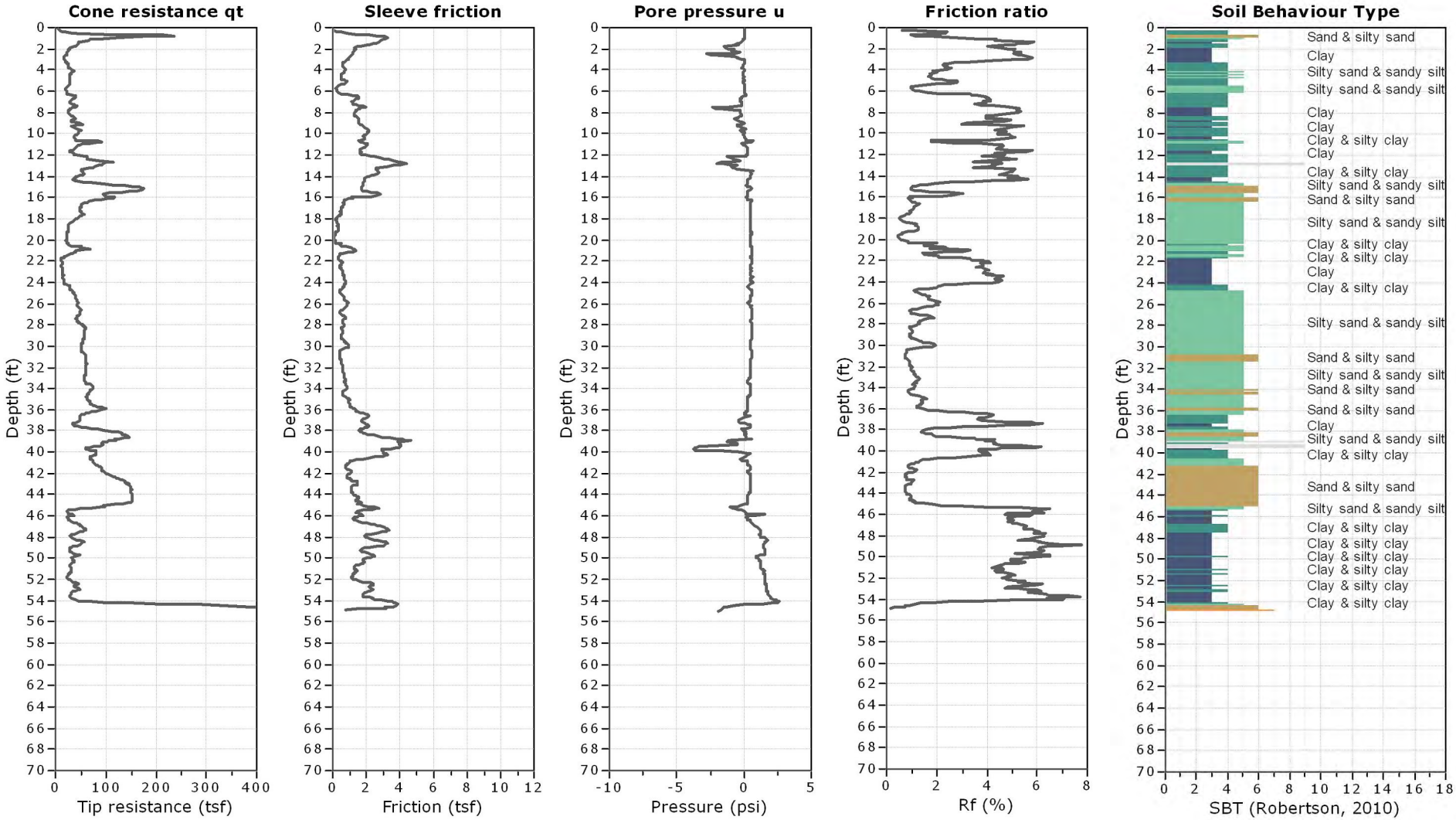
www.kehoetesting.com

CPT: CPT-10

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 54.96 ft, Date: 7/24/2014
Cone Type: Vertek



Kehoe Testing and Engineering
714-901-7270
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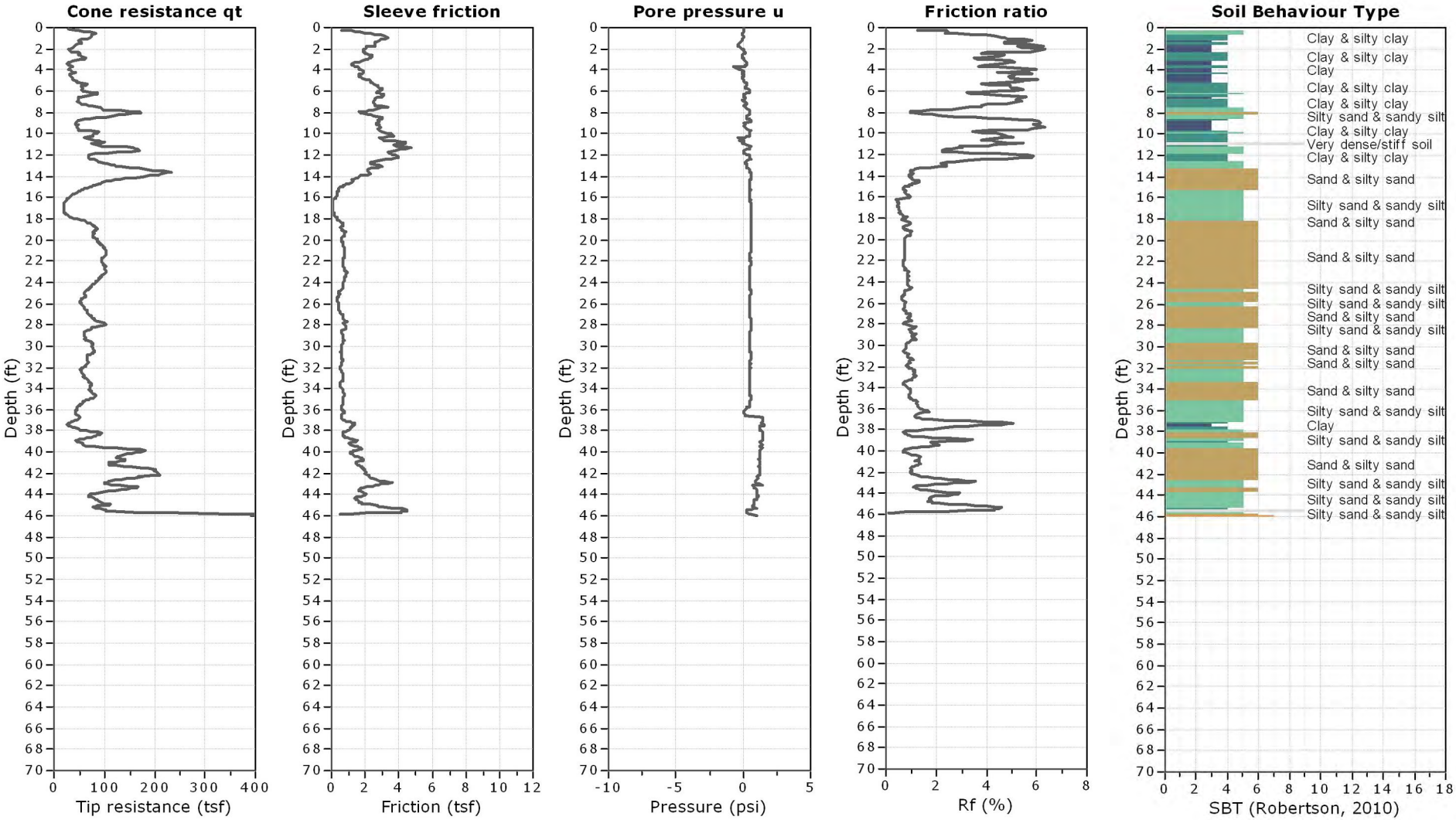
www.kehoetesting.com

CPT: CPT-11B

Project: **LGC Geotechnical, Inc./Westridge Golf Course**
Location: **1400 La Habra Hills Dr. La Habra Heights, CA**

Total depth: 46.03 ft, Date: 7/24/2014
Cone Type: Vertek



From GMU, 1996

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 257±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary Bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 41 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 1/30/96

REMARKS

Bottom at 41 feet
No caving or water
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	COLLUVIUM/OLDER ALLUVIUM, (Qcol/Qoal)	SILTY SAND (SW), fine, light brown, dry to damp, loose;	255									
		becoming very fine below 3 feet;										
5		becoming tan to light brown below 5 feet;		5			P	2400	5	101		
			250									
		rounded, medium gravel at 8 feet.										
10				10			5	2400	4	110		CN
		WELL GRADED SAND (SW), with gravel, light brown, damp, medium dense.	245									
15		SILTY SAND (SM), fine, tan to light brown, damp, medium dense;		15			3	2400	7	111		
			240									
20		with very fine sand at 20 feet;		20			3	2400	8	107		CN
			235									
25				25			2	1550	12	104		
			230									
		damp to moist below 28 feet.										
		SILT (ML), with very fine sand, light brown, damp to moist, stiff, slightly porous;										
30		becoming mottled olive gray to light brown below 30 feet.		30			6	1550	17	103		
			225									
35				35			7	1550	23	99		
			220									
	SAN PEDRO FM. (Qsp), siltstone	SILT (ML), mottled olive gray to light brown, moist, stiff.										

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 1

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.1

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	TEST DATA: ADDITIONAL TESTS
						■	8	1550	24	97		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 1

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.1

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 295±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 56 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/7/96

REMARKS

Bottom at 56 feet
No water or caving
Hole backfilled with native soils

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	FILL (Af), very fine grained sand	SILTY SAND (SW), light brown, damp, loose to medium dense; becoming light olive brown in color below 3 feet.	295									
5		SILT (ML) with fine sand, light olive brown, damp, firm,	290	5			1	2400	14	101		
10		becoming moist below 9 feet.	285	10			1	2400	16	99		
15		SILTY SAND (SW), fine, light brown, damp to moist, loose to medium dense.	280	15			1	2400	10	110		
	COLLUVIUM/ALLUVIUM (Qcol/Qoal)	SILTY SAND (SW), fine, olive brown, moist, medium dense;										
20			275	20			3	2400	11	114		
25		less fines at 25 feet.	270	25			4	1550	12	81		
		LEAN CLAY (CL), olive, moist, stiff.										
30			265	30			6	1550	19	106		
		SILTY SAND (SW) with small gravel, olive brown, moist, medium dense.										
35		LEAN CLAY (CL) with silt, olive, wet, firm;	260	35			3	1550	21	102		
			255									

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 4

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.4

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	ADDITIONAL TESTS
		with some fine sand at 41 feet.	255				P	1550	25	100		
45			250	45			9	1550	25	98		
	SAN PEDRO FM (Qsp), siltstone	SILT (ML), olive gray, moist, stiff, slightly micaceous;										
50		becoming gray below 50 feet.	245	50			50	850	23	106		
55			240	55			35	850	22	105		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 4

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.4

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 275±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rovary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 60 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/7/96

REMARKS

Bottom at 56 feet
No water or caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	FILL (Af)	SILTY SAND (SM), fine brown, damp, loose;	275									
		becoming light brown below 4 feet;										
5			270	5			2	2400	5	110		
		becoming brown in color below 8 feet.										
	COLLUVIUM/OLDER ALLUVIUM (Qcol/Qoal)	SILTY SAND (SM), fine, brown, damp, medium dense;										
10		with medium to coarse sand at 10 feet;	265	10			3	2400	6	114		
		with some small gravel at 13 feet;										
15			260	15			2	2400	5	112		
		moist at 16 feet;										
20		damp below 20 feet;	255	20			4	2400	4	113		
	large rounded gravel at 21 feet											
25			250	25			3	1550	6	110		CN
		fine to medium sand at 26 feet.										
30			245	30			7	1550	5	116		
		WELL GRADED SAND (SW), light brown, damp, medium dense;										
		small gravel at 33 feet;										
35			240	35			8	1550	3	119		
			230									

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 5

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.5

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	TEST DATA: ADDITIONAL TESTS
		becoming damp to moist below 40 feet.	235			CN	8	1550	7	117		CN
		SILTY SAND (SM), light brown, damp to moist, medium dense.										
45		WELL GRADED SAND (SW) with gravel, light brown, damp, medium dense.	230	45			10	1550	8	115		
	SAN PEDRO FM (Qsp), siltstone	SILT (ML), olive, moist, stiff;										
50			225	50			16	850	26	98		
		becoming olive-gray in color below 53 feet.										
55			220	55			21	850	28	95		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 5

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.5

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 410±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 61 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/13/96

REMARKS

Bottom at 61 feet
No water or caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	FILL (Af)	SILT (ML), light brown, dry to damp, firm.	410									
	LANDSLIDE DEBRIS (Qls), light brown silt with fine sand, highly fractured with rootlets to 8 feet.	SILT (ML), light brown, damp, firm;										
5		becoming orange brown below 5 feet.	405	5								
10	sharp contact with fine grained sand, B-N85E, 28SE, at 9 feet	POORLY GRADED SAND (SP), fine, light brown, damp.	400	10			4	2400	3	101		
15	contact with coarse grain sand, B-N15E, 50SW at 14 feet		395	15								
	3" clay bed highly sheared, B-N30W, 45SW, at 17 feet, becoming a gray silt below 17 feet	SILT (ML), olive, damp to moist, firm to stiff;										
20	stiff below 21 feet	becoming olive gray below 20 feet.	390	20			6	2400	18	105		
25	slightly micaceous below 25 feet		385	25								
30	bedding within slide, B-N40W, 12NE at 29 feet 1/2" thick fine sand layer, B-N40E, 15NW at 34 feet, 2" thick clay shear, rupture surface, RS-N10W, 20SW, at 35 feet		380	30			10	1550	23	102		
35	SAN PEDRO FM (Qsp), olive siltstone with very fine sand	SILT (ML), olive gray, damp to moist, firm to stiff;	375	35								
			370									

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 17

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.17

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	TEST DATA: ADDITIONAL TESTS
		slightly micaceous with fine sand below 40 feet.	370				12	1550	21	103		
	bedding break, B-N70E, 9NW, at 42 feet, gray siltstone, slightly fractured below 42 feet											
45	J-N50W, 55NE		365	45								
	thinnly bedded siltstone, B-N25E, 8NW at 47 feet											
50	J-N40W, 60NE, at 51 feet		360	50			50	850	25	102		
55	shear, S-N30W, 42NE, at 55 feet		355	55								
60			350	60			33/8"	850	21	98		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 17

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.17

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 270±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH 41.0 ELEVATION 229.0
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 61 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/14/96

REMARKS

Bottom at 61 feet
Seepage at 41 feet, no caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	ASPHALT, 2" thick asphalt		270								
	FILL (Af), with 2" diameter, well rounded gravel	SILTY SAND (SW), fine, tan to light brown, dry to damp, loose.									
	LANDSLIDE DEBRIS (Qls), light brown, fine sandy silt, soft to 17 feet	SILT (ML) with small gravel, light brown, damp, firm.									
5			265	5							
10			260	10		2	2400	7	103		
15			255	15							
	silty, fine grained sand, below 17 feet	SILTY SAND (SW), fine to medium, reddish light brown, damp, medium dense;									
20	abundant well rounded pebbles, gradational contact to a fine grained yellow brown, friable sand below, 20 feet	with some gravel and small cobbles below 20 feet.	250	20		8	2400	5	114		
		POORLY GRADED SAND (SP), reddish light brown, damp, medium dense;									
25	silty fine sand, moderatly dense below 24 feet	change to tan light brown below 25 feet.	245	25							
	gradational change to a silt with very fine sand below 28 feet	SILTY SAND (SW), fine, tan to light brown, damp, medium dense.									
30			240	30		20	1550	13	100		
		SILT (ML) with fine sand, tan to light brown, damp to moist, stiff;									
35	olive color silt, stiff, slightly, micaceous below 35 feet		235	35							
	orange rust staining between fractures at 37 feet	becoming light olive in color below 37 feet.									
	4" thick fine moist to wet sand layer, B-N50W, 35NE, at		230								

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 19

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.19

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	TEST DATA: ADDITIONAL TESTS
	39 feet rupture surface, clay shear with seepage, RS-N45W, 50NE at 41 feet		230				10	1550	23	102		
45	SAN PEDRO FM (Qsp), gray color siltstone, highly fractured to 45 feet	SILT (ML), gray, moist, firm becoming gray in color below 44 feet; micaceous below 45 feet.	225	45								
	bedding break, N10E, 14NW, at 48 feet											
50			220	50			30	850	25	101		
	very stiff below 54 feet											
55	bedding break, B-N50W, 6SW, at 55 feet		215	55								
60	1" thick hard silicious layer with slight seepage, N-S, 12SW at 59 feet		210	60			35	850	24	102		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 19

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.19

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 485±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 66 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/16/96

REMARKS

Bottom at 66 feet
No water or caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	TOPSOIL, dark brown clay with rootlets	LEAN CLAY (CL), brown, damp to moist, firm to stiff, with rootlets.	485									
	SAN PEDRO FM (Qsp), olive gray siltstone with orange staining, weathered to 6 feet	SILT (ML), light gray, moist, firm to stiff;										
5	3" thick gray clay layer, B-N55W, 14NE, at 5 feet gradational change to fine grained sand at 6 feet change back to siltstone below 7 feet caliche streaking at 8.5 feet	becoming olive color below 8 feet;	480	5								
10	becoming thinnly bedded at 10 feet, with interbedded fine sand layers approx. 2" thick 1/4" thick gypsum bed, B-N70W, 15NE, at 11 feet B-N60W, 18NE, at 13 feet	becoming stiff below 10 feet;	475	10			8	2400	11	102		
15	12" thick dark gray clay bed at 15 feet shear with hairline roots, S-N20W, 44SW, at 16 feet	becoming olive gray in color below 15 feet;	470	15								
	Approx. B-N-S, 12E, at 18 feet	change to light gray below 18 feet, with fine sand;										
20	olive color, very fine grained sand below 19 feet fine sand at 21 feet		465	20			6	2400	8	99		
	olive silt below 23 feet B-N40W, 18NE, at 24 feet											
25			460	25								
	becoming very stiff below 27 feet very fine sand at 28 feet gypsum lined joint, J-E-W,											
30	vertical at 29 feet		455	30			14	1550	20	103		
	1 foot layer fine sand at 33 feet											
35	1 foot layer olive gray silt, very stiff at 34 feet light gray silty sandstone below 35 feet		450	35								
			445									

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 21

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.21

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	ADDITIONAL TESTS
		with very fine sand at 40 feet.	445			■	17	1550	11	119		
	5" thick layer of silty fine sandstone at 42 feet fine grained sandstone below 44 feet	SILTY SAND (SP), fine, light gray, damp, dense;										
45	4" thick sandy gravel offset by fault, S-N20W, 50SW, at 45 feet 6" thick olive siltstone bed at 45.5 feet well graded friable sandstone below 46 feet	moist at 45 feet.	440	45								
50	abundant pebbles and gravel, well rounded below 47 feet 4" thick clay shear, gypsum within clay, S-N50E, 38NW, at 50 feet	WELL GRADED SAND (SW) with gravel, light gray, damp, dense.	435	50		■	30/10"	850	6	110		
55	18" thick gravel bed, approximate bedding, B-N70E, 30NW, at 55 feet fine grained sandstone, light gray below 55 feet dark gray siltstone at 58 feet		430	55								
		POORLY GRADED SAND (SP), fine, light gray, damp, dense.										
60	2" thick, very moist clay bed, B-N50E, 18NW, at 59 feet 4", well cemented, sandy conglomerate at 60 feet, shear S-N85, 50NW	SILTY GRAVEL (GM), medium, light brown to gray, damp to moist, dense.	425	60								
65		WELL GRADED SAND (SW), light gray, damp, dense.	420	65		■	40/9"	850	2	132		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 21

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.21

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 485±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 51 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/16/96

REMARKS

Bottom at 50.5 feet
No water or caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	SAN PEDRO FM (Qsp), brown color fine sandstone with rootlets light brown silt at 1 foot 1/4" thick clay bed, B-N20W, 8NE, at 1.5 feet 2" thick fine to medium grained sand layer at 2 feet thinnly bedded siltstone below 2.5 feet 1" thick gypsum layer, rust stained, B-N10E, 15SE, at 4 feet massive olive siltstone below 5 feet becoming a fine sandy siltstone below 9 feet dense olive gray silty fine sandstone, moderatly bedded, below 10 feet	SILTY SAND (SW), fine, light brown, damp, loose.	485									
5			480	5								
		SILT (ML), olive gray, moist, stiff.										
10			475	10			10	2400	15	105		
15	fine grained friable sandstone below 15 feet becoming fine to medium grained below 18 feet	SILTY SAND (SW), fine, light brown, damp to moist, dense.	470	15								
20	6" thick well graded sand layer at 20 feet 2" thick clay bed, B-N80W, 16NE, at 20.5 feet 6" thick gravel layer at 22 feet fine sandstone below 22.5 feet		465	20			15	2400	4	109		
25	gravel layer between 24 and 27 feet 6" thick siltstone blebs within gravel, clay shear seperating small and larger gravel, S-E-W, 55N, at 24 feet		460	25								
30	coarse sand with gravel below 27 feet B-N80E, 14NW, at 29 feet 6" thick claybed, B-N55W, 11NE, at 32 feet friable fine sand at 33 feet well graded sand below 33 feet	POORLY GRADED GRAVEL (GP), tan to light brown, damp, dense.	455	30								
		SILTY SAND (SW), fine, light brown, damp, dense.										
35			450	35			20/10"	1550	4	103	85	CP,CS,HY,AL,EI,CH,DS(R)
	3" thick gravel layer, B-N55W, 18NE, at 38 feet massive fine sandstone below	POORLY GRADED SAND (SP), fine, light gray, damp, dense.										
			440									

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 22

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.22

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	TEST DATA: ADDITIONAL TESTS
	39 feet		445			■	30/10"	1550	7	99		
45			440	45								
50			435	50		■	40/5"	850	3	106		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 22

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.22

PROJECT Pacfic Coast Homes
LOCATION West Covote Hills.
GROUND SURFACE ELEVATION 425±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 61 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 2/19/96

REMARKS

Bottom at 61 feet
No water or caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	TOPSOIL, slightly porous brown clay	LEAN CLAY (CL), brown, damp to moist, firm.	425									
5	SAN PEDRO FM (Qsp), alternating layers of fine sands and silts to 8 feet, hairline rootlets along joint/fractures to 10 feet B-N65W, 5NE, at 5 feet	POORLY GRADED SAND (SP), very fine, olive brown, damp to moist, loose.	420	5								
10	B-N25E, 15SE, at 9 feet 4" thick fine sand layer, gray silt with fine sand below 9.5 feet becoming stiffer below 11 feet	LEAN CLAY (CL) with fine sand, olive, moist, stiff.	415	10			4	2400	22	98		
15	light gray fine grained friable sand below 14 feet, approx. bedding, B-N65W, 15NE, at 14 feet olive gray silt below 17 feet, B-N60W, 20NE, at 17 feet	POORLY GRADED SAND (SP), fine, olive, moist, medium dense.	410	15								
		SILTY SAND (SM), fine, olive, moist, stiff, medium dense.										
20	siltstone highly fractured below 20 feet	LEAN CLAY (CL) with fine sand, olive, moist, stiff with orange rust staining.	405	20			4	2400	21	103		
	shear with polished surface, S-N80E, 55NW, at 23 feet	SILT (ML), olive gray, moist, stiff.										
25	B-N60E, 20NW, at 25 feet		400	25								
	1 foot layer fine sand at 27 feet olive gray silt below 28 feet											
30	silty fine sandstone below 30 feet		395	30			8	1550	20	100		
35	dense fine grained sand below 34 feet	SILTY SAND (SM), fine, olive, damp to moist, medium dense.	390	35								
	2" thick silt bed, B-N50W, 15NE, at 37 feet shear, S-N35E, 18SE, at 38 feet		365									

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 24

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.24

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
			385									
	B-N30E, 20SE, at 43 feet						12	1550	19	100		
45	fine to medium sand below 44.5 feet		380	45								
	dark gray siltstone, B-N70W, 14NE, at 46 feet											
	gradational change to silty fine grained sand below 47 feet	POORLY GRADED SAND (SP), fine, light gray, dense.										
50			375	50			25	850	16	99		
	gray silt with fine sand below 51 feet	LEAN CLAY (CL), gray, moist, stiff.										
	dark gray clay stone, very stiff and moist below 53 feet end visual log at 53 feet	SILT (ML), olive gray, moist, stiff.										
55			370	55								
60			365	60			24	850	20	105		

SAMPLE DATA | TEST DATA

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 24

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.24

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 222±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rovary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 61 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Oen drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/4/96

REMARKS

No water or caving
Hole tamped while backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	ASPHALT, 3" FILL (Af), red brick pieces	SILTY SAND (SW), fine to medium, dark gray, damp to moist, medium dense; becoming brown in color below 2 feet; petroleum odor at 4 feet; becoming very fine grained below 5 feet	220								
5	COLLUVIUM/OLDER ALLUVIUM (Qcol/Qoal)	SILT (ML) with fine sand, olive, moist, firm to stiff;	215	5		1	2400	10	108		
10			210	10		1	2400	12	104		
15		becoming light olive color below 15 feet.	205	15		2	2400	9	111		
20		SILTY SAND (SW), fine to medium, with small gravel, olive, moist, medium dense.	200	20		3	2400	8	113		
25		SILT (ML) with small gravel, olive, moist, firm to stiff;	195	25		3	1550	13	109		
30		with some fine sand at 30 feet.	190	30		5	1550	11	115		
35		CLAYEY SAND (SC), fine, brown, moist, medium dense.	185	35		6	1550	15	116		

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 25

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.25

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
		SILTY SAND (SM), fine, brown, moist, medium dense.	180				5	1550				
45			175	45			14	1550				
50		LEAN CLAY (CL), grayish-brown, moist to wet, firm.	170	50			10	850				
55	SAN PEDRO FM (Qsp), siltstone	SILT (ML), olive, moist, stiff; becoming gray in color below 57 feet.	165	55			25	850				
60				60			35	850				

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 25

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.25

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 230±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH 50.0 ELEVATION 180.0
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 56 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/4/96

REMARKS

Bottom at 56 feet
Water at 50 feet, no caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	COLLUVIUM/OLDER ALLUVIUM (Qclo/Qoal)	SILTY SAND (SW), fine, light brown, damp, loose.	230									
5			225	5			2	2400	5	101		
10		SILT (ML), with fine sand, light brown, damp, firm.	220	10			2	2400	8	106		
15			215	15			2	2400	9	105		
20		SILTY SAND (SW), fine, with small to medium gravel, light brown, damp, medium dense.	210	20			2	2400	8	107		
		SILT (ML) with fine sand, light brown, damp, firm;										
25		becoming stiff below 25 feet.	205	25			4	1550	7	108		
30			200	30			5	1550	4	114		
		SILTY SAND (SW), fine, light brown, damp, medium dense.										
35			195	35			7	1550	8	111		
			190									

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 26

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.26

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
		LEAN CLAY (CL) with fine sand, brown, moist, firm to stiff.	190				4	1550	16	105		
45		SILTY SAND (SM), fine, light brown, damp, medium dense; becoming moist below 46 feet;	185	45			11	1550	10	97		
50	SAN PEDRO FM (Qsp), siltstone	seepage at 50 feet. SILT (ML) with fine sand, olive brown, wet, stiff; mottled olive-gray below 52 feet	180	50			20	850	26	97		
55			175	55			11	850	25	98		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 26

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.26

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 205±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH 20.0 ELEVATION 185.0
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 41 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/18/96

REMARKS

Bottom at 41 feet
Seepage at 20 feet, caving below 20 feet
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	FILL (Qaf)	SILTY SAND (SM), fine, damp to moist, loose to medium dense.	205				4	1550				
	COLLOUVIUM/OLDER ALLUVIUM (Qccol/Qoal)	FAT CLAY (CH), dark brown, moist, firm;										
5		light yellow brown at 7 feet.	200	5			P	2400	17	99		CN
		SILT (ML), light brown, moist, firm;										
10		very moist, yellow brown at 12 feet;	195	10			1	2400	17	102		CN
15		becoming brown in color at 15 feet;	190	15			1	2400	17	107		
20		moist to wet below 20 feet, seepage at 20 feet.	185	20			1	2400	22	99		
25		LEAN CLAY (CL), yellowish brown, wet, stiff.	180	25					20	108		
30			175	30			1	1550	19	109		
		LEAN CLAY (CL), yellowish brown, wet, stiff.										
35			170	35			2	1550	25	98		
			165									

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 27

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.27

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	TEST DATA: ADDITIONAL TESTS
			165			■	3	1550	20	107		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 27

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.27

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 295±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 31 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/18/96

REMARKS

Bottom at 31 feet
No water or caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	FILL (Qaf)	SILT (ML) with fine sand, light brown, dry to damp, loose;	295									
5		with some coarse grain sand at 5 feet;	290	5			P	2400	7	98		
10		roots and organic debris at 9 feet.	285	10								
	COLLUVIUM/OLDER ALLUVIUM (Qcol/Qoal)	SILT (ML) with clay, olive brown, moist, firm;										
15			280	15			P	2400	15	102		
20	SAN PEDRO FM (Qsp), siltstone	SILT (ML), olive, moist, stiff;	275	20			5	2400	20	106		
25			270	25								
		becoming olive gray below 28 feet.										
30			265	30			12	1550	24	102		

LEGEND ON PLATE A-3

SHEET 1 OF 1

LOG OF DRILL HOLE

DH 29

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.29

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 265±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 51 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/19/96

REMARKS

Bottom at 51 feet
No water or caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	TOPSOIL, brown, very moist clay, soft to firm	FAT CLAY (CH), dark brown, moist, firm.	265									
5	LANDSLIDE DEBRIS (Qls), highly weathered, slightly porous silt	SILT (ML) with clay, light brown, moist, firm.	260	5								
10	rootlets to 10 feet	SILTY SAND (SM), fine, olive, damp, medium dense.	255	10			5	2400	16	98		
15	silt with fine sand, no discernable bedding at 14 feet 1 foot thick dark gray clay shear with slicken sides, S-N60W, 22NE, at 18 feet	LEAN CLAY (CL), olive, moist, firm.	250	15			3	2400	25	96		
20	SAN PEDRO FM (Qsp), ~~siltstone, massive bedding~~	SILT (ML) with clay, olive-gray, moist, stiff.	245	20			5	2400	24	99		
25	light gray, medium grained sand, slightly friable, B-N35W, 20NE at 26 feet	WELL GRADED SAND (SW), orange-brown, damp to moist, dense.	240	25			17	1550	24	98		
30			235	30			9	1550	10	111		
35	gray, fine sand B-N25W, 20NE, at 32 feet orange-brown, silty fine sand below 37 feet	POORLY GRADED SAND (SP), fine, gray, damp, dense.	230	35								

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 32

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.32

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	TEST DATA: ADDITIONAL TESTS
		SILTY SAND (SM), fine, orange-brown, damp, dense.	225				17	1550	10	108		
45			220	45								
50			215	50					11	98		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 32

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.32

PROJECT Pacfic Coast Homes
LOCATION West Coyote Hills.
GROUND SURFACE ELEVATION 247±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 51 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/20/96

REMARKS

Bottom at 51 feet
No water or caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	FILL (Qaf), asphalt at surface, dark brown clay	SILTY SAND (SW), very fine, light brown, damp to moist, loose.	245									
5	SAN PEDRO FM (Qsp), or LANDSLIDE DEBRIS (Qls), olive siltstone firm, massive bedding becoming firmer at 7 feet	SILT (ML) with fine sand, light brown, damp, firm; becoming light olive in color below 8 feet; becoming stiff below 10 feet.	240	5								
10	B-N55E, 8NW, at 12 feet thinnly bedded below 12 feet		235	10			8	2400	15	104		
15	B-N45E, 30NW, at 15 feet		230	15								
20	possible rupture surface, 4" thick clay shear, S-N40E, 30NW SAN PEDRO FM (Qsp), siltstone, becoming stiffer below 22 feet		225	20			5	2400	25	99		
25			220	25								
30		LEAN CLAY (CL), olive, moist, stiff.	215	30			14	1550	23	103		
35		SILT (ML), olive, moist, stiff.	210	35								

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 34

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.34

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	TEST DATA: ADDITIONAL TESTS
		LEAN CLAY (CL), olive, moist, stiff.	205				12	1550	22	104		
45	slightly friable sand below 44 feet, B-N20E, 20NW, at 44 feet	SILTY SAND (SM), fine, light olive, damp to moist, dense.		45								
	large rounded gravel at 48 feet silty clay at 49 feet	POORLY GRADED SAND (SP), fine, light olive, damp, dense.	200									
50		LEAN CLAY (CL), dark olive, moist, very stiff.		50			40	850	23	102		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 34

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.34

PROJECT Pacfic Coast Homes
LOCATION West Covote Hills.
GROUND SURFACE ELEVATION 245±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 51 FEET DIAMETER(S) OF HOLE 18 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD Kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/20/96

REMARKS

Bottom at 51 feet
No water or caving
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	FILL (Qaf), loose, silty sand with rootlets, wood, wire, and asphalt debris dispersed thru-out fill 1	SILTY SAND (SW), fine, brown, moist, loose.	245									
		SILT (ML), light olive, damp to moist, firm.										
5	SAN PEDOR FM (Qsp), olive color very fine grained sandstone, massively bedded to 12 feet	SILT (ML), light olive, damp to moist, firm; with fine sand at 8 feet.	240	5								
10	thinnly beded siltstone, B-N10E, 10SE, at 12 feet very fine grained sandstone below 13 feet	SILTY SAND (SW), fine, tan to light brown, damp, medium dense.	235	10			8	2400	6	104		
15	friable fine sand below 15 feet	POORLY GRADED SAND (SP), fine, orange-brown, damp to moist, medium dense.	230	15								
	well graded sand with rounded gravel at 17 feet sharp contact with olive gray silt at 18 feet	SILT (ML), olive, moist, stiff.										
20	F-N15W, 75SW, at 19 feet, 1 foot seperation of upper sand and lower silt		225	20			6	2400	3	108		
		WELL GRADED SAND (SW), orange-brown, damp, medium dense.										
	silt becoming very stiff below 23 feet	LEAN CLAY (CL), olive-gray, moist, stiff with rust staining.										
25			220	25								
30			215	30			10	1550	23	101		
		SILT (ML), olive-gray, moist, stiff.										
35	seepage along 2" thick clay gouge zone, F-N35W, 75SW, at 34 feet		210	35								
			205									

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 35

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.35

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	TEST DATA: ADDITIONAL TESTS
		LEAN CLAY (CL), olive-gray, moist, stiff;	205				10	1550	25	99		
45			200	45								
		becoming gray in color below 46 feet.										
50			195	50			30/10"	850	23	101		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 35

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.35

PROJECT Pacfic Coast Homes
LOCATION West Covote Hills.
GROUND SURFACE ELEVATION 250±FEET
DATUM Mean Sea Level
GROUNDWATER DEPTH _____ ELEVATION _____
DRILLING METHOD Rotary bucket
CONTRACTOR Al-Roy Drilling Inc.
TOTAL DEPTH OF HOLE 41 FEET DIAMETER(S) OF HOLE 24 INCHES

SAMPLING INFORMATION
SAMPLER(S) Open drive sampler with 8-inch sleeve
DRIVING METHOD kelly DROP 12 inches

LOGGED BY EDL
DATE DRILLED 3/20/96

REMARKS

Bottom at 41 feet
No water or caving
Petroleum odor at 29 feet
Hole backfilled

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE	NUMBER OF BLOWS	DRIVING WEIGHT (pounds)	MOISTURE CONTENT	DRY DENSITY (pcf)	RELATIVE COMPACT.	ADDITIONAL TESTS
	FILL (Qaf)	SILTY SAND (SM), fine, brown, moist, loose.	250									
		SILT (ML), light olive, moist, firm;										
5			245	5								
	COLLUVIUM/OLDER ALLUVIUM (Qcol/Qoal), no visual log due to petroleum fumes	SILT (ML), light olive, moist, firm.										
10			240	10			P	2400	19	106		
15			235	15								
		SILT (ML) with fine sand, olive, moist, firm;										
20		with some clay at 20 feet;	230	20			P	2400	19	100		
	SAN PEDRO FM (Qsp)	becoming very moist at 24 feet.										
25		LEAN CLAY (CL), gray, moist, firm;	225	25								
30		with some dark gray fine sand, and petroleum odor at 29 feet; stiff below 30 feet.	220	30			8	1550	26	98		
35			215	35								
			210									

LEGEND ON PLATE A-3

SHEET 1 OF 2

LOG OF DRILL HOLE

DH 36

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.36

DEPTH	GEOLOGICAL CLASSIFICATION DESCRIPTION	ENGINEERING CLASSIFICATION AND DESCRIPTION	ELEVATION	DEPTH	SOIL SYMBOL	SAMPLE DATA: SAMPLE	SAMPLE DATA: NUMBER OF BLOWS	SAMPLE DATA: DRIVING WEIGHT (pounds)	TEST DATA: MOISTURE CONTENT	TEST DATA: DRY DENSITY (pcf)	TEST DATA: RELATIVE COMPACT.	ADDITIONAL TESTS
			210			■	12	1550	24	101		

LEGEND ON PLATE A-3

SHEET 2 OF 2

LOG OF DRILL HOLE

DH 36

PROJECT 96-01

Goffman, McCormick & Urban, Inc.

PLATE A-1.36

Appendix C
Laboratory Test Results

APPENDIX C

Laboratory Test Results

The laboratory testing program was directed towards providing quantitative data relating to the relevant engineering properties of the soils. Samples considered representative of site conditions were tested in general accordance with American Society for Testing and Materials (ASTM) procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and a table summarizing the test results.

Moisture and Density Determination Tests: Moisture content (ASTM D2216) and dry density determinations (ASTM D2937) were performed on driven samples obtained from the test borings. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined from undisturbed or disturbed samples.

Grain Size Distribution/Fines Content: Representative samples were dried, weighed, and soaked in water until individual soil particles were separated (per ASTM D421) and then washed on a No. 200 sieve (ASTM D1140). Where applicable, the portion retained on the No. 200 sieve was dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D6913 (sieve) or ASTM D422 (sieve and hydrometer).

Sample Location	Description	% Passing # 200 Sieve
HS-11 @ 35 ft	Silty Sand	34
HS-11 @ 40 ft	Silty-Clayey Sand	42
HS-13 @ 15 ft	Silty Sand	28
HS-13 @ 25 ft	Silty Sand	28
HS-13 @ 35 ft	Silty-Clayey Sand	44
HS-13 @ 40 ft	Silty-Clayey Sand	36
HS-15 @ 20 ft	Clayey Sand	15
HS-16 @ 15 ft	Sandy Clay	51
HS-16 @ 25 ft	Clay with Sand	75
HS-16 @ 35 ft	Silt with Sand	84
HS-17 @ 5-7 ft	Sandy Clay	51
HS-17 @ 15 ft	Silty Sand	25
HS-17 @ 30 ft	Silty Sand	44
HS-17 @ 40 ft	Sand with Silt	7
B-3 @ 30-33 ft	Sandy Clay	51
B-4 @ 35-40 ft	Silty Sand	20

Laboratory Test Results

Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined per ASTM D4318 for engineering classification of fine-grained material and presented in the table below. The USCS soil classification indicated in the table below is based on the portion of sample passing the No. 40 sieve and may not necessarily be representative of the entire sample. The plots are provided in this Appendix.

Sample Location	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS Soil Classification
HS-3 @ 10 ft	27	14	13	CL
HS-3 @ 15 ft	25	15	10	CL
HS-3 @ 25 ft	39	16	23	CL
HS-11 @ 40 ft	24	20	4	CL-ML
HS-12 @ 40 ft	37	14	23	CL
HS-12 @ 50 ft	42	20	22	CL
HS-13 @ 15 ft	21	20	1	ML
HS-13 @ 35 ft	24	20	4	CL-ML
HS-14 @ 10 ft	39	16	23	CL
HS-14 @ 20 ft	25	15	10	CL
HS-15 @ 20 ft	67	19	48	CH
HS-15 @ 25 ft	42	21	21	CL
HS-16 @ 20 ft	36	19	17	CL
HS-16 @ 35 ft	38	27	11	ML
HS-17 @ 5-7 ft	31	16	15	CL
HS-17 @ 20 ft	42	20	22	CL
HS-17 @ 25 ft	32	17	15	CL
B-1 @ 30 ft	44	24	20	CL
B-3 @ 30-33 ft	33	23	10	CL
B-4 @ 40 ft	NP	NP	NP	ML
B-4 @ 35-40 ft	NP	NP	NP	SM
B-4 @ 60 ft	49	23	26	CL

Direct Shear: Direct shear tests were performed on selected driven and remolded samples, which were soaked for a minimum of 24 hours prior to testing. The samples were tested under various normal loads using a motor-driven, strain-controlled, direct-shear testing apparatus (ASTM D3080). The plots are provided in this Appendix.

Laboratory Test Results

Consolidation: Consolidation tests were performed per ASTM D2435. Samples (2.4 inches in diameter and 1 inch in height) were placed in a consolidometer and increasing loads were applied. The samples were allowed to consolidate under "double drainage" and total deformation for each loading step was recorded. The percent consolidation for each load step was recorded as the ratio of the amount of vertical compression to the original sample height. The consolidation pressure curves are provided in this Appendix.

Expansion Index: The expansion potential of selected representative samples was evaluated by the Expansion Index Test per ASTM D4829.

Sample Location	Expansion Index	Expansion Potential*
HS-1 @ 30 ft	15	Very Low
HS-6 @ 23-28 ft	37	Low
B-1 @ 5-8 ft	36	Low

* Per ASTM D4829

Laboratory Compaction: The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D1557. The results of these tests are presented in the table below.

Sample Location	Sample Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
HS-1 @ 40-45 ft	Light Olive Brown Silty Sand	125.5	10.5
HS-3 @ 15-20 ft	Olive Brown Silty Sand with Gravel	140.0*	5.5*
HS-17 @ 5-7 ft	Olive Brown Sandy Clay	127.0*	9.0*
B-3 @ 30-33 ft	Light Olive Brown Sandy Clay	115.0	14.5
B-4 @ 35-40 ft	Light Olive Brown Silty Sand	120.0	11.5

*Includes oversize rock correction factor

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geochemical methods (CTM 417). The test results are presented in the table below.

Sample Location	Sulfate Content
HS-1 @ 30 ft	0.013%
HS-6 @ 23-28 ft	0.050%
B-1 @ 5-8 ft	0.011%

Laboratory Test Results

Chloride Content: Chloride content was tested per CTM 422. The results are presented below.

Sample Location	Chloride Content, ppm
HS-1 @ 30 ft	75
HS-6 @ 23-28 ft	175
B-1 @ 5-8 ft	33

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with CTM 643 and standard geochemical methods. The results are presented in the table below.

Sample Location	pH	Minimum Resistivity (ohms-cm)
HS-1 @ 30 ft	8.2	1,075
HS-6 @ 23-28 ft	7.8	478
B-1 @ 5-8 ft	7.6	1,898

ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	08/07/14
Project No. :	14057-01	Input By:	J. Ward	Date:	08/11/14
Boring No.:	HS-3	Checked By:	J. Ward		
Sample No.:	R-3	Depth (ft.)	10.0		
Soil Identification:	Dark grayish brown lean clay (CL)				

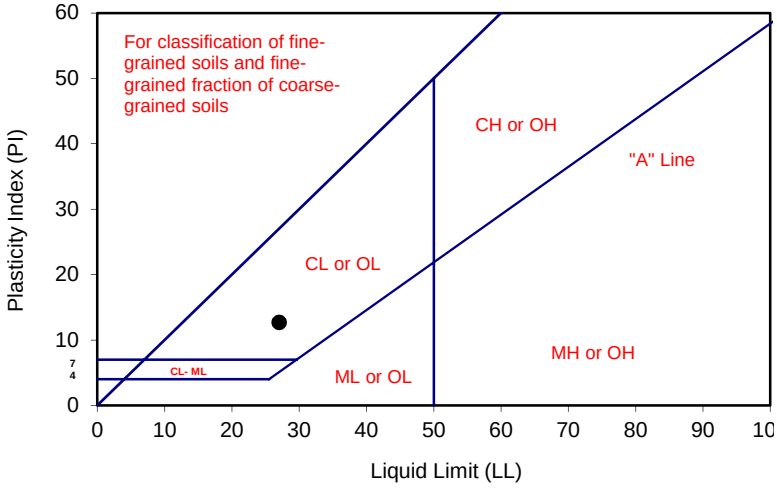
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	29	22	17
Wet Wt. of Soil + Cont. (g)	20.57	19.92	29.15	27.75	27.08	26.16
Dry Wt. of Soil + Cont. (g)	19.43	18.89	25.92	24.78	24.20	23.43
Wt. of Container (g)	11.50	11.65	13.59	13.61	13.58	13.62
Moisture Content (%) [Wn]	14.38	14.23	26.20	26.59	27.12	27.83

Liquid Limit	**27**
Plastic Limit	**14**
Plasticity Index	**13**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 5.11

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



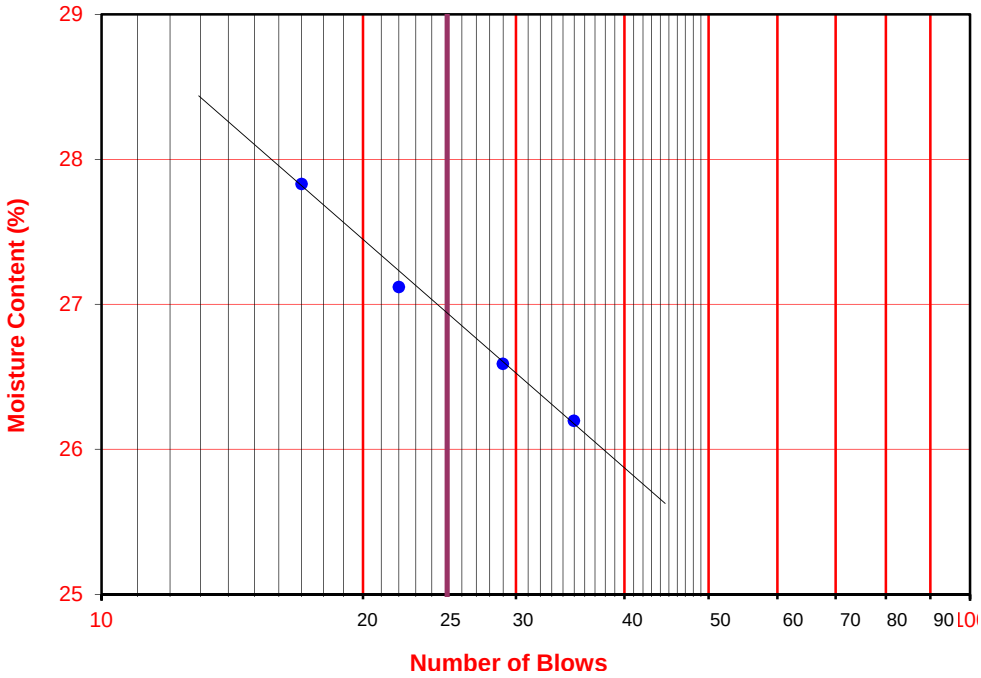
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	08/11/14
Project No. :	14057-01	Input By:	J. Ward	Date:	08/15/14
Boring No.:	HS-3	Checked By:	J. Ward		
Sample No.:	R-4	Depth (ft.)	15.0		
Soil Identification:	Dark yellowish brown sandy lean clay s(CL)				

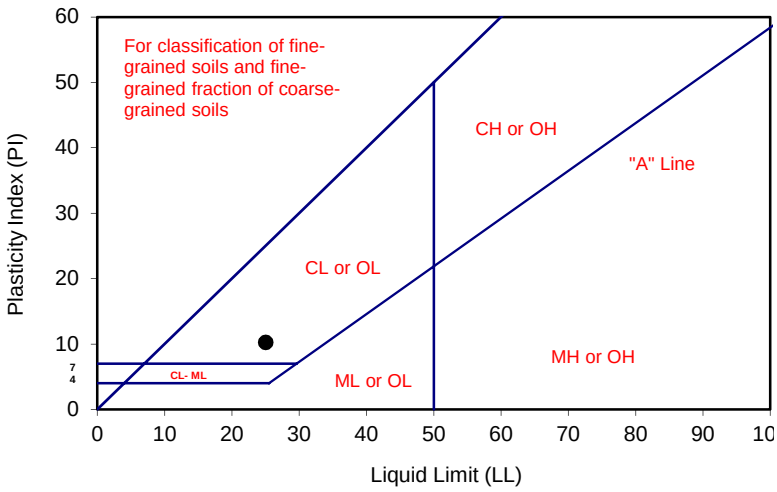
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	26	20	
Wet Wt. of Soil + Cont. (g)	26.29	24.43	28.49	29.36	29.42	
Dry Wt. of Soil + Cont. (g)	24.65	22.79	25.61	26.23	26.16	
Wt. of Container (g)	13.56	11.65	13.50	13.63	13.55	
Moisture Content (%) [Wn]	14.79	14.72	23.78	24.84	25.85	

Liquid Limit	**25**
Plastic Limit	**15**
Plasticity Index	**10**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 3.65

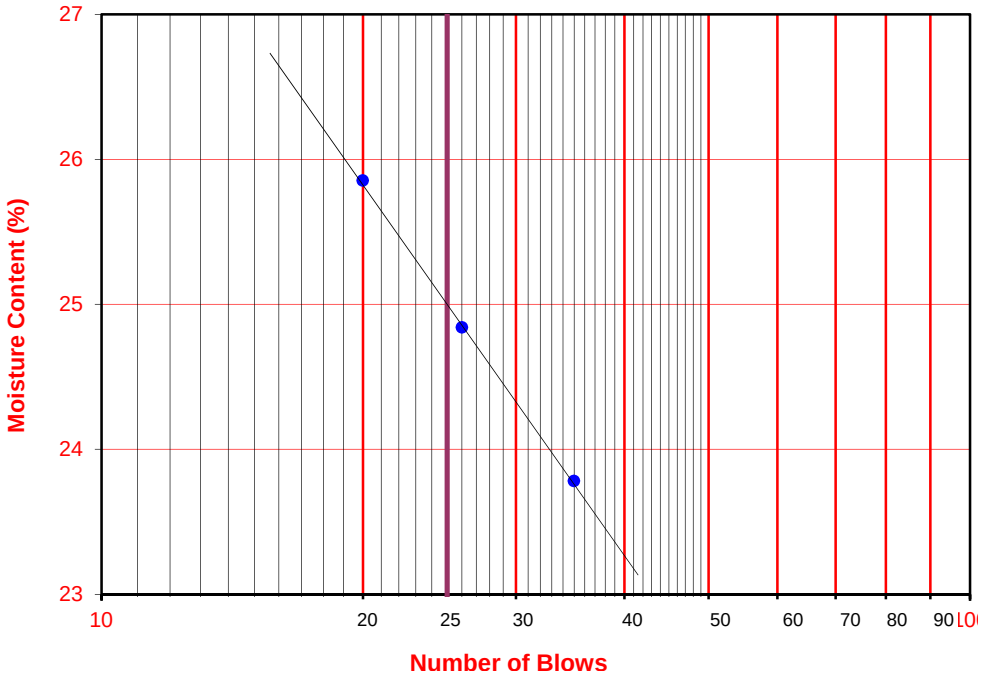
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation
  Multipoint - Wet
- [x] Dry Preparation
  Multipoint - Dry
- [x] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	08/11/14
Project No. :	14057-01	Input By:	J. Ward	Date:	08/15/14
Boring No.:	HS-3	Checked By:	J. Ward		
Sample No.:	R-6	Depth (ft.)	25.0		
Soil Identification:	Dark yellowish brown lean clay (CL)				

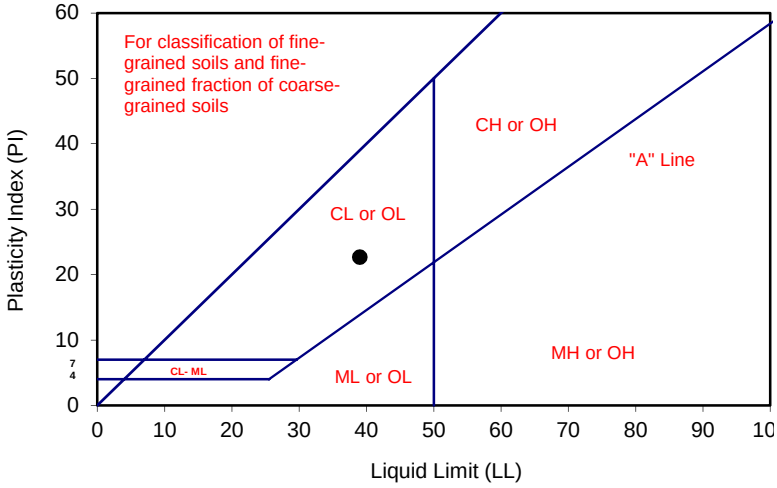
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	27	19	
Wet Wt. of Soil + Cont. (g)	26.58	25.13	25.97	27.30	30.10	
Dry Wt. of Soil + Cont. (g)	24.76	23.52	22.64	23.51	25.34	
Wt. of Container (g)	13.63	13.64	13.62	13.56	13.50	
Moisture Content (%) [Wn]	16.35	16.30	36.92	38.09	40.20	

Liquid Limit	**39**
Plastic Limit	**16**
Plasticity Index	**23**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 13.87

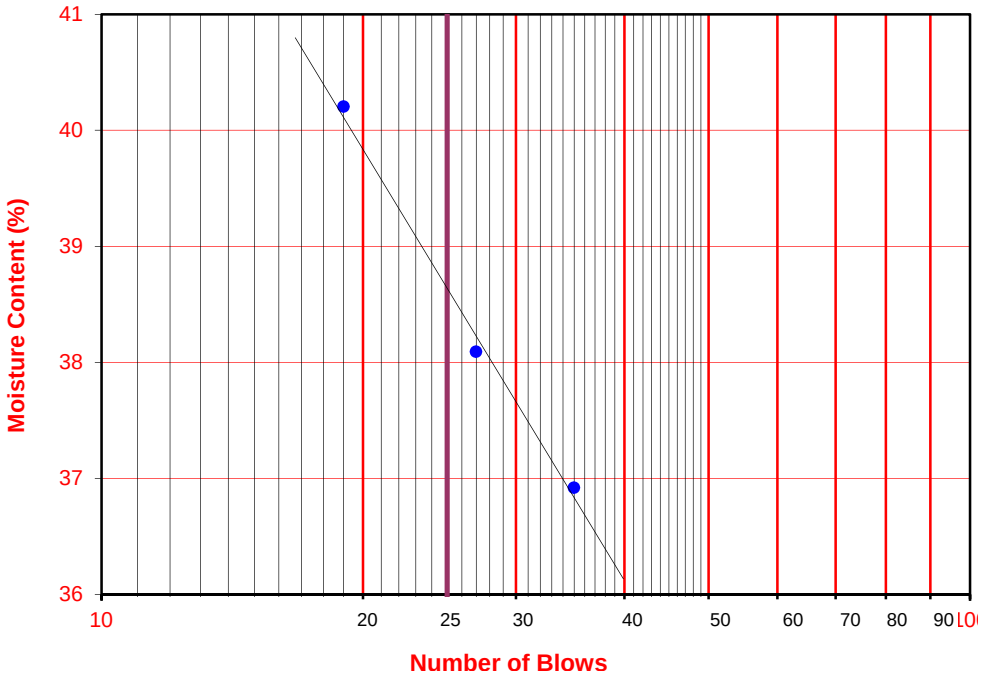
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$

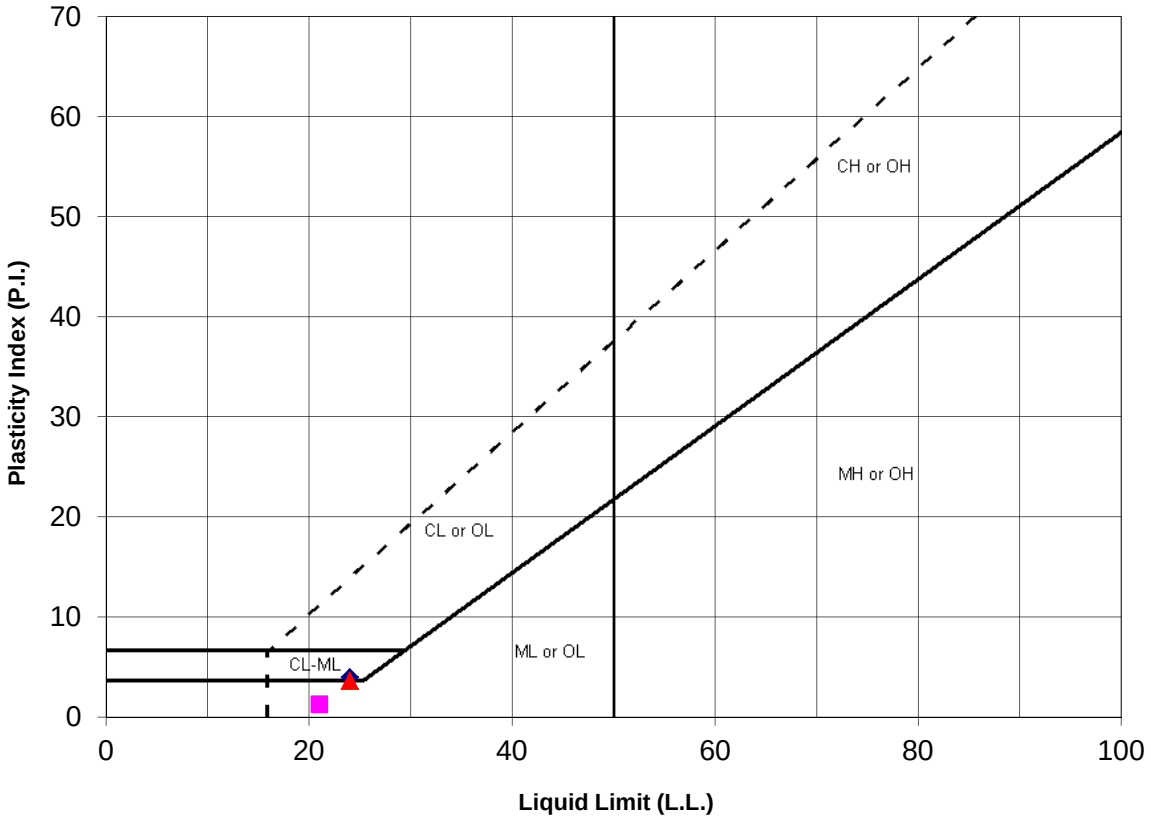


PROCEDURES USED

- [ ] Wet Preparation
  Multipoint - Wet
- [x] Dry Preparation
  Multipoint - Dry
- [x] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test



PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



Symbol	Location.:	Sample No.:	Depth (ft)	Passing No. 200 Sieve (%)	Liquid Limit (%) LL	Plastic Limit (%) PL	Plasticity Index (%) PI	USCS
◆	HS-11	R-5	40	42	24	20	4	CL-ML
■	HS-13	R-2	15	28	21	20	1	ML
▲	HS-13	R-6	35	44	24	20	4	CL-ML

LGC Geotechnical, Inc.

ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 14057-01
Date: Aug-14

Westridge

ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	08/12/14
Project No. :	14057-01	Input By:	J. Ward	Date:	08/15/14
Boring No.:	HS-12	Checked By:	J. Ward		
Sample No.:	R-4	Depth (ft.)	40.0		
Soil Identification:	Dark grayish brown lean clay with sand (CL)s				

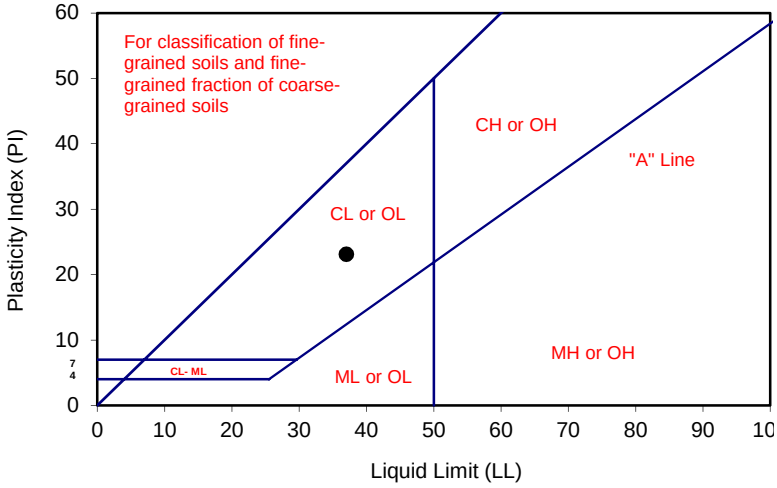
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	26	21	16
Wet Wt. of Soil + Cont. (g)	19.92	21.42	27.77	31.25	31.04	31.02
Dry Wt. of Soil + Cont. (g)	18.89	20.23	24.17	26.53	26.21	25.96
Wt. of Container (g)	11.49	11.65	13.62	13.62	13.58	13.59
Moisture Content (%) [Wn]	13.92	13.87	34.12	36.56	38.24	40.91

Liquid Limit	**37**
Plastic Limit	**14**
Plasticity Index	**23**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 12.41

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



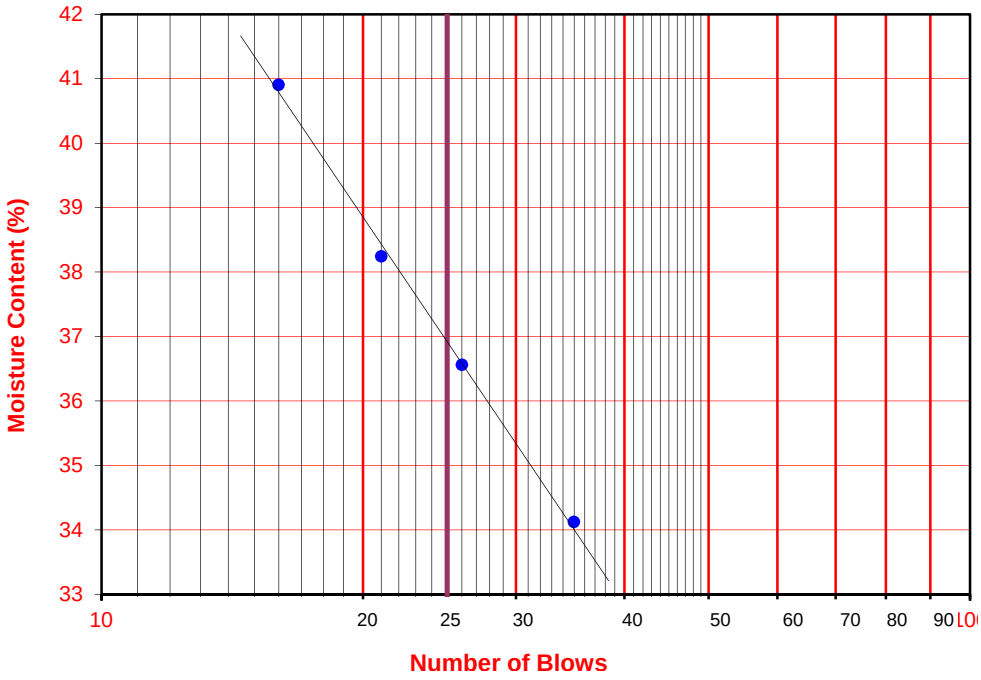
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	08/12/14
Project No. :	14057-01	Input By:	J. Ward	Date:	08/15/14
Boring No.:	HS-12	Checked By:	J. Ward		
Sample No.:	R-6	Depth (ft.)	50.0		
Soil Identification:	Olive gray lean clay (CL)				

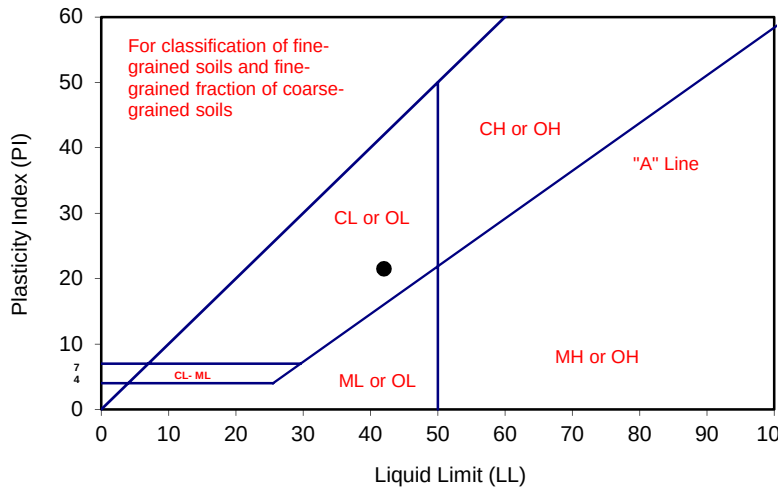
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	25	16	
Wet Wt. of Soil + Cont. (g)	18.08	21.91	27.32	27.07	27.68	
Dry Wt. of Soil + Cont. (g)	16.97	20.15	23.37	23.05	23.34	
Wt. of Container (g)	11.50	11.65	13.54	13.55	13.64	
Moisture Content (%) [Wn]	20.29	20.71	40.18	42.32	44.74	

Liquid Limit	**42**
Plastic Limit	**20**
Plasticity Index	**22**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 16.06

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



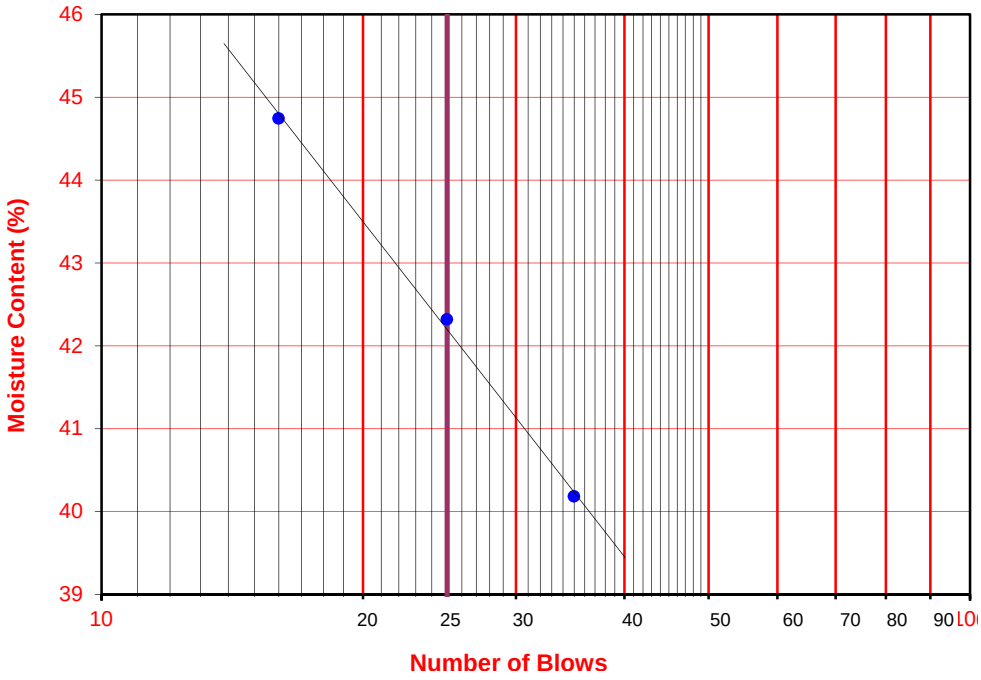
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	08/13/14
Project No. :	14057-01	Input By:	J. Ward	Date:	08/15/14
Boring No.:	HS-14	Checked By:	J. Ward		
Sample No.:	R-2	Depth (ft.)	10.0		
Soil Identification:	Dark olive gray lean clay (CL)				

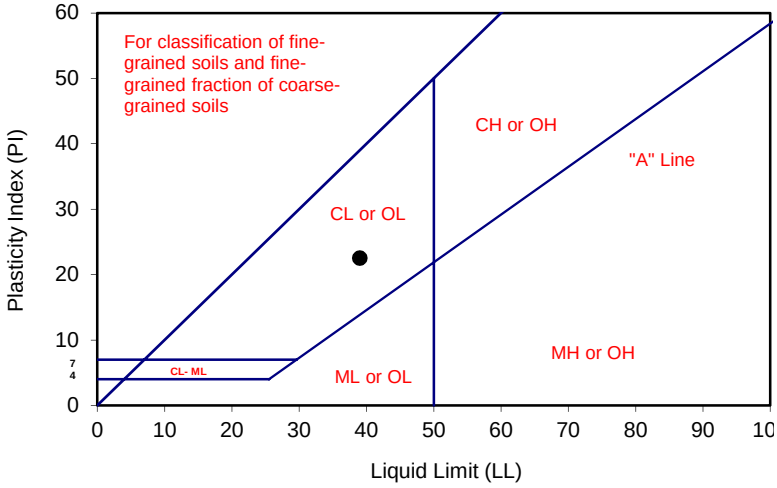
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	28	19	
Wet Wt. of Soil + Cont. (g)	23.31	24.20	27.49	29.16	29.79	
Dry Wt. of Soil + Cont. (g)	21.95	22.68	23.77	24.82	25.07	
Wt. of Container (g)	13.57	13.59	13.63	13.59	13.50	
Moisture Content (%) [Wn]	16.23	16.72	36.69	38.65	40.80	

Liquid Limit	**39**
Plastic Limit	**16**
Plasticity Index	**23**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 13.87

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



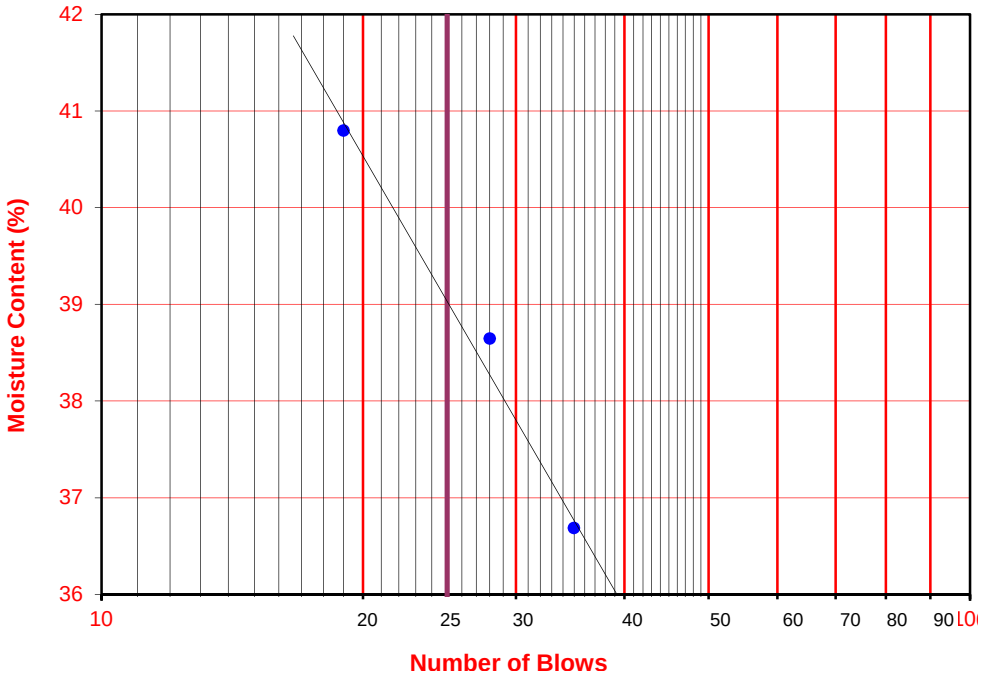
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	08/14/14
Project No. :	14057-01	Input By:	J. Ward	Date:	08/15/14
Boring No.:	HS-14	Checked By:	J. Ward		
Sample No.:	R-4	Depth (ft.)	20.0		
Soil Identification:	Olive brown clayey sand (SC)				

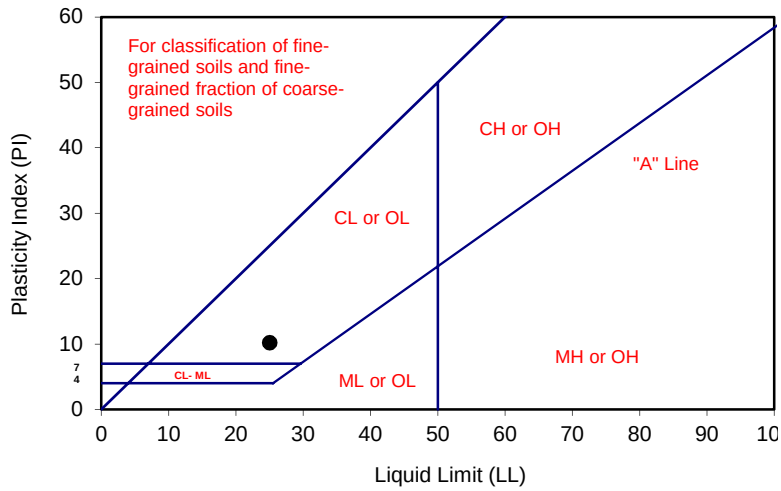
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			31	26	17	
Wet Wt. of Soil + Cont. (g)	23.92	22.64	28.00	26.93	27.22	
Dry Wt. of Soil + Cont. (g)	22.32	21.22	25.24	24.28	24.38	
Wt. of Container (g)	11.50	11.64	13.60	13.50	13.58	
Moisture Content (%) [Wn]	14.79	14.82	23.71	24.58	26.30	

Liquid Limit	**25**
Plastic Limit	**15**
Plasticity Index	**10**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 3.65

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



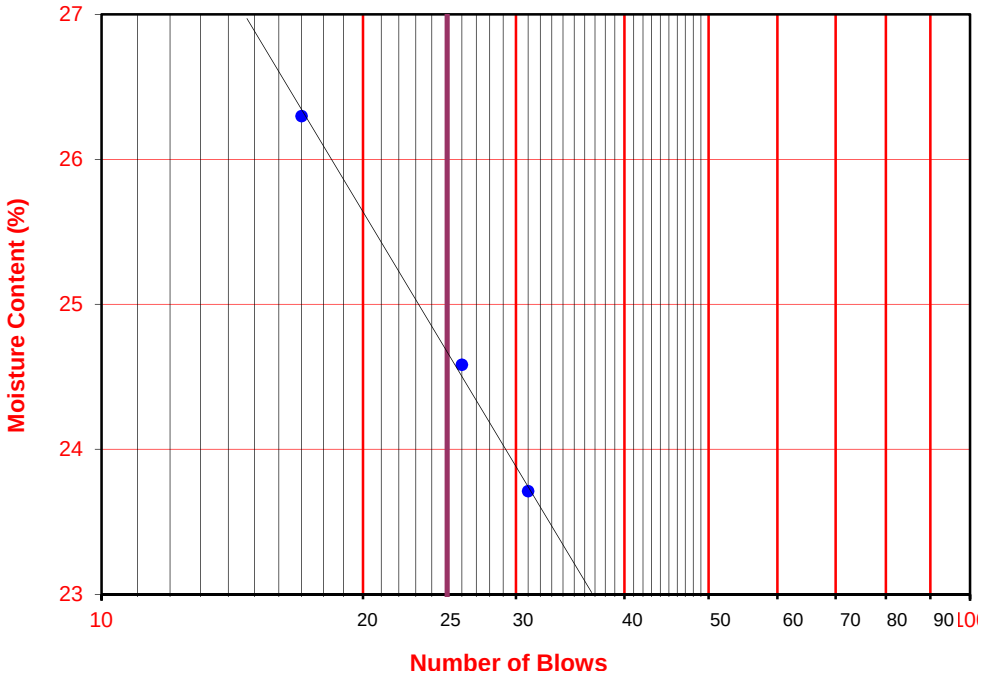
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

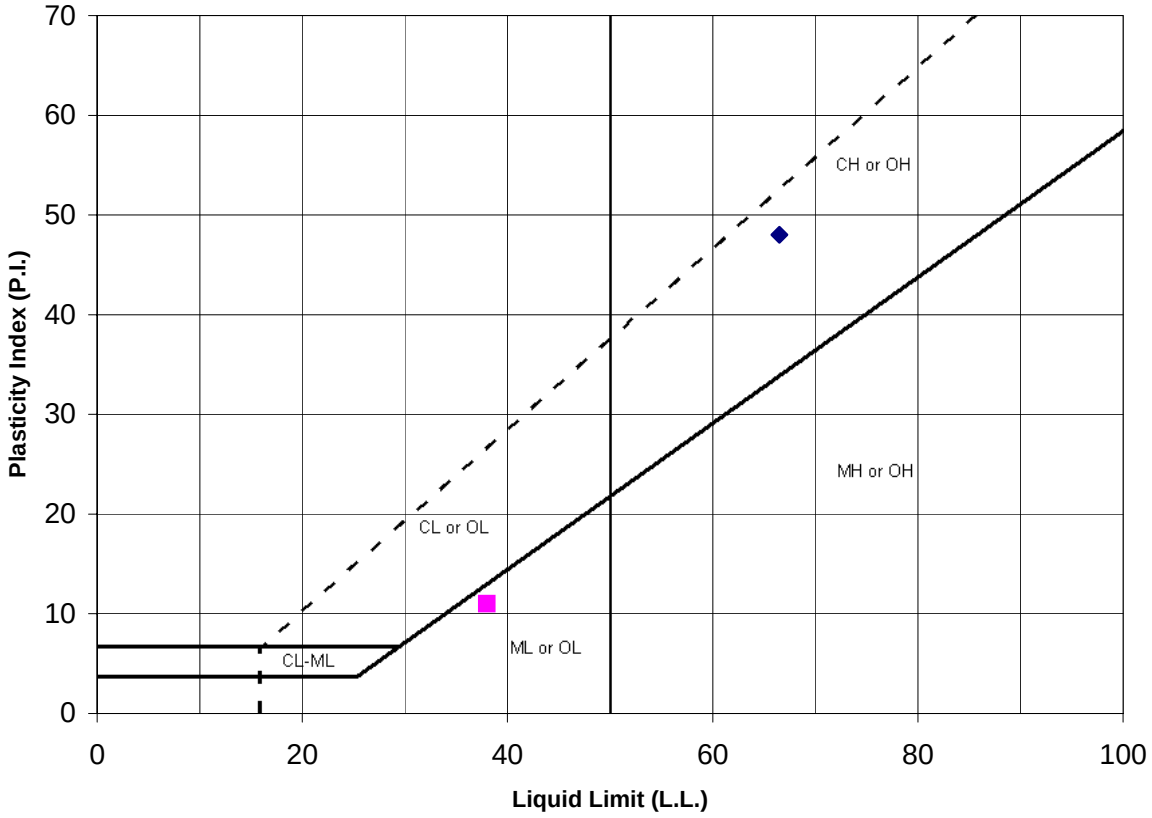
[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



Symbol	Location.:	Sample No.:	Depth (ft)	Passing No. 200 Sieve (%)	Liquid Limit (%) LL	Plastic Limit (%) PL	Plasticity Index (%) PI	USCS
◆	HS-15	R-4	20	15	67	19	48	CH
■	HS-16	R-7	35	84	38	27	11	ML

LGC Geotechnical, Inc.

ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 14057-01
Date: Feb-15

La Habra - Westridge

ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	S. Felter	Date:	03/09/15
Project No. :	14057-01	Input By:	J. Ward	Date:	03/13/15
Boring No.:	HS-15	Checked By:	J. Ward		
Sample No.:	R-5	Depth (ft.)	25.0		
Soil Identification:	Olive brown clayey sand (SC)				

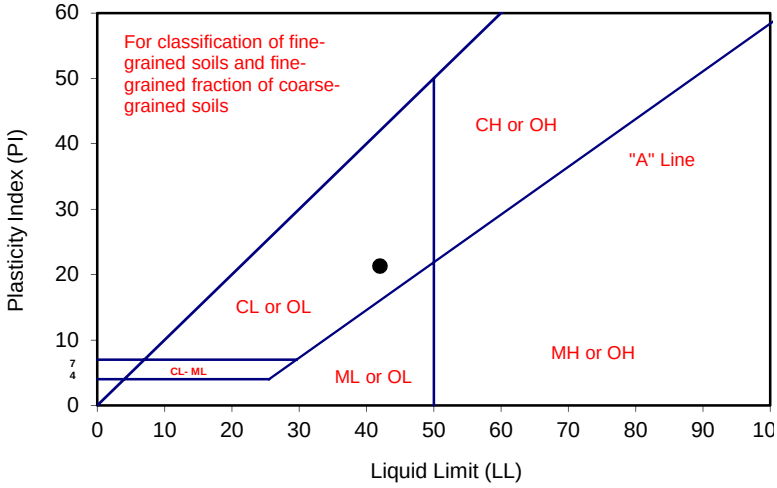
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			33	27	20	
Wet Wt. of Soil + Cont. (g)	23.69	23.74	35.36	35.28	36.64	
Dry Wt. of Soil + Cont. (g)	21.96	21.99	29.24	28.96	29.63	
Wt. of Container (g)	13.56	13.59	13.60	13.58	13.55	
Moisture Content (%) [Wn]	20.60	20.83	39.13	41.09	43.59	

Liquid Limit	**42**
Plastic Limit	**21**
Plasticity Index	**21**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 16.06

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



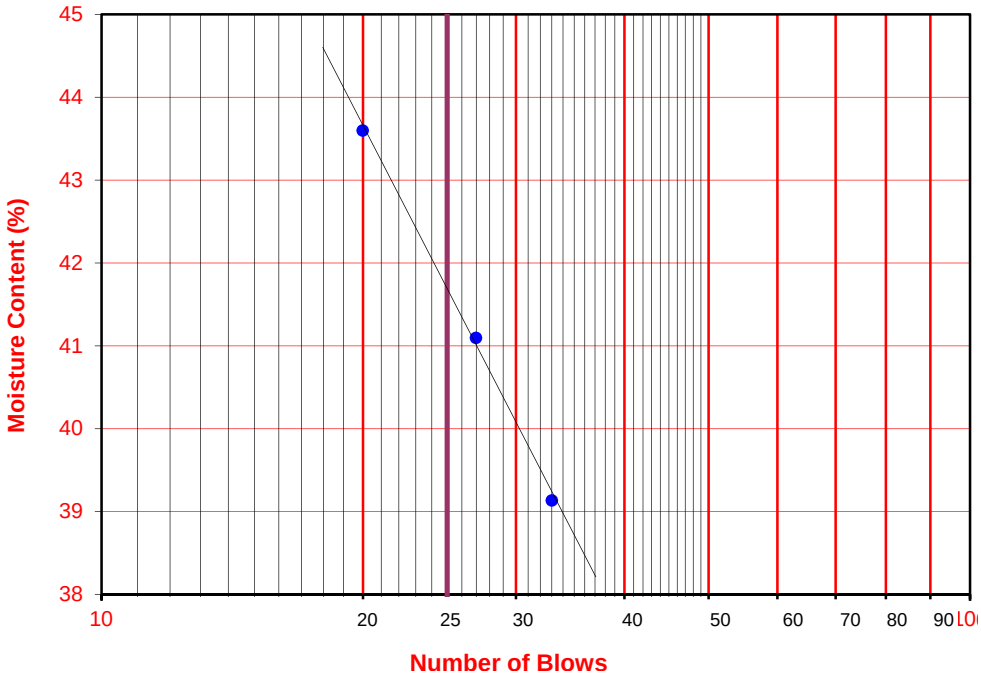
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	S. Felter	Date:	03/10/15
Project No. :	14057-01	Input By:	J. Ward	Date:	03/13/15
Boring No.:	HS-16	Checked By:	J. Ward		
Sample No.:	R-4	Depth (ft.)	20.0		
Soil Identification:	Brown lean clay (CL)				

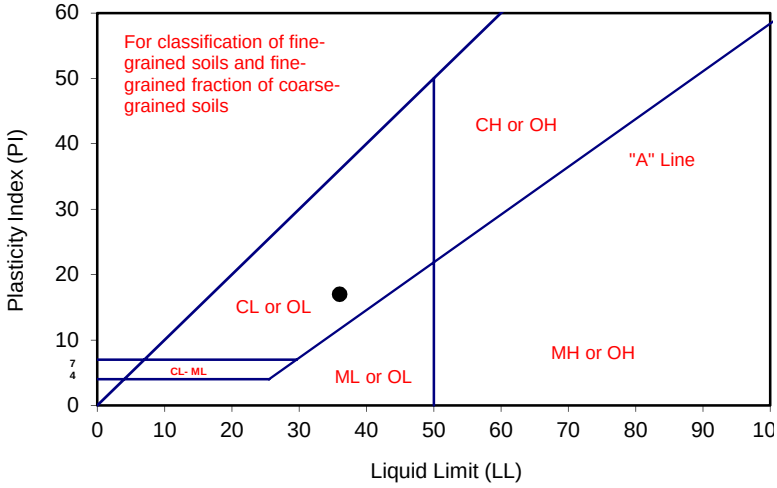
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	28	19	
Wet Wt. of Soil + Cont. (g)	23.59	23.76	35.34	35.91	37.07	
Dry Wt. of Soil + Cont. (g)	22.00	22.11	29.62	29.95	30.76	
Wt. of Container (g)	13.52	13.56	13.63	13.54	13.62	
Moisture Content (%) [Wn]	18.75	19.30	35.77	36.32	36.81	

Liquid Limit	**36**
Plastic Limit	**19**
Plasticity Index	**17**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 11.68

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



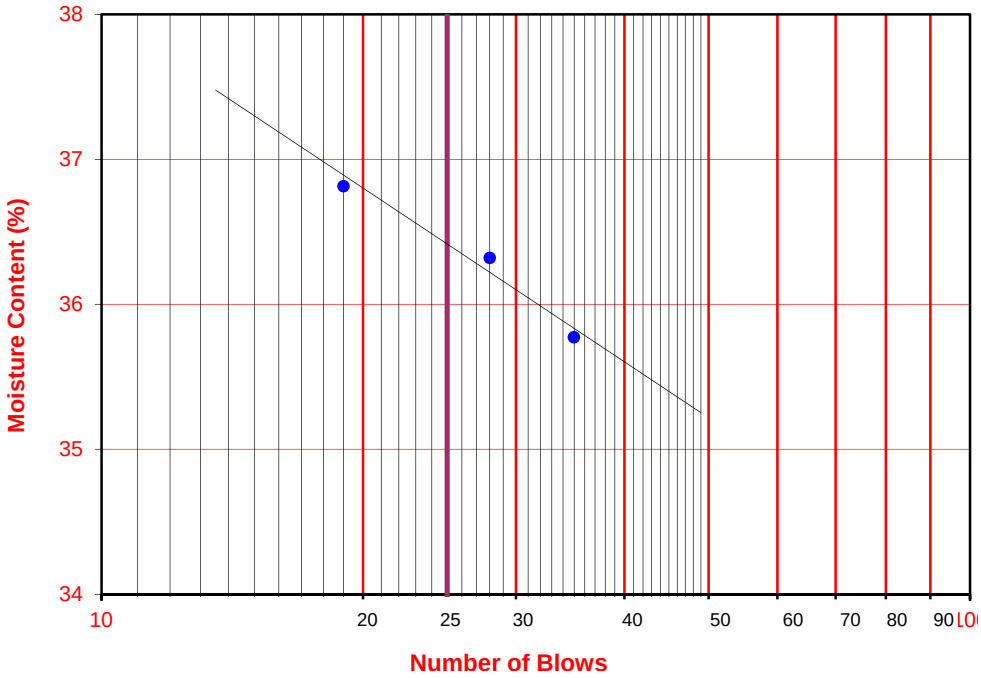
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	02/15/15
Project No. :	14057-01	Input By:	J. Ward	Date:	02/16/15
Boring No.:	HS-17	Checked By:	J. Ward		
Sample No.:	B-1	Depth (ft.)	5-7		
Soil Identification:	Olive brown sandy lean clay s(CL)				

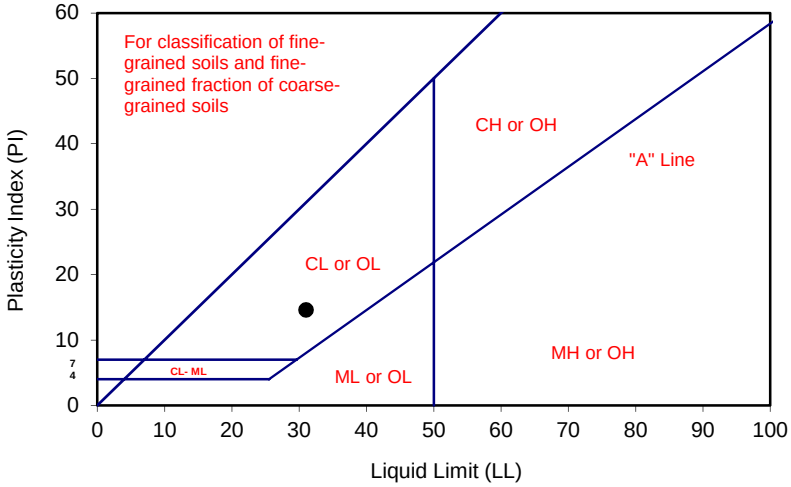
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			33	24	17	
Wet Wt. of Soil + Cont. (g)	21.08	19.93	27.88	30.56	29.08	
Dry Wt. of Soil + Cont. (g)	19.72	18.77	24.62	26.57	25.29	
Wt. of Container (g)	11.50	11.65	13.57	13.63	13.56	
Moisture Content (%) [Wn]	16.55	16.29	29.50	30.83	32.31	

Liquid Limit	**31**
Plastic Limit	**16**
Plasticity Index	**15**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 8.03

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



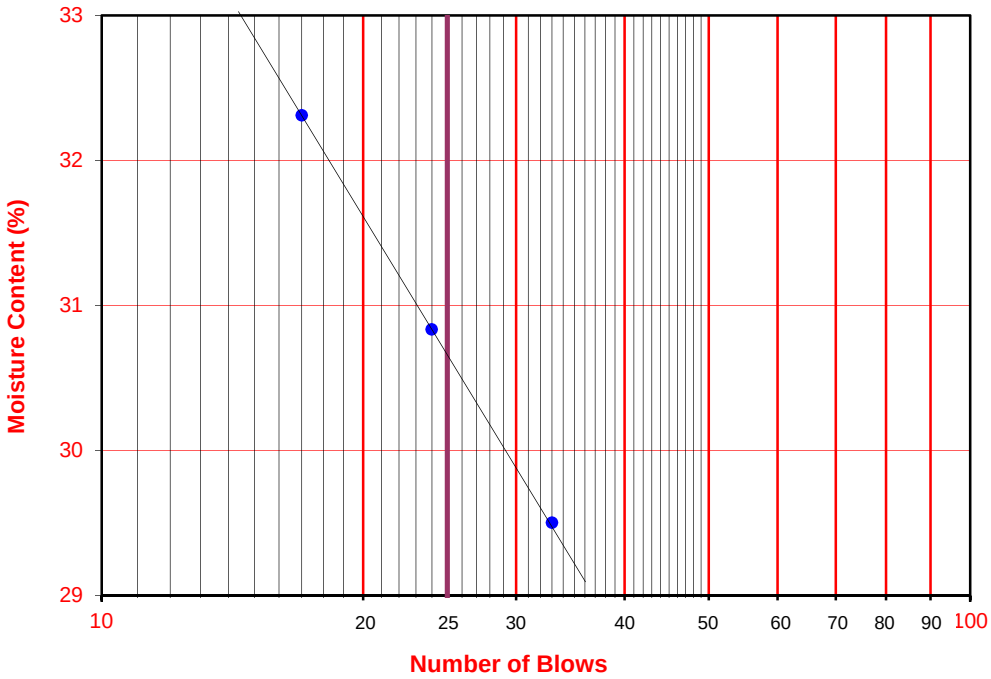
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	S. Felter	Date:	03/10/15
Project No. :	14057-01	Input By:	J. Ward	Date:	03/13/15
Boring No.:	HS-17	Checked By:	J. Ward		
Sample No.:	R-4	Depth (ft.)	20.0		
Soil Identification:	Yellowish brown lean clay (CL)				

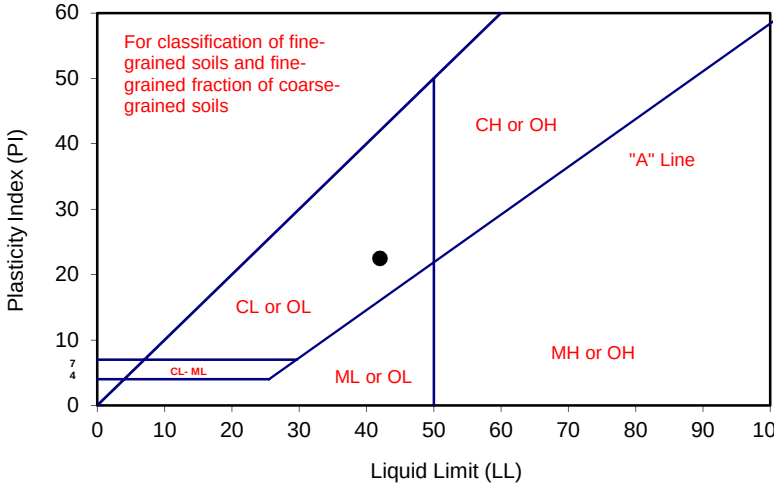
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	27	19	
Wet Wt. of Soil + Cont. (g)	23.80	24.58	34.59	35.15	35.69	
Dry Wt. of Soil + Cont. (g)	22.11	22.81	28.63	28.88	29.03	
Wt. of Container (g)	13.57	13.60	13.61	13.57	13.58	
Moisture Content (%) [Wn]	19.79	19.22	39.68	40.95	43.11	

Liquid Limit	**42**
Plastic Limit	**20**
Plasticity Index	**22**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 16.06

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



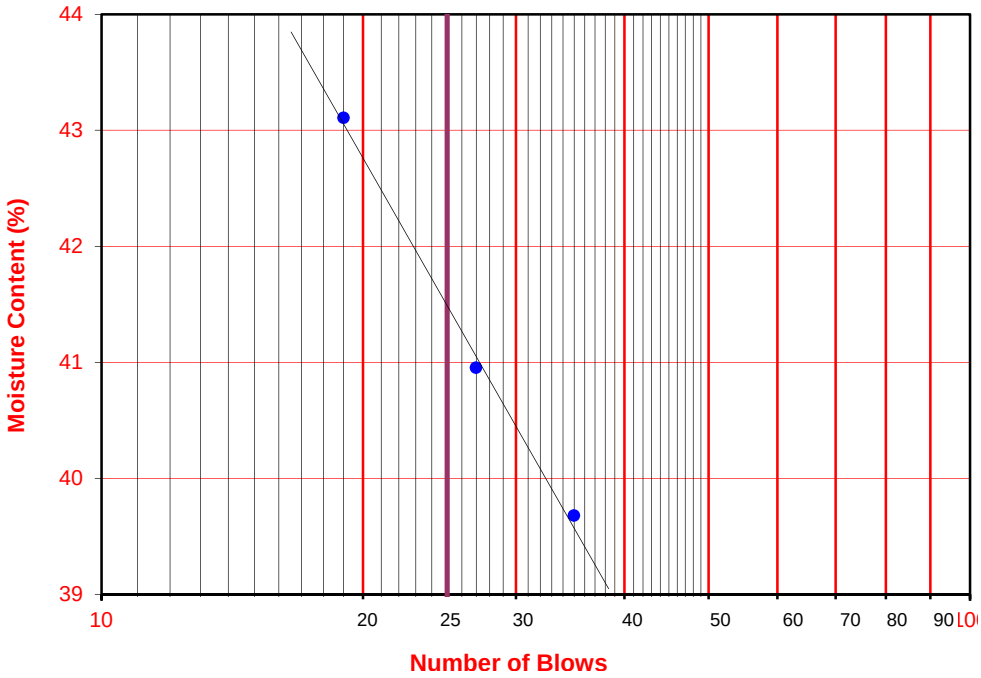
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	S. Felter	Date:	03/10/15
Project No. :	14057-01	Input By:	J. Ward	Date:	03/13/15
Boring No.:	HS-17	Checked By:	J. Ward		
Sample No.:	R-5	Depth (ft.)	25.0		
Soil Identification:	Dark yellowish brown lean clay (CL)				

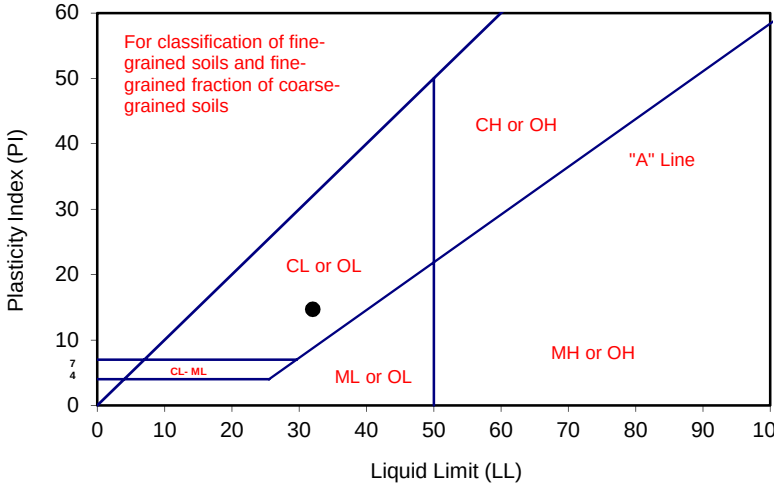
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			34	25	19	
Wet Wt. of Soil + Cont. (g)	23.85	24.02	36.89	35.23	34.57	
Dry Wt. of Soil + Cont. (g)	22.35	22.46	31.49	30.08	29.36	
Wt. of Container (g)	13.62	13.52	13.50	13.55	13.64	
Moisture Content (%) [Wn]	17.18	17.45	30.02	31.16	33.14	

Liquid Limit	**32**
Plastic Limit	**17**
Plasticity Index	**15**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 8.76

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



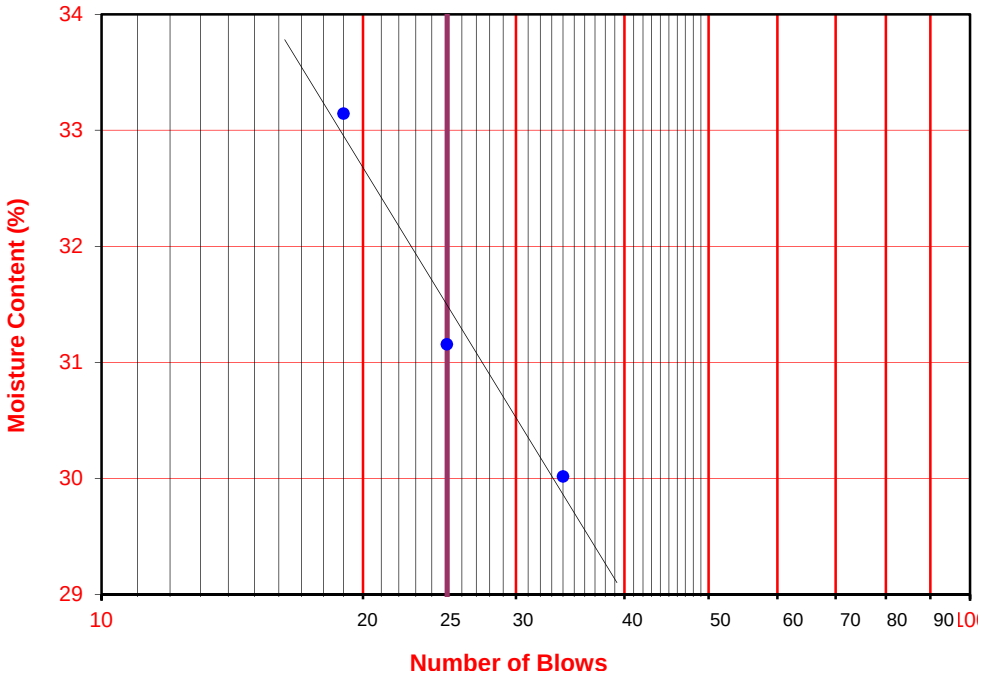
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	03/26/15
Project No. :	14057-01	Input By:	J. Ward	Date:	03/27/15
Boring No.:	B-1	Checked By:	J. Ward		
Sample No.:	R-3	Depth (ft.)	30.0		
Soil Identification:	Dark olive gray lean clay'stone' (CL)				

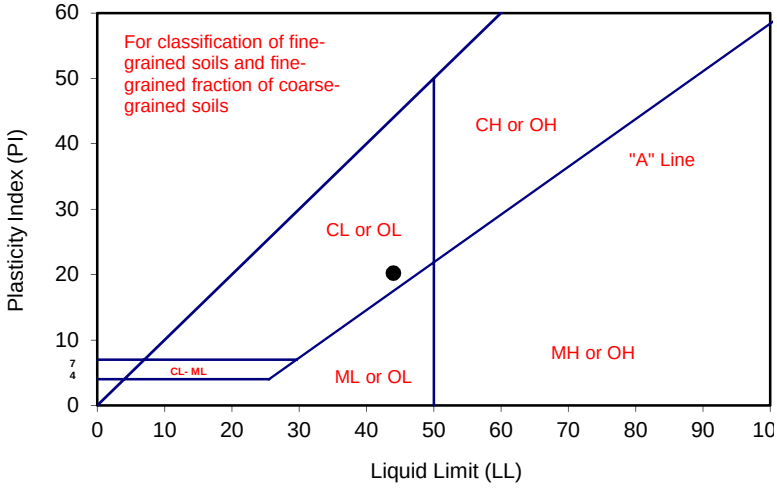
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			34	29	23	15
Wet Wt. of Soil + Cont. (g)	22.15	22.14	25.17	24.93	25.30	25.60
Dry Wt. of Soil + Cont. (g)	20.10	20.13	21.76	21.48	21.68	21.76
Wt. of Container (g)	11.50	11.66	13.63	13.53	13.53	13.63
Moisture Content (%) [Wn]	23.84	23.73	41.94	43.40	44.42	47.23

Liquid Limit	**44**
Plastic Limit	**24**
Plasticity Index	**20**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 17.52

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



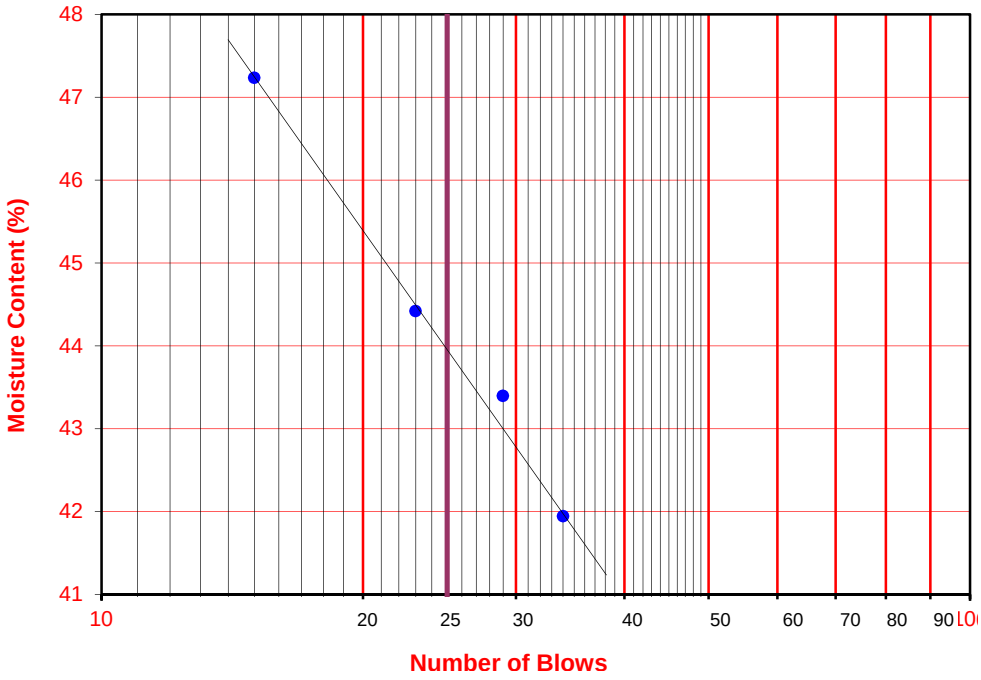
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	02/10/15
Project No. :	14057-01	Input By:	J. Ward	Date:	02/16/15
Boring No.:	B-3	Checked By:	J. Ward		
Sample No.:	B-1	Depth (ft.)	30-33		
Soil Identification:	Light olive brown sandy lean clay s(CL)				

TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2		
Number of Blows [N]			20	22	Trial 1 =	33
Wet Wt. of Soil + Cont. (g)	22.37	22.56	27.55	28.64	Trial 2 =	33
Dry Wt. of Soil + Cont. (g)	20.34	20.54	24.02	24.84	Ave. LL =	**33**
Wt. of Container (g)	11.50	11.65	13.64	13.55	(see equation below)	
Moisture Content (%) [Wn]	22.96	22.72	34.01	33.66		

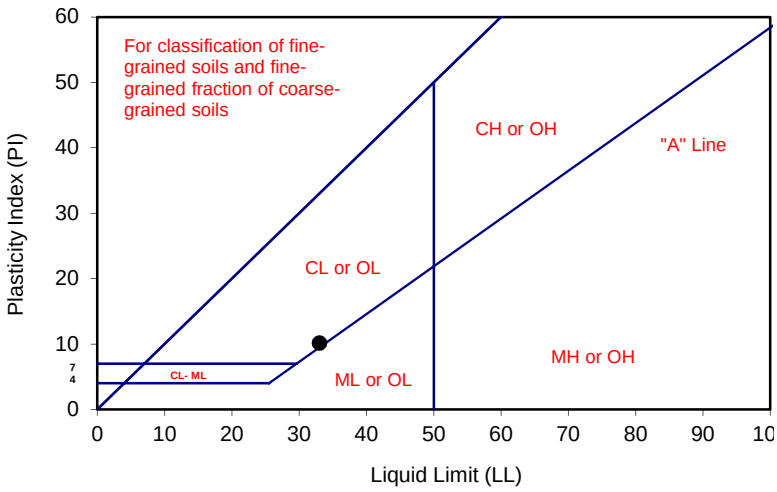
Liquid Limit	**33**
Plastic Limit	**23**
Plasticity Index	**10**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 9.49

One - Point Liquid Limit Calculation

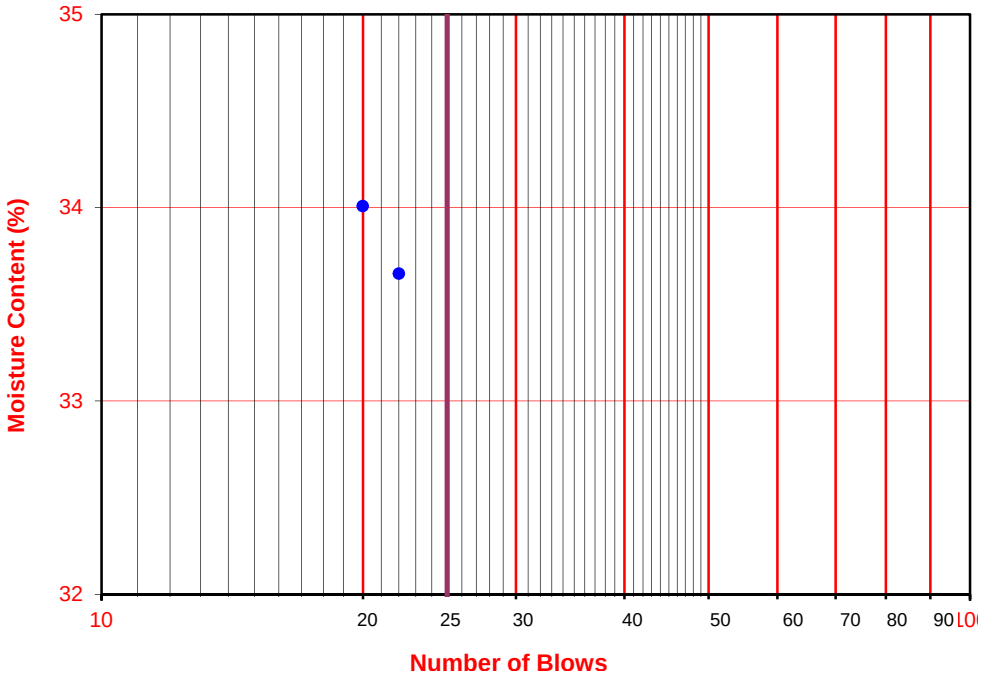
$LL = Wn(N/25)^{0.121}$

(Wn = water content, N = number of blows)



PROCEDURES USED

- [ ] Wet Preparation
  Multipoint - Wet
- [x] Dry Preparation
  One-point
- [ ] Procedure A
  Multipoint Test
- [x] Procedure B
  One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	03/26/15
Project No. :	14057-01	Input By:	J. Ward	Date:	03/27/15
Boring No.:	B-4	Checked By:	J. Ward		
Sample No.:	R-4	Depth (ft.)	40.0		
Soil Identification:	Brownish yellow sandy silt s(ML)				

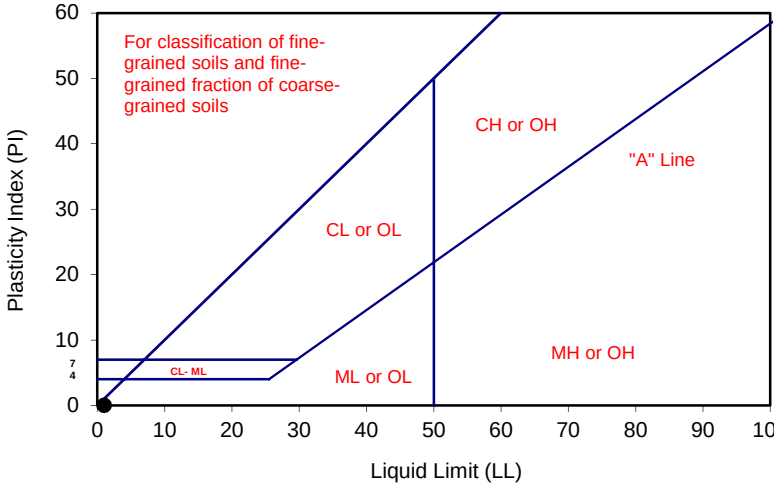
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			8			
Wet Wt. of Soil + Cont. (g)	**Cannot be rolled:**		31.41	**Cannot get more than 8 blows:**		
Dry Wt. of Soil + Cont. (g)	**NonPlastic**		27.25	**NonPlastic**		
Wt. of Container (g)			13.55			
Moisture Content (%) [Wn]			30.36			

Liquid Limit	**NP**
Plastic Limit	**NP**
Plasticity Index	**NP**
Classification	**NP**

PI at "A" - Line = 0.73(LL-20) =

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



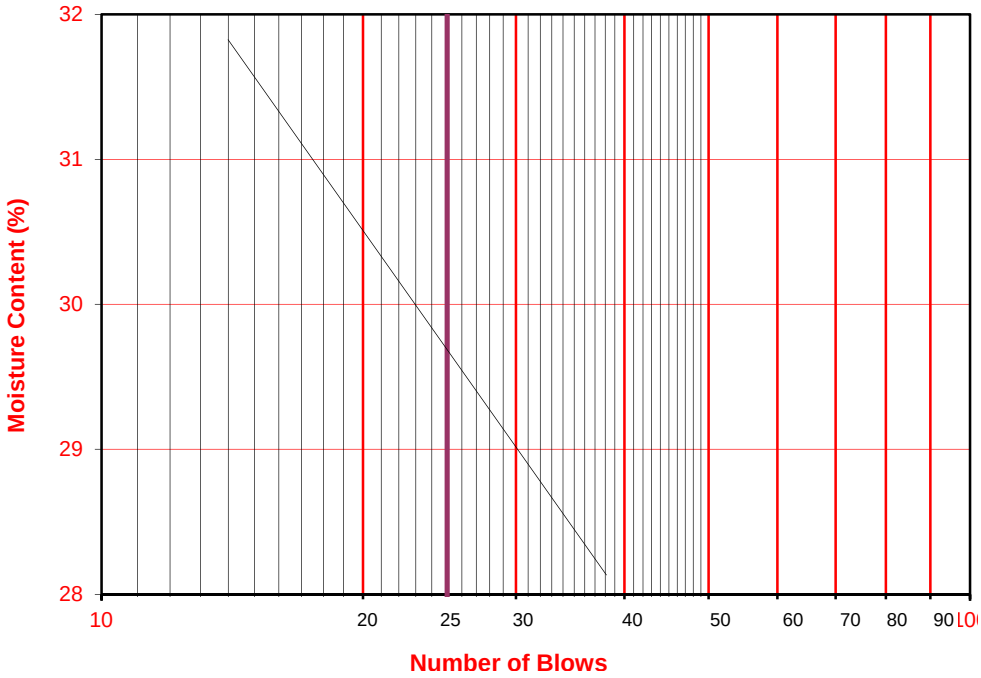
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	A. Santos	Date:	03/01/15
Project No. :	14057-01	Input By:	J. Ward	Date:	03/11/15
Boring No.:	B-4	Checked By:	J. Ward		
Sample No.:	B-1	Depth (ft.)	35-40		
Soil Identification:	Light olive brown silty sand (SM)				

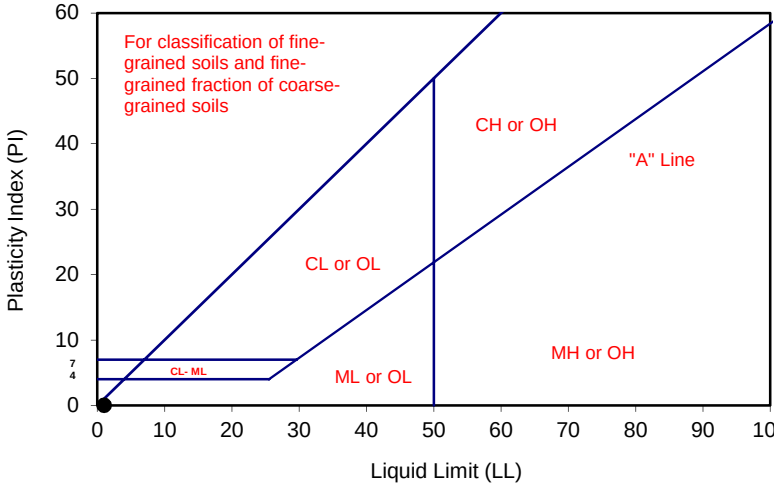
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			5			
Wet Wt. of Soil + Cont. (g)	**Cannot be rolled:**		23.75	**Cannot get more than 5 blows:**		
Dry Wt. of Soil + Cont. (g)	**NonPlastic**		19.41	**NonPlastic**		
Wt. of Container (g)			1.07			
Moisture Content (%) [Wn]			23.66			

Liquid Limit	**NP**
Plastic Limit	**NP**
Plasticity Index	**NP**
Classification	**NP**

PI at "A" - Line = 0.73(LL-20) =

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



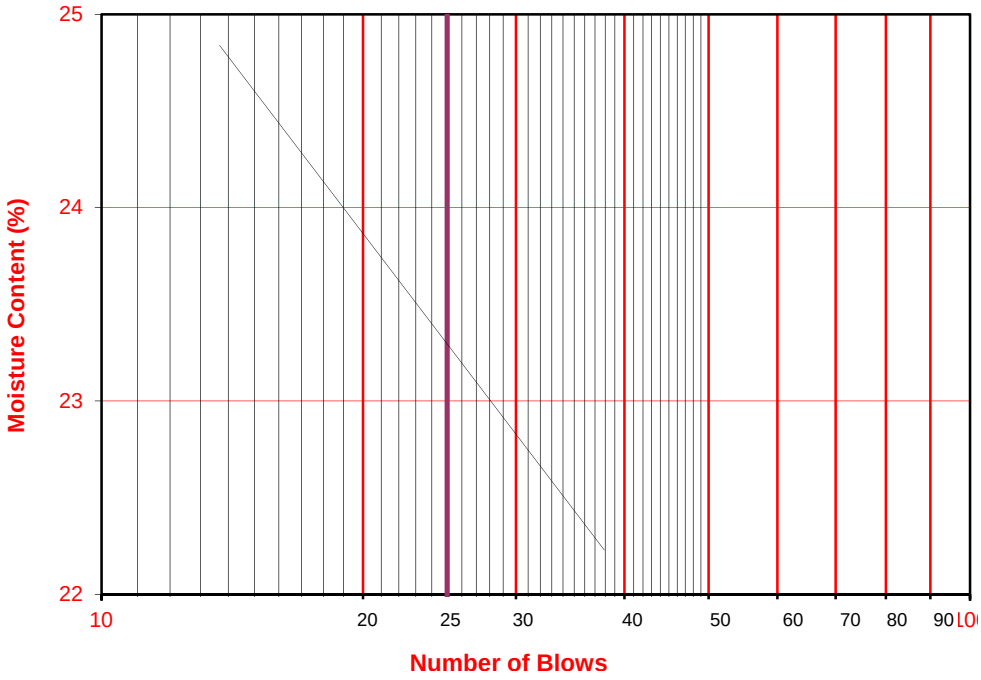
PROCEDURES USED

[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	La Habra	Tested By:	G. Bathala	Date:	02/27/15
Project No. :	14057-01	Input By:	J. Ward	Date:	03/11/15
Boring No.:	B-4	Checked By:	J. Ward		
Sample No.:	R-6	Depth (ft.)	60.0		
Soil Identification:	Olive lean clay (CL)				

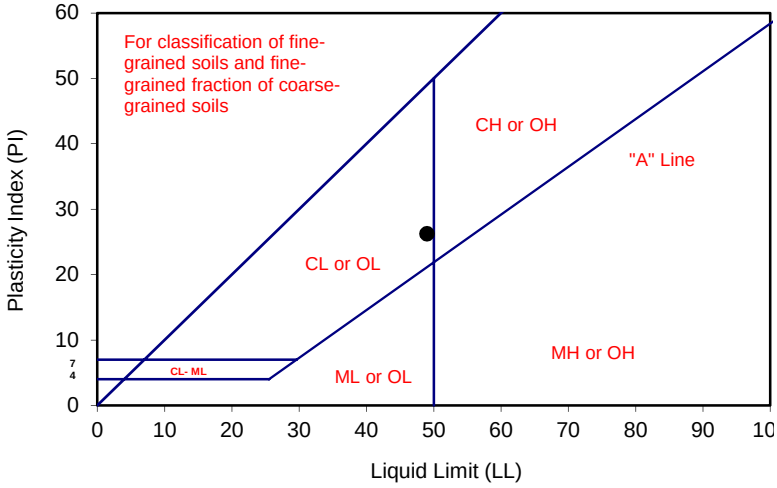
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			34	27	21	15
Wet Wt. of Soil + Cont. (g)	21.11	22.34	24.08	24.82	26.28	26.20
Dry Wt. of Soil + Cont. (g)	19.31	20.38	20.74	21.14	22.03	21.84
Wt. of Container (g)	11.50	11.65	13.57	13.54	13.55	13.59
Moisture Content (%) [Wn]	23.05	22.45	46.58	48.42	50.12	52.85

Liquid Limit	**49**
Plastic Limit	**23**
Plasticity Index	**26**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 21.17

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



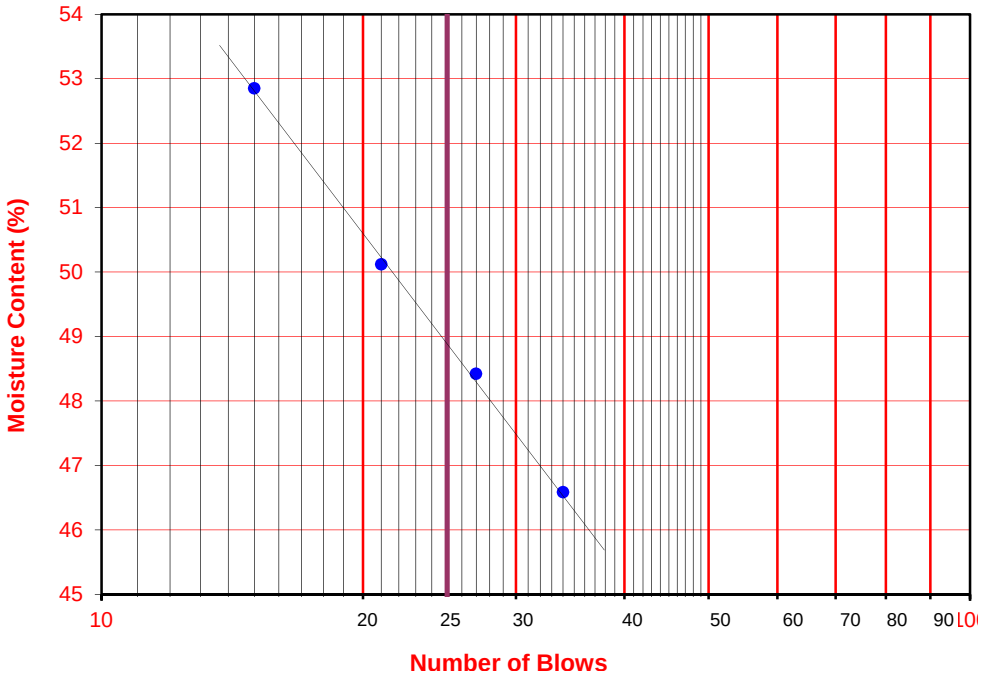
PROCEDURES USED

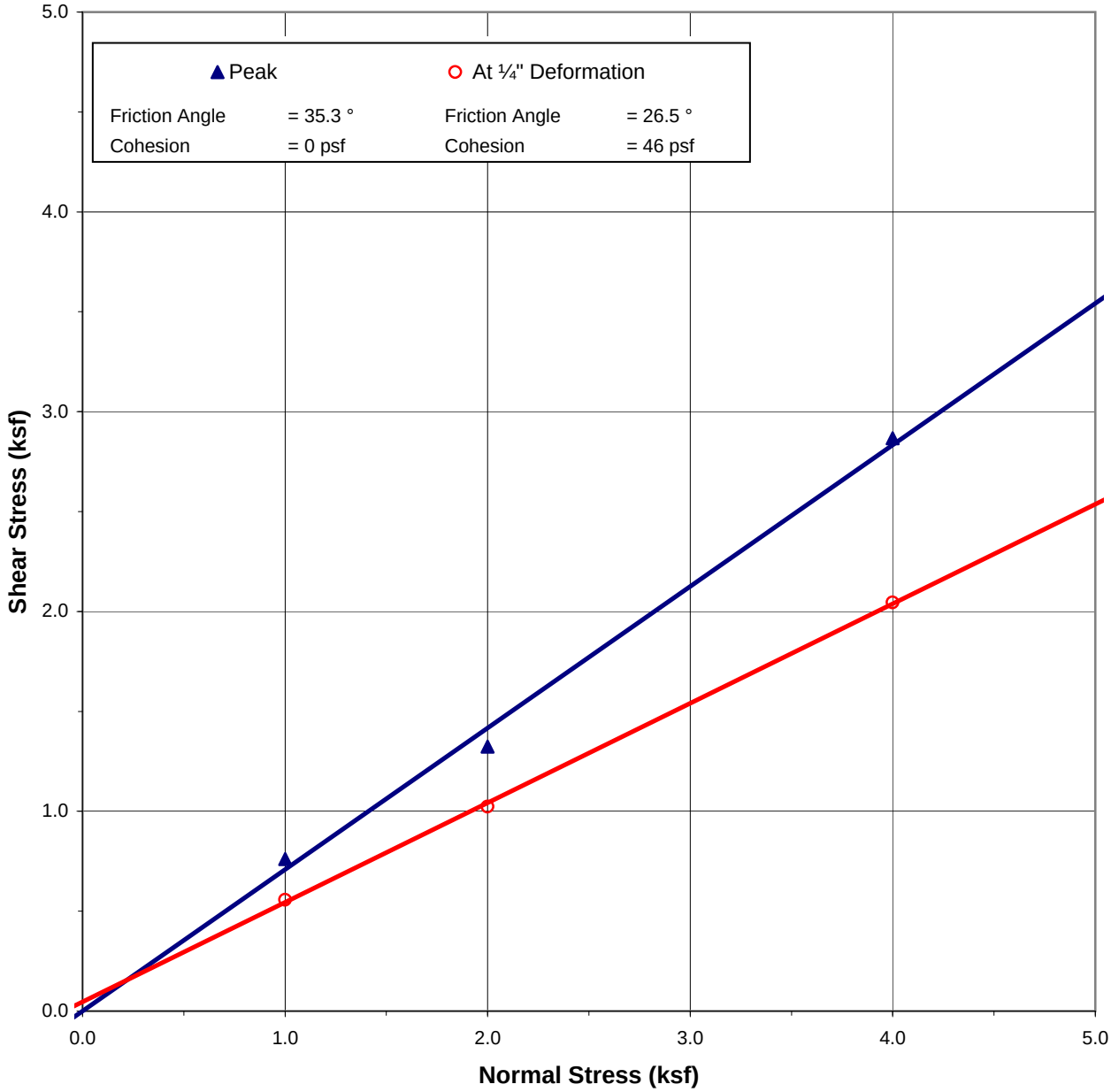
[ ] Wet Preparation
Multipoint - Wet

[X] Dry Preparation
Multipoint - Dry

[X] Procedure A
Multipoint Test

[ ] Procedure B
One-point Test





Location:	Sample No.:	Depth (ft)	Sample Type	Shear Rate (inch/min)	Dry Density (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)
B-1	**R-2**	**20'**	**Ring**	**0.0005**	**109.6**	**18.2**	**24.0**

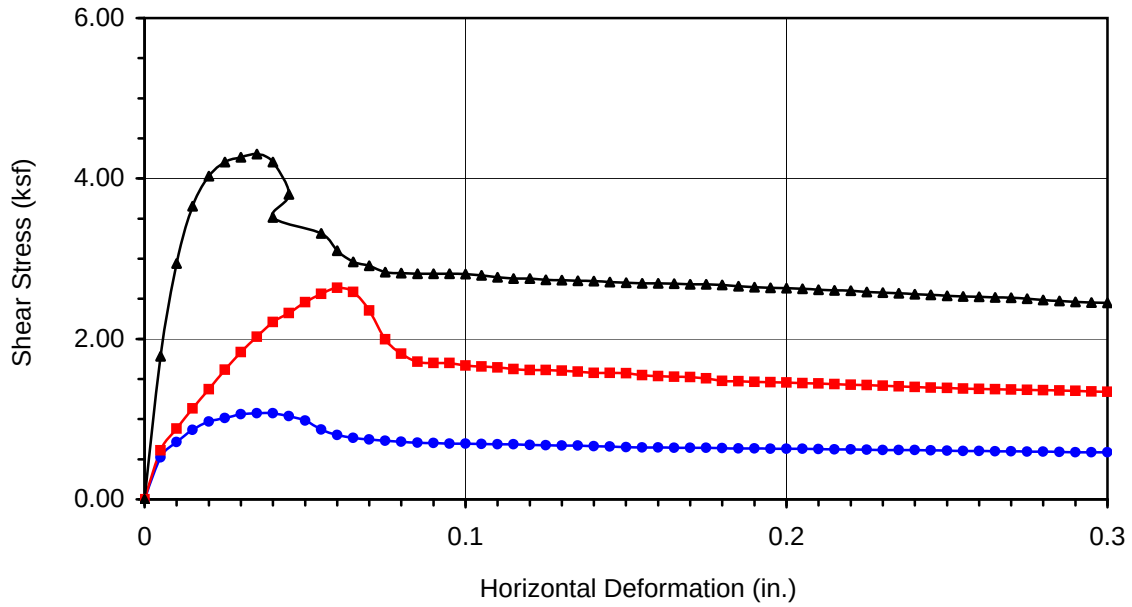
Sample Description: Fine sandy siltstone

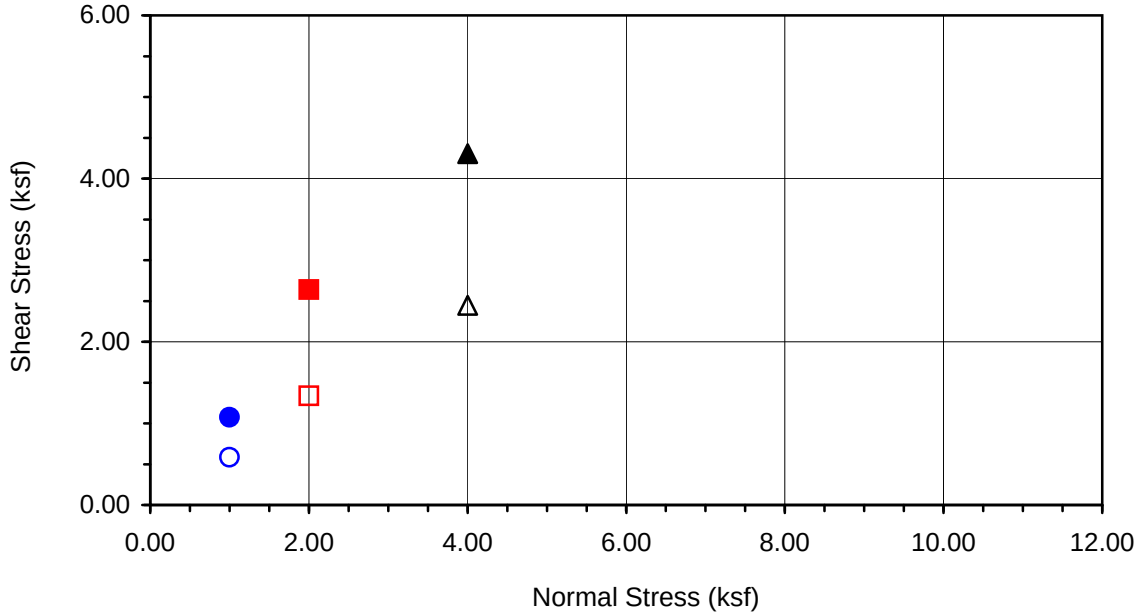
LGC Geotechnical, Inc.

DIRECT SHEAR PLOT

Project Number: 14057-01
Date: Aug-14

Westridge





Boring No.	**B-1**
Sample No.	**R-3**
Depth (ft)	**30**

Sample Type:

Ring

Soil Identification:
Dark olive gray clay stone (CL)

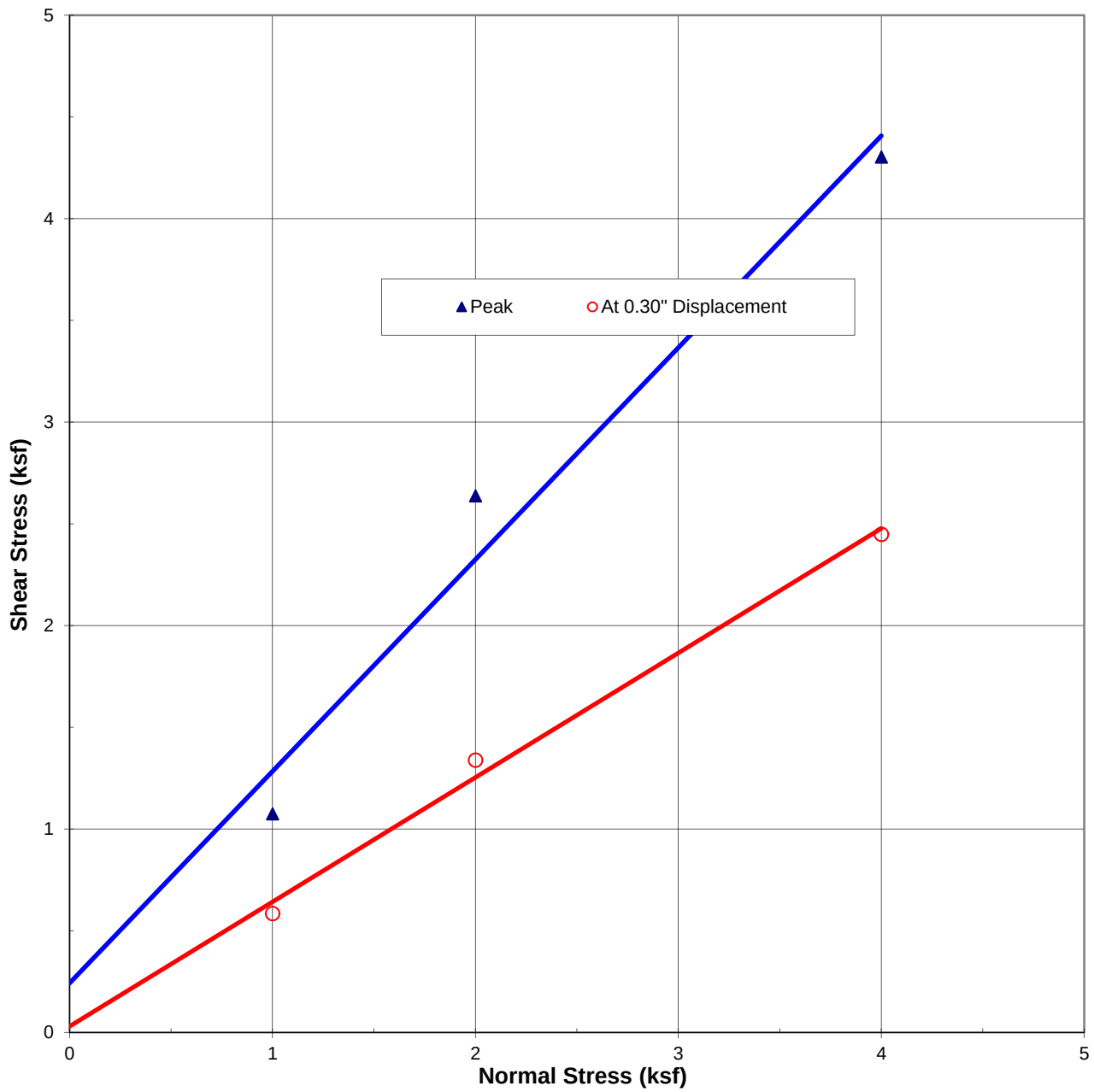
Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 1.075	■ 2.638	▲ 4.304
Shear Stress @ End of Test (ksf)	○ 0.585	□ 1.339	△ 2.449
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	20.26	20.26	20.26
Dry Density (pcf)	97.3	103.4	105.0
Saturation (%)	74.8	86.9	90.4
Soil Height Before Shearing (in.)	0.9956	0.9908	0.9872
Final Moisture Content (%)	27.5	25.2	24.6

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

12-14

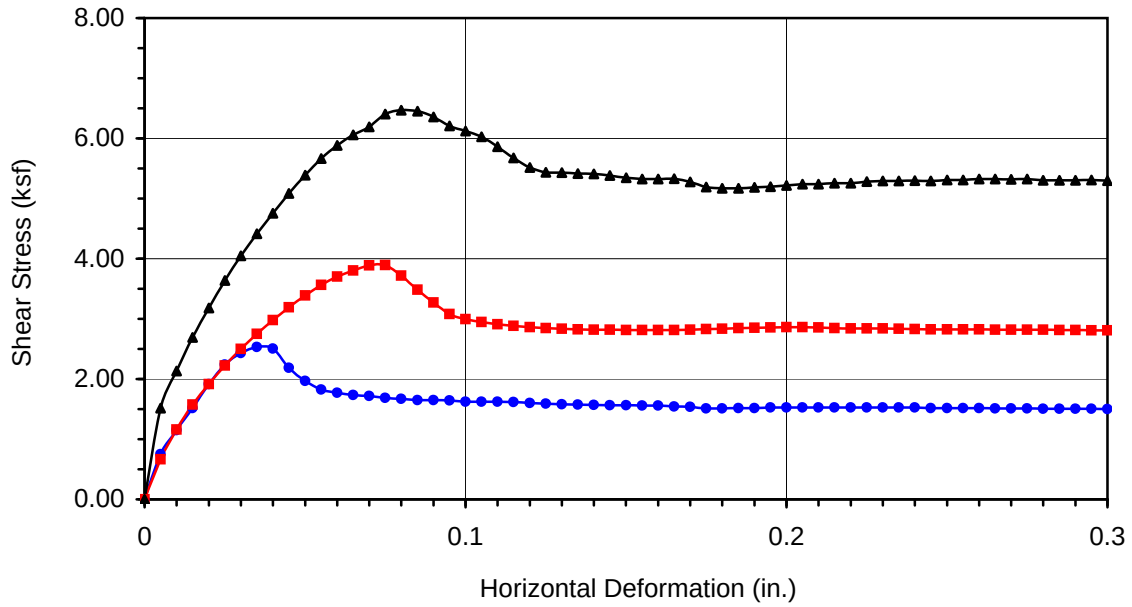


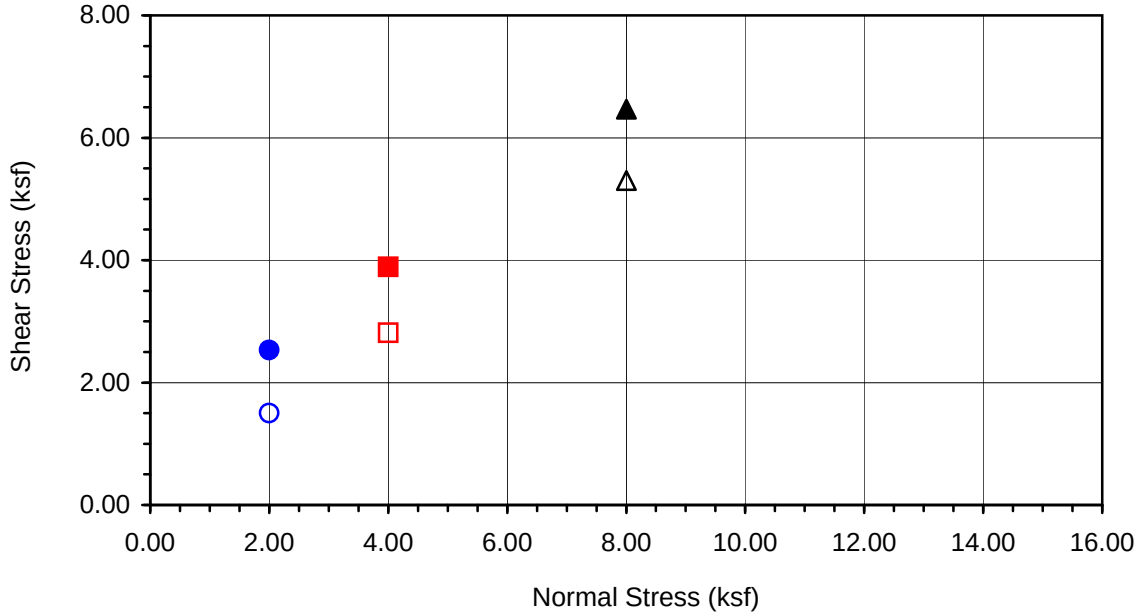
Tested Sample:

B-1 at 30 ft

Peak:	At 0.30" Displacement:
46.2 Degrees	31.5 Degrees
0 ksf	0.03 ksf

LGC Geotechnical, Inc.	**DIRECT SHEAR PLOT**	**Project Number:** 14057-01 **Date:** Dec-14
		Westridge / La Habra





Boring No.	**B-1**
Sample No.	**R-4**
Depth (ft)	**40**

Sample Type:

Ring

Soil Identification:
Dark olive gray silty clay stone (CL-ML)

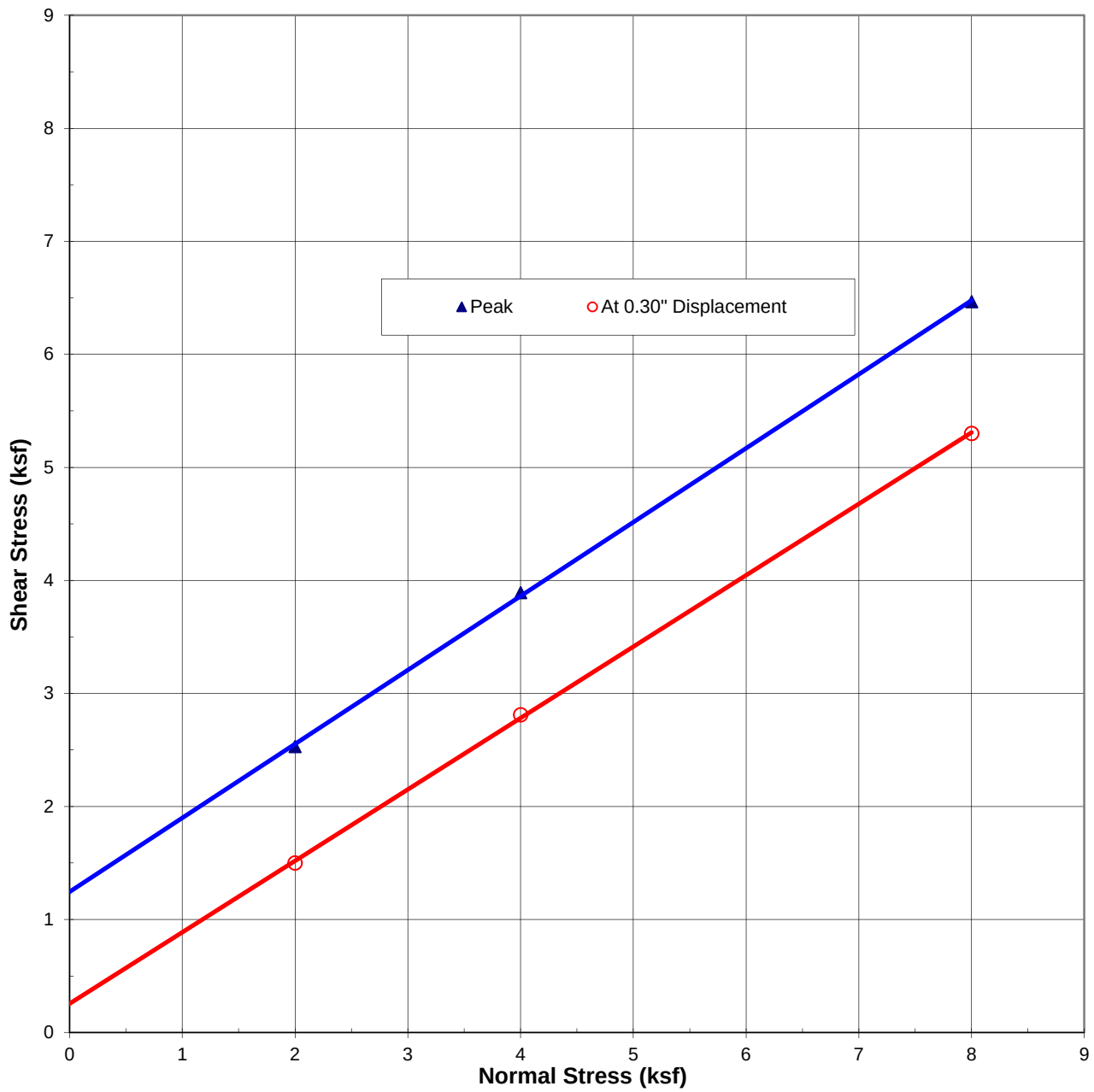
Normal Stress (kip/ft²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 2.531	■ 3.892	▲ 6.467
Shear Stress @ End of Test (ksf)	○ 1.500	□ 2.811	△ 5.300
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	17.51	17.51	17.51
Dry Density (pcf)	100.0	105.1	106.9
Saturation (%)	68.9	78.3	81.9
Soil Height Before Shearing (in.)	0.9898	0.9829	0.9698
Final Moisture Content (%)	22.2	21.3	23.6

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

12-14



Tested Sample:

B-1 at 40 ft

Peak:	At 0.30" Displacement:
33.2 Degrees	32.3 Degrees
1.2 ksf	0.26 ksf

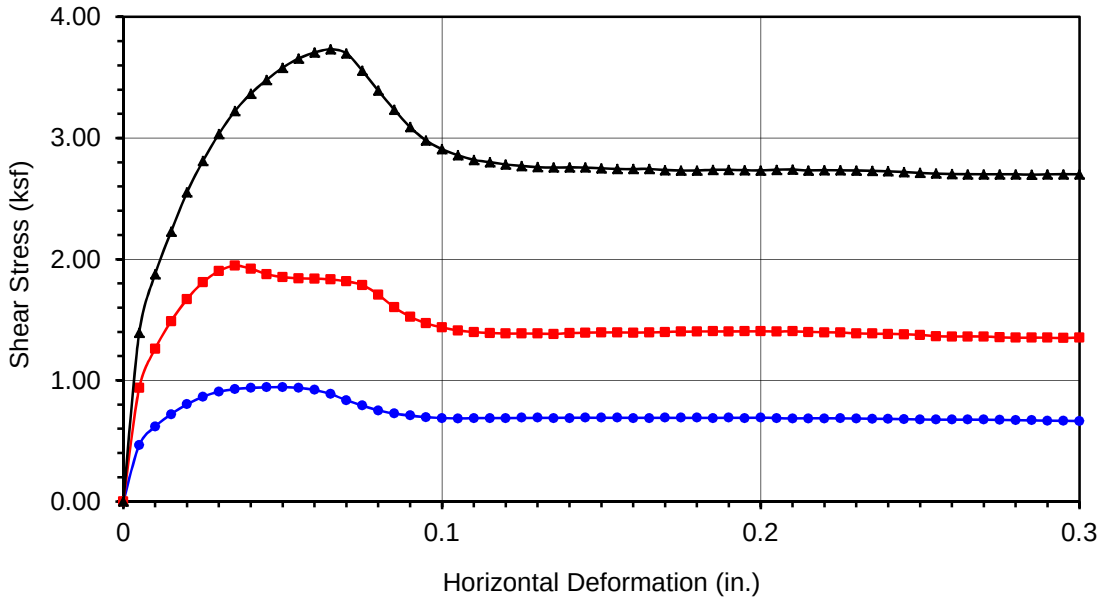
LGC Geotechnical, Inc.

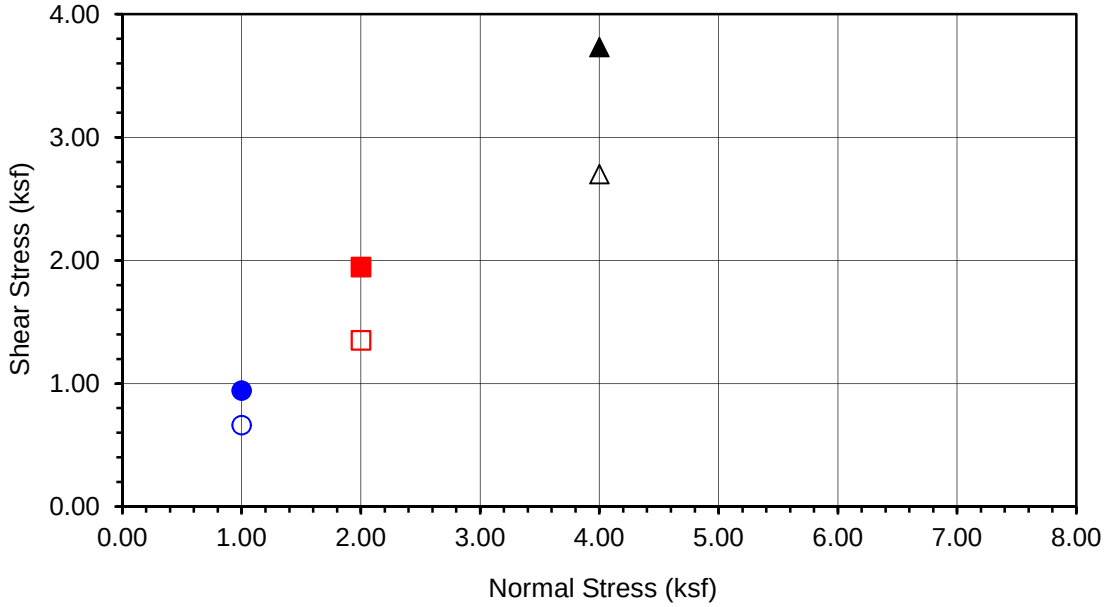
DIRECT SHEAR PLOT

Project Number: 14057-01

Date: Dec-14

Westridge / La Habra





Boring No.	**B-4**
Sample No.	**R-4**
Depth (ft)	**40**

Sample Type:

Ring

Soil Identification:
Brownish yellow sandy silt s(ML)

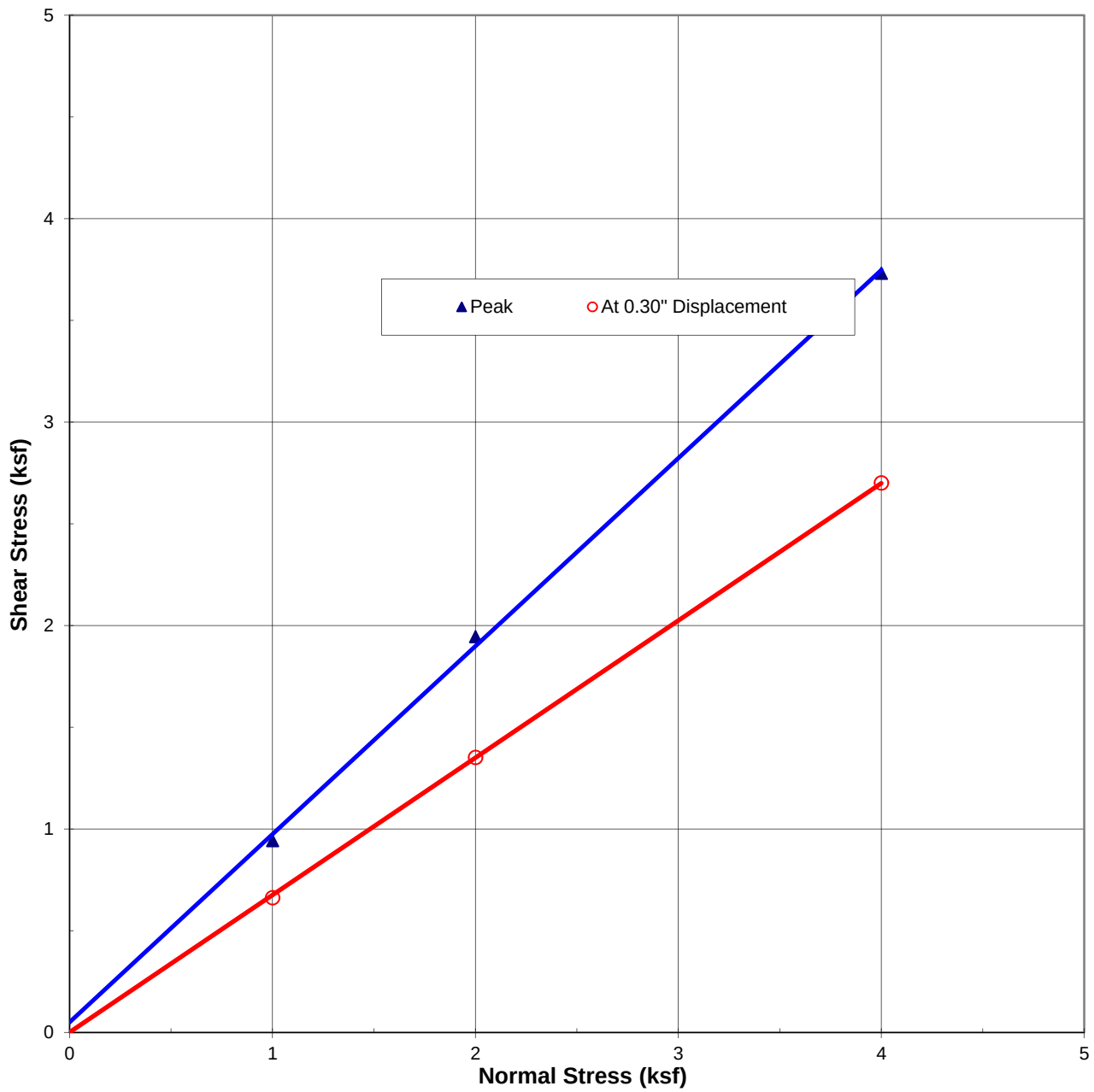
Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 0.943	■ 1.946	▲ 3.732
Shear Stress @ End of Test (ksf)	○ 0.663	□ 1.352	△ 2.701
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	4.23	4.23	4.23
Dry Density (pcf)	101.2	104.1	107.2
Saturation (%)	17.2	18.5	20.0
Soil Height Before Shearing (in.)	0.9959	0.9935	0.9844
Final Moisture Content (%)	23.0	20.8	20.4

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

02-15



Tested Sample:

B-4 at 40 ft

Peak:	At 0.30" Displacement:
42.8 Degrees	34.0 Degrees
0 ksf	0 ksf

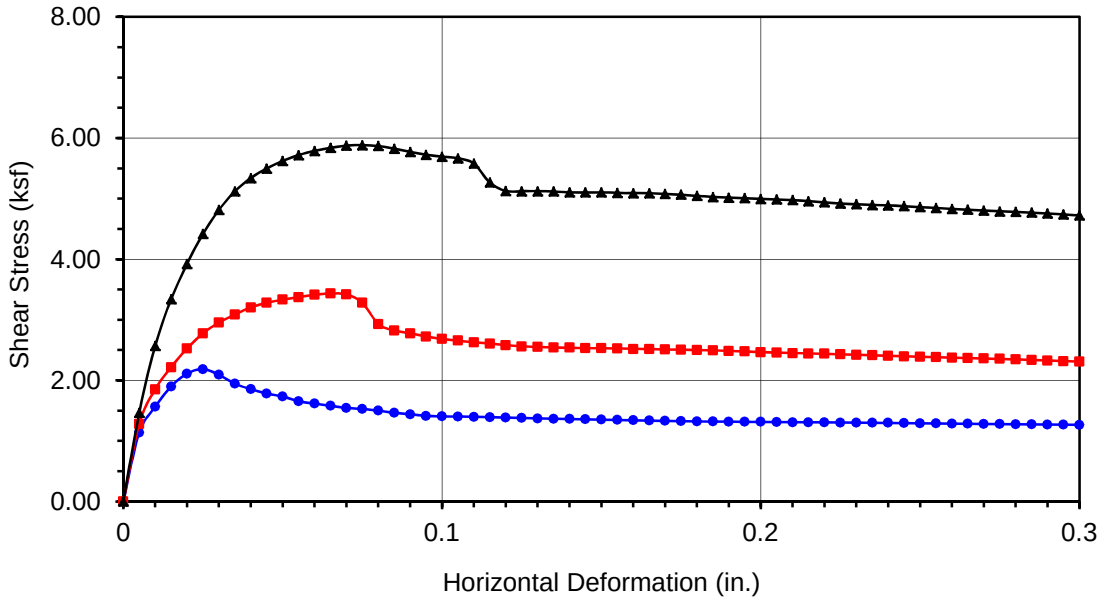
LGC Geotechnical, Inc.

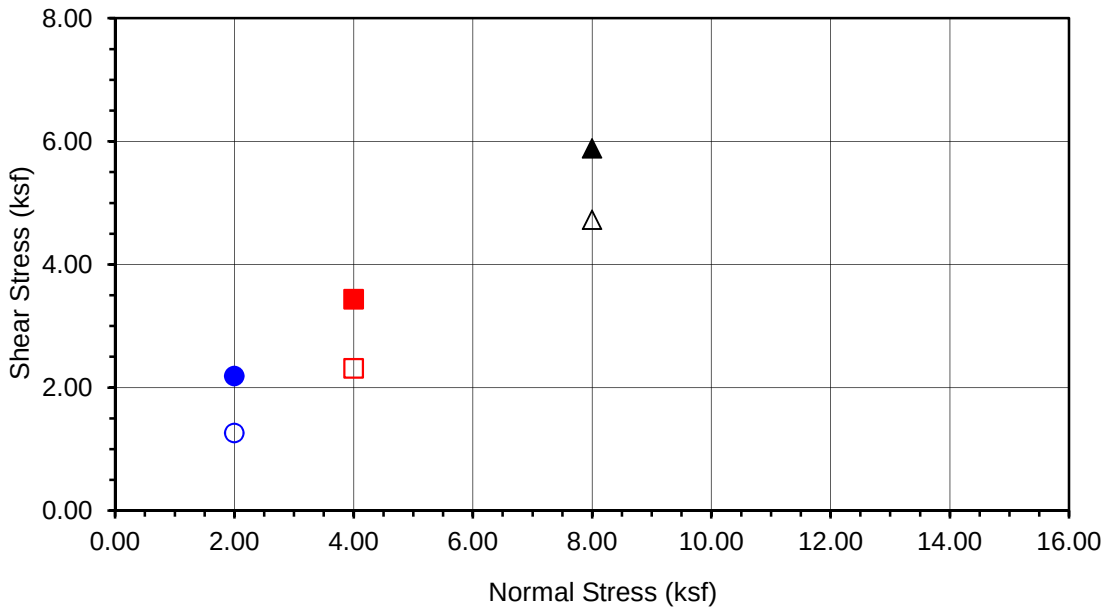
DIRECT SHEAR PLOT

Project Number: 14057-01

Date: Mar-14

Westridge / La Habra





Boring No.	**B-4**
Sample No.	**R-6**
Depth (ft)	**60**

Sample Type:

Ring

Soil Identification:
Olive silty clay (CL-ML)

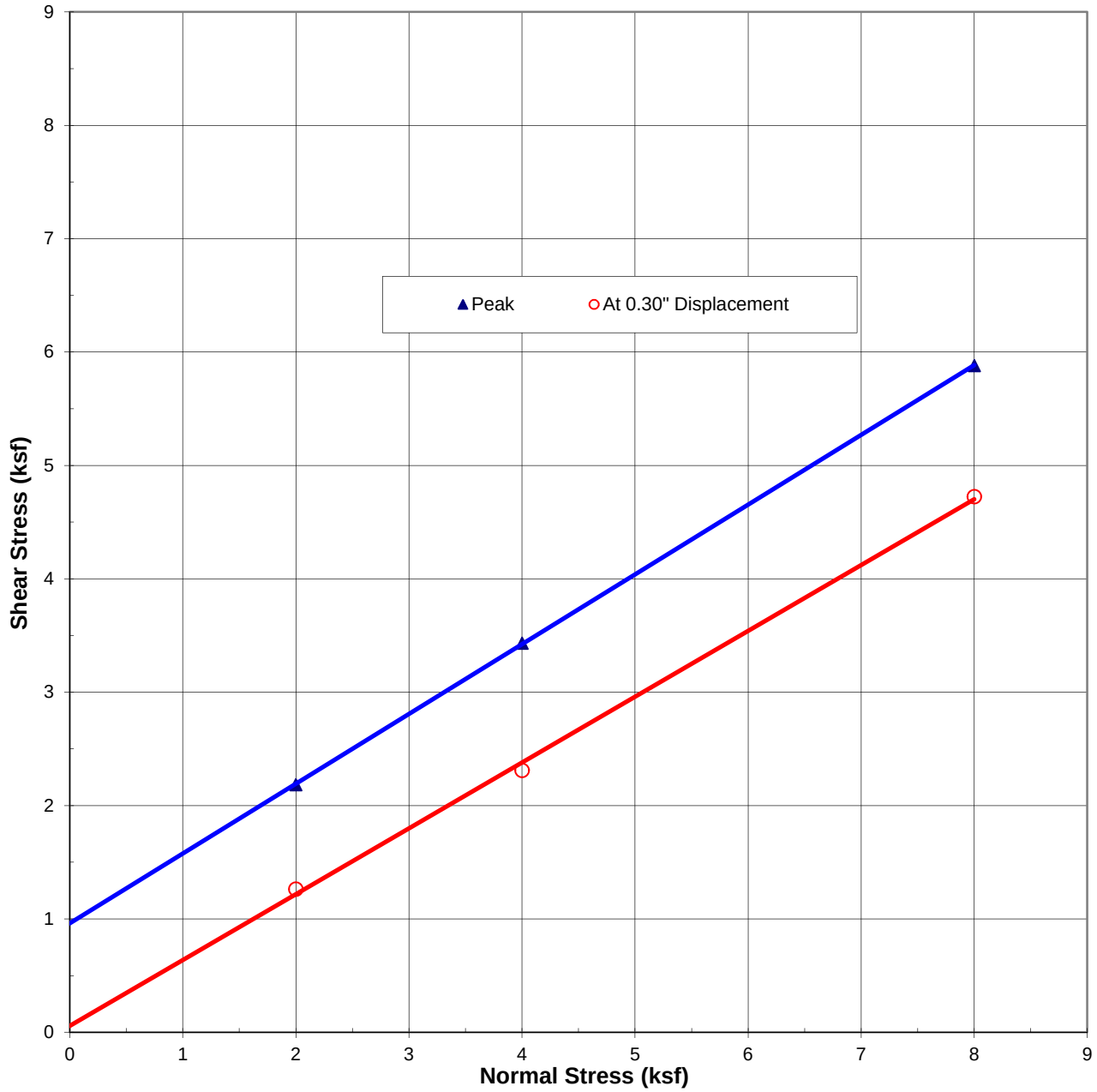
Normal Stress (kip/ft²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 2.185	■ 3.433	▲ 5.882
Shear Stress @ End of Test (ksf)	○ 1.264	□ 2.311	△ 4.725
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	23.28	23.28	23.28
Dry Density (pcf)	101.7	102.2	102.4
Saturation (%)	95.7	96.8	97.2
Soil Height Before Shearing (in.)	0.9932	0.9886	0.9764
Final Moisture Content (%)	27.0	25.3	24.1

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

02-15



Tested Sample:

B-4 at 60 ft

Peak:	At 0.30" Displacement:
31.6 Degrees	30.1 Degrees
1.0 ksf	0.06 ksf

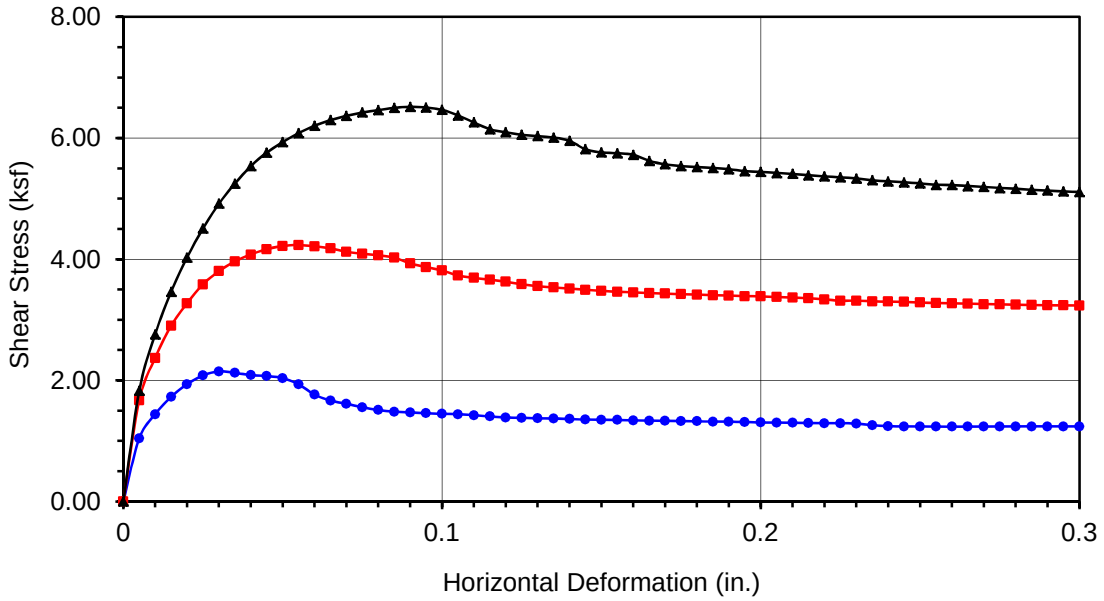
LGC Geotechnical, Inc.

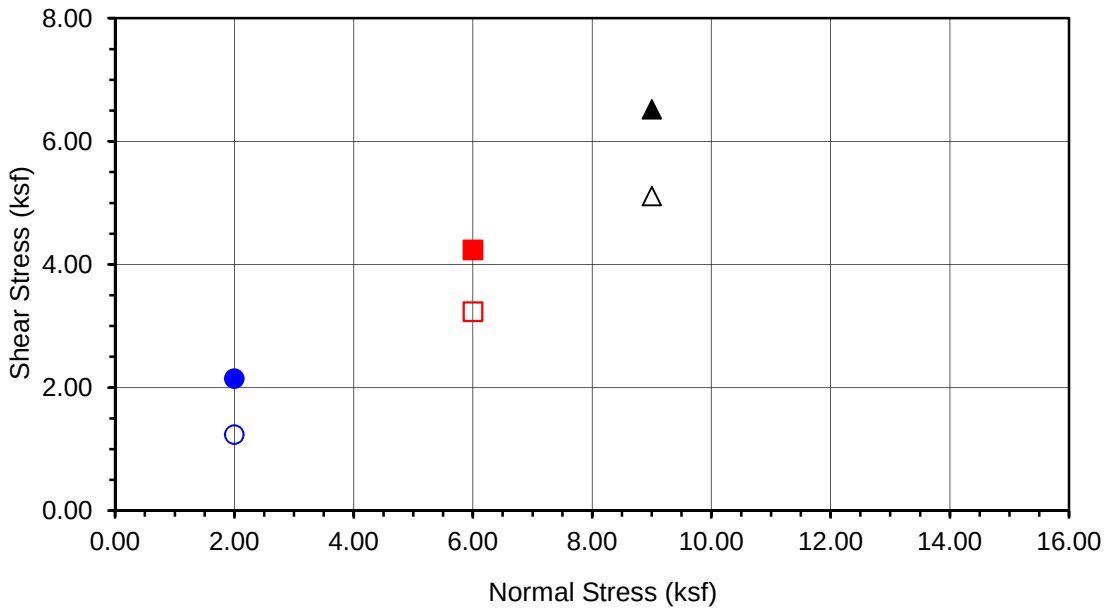
DIRECT SHEAR PLOT

Project Number: 14057-01

Date: Mar-15

Westridge / La Habra





Boring No.	**B-4**
Sample No.	**R-7**
Depth (ft)	**70**

Sample Type:

Ring

Soil Identification:
Olive lean clay'stone' (CL)

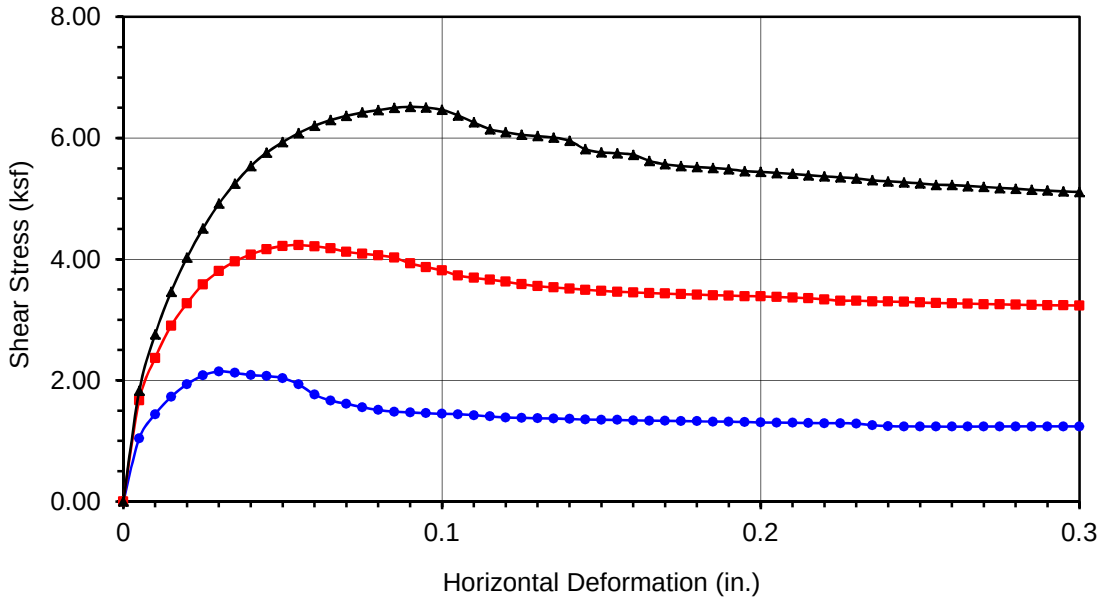
Normal Stress (kip/ft²)	2.000	6.000	9.000
Peak Shear Stress (kip/ft²)	● 2.147	■ 4.235	▲ 6.517
Shear Stress @ End of Test (ksf)	○ 1.236	□ 3.232	△ 5.109
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	22.88	22.88	22.88
Dry Density (pcf)	102.0	102.5	102.7
Saturation (%)	94.7	95.9	96.4
Soil Height Before Shearing (in.)	0.9936	0.9846	0.9705
Final Moisture Content (%)	25.2	24.5	23.8

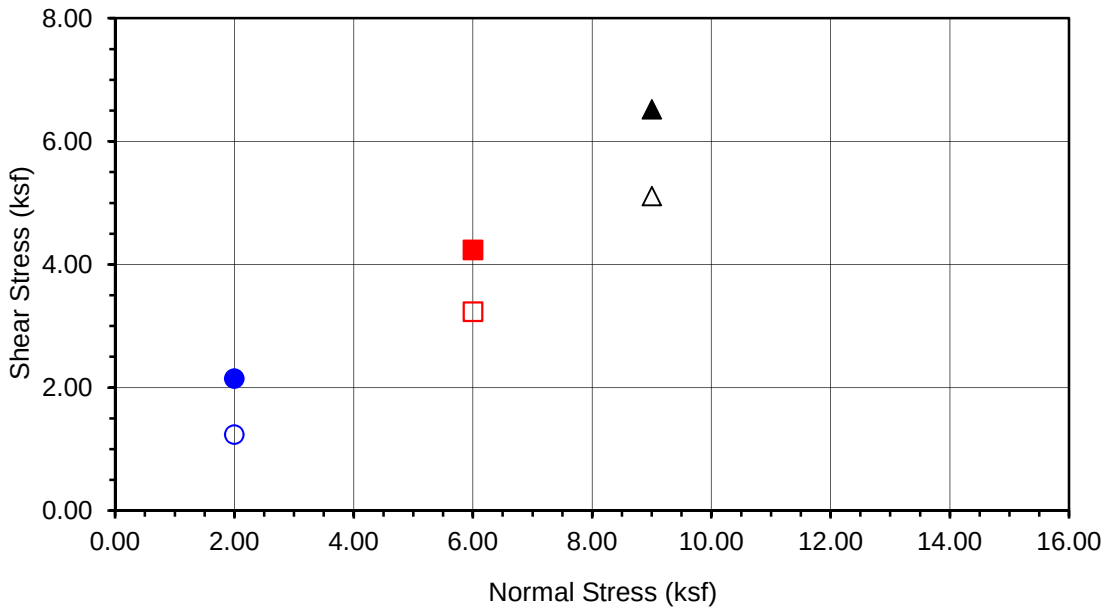
DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

02-15





Boring No.	**B-4**
Sample No.	**R-7**
Depth (ft)	**70**

Sample Type:

Ring

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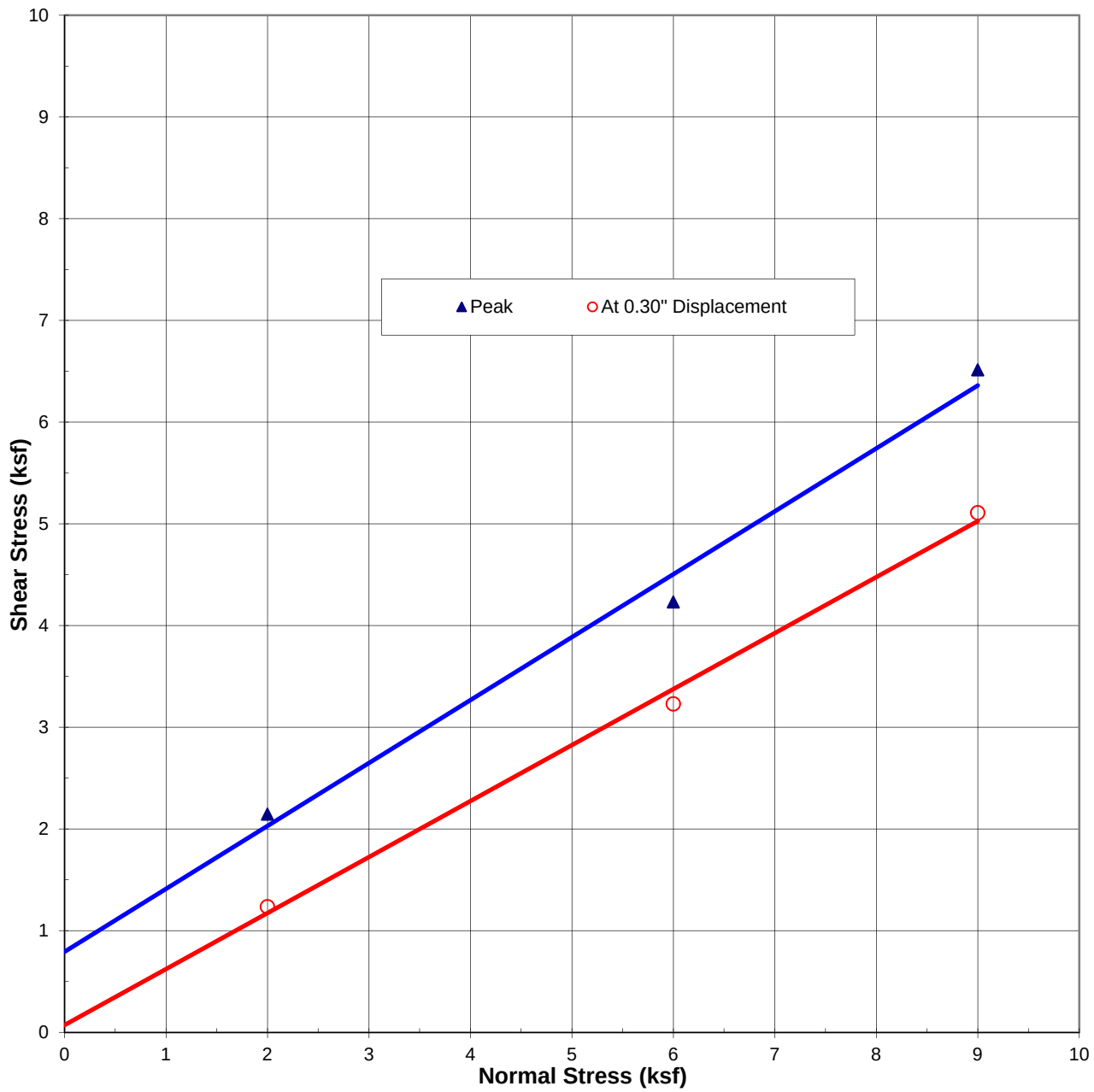
DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

02-15



Tested Sample:

B-4 at 70 ft

Peak:	At 0.30" Displacement:
31.7 Degrees	28.8 Degrees
0.8 ksf	0.07 ksf

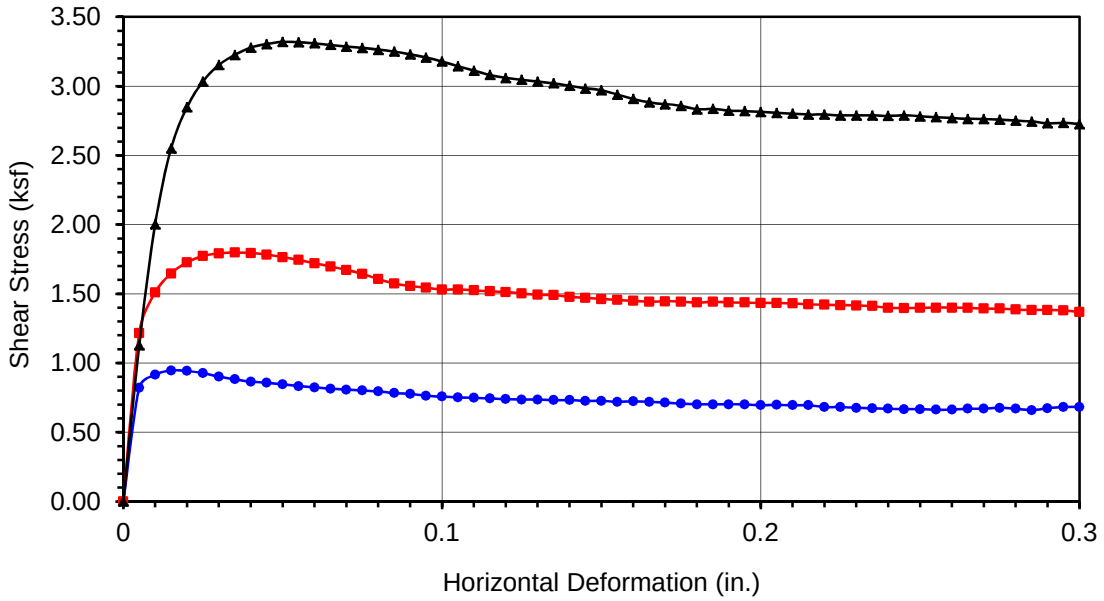
LGC Geotechnical, Inc.

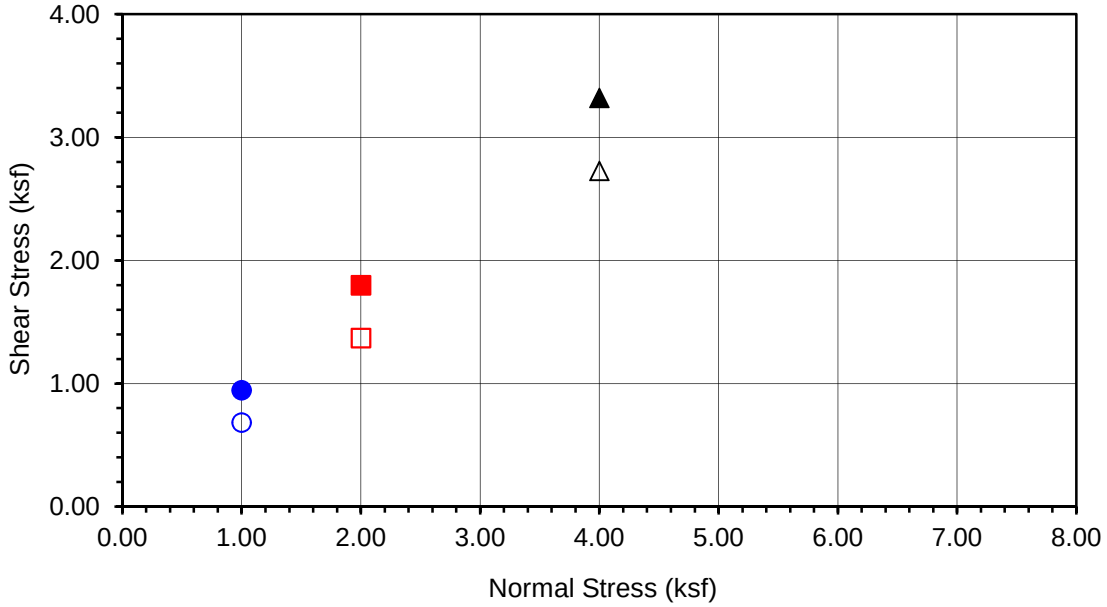
DIRECT SHEAR PLOT

Project Number: 14057-01

Date: Mar-15

Westridge / La Habra





Boring No.	**HS-1**
Sample No.	**B-2**
Depth (ft)	**40-45**

Sample Type:

90% Remold

Soil Identification:
Light olive brown silty sand (SM)

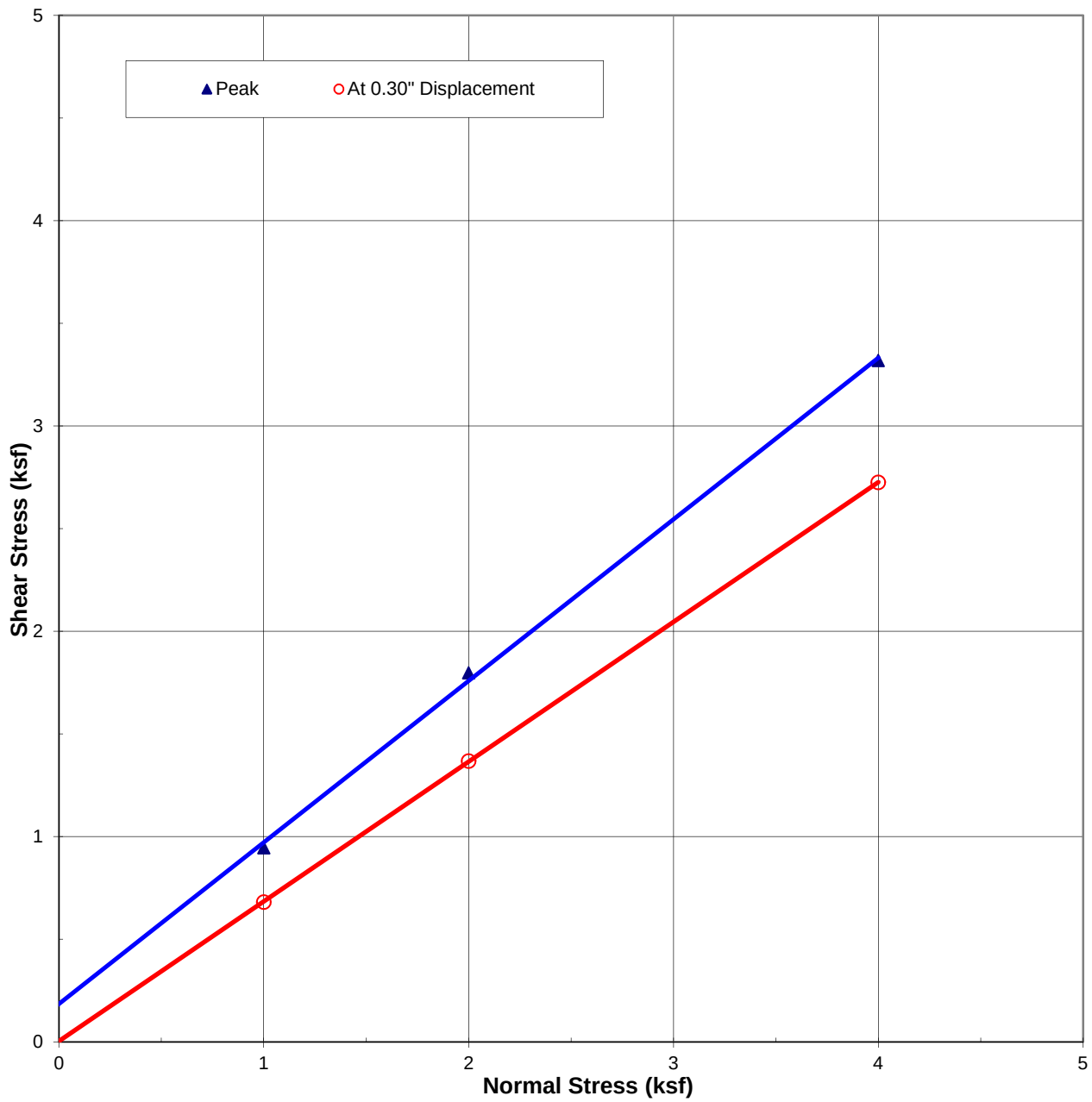
Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 0.946	■ 1.798	▲ 3.320
Shear Stress @ End of Test (ksf)	○ 0.682	□ 1.368	△ 2.726
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	10.30	10.30	10.30
Dry Density (pcf)	113.3	113.2	113.2
Saturation (%)	57.0	56.9	56.9
Soil Height Before Shearing (in.)	0.9960	0.9897	0.9844
Final Moisture Content (%)	14.8	14.5	14.4

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

10-05



Tested Sample:

HS-1 at 40-45 ft (Af)

Peak:	At 0.30" Displacement:
38.2 Degrees	34.3 Degrees
0.19 ksf	0.0 ksf

Samples Remolded to 90% R.C.

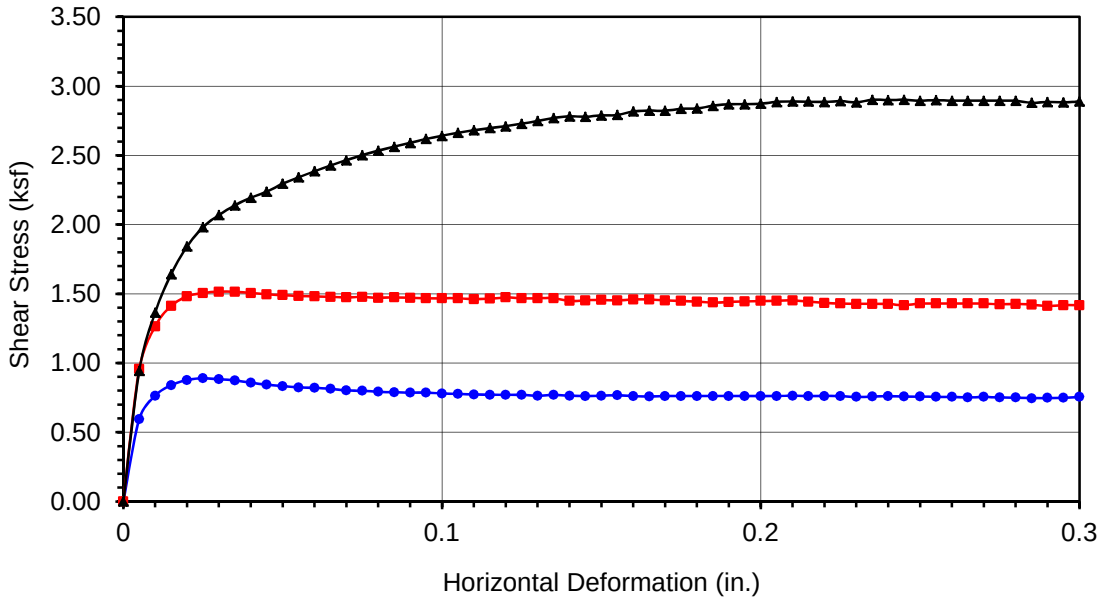
LGC Geotechnical, Inc.

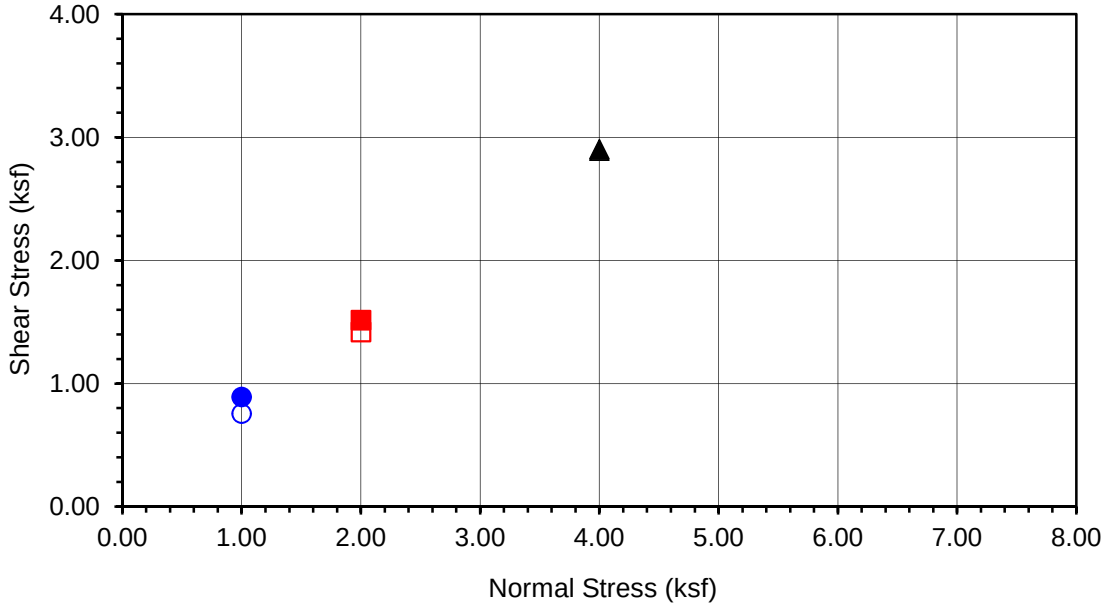
DIRECT SHEAR PLOT

Project Number: 14057-01

Date: Jan-15

Westridge / La Habra





Boring No.	**HS-3**
Sample No.	**B-1**
Depth (ft)	**15-20**

Sample Type:

90% Remold

Soil Identification:
Olive brown silty sand with gravel (SM)g

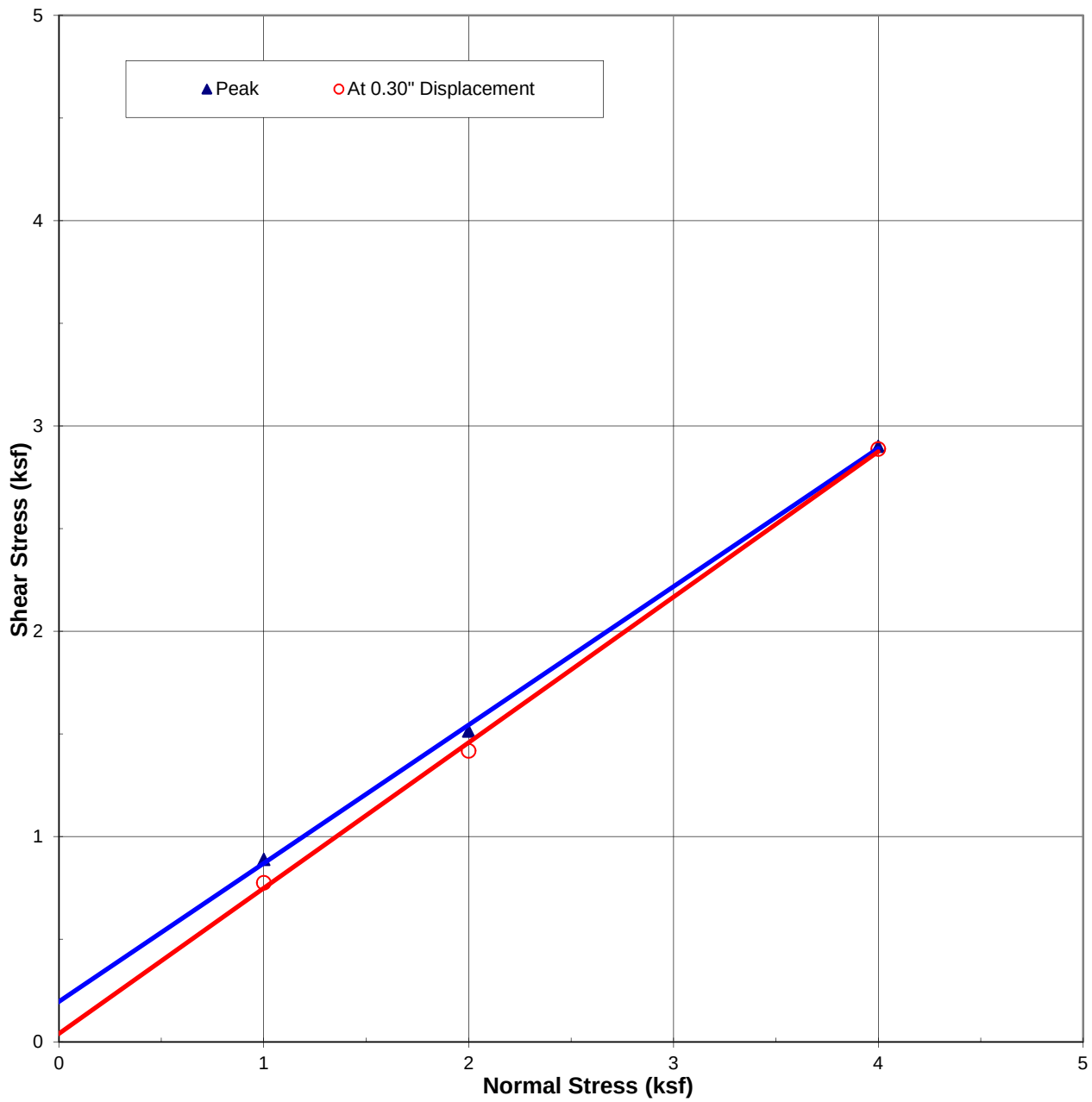
Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 0.890	■ 1.515	▲ 2.902
Shear Stress @ End of Test (ksf)	○ 0.755	□ 1.418	△ 2.889
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	6.77	6.77	6.77
Dry Density (pcf)	119.2	119.2	119.2
Saturation (%)	44.2	44.2	44.1
Soil Height Before Shearing (in.)	0.9939	0.9904	0.9820
Final Moisture Content (%)	12.6	12.2	11.8

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

01-15



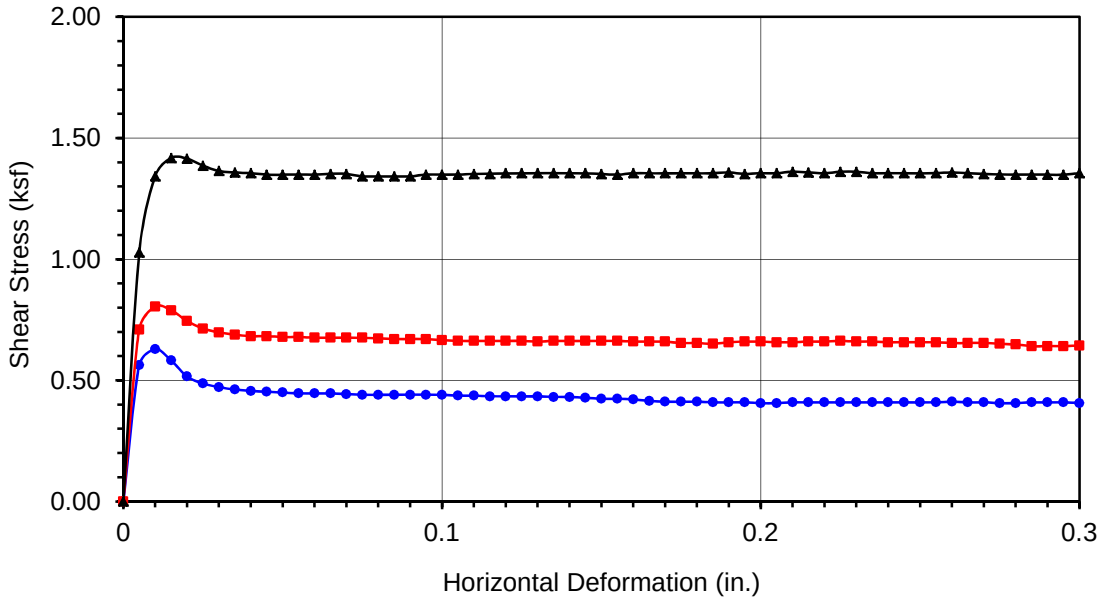
Tested Sample:

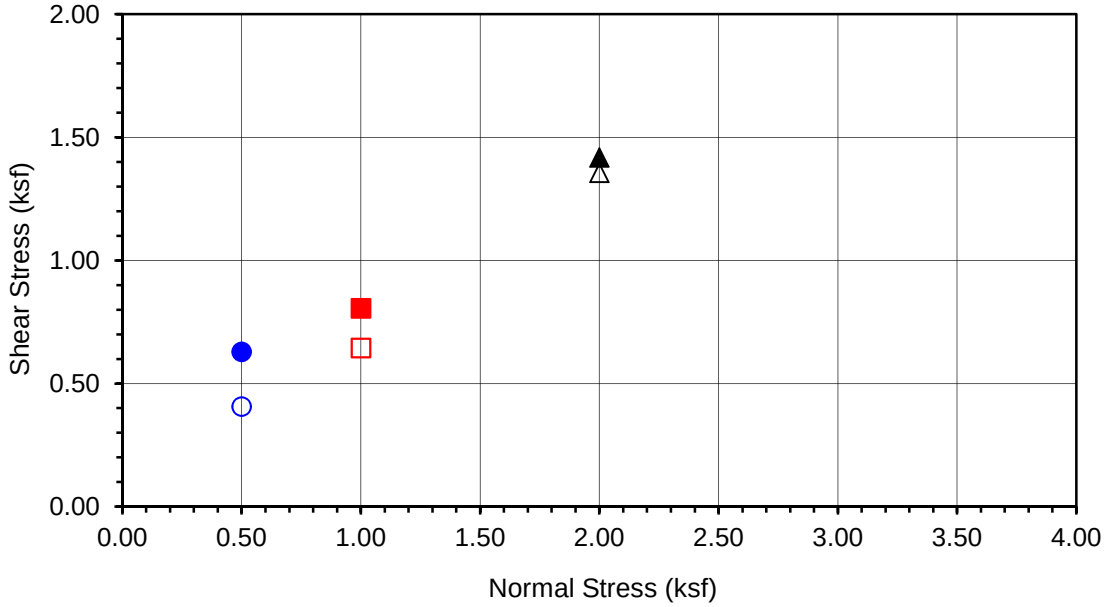
HS-3 at 15-20 ft (Af)

Peak:	At 0.30" Displacement:
34.0 Degrees	35.3 Degrees
0.20 ksf	0.0 ksf

Samples Remolded to 90% R.C.

LGC Geotechnical, Inc.	**DIRECT SHEAR PLOT**	**Project Number:** 14057-01 **Date:** Jan-15
		Westridge / La Habra





Boring No.	**HS-17**
Sample No.	**B-1**
Depth (ft)	**5-7**

Sample Type:

90% Remold

Soil Identification:
Olive brown sandy lean clay s(CL)

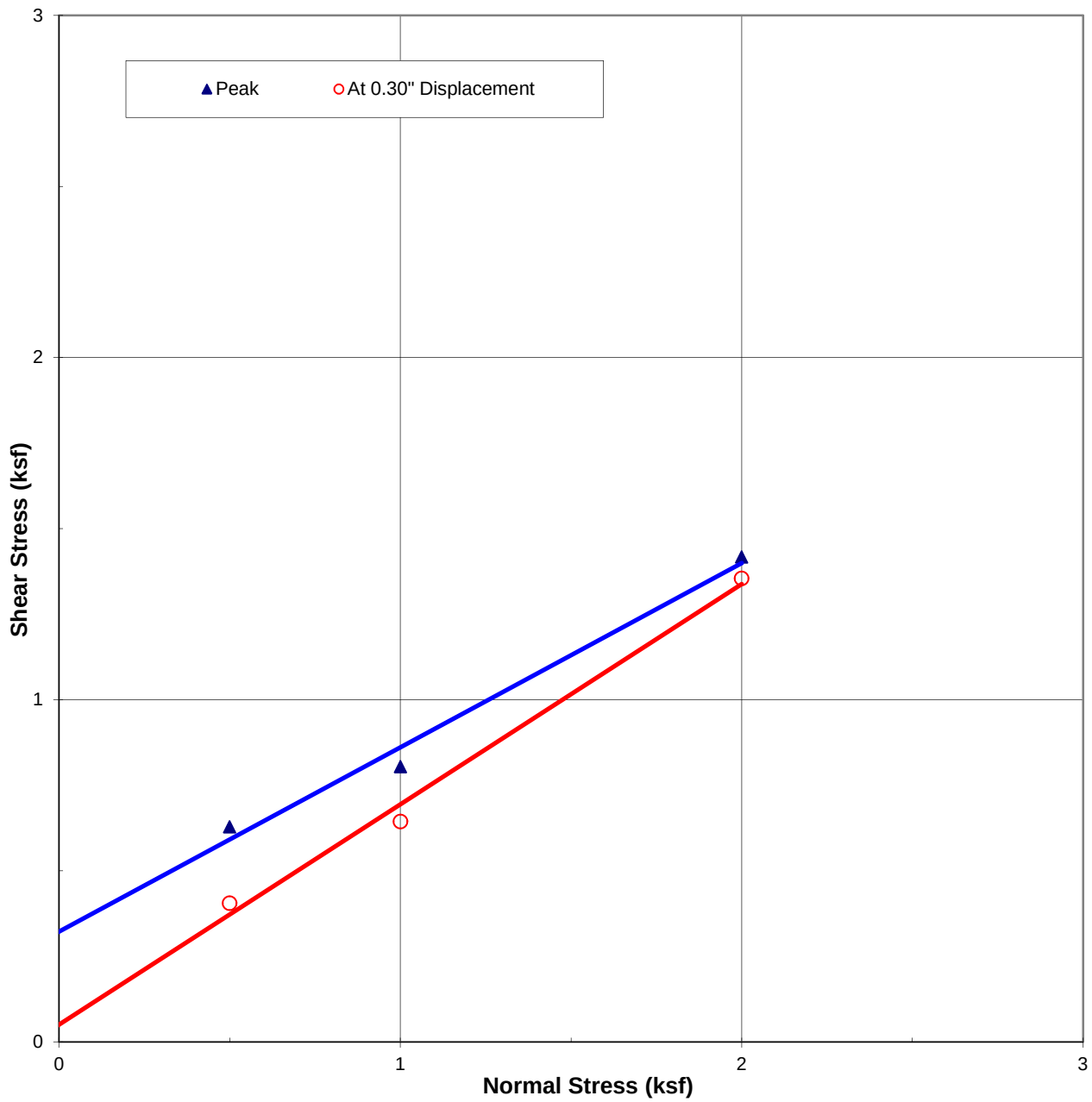
Normal Stress (kip/ft²)	0.500	1.000	2.000
Peak Shear Stress (kip/ft²)	● 0.629	■ 0.805	▲ 1.418
Shear Stress @ End of Test (ksf)	○ 0.406	□ 0.644	△ 1.355
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	9.51	9.51	9.51
Dry Density (pcf)	113.1	113.1	113.0
Saturation (%)	52.3	52.3	52.2
Soil Height Before Shearing (in.)	1.0059	0.9997	0.9901
Final Moisture Content (%)	16.8	16.5	16.1

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

02-15



Tested Sample:

HS-17 at 5-7 ft (Af)

Peak:	At 0.30" Displacement:
28.3 Degrees	32.8 Degrees
0.32 ksf	0.05 ksf

Samples Remolded to 90% R.C.

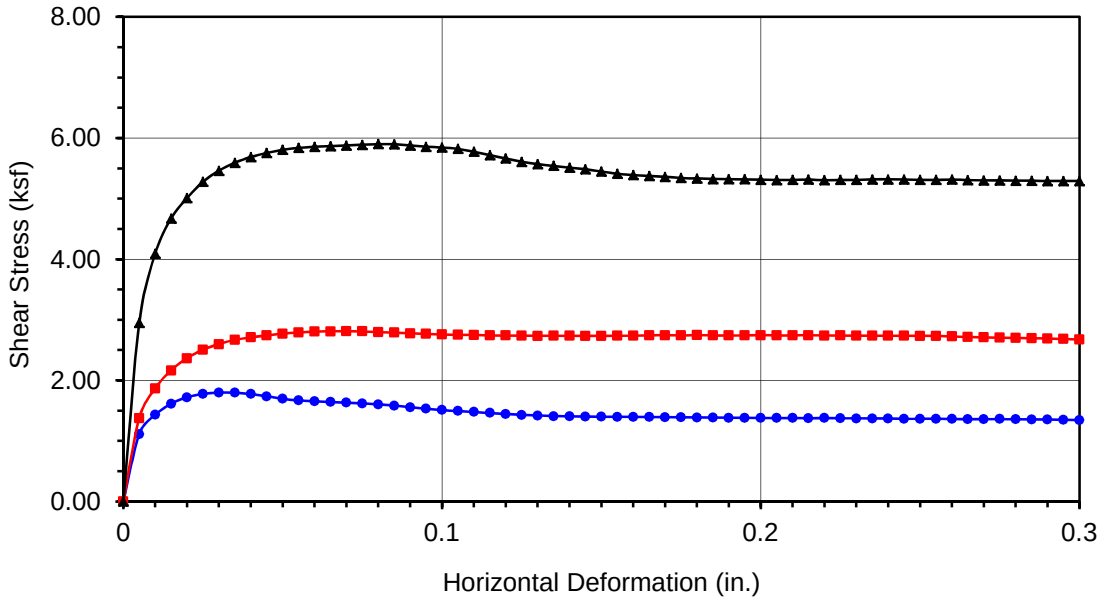
LGC Geotechnical, Inc.

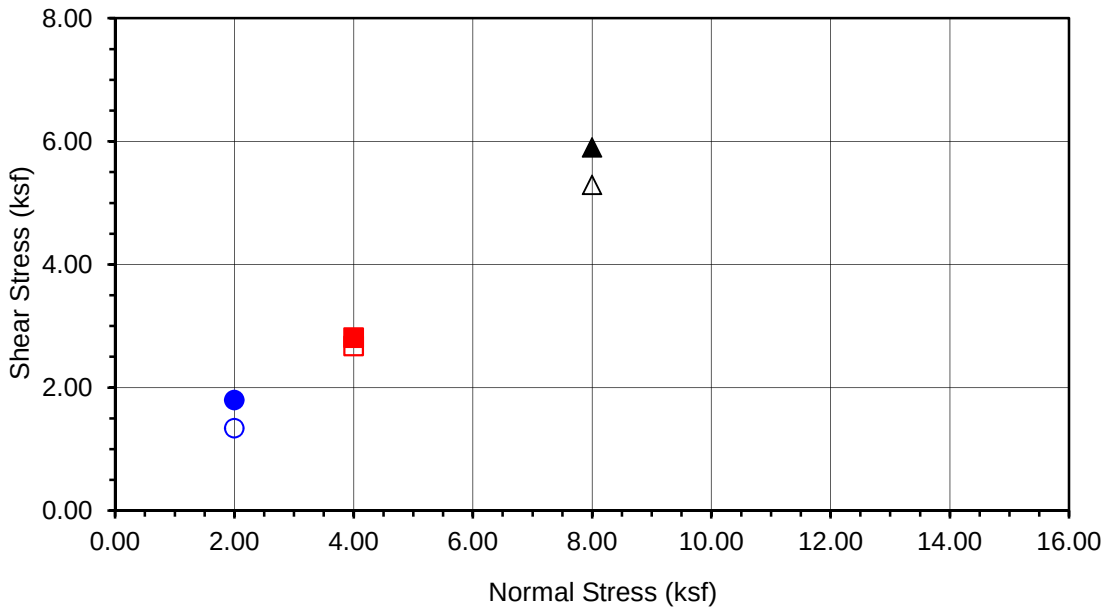
DIRECT SHEAR PLOT

Project Number: 14057-01

Date: Feb-15

Westridge / La Habra





Boring No.	**B-3**
Sample No.	**B-1**
Depth (ft)	**30-33**

Sample Type:

90% Remold

Soil Identification:
Light olive brown sandy lean clay s(CL)

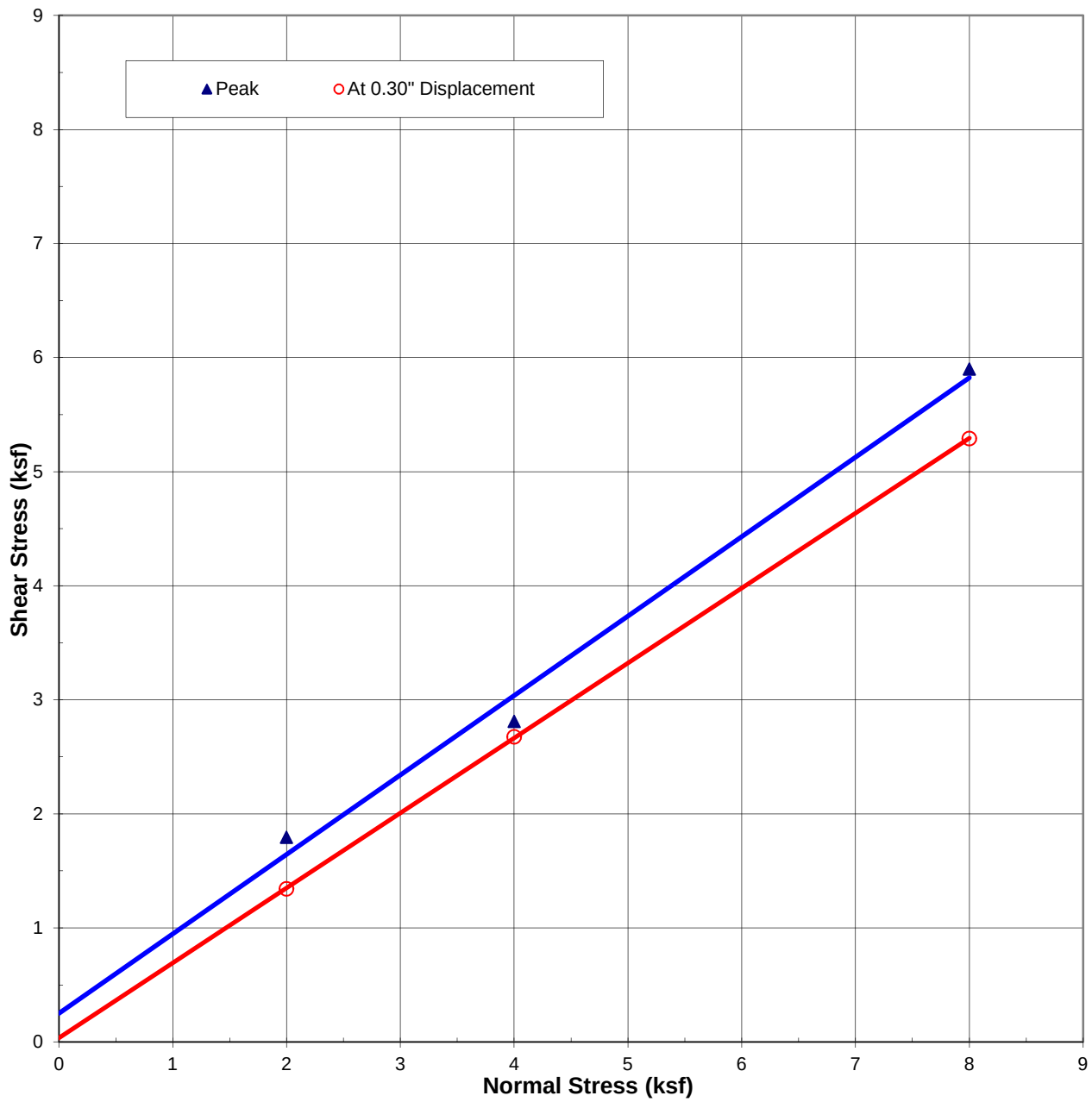
Normal Stress (kip/ft²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 1.795	■ 2.811	▲ 5.901
Shear Stress @ End of Test (ksf)	○ 1.342	□ 2.675	△ 5.291
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	14.58	14.58	14.58
Dry Density (pcf)	103.5	103.5	103.5
Saturation (%)	62.6	62.6	62.6
Soil Height Before Shearing (in.)	0.9922	0.9862	0.9804
Final Moisture Content (%)	21.3	20.7	19.6

DIRECT SHEAR TEST RESULTS
Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

02-15



Tested Sample:

B-3 at 30-33 ft (Af)

Peak:	At 0.30" Displacement:
34.9 Degrees	33.3 Degrees
0.25 ksf	0.03 ksf

Samples Remolded to 90% R.C.

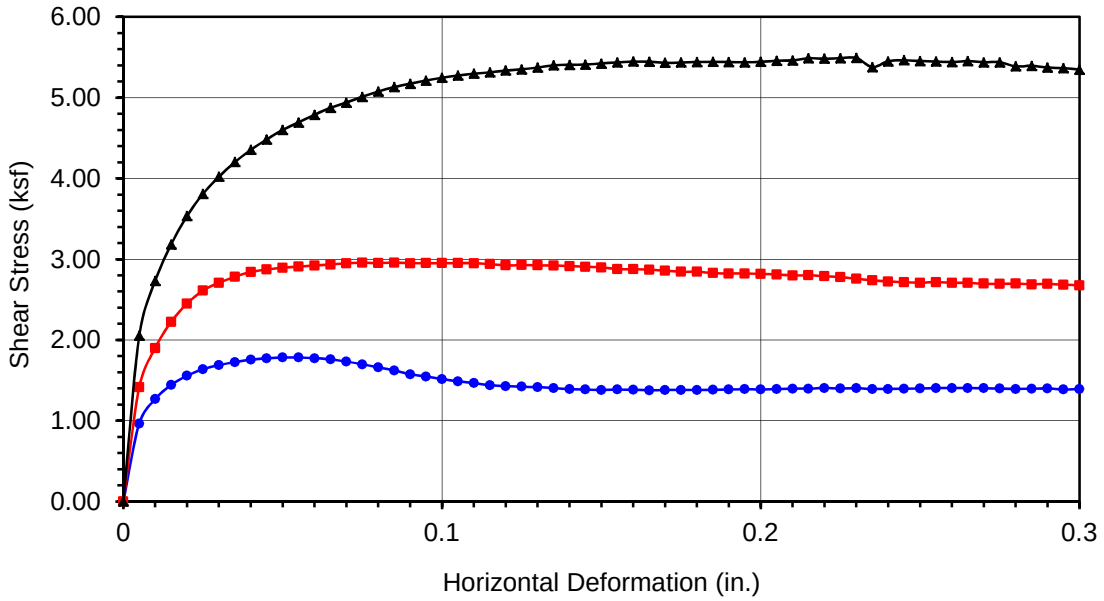
LGC Geotechnical, Inc.

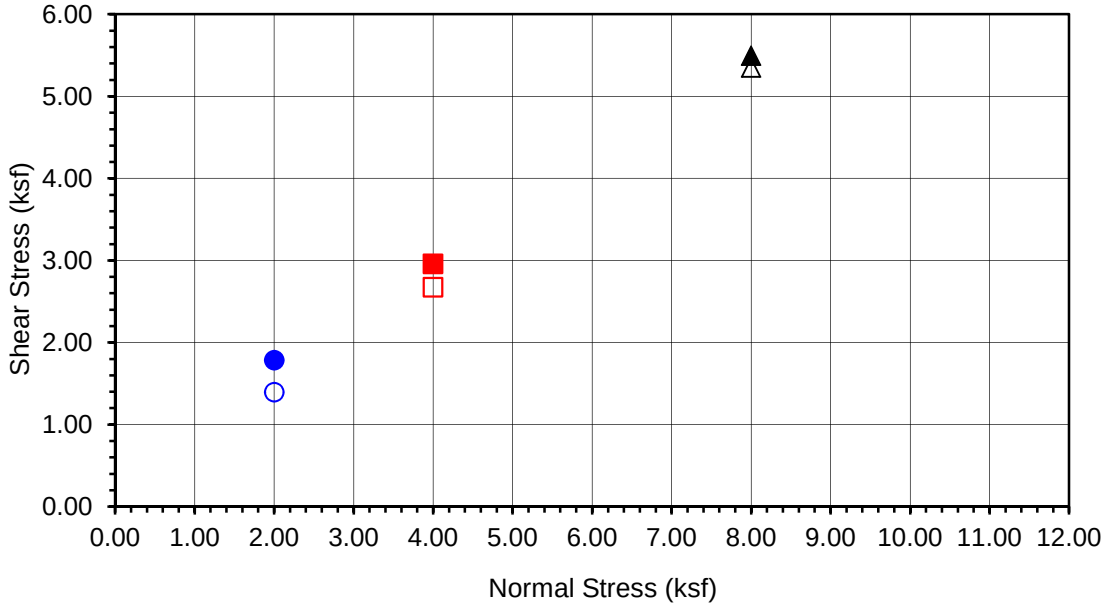
DIRECT SHEAR PLOT

Project Number: 14057-01

Date: Feb-15

Westridge / La Habra





Boring No.	**B-4**
Sample No.	**B-1**
Depth (ft)	**35-40**
Sample Type: 90% Remold	
Soil Identification: Light olive brown silty sand (SM)	

Normal Stress (kip/ft²)	2.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 1.783	■ 2.958	▲ 5.492
Shear Stress @ End of Test (ksf)	○ 1.393	□ 2.675	△ 5.348
Deformation Rate (in./min.)	0.0033	0.0033	0.0033
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	11.62	11.62	11.62
Dry Density (pcf)	108.0	108.0	108.0
Saturation (%)	55.9	55.9	55.9
Soil Height Before Shearing (in.)	0.9892	0.9851	0.9711
Final Moisture Content (%)	16.9	16.3	15.4

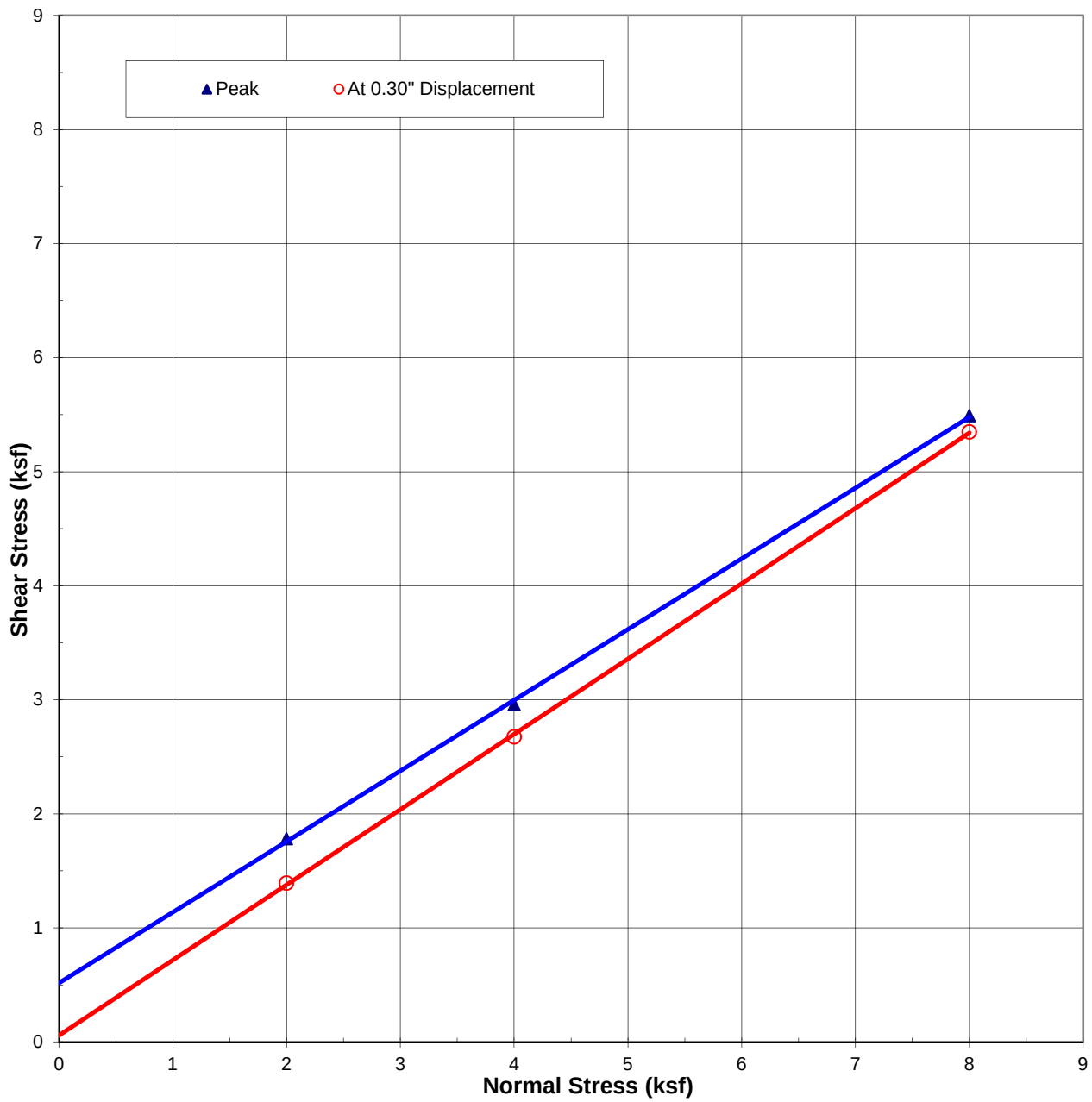
DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 14057-01

La Habra

03-15



Tested Sample:

B-4 at 35-40 ft (Af)

Peak:	At 0.30" Displacement:
31.8 Degrees	33.4 Degrees
0.52 ksf	0.06 ksf

Samples Remolded to 90% R.C.

LGC Geotechnical, Inc.

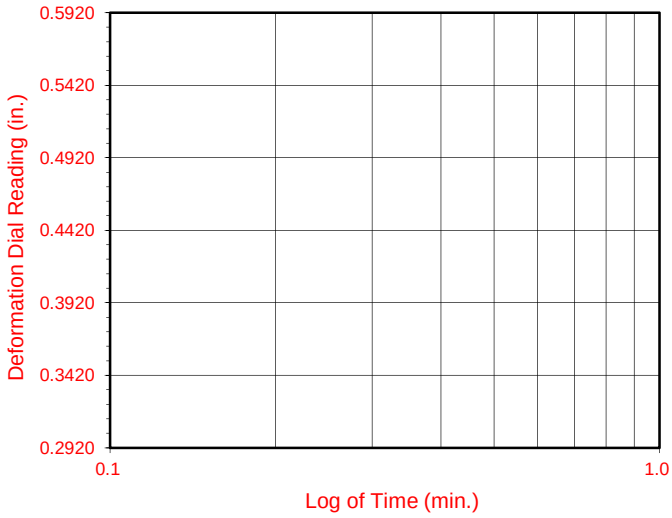
DIRECT SHEAR PLOT

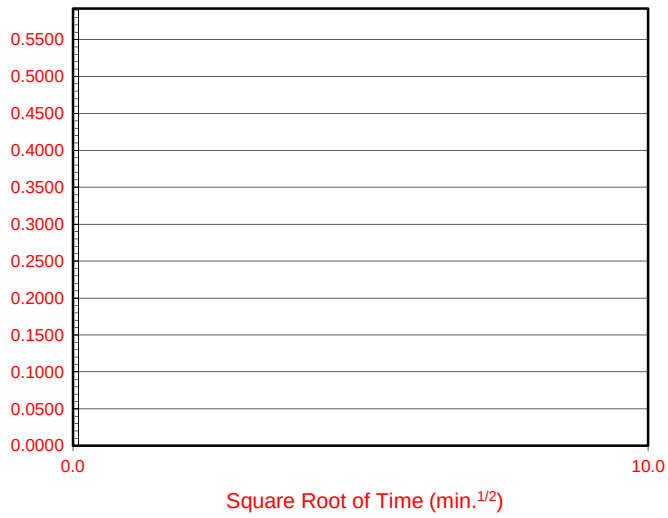
Project Number: 14057-01

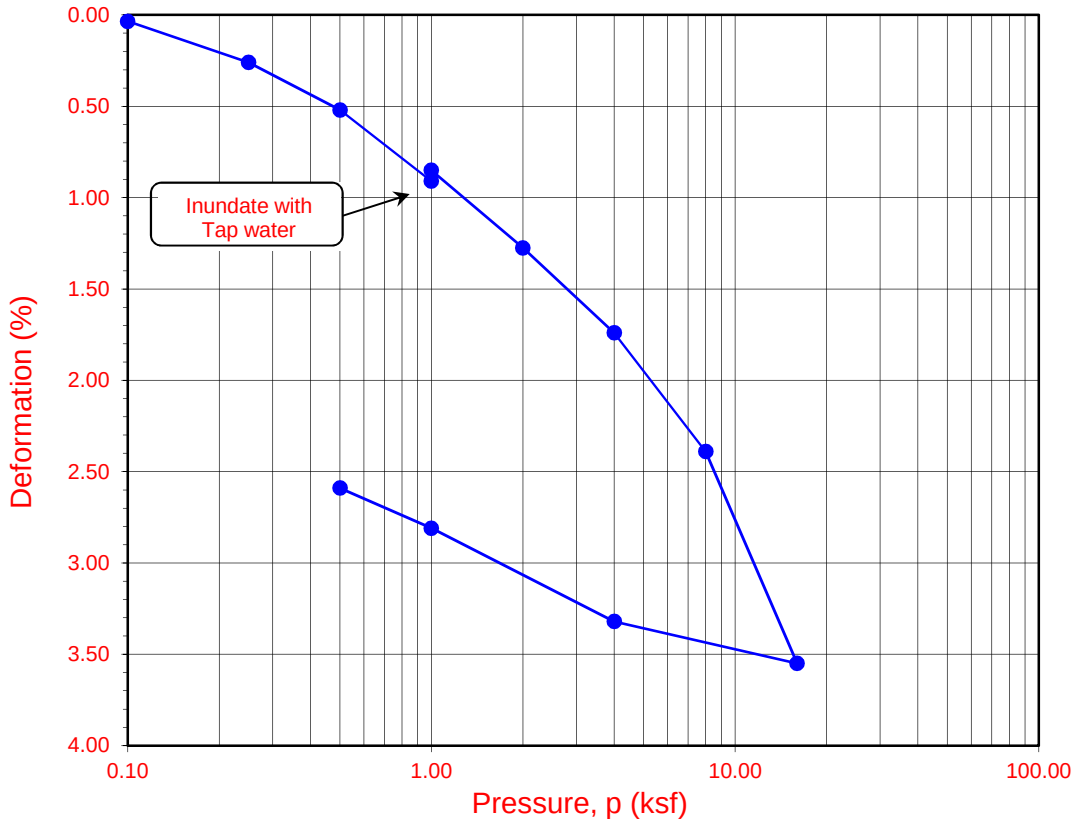
Date: Mar-15

Westridge / La Habra

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-3	**R-3**	**10.0**	**11.6**	**13.2**	**118.1**	**120.9**	**0.428**	**0.391**	**73**	**91**

Soil Identification: Dark grayish brown lean clay (CL)

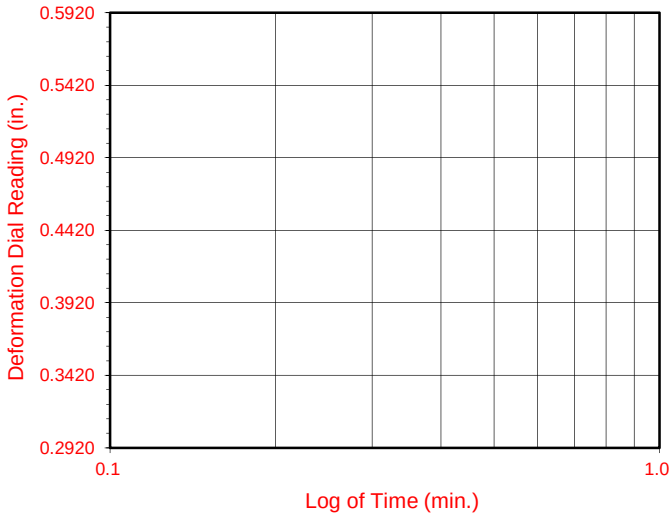
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

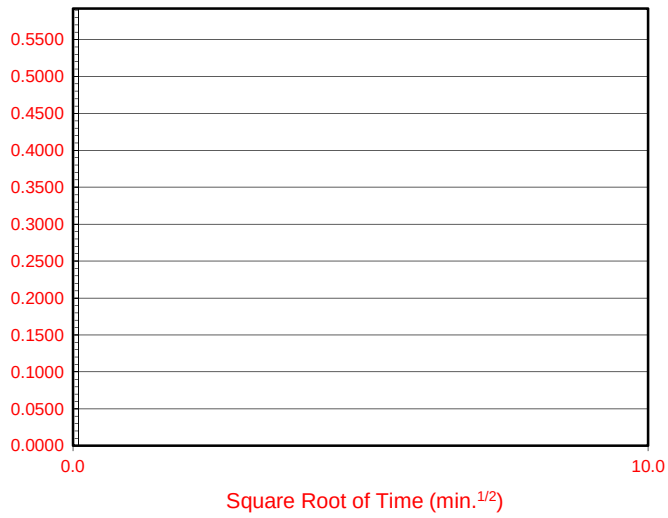
Project No.: 14057-01

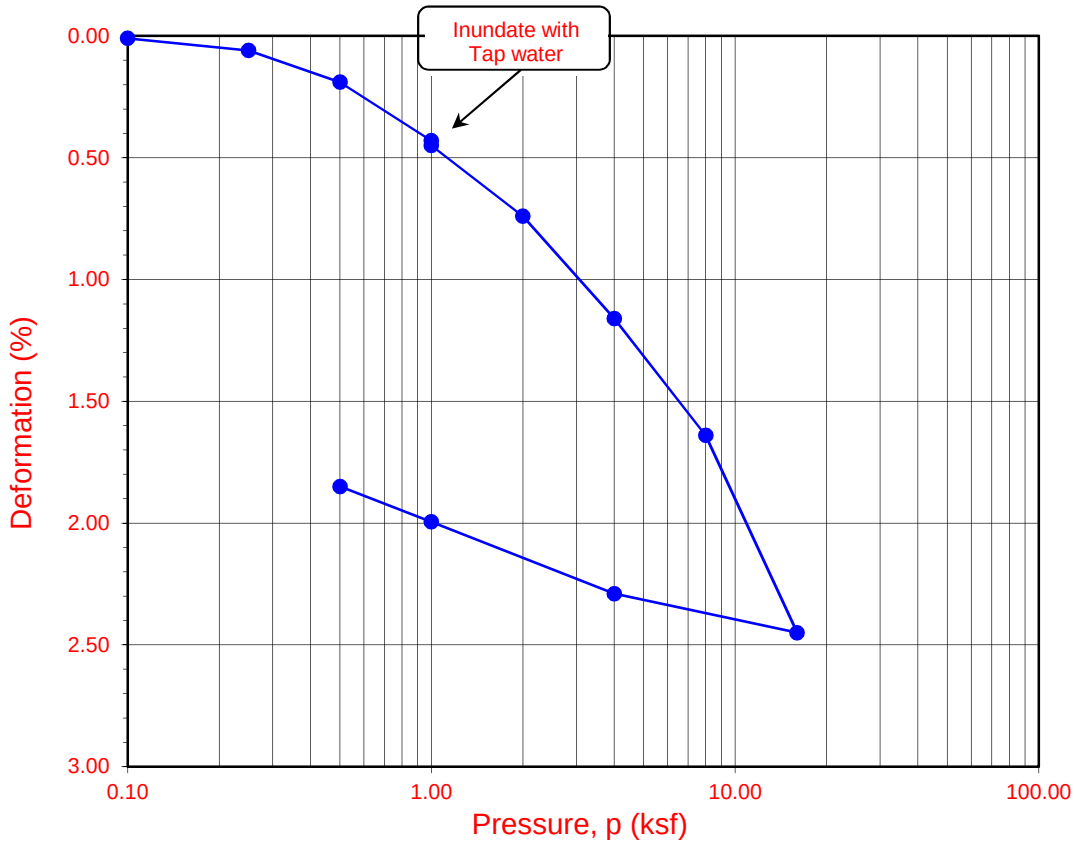
La Habra

08-14

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-3	**R-4**	**15.0**	**9.7**	**13.1**	**115.1**	**118.1**	**0.464**	**0.437**	**57**	**83**

Soil Identification: Dark yellowish brown sandy lean clay s(CL)

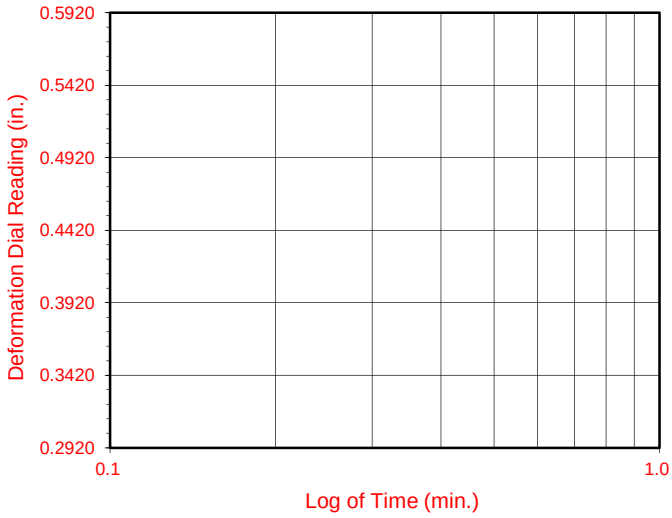
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

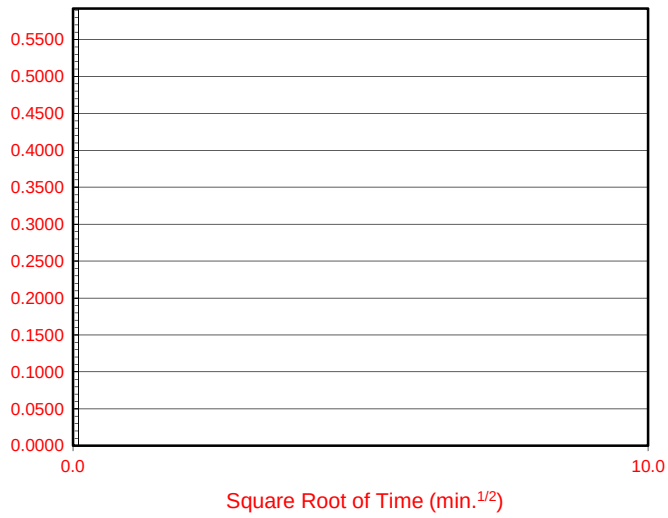
Project No.: 14057-01

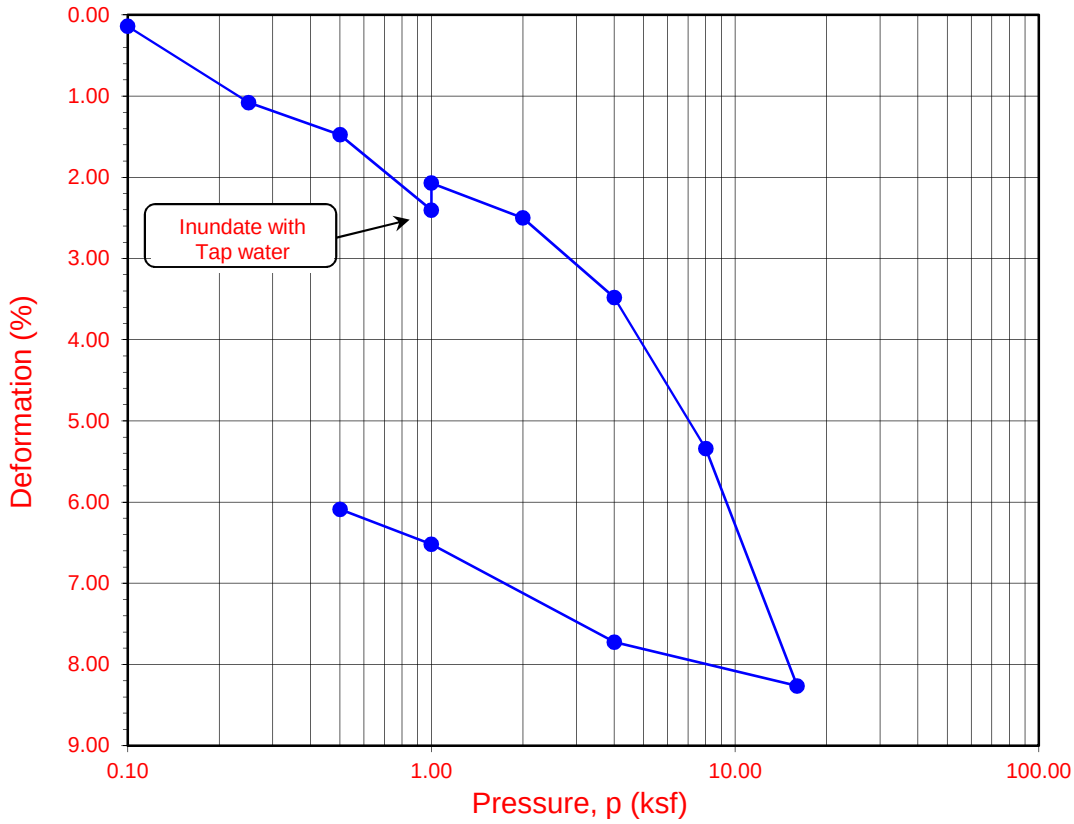
La Habra

08-14

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-3	**R-6**	**25.0**	**21.3**	**19.5**	**103.2**	**109.7**	**0.634**	**0.535**	**91**	**98**

Soil Identification: Dark yellowish brown lean clay (CL)

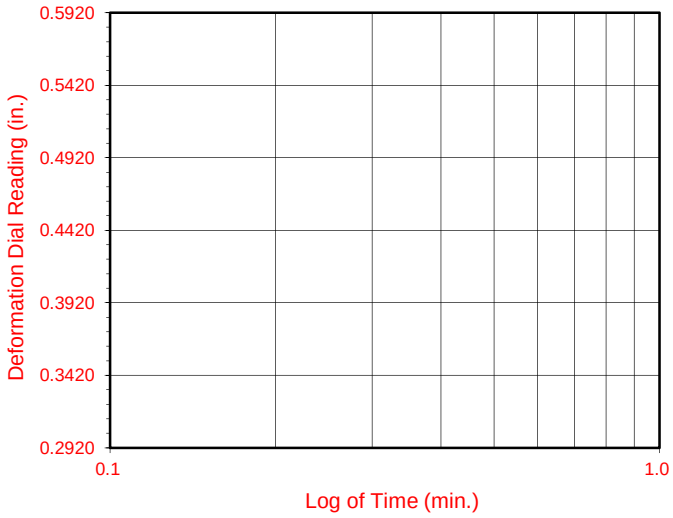
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

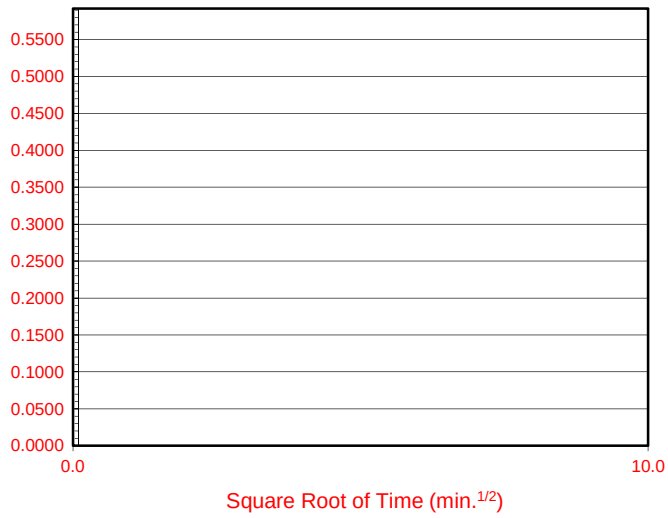
Project No.: 14057-01

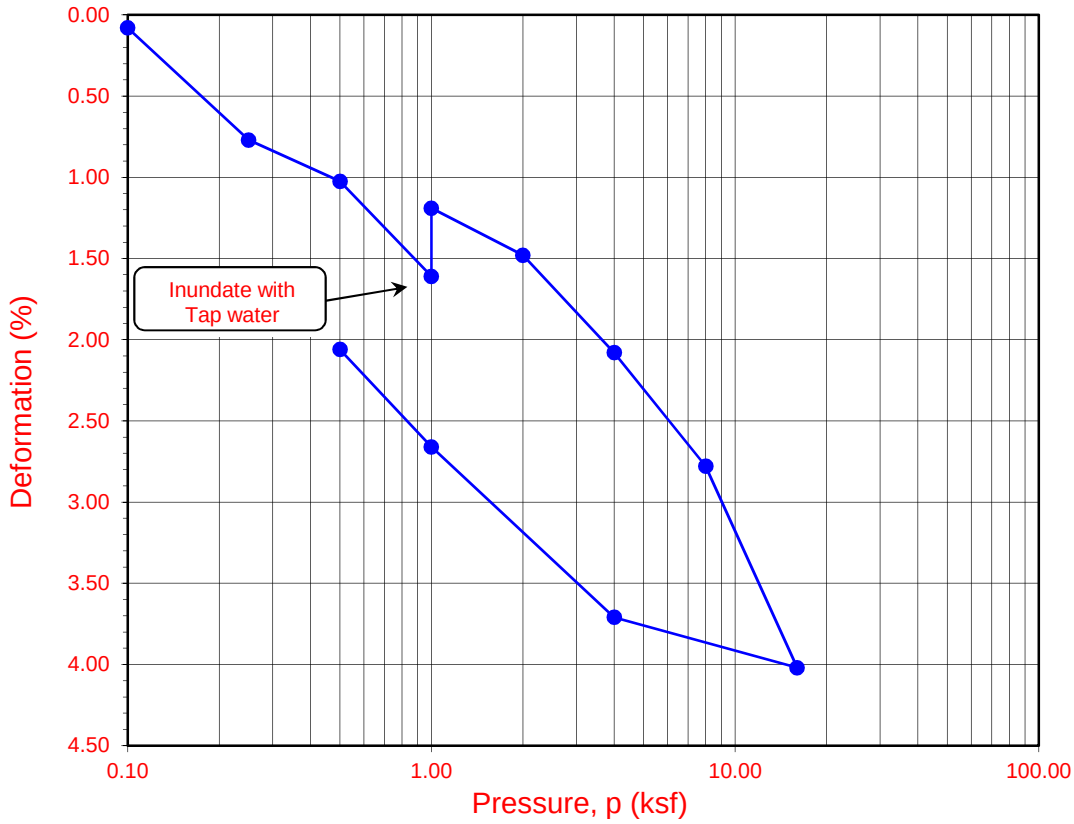
La Habra

08-14

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-12	**R-4**	**40.0**	**14.8**	**15.1**	**115.7**	**117.8**	**0.457**	**0.427**	**88**	**95**

Soil Identification: Dark grayish brown lean clay with sand (CL)s

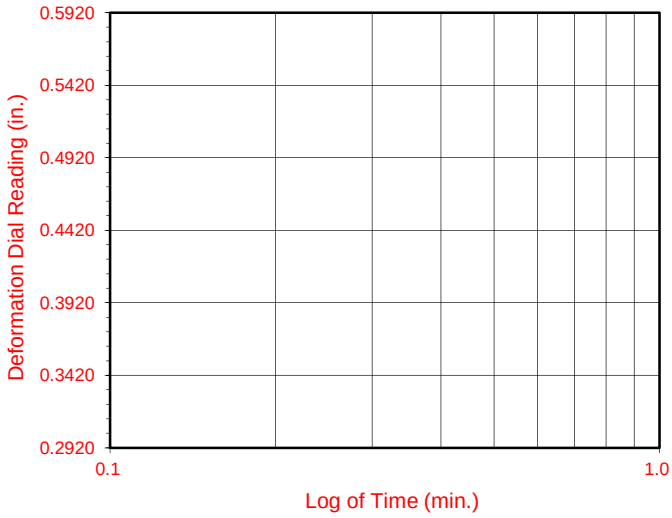
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

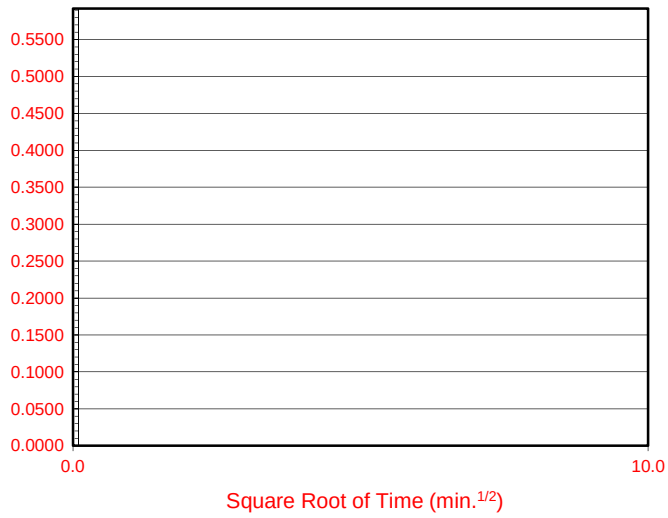
Project No.: 14057-01

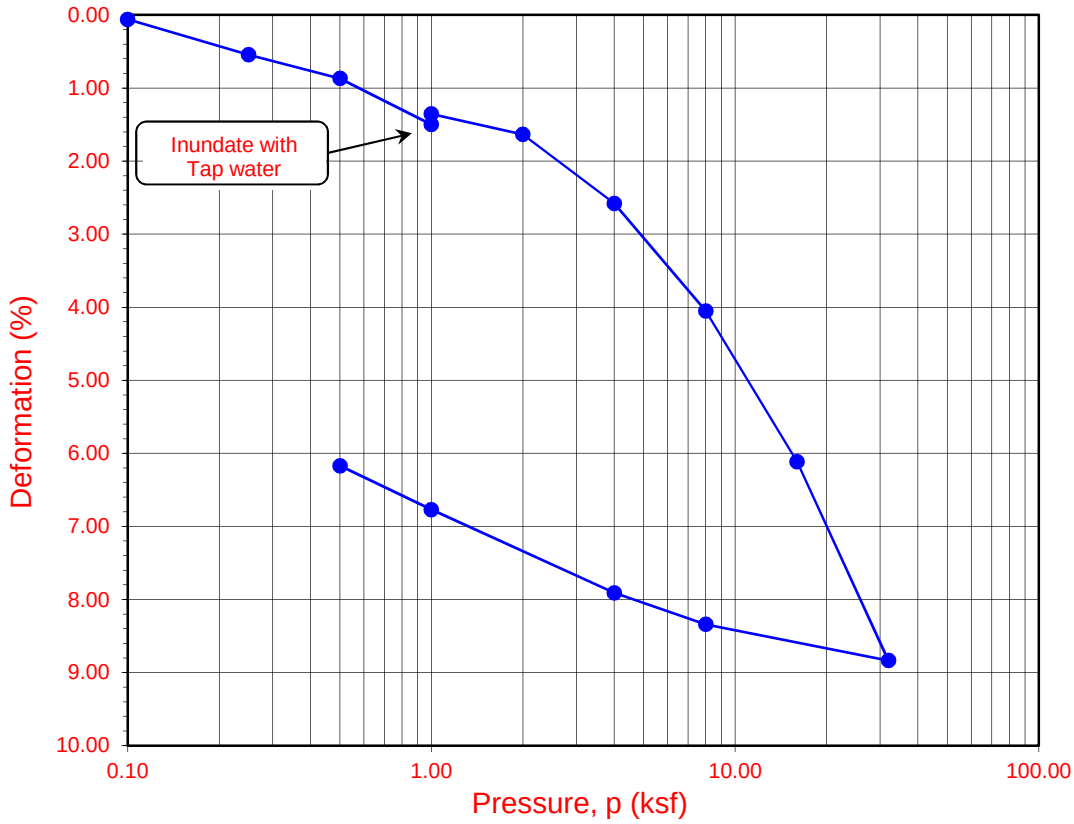
La Habra

08-14

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-12	**R-6**	**50.0**	**25.7**	**22.6**	**97.5**	**103.7**	**0.729**	**0.623**	**95**	**98**

Soil Identification: Olive gray lean clay (CL)

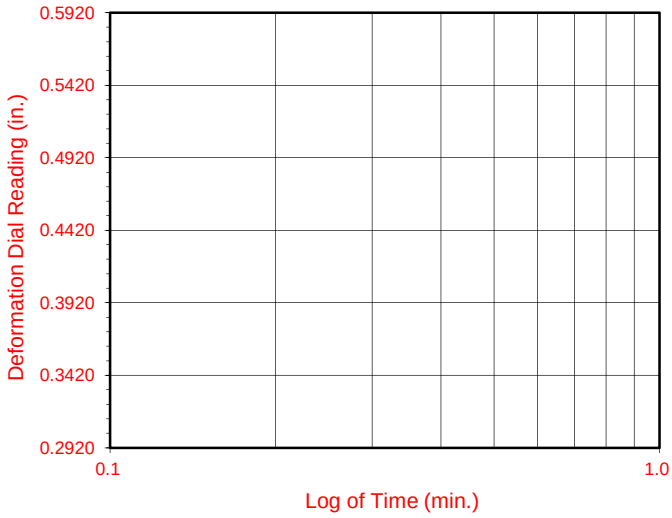
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

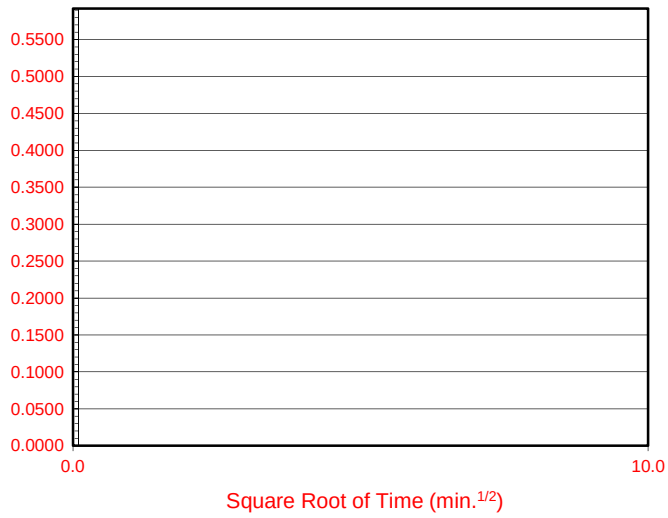
Project No.: 14057-01

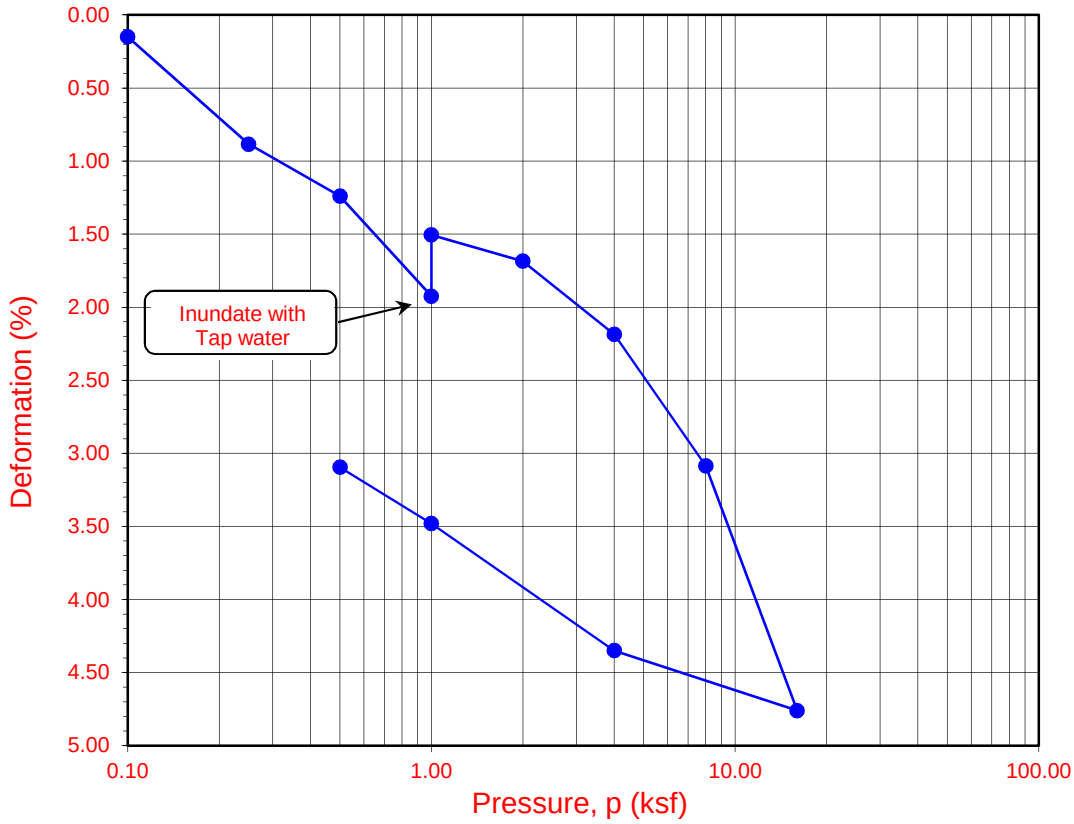
La Habra

08-14

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-14	**R-2**	**10.0**	**21.4**	**18.5**	**107.5**	**112.5**	**0.580**	**0.531**	**100**	**99**

Soil Identification: Dark olive gray lean clay (CL)

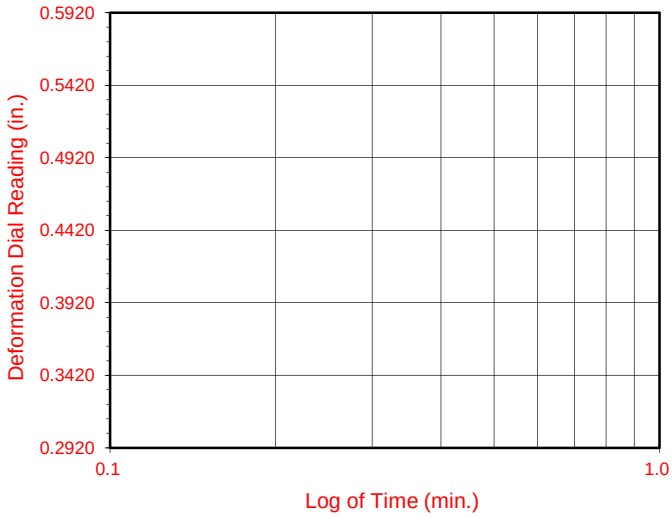
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

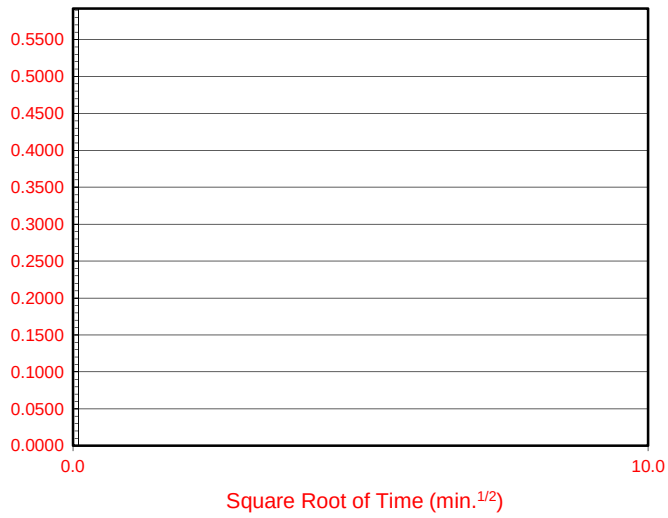
Project No.: 14057-01

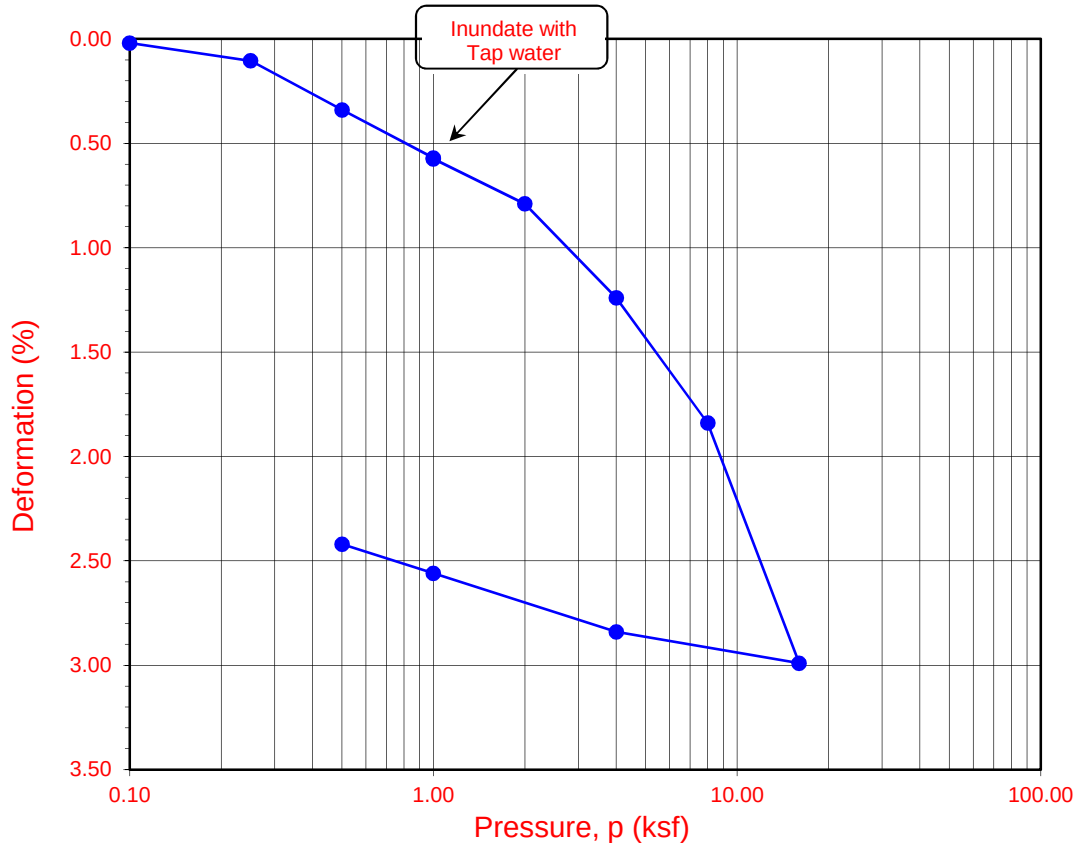
La Habra

08-14

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-14	**R-4**	**20.0**	**9.1**	**13.4**	**115.3**	**117.8**	**0.462**	**0.427**	**53**	**84**

Soil Identification: Olive brown clayey sand (SC)

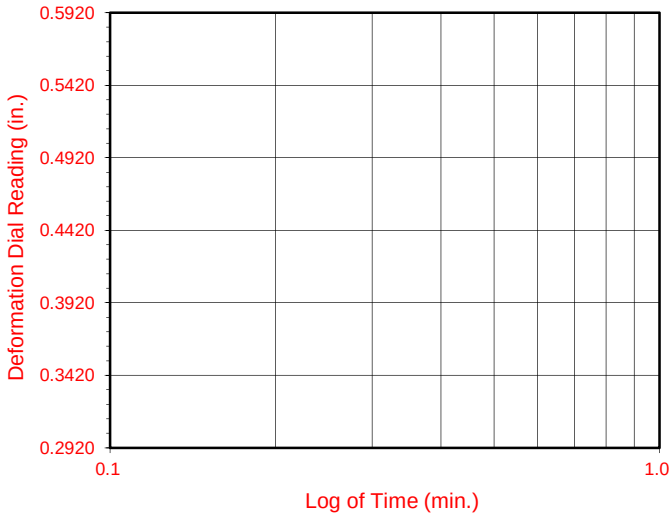
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

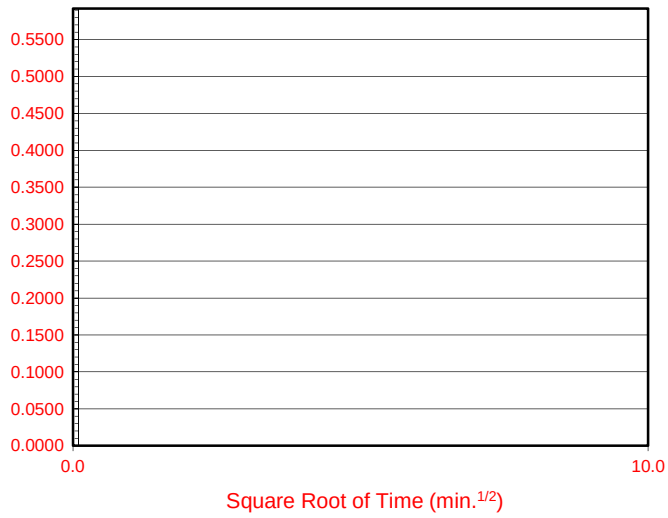
Project No.: 14057-01

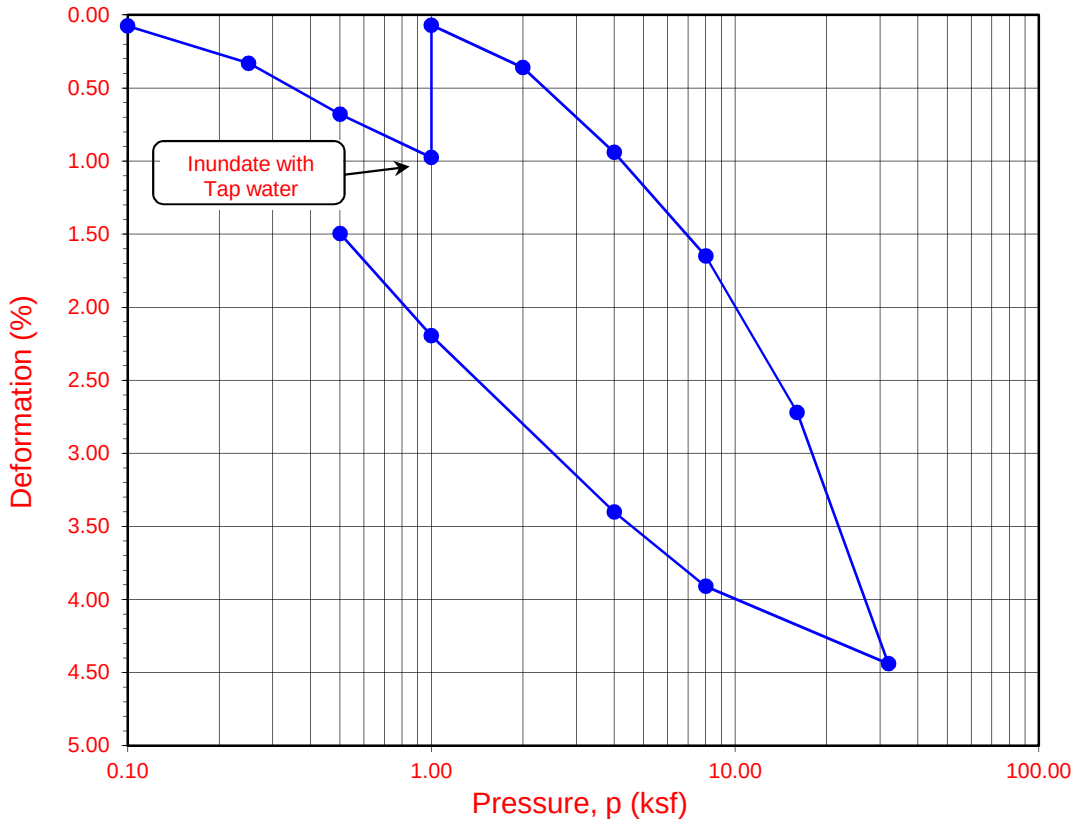
La Habra

08-14

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-15	**R-5**	**25.0**	**13.4**	**14.8**	**119.2**	**120.5**	**0.414**	**0.393**	**88**	**100**

Soil Identification: Olive brown clayey sand (SC)

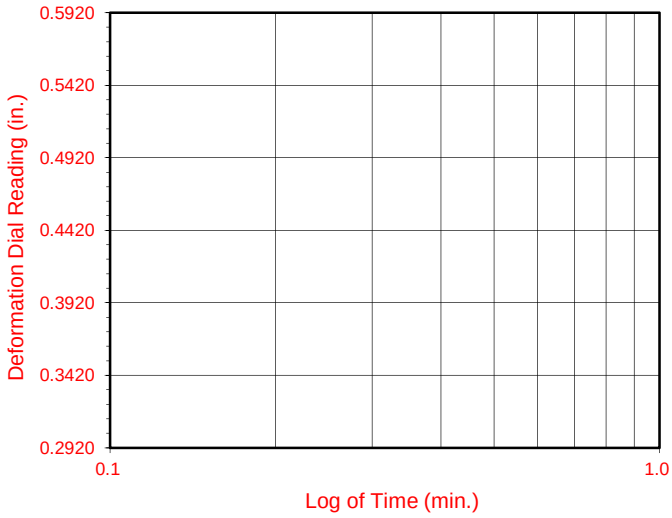
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

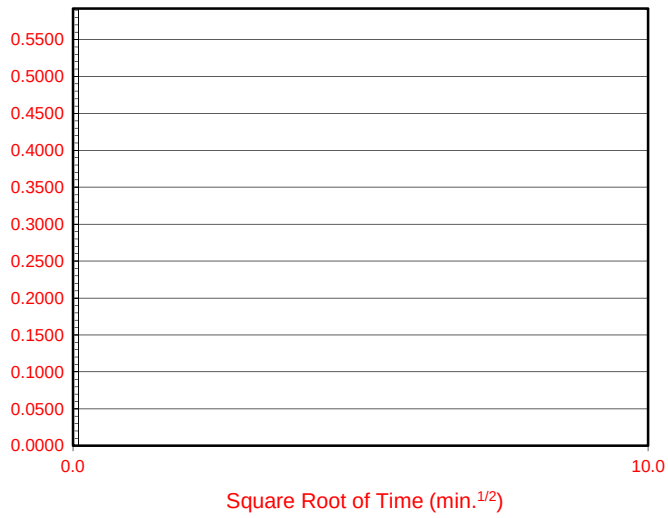
Project No.: 14057-01

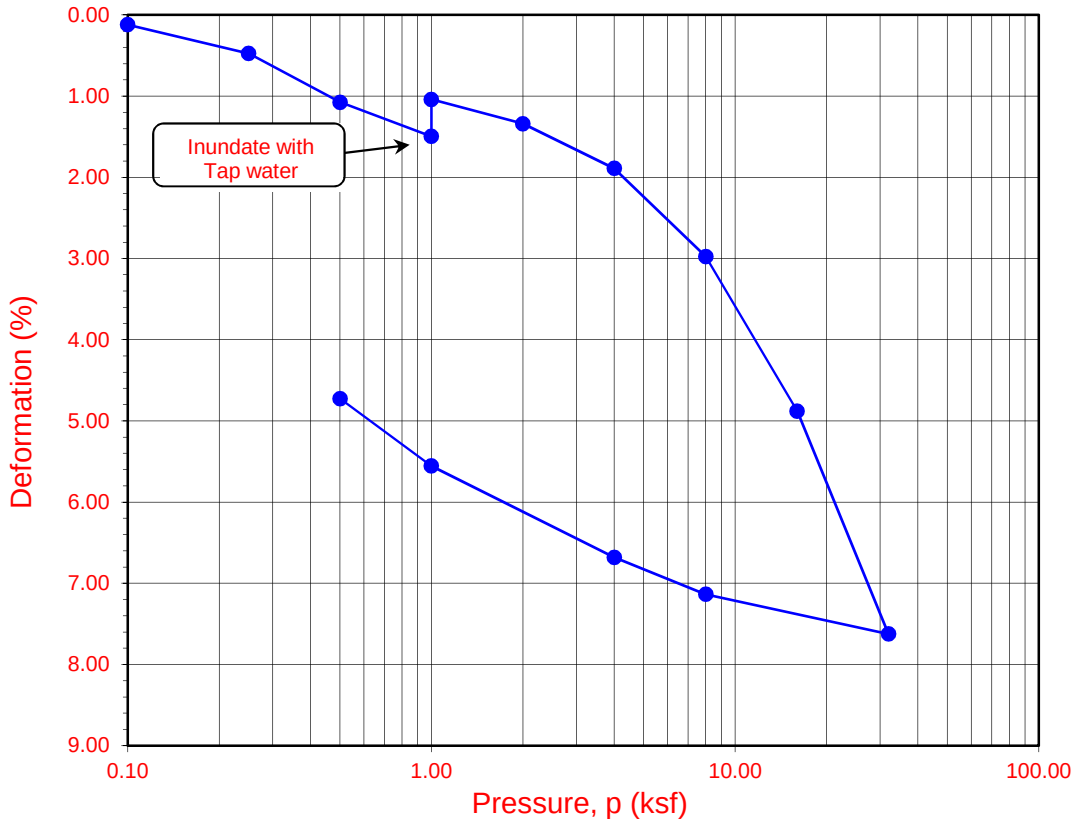
La Habra

03-15

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-16	**R-4**	**20.0**	**16.4**	**16.4**	**112.0**	**116.9**	**0.505**	**0.434**	**88**	**100**

Soil Identification: Brown lean clay (CL)

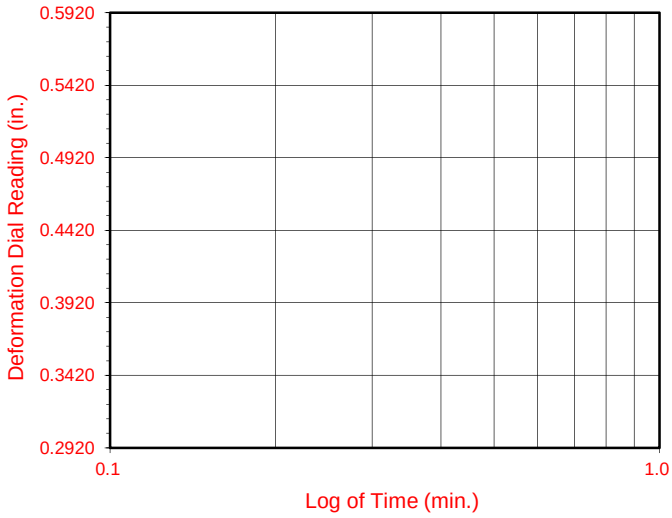
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

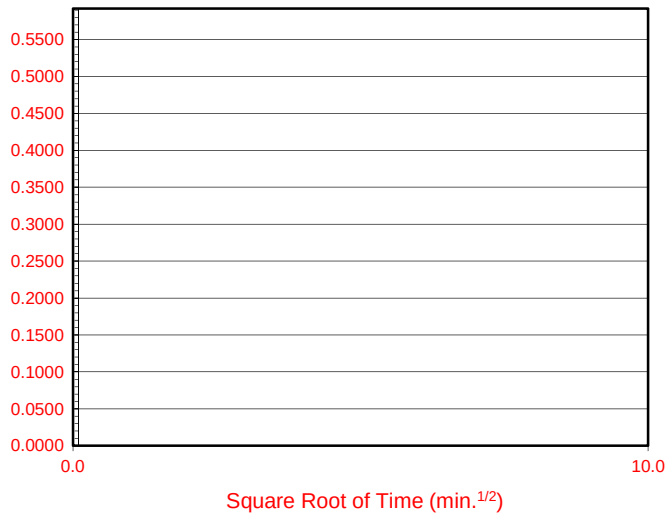
Project No.: 14057-01

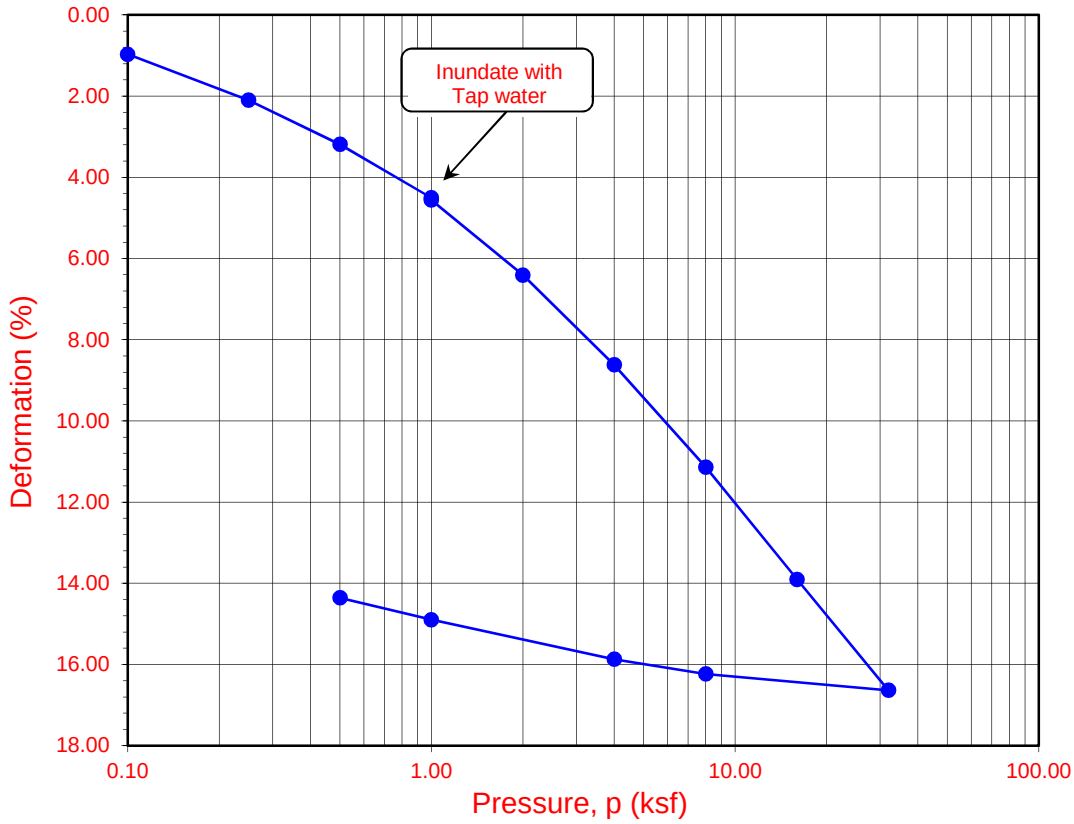
La Habra

03-15

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-17	**R-4**	**20.0**	**26.3**	**17.6**	**97.6**	**113.8**	**0.728**	**0.480**	**98**	**99**

Soil Identification: Yellowish brown lean clay (CL)

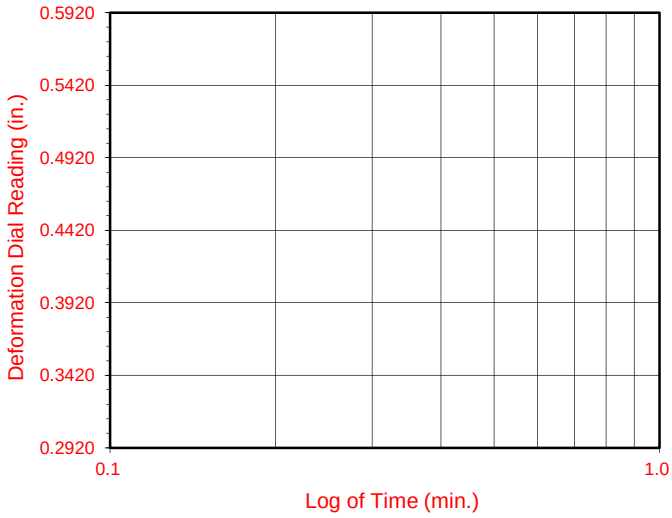
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

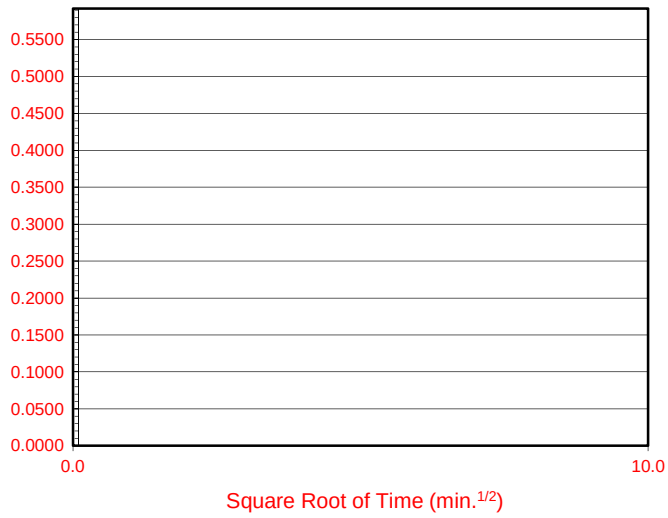
Project No.: 14057-01

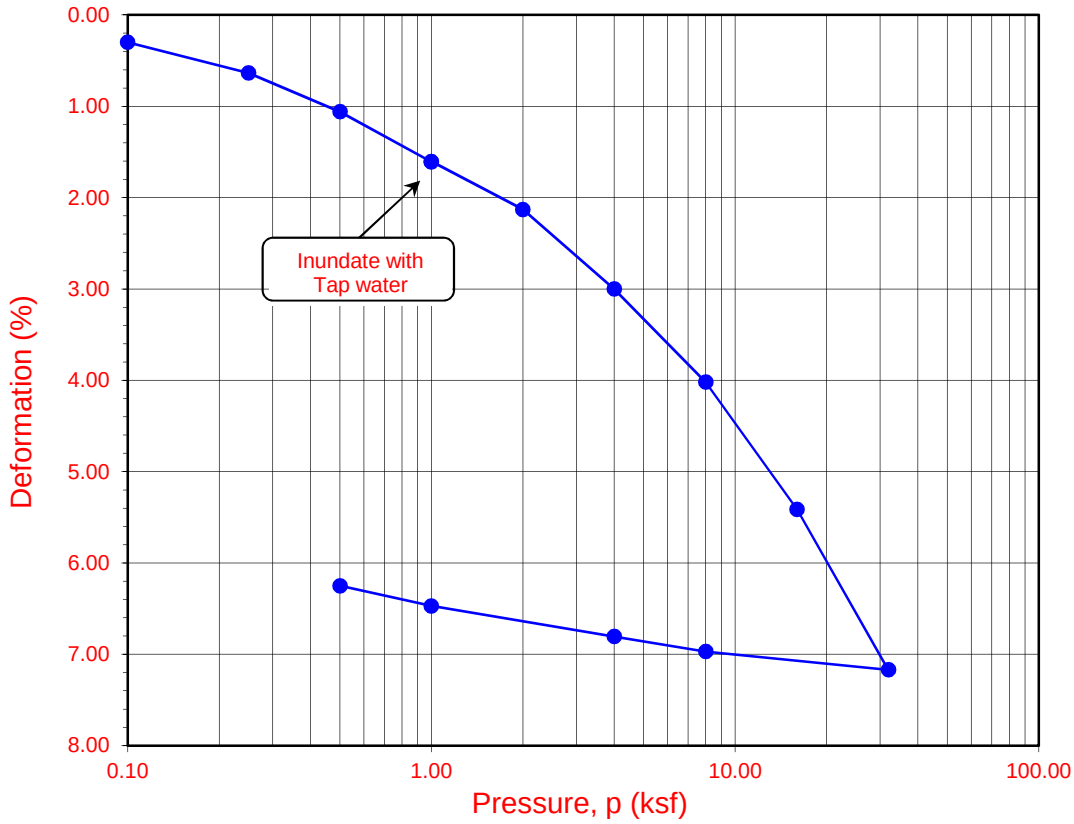
La Habra

03-15

No Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-17	**R-5**	**25.0**	**18.2**	**15.9**	**112.0**	**118.8**	**0.522**	**0.427**	**95**	**100**

Soil Identification: Dark yellowish brown lean clay (CL)

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 14057-01

La Habra

03-15

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	La Habra	Tested By:	S. Felter	Date:	08/06/14
Project No.:	14057-01	Checked By:	J. Ward	Date:	08/11/14
Boring No.:	B-1	Depth (ft.):	5-8		
Sample No.:	B-1				
Soil Identification:	Olive silt (ML)				

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN		Before Test	After Test
Specimen Diameter	(in.)	4.01	4.01
Specimen Height	(in.)	1.0000	1.0355
Wt. Comp. Soil + Mold	(g)	585.10	414.29
Wt. of Mold	(g)	207.50	0.00
Specific Gravity (Assumed)		2.70	2.70
Container No.		O	O
Wet Wt. of Soil + Cont.	(g)	757.60	621.79
Dry Wt. of Soil + Cont.	(g)	675.80	544.34
Wt. of Container	(g)	0.00	207.50
Moisture Content	(%)	12.10	22.99
Wet Density	(pcf)	113.9	120.7
Dry Density	(pcf)	101.6	98.1
Void Ratio		0.659	0.718
Total Porosity		0.397	0.418
Pore Volume	(cc)	82.2	89.6
Degree of Saturation (%) [S_{meas}]		**49.6**	86.5

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
08/06/14	13:44	1.0	0	0.1945
08/06/14	13:54	1.0	10	0.1940
Add Distilled Water to the Specimen				
08/06/14	14:32	1.0	38	0.2250
08/07/14	6:11	1.0	977	0.2300
08/07/14	7:46	1.0	1072	0.2300

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**36**

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	La Habra	Tested By:	S. Felter	Date:	08/06/14
Project No.:	14057-01	Checked By:	J. Ward	Date:	08/11/14
Boring No.:	HS-1	Depth (ft.):	30.0		
Sample No.:	B-1				
Soil Identification:	Dark brown clayey sand (SC)				

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN		Before Test	After Test
Specimen Diameter	(in.)	4.01	4.01
Specimen Height	(in.)	1.0000	1.0145
Wt. Comp. Soil + Mold	(g)	622.40	433.28
Wt. of Mold	(g)	208.40	0.00
Specific Gravity (Assumed)		2.70	2.70
Container No.		O	O
Wet Wt. of Soil + Cont.	(g)	821.80	641.68
Dry Wt. of Soil + Cont.	(g)	754.70	588.60
Wt. of Container	(g)	0.00	208.40
Moisture Content	(%)	8.89	13.96
Wet Density	(pcf)	124.9	128.8
Dry Density	(pcf)	114.7	113.0
Void Ratio		0.470	0.491
Total Porosity		0.320	0.329
Pore Volume	(cc)	66.2	69.2
Degree of Saturation (%) [S_{meas}]		**51.1**	76.7

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
08/06/14	11:38	1.0	0	0.0180
08/06/14	11:48	1.0	10	0.0175
Add Distilled Water to the Specimen				
08/06/14	14:30	1.0	162	0.0325
08/07/14	6:13	1.0	1105	0.0325
08/07/14	7:42	1.0	1194	0.0325

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**15**

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	La Habra	Tested By:	S. Felter	Date:	08/06/14
Project No.:	14057-01	Checked By:	J. Ward	Date:	08/11/14
Boring No.:	HS-6	Depth (ft.):	23-28		
Sample No.:	B-1				
Soil Identification:	Dark brown clayey sand (SC)				

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN		Before Test	After Test
Specimen Diameter	(in.)	4.01	4.01
Specimen Height	(in.)	1.0000	1.0360
Wt. Comp. Soil + Mold	(g)	568.20	436.16
Wt. of Mold	(g)	166.50	0.00
Specific Gravity (Assumed)		2.70	2.70
Container No.		O	O
Wet Wt. of Soil + Cont.	(g)	800.20	602.66
Dry Wt. of Soil + Cont.	(g)	728.10	532.04
Wt. of Container	(g)	0.00	166.50
Moisture Content	(%)	9.90	19.32
Wet Density	(pcf)	121.2	127.0
Dry Density	(pcf)	110.3	106.4
Void Ratio		0.529	0.584
Total Porosity		0.346	0.369
Pore Volume	(cc)	71.6	79.1
Degree of Saturation (%) [S_{meas}]		**50.5**	89.3

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
08/06/14	13:12	1.0	0	0.1330
08/06/14	13:22	1.0	10	0.1320
Add Distilled Water to the Specimen				
08/06/14	14:31	1.0	69	0.1650
08/07/14	6:12	1.0	1010	0.1690
08/07/14	7:44	1.0	1102	0.1690

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**37**

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	La Habra	Tested By:	O. Figueroa	Date:	01/09/15
Project No.:	14057-01	Input By:	J. Ward	Date:	01/12/15
Boring No.:	HS-1	Depth (ft.):	40-45		
Sample No.:	B-2				
Soil Identification:	Light olive brown silty sand (SM)				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03330 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3788.0	3893.0	3964.0	3869.0		
Weight of Mold (g)	1870.0	1870.0	1870.0	1870.0		
Net Weight of Soil (g)	1918.0	2023.0	2094.0	1999.0		
Wet Weight of Soil + Cont. (g)	396.90	402.30	410.60	461.50		
Dry Weight of Soil + Cont. (g)	376.80	374.20	374.40	411.30		
Weight of Container (g)	38.50	38.60	37.30	38.30		
Moisture Content (%)	5.94	8.37	10.74	13.46		
Wet Density (pcf)	127.0	133.9	138.6	132.3		
Dry Density (pcf)	119.9	123.6	125.2	116.6		

Maximum Dry Density (pcf) 125.5 **Optimum Moisture Content (%)** 10.5

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

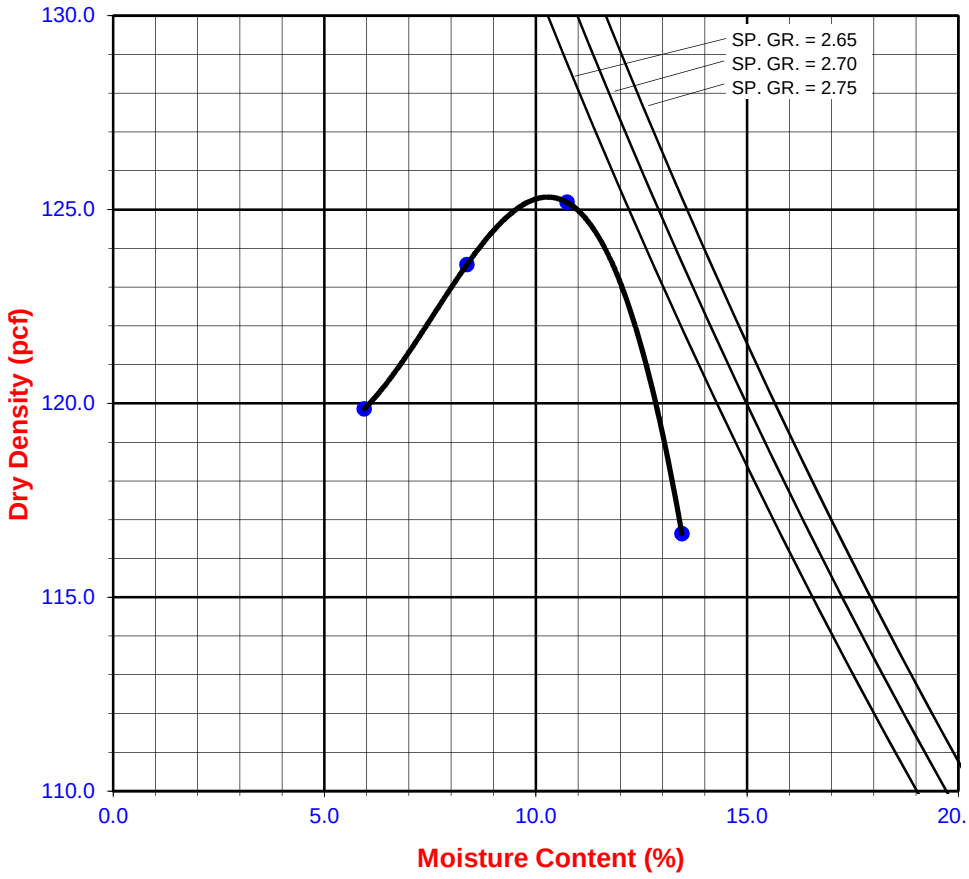
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



MX HS-1, B-2 @ 40-45

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	La Habra	Tested By:	O. Figueroa	Date:	01/09/15
Project No.:	14057-01	Input By:	J. Ward	Date:	01/12/15
Boring No.:	HS-3	Depth (ft.):	15-20		
Sample No.:	B-1				
Soil Identification:	Olive brown silty sand with gravel (SM)g				

Preparation Method:	X	Moist	Scalp Fraction (%)		Rammer Weight (lb.) = 10.0
		Dry	#3/4		Height of Drop (in.) = 18.0
Compaction Method	X	Mechanical Ram	#3/8		
		Manual Ram	#4	26.5	Mold Volume (ft³) 0.03330

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3851.0	4007.0	3997.0			
Weight of Mold (g)	1880.0	1880.0	1880.0			
Net Weight of Soil (g)	1971.0	2127.0	2117.0			
Wet Weight of Soil + Cont. (g)	424.60	437.50	430.60			
Dry Weight of Soil + Cont. (g)	408.70	412.00	397.30			
Weight of Container (g)	37.60	38.20	37.90			
Moisture Content (%)	4.28	6.82	9.27			
Wet Density (pcf)	130.5	140.8	140.2			
Dry Density (pcf)	125.1	131.8	128.3			

Maximum Dry Density (pcf)	**132.0**	**Optimum Moisture Content (%)**	**7.0**
Corrected Dry Density (pcf)	**140.0**	**Corrected Moisture Content (%)**	**5.5**

X Procedure A
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

Procedure B
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

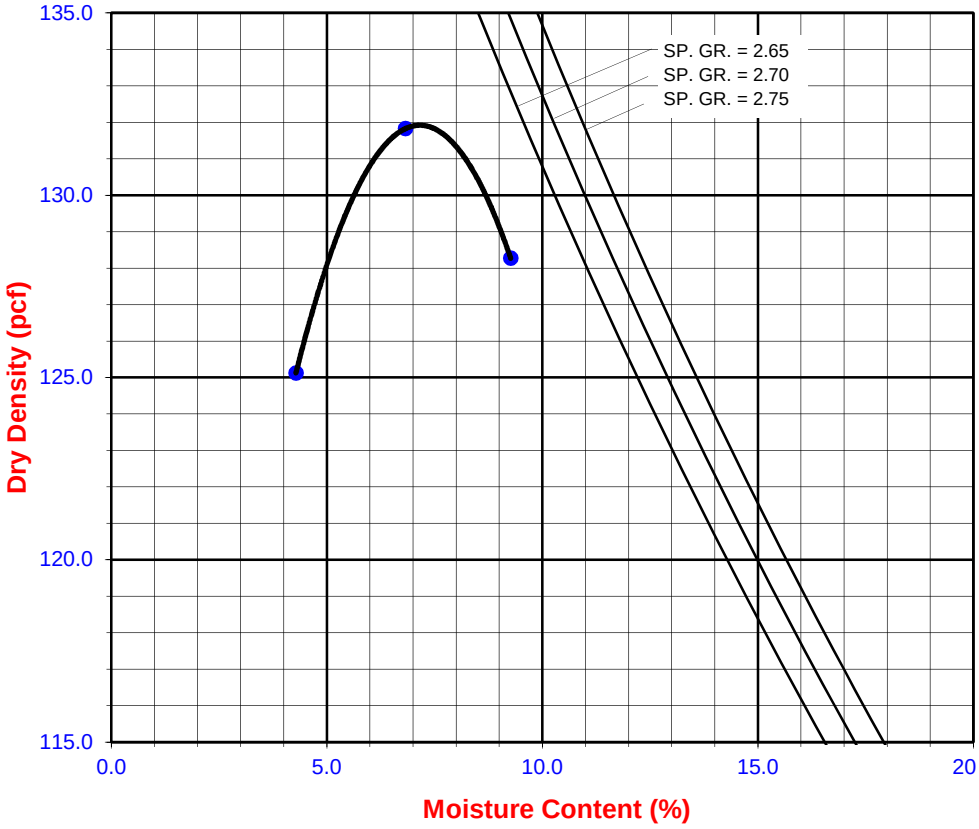
Procedure C
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	La Habra	Tested By:	O. Figueroa	Date:	02/09/15
Project No.:	14057-01	Input By:	J. Ward	Date:	02/16/15
Boring No.:	HS-17	Depth (ft.):	5-7		
Sample No.:	B-1				
Soil Identification:	Olive brown sandy lean clay s(CL)				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

Preparation Method:	X	Moist	Scalp Fraction (%)		Rammer Weight (lb.) =	10.0
		Dry	#3/4		Height of Drop (in.) =	18.0
Compaction Method	X	Mechanical Ram	#3/8			
		Manual Ram	#4	4.9	Mold Volume (ft³)	0.03330

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3758.0	3876.0	3952.0	3918.0		
Weight of Mold (g)	1870.0	1870.0	1870.0	1870.0		
Net Weight of Soil (g)	1888.0	2006.0	2082.0	2048.0		
Wet Weight of Soil + Cont. (g)	341.60	477.20	460.40	531.60		
Dry Weight of Soil + Cont. (g)	327.80	447.40	423.10	477.40		
Weight of Container (g)	37.60	38.10	38.80	37.80		
Moisture Content (%)	4.76	7.28	9.71	12.33		
Wet Density (pcf)	125.0	132.8	137.8	135.6		
Dry Density (pcf)	119.3	123.8	125.6	120.7		

Maximum Dry Density (pcf)	**125.5**	**Optimum Moisture Content (%)**	**9.5**
Corrected Dry Density (pcf)	**127.0**	**Corrected Moisture Content (%)**	**9.0**

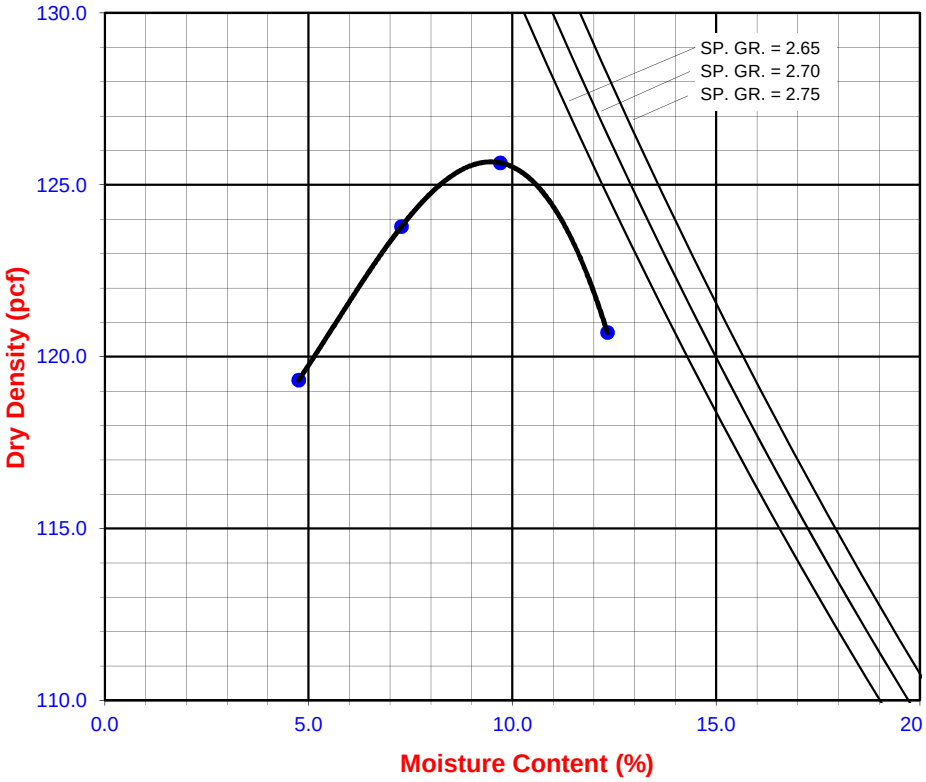
[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
5:45:50
GR:SA:FI

Atterberg Limits:
31,16,15
LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	La Habra	Tested By:	O. Figueroa	Date:	02/08/15
Project No.:	14057-01	Input By:	J. Ward	Date:	02/09/15
Boring No.:	B-3	Depth (ft.):	30-33		
Sample No.:	B-1				
Soil Identification:	Light olive brown sandy lean clay s(CL)				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03330 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3723.0	3791.0	3856.0	3817.0		
Weight of Mold (g)	1870.0	1870.0	1870.0	1870.0		
Net Weight of Soil (g)	1853.0	1921.0	1986.0	1947.0		
Wet Weight of Soil + Cont. (g)	457.00	453.60	449.80	529.10		
Dry Weight of Soil + Cont. (g)	422.10	411.10	399.90	459.50		
Weight of Container (g)	54.60	55.70	53.10	54.70		
Moisture Content (%)	9.50	11.96	14.39	17.19		
Wet Density (pcf)	122.7	127.2	131.5	128.9		
Dry Density (pcf)	112.0	113.6	114.9	110.0		

Maximum Dry Density (pcf) 115.0 **Optimum Moisture Content (%)** 14.5

PROCEDURE USED

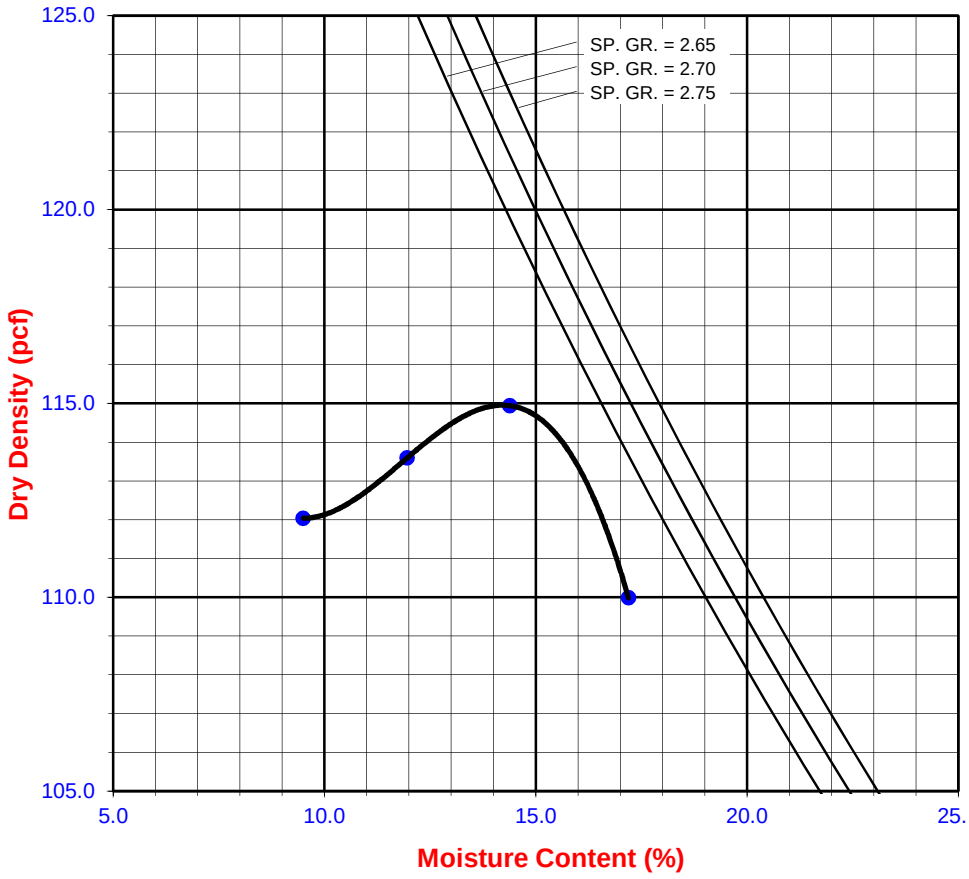
[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:
1:48:51
GR:SA:FI

Atterberg Limits:
33,23,10
LL,PL,PI



MX B-3, B-1 @ 30-33

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	La Habra	Tested By:	O. Figueroa	Date:	02/25/15
Project No.:	14057-01	Input By:	J. Ward	Date:	02/27/15
Boring No.:	B-4	Depth (ft.):	35-40		
Sample No.:	B-1				
Soil Identification:	Light olive brown silty sand (SM)				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03330

Ram Weight = 10 lb.; Drop = 18 in.

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3793.0	3882.0	3893.0			
Weight of Mold (g)	1870.0	1870.0	1870.0			
Net Weight of Soil (g)	1923.0	2012.0	2023.0			
Wet Weight of Soil + Cont. (g)	416.80	383.50	422.80			
Dry Weight of Soil + Cont. (g)	388.10	350.70	377.90			
Weight of Container (g)	54.70	54.60	51.30			
Moisture Content (%)	8.61	11.08	13.75			
Wet Density (pcf)	127.3	133.2	133.9			
Dry Density (pcf)	117.2	119.9	117.7			

Maximum Dry Density (pcf) 120.0 **Optimum Moisture Content (%)** 11.5

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

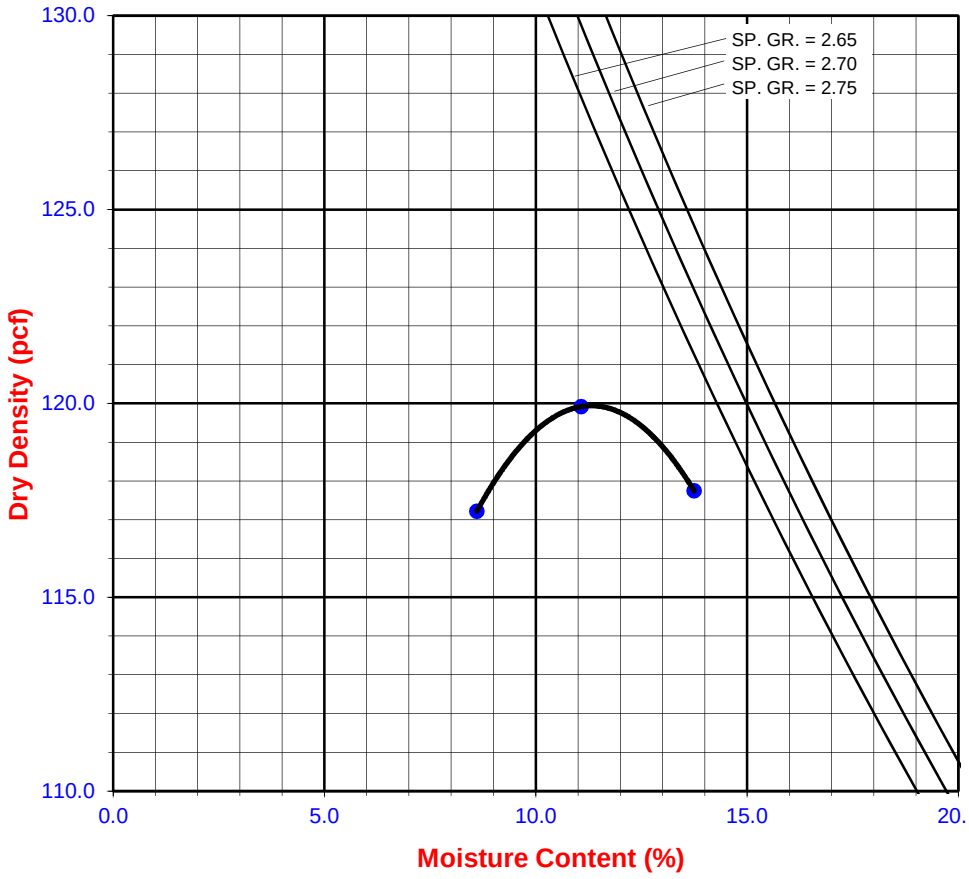
Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

NP

LL,PL,PI



MX B-4, B-1 @ 35-40

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: La Habra | Tested By : G. Berdy | Date: 08/05/14

Project No. : 14057-01 | Data Input By: J. Ward | Date: 08/11/14

Boring No.	HS-1	HS-6	B-1	
Sample No.	B-1	B-1	B-1	
Sample Depth (ft)	30.0	23-28	5-8	
Soil Identification:	Dark brown SC	Dark brown SC	Olive ML	
Wet Weight of Soil + Container (g)	240.29	273.38	212.07	
Dry Weight of Soil + Container (g)	228.82	257.24	197.54	
Weight of Container (g)	60.29	67.29	55.98	
Moisture Content (%)	6.81	8.50	10.26	
Weight of Soaked Soil (g)	100.70	100.40	100.01	

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	26	36	40	
Crucible No.	15	18	20	
Furnace Temperature (°C)	840	840	840	
Time In / Time Out	10:35/11:20	10:35/11:20	10:35/11:20	
Duration of Combustion (min)	45	45	45	
Wt. of Crucible + Residue (g)	20.3232	19.7515	21.2331	
Wt. of Crucible (g)	20.3202	19.7403	21.2308	
Wt. of Residue (g) (A)	0.0030	0.0112	0.0023	
PPM of Sulfate (A) x 41150	123.45	460.88	94.65	
PPM of Sulfate, Dry Weight Basis	**132**	**504**	**105**	

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30	15	30	
ml of AgNO3 Soln. Used in Titration (C)	0.9	1.0	0.5	
PPM of Chloride (C -0.2) * 100 * 30 / B	70	160	30	
PPM of Chloride, Dry Wt. Basis	**75**	**175**	**33**	

pH TEST, DOT California Test 532/643

pH Value	**8.16**	**7.81**	**7.60**	
Temperature °C	22.2	22.2	22.2	

SOIL RESISTIVITY TEST

DOT CA TEST 532 / 643

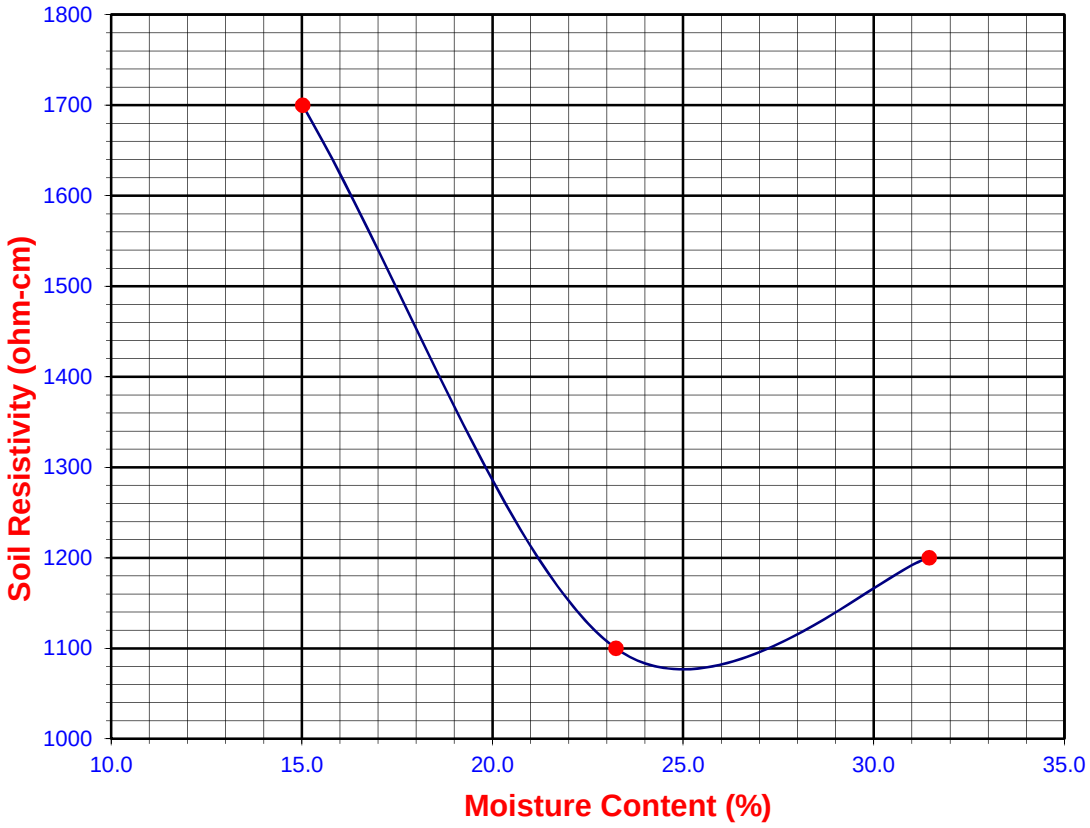
Project Name:	La Habra	Tested By :	G. Berdy	Date:	08/07/14
Project No. :	14057-01	Data Input By:	J. Ward	Date:	08/11/14
Boring No.:	HS-1	Depth (ft.) :	30.0		
Sample No. :	B-1				
Soil Identification:*	Dark brown SC				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	10	15.02	1700	1700
2	20	23.24	1100	1100
3	30	31.45	1200	1200
4				
5				

Moisture Content (%) (MCi)	6.81
Wet Wt. of Soil + Cont. (g)	240.29
Dry Wt. of Soil + Cont. (g)	228.82
Wt. of Container (g)	60.29
Container No.	
Initial Soil Wt. (g) (Wt)	130.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 532 / 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 532 / 643	
1075	**25.0**	**132**	**75**	**8.16**	**22.2**



SOIL RESISTIVITY TEST

DOT CA TEST 532 / 643

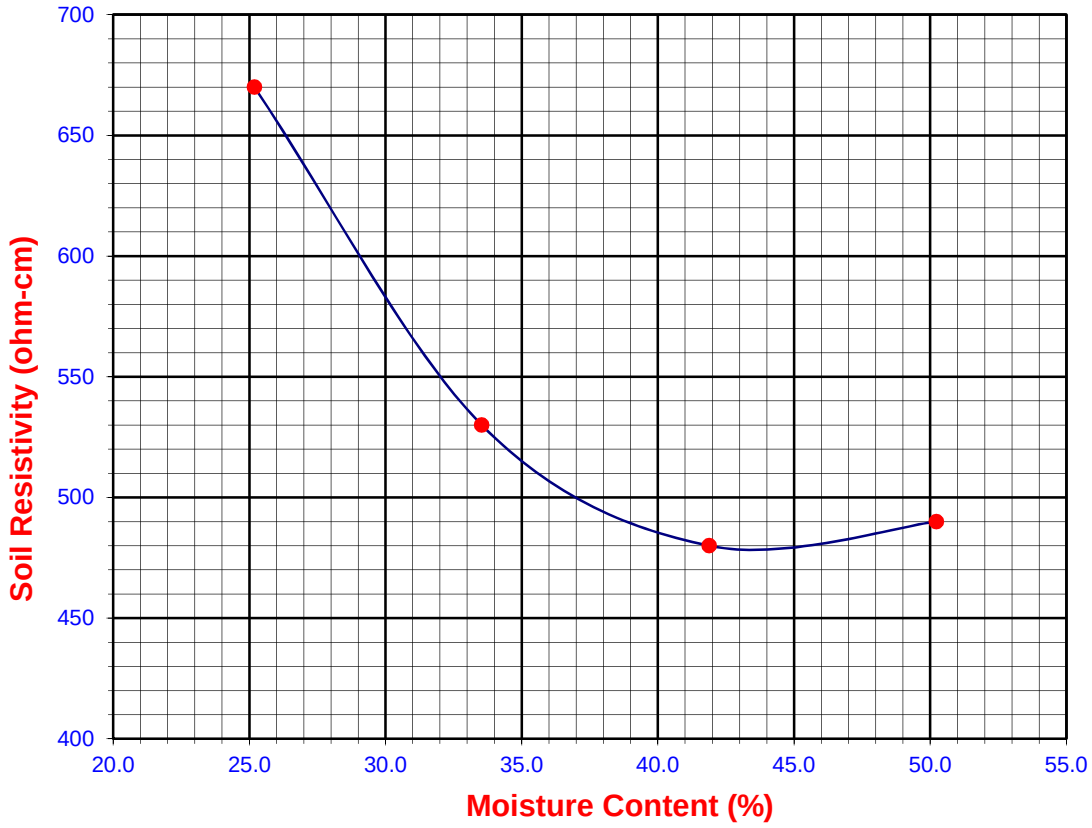
Project Name:	La Habra	Tested By :	G. Berdy	Date:	08/07/14
Project No. :	14057-01	Data Input By:	J. Ward	Date:	08/11/14
Boring No.:	HS-6	Depth (ft.) :	23-28		
Sample No. :	B-1				
Soil Identification:*	Dark brown SC				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	25.19	670	670
2	30	33.53	530	530
3	40	41.88	480	480
4	50	50.23	490	490
5				

Moisture Content (%) (MCi)	8.50
Wet Wt. of Soil + Cont. (g)	273.38
Dry Wt. of Soil + Cont. (g)	257.24
Wt. of Container (g)	67.29
Container No.	
Initial Soil Wt. (g) (Wt)	130.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 532 / 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 532 / 643	
478	**43.5**	**504**	**175**	**7.81**	**22.2**



SOIL RESISTIVITY TEST

DOT CA TEST 532 / 643

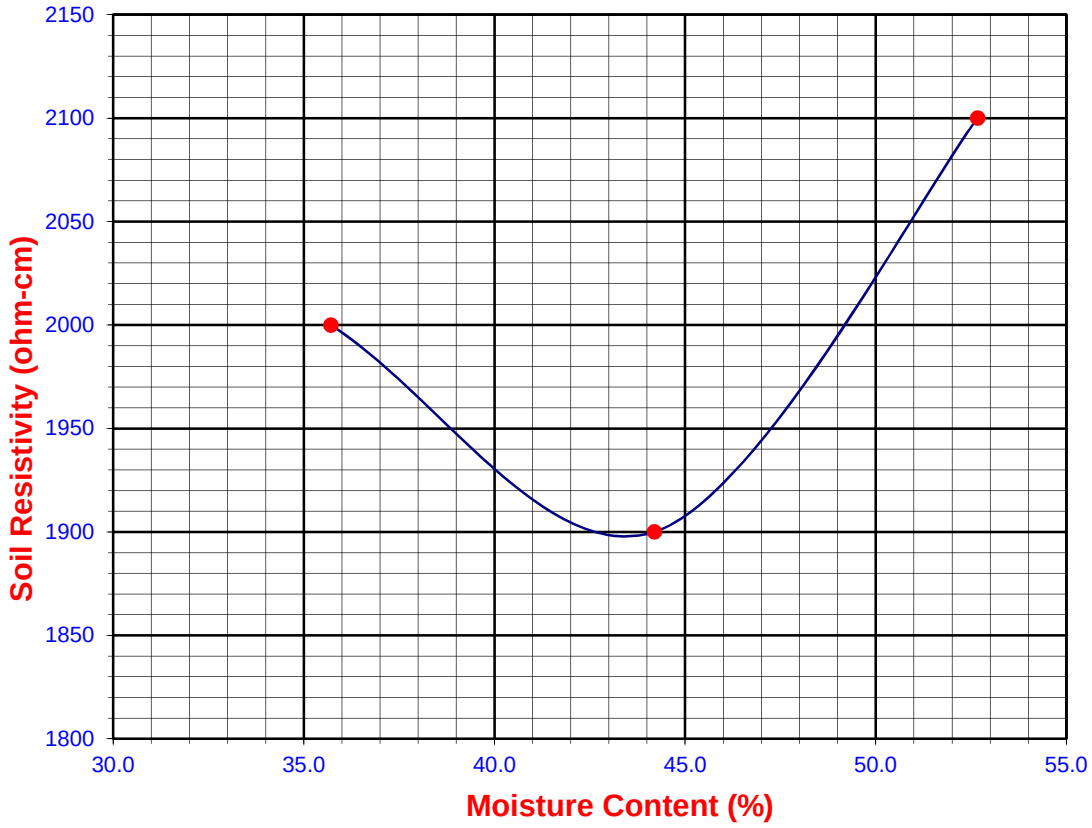
Project Name:	La Habra	Tested By :	G. Berdy	Date:	08/08/14
Project No. :	14057-01	Data Input By:	J. Ward	Date:	08/11/14
Boring No.:	B-1	Depth (ft.) :	5-8		
Sample No. :	B-1				
Soil Identification:*	Olive ML				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	30	35.71	2000	2000
2	40	44.19	1900	1900
3	50	52.67	2100	2100
4				
5				

Moisture Content (%) (MCi)	10.26
Wet Wt. of Soil + Cont. (g)	212.07
Dry Wt. of Soil + Cont. (g)	197.54
Wt. of Container (g)	55.98
Container No.	
Initial Soil Wt. (g) (Wt)	130.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 532 / 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 532 / 643	
1898	**43.4**	**105**	**33**	**7.60**	**22.2**



From GMU, 1996

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
ASTM Designation: D 2487
(Based on Unified Soil Classification System)

SOIL ENGINEERING

			Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests	Soil Classification: Group Symbol	Soil Classification: Group Name
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$	GW	Well graded gravel
			$Cu < 4$ and/or $1 > Cc > 3$	GP	Poorly graded gravel
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel
			Fines classify as CL or CH	GC	Clayey gravel
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$	SW	Well-graded sand
			$Cu < 6$ and/or $1 > Cc > 3$	SP	Poorly graded sand
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand
			Fines classify as CL or CH	SC	Clayey sand
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay
			PI < 4 or plots below "A" line[J]	ML	Silt
		organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OL	Organic clay Organic silt
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay
			PI plots below "A" line	MH	Elastic silt
		organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OH	Organic clay Organic silt
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

ADDITIONAL TESTS

DS	Direct Shear Test
HY	Hydrometer Test
TC	Triaxial Compression Test
CN	Consolidation Test
(T)	Time Rate
EX	Expansion Test
CP	Compaction Test
GS	Grain Size Distribution
EI	Expansion Index
SE	Sand Equivalent Test
AL	Atterberg Limits
CH	Chemical Tests
RV	Resistance Value
(N)	Natural Undisturbed Sample
(R)	Remolded Sample

SAMPLE SYMBOLS

- ■ Undisturbed Sample
- ☒ Disturbed Sample
- ⊡ Unsuccessful Sampling Attempt

GEOLOGIC STRUCTURE

STRIKE AND DIP

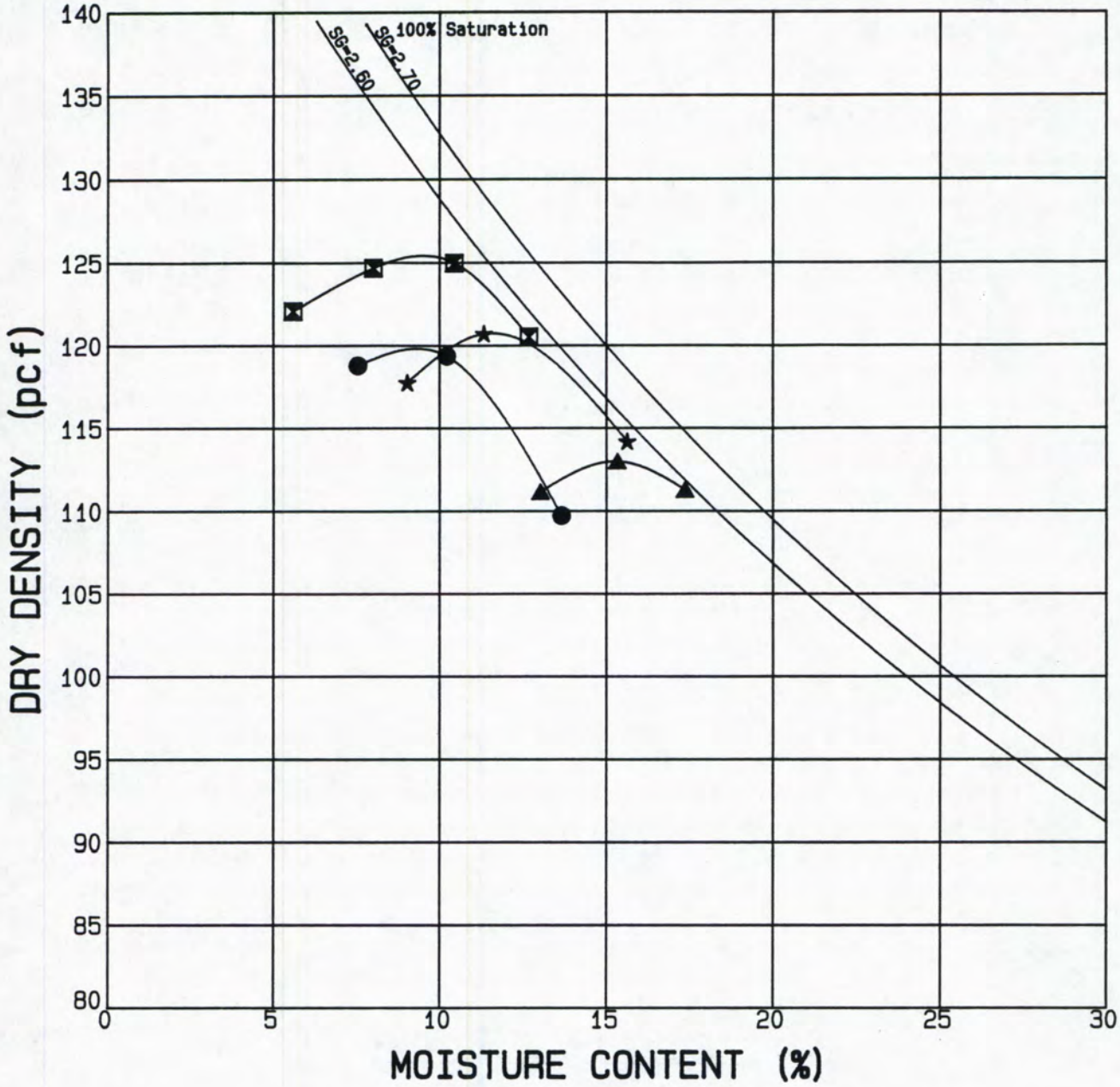
B N75W 50S (B=Bedding)

C N15E 75W (C=Contact)

J N45W 85E (J=Jointing)

S N30E 45W (S=Shear)

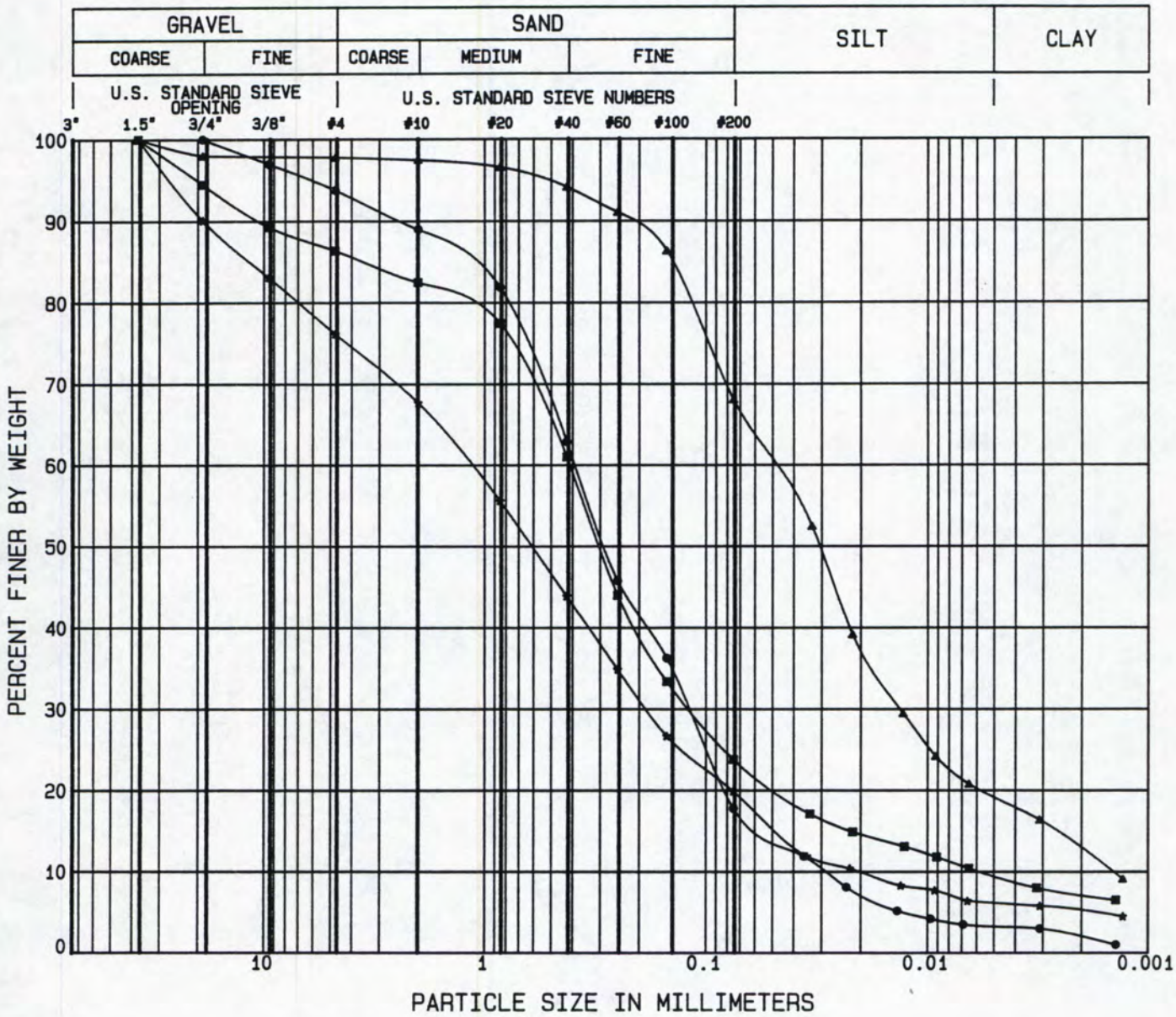
LEGEND TO LOGS



	SAMPLE LOCATION	SOURCE	MAXIMUM DRY DENSITY, pcf	OPTIMIUM MOISTURE CONTENT %
●	DH 2 @ 16.00'	Qcol/Qoal	120	9
⊠	DH 11 @ 25.00'	Qsp	125	10
▲	DH 18 @ 20.00'	Qsp	113	15
★	DH 22 @ 35.00'	Qsp	121	12

COMPACTION TEST DATA

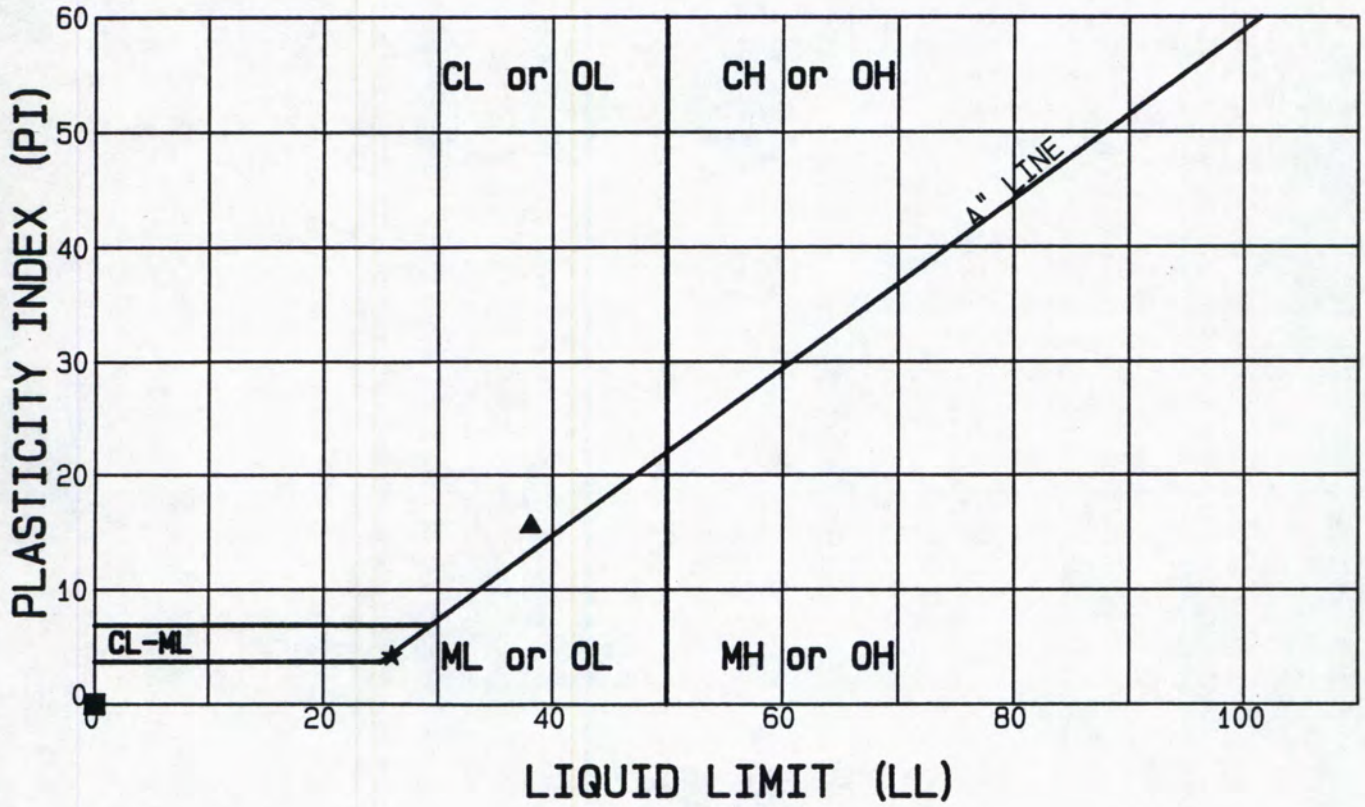
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-4



SAMPLE LOCATION	SOURCE	CLASSIFICATION
● DH 2 @ 16.00'	Qcol/Qoal	SILTY SAND (SM) fine to medium, non-plastic
⊠ DH 11 @ 25.00'	Qsp	SILTY SAND (SM) fine to medium, non-plastic
▲ DH 18 @ 20.00'	Qsp	SANDY LEAN CLAY (CL) moderate plasticity, fine
★ DH 22 @ 35.00'	Qsp	SILTY SAND with GRAVEL (SM) fine to medium, low plasticity, fine to coarse

PARTICLE SIZE DISTRIBUTION

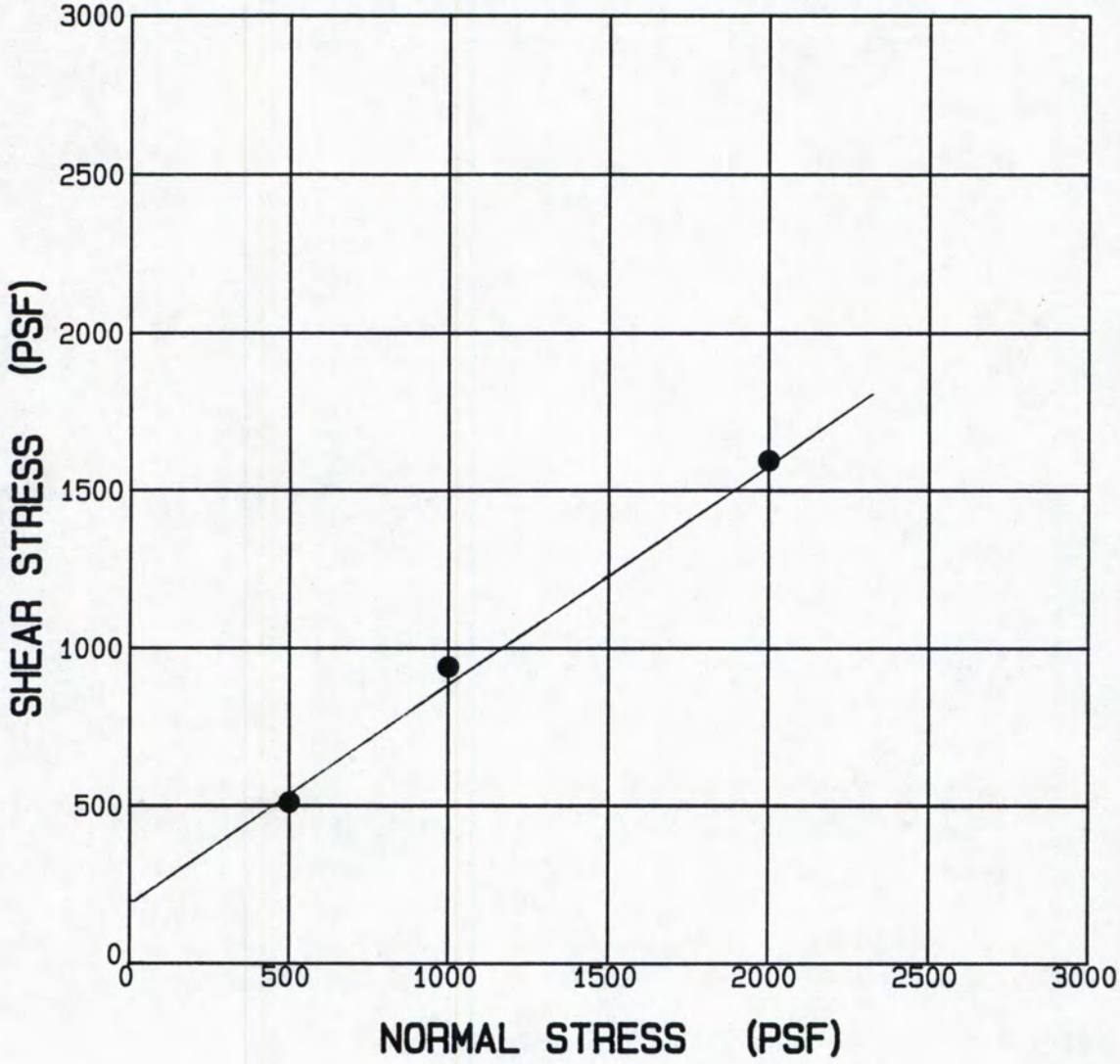
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-5



	SAMPLE LOCATION	SOURCE	LL	PL	PI
●	DH 2 @ 16.00'	Qcol/Qoal	NP	NP	NP
⊠	DH 11 @ 25.00'	Qsp	NP	NP	NP
▲	DH 18 @ 20.00'	Qsp	38	22	16
★	DH 22 @ 35.00'	Qsp	26	22	4

ATTERBERG LIMITS

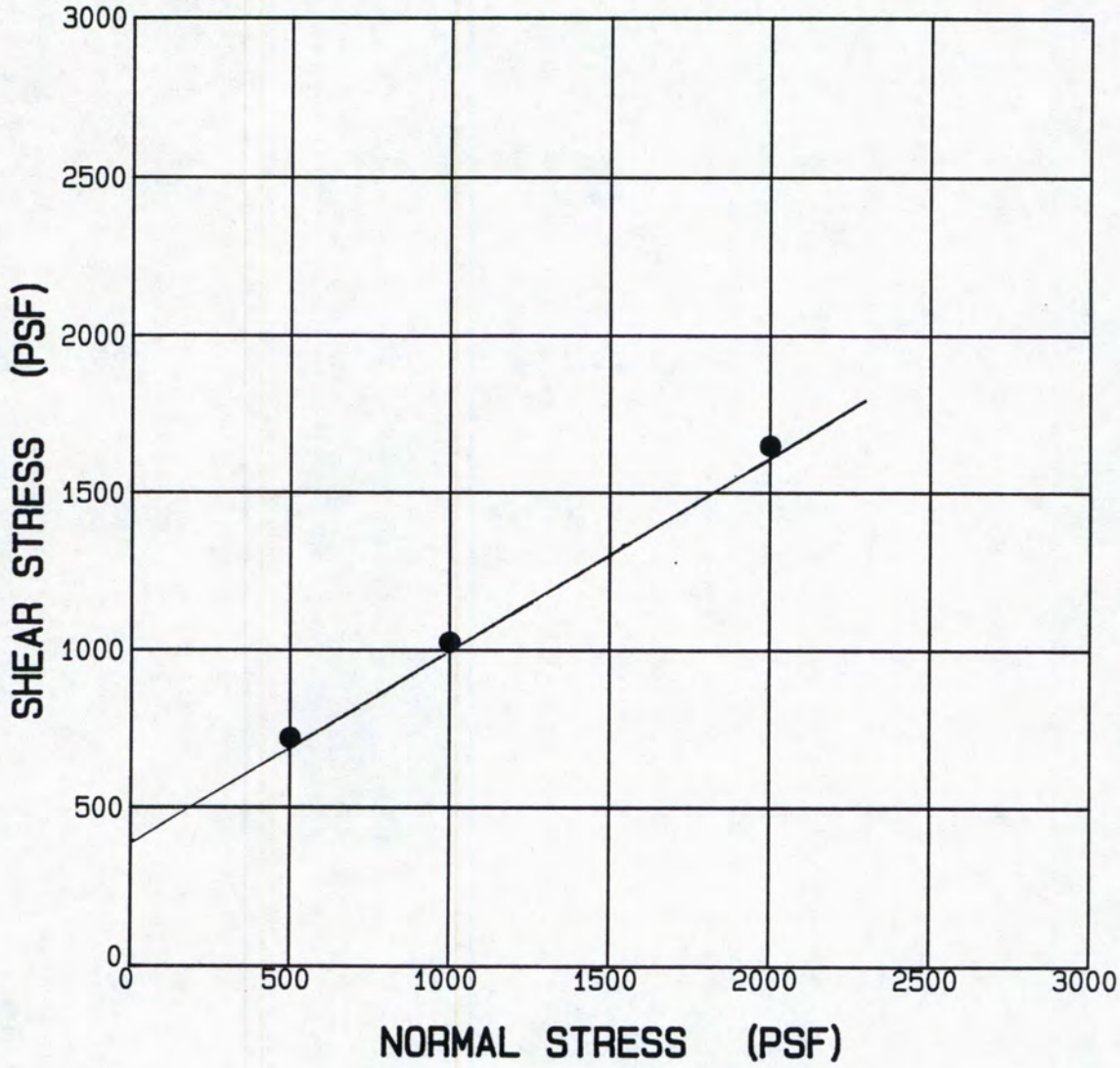
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-6



SAMPLE AND TEST DESCRIPTION

SAMPLE LOCATION: DH 2 @ 16.00'
SOURCE: Qcol/Qoal
TEST DESCRIPTION: DIRECT SHEAR, STRAIN RATE: .10 IN/MIN
AVG.DRY DENSITY (PCF): 103 AVG.MOISTURE CONTENT (%): 16
AVG.SATURATION (%): 72 AVG.VOID RATIO: 0.5994
COHESION (PSF): 200 FRICTION ANGLE (DEG): 34

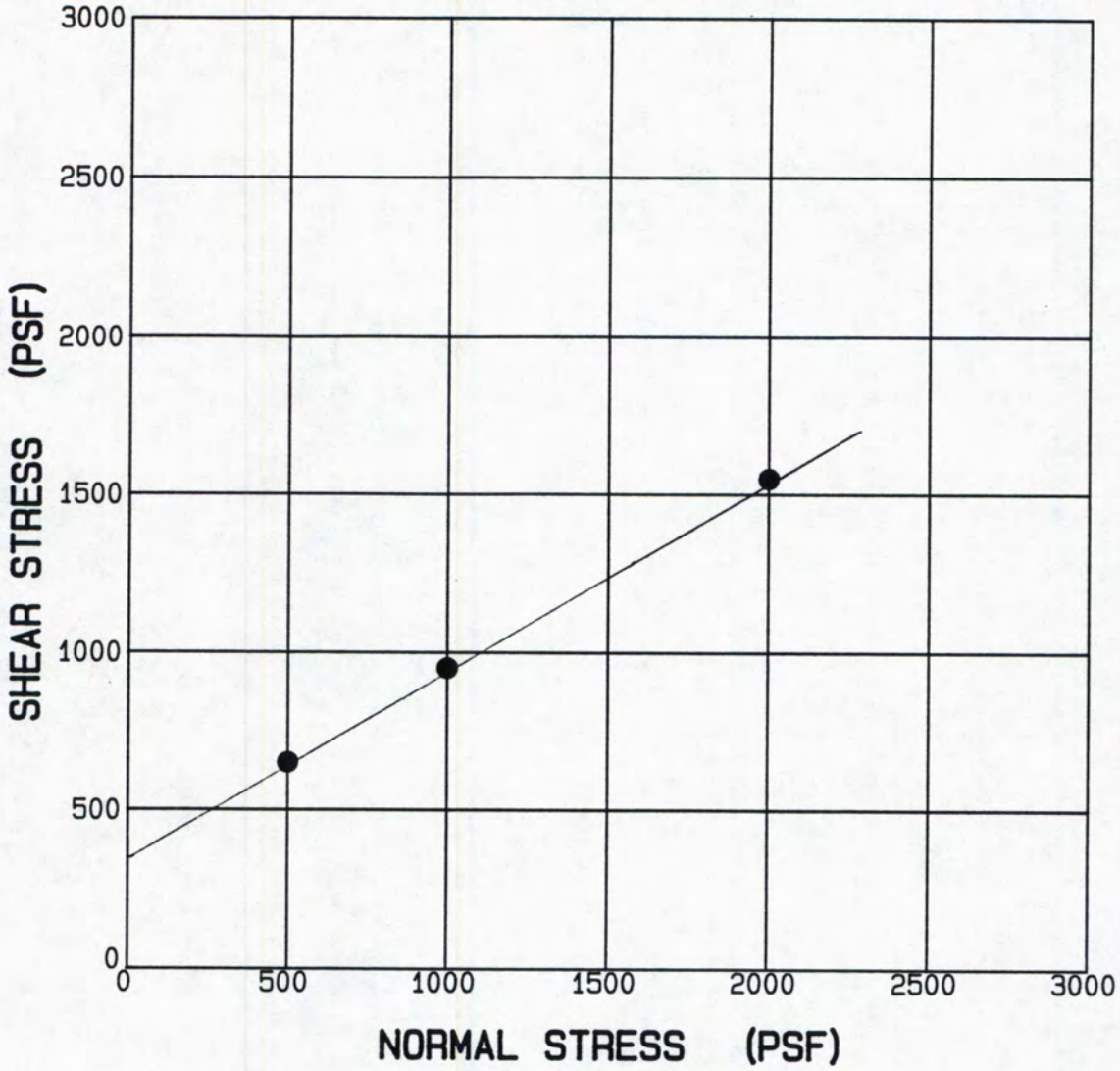
SHEAR TEST DATA



SAMPLE AND TEST DESCRIPTION

SAMPLE LOCATION: DH 18 @ 20.00'
SOURCE: Qsp
TEST DESCRIPTION: DIRECT SHEAR, STRAIN RATE: .01 IN/MIN
AVG.DRY DENSITY (PCF): 97 AVG.MOISTURE CONTENT (%): 24
AVG.SATURATION (%): 88 AVG.VOID RATIO: 0.7089
COHESION (PSF): 400 FRICTION ANGLE (DEG): 31

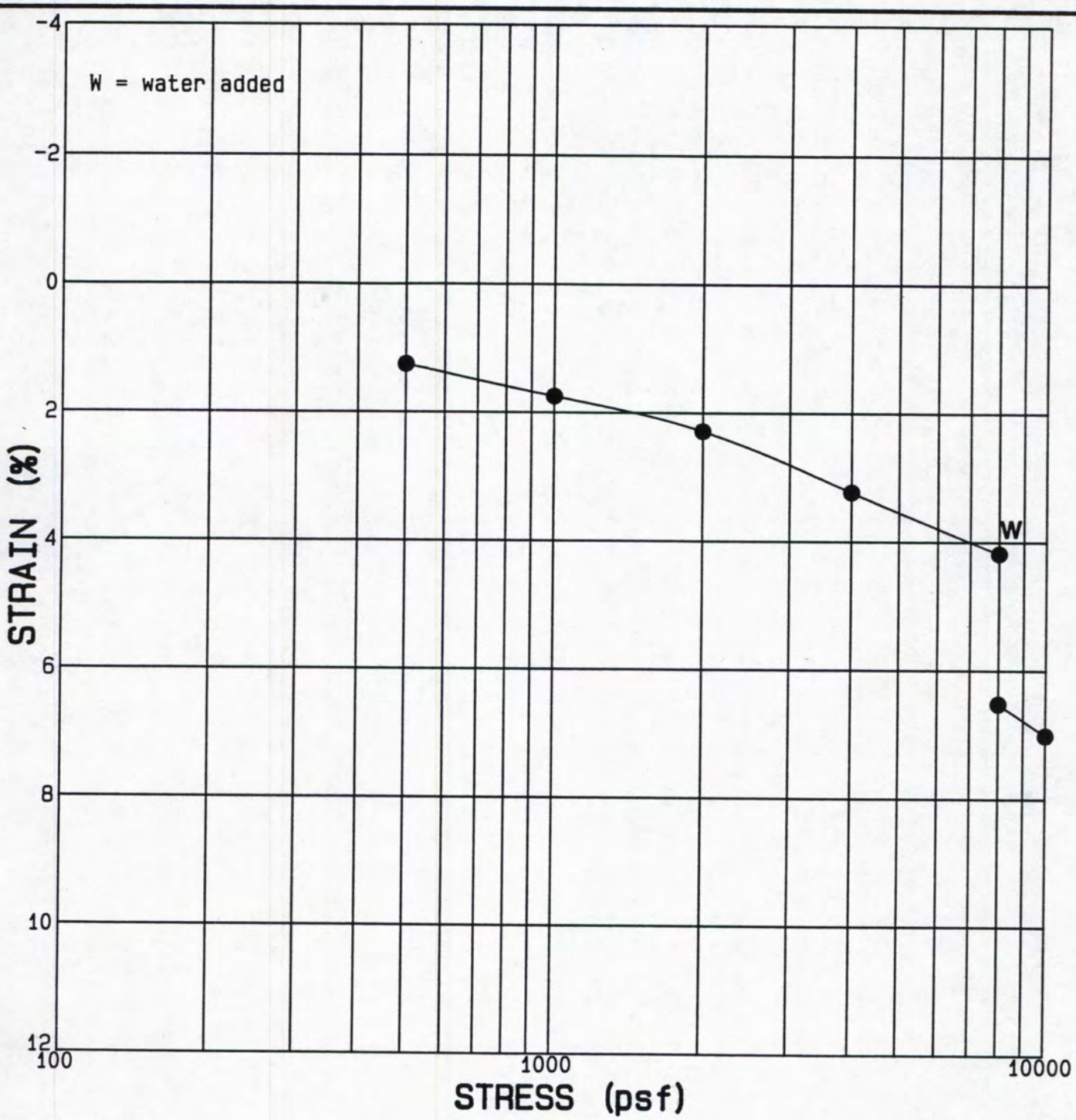
SHEAR TEST DATA



SAMPLE AND TEST DESCRIPTION

SAMPLE LOCATION: DH 22 @ 35.00'
SOURCE: Qsp
TEST DESCRIPTION: DIRECT SHEAR, STRAIN RATE: .01 IN/MIN
AVG.DRY DENSITY (PCF): 106 AVG.MOISTURE CONTENT (%): 19
AVG.SATURATION (%): 91 AVG.VOID RATIO: 0.5624
COHESION (PSF): 350 FRICTION ANGLE (DEG): 30

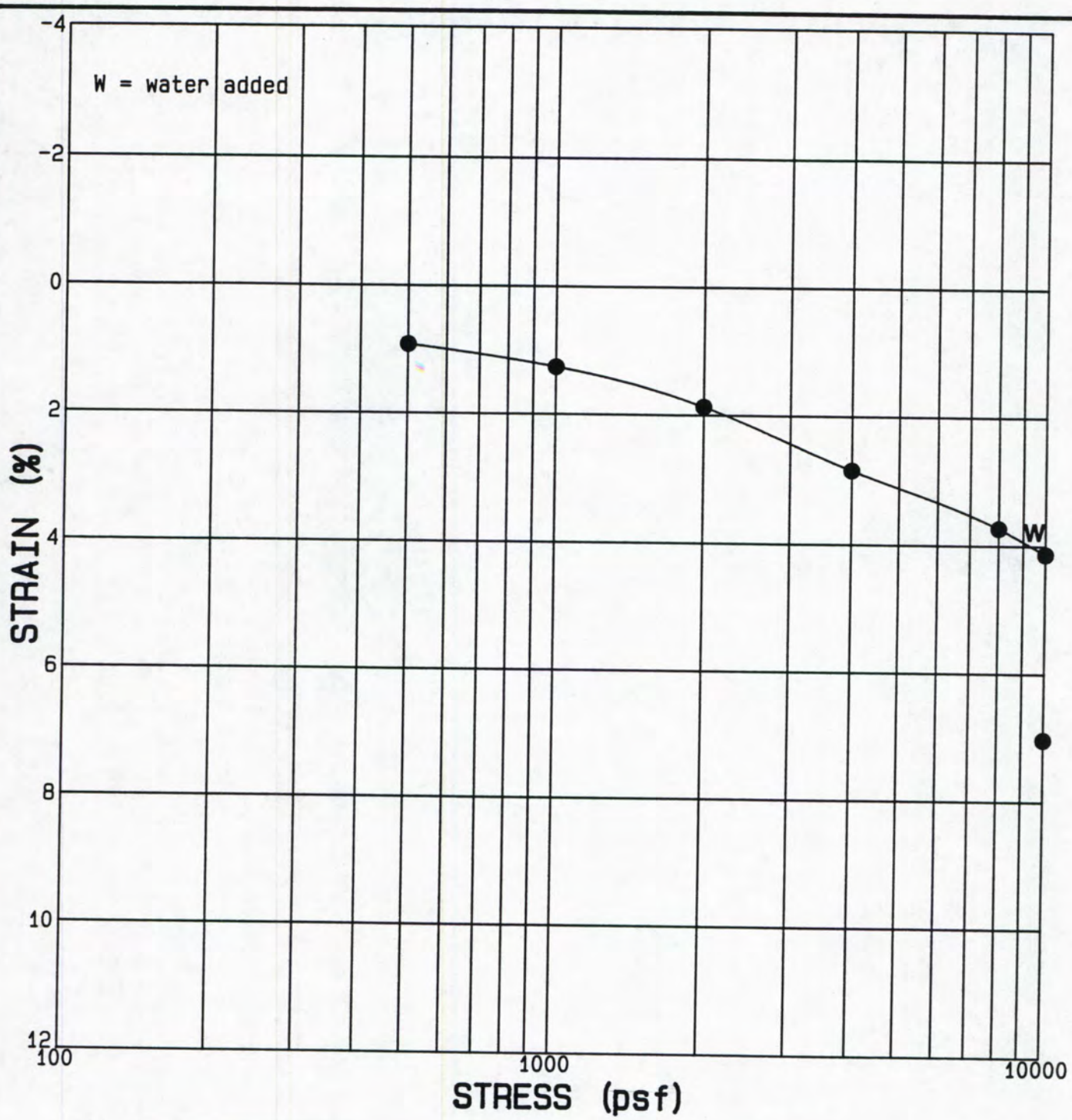
SHEAR TEST DATA



	SAMPLE LOCATION	SOURCE	INITIAL VOID RATIO	MOIST. (%)	D.D. (pcf)	R.C. (%)
●	DH 1 @ 10.00'	Qcol/Qoal	0.5637	4	106	

CONSOLIDATION TEST DATA

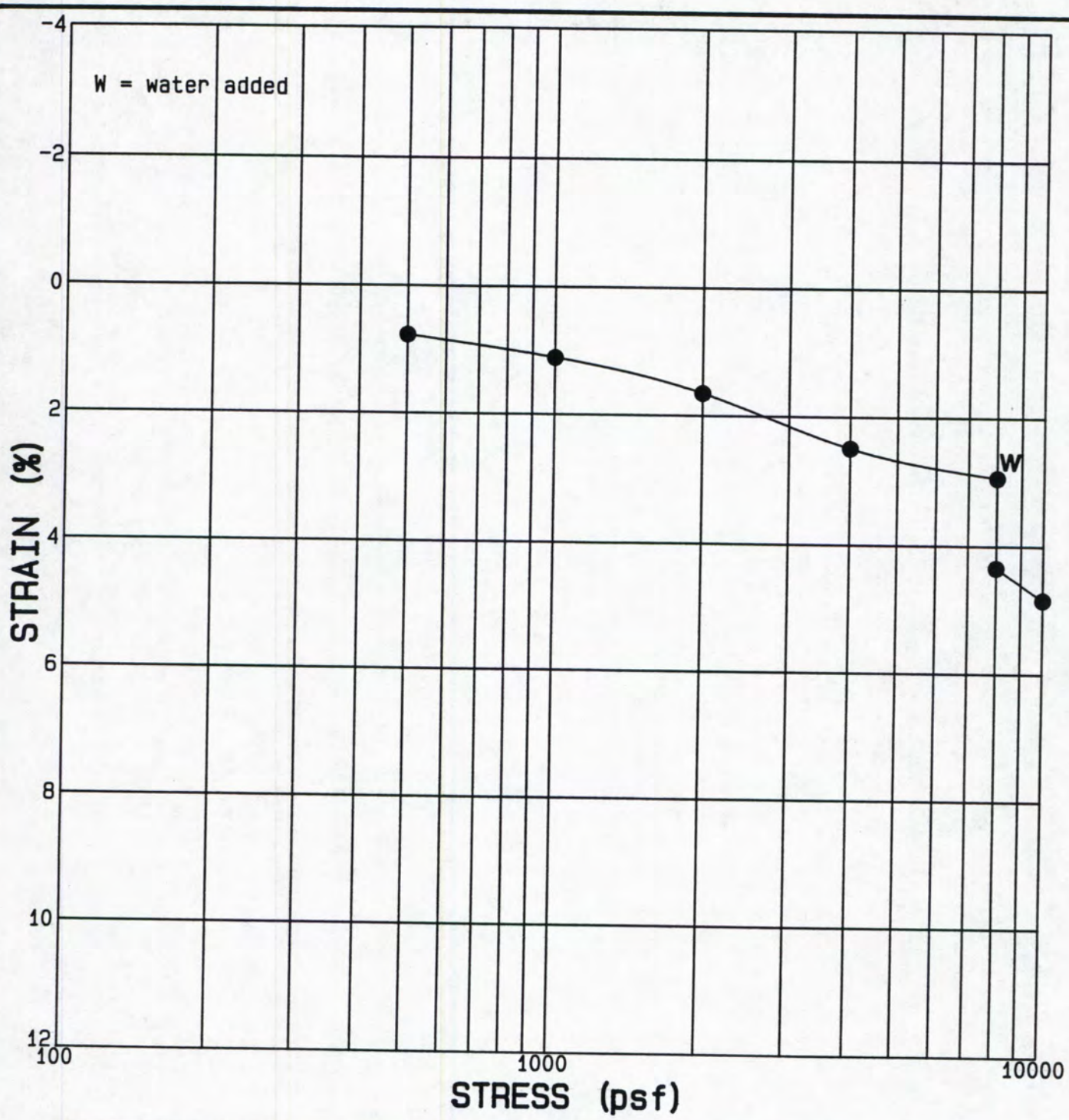
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.1



	SAMPLE LOCATION	SOURCE	INITIAL VOID RATIO	MOIST. (%)	D.D. (pcf)	R.C. (%)
●	DH 1 @ 20.00'	Qcol/Qoal	0.5953	7	104	

CONSOLIDATION TEST DATA

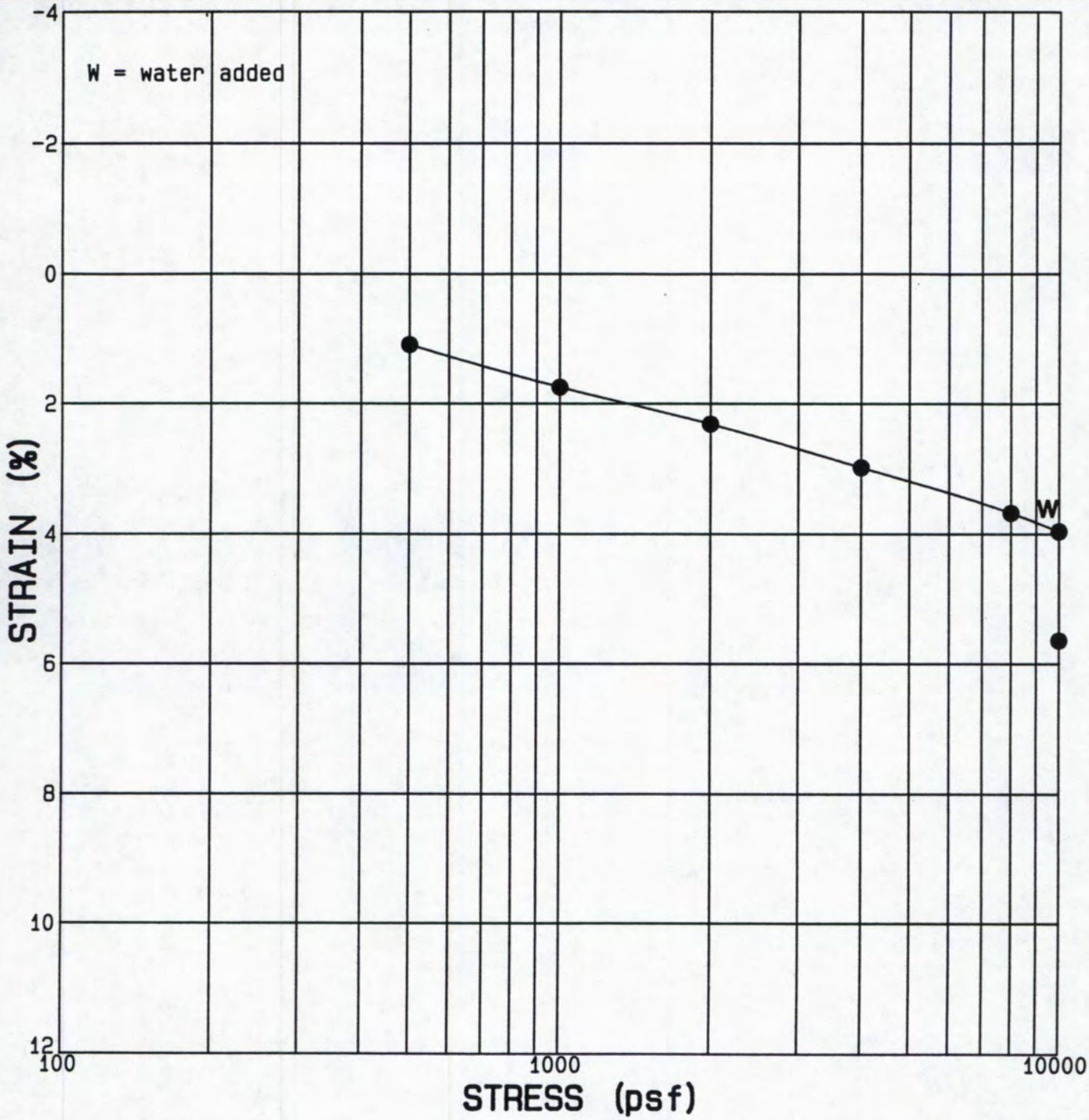
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.2



	SAMPLE LOCATION	SOURCE	INITIAL VOID RATIO	MOIST. (%)	D.D. (pcf)	R.C. (%)
●	DH 5 @ 25.00'	Qcol/Qoal	0.4904	4	111	

CONSOLIDATION TEST DATA

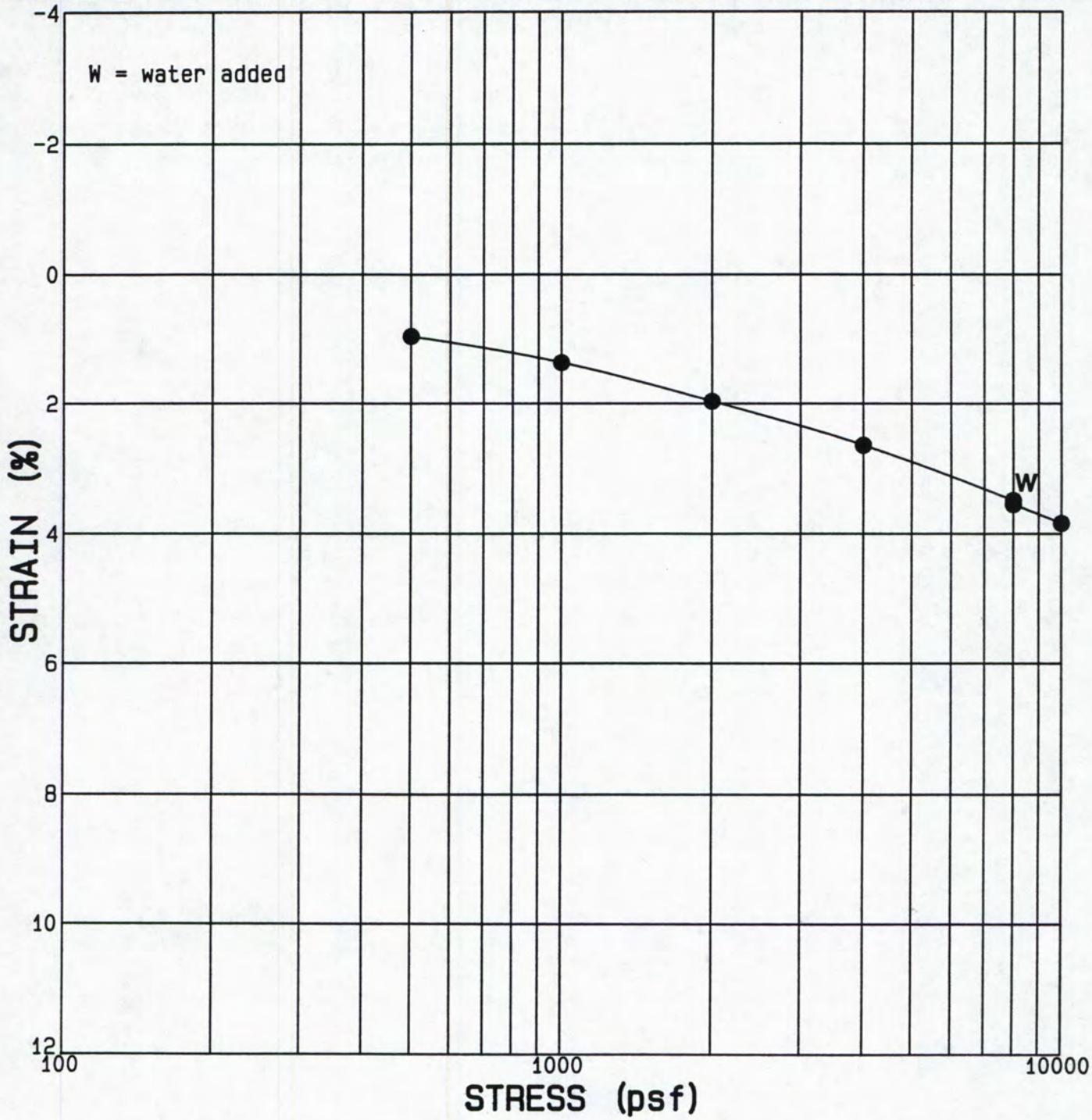
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.3



	SAMPLE LOCATION	SOURCE	INITIAL VOID RATIO	MOIST. (%)	D.D. (pcf)	R.C. (%)
●	DH 5 @ 40.00'	Qcol/Qoal	0.3616	4	121	

CONSOLIDATION TEST DATA

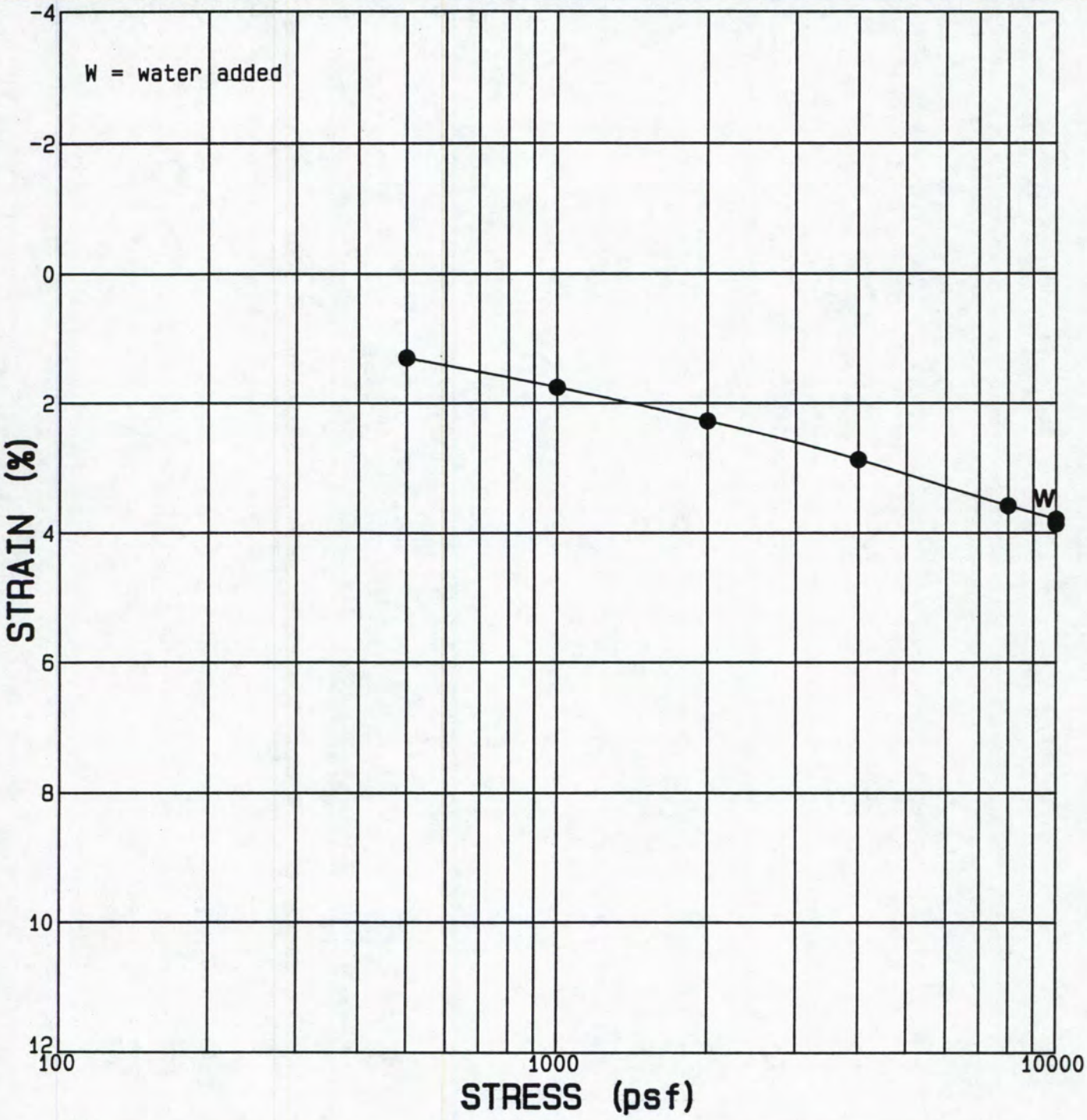
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.4



	SAMPLE LOCATION	SOURCE	INITIAL VOID RATIO	MOIST. (%)	D.D. (pcf)	R.C. (%)
●	DH 8 @ 15.00'	Qcol/Qoal	0.3088	5	126	

CONSOLIDATION TEST DATA

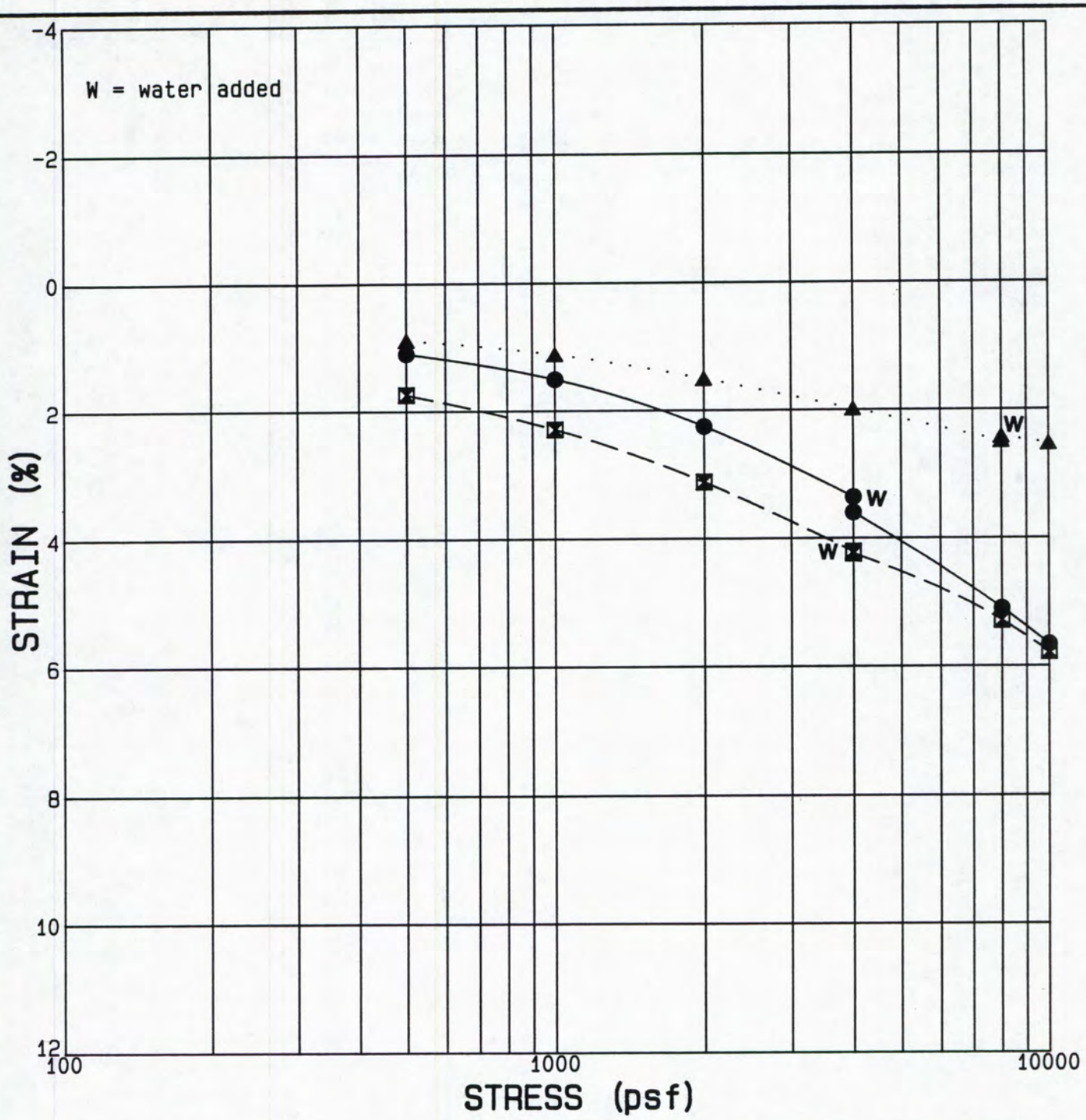
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.5



	SAMPLE LOCATION	SOURCE	INITIAL VOID RATIO	MOIST. (%)	D.D. (pcf)	R.C. (%)
●	DH 8 @ 25.00'	Qcol/Qoal	0.4904	16	111	

CONSOLIDATION TEST DATA

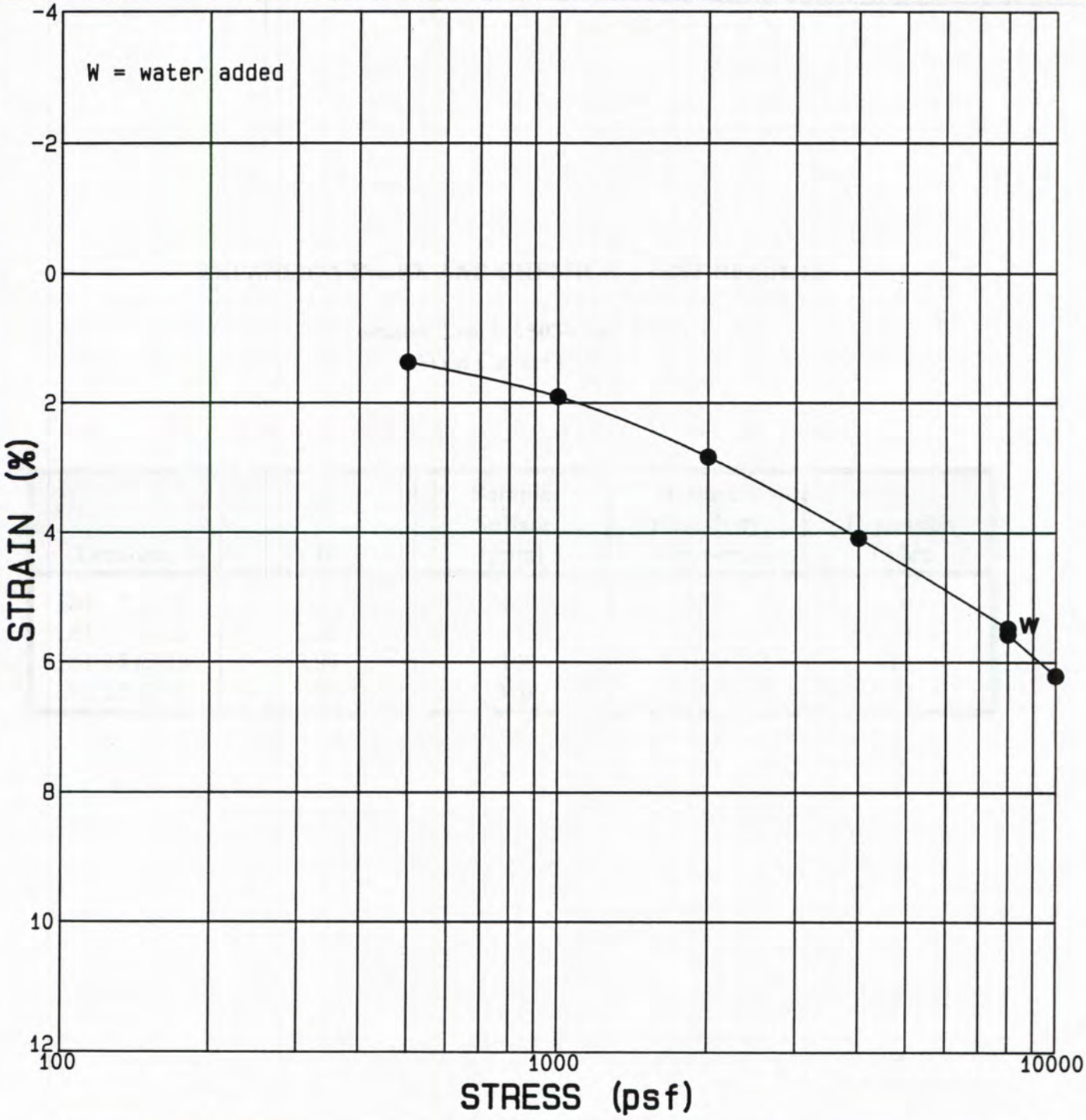
PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.6



	SAMPLE LOCATION	SOURCE	INITIAL VOID RATIO	MOIST. (%)	D.D. (pcf)	R.C. (%)
●	DH 27 @ 5.00'	Qcol/Qoal	0.5290	16	108	
⊠	DH 27 @ 10.00'	Qcol/Qoal	0.5476	18	107	
▲	DH 28 @ 5.00'	Qcol/Qoal	0.3309	9	124	

CONSOLIDATION TEST DATA

PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.7



	SAMPLE LOCATION	SOURCE	INITIAL VOID RATIO	MOIST. (%)	D.D. (pcf)	R.C. (%)
●	DH 28 @ 10.00'	Qcol/Qoal	0.4891	15	111	

CONSOLIDATION TEST DATA

PROJECT 96-01 **Goffman, McCormick & Urban, Inc.** PLATE A-8.8

Appendix D
Slope Stability Analyses

Summary of Slope Stability Analysis

Cross-Section	File Name	Factor of Safety	Description
1-1’	x1dl	1.65	Lower Basin Cut Slope - Static
	x1dle	1.22	Seismic
2’-2”	x2l	1.90	Lower Basin Slope - Static
	x2le	1.38	Seismic
3-3’	x3ub	1.88	Upper Slope - Static
	x3ube	1.40	Seismic
	x3u	2.22	Upper Slope - Static
	x3ue	1.69	Seismic
3A-3A’	x3a	1.57	MSE Wall – Static
	x3ae	1.35	Seismic
4-4’	x4u	1.58	Upper Slope – Static
	x4ue	1.34	Seismic
5-5’	x5du	1.85	Upper Slope – Static
	x5due	1.44	Seismic
6-6’	x6dur	1.85	Upper Slope – Rotational – Static
	x6dure	1.56	Seismic
	x6du	2.32	Upper Slope – Block – Static
	x6due	1.93	Seismic
7-7’	x7du	2.20	Upper Slope – Static
	x7du	1.89	Seismic
8-8’	x8du	2.61	Upper Slope – Static
	x8due	1.88	Seismic
	x8dl	1.82	Lower Slope – Static
	x8dle	1.53	Seismic
9-9’	x9dexrf	1.61	Upper Slope – Rotational – Static
	x9dexrfe	1.36	Seismic
	x9dex	2.17	Upper Slope – Block – Static
	x9dexe	1.82	Seismic
10-10’	x10	2.03	Static
	x10e	1.70	Seismic
11-11’	x11	2.06	Upper Slope - Static
	x11e	2.25	Seismic
12’-12’”	x12	1.89	Upper Slope - Static
	x12e	1.53	Seismic

Please Note:

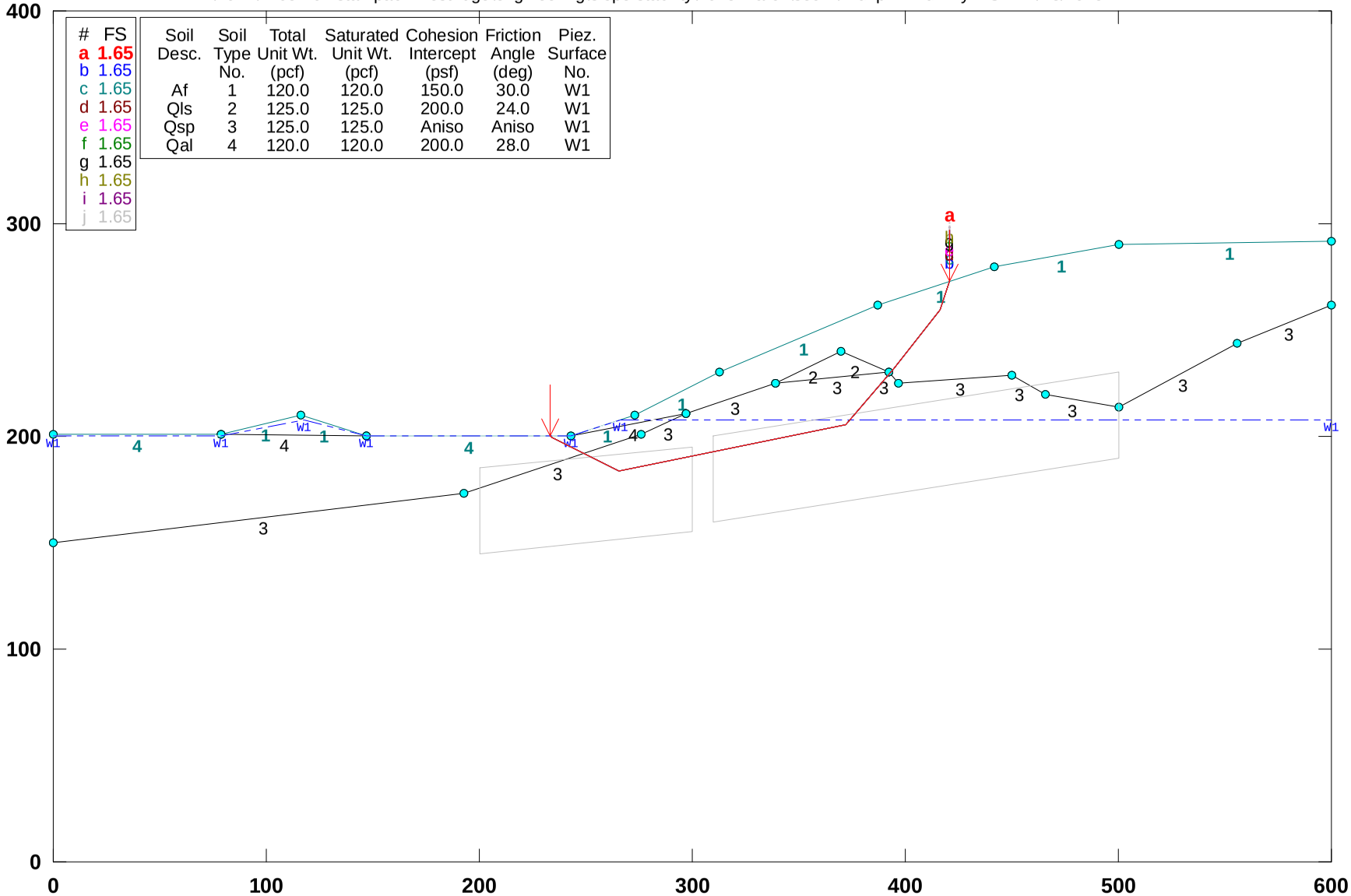
The current design topo map is dated 6/11/2015. Cross Sections 1, 6 through 9 reflect design date of 3/13 which did not change based on the current topo map dated 6/11/2015.

Discussion Regarding Geogrid-Reinforcement Strengths:

Global slope stability analysis was performed using the computer program GSTABL7 with STEDwin version 2.005.3 (Gregory Geotechnical Software, 2013). The program GSTABL7 uses what is commonly referred to as Method "B" with respect to calculating factors of safety with the inclusion of added reinforcements such as geogrid. In Method "B" the reinforcement are added to the resisting force/moments in the stability equations thereby the reinforcement will automatically be divided by the factor of safety in the same manner as the soil strength. It is appropriate to use "limiting" values of reinforcement compared to the allowable reinforcement strength values within the slope stability program. Thereby, the required allowable geogrid-reinforcement strength (as defined below) can be obtained by dividing the "limiting" geogrid strength by the slope stability factor of safety of 1.5 (i.e., 5 kips/ft divided by 1.5 = 3.33 kips/ft). The allowable strength of the geogrid reinforcement is the ultimate strength reduced by series of reduction factors (e.g., creep, installation damage, etc.) determined by the geogrid manufacturer.

Westridge/14057-01/Sec 1-1'/ 3/13 Design- Lower Basin Cut Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 1\x1dl.pl2 Run By: ASR 4/13/2015 12:24PM



GSTABL7 v.2 FSmin=1.65

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                      SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
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    Time of Run:              12:24PM
    Run By:                   ASR
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ility\2015 March\Sec 1\x1dl.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 1\x1dl.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 1\x1dl.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 1-1'/ 3/13 Design
                        - Lower Basin Cut Slope - Static
    BOUNDARY COORDINATES
       10 Top   Boundaries
       25 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     201.00      79.00     201.00         4
        2        79.00     201.00     116.00     210.00         1
        3       116.00     210.00     147.00     200.00         1
        4       147.00     200.00     243.00     200.00         4
        5       243.00     200.00     273.00     210.00         1
        6       273.00     210.00     313.00     230.00         1
        7       313.00     230.00     387.00     262.00         1
        8       387.00     262.00     442.00     280.00         1
        9       442.00     280.00     500.00     290.00         1
       10       500.00     290.00     600.00     292.00         1
       11        79.00     201.00     147.00     200.00         4
       12       243.00     200.00     297.00     211.00         4
       13         0.00     150.00     193.00     173.00         3
       14       193.00     173.00     276.00     201.00         3
       15       276.00     201.00     297.00     211.00         3
       16       297.00     211.00     339.00     225.00         3
       17       339.00     225.00     370.00     240.00         2
       18       370.00     240.00     392.00     230.00         2
       19       392.00     230.00     397.00     225.00         3
       20       397.00     225.00     450.00     229.00         3
       21       450.00     229.00     466.00     220.00         3
       22       466.00     220.00     500.00     214.00         3
       23       500.00     214.00     556.00     244.00         3
       24       556.00     244.00     600.00     262.00         3
       25       339.00     225.00     392.00     230.00         3
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0     0.00      0.0      1
      2   125.0    125.0     200.0     24.0     0.00      0.0      1
      3   125.0    125.0     300.0     32.0     0.00      0.0      1
      4   120.0    120.0     200.0     28.0     0.00      0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  3 Is Anisotropic
```



```
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             300.00         32.00
        2             12.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    1 PIEZOMETRIC SURFACE(S) SPECIFIED
    Unit Weight of Water =  62.40 (pcf)
    Piezometric Surface No.  1 Specified by  7 Coordinate Points
    Pore Pressure Inclination Factor =  0.50
      Point      X-Water     Y-Water
       No.         (ft)        (ft)
        1          0.00      200.00
        2         79.00      200.00
        3        118.00      208.00
        4        147.00      200.00
        5        243.00      200.00
        6        266.00      208.00
        7        600.00      208.00
    Janbus Empirical Coef is being used for the case of  c & phi both > 0
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Sliding Block Surfaces, Has Been
    Specified.
    9999 Trial Surfaces Have Been Generated.
    2 Boxes Specified For Generation Of Central Block Base
    Length Of Line Segments For Active And Passive Portions Of
    Sliding Block Is  35.0
    Box        X-Left     Y-Left    X-Right    Y-Right      Height
    No.         (ft)       (ft)       (ft)       (ft)        (ft)
     1         200.00     165.00     300.00     175.00      40.00
     2         310.00     180.00     500.00     210.00      40.00
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Evaluated. They Are
          Ordered - Most Critical First.
          * * Safety Factors Are Calculated By The Simplified Janbu Method * *
          Total Number of Trial Surfaces Attempted =  9999
          Number of Trial Failure Surfaces is Greater Than 5000.
          Statistical Data on FS Values are Not Generated.
          To Generate Stastical Data, Reduce Number of Trial
          Failure Surfaces to 5000 or less.
          Failure Surface Specified By  7 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1       233.564     200.000
              2       234.115     199.720
              3       265.302     183.832
              4       371.636     205.530
              5       394.624     231.923
              6       416.565     259.192
              7       420.909     273.098
                 Factor of Safety
               ***    1.649   ***
              Individual data on the    21  slices
                         Water  Water     Tie     Tie     Earthquake
                         Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      0.6      9.3     0.0     5.4       0.      0.     0.0     0.0     0.0
  2      8.9   2710.9     0.0  1582.1       0.      0.     0.0     0.0     0.0
  3      6.3   5628.5     0.0  3126.5       0.      0.     0.0     0.0     0.0
  4     16.0  32925.8     0.0 18098.5       0.      0.     0.0     0.0     0.0
  5      0.7   2029.5     0.0  1008.9       0.      0.     0.0     0.0     0.0
```

6	7.0	20775.3	0.0	10392.0	0.	0.	0.0	0.0	0.0
7	3.0	9236.4	0.0	4258.8	0.	0.	0.0	0.0	0.0
8	6.3	20378.4	0.0	8526.8	0.	0.	0.0	0.0	0.0
9	8.4	29661.9	0.0	10650.6	0.	0.	0.0	0.0	0.0
10	6.3	23885.0	0.0	7359.3	0.	0.	0.0	0.0	0.0
11	16.0	67147.3	0.0	16371.8	0.	0.	0.0	0.0	0.0
12	26.0	126117.2	0.0	19508.8	0.	0.	0.0	0.0	0.0
13	31.0	175516.0	0.0	11779.1	0.	0.	0.0	0.0	0.0
14	1.6	10027.6	0.0	274.8	0.	0.	0.0	0.0	0.0
15	2.2	13006.4	0.0	252.3	0.	0.	0.0	0.0	0.0
16	13.2	70363.3	0.0	0.0	0.	0.	0.0	0.0	0.0
17	5.0	22194.1	0.0	0.0	0.	0.	0.0	0.0	0.0
18	0.5	2101.9	0.0	0.0	0.	0.	0.0	0.0	0.0
19	2.1	8494.1	0.0	0.0	0.	0.	0.0	0.0	0.0
20	21.9	59315.3	0.0	0.0	0.	0.	0.0	0.0	0.0
21	4.3	3254.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	233.564	200.000
2	234.115	199.720
3	265.302	183.832
4	371.636	205.530
5	394.624	231.923
6	416.565	259.192
7	420.909	273.098

Factor of Safety
*** 1.649 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	233.564	200.000
2	234.115	199.720
3	265.302	183.832
4	371.636	205.530
5	394.624	231.923
6	416.565	259.192
7	420.909	273.098

Factor of Safety
*** 1.649 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	233.564	200.000
2	234.115	199.720
3	265.302	183.832
4	371.636	205.530
5	394.624	231.923
6	416.565	259.192
7	420.909	273.098

Factor of Safety
*** 1.649 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	233.564	200.000
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3	265.302	183.832
4	371.636	205.530
5	394.624	231.923
6	416.565	259.192
7	420.909	273.098

Factor of Safety
*** 1.649 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
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3	265.302	183.832

4	371.636	205.530
5	394.624	231.923
6	416.565	259.192
7	420.909	273.098

Factor of Safety
*** 1.649 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	233.564	200.000
2	234.115	199.720
3	265.302	183.832
4	371.636	205.530
5	394.624	231.923
6	416.565	259.192
7	420.909	273.098

Factor of Safety
*** 1.649 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	233.564	200.000
2	234.115	199.720
3	265.302	183.832
4	371.636	205.530
5	394.624	231.923
6	416.565	259.192
7	420.909	273.098

Factor of Safety
*** 1.649 ***

Failure Surface Specified By 7 Coordinate Points

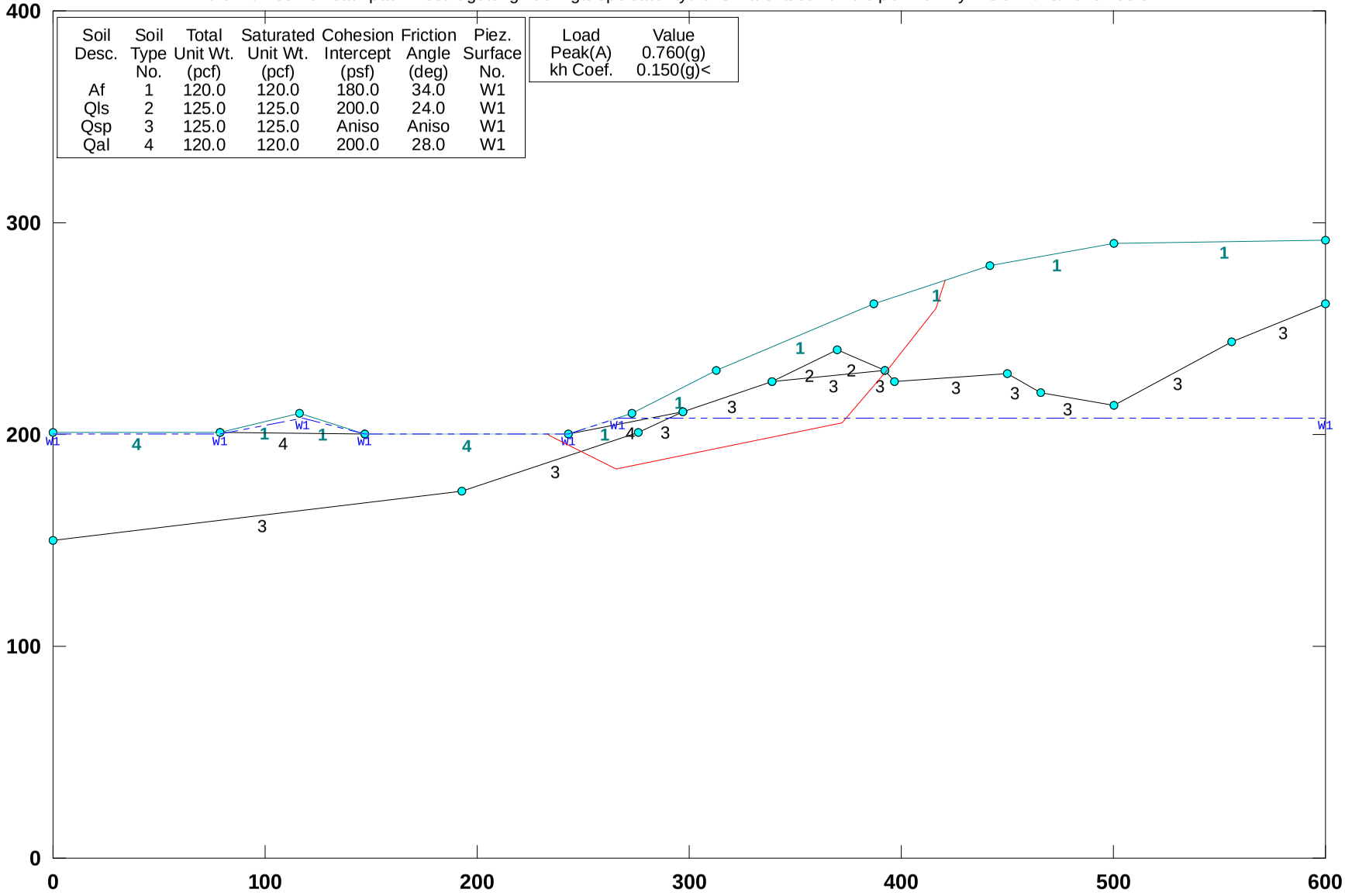
Point No.	X-Surf (ft)	Y-Surf (ft)
1	233.564	200.000
2	234.115	199.720
3	265.302	183.832
4	371.636	205.530
5	394.624	231.923
6	416.565	259.192
7	420.909	273.098

Factor of Safety
*** 1.649 ***

**** END OF GSTABL7 OUTPUT ****

Westridge/14057-01/Sec 1-1'/ 3/13 Design- Lower Basin Cut Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 1\x1dle.plt Run By: LGC 4/13/2015 03:31PM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qls	2	125.0	125.0	200.0	24.0	W1
Qsp	3	125.0	125.0	Aniso	Aniso	W1
Qal	4	120.0	120.0	200.0	28.0	W1

Load	Value
Peak(A)	0.760(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.22

Factor Of Safety Is Calculated By The Simplified Janbu Method

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
             (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        4/13/2015
    Time of Run:              03:31PM
    Run By:                   LGC
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ility\2015 March\Sec 1\x1dle.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 1\x1dle.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 1\x1dle.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 1-1'/ 3/13 Design
                          - Lower Basin Cut Slope - Seismic
    BOUNDARY COORDINATES
       10 Top   Boundaries
       25 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     201.00      79.00     201.00         4
        2        79.00     201.00     116.00     210.00         1
        3       116.00     210.00     147.00     200.00         1
        4       147.00     200.00     243.00     200.00         4
        5       243.00     200.00     273.00     210.00         1
        6       273.00     210.00     313.00     230.00         1
        7       313.00     230.00     387.00     262.00         1
        8       387.00     262.00     442.00     280.00         1
        9       442.00     280.00     500.00     290.00         1
       10       500.00     290.00     600.00     292.00         1
       11        79.00     201.00     147.00     200.00         4
       12       243.00     200.00     297.00     211.00         4
       13         0.00     150.00     193.00     173.00         3
       14       193.00     173.00     276.00     201.00         3
       15       276.00     201.00     297.00     211.00         3
       16       297.00     211.00     339.00     225.00         3
       17       339.00     225.00     370.00     240.00         2
       18       370.00     240.00     392.00     230.00         2
       19       392.00     230.00     397.00     225.00         3
       20       397.00     225.00     450.00     229.00         3
       21       450.00     229.00     466.00     220.00         3
       22       466.00     220.00     500.00     214.00         3
       23       500.00     214.00     556.00     244.00         3
       24       556.00     244.00     600.00     262.00         3
       25       339.00     225.00     392.00     230.00         3
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     500.0     34.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  3 Is Anisotropic
```

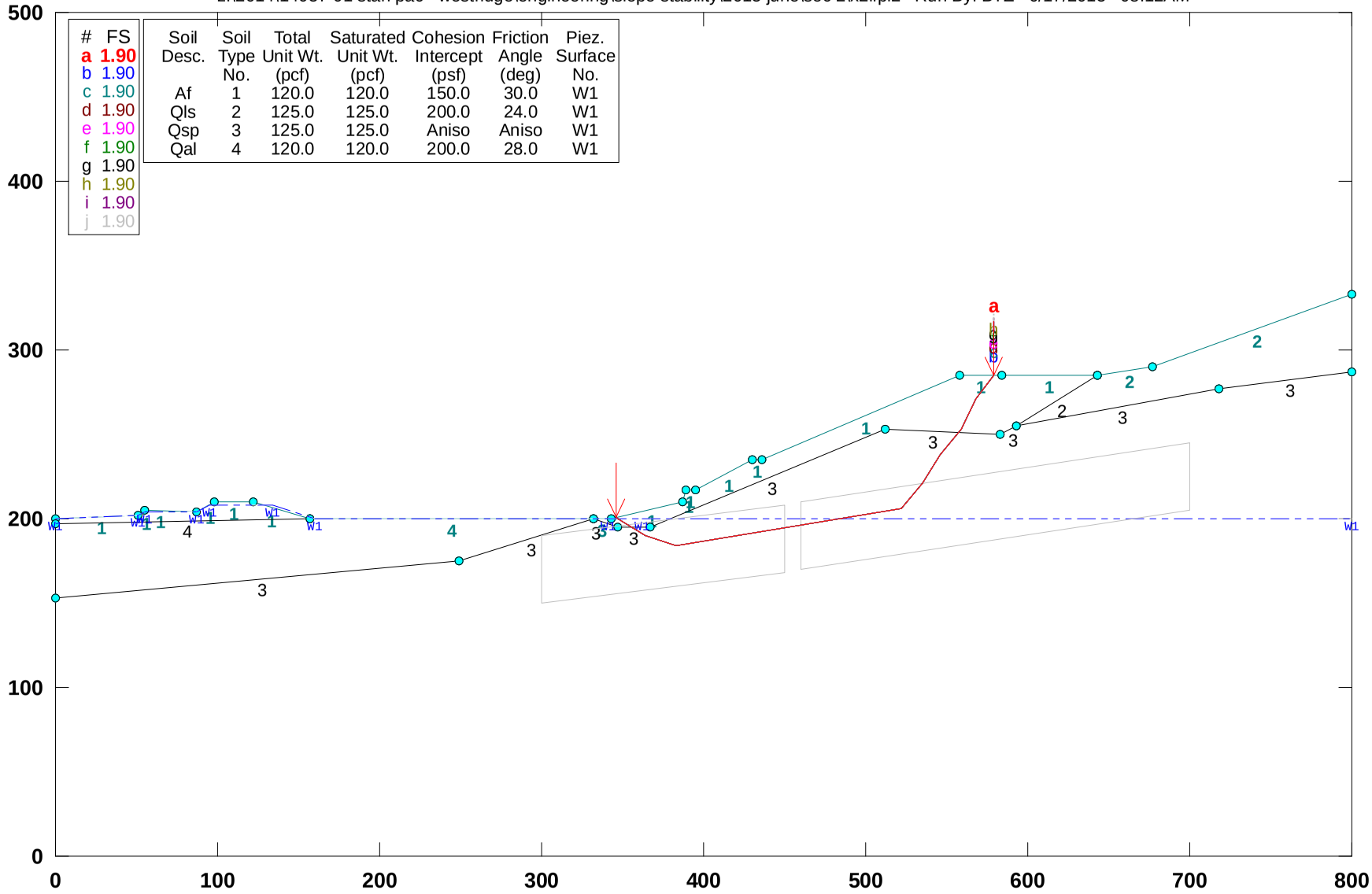


```
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             500.00         34.00
        2             12.0             200.00         27.00
        3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    1 PIEZOMETRIC SURFACE(S) SPECIFIED
    Unit Weight of Water =  62.40 (pcf)
    Piezometric Surface No.  1 Specified by  7 Coordinate Points
    Pore Pressure Inclination Factor =  0.50
      Point      X-Water     Y-Water
       No.         (ft)        (ft)
        1          0.00      200.00
        2         79.00      200.00
        3        118.00      208.00
        4        147.00      200.00
        5        243.00      200.00
        6        266.00      208.00
        7        600.00      208.00
    Specified Peak Ground Acceleration Coefficient (A) =   0.760(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
    Trial Failure Surface Specified By  7 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1        233.564     200.000
        2        234.115     199.720
        3        265.302     183.832
        4        371.636     205.530
        5        394.624     231.923
        6        416.565     259.192
        7        420.909     273.098
    Janbu's Empirical Coefficient (fo) =  1.077
    * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.223
         ***Table 1 - Individual Data on the   21 Slices***
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      0.6       9.3     0.0     5.4      0.0     0.0     1.4     0.0     0.0
  2      8.9    2711.6     0.0  1582.4      0.0     0.0   406.7     0.0     0.0
  3      6.3    5628.2     0.0  3126.3      0.0     0.0   844.2     0.0     0.0
  4     16.0   32928.4     0.0 18099.8      0.0     0.0  4939.3     0.0     0.0
  5      0.7    2028.2     0.0  1008.3      0.0     0.0   304.2     0.0     0.0
  6      7.0   20775.7     0.0 10392.2      0.0     0.0  3116.4     0.0     0.0
  7      3.0    9236.6     0.0  4258.9      0.0     0.0  1385.5     0.0     0.0
  8      6.3   20378.7     0.0  8527.0      0.0     0.0  3056.8     0.0     0.0
  9      8.4   29662.4     0.0 10650.9      0.0     0.0  4449.4     0.0     0.0
 10      6.3   23885.3     0.0  7359.4      0.0     0.0  3582.8     0.0     0.0
 11     16.0   67148.2     0.0 16372.3      0.0     0.0 10072.2     0.0     0.0
 12     26.0  126118.5     0.0 19509.4      0.0     0.0 18917.8     0.0     0.0
 13     31.0  175517.4     0.0 11779.8      0.0     0.0 26327.6     0.0     0.0
 14      1.6   10025.6     0.0   274.7      0.0     0.0  1503.8     0.0     0.0
 15      2.2   13008.6     0.0   252.4      0.0     0.0  1951.3     0.0     0.0
 16     13.2   70363.4     0.0     0.0      0.0     0.0 10554.5     0.0     0.0
 17      5.0   22194.3     0.0     0.0      0.0     0.0  3329.1     0.0     0.0
 18      0.5    2102.5     0.0     0.0      0.0     0.0   315.4     0.0     0.0
 19      2.1    8494.2     0.0     0.0      0.0     0.0  1274.1     0.0     0.0
 20     21.9   59314.4     0.0     0.0      0.0     0.0  8897.2     0.0     0.0
```

```
 21      4.3    3253.8     0.0     0.0      0.0     0.0   488.1     0.0      0.0
        ***Table 2 - Base Stress Data on the   21 Slices***
Slice   Alpha     X-Coord.      Base          Available             Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
  *                  (ft)       (ft)           (psf)                 (psf)
  1     -26.94      233.84        0.62            294.12                -5.36
  2     -27.00      238.56        9.97            400.58               -97.74
  3     -27.00      246.14        7.06            634.69              -286.59
  4     -27.00      257.30       17.97           1884.94              -658.63
  5      11.53      265.65        0.71            902.43              1008.00
  6      11.53      269.50        7.14            913.45              1029.60
  7      11.53      274.50        3.06            997.11              1068.08
  8      11.53      279.14        6.40           1106.85              1127.02
  9      11.53      286.49        8.60           1281.60              1221.04
 10      11.53      293.85        6.43           1456.68              1315.24
 11      11.53      305.00       16.33           1719.04              1455.88
 12      11.53      326.00       26.54           2160.63              1682.74
 13      11.53      354.50       31.64           2723.33              1964.13
 14      11.53      370.82        1.67           3046.35              2125.86
 15      48.94      372.71        3.28           4220.18              5155.43
 16      48.94      380.39       20.12           3815.05              4540.44
 17      48.94      389.50        7.61           3257.52              3784.54
 18      48.94      392.25        0.77           3072.64              3533.88
 19      48.94      393.57        3.22           2691.32              3421.37
 20      51.18      405.59       35.00           1896.27              2360.42
 21      72.65      418.74       14.57            831.05               748.45
    Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
    Soil Nail, and Applied Forces if applicable) =  455616.69 (lbs)
    Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
    Soil Nail, and Applied Forces if applicable) =   1992.09(psf)
    Sum of the Driving Forces =   401113.22 (lbs)
    Average Mobilized Shear Stress =    1753.78(psf)
    Total length of the failure surface =     228.71(ft)
            *** SEISMIC SLOPE DISPLACEMENT DATA ***
    (Note: kv is set = zero for displacement calculations)
    Seismic Yield Coefficient (ky) =  0.2521(g)
    Calculated Newmark Seismic Displacement =   0.670(ft)
    Non-Symmetrical Sliding Resistance Has Been Specified
    for Downhill Sliding.
                  **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 2-2' - 6/11 Design - Lower Basin Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 2\x2l.pl2 Run By: BTZ 6/17/2015 08:12AM



#	FS
a	1.90
b	1.90
c	1.90
d	1.90
e	1.90
f	1.90
g	1.90
h	1.90
i	1.90
j	1.90

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	150.0	30.0	W1
Qls	2	125.0	125.0	200.0	24.0	W1
Qsp	3	125.0	125.0	Aniso	Aniso	W1
Qal	4	120.0	120.0	200.0	28.0	W1

GSTABL7 v.2 FSmin=1.90

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
             (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        6/17/2015
    Time of Run:              08:12AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 2\x2l.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 2\x2l.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 2\x2l.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 2-2' -
                          6/11 Design - Lower Basin Slope - Static
    BOUNDARY COORDINATES
       18 Top   Boundaries
       29 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     200.00      51.00     202.00        1
        2        51.00     202.00      55.00     205.00        1
        3        55.00     205.00      87.00     204.00        1
        4        87.00     204.00      98.00     210.00        1
        5        98.00     210.00     122.00     210.00        1
        6       122.00     210.00     157.00     200.00        1
        7       157.00     200.00     332.00     200.00        4
        8       332.00     200.00     343.00     200.00        3
        9       343.00     200.00     387.00     210.00        1
       10       387.00     210.00     388.75     217.00        1
       11       388.75     217.00     395.00     217.00        1
       12       395.00     217.00     430.00     235.00        1
       13       430.00     235.00     436.00     235.00        1
       14       436.00     235.00     558.00     285.00        1
       15       558.00     285.00     584.00     285.00        1
       16       584.00     285.00     643.00     285.00        1
       17       643.00     285.00     677.00     290.00        2
       18       677.00     290.00     800.00     333.00        2
       19         0.00     197.00     157.00     200.00        4
       20         0.00     153.00     249.00     175.00        3
       21       249.00     175.00     332.00     200.00        3
       22       332.00     200.00     347.00     195.00        3
       23       347.00     195.00     367.00     195.00        3
       24       367.00     195.00     512.00     253.00        3
       25       512.00     253.00     583.00     250.00        3
       26       583.00     250.00     593.00     255.00        3
       27       593.00     255.00     643.00     285.00        2
       28       593.00     255.00     718.00     277.00        3
       29       718.00     277.00     800.00     287.00        3
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      1
```



```
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  3 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept       Angle
    No.            (deg)            (psf)         (deg)
     1              7.0             300.00         32.00
     2             12.0             200.00         27.00
     3             90.0             300.00         32.00
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
 1 PIEZOMETRIC SURFACE(S) SPECIFIED
 Unit Weight of Water =  62.40 (pcf)
 Piezometric Surface No.  1 Specified by 10 Coordinate Points
 Pore Pressure Inclination Factor =  0.50
   Point      X-Water     Y-Water
    No.         (ft)        (ft)
     1          0.00      200.00
     2         51.00      202.00
     3         55.00      204.00
     4         87.00      204.00
     5         95.00      208.00
     6        134.00      208.00
     7        160.00      200.00
     8        341.00      200.00
     9        362.00      200.00
    10        800.00      200.00
 Janbus Empirical Coef is being used for the case of  c & phi both > 0
 A Critical Failure Surface Searching Method, Using A Random
 Technique For Generating Sliding Block Surfaces, Has Been
 Specified.
 9999 Trial Surfaces Have Been Generated.
 2 Boxes Specified For Generation Of Central Block Base
 Length Of Line Segments For Active And Passive Portions Of
 Sliding Block Is  20.0
 Box        X-Left     Y-Left    X-Right    Y-Right      Height
 No.         (ft)       (ft)       (ft)       (ft)        (ft)
  1         300.00     170.00     450.00     188.00      40.00
  2         460.00     190.00     700.00     225.00      40.00
 Following Are Displayed The Ten Most Critical Of The Trial
       Failure Surfaces Evaluated. They Are
       Ordered - Most Critical First.
       * * Safety Factors Are Calculated By The Simplified Janbu Method * *
       Total Number of Trial Surfaces Attempted =  9999
       Number of Trial Failure Surfaces is Greater Than 5000.
       Statistical Data on FS Values are Not Generated.
       To Generate Stastical Data, Reduce Number of Trial
       Failure Surfaces to 5000 or less.
       Failure Surface Specified By 10 Coordinate Points
         Point      X-Surf      Y-Surf
          No.        (ft)        (ft)
           1        345.805     200.637
           2        346.513     199.930
           3        363.683     189.674
           4        382.901     184.135
           5        521.743     206.453
           6        535.448     221.019
           7        546.080     237.959
           8        559.089     253.151
           9        567.638     271.231
          10        578.596     285.000
              Factor of Safety
            ***    1.897   ***
```

Individual data on the 23 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.6	30.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	0.1	6.9	0.0	0.2	0.	0.	0.0	0.0	0.0
3	8.3	4230.4	0.0	1520.7	0.	0.	0.0	0.0	0.0
4	7.2	9327.8	0.0	3764.5	0.	0.	0.0	0.0	0.0
5	1.7	2935.7	0.0	1201.9	0.	0.	0.0	0.0	0.0
6	3.3	6417.3	0.0	2327.1	0.	0.	0.0	0.0	0.0
7	12.5	30598.9	0.0	10620.4	0.	0.	0.0	0.0	0.0
8	3.4	10091.0	0.0	3395.7	0.	0.	0.0	0.0	0.0
9	4.1	12694.3	0.0	4024.6	0.	0.	0.0	0.0	0.0
10	1.8	6159.9	0.0	1666.3	0.	0.	0.0	0.0	0.0
11	6.2	24172.2	0.0	5696.9	0.	0.	0.0	0.0	0.0
12	35.0	160103.4	0.0	24569.2	0.	0.	0.0	0.0	0.0
13	6.0	31700.9	0.0	2962.3	0.	0.	0.0	0.0	0.0
14	45.6	270762.8	0.0	10561.5	0.	0.	0.0	0.0	0.0
15	30.4	216437.3	0.0	0.0	0.	0.	0.0	0.0	0.0
16	9.7	75339.3	0.0	0.0	0.	0.	0.0	0.0	0.0
17	13.7	100022.3	0.0	0.0	0.	0.	0.0	0.0	0.0
18	10.6	62998.9	0.0	0.0	0.	0.	0.0	0.0	0.0
19	11.2	51495.0	0.0	0.0	0.	0.	0.0	0.0	0.0
20	0.7	2723.2	0.0	0.0	0.	0.	0.0	0.0	0.0
21	1.1	4244.2	0.0	0.0	0.	0.	0.0	0.0	0.0
22	8.5	23398.8	0.0	0.0	0.	0.	0.0	0.0	0.0
23	11.0	9053.0	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	345.805	200.637
2	346.513	199.930
3	363.683	189.674
4	382.901	184.135
5	521.743	206.453
6	535.448	221.019
7	546.080	237.959
8	559.089	253.151
9	567.638	271.231
10	578.596	285.000

Factor of Safety
*** 1.897 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	345.805	200.637
2	346.513	199.930
3	363.683	189.674
4	382.901	184.135
5	521.743	206.453
6	535.448	221.019
7	546.080	237.959
8	559.089	253.151
9	567.638	271.231
10	578.596	285.000

Factor of Safety
*** 1.897 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	345.805	200.637
2	346.513	199.930
3	363.683	189.674
4	382.901	184.135
5	521.743	206.453
6	535.448	221.019
7	546.080	237.959
8	559.089	253.151
9	567.638	271.231

Point No.	X-Surf (ft)	Y-Surf (ft)
10	578.596	285.000

Factor of Safety
*** 1.897 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	345.805	200.637
2	346.513	199.930
3	363.683	189.674
4	382.901	184.135
5	521.743	206.453
6	535.448	221.019
7	546.080	237.959
8	559.089	253.151
9	567.638	271.231
10	578.596	285.000

Factor of Safety
*** 1.897 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	345.805	200.637
2	346.513	199.930
3	363.683	189.674
4	382.901	184.135
5	521.743	206.453
6	535.448	221.019
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8	559.089	253.151
9	567.638	271.231
10	578.596	285.000

Factor of Safety
*** 1.897 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	345.805	200.637
2	346.513	199.930
3	363.683	189.674
4	382.901	184.135
5	521.743	206.453
6	535.448	221.019
7	546.080	237.959
8	559.089	253.151
9	567.638	271.231
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Factor of Safety
*** 1.897 ***

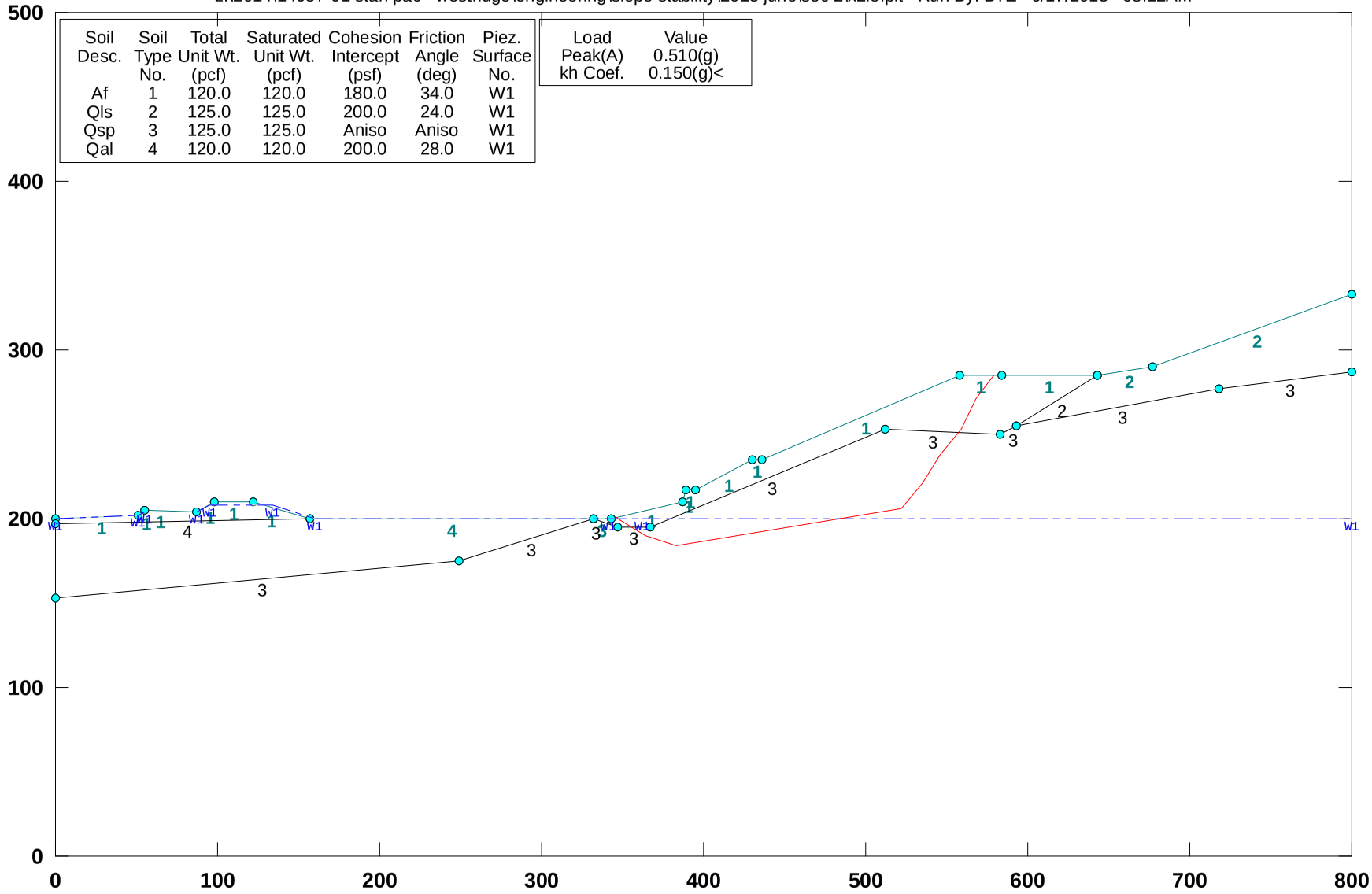
Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	345.805	200.637
2	346.513	199.930
3	363.683	189.674
4	382.901	184.135

```
     5        521.743      206.453
     6        535.448      221.019
     7        546.080      237.959
     8        559.089      253.151
     9        567.638      271.231
    10        578.596      285.000
        Factor of Safety
       ***    1.897   ***
Failure Surface Specified By 10 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        345.805      200.637
     2        346.513      199.930
     3        363.683      189.674
     4        382.901      184.135
     5        521.743      206.453
     6        535.448      221.019
     7        546.080      237.959
     8        559.089      253.151
     9        567.638      271.231
    10        578.596      285.000
        Factor of Safety
       ***    1.897   ***
           **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 2-2' - 6/11 Design - Lower Basin Slope -Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 2\x2le.plt Run By: BTZ 6/17/2015 08:12AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qls	2	125.0	125.0	200.0	24.0	W1
Qsp	3	125.0	125.0	Aniso	Aniso	W1
Qal	4	120.0	120.0	200.0	28.0	W1

Load	Value
Peak(A)	0.510(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.38

Factor Of Safety Is Calculated By The Simplified Janbu Method

***** GSTABL7 *****

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
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****

SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

****

Analysis Run Date: 6/17/2015
Time of Run: 08:12AM
Run By: BTZ
Input Data Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\2015 June\Sec 2\x2le.in
Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\2015 June\Sec 2\x2le.OUT
Unit System: English
Plotted Output Filename: Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stability\2015 June\Sec 2\x2le.PLT
PROBLEM DESCRIPTION: Westridge/14057-01/Sec 2-2' -
6/11 Design - Lower Basin Slope -Seismic

BOUNDARY COORDINATES
18 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	200.00	51.00	202.00	1
2	51.00	202.00	55.00	205.00	1
3	55.00	205.00	87.00	204.00	1
4	87.00	204.00	98.00	210.00	1
5	98.00	210.00	122.00	210.00	1
6	122.00	210.00	157.00	200.00	1
7	157.00	200.00	332.00	200.00	4
8	332.00	200.00	343.00	200.00	3
9	343.00	200.00	387.00	210.00	1
10	387.00	210.00	388.75	217.00	1
11	388.75	217.00	395.00	217.00	1
12	395.00	217.00	430.00	235.00	1
13	430.00	235.00	436.00	235.00	1
14	436.00	235.00	558.00	285.00	1
15	558.00	285.00	584.00	285.00	1
16	584.00	285.00	643.00	285.00	1
17	643.00	285.00	677.00	290.00	2
18	677.00	290.00	800.00	333.00	2
19	0.00	197.00	157.00	200.00	4
20	0.00	153.00	249.00	175.00	3
21	249.00	175.00	332.00	200.00	3
22	332.00	200.00	347.00	195.00	3
23	347.00	195.00	367.00	195.00	3
24	367.00	195.00	512.00	253.00	3
25	512.00	253.00	583.00	250.00	3
26	583.00	250.00	593.00	255.00	3
27	593.00	255.00	643.00	285.00	2
28	593.00	255.00	718.00	277.00	3
29	718.00	277.00	800.00	287.00	3

Default Y-Origin = 0.00(ft)
Default X-Plus Value = 0.00(ft)
Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS
4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	180.0	34.0	0.00	0.0	1
2	125.0	125.0	200.0	24.0	0.00	0.0	1
3	125.0	125.0	500.0	34.0	0.00	0.0	1
4	120.0	120.0	200.0	28.0	0.00	0.0	1

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)
Soil Type 3 Is Anisotropic
Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	7.0	500.00	34.00
2	12.0	200.00	27.00
3	90.0	500.00	34.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

1 PIEZOMETRIC SURFACE(S) SPECIFIED
Unit Weight of Water = 62.40 (pcf)
Piezometric Surface No. 1 Specified by 10 Coordinate Points
Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	200.00
2	51.00	202.00
3	55.00	204.00
4	87.00	204.00
5	95.00	208.00
6	134.00	208.00
7	160.00	200.00
8	341.00	200.00
9	362.00	200.00
10	800.00	200.00

Specified Peak Ground Acceleration Coefficient (A) = 0.510(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)
Specified Seismic Pore-Pressure Factor = 0.000
Janbu's Empirical Coef. is being used for the case of c & phi both > 0
Trial Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	345.805	200.637
2	346.513	199.930
3	363.683	189.674
4	382.901	184.135
5	521.743	206.453
6	535.448	221.019
7	546.080	237.959
8	559.089	253.151
9	567.638	271.231
10	578.596	285.000

Janbu's Empirical Coefficient (fo) = 1.076
* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
Factor Of Safety For The Preceding Specified Surface = 1.378

Table 1 - Individual Data on the 23 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	0.6	30.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0
2	0.1	6.9	0.0	0.2	0.0	0.0	1.0	0.0	0.0
3	8.3	4230.4	0.0	1520.8	0.0	0.0	634.6	0.0	0.0
4	7.2	9328.2	0.0	3764.6	0.0	0.0	1399.2	0.0	0.0
5	1.7	2935.2	0.0	1201.7	0.0	0.0	440.3	0.0	0.0
6	3.3	6417.8	0.0	2327.3	0.0	0.0	962.7	0.0	0.0
7	12.5	30599.0	0.0	10620.5	0.0	0.0	4589.9	0.0	0.0
8	3.4	10091.1	0.0	3395.7	0.0	0.0	1513.7	0.0	0.0
9	4.1	12694.4	0.0	4024.7	0.0	0.0	1904.2	0.0	0.0
10	1.8	6159.9	0.0	1666.3	0.0	0.0	924.0	0.0	0.0

11	6.2	24172.2	0.0	5697.0	0.0	0.0	3625.8	0.0	0.0
12	35.0	160103.7	0.0	24569.4	0.0	0.0	24015.6	0.0	0.0
13	6.0	31700.9	0.0	2962.3	0.0	0.0	4755.1	0.0	0.0
14	45.6	270761.8	0.0	10561.5	0.0	0.0	40614.3	0.0	0.0
15	30.4	216438.2	0.0	0.0	0.0	0.0	32465.7	0.0	0.0
16	9.7	75337.7	0.0	0.0	0.0	0.0	11300.7	0.0	0.0
17	13.7	100024.3	0.0	0.0	0.0	0.0	15003.6	0.0	0.0
18	10.6	62996.0	0.0	0.0	0.0	0.0	9449.4	0.0	0.0
19	11.2	51496.0	0.0	0.0	0.0	0.0	7724.4	0.0	0.0
20	0.7	2723.9	0.0	0.0	0.0	0.0	408.6	0.0	0.0
21	1.1	4245.1	0.0	0.0	0.0	0.0	636.8	0.0	0.0
22	8.5	23399.3	0.0	0.0	0.0	0.0	3509.9	0.0	0.0
23	11.0	9052.8	0.0	0.0	0.0	0.0	1357.9	0.0	0.0

Table 2 - Base Stress Data on the 23 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-44.98	346.12	0.90	585.85	-28.20
2	-44.98	346.48	0.10	679.05	-59.51
3	-30.85	350.64	9.61	689.82	-196.84
4	-30.85	358.38	8.43	1758.93	-495.24
5	-30.85	362.84	1.96	2079.05	-669.76
6	-16.08	365.34	3.45	1636.15	-256.97
7	-16.08	373.25	13.01	1939.27	-325.12
8	-16.08	381.20	3.54	2246.71	-394.07
9	9.13	384.95	4.15	1227.54	950.16
10	9.13	387.88	1.77	1447.87	1079.93
11	9.13	391.88	6.33	1636.74	1186.59
12	9.13	412.50	35.45	2081.82	1403.45
13	9.13	433.00	6.08	2527.39	1621.00
14	9.13	458.80	46.18	2972.24	1821.80
15	9.13	496.80	30.79	3659.07	2184.24
16	9.13	516.87	9.87	3957.78	2372.38
17	46.74	528.60	20.00	5205.15	6065.62
18	57.89	540.76	20.00	4751.86	5491.03
19	49.43	551.70	17.28	3511.98	3926.98
20	49.43	557.66	1.05	2818.84	3433.18
21	49.43	558.54	1.67	2748.09	3341.27
22	64.69	563.36	20.00	2328.78	2649.90
23	51.49	573.12	17.60	733.00	723.58

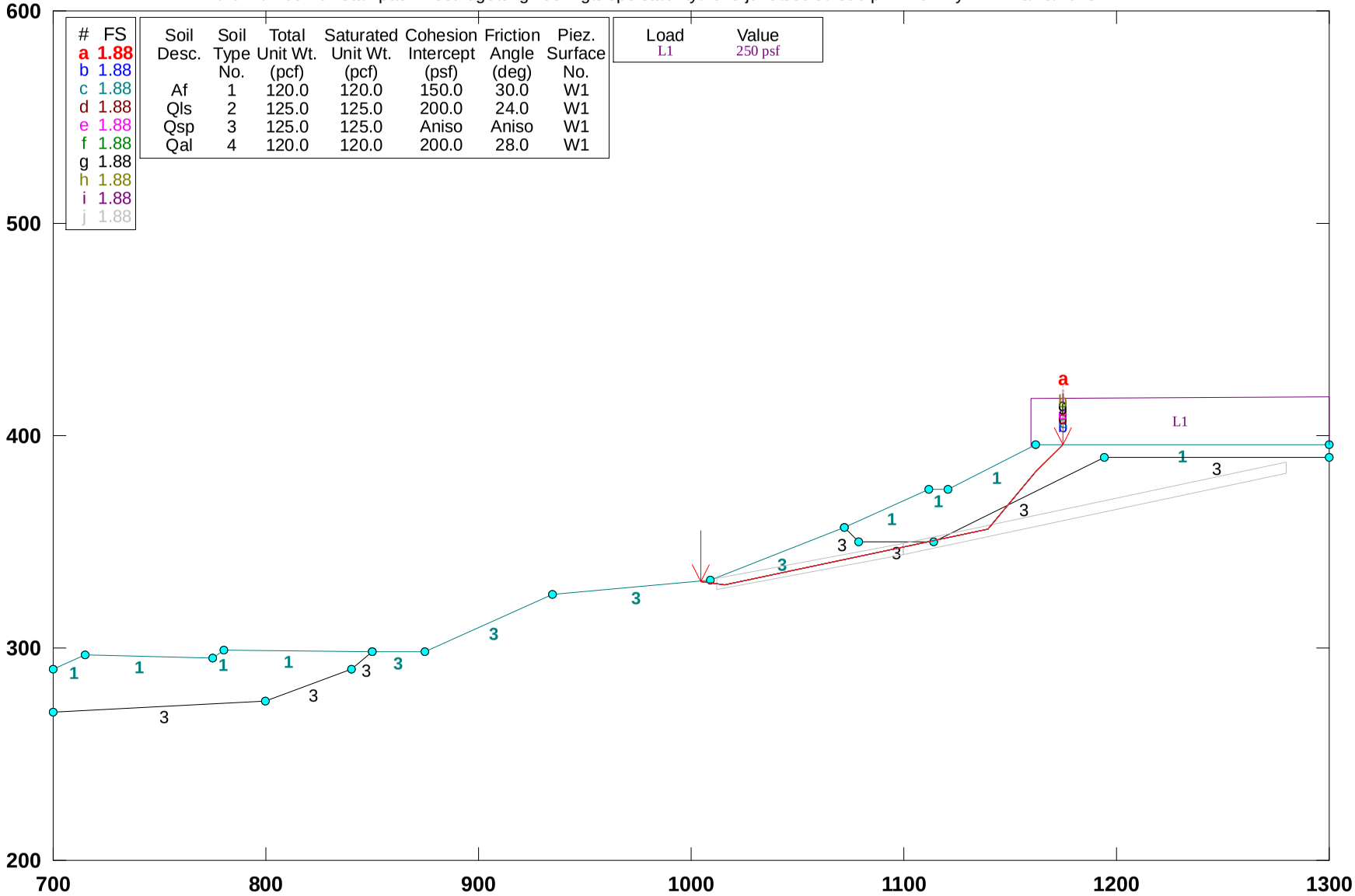
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 778104.88 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 2786.68(psf)
Sum of the Driving Forces = 607764.44 (lbs)
Average Mobilized Shear Stress = 2176.63(psf)
Total length of the failure surface = 279.22(ft)

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3150(g)
Calculated Newmark Seismic Displacement = 0.130(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

**** END OF GSTABL7 OUTPUT ****

Westridge/14057-01/Sec 3-3' - 6/11 Design - Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 3\x3ub.pl2 Run By: BTZ 6/16/2015 12:44PM



#	FS
a	1.88
b	1.88
c	1.88
d	1.88
e	1.88
f	1.88
g	1.88
h	1.88
i	1.88
j	1.88

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	150.0	30.0	W1
Qls	2	125.0	125.0	200.0	24.0	W1
Qsp	3	125.0	125.0	Aniso	Aniso	W1
Qal	4	120.0	120.0	200.0	28.0	W1

Load	Value
L1	250 psf

GSTABL7 v.2 FSmin=1.88

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        6/16/2015
    Time of Run:              12:44PM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3ub.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3ub.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3ub.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 3-3' - 6/11
                          Design - Upper Slope - Static
    BOUNDARY COORDINATES
       12 Top   Boundaries
       19 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        700.00     290.00     715.00     297.00        1
        2        715.00     297.00     775.00     295.00        1
        3        775.00     295.00     780.00     299.00        1
        4        780.00     299.00     850.00     298.00        1
        5        850.00     298.00     875.00     298.00        3
        6        875.00     298.00     935.00     325.00        3
        7        935.00     325.00    1009.00     332.00        3
        8       1009.00     332.00    1072.00     357.00        3
        9       1072.00     357.00    1112.00     375.00        1
       10       1112.00     375.00    1121.00     375.00        1
       11       1121.00     375.00    1162.00     396.00        1
       12       1162.00     396.00    1300.00     396.00        1
       13       1072.00     357.00    1079.00     350.00        3
       14       1079.00     350.00    1114.00     350.00        3
       15       1114.00     350.00    1194.00     390.00        3
       16       1194.00     390.00    1300.00     390.00        3
       17        700.00     270.00     800.00     275.00        3
       18        800.00     275.00     840.00     290.00        3
       19        840.00     290.00     850.00     298.00        3
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept      Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             300.00         32.00
        2             12.0             200.00         27.00
```



```
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)        (ft)        (psf)         (deg)
      1        1160.00     1300.00       250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Janbus Empirical Coef is being used for the case of  c & phi both > 0
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Sliding Block Surfaces, Has Been
    Specified.
    9999 Trial Surfaces Have Been Generated.
    2 Boxes Specified For Generation Of Central Block Base
    Length Of Line Segments For Active And Passive Portions Of
    Sliding Block Is  35.0
    Box        X-Left     Y-Left    X-Right    Y-Right      Height
    No.         (ft)       (ft)       (ft)       (ft)        (ft)
     1        1012.00     330.00    1100.00     346.70       5.00
     2        1100.10     346.70    1280.00     385.00       5.00
    Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Evaluated. They Are
           Ordered - Most Critical First.
           * * Safety Factors Are Calculated By The Simplified Janbu Method * *
           Total Number of Trial Surfaces Attempted =  9999
           Number of Trial Failure Surfaces is Greater Than 5000.
           Statistical Data on FS Values are Not Generated.
           To Generate Stastical Data, Reduce Number of Trial
           Failure Surfaces to 5000 or less.
           Failure Surface Specified By  5 Coordinate Points
             Point       X-Surf      Y-Surf
              No.         (ft)        (ft)
               1       1004.545      331.579
               2       1015.819      329.786
               3       1139.793      355.967
               4       1162.217      382.840
               5       1174.875      396.000
                 Factor of Safety
                ***    1.877   ***
                Individual data on the    14  slices
                           Water  Water     Tie     Tie     Earthquake
                           Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight      Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)     (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      4.5     314.6      0.0    0.0       0.      0.     0.0     0.0      0.0
  2      6.8    2578.4      0.0    0.0       0.      0.     0.0     0.0      0.0
  3     56.2   71174.6      0.0    0.0       0.      0.     0.0     0.0      0.0
  4      7.0   13984.9      0.0    0.0       0.      0.     0.0     0.0      0.0
  5     32.5   82193.0      0.0    0.0       0.      0.     0.0     0.0      0.0
  6      0.5    1375.8      0.0    0.0       0.      0.     0.0     0.0      0.0
  7      3.8   11172.0      0.0    0.0       0.      0.     0.0     0.0      0.0
  8      5.2   14715.9      0.0    0.0       0.      0.     0.0     0.0      0.0
  9     18.8   58649.4      0.0    0.0       0.      0.     0.0     0.0      0.0
 10      9.9   30239.6      0.0    0.0       0.      0.     0.0     0.0      0.0
 11     10.3   22612.1      0.0    0.0       0.      0.     0.0     0.0      0.0
 12      2.0    3385.4      0.0    0.0       0.      0.     0.0     0.0    500.0
 13      0.2     345.9      0.0    0.0       0.      0.     0.0     0.0     54.2
 14     12.7    9995.0      0.0    0.0       0.      0.     0.0     0.0   3164.6
           Failure Surface Specified By  5 Coordinate Points
             Point       X-Surf      Y-Surf
              No.         (ft)        (ft)
               1       1004.545      331.579
               2       1015.819      329.786
```

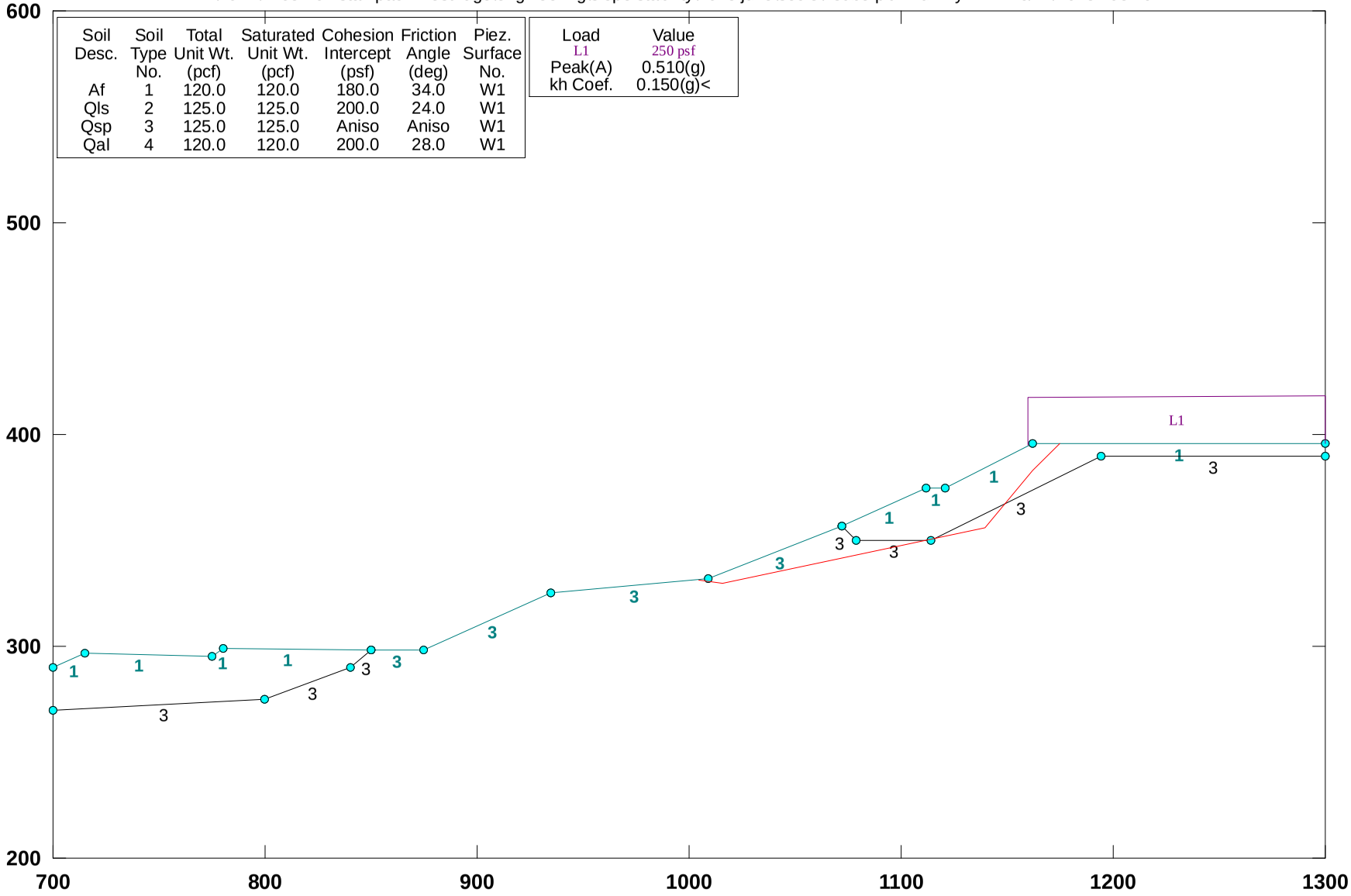
```
     3       1139.793      355.967
     4       1162.217      382.840
     5       1174.875      396.000
        Factor of Safety
       ***    1.877   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       1004.545      331.579
    2       1015.819      329.786
    3       1139.793      355.967
    4       1162.217      382.840
    5       1174.875      396.000
        Factor of Safety
       ***    1.877   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       1004.545      331.579
    2       1015.819      329.786
    3       1139.793      355.967
    4       1162.217      382.840
    5       1174.875      396.000
        Factor of Safety
       ***    1.877   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       1004.545      331.579
    2       1015.819      329.786
    3       1139.793      355.967
    4       1162.217      382.840
    5       1174.875      396.000
        Factor of Safety
       ***    1.877   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       1004.545      331.579
    2       1015.819      329.786
    3       1139.793      355.967
    4       1162.217      382.840
    5       1174.875      396.000
        Factor of Safety
       ***    1.877   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       1004.545      331.579
    2       1015.819      329.786
    3       1139.793      355.967
    4       1162.217      382.840
    5       1174.875      396.000
        Factor of Safety
       ***    1.877   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       1004.545      331.579
    2       1015.819      329.786
```



```
     3       1139.793      355.967
     4       1162.217      382.840
     5       1174.875      396.000
        Factor of Safety
       ***    1.877   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       1004.545      331.579
    2       1015.819      329.786
    3       1139.793      355.967
    4       1162.217      382.840
    5       1174.875      396.000
        Factor of Safety
       ***    1.877   ***
           **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 3-3' - 6/11 Design - Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 3\x3ube.plt Run By: BTZ 6/17/2015 08:16AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qls	2	125.0	125.0	200.0	24.0	W1
Qsp	3	125.0	125.0	Aniso	Aniso	W1
Qal	4	120.0	120.0	200.0	28.0	W1

Load	Value
L1	250 psf
Peak(A)	0.510(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.40

Factor Of Safety Is Calculated By The Simplified Janbu Method

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        6/17/2015
    Time of Run:              08:16AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3ube.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3ube.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3ube.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 3-3' - 6/11
                          Design - Upper Slope - Seismic
    BOUNDARY COORDINATES
       12 Top   Boundaries
       19 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        700.00     290.00     715.00     297.00        1
        2        715.00     297.00     775.00     295.00        1
        3        775.00     295.00     780.00     299.00        1
        4        780.00     299.00     850.00     298.00        1
        5        850.00     298.00     875.00     298.00        3
        6        875.00     298.00     935.00     325.00        3
        7        935.00     325.00    1009.00     332.00        3
        8       1009.00     332.00    1072.00     357.00        3
        9       1072.00     357.00    1112.00     375.00        1
       10       1112.00     375.00    1121.00     375.00        1
       11       1121.00     375.00    1162.00     396.00        1
       12       1162.00     396.00    1300.00     396.00        1
       13       1072.00     357.00    1079.00     350.00        3
       14       1079.00     350.00    1114.00     350.00        3
       15       1114.00     350.00    1194.00     390.00        3
       16       1194.00     390.00    1300.00     390.00        3
       17        700.00     270.00     800.00     275.00        3
       18        800.00     275.00     840.00     290.00        3
       19        840.00     290.00     850.00     298.00        3
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     500.0     34.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept      Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             500.00         34.00
        2             12.0             200.00         27.00
```



```
        3              90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)        (ft)        (psf)          (deg)
     1        1160.00     1300.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.510(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
    Trial Failure Surface Specified By  5 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1       1004.545     331.579
        2       1015.819     329.786
        3       1139.793     355.967
        4       1162.217     382.840
        5       1174.875     396.000
    Janbu's Empirical Coefficient (fo) =  1.056
    * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.399
        ***Table 1 - Individual Data on the   14 Slices***
                            Water  Water     Tie      Tie     Earthquake
                            Force  Force    Force    Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      4.5     314.6     0.0     0.0      0.0     0.0    47.2     0.0      0.0
  2      6.8    2578.3     0.0     0.0      0.0     0.0   386.7     0.0      0.0
  3     56.2   71172.7     0.0     0.0      0.0     0.0 10675.9     0.0      0.0
  4      7.0   13984.7     0.0     0.0      0.0     0.0  2097.7     0.0      0.0
  5     32.5   82189.5     0.0     0.0      0.0     0.0 12328.4     0.0      0.0
  6      0.5    1378.4     0.0     0.0      0.0     0.0   206.8     0.0      0.0
  7      3.8   11173.7     0.0     0.0      0.0     0.0  1676.1     0.0      0.0
  8      5.2   14714.0     0.0     0.0      0.0     0.0  2207.1     0.0      0.0
  9     18.8   58647.3     0.0     0.0      0.0     0.0  8797.1     0.0      0.0
 10      9.9   30240.4     0.0     0.0      0.0     0.0  4536.1     0.0      0.0
 11     10.3   22612.5     0.0     0.0      0.0     0.0  3391.9     0.0      0.0
 12      2.0    3385.5     0.0     0.0      0.0     0.0   507.8     0.0    500.0
 13      0.2     345.9     0.0     0.0      0.0     0.0    51.9     0.0     54.2
 14     12.7    9994.9     0.0     0.0      0.0     0.0  1499.2     0.0   3164.5
        ***Table 2 - Base Stress Data on the   14 Slices***
Slice   Alpha     X-Coord.      Base          Available              Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength          Shear Stress
  *                 (ft)        (ft)           (psf)                  (psf)
  1      -9.03     1006.77       4.51           600.54                 -0.63
  2      -9.03     1012.41       6.90           827.99                 -3.36
  3      11.92     1043.91      57.42           802.42                447.69
  4      11.92     1075.50       7.15          1155.90                706.00
  5      11.92     1095.27      33.26          1411.30                892.65
  6      11.92     1111.77       0.47          2032.54               1053.68
  7      11.92     1113.90       3.88          2006.56               1039.00
  8      11.92     1118.40       5.31          1558.25               1000.03
  9      11.92     1130.40      19.21          1698.90               1102.82
 10      50.16     1144.75      15.49          2528.35               2633.06
 11      50.16     1154.86      16.05          1645.08               1899.34
 12      50.16     1161.00       3.12          1474.39               1654.32
 13      50.16     1162.11       0.34          1409.04               1569.71
 14      46.11     1168.55      18.26           846.76                831.37
    Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
    Soil Nail, and Applied Forces if applicable) =  243345.72 (lbs)
```

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Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) =   1271.51(psf)
Sum of the Driving Forces =   183590.20 (lbs)
Average Mobilized Shear Stress =     959.28(psf)
Total length of the failure surface =     191.38(ft)
       *** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.3276(g)
Calculated Newmark Seismic Displacement =   0.120(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
              **** END OF GSTABL7 OUTPUT ****
```

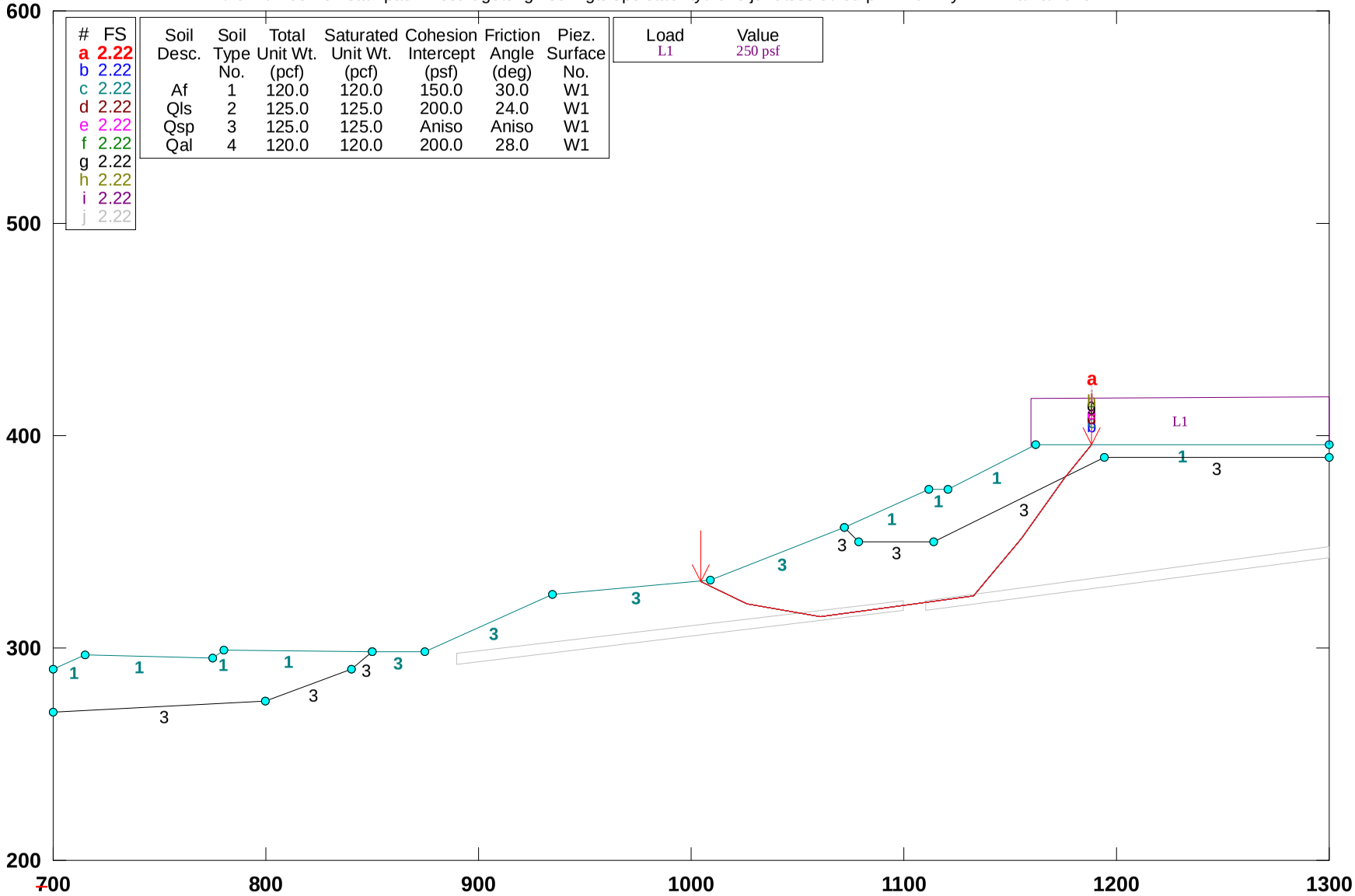
Westridge/14057-01/Sec 3-3' - 6/11 Design - Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 3\x3u.pl2 Run By: BTZ 6/16/2015 12:47PM

#	FS
a	2.22
b	2.22
c	2.22
d	2.22
e	2.22
f	2.22
g	2.22
h	2.22
i	2.22
j	2.22

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	150.0	30.0	W1
Qls	2	125.0	125.0	200.0	24.0	W1
Qsp	3	125.0	125.0	Aniso	Aniso	W1
Qal	4	120.0	120.0	200.0	28.0	W1

Load	Value
L1	250 psf



GSTABL7 v.2 FSmin=2.22

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                           SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        6/16/2015
    Time of Run:              12:47PM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3u.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3u.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3u.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 3-3' - 6/11
                          Design - Upper Slope - Static
    BOUNDARY COORDINATES
       12 Top   Boundaries
       19 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        700.00     290.00     715.00     297.00        1
        2        715.00     297.00     775.00     295.00        1
        3        775.00     295.00     780.00     299.00        1
        4        780.00     299.00     850.00     298.00        1
        5        850.00     298.00     875.00     298.00        3
        6        875.00     298.00     935.00     325.00        3
        7        935.00     325.00    1009.00     332.00        3
        8       1009.00     332.00    1072.00     357.00        3
        9       1072.00     357.00    1112.00     375.00        1
       10       1112.00     375.00    1121.00     375.00        1
       11       1121.00     375.00    1162.00     396.00        1
       12       1162.00     396.00    1300.00     396.00        1
       13       1072.00     357.00    1079.00     350.00        3
       14       1079.00     350.00    1114.00     350.00        3
       15       1114.00     350.00    1194.00     390.00        3
       16       1194.00     390.00    1300.00     390.00        3
       17        700.00     270.00     800.00     275.00        3
       18        800.00     275.00     840.00     290.00        3
       19        840.00     290.00     850.00     298.00        3
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             300.00         32.00
        2             12.0             200.00         27.00
```



```
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)        (ft)        (psf)          (deg)
     1        1160.00     1300.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Janbus Empirical Coef is being used for the case of  c & phi both > 0
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Sliding Block Surfaces, Has Been
    Specified.
    9999 Trial Surfaces Have Been Generated.
    2 Boxes Specified For Generation Of Central Block Base
    Length Of Line Segments For Active And Passive Portions Of
    Sliding Block Is  35.0
    Box        X-Left     Y-Left    X-Right    Y-Right      Height
    No.         (ft)       (ft)       (ft)       (ft)        (ft)
     1         890.00     295.00    1100.00     320.00       5.00
     2        1110.00     320.00    1300.00     345.00       5.00
    Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Evaluated. They Are
           Ordered - Most Critical First.
           * * Safety Factors Are Calculated By The Simplified Janbu Method * *
           Total Number of Trial Surfaces Attempted =  9999
           Number of Trial Failure Surfaces is Greater Than 5000.
           Statistical Data on FS Values are Not Generated.
           To Generate Stastical Data, Reduce Number of Trial
           Failure Surfaces to 5000 or less.
           Failure Surface Specified By  7 Coordinate Points
             Point       X-Surf      Y-Surf
              No.         (ft)        (ft)
               1       1004.695      331.593
               2       1026.591      320.955
               3       1060.971      314.396
               4       1132.486      324.821
               5       1155.509      351.183
               6       1175.208      380.113
               7       1188.281      396.000
                  Factor of Safety
                 ***    2.222   ***
                Individual data on the    15  slices
                           Water  Water     Tie     Tie     Earthquake
                           Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      4.3     672.3     0.0     0.0       0.      0.     0.0     0.0     0.0
  2     17.6   22564.9     0.0     0.0       0.      0.     0.0     0.0     0.0
  3     34.4  120871.8     0.0     0.0       0.      0.     0.0     0.0     0.0
  4     11.0   54609.1     0.0     0.0       0.      0.     0.0     0.0     0.0
  5      7.0   36625.5     0.0     0.0       0.      0.     0.0     0.0     0.0
  6     33.0  195699.6     0.0     0.0       0.      0.     0.0     0.0     0.0
  7      2.0   13004.8     0.0     0.0       0.      0.     0.0     0.0     0.0
  8      7.0   45004.2     0.0     0.0       0.      0.     0.0     0.0     0.0
  9     11.5   76230.4     0.0     0.0       0.      0.     0.0     0.0     0.0
 10     23.0  137868.8     0.0     0.0       0.      0.     0.0     0.0     0.0
 11      4.5   21593.8     0.0     0.0       0.      0.     0.0     0.0     0.0
 12      2.0    8840.5     0.0     0.0       0.      0.     0.0     0.0   500.0
 13     13.2   41009.7     0.0     0.0       0.      0.     0.0     0.0  3302.1
 14      0.7    1276.9     0.0     0.0       0.      0.     0.0     0.0   171.8
 15     12.4   11185.2     0.0     0.0       0.      0.     0.0     0.0  3096.3
           Failure Surface Specified By  7 Coordinate Points
             Point       X-Surf      Y-Surf
```

```
  No.        (ft)        (ft)
   1       1004.695      331.593
   2       1026.591      320.955
   3       1060.971      314.396
   4       1132.486      324.821
   5       1155.509      351.183
   6       1175.208      380.113
   7       1188.281      396.000
      Factor of Safety
     ***    2.222   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1       1004.695      331.593
   2       1026.591      320.955
   3       1060.971      314.396
   4       1132.486      324.821
   5       1155.509      351.183
   6       1175.208      380.113
   7       1188.281      396.000
      Factor of Safety
     ***    2.222   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1       1004.695      331.593
   2       1026.591      320.955
   3       1060.971      314.396
   4       1132.486      324.821
   5       1155.509      351.183
   6       1175.208      380.113
   7       1188.281      396.000
      Factor of Safety
     ***    2.222   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1       1004.695      331.593
   2       1026.591      320.955
   3       1060.971      314.396
   4       1132.486      324.821
   5       1155.509      351.183
   6       1175.208      380.113
   7       1188.281      396.000
      Factor of Safety
     ***    2.222   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1       1004.695      331.593
   2       1026.591      320.955
   3       1060.971      314.396
   4       1132.486      324.821
   5       1155.509      351.183
   6       1175.208      380.113
   7       1188.281      396.000
      Factor of Safety
     ***    2.222   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1       1004.695      331.593
   2       1026.591      320.955
   3       1060.971      314.396
   4       1132.486      324.821
   5       1155.509      351.183
   6       1175.208      380.113
   7       1188.281      396.000
      Factor of Safety
     ***    2.222   ***
```



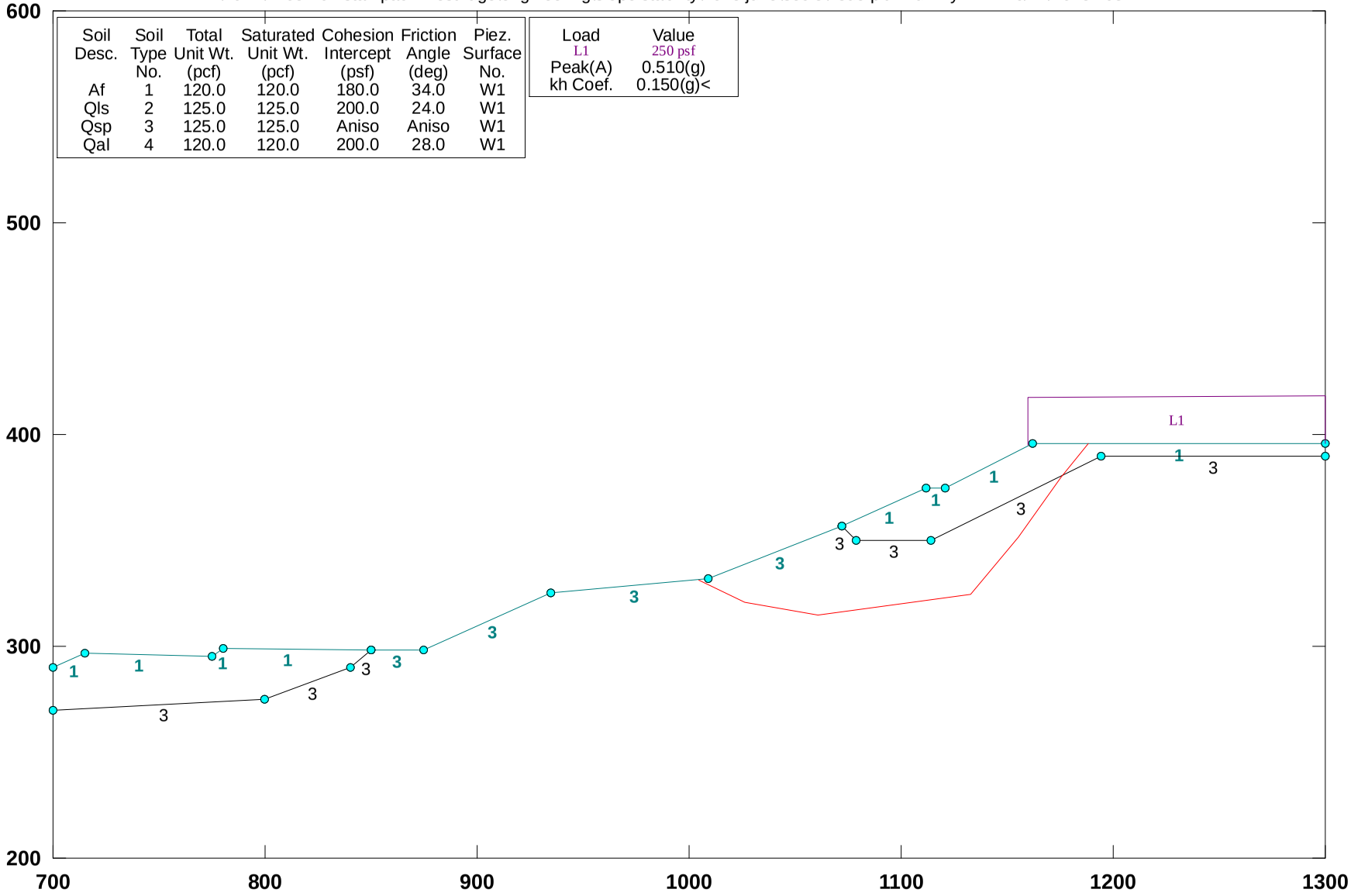
```
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1       1004.695      331.593
   2       1026.591      320.955
   3       1060.971      314.396
   4       1132.486      324.821
   5       1155.509      351.183
   6       1175.208      380.113
   7       1188.281      396.000
      Factor of Safety
     ***    2.222   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1       1004.695      331.593
   2       1026.591      320.955
   3       1060.971      314.396
   4       1132.486      324.821
   5       1155.509      351.183
   6       1175.208      380.113
   7       1188.281      396.000
      Factor of Safety
     ***    2.222   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
  No.        (ft)        (ft)
   1       1004.695      331.593
   2       1026.591      320.955
   3       1060.971      314.396
   4       1132.486      324.821
   5       1155.509      351.183
   6       1175.208      380.113
   7       1188.281      396.000
      Factor of Safety
     ***    2.222   ***
         **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 3-3' - 6/11 Design - Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 3\x3ue.plt Run By: BTZ 6/17/2015 08:17AM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qls	2	125.0	125.0	200.0	24.0	W1
Qsp	3	125.0	125.0	Aniso	Aniso	W1
Qal	4	120.0	120.0	200.0	28.0	W1

Load	Value
L1	250 psf
Peak(A)	0.510(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.69

Factor Of Safety Is Calculated By The Simplified Janbu Method

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                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
             (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        6/17/2015
    Time of Run:              08:17AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3ue.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3ue.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3\x3ue.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 3-3' - 6/11
                          Design - Upper Slope - Seismic
    BOUNDARY COORDINATES
       12 Top   Boundaries
       19 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        700.00     290.00     715.00     297.00        1
        2        715.00     297.00     775.00     295.00        1
        3        775.00     295.00     780.00     299.00        1
        4        780.00     299.00     850.00     298.00        1
        5        850.00     298.00     875.00     298.00        3
        6        875.00     298.00     935.00     325.00        3
        7        935.00     325.00    1009.00     332.00        3
        8       1009.00     332.00    1072.00     357.00        3
        9       1072.00     357.00    1112.00     375.00        1
       10       1112.00     375.00    1121.00     375.00        1
       11       1121.00     375.00    1162.00     396.00        1
       12       1162.00     396.00    1300.00     396.00        1
       13       1072.00     357.00    1079.00     350.00        3
       14       1079.00     350.00    1114.00     350.00        3
       15       1114.00     350.00    1194.00     390.00        3
       16       1194.00     390.00    1300.00     390.00        3
       17        700.00     270.00     800.00     275.00        3
       18        800.00     275.00     840.00     290.00        3
       19        840.00     290.00     850.00     298.00        3
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     500.0     34.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept      Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             500.00         34.00
        2             12.0             200.00         27.00
```

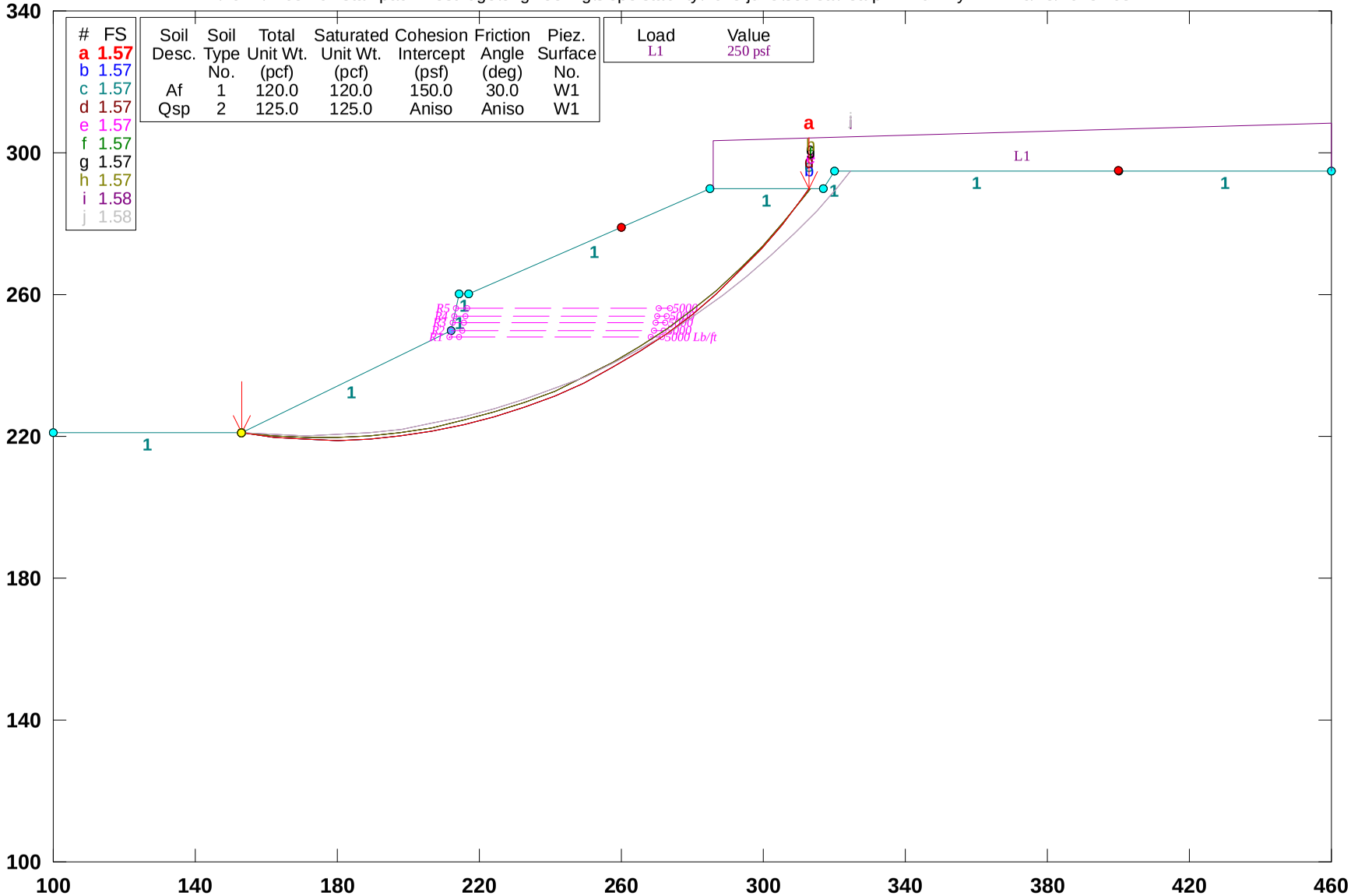


```
        3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load         X-Left      X-Right     Intensity     Deflection
     No.          (ft)        (ft)        (psf)          (deg)
     1         1160.00     1300.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.510(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
    Trial Failure Surface Specified By  7 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1       1004.695     331.593
        2       1026.591     320.955
        3       1060.971     314.396
        4       1132.486     324.821
        5       1155.509     351.183
        6       1175.208     380.113
        7       1188.281     396.000
    Janbu's Empirical Coefficient (fo) =  1.081
    * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.691
         ***Table 1 - Individual Data on the   15 Slices***
                            Water  Water     Tie     Tie     Earthquake
                            Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)  (lbs)
  1      4.3     672.3     0.0     0.0      0.0     0.0   100.8     0.0      0.0
  2     17.6   22565.1     0.0     0.0      0.0     0.0  3384.8     0.0      0.0
  3     34.4  120873.6     0.0     0.0      0.0     0.0 18131.0     0.0      0.0
  4     11.0   54610.1     0.0     0.0      0.0     0.0  8191.5     0.0      0.0
  5      7.0   36625.8     0.0     0.0      0.0     0.0  5493.9     0.0      0.0
  6     33.0  195700.7     0.0     0.0      0.0     0.0 29355.1     0.0      0.0
  7      2.0   13004.9     0.0     0.0      0.0     0.0  1950.7     0.0      0.0
  8      7.0   45004.4     0.0     0.0      0.0     0.0  6750.7     0.0      0.0
  9     11.5   76230.8     0.0     0.0      0.0     0.0 11434.6     0.0      0.0
 10     23.0  137867.8     0.0     0.0      0.0     0.0 20680.2     0.0      0.0
 11      4.5   21594.2     0.0     0.0      0.0     0.0  3239.1     0.0      0.0
 12      2.0    8840.3     0.0     0.0      0.0     0.0  1326.0     0.0    500.0
 13     13.2   41007.1     0.0     0.0      0.0     0.0  6151.1     0.0   3302.0
 14      0.7    1275.1     0.0     0.0      0.0     0.0   191.3     0.0    171.6
 15     12.4   11187.1     0.0     0.0      0.0     0.0  1678.1     0.0   3096.6
         ***Table 2 - Base Stress Data on the   15 Slices***
Slice   Alpha     X-Coord.      Base          Available              Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength          Shear Stress
 *                  (ft)        (ft)           (psf)                  (psf)
  1     -25.91     1006.85       4.79           834.80                 -47.18
  2     -25.91     1017.80      19.56          1882.73                -387.49
  3     -10.80     1043.78      35.00          3164.04                -140.83
  4       8.29     1066.49      11.15          2635.89                1449.20
  5       8.29     1075.50       7.07          2774.38                1531.38
  6       8.29     1095.50      33.35          3118.70                1735.69
  7       8.29     1113.00       2.02          3400.89                1903.14
  8       8.29     1117.50       7.07          3364.76                1881.70
  9       8.29     1126.74      11.61          3467.19                1942.48
 10      48.87     1144.00      35.00          4736.78                5101.17
 11      55.75     1157.75       7.98          4193.79                4380.40
 12      55.75     1161.00       3.55          4089.35                4233.40
 13      55.75     1168.60      23.47          3095.29                3035.03
```

```
14      50.55     1175.55        1.08           2036.78              1804.51
15      50.55     1182.09       19.49           1015.23               976.54
   Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
   Soil Nail, and Applied Forces if applicable) =  676422.31 (lbs)
   Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
   Soil Nail, and Applied Forces if applicable) =   3044.36(psf)
   Sum of the Driving Forces =   432587.50 (lbs)
   Average Mobilized Shear Stress =    1946.94(psf)
   Total length of the failure surface =     222.19(ft)
          *** SEISMIC SLOPE DISPLACEMENT DATA ***
   (Note: kv is set = zero for displacement calculations)
   Seismic Yield Coefficient (ky) =  0.4626(g)
   Calculated Newmark Seismic Displacement =   0.060(ft)
   Non-Symmetrical Sliding Resistance Has Been Specified
   for Downhill Sliding.
                 **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 3A-3A' - 6/11 Design / Lower Slope MSE - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 3a\x3a.pl2 Run By: BTZ 6/18/2015 08:27AM



GSTABL7 v.2 FSmin=1.57

Safety Factors Are Calculated By The Modified Bishop Method

```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
         ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                           SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        6/18/2015
    Time of Run:              08:27AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3A\x3a.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3A\x3a.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3A\x3a.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 3A-3A' - 6/11
                          Design / Lower Slope MSE - Static
    BOUNDARY COORDINATES
        9 Top   Boundaries
        9 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        100.00     221.00     153.00     221.00        1
        2        153.00     221.00     212.00     250.00        1
        3        212.00     250.00     214.50     260.00        1
        4        214.50     260.00     217.00     260.00        1
        5        217.00     260.00     285.00     290.00        1
        6        285.00     290.00     317.00     290.00        1
        7        317.00     290.00     320.00     295.00        1
        8        320.00     295.00     400.00     295.00        1
        9        400.00     295.00     460.00     295.00        1
    User Specified Y-Origin =       100.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     2 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     300.0     32.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             300.00         32.00
        2             12.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load         X-Left      X-Right     Intensity     Deflection
     No.          (ft)         (ft)        (psf)         (deg)
```



```
     1         286.00       460.00        250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
   REINFORCING LAYER(S)
       5 REINFORCING LAYER(S) SPECIFIED
    REINFORCING LAYER NO.   1
      4 POINTS DEFINE THIS LAYER
         POINT     X-COORD   Y-COORD   FORCE   INCLINATION
          NO.                                    FACTOR
           1       211.50    248.00      0.00     0.000
           2       214.50    248.00   5000.00     0.000
           3       268.50    248.00   5000.00     0.000
           4       271.50    248.00      0.00     0.000
    REINFORCING LAYER NO.   2
      4 POINTS DEFINE THIS LAYER
         POINT     X-COORD   Y-COORD   FORCE   INCLINATION
          NO.                                    FACTOR
           1       212.00    250.00      0.00     0.000
           2       215.00    250.00   5000.00     0.000
           3       269.00    250.00   5000.00     0.000
           4       272.00    250.00      0.00     0.000
    REINFORCING LAYER NO.   3
      4 POINTS DEFINE THIS LAYER
         POINT     X-COORD   Y-COORD   FORCE   INCLINATION
          NO.                                    FACTOR
           1       212.50    252.00      0.00     0.000
           2       215.50    252.00   5000.00     0.000
           3       269.50    252.00   5000.00     0.000
           4       272.50    252.00      0.00     0.000
    REINFORCING LAYER NO.   4
      4 POINTS DEFINE THIS LAYER
         POINT     X-COORD   Y-COORD   FORCE   INCLINATION
          NO.                                    FACTOR
           1       213.00    254.00      0.00     0.000
           2       216.00    254.00   5000.00     0.000
           3       270.00    254.00   5000.00     0.000
           4       273.00    254.00      0.00     0.000
    REINFORCING LAYER NO.   5
      4 POINTS DEFINE THIS LAYER
         POINT     X-COORD   Y-COORD   FORCE   INCLINATION
          NO.                                    FACTOR
           1       213.50    256.00      0.00     0.000
           2       216.50    256.00   5000.00     0.000
           3       270.50    256.00   5000.00     0.000
           4       273.50    256.00      0.00     0.000
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Circular Surfaces, Has Been Specified.
   37500 Trial Surfaces Have Been Generated.
    2500 Surface(s) Initiate(s) From Each Of    15 Points Equally Spaced
    Along The Ground Surface Between  X = 153.00(ft)
                                  and  X = 153.00(ft)
    Each Surface Terminates Between   X = 260.00(ft)
                                  and   X = 400.00(ft)
    Unless Further Limitations Were Imposed, The Minimum Elevation
    At Which A Surface Extends Is  Y =      0.00(ft)
     9.00(ft) Line Segments Define Each Trial Failure Surface.
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Evaluated. They Are
          Ordered - Most Critical First.
          * * Safety Factors Are Calculated By The Modified Bishop Method * *
          Total Number of Trial Surfaces Attempted =     0
          Number of Trial Surfaces With Valid FS =    0
          Statistical Data On All Valid FS Values:
             FS Max =   0.000   FS Min = 500.000   FS Ave =  NaN
             Standard Deviation =    0.000   Coefficient of Variation =  NaN    %
          Failure Surface Specified By 22 Coordinate Points
            Point       X-Surf       Y-Surf
             No.         (ft)         (ft)
              1        153.000      221.000
              2        161.922      219.815
```

3	170.895	219.128
4	179.893	218.940
5	188.888	219.253
6	197.851	220.064
7	206.756	221.373
8	215.574	223.174
9	224.278	225.462
10	232.842	228.230
11	241.239	231.469
12	249.442	235.170
13	257.428	239.321
14	265.171	243.909
15	272.647	248.920
16	279.832	254.339
17	286.706	260.149
18	293.247	266.331
19	299.434	272.867
20	305.248	279.737
21	310.671	286.919
22	312.739	290.000

Circle Center At X = 178.794 ; Y = 380.689 ; and Radius = 161.759

Factor of Safety

*** 1.573 ***

Individual data on the 26 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.9	2981.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	9.0	8742.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	9.0	14008.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	9.0	18708.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	9.0	22785.7	0.0	0.0	0.	0.	0.0	0.0	0.0
6	8.9	26195.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	5.2	16867.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	2.5	9690.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	1.1	4759.2	0.0	0.0	0.	0.	0.0	0.0	0.0
10	1.4	6270.8	0.0	0.0	0.	0.	0.0	0.0	0.0
11	7.3	32402.3	0.0	0.0	0.	0.	0.0	0.0	0.0
12	8.6	39312.1	0.0	0.0	0.	0.	0.0	0.0	0.0
13	8.4	39288.7	0.0	0.0	0.	0.	0.0	0.0	0.0
14	8.2	38574.7	0.0	0.0	0.	0.	0.0	0.0	0.0
15	8.0	37208.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	7.7	35240.4	0.0	0.0	0.	0.	0.0	0.0	0.0
17	7.5	32731.7	0.0	0.0	0.	0.	0.0	0.0	0.0
18	7.2	29754.3	0.0	0.0	0.	0.	0.0	0.0	0.0
19	5.2	20052.5	0.0	0.0	0.	0.	0.0	0.0	0.0
20	1.0	3704.5	0.0	0.0	0.	0.	0.0	0.0	0.0
21	0.7	2555.1	0.0	0.0	0.	0.	0.0	0.0	176.6
22	6.5	21002.7	0.0	0.0	0.	0.	0.0	0.0	1635.1
23	6.2	15146.1	0.0	0.0	0.	0.	0.0	0.0	1546.7
24	5.8	9557.0	0.0	0.0	0.	0.	0.0	0.0	1453.6
25	5.4	4342.2	0.0	0.0	0.	0.	0.0	0.0	1355.9
26	2.1	382.2	0.0	0.0	0.	0.	0.0	0.0	517.0

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	153.000	221.000
2	161.922	219.815
3	170.895	219.128
4	179.893	218.940
5	188.888	219.253
6	197.851	220.064
7	206.756	221.373
8	215.574	223.174
9	224.278	225.462
10	232.842	228.230
11	241.239	231.469
12	249.442	235.170
13	257.428	239.321

14	265.171	243.909
15	272.647	248.920
16	279.832	254.339
17	286.706	260.149
18	293.247	266.331
19	299.434	272.867
20	305.248	279.737
21	310.671	286.919
22	312.739	290.000

Circle Center At X = 178.794 ; Y = 380.689 ; and Radius = 161.759

Factor of Safety

*** 1.573 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	153.000	221.000
2	161.922	219.815
3	170.895	219.128
4	179.893	218.940
5	188.888	219.253
6	197.851	220.064
7	206.756	221.373
8	215.574	223.174
9	224.278	225.462
10	232.842	228.230
11	241.239	231.469
12	249.442	235.170
13	257.428	239.321
14	265.171	243.909
15	272.647	248.920
16	279.832	254.339
17	286.706	260.149
18	293.247	266.331
19	299.434	272.867
20	305.248	279.737
21	310.671	286.919
22	312.739	290.000

Circle Center At X = 178.794 ; Y = 380.689 ; and Radius = 161.759

Factor of Safety

*** 1.573 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	153.000	221.000
2	161.922	219.815
3	170.895	219.128
4	179.893	218.940
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6	197.851	220.064
7	206.756	221.373
8	215.574	223.174
9	224.278	225.462
10	232.842	228.230
11	241.239	231.469
12	249.442	235.170
13	257.428	239.321
14	265.171	243.909
15	272.647	248.920
16	279.832	254.339
17	286.706	260.149
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19	299.434	272.867
20	305.248	279.737
21	310.671	286.919
22	312.739	290.000

Circle Center At X = 178.794 ; Y = 380.689 ; and Radius = 161.759

Factor of Safety

*** 1.573 ***

Failure Surface Specified By 22 Coordinate Points

Point	X-Surf	Y-Surf

```
   No.        (ft)        (ft)
    1        153.000      221.000
    2        161.952      220.076
    3        170.941      219.625
    4        179.941      219.648
    5        188.927      220.146
    6        197.875      221.117
    7        206.759      222.557
    8        215.554      224.464
    9        224.237      226.832
   10        232.783      229.655
   11        241.169      232.923
   12        249.370      236.629
   13        257.365      240.762
   14        265.131      245.311
   15        272.646      250.263
   16        279.890      255.604
   17        286.843      261.319
   18        293.484      267.393
   19        299.796      273.808
   20        305.762      280.547
   21        311.363      287.592
   22        313.080      290.000
Circle Center At X =   175.023 ; Y =   390.098 ; and Radius =   170.526
       Factor of Safety
      ***    1.574    ***
Failure Surface Specified By 22 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        153.000      221.000
    2        161.952      220.076
    3        170.941      219.625
    4        179.941      219.648
    5        188.927      220.146
    6        197.875      221.117
    7        206.759      222.557
    8        215.554      224.464
    9        224.237      226.832
   10        232.783      229.655
   11        241.169      232.923
   12        249.370      236.629
   13        257.365      240.762
   14        265.131      245.311
   15        272.646      250.263
   16        279.890      255.604
   17        286.843      261.319
   18        293.484      267.393
   19        299.796      273.808
   20        305.762      280.547
   21        311.363      287.592
   22        313.080      290.000
Circle Center At X =   175.023 ; Y =   390.098 ; and Radius =   170.526
       Factor of Safety
      ***    1.574    ***
Failure Surface Specified By 22 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        153.000      221.000
    2        161.952      220.076
    3        170.941      219.625
    4        179.941      219.648
    5        188.927      220.146
    6        197.875      221.117
    7        206.759      222.557
    8        215.554      224.464
    9        224.237      226.832
   10        232.783      229.655
   11        241.169      232.923
   12        249.370      236.629
   13        257.365      240.762
```



```
   14        265.131      245.311
   15        272.646      250.263
   16        279.890      255.604
   17        286.843      261.319
   18        293.484      267.393
   19        299.796      273.808
   20        305.762      280.547
   21        311.363      287.592
   22        313.080      290.000
Circle Center At X =   175.023 ; Y =   390.098 ; and Radius =   170.526
       Factor of Safety
      ***    1.574    ***
Failure Surface Specified By 22 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        153.000      221.000
    2        161.952      220.076
    3        170.941      219.625
    4        179.941      219.648
    5        188.927      220.146
    6        197.875      221.117
    7        206.759      222.557
    8        215.554      224.464
    9        224.237      226.832
   10        232.783      229.655
   11        241.169      232.923
   12        249.370      236.629
   13        257.365      240.762
   14        265.131      245.311
   15        272.646      250.263
   16        279.890      255.604
   17        286.843      261.319
   18        293.484      267.393
   19        299.796      273.808
   20        305.762      280.547
   21        311.363      287.592
   22        313.080      290.000
Circle Center At X =   175.023 ; Y =   390.098 ; and Radius =   170.526
       Factor of Safety
      ***    1.574    ***
Failure Surface Specified By 23 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        153.000      221.000
    2        161.980      220.395
    3        170.978      220.203
    4        179.975      220.426
    5        188.952      221.062
    6        197.891      222.110
    7        206.772      223.568
    8        215.577      225.433
    9        224.286      227.701
   10        232.882      230.367
   11        241.347      233.426
   12        249.661      236.871
   13        257.809      240.694
   14        265.772      244.888
   15        273.534      249.444
   16        281.078      254.352
   17        288.388      259.602
   18        295.449      265.182
   19        302.246      271.081
   20        308.765      277.287
   21        314.991      283.786
   22        320.912      290.564
   23        324.440      295.000
Circle Center At X =   170.641 ; Y =   415.851 ; and Radius =   195.648
       Factor of Safety
      ***    1.578    ***
Failure Surface Specified By 23 Coordinate Points
```

Point No.	X-Surf (ft)	Y-Surf (ft)
1	153.000	221.000
2	161.980	220.395
3	170.978	220.203
4	179.975	220.426
5	188.952	221.062
6	197.891	222.110
7	206.772	223.568
8	215.577	225.433
9	224.286	227.701
10	232.882	230.367
11	241.347	233.426
12	249.661	236.871
13	257.809	240.694
14	265.772	244.888
15	273.534	249.444
16	281.078	254.352
17	288.388	259.602
18	295.449	265.182
19	302.246	271.081
20	308.765	277.287
21	314.991	283.786
22	320.912	290.564
23	324.440	295.000

Circle Center At X = 170.641 ; Y = 415.851 ; and Radius = 195.648

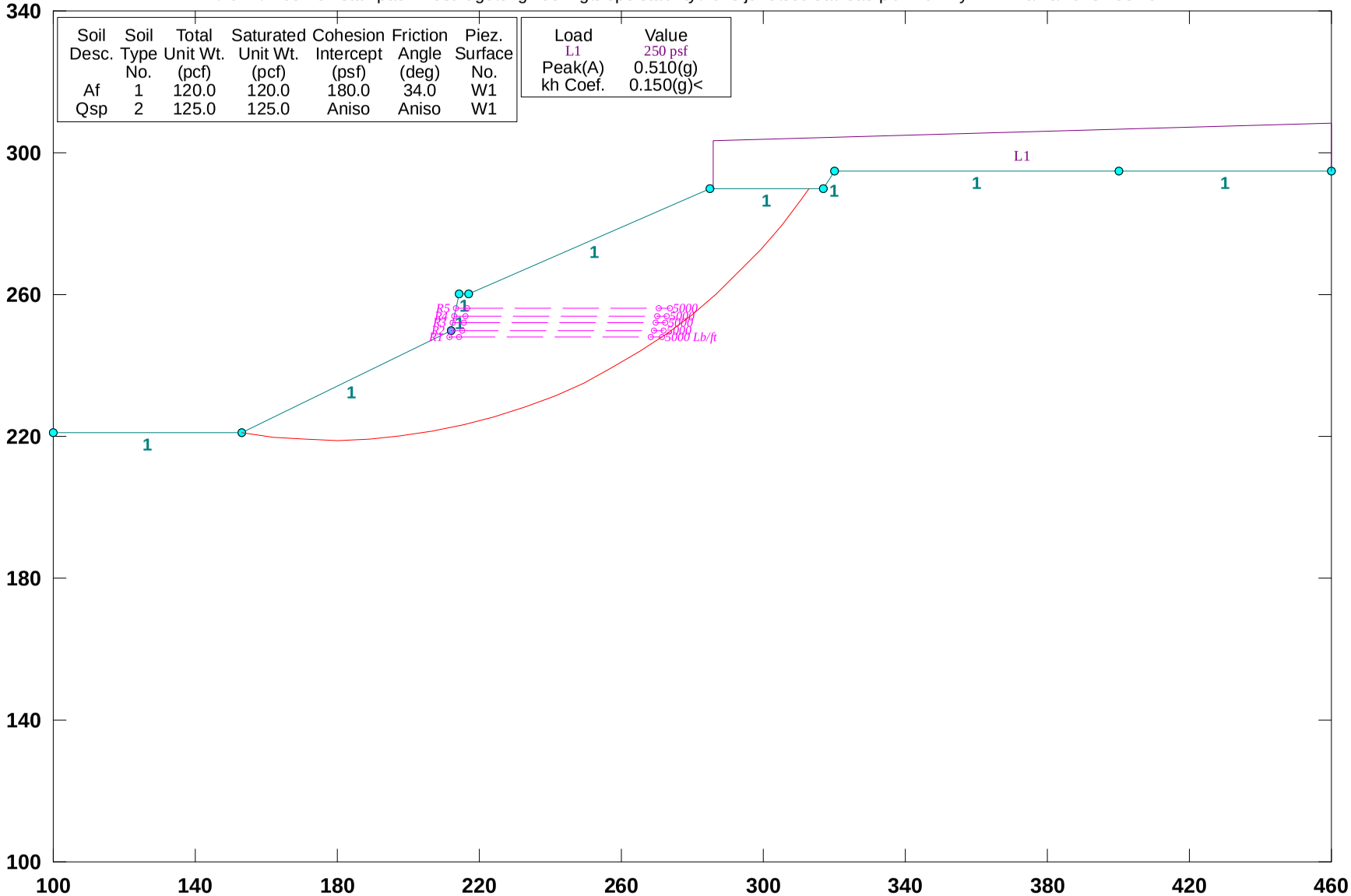
Factor of Safety

*** 1.578 ***

**** END OF GSTABL7 OUTPUT ****

Westridge/14057-01/Sec 3A-3A' - 6/11 Design / Lower Slope MSE - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 3a\x3ae.plt Run By: BTZ 6/18/2015 08:29AM



GSTABL7 v.2 FSmin=1.35

Factor Of Safety Is Calculated By The Modified Bishop Method

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                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
             (All Rights Reserved-Unauthorized Use Prohibited)
 ******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
 ******************************************************************************
 Analysis Run Date:        6/18/2015
 Time of Run:              08:29AM
 Run By:                   BTZ
 Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3A\x3ae.in
 Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3A\x3ae.OUT
 Unit System:              English
 Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 3A\x3ae.PLT
 PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 3A-3A' - 6/11
                       Design / Lower Slope MSE - Seismic
 BOUNDARY COORDINATES
     9 Top   Boundaries
     9 Total Boundaries
 Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
    No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
     1        100.00     221.00     153.00     221.00        1
     2        153.00     221.00     212.00     250.00        1
     3        212.00     250.00     214.50     260.00        1
     4        214.50     260.00     217.00     260.00        1
     5        217.00     260.00     285.00     290.00        1
     6        285.00     290.00     317.00     290.00        1
     7        317.00     290.00     320.00     295.00        1
     8        320.00     295.00     400.00     295.00        1
     9        400.00     295.00     460.00     295.00        1
 User Specified Y-Origin =       100.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  2 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
   1   120.0    120.0     180.0     34.0    0.00       0.0      1
   2   125.0    125.0     500.0     34.0    0.00       0.0      1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept       Angle
    No.            (deg)            (psf)         (deg)
     1              7.0             500.00         34.00
     2             12.0             200.00         27.00
     3             90.0             500.00         34.00
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
BOUNDARY LOAD(S)
     1 Load(s) Specified
 Load        X-Left      X-Right     Intensity     Deflection
  No.         (ft)         (ft)        (psf)          (deg)
```



```
   1         286.00       460.00        250.0          0.0
 NOTE - Intensity Is Specified As A Uniformly Distributed
        Force Acting On A Horizontally Projected Surface.
 Specified Peak Ground Acceleration Coefficient (A) =   0.510(g)
 Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
 Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
 Specified Seismic Pore-Pressure Factor =   0.000
REINFORCING LAYER(S)
     5 REINFORCING LAYER(S) SPECIFIED
 REINFORCING LAYER NO.   1
   4 POINTS DEFINE THIS LAYER
      POINT     X-COORD   Y-COORD   FORCE   INCLINATION
       NO.                                    FACTOR
        1       211.50    248.00      0.00     0.000
        2       214.50    248.00   5000.00     0.000
        3       268.50    248.00   5000.00     0.000
        4       271.50    248.00      0.00     0.000
 REINFORCING LAYER NO.   2
   4 POINTS DEFINE THIS LAYER
      POINT     X-COORD   Y-COORD   FORCE   INCLINATION
       NO.                                    FACTOR
        1       212.00    250.00      0.00     0.000
        2       215.00    250.00   5000.00     0.000
        3       269.00    250.00   5000.00     0.000
        4       272.00    250.00      0.00     0.000
 REINFORCING LAYER NO.   3
   4 POINTS DEFINE THIS LAYER
      POINT     X-COORD   Y-COORD   FORCE   INCLINATION
       NO.                                    FACTOR
        1       212.50    252.00      0.00     0.000
        2       215.50    252.00   5000.00     0.000
        3       269.50    252.00   5000.00     0.000
        4       272.50    252.00      0.00     0.000
 REINFORCING LAYER NO.   4
   4 POINTS DEFINE THIS LAYER
      POINT     X-COORD   Y-COORD   FORCE   INCLINATION
       NO.                                    FACTOR
        1       213.00    254.00      0.00     0.000
        2       216.00    254.00   5000.00     0.000
        3       270.00    254.00   5000.00     0.000
        4       273.00    254.00      0.00     0.000
 REINFORCING LAYER NO.   5
   4 POINTS DEFINE THIS LAYER
      POINT     X-COORD   Y-COORD   FORCE   INCLINATION
       NO.                                    FACTOR
        1       213.50    256.00      0.00     0.000
        2       216.50    256.00   5000.00     0.000
        3       270.50    256.00   5000.00     0.000
        4       273.50    256.00      0.00     0.000
 Trial Failure Surface Specified By 22 Coordinate Points
   Point      X-Surf      Y-Surf
    No.        (ft)        (ft)
     1       153.000     221.000
     2       161.922     219.815
     3       170.895     219.128
     4       179.893     218.940
     5       188.888     219.253
     6       197.851     220.064
     7       206.756     221.373
     8       215.574     223.174
     9       224.278     225.462
    10       232.842     228.230
    11       241.239     231.469
    12       249.442     235.170
    13       257.428     239.321
    14       265.171     243.909
    15       272.647     248.920
    16       279.832     254.339
    17       286.706     260.149
    18       293.247     266.331
```

19	299.434	272.867
20	305.248	279.737
21	310.671	286.919
22	312.739	290.000

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

Angle/Segment No.	Deflection(Deg)	Segment Length(ft)
1	3.19	9.00
2	3.18	9.00
3	3.19	9.00
4	3.18	9.00
5	3.19	9.00
6	3.18	9.00
7	3.18	9.00
8	3.18	9.00
9	3.18	9.00
10	3.19	9.00
11	3.18	9.00
12	3.18	9.00
13	3.19	9.00
14	3.19	9.00
15	3.18	9.00
16	3.18	9.00
17	3.19	9.00
18	3.19	9.00
19	3.19	9.00

Circle Center At X = 178.795(ft) ; Y = 380.686(ft); and Radius = 161.756(ft)
* * Factor Of Safety Is Calculated By The Modified Bishop Method * *
Sum of Reinforcing Forces on Failure Surface = 312.27 (lbs)
Factor Of Safety For The Preceding Specified Surface = 1.346
The calculated factor of safety for the specified surface without piers/piles, reinforcement, soil nails, or applied forces = 1.344

Table 1 - Individual Data on the 26 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	8.9	2981.9	0.0	0.0	0.0	0.0	447.3	0.0	0.0
2	9.0	8742.4	0.0	0.0	0.0	0.0	1311.4	0.0	0.0
3	9.0	14008.0	0.0	0.0	0.0	0.0	2101.2	0.0	0.0
4	9.0	18708.9	0.0	0.0	0.0	0.0	2806.3	0.0	0.0
5	9.0	22784.8	0.0	0.0	0.0	0.0	3417.7	0.0	0.0
6	8.9	26197.1	0.0	0.0	0.0	0.0	3929.6	0.0	0.0
7	5.2	16866.4	0.0	0.0	0.0	0.0	2530.0	0.0	0.0
8	2.5	9690.2	0.0	0.0	0.0	0.0	1453.5	0.0	0.0
9	1.1	4760.3	0.0	0.0	0.0	0.0	714.0	0.0	0.0
10	1.4	6269.6	0.0	0.0	0.0	0.0	940.4	0.0	0.0
11	7.3	32401.7	0.0	0.0	0.0	0.0	4860.2	0.0	0.0
12	8.6	39312.9	0.0	0.0	0.0	0.0	5896.9	0.0	0.0
13	8.4	39289.8	0.0	0.0	0.0	0.0	5893.5	0.0	0.0
14	8.2	38570.8	0.0	0.0	0.0	0.0	5785.6	0.0	0.0
15	8.0	37210.3	0.0	0.0	0.0	0.0	5581.5	0.0	0.0
16	7.7	35242.2	0.0	0.0	0.0	0.0	5286.3	0.0	0.0
17	7.5	32732.7	0.0	0.0	0.0	0.0	4909.9	0.0	0.0
18	7.2	29750.7	0.0	0.0	0.0	0.0	4462.6	0.0	0.0
19	5.2	20054.1	0.0	0.0	0.0	0.0	3008.1	0.0	0.0
20	1.0	3704.4	0.0	0.0	0.0	0.0	555.7	0.0	0.0
21	0.7	2554.3	0.0	0.0	0.0	0.0	383.2	0.0	176.5
22	6.5	21004.4	0.0	0.0	0.0	0.0	3150.7	0.0	1635.2
23	6.2	15146.5	0.0	0.0	0.0	0.0	2272.0	0.0	1546.7
24	5.8	9556.9	0.0	0.0	0.0	0.0	1433.5	0.0	1453.5
25	5.4	4341.9	0.0	0.0	0.0	0.0	651.3	0.0	1355.8
26	2.1	382.3	0.0	0.0	0.0	0.0	57.3	0.0	517.0

Table 2 - Base Stress Data on the 26 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-7.57	157.46	9.00	434.87	5.22
2	-4.38	166.41	9.00	871.58	67.48
3	-1.20	175.39	9.00	1244.46	191.54
4	1.99	184.39	9.00	1557.46	367.20

5	5.17	193.37	9.00	1814.36	581.50
6	8.36	202.30	9.00	2017.82	822.16
7	11.54	209.38	5.35	2133.35	1054.57
8	11.54	213.25	2.55	2537.43	1261.20
9	11.54	215.04	1.10	2878.09	1432.85
10	14.73	216.29	1.47	2782.02	1625.66
11	14.73	220.64	7.53	2815.05	1645.21
12	17.91	228.56	9.00	2822.15	1889.34
13	21.09	237.04	9.00	2798.07	2103.12
14	24.28	245.34	9.00	2735.80	2270.80
15	27.46	253.43	9.00	2638.29	2382.57
16	30.65	261.30	9.00	2507.85	2432.52
17	33.83	268.91	9.00	2347.17	2416.61
18	37.02	276.24	9.00	2159.01	2333.62
19	40.20	282.42	6.77	1966.39	2208.19
20	40.20	285.50	1.31	1882.94	2109.96
21	40.20	286.35	0.92	1960.46	2184.86
22	43.38	289.98	9.00	1707.51	1953.31
23	46.57	296.34	9.00	1308.44	1504.66
24	49.76	302.34	9.00	915.86	1030.00
25	52.94	307.96	9.00	534.44	547.37
26	56.13	311.71	3.71	271.13	209.76

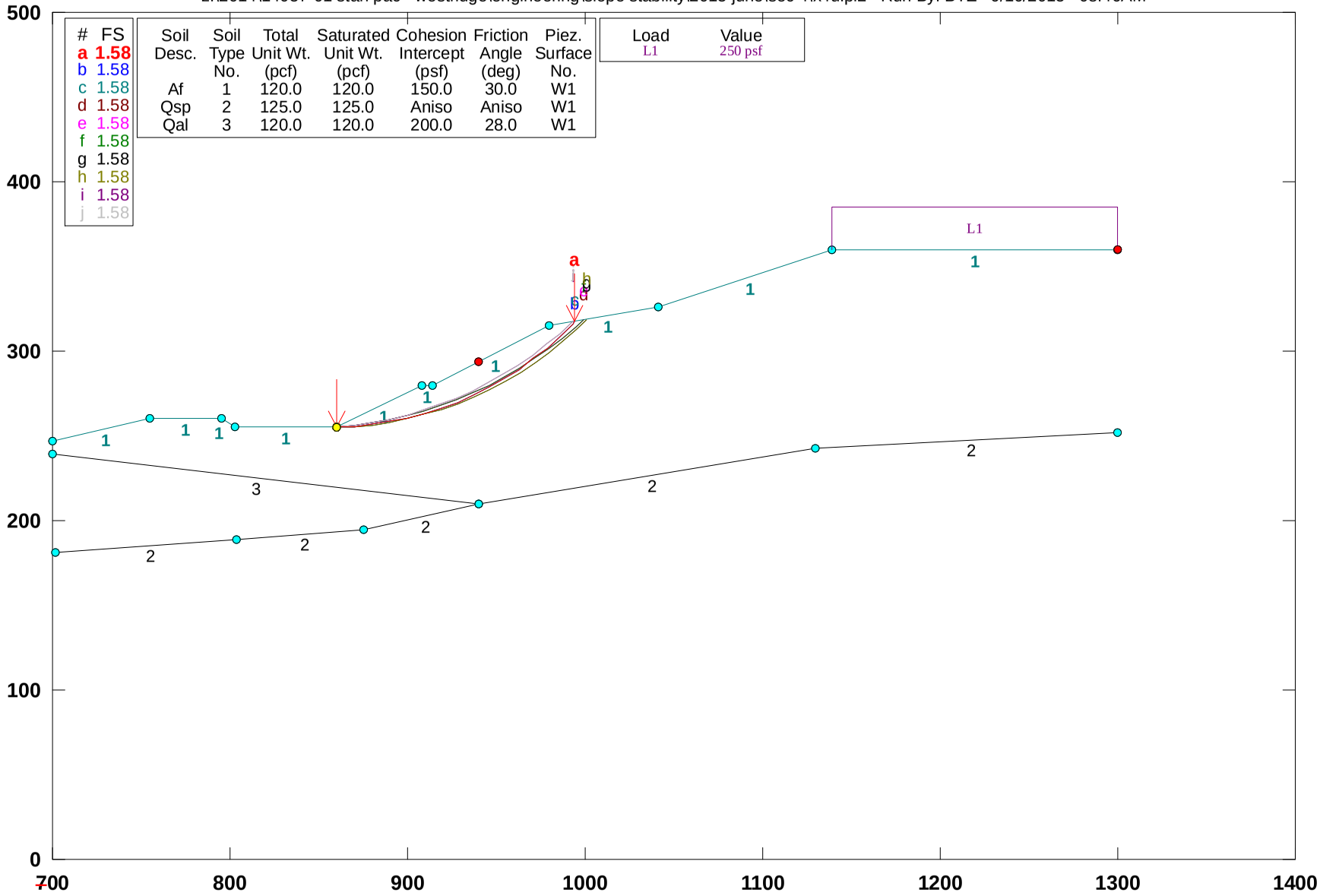
NOTE: Pier/Pile, reinforcement, soil nail, and applied forces (if applicable) are included in the Available Shear values in Table 2 by uniform distribution on each slice base, based upon the converged factor of safety.
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing Soil Nail, and Applied Forces if applicable) = 338815.09 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing, Soil Nail, and Applied Forces if applicable) = 1844.29(psf)
Sum of the Driving Forces = 251803.61 (lbs)
Average Mobilized Shear Stress = 1370.66(psf)
Total length of the failure surface = 183.71(ft)
CAUTION - Factor Of Safety Is Calculated By The Modified Bishop Method. This Method Is Valid Only If The Failure Surface Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3241(g)
Calculated Newmark Seismic Displacement = 0.123(ft)
Non-Symmetrical Sliding Resistance Has Been Specified for Downhill Sliding.

**** END OF GSTABL7 OUTPUT ****

Westridge/14057-01/Sec 4-4'/ 6/11 Design- Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 4\x4u.pl2 Run By: BTZ 6/16/2015 08:46AM



GSTABL7 v.2 FSmin=1.58

Safety Factors Are Calculated By The Modified Bishop Method

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                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
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    Analysis Run Date:        6/16/2015
    Time of Run:              08:46AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 4\x4u.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 4\x4u.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 4\x4u.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 4-4'/ 6/11 Design
                           - Upper Slope - Static
    BOUNDARY COORDINATES
       10 Top   Boundaries
       16 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        700.00     247.00     755.00     260.00        1
        2        755.00     260.00     795.00     260.00        1
        3        795.00     260.00     803.00     255.00        1
        4        803.00     255.00     860.00     255.00        1
        5        860.00     255.00     908.00     280.00        1
        6        908.00     280.00     914.00     280.00        1
        7        914.00     280.00     980.00     315.00        1
        8        980.00     315.00    1041.00     326.00        1
        9       1041.00     326.00    1139.00     360.00        1
       10       1139.00     360.00    1300.00     360.00        1
       11        700.00     239.00     940.00     210.00        3
       12        940.00     210.00    1130.00     243.00        2
       13       1130.00     243.00    1300.00     252.00        2
       14        702.00     181.00     804.00     189.00        2
       15        804.00     189.00     875.00     195.00        2
       16        875.00     195.00     940.00     210.00        2
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     3 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     300.0     32.0    0.00       0.0      1
      3   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept      Angle
       No.            (deg)            (psf)         (deg)
        1              7.0             300.00         32.00
        2             14.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
```



```
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)         (ft)        (psf)          (deg)
      1        1139.00      1300.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Circular Surfaces, Has Been Specified.
   15000 Trial Surfaces Have Been Generated.
     500 Surface(s) Initiate(s) From Each Of    30 Points Equally Spaced
    Along The Ground Surface Between  X = 860.00(ft)
                                  and  X = 860.00(ft)
    Each Surface Terminates Between   X = 940.00(ft)
                                  and   X =1300.00(ft)
    Unless Further Limitations Were Imposed, The Minimum Elevation
    At Which A Surface Extends Is  Y =      0.00(ft)
    10.00(ft) Line Segments Define Each Trial Failure Surface.
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Evaluated. They Are
          Ordered - Most Critical First.
          * * Safety Factors Are Calculated By The Modified Bishop Method * *
          Total Number of Trial Surfaces Attempted =     0
          Number of Trial Surfaces With Valid FS =    0
          Statistical Data On All Valid FS Values:
             FS Max =   0.000   FS Min = 500.000   FS Ave =  NaN
             Standard Deviation =    0.000   Coefficient of Variation =  NaN    %
          Failure Surface Specified By 17 Coordinate Points
            Point       X-Surf       Y-Surf
             No.         (ft)         (ft)
              1        860.000      255.000
              2        869.984      255.567
              3        879.924      256.664
              4        889.791      258.288
              5        899.558      260.434
              6        909.197      263.096
              7        918.681      266.267
              8        927.983      269.937
              9        937.077      274.097
             10        945.937      278.734
             11        954.537      283.836
             12        962.855      289.387
             13        970.865      295.373
             14        978.546      301.777
             15        985.876      308.579
             16        992.834      315.762
             17        994.437      317.603
          Circle Center At X =   854.332 ; Y =   442.968 ; and Radius =   188.054
                Factor of Safety
              ***    1.576    ***
             Individual data on the     0  slices
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
          Failure Surface Specified By 17 Coordinate Points
            Point       X-Surf       Y-Surf
             No.         (ft)         (ft)
              1        860.000      255.000
              2        869.984      255.567
              3        879.924      256.664
              4        889.791      258.288
              5        899.558      260.434
              6        909.197      263.096
              7        918.681      266.267
              8        927.983      269.937
```

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    9        937.077      274.097
   10        945.937      278.734
   11        954.537      283.836
   12        962.855      289.387
   13        970.865      295.373
   14        978.546      301.777
   15        985.876      308.579
   16        992.834      315.762
   17        994.437      317.603
Circle Center At X =   854.332 ; Y =   442.968 ; and Radius =   188.054
       Factor of Safety
      ***    1.576   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        860.000      255.000
    2        869.984      255.567
    3        879.924      256.664
    4        889.791      258.288
    5        899.558      260.434
    6        909.197      263.096
    7        918.681      266.267
    8        927.983      269.937
    9        937.077      274.097
   10        945.937      278.734
   11        954.537      283.836
   12        962.855      289.387
   13        970.865      295.373
   14        978.546      301.777
   15        985.876      308.579
   16        992.834      315.762
   17        994.437      317.603
Circle Center At X =   854.332 ; Y =   442.968 ; and Radius =   188.054
       Factor of Safety
      ***    1.576   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        860.000      255.000
    2        869.946      256.034
    3        879.837      257.510
    4        889.652      259.425
    5        899.372      261.775
    6        908.977      264.555
    7        918.450      267.761
    8        927.770      271.385
    9        936.919      275.421
   10        945.880      279.861
   11        954.634      284.695
   12        963.164      289.914
   13        971.453      295.507
   14        979.485      301.465
   15        987.243      307.774
   16        994.713      314.423
   17        998.787      318.388
Circle Center At X =   841.770 ; Y =   478.740 ; and Radius =   224.481
       Factor of Safety
      ***    1.581   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        860.000      255.000
    2        869.946      256.034
    3        879.837      257.510
    4        889.652      259.425
    5        899.372      261.775
    6        908.977      264.555
    7        918.450      267.761
    8        927.770      271.385
    9        936.919      275.421
```



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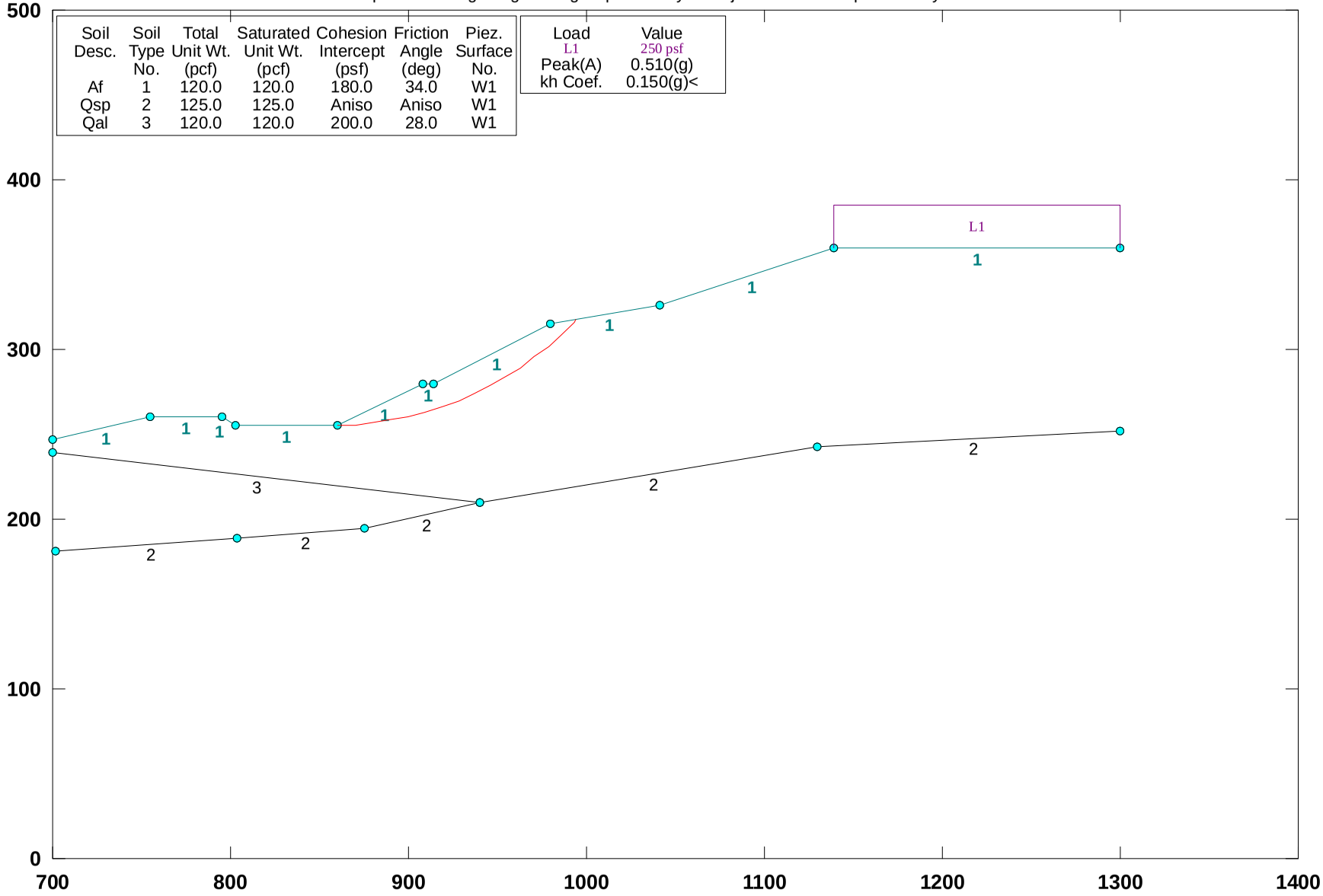
   10        945.880      279.861
   11        954.634      284.695
   12        963.164      289.914
   13        971.453      295.507
   14        979.485      301.465
   15        987.243      307.774
   16        994.713      314.423
   17        998.787      318.388
Circle Center At X =   841.770 ; Y =   478.740 ; and Radius =   224.481
       Factor of Safety
      ***    1.581   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        860.000      255.000
    2        869.946      256.034
    3        879.837      257.510
    4        889.652      259.425
    5        899.372      261.775
    6        908.977      264.555
    7        918.450      267.761
    8        927.770      271.385
    9        936.919      275.421
   10        945.880      279.861
   11        954.634      284.695
   12        963.164      289.914
   13        971.453      295.507
   14        979.485      301.465
   15        987.243      307.774
   16        994.713      314.423
   17        998.787      318.388
Circle Center At X =   841.770 ; Y =   478.740 ; and Radius =   224.481
       Factor of Safety
      ***    1.581   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        860.000      255.000
    2        869.988      255.499
    3        879.937      256.502
    4        889.823      258.005
    5        899.621      260.006
    6        909.306      262.499
    7        918.852      265.477
    8        928.236      268.933
    9        937.433      272.859
   10        946.420      277.244
   11        955.175      282.076
   12        963.674      287.345
   13        971.897      293.036
   14        979.822      299.134
   15        987.430      305.625
   16        994.699      312.492
   17       1000.667      318.727
Circle Center At X =   855.110 ; Y =   452.999 ; and Radius =   198.060
       Factor of Safety
      ***    1.581   ***
Failure Surface Specified By 17 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        860.000      255.000
    2        869.988      255.499
    3        879.937      256.502
    4        889.823      258.005
    5        899.621      260.006
    6        909.306      262.499
    7        918.852      265.477
    8        928.236      268.933
    9        937.433      272.859
   10        946.420      277.244
```

```
   11        955.175      282.076
   12        963.674      287.345
   13        971.897      293.036
   14        979.822      299.134
   15        987.430      305.625
   16        994.699      312.492
   17       1000.667      318.727
Circle Center At X =   855.110 ; Y =   452.999 ; and Radius =   198.060
       Factor of Safety
      ***    1.581   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        860.000      255.000
    2        869.939      256.104
    3        879.815      257.671
    4        889.608      259.699
    5        899.294      262.183
    6        908.854      265.117
    7        918.266      268.496
    8        927.509      272.311
    9        936.564      276.555
   10        945.411      281.218
   11        954.029      286.289
   12        962.401      291.759
   13        970.508      297.614
   14        978.331      303.842
   15        985.855      310.429
   16        993.055      317.354
Circle Center At X =   841.398 ; Y =   467.831 ; and Radius =   213.642
       Factor of Safety
      ***    1.582   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        860.000      255.000
    2        869.939      256.104
    3        879.815      257.671
    4        889.608      259.699
    5        899.294      262.183
    6        908.854      265.117
    7        918.266      268.496
    8        927.509      272.311
    9        936.564      276.555
   10        945.411      281.218
   11        954.029      286.289
   12        962.401      291.759
   13        970.508      297.614
   14        978.331      303.842
   15        985.855      310.429
   16        993.055      317.354
Circle Center At X =   841.398 ; Y =   467.831 ; and Radius =   213.642
       Factor of Safety
      ***    1.582   ***
          **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 4-4'/ 6/11 Design- Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 4\x4ue.plt Run By: BTZ 6/18/2015 11:16AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qsp	2	125.0	125.0	Aniso	Aniso	W1
Qal	3	120.0	120.0	200.0	28.0	W1

Load	Value
L1	250 psf
Peak(A)	0.510(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.34

Factor Of Safety Is Calculated By The Modified Bishop Method

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                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
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   Time of Run:              11:16AM
   Run By:                   BTZ
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ility\2015 June\Sec 4\x4ue.in
   Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 4\x4ue.OUT
   Unit System:              English
   Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 4\x4ue.PLT
   PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 4-4'/ 6/11 Design
                          - Upper Slope - Seismic
   BOUNDARY COORDINATES
      10 Top   Boundaries
      16 Total Boundaries
   Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
      No.         (ft)       (ft)       (ft)       (ft)     Below Bnd
       1        700.00     247.00     755.00     260.00        1
       2        755.00     260.00     795.00     260.00        1
       3        795.00     260.00     803.00     255.00        1
       4        803.00     255.00     860.00     255.00        1
       5        860.00     255.00     908.00     280.00        1
       6        908.00     280.00     914.00     280.00        1
       7        914.00     280.00     980.00     315.00        1
       8        980.00     315.00    1041.00     326.00        1
       9       1041.00     326.00    1139.00     360.00        1
      10       1139.00     360.00    1300.00     360.00        1
      11        700.00     239.00     940.00     210.00        3
      12        940.00     210.00    1130.00     243.00        2
      13       1130.00     243.00    1300.00     252.00        2
      14        702.00     181.00     804.00     189.00        2
      15        804.00     189.00     875.00     195.00        2
      16        875.00     195.00     940.00     210.00        2
   Default Y-Origin = 0.00(ft)
   Default X-Plus Value = 0.00(ft)
   Default Y-Plus Value = 0.00(ft)
  ISOTROPIC SOIL PARAMETERS
    3 Type(s) of Soil
   Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
   Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
    No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
     1   120.0    120.0     180.0     34.0    0.00       0.0      1
     2   125.0    125.0     500.0     34.0    0.00       0.0      1
     3   120.0    120.0     200.0     28.0    0.00       0.0      1
  ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
   Soil Type  2 Is Anisotropic
   Number Of Direction Ranges Specified =  3
   Direction    Counterclockwise     Cohesion     Friction
     Range       Direction Limit    Intercept       Angle
      No.            (deg)            (psf)         (deg)
       1              7.0             500.00         34.00
       2             14.0             200.00         27.00
       3             90.0             500.00         34.00
   ANISOTROPIC SOIL NOTES:
      (1) An input value of 0.01 for C and/or Phi will cause Aniso
          C and/or Phi to be ignored in that range.
```



```
      (2) An input value of 0.02 for Phi will set both Phi and
          C equal to zero, with no water weight in the tension crack.
      (3) An input value of 0.03 for Phi will set both Phi and
          C equal to zero, with water weight in the tension crack.
  BOUNDARY LOAD(S)
       1 Load(s) Specified
   Load        X-Left      X-Right     Intensity     Deflection
    No.         (ft)         (ft)        (psf)          (deg)
     1        1139.00      1300.00       250.0           0.0
   NOTE - Intensity Is Specified As A Uniformly Distributed
          Force Acting On A Horizontally Projected Surface.
   Specified Peak Ground Acceleration Coefficient (A) =   0.510(g)
   Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
   Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
   Specified Seismic Pore-Pressure Factor =   0.000
   Trial Failure Surface Specified By 17 Coordinate Points
     Point      X-Surf      Y-Surf
      No.        (ft)        (ft)
       1        860.000     255.000
       2        869.984     255.567
       3        879.924     256.664
       4        889.791     258.288
       5        899.558     260.434
       6        909.197     263.096
       7        918.681     266.267
       8        927.983     269.937
       9        937.077     274.097
      10        945.937     278.734
      11        954.537     283.836
      12        962.855     289.387
      13        970.865     295.373
      14        978.546     301.777
      15        985.876     308.579
      16        992.834     315.762
      17        994.437     317.603
DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)
    Angle/Segment No.   Deflection(Deg)   Segment Length(ft)
           1                 3.05               10.00
           2                 3.05               10.00
           3                 3.05               10.00
           4                 3.05               10.00
           5                 3.05               10.00
           6                 3.04               10.00
           7                 3.05               10.00
           8                 3.04               10.00
           9                 3.05               10.00
          10                 3.04               10.00
          11                 3.05               10.00
          12                 3.05               10.00
          13                 3.04               10.00
          14                 3.05               10.00
   Circle Center At X =   854.333(ft) ; Y =   442.966(ft); and Radius =   188.051(ft)
   * * Factor Of Safety Is Calculated By The Modified Bishop Method * *
   Factor Of Safety For The Preceding Specified Surface =  1.337
        ***Table 1 - Individual Data on the   19 Slices***
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)  (lbs)
  1     10.0    2775.4     0.0     0.0      0.0     0.0   416.3     0.0      0.0
  2      9.9    7959.7     0.0     0.0      0.0     0.0  1194.0     0.0      0.0
  3      9.9   12397.6     0.0     0.0      0.0     0.0  1859.6     0.0      0.0
  4      9.8   16055.3     0.0     0.0      0.0     0.0  2408.3     0.0      0.0
  5      8.4   16413.1     0.0     0.0      0.0     0.0  2462.0     0.0      0.0
  6      1.2    2451.9     0.0     0.0      0.0     0.0   367.8     0.0      0.0
  7      4.8    9280.0     0.0     0.0      0.0     0.0  1392.0     0.0      0.0
  8      4.7    8850.8     0.0     0.0      0.0     0.0  1327.6     0.0      0.0
  9      9.3   18805.2     0.0     0.0      0.0     0.0  2820.8     0.0      0.0
 10      9.1   19435.2     0.0     0.0      0.0     0.0  2915.3     0.0      0.0
 11      8.9   19320.1     0.0     0.0      0.0     0.0  2898.0     0.0      0.0
```

12	8.6	18505.4	0.0	0.0	0.0	0.0	2775.8	0.0	0.0
13	8.3	17059.4	0.0	0.0	0.0	0.0	2558.9	0.0	0.0
14	8.0	15044.6	0.0	0.0	0.0	0.0	2256.7	0.0	0.0
15	7.7	12551.3	0.0	0.0	0.0	0.0	1882.7	0.0	0.0
16	1.5	2122.2	0.0	0.0	0.0	0.0	318.3	0.0	0.0
17	5.9	6823.5	0.0	0.0	0.0	0.0	1023.5	0.0	0.0
18	7.0	3771.1	0.0	0.0	0.0	0.0	565.7	0.0	0.0
19	1.6	149.3	0.0	0.0	0.0	0.0	22.4	0.0	0.0

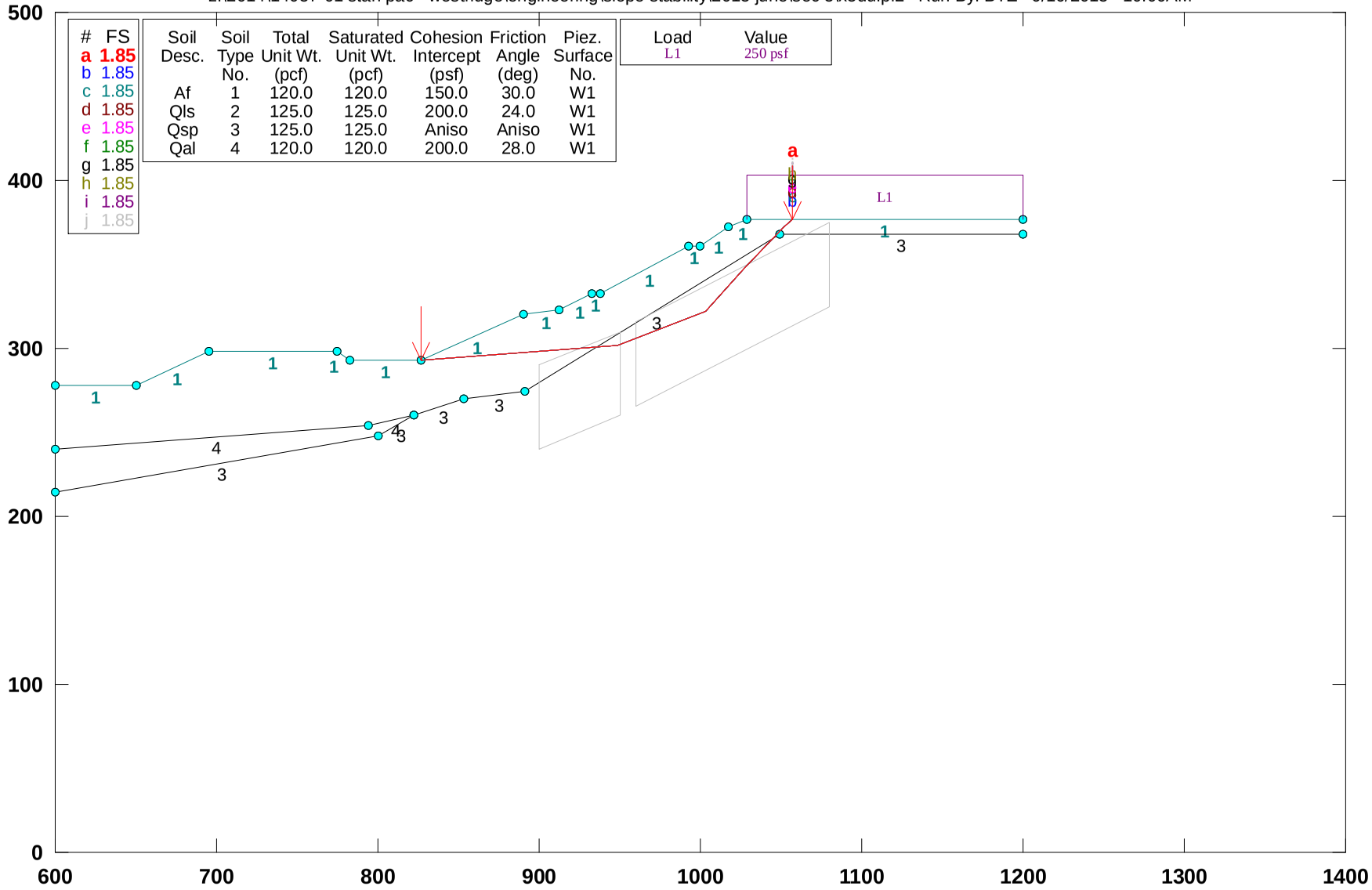
Table 2 - Base Stress Data on the 19 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	3.25	864.99	10.00	357.27	57.04
2	6.30	874.95	10.00	682.16	203.86
3	9.35	884.86	10.00	948.75	379.67
4	12.39	894.67	10.00	1160.22	571.00
5	15.44	903.78	8.76	1309.07	757.74
6	15.44	908.60	1.24	1370.69	797.63
7	18.49	911.60	5.06	1269.22	829.97
8	18.49	916.34	4.94	1245.37	812.46
9	21.53	923.33	10.00	1287.43	939.93
10	24.58	932.53	10.00	1317.56	1059.75
11	27.63	941.51	10.00	1306.09	1138.61
12	30.68	950.24	10.00	1255.70	1169.75
13	33.72	958.70	10.00	1169.69	1148.16
14	36.77	966.86	10.00	1050.83	1072.02
15	39.82	974.71	10.00	902.65	941.50
16	42.86	979.27	1.98	793.24	840.18
17	42.86	982.94	8.02	656.19	669.32
18	45.91	989.35	10.00	358.78	309.53
19	48.96	993.64	2.44	153.75	52.13

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 151008.19 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 990.60(psf)
Sum of the Driving Forces = 112907.55 (lbs)
Average Mobilized Shear Stress = 740.66(psf)
Total length of the failure surface = 152.44(ft)
CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3136(g)
Calculated Newmark Seismic Displacement = 0.131(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
**** END OF GSTABL7 OUTPUT ****

Westridge/14057-01/Sec 5-5'/ 6/11 Design- Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 5\x5du.pl2 Run By: BTZ 6/16/2015 10:00AM



GSTABL7 v.2 FSmin=1.85

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                          SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        6/16/2015
    Time of Run:              10:00AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 5\x5du.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 5\x5du.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 5\x5du.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 5-5'/ 6/11 Design
                          - Upper Slope - Static
    BOUNDARY COORDINATES
       14 Top   Boundaries
       22 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        600.00     278.00     650.00     278.00        1
        2        650.00     278.00     695.00     298.00        1
        3        695.00     298.00     775.00     298.00        1
        4        775.00     298.00     783.00     293.00        1
        5        783.00     293.00     827.00     293.00        1
        6        827.00     293.00     890.00     320.00        1
        7        890.00     320.00     912.00     323.00        1
        8        912.00     323.00     933.00     333.00        1
        9        933.00     333.00     938.00     333.00        1
       10        938.00     333.00     993.00     361.00        1
       11        993.00     361.00    1000.00     361.00        1
       12       1000.00     361.00    1017.00     372.00        1
       13       1017.00     372.00    1029.00     377.00        1
       14       1029.00     377.00    1200.00     377.00        1
       15        600.00     240.00     794.00     254.00        4
       16        794.00     254.00     822.00     260.00        4
       17        822.00     260.00     853.00     270.00        3
       18        853.00     270.00     891.00     274.00        3
       19        891.00     274.00    1049.00     368.00        3
       20       1049.00     368.00    1200.00     368.00        3
       21        600.00     214.00     800.00     248.00        3
       22        800.00     248.00     822.00     260.00        3
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
```



```
       No.            (deg)            (psf)         (deg)
        1               7.0             300.00         32.00
        2              22.0             200.00         27.00
        3              90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)         (ft)        (psf)          (deg)
      1        1029.00      1200.00        250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Janbus Empirical Coef is being used for the case of  c & phi both > 0
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Sliding Block Surfaces, Has Been
    Specified.
    9999 Trial Surfaces Have Been Generated.
    3 Boxes Specified For Generation Of Central Block Base
    Length Of Line Segments For Active And Passive Portions Of
    Sliding Block Is  35.0
    Box        X-Left     Y-Left    X-Right    Y-Right      Height
    No.         (ft)       (ft)       (ft)       (ft)        (ft)
     1         827.00     293.00     827.00     293.00       0.00
     2         900.00     265.00     950.00     285.00      50.00
     3         960.00     291.00    1080.00     350.00      50.00
    Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Evaluated. They Are
           Ordered - Most Critical First.
           * * Safety Factors Are Calculated By The Simplified Janbu Method * *
           Total Number of Trial Surfaces Attempted =  9999
           Number of Trial Failure Surfaces is Greater Than 5000.
           Statistical Data on FS Values are Not Generated.
           To Generate Stastical Data, Reduce Number of Trial
           Failure Surfaces to 5000 or less.
           Failure Surface Specified By  6 Coordinate Points
             Point       X-Surf       Y-Surf
              No.         (ft)         (ft)
               1        827.000      293.000
               2        948.605      302.151
               3       1003.235      322.130
               4       1027.331      347.514
               5       1052.026      372.316
               6       1056.703      377.000
                  Factor of Safety
                ***    1.854   ***
               Individual data on the    15  slices
                            Water  Water     Tie     Tie     Earthquake
                            Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight      Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)     (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1     63.0   84138.7     0.0    0.0       0.      0.     0.0     0.0      0.0
  2     22.0   60538.1     0.0    0.0       0.      0.     0.0     0.0      0.0
  3     21.0   70089.0     0.0    0.0       0.      0.     0.0     0.0      0.0
  4      3.8   14646.9     0.0    0.0       0.      0.     0.0     0.0      0.0
  5      1.2    4455.7     0.0    0.0       0.      0.     0.0     0.0      0.0
  6     10.6   43380.9     0.0    0.0       0.      0.     0.0     0.0      0.0
  7     44.4  212548.3     0.0    0.0       0.      0.     0.0     0.0      0.0
  8      7.0   35318.5     0.0    0.0       0.      0.     0.0     0.0      0.0
  9      3.2   16020.3     0.0    0.0       0.      0.     0.0     0.0      0.0
 10     13.8   64109.8     0.0    0.0       0.      0.     0.0     0.0      0.0
 11     10.3   40284.3     0.0    0.0       0.      0.     0.0     0.0      0.0
 12      1.7    5728.7     0.0    0.0       0.      0.     0.0     0.0      0.0
 13     16.9   39453.3     0.0    0.0       0.      0.     0.0     0.0   4220.1
 14      6.1    5730.0     0.0    0.0       0.      0.     0.0     0.0   1536.4
```

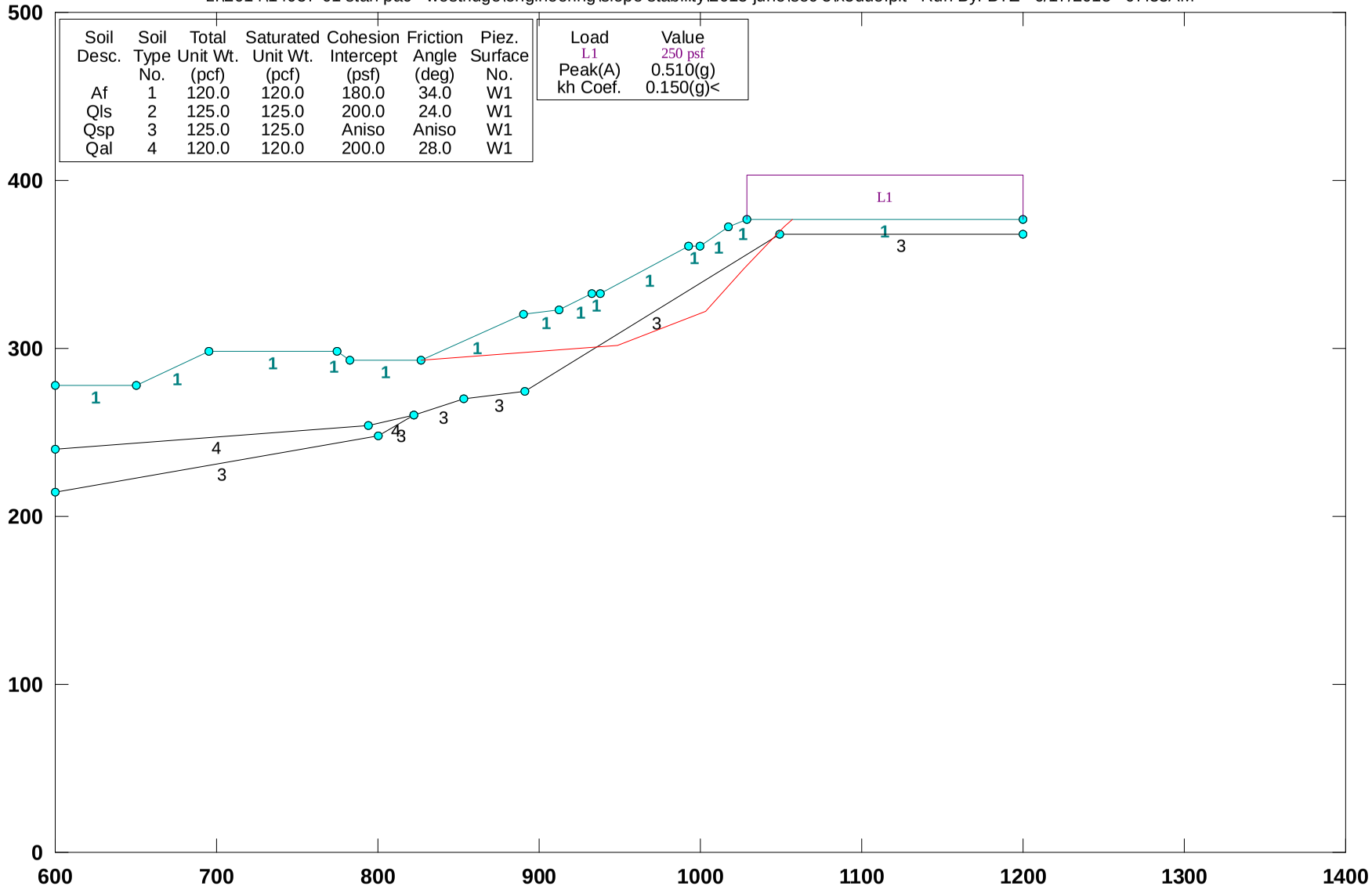
```
15      4.7    1314.2     0.0     0.0       0.      0.     0.0     0.0   1169.1
        Failure Surface Specified By  6 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        827.000      293.000
            2        948.605      302.151
            3       1003.235      322.130
            4       1027.331      347.514
            5       1052.026      372.316
            6       1056.703      377.000
               Factor of Safety
              ***    1.854   ***
        Failure Surface Specified By  6 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        827.000      293.000
            2        948.605      302.151
            3       1003.235      322.130
            4       1027.331      347.514
            5       1052.026      372.316
            6       1056.703      377.000
               Factor of Safety
              ***    1.854   ***
        Failure Surface Specified By  6 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        827.000      293.000
            2        948.605      302.151
            3       1003.235      322.130
            4       1027.331      347.514
            5       1052.026      372.316
            6       1056.703      377.000
               Factor of Safety
              ***    1.854   ***
        Failure Surface Specified By  6 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        827.000      293.000
            2        948.605      302.151
            3       1003.235      322.130
            4       1027.331      347.514
            5       1052.026      372.316
            6       1056.703      377.000
               Factor of Safety
              ***    1.854   ***
        Failure Surface Specified By  6 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        827.000      293.000
            2        948.605      302.151
            3       1003.235      322.130
            4       1027.331      347.514
            5       1052.026      372.316
            6       1056.703      377.000
               Factor of Safety
              ***    1.854   ***
        Failure Surface Specified By  6 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        827.000      293.000
            2        948.605      302.151
            3       1003.235      322.130
            4       1027.331      347.514
            5       1052.026      372.316
            6       1056.703      377.000
               Factor of Safety
              ***    1.854   ***
        Failure Surface Specified By  6 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
```



```
            1        827.000      293.000
            2        948.605      302.151
            3       1003.235      322.130
            4       1027.331      347.514
            5       1052.026      372.316
            6       1056.703      377.000
               Factor of Safety
              ***    1.854   ***
        Failure Surface Specified By  6 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        827.000      293.000
            2        948.605      302.151
            3       1003.235      322.130
            4       1027.331      347.514
            5       1052.026      372.316
            6       1056.703      377.000
               Factor of Safety
              ***    1.854   ***
        Failure Surface Specified By  6 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        827.000      293.000
            2        948.605      302.151
            3       1003.235      322.130
            4       1027.331      347.514
            5       1052.026      372.316
            6       1056.703      377.000
               Factor of Safety
              ***    1.854   ***
                 **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 5-5'/ 6/11 Design- Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 5\x5due.plt Run By: BTZ 6/17/2015 07:33AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qls	2	125.0	125.0	200.0	24.0	W1
Qsp	3	125.0	125.0	Aniso	Aniso	W1
Qal	4	120.0	120.0	200.0	28.0	W1

Load	Value
L1	250 psf
Peak(A)	0.510(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.44

Factor Of Safety Is Calculated By The Simplified Janbu Method

```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                           SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        6/17/2015
    Time of Run:              07:33AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 5\x5due.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 5\x5due.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 5\x5due.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 5-5'/ 6/11 Design
                          - Upper Slope - Seismic
    BOUNDARY COORDINATES
       14 Top   Boundaries
       22 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        600.00     278.00     650.00     278.00        1
        2        650.00     278.00     695.00     298.00        1
        3        695.00     298.00     775.00     298.00        1
        4        775.00     298.00     783.00     293.00        1
        5        783.00     293.00     827.00     293.00        1
        6        827.00     293.00     890.00     320.00        1
        7        890.00     320.00     912.00     323.00        1
        8        912.00     323.00     933.00     333.00        1
        9        933.00     333.00     938.00     333.00        1
       10        938.00     333.00     993.00     361.00        1
       11        993.00     361.00    1000.00     361.00        1
       12       1000.00     361.00    1017.00     372.00        1
       13       1017.00     372.00    1029.00     377.00        1
       14       1029.00     377.00    1200.00     377.00        1
       15        600.00     240.00     794.00     254.00        4
       16        794.00     254.00     822.00     260.00        4
       17        822.00     260.00     853.00     270.00        3
       18        853.00     270.00     891.00     274.00        3
       19        891.00     274.00    1049.00     368.00        3
       20       1049.00     368.00    1200.00     368.00        3
       21        600.00     214.00     800.00     248.00        3
       22        800.00     248.00     822.00     260.00        3
    Default Y-Origin = 0.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     500.0     34.0    0.00       0.0      1
      4   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  3 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
```



```
       No.            (deg)            (psf)         (deg)
        1               7.0            500.00         34.00
        2              22.0            200.00         27.00
        3              90.0            500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)        (ft)        (psf)          (deg)
      1        1029.00     1200.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.510(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
    Trial Failure Surface Specified By  6 Coordinate Points
      Point       X-Surf      Y-Surf
       No.         (ft)        (ft)
        1        827.000     293.000
        2        948.605     302.151
        3       1003.235     322.130
        4       1027.331     347.514
        5       1052.026     372.316
        6       1056.703     377.000
    Janbu's Empirical Coefficient (fo) =  1.055
    * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.441
         ***Table 1 - Individual Data on the   15 Slices***
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
 1      63.0   84139.6     0.0     0.0      0.0     0.0 12620.9     0.0      0.0
 2      22.0   60538.8     0.0     0.0      0.0     0.0  9080.8     0.0      0.0
 3      21.0   70089.9     0.0     0.0      0.0     0.0 10513.5     0.0      0.0
 4       3.8   14644.1     0.0     0.0      0.0     0.0  2196.6     0.0      0.0
 5       1.2    4458.8     0.0     0.0      0.0     0.0   668.8     0.0      0.0
 6      10.6   43379.9     0.0     0.0      0.0     0.0  6507.0     0.0      0.0
 7      44.4  212550.2     0.0     0.0      0.0     0.0 31882.5     0.0      0.0
 8       7.0   35318.3     0.0     0.0      0.0     0.0  5297.7     0.0      0.0
 9       3.2   16021.1     0.0     0.0      0.0     0.0  2403.2     0.0      0.0
10      13.8   64108.7     0.0     0.0      0.0     0.0  9616.3     0.0      0.0
11      10.3   40285.0     0.0     0.0      0.0     0.0  6042.8     0.0      0.0
12       1.7    5728.3     0.0     0.0      0.0     0.0   859.2     0.0      0.0
13      16.9   39454.5     0.0     0.0      0.0     0.0  5918.2     0.0   4220.3
14       6.1    5729.3     0.0     0.0      0.0     0.0   859.4     0.0   1536.2
15       4.7    1314.4     0.0     0.0      0.0     0.0   197.2     0.0   1169.3
         ***Table 2 - Base Stress Data on the   15 Slices***
Slice   Alpha     X-Coord.      Base          Available              Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength          Shear Stress
  *                 (ft)        (ft)           (psf)                  (psf)
 1        4.30     858.50       63.18          1047.00                299.99
 2        4.30     901.00       22.06          1972.35                618.09
 3        4.30     922.50       21.06          2355.14                749.68
 4        4.30     934.91        3.84          2673.93                859.27
 5        4.30     937.41        1.18          2970.15                854.55
 6        4.30     943.30       10.63          3157.07                918.80
 7       20.09     970.80       47.27          2488.52               2318.88
 8       20.09     996.50        7.45          2612.35               2443.73
 9       20.09    1001.62        3.44          2567.62               2398.62
10       46.49    1010.12       19.99          3542.04               3858.82
11       46.49    1022.17       15.01          3044.74               3230.81
```

```
12      45.12     1028.17        2.37           2713.66              2795.50
13      45.12     1037.44       23.93           2164.18              2080.74
14      45.12     1048.95        8.71            942.29               936.54
15      45.04     1054.36        6.62            518.53               405.57
   Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
   Soil Nail, and Applied Forces if applicable) =  534477.69 (lbs)
   Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
   Soil Nail, and Applied Forces if applicable) =   2081.82(psf)
   Sum of the Driving Forces =   391411.41 (lbs)
   Average Mobilized Shear Stress =    1524.57(psf)
   Total length of the failure surface =     256.74(ft)
          *** SEISMIC SLOPE DISPLACEMENT DATA ***
   (Note: kv is set = zero for displacement calculations)
   Seismic Yield Coefficient (ky) =  0.3460(g)
   Calculated Newmark Seismic Displacement =   0.108(ft)
   Non-Symmetrical Sliding Resistance Has Been Specified
   for Downhill Sliding.
                 **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 6-6'/3/13 Design - Upper Slope - Rotational - Static

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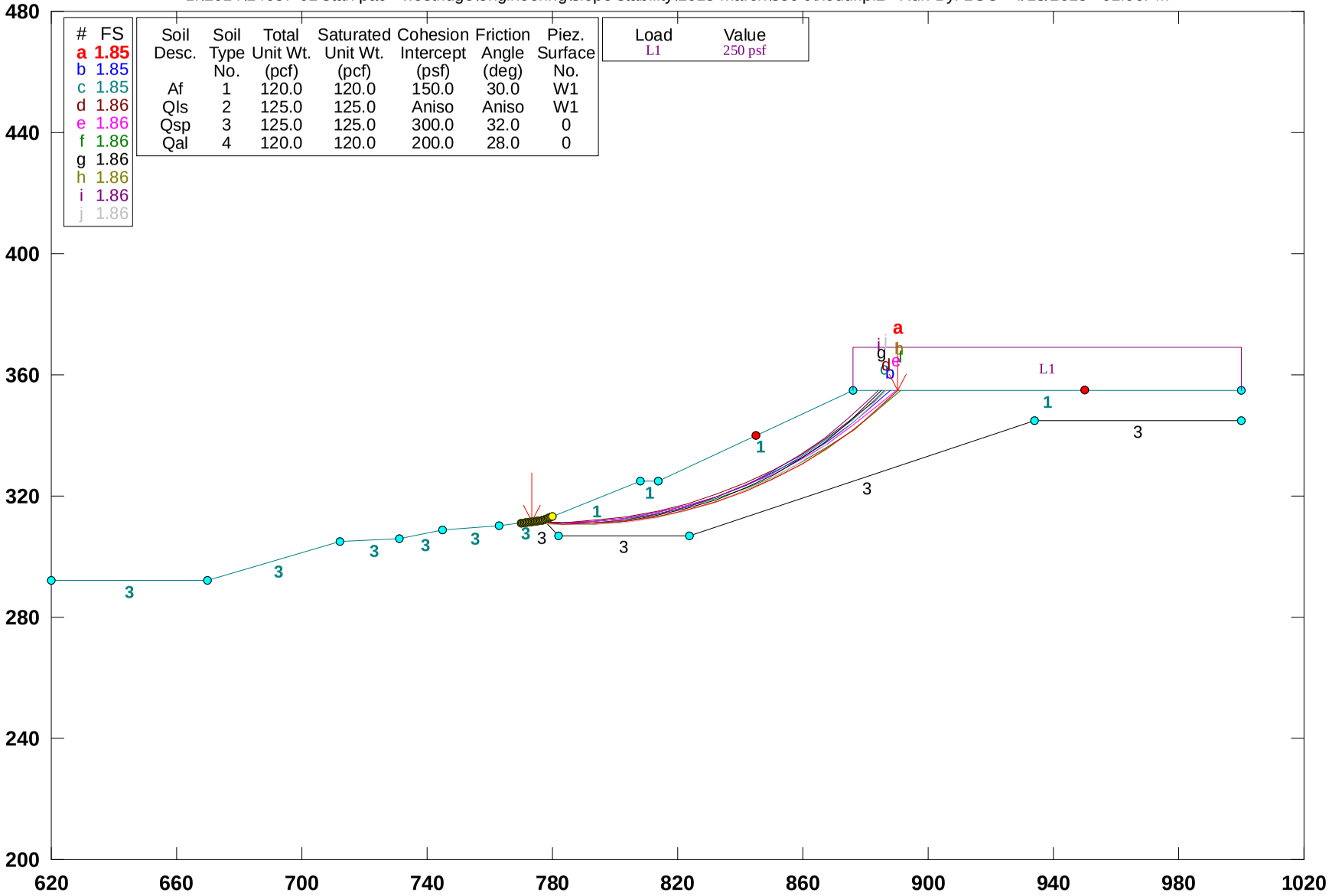

GSTABL7 v.2 FSmin=1.85

Safety Factors Are Calculated By The Modified Bishop Method

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                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                          SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        4/13/2015
    Time of Run:              01:06PM
    Run By:                   LGC
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    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6dur.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6dur.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 6-6'/3/13 Design
                          - Upper Slope - Rotational - Static
    BOUNDARY COORDINATES
       10 Top   Boundaries
       14 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        620.00     292.00     670.00     292.00        3
        2        670.00     292.00     712.00     305.00        3
        3        712.00     305.00     731.00     306.00        3
        4        731.00     306.00     745.00     309.00        3
        5        745.00     309.00     763.00     310.00        3
        6        763.00     310.00     777.00     312.00        3
        7        777.00     312.00     808.00     325.00        1
        8        808.00     325.00     814.00     325.00        1
        9        814.00     325.00     876.00     355.00        1
       10        876.00     355.00    1000.00     355.00        1
       11        777.00     312.00     782.00     307.00        3
       12        782.00     307.00     824.00     307.00        3
       13        824.00     307.00     934.00     345.00        3
       14        934.00     345.00    1000.00     345.00        3
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      0
      4   120.0    120.0     200.0     28.0    0.00       0.0      0
   ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
      No.            (deg)            (psf)         (deg)
       1              2.0             300.00         32.00
       2             13.0             200.00         27.00
       3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
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           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
        1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)         (ft)        (psf)          (deg)
       1         876.00      1000.00       250.0           0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     A Critical Failure Surface Searching Method, Using A Random
     Technique For Generating Circular Surfaces, Has Been Specified.
    15000 Trial Surfaces Have Been Generated.
      500 Surface(s) Initiate(s) From Each Of    30 Points Equally Spaced
     Along The Ground Surface Between  X = 770.00(ft)
                                  and  X = 780.00(ft)
     Each Surface Terminates Between   X = 845.00(ft)
                                  and   X = 950.00(ft)
     Unless Further Limitations Were Imposed, The Minimum Elevation
     At Which A Surface Extends Is  Y =      0.00(ft)
     10.00(ft) Line Segments Define Each Trial Failure Surface.
     Following Are Displayed The Ten Most Critical Of The Trial
            Failure Surfaces Evaluated. They Are
            Ordered - Most Critical First.
            * * Safety Factors Are Calculated By The Modified Bishop Method * *
            Total Number of Trial Surfaces Attempted =     0
            Number of Trial Surfaces With Valid FS =    0
            Statistical Data On All Valid FS Values:
               FS Max =   0.000   FS Min = 500.000   FS Ave =  NaN
               Standard Deviation =    0.000   Coefficient of Variation =  NaN    %
            Failure Surface Specified By 14 Coordinate Points
              Point       X-Surf      Y-Surf
               No.         (ft)        (ft)
                1        773.448     311.493
                2        783.429     310.876
                3        793.429     310.961
                4        803.398     311.749
                5        813.287     313.235
                6        823.047     315.412
                7        832.630     318.269
                8        841.989     321.792
                9        851.078     325.964
               10        859.850     330.764
               11        868.264     336.168
               12        876.278     342.149
               13        883.852     348.679
               14        890.219     355.000
            Circle Center At X =   787.229 ; Y =   452.962 ; and Radius =   142.139
                  Factor of Safety
                 ***    1.853   ***
                 Individual data on the    18  slices
                           Water  Water     Tie     Tie     Earthquake
                           Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot      Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      3.6     161.3     0.0    0.0       0.      0.     0.0     0.0     0.0
  2      0.8      86.3     0.0    0.0       0.      0.     0.0     0.0     0.0
  3      5.7    1669.3     0.0    0.0       0.      0.     0.0     0.0     0.0
  4     10.0    7048.9     0.0    0.0       0.      0.     0.0     0.0     0.0
  5     10.0   11513.6     0.0    0.0       0.      0.     0.0     0.0     0.0
  6      4.6    6593.8     0.0    0.0       0.      0.     0.0     0.0     0.0
  7      5.3    7716.1     0.0    0.0       0.      0.     0.0     0.0     0.0
  8      0.7     999.8     0.0    0.0       0.      0.     0.0     0.0     0.0
  9      9.0   13880.9     0.0    0.0       0.      0.     0.0     0.0     0.0
 10      9.6   17083.6     0.0    0.0       0.      0.     0.0     0.0     0.0
 11      9.4   18247.7     0.0    0.0       0.      0.     0.0     0.0     0.0
 12      9.1   18391.7     0.0    0.0       0.      0.     0.0     0.0     0.0
 13      8.8   17580.1     0.0    0.0       0.      0.     0.0     0.0     0.0
 14      8.4   15908.3     0.0    0.0       0.      0.     0.0     0.0     0.0
 15      7.7   13064.3     0.0    0.0       0.      0.     0.0     0.0     0.0
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16      0.3     432.4     0.0     0.0       0.      0.     0.0     0.0     69.5
17      7.6    8712.1     0.0     0.0       0.      0.     0.0     0.0   1893.4
18      6.4    2414.6     0.0     0.0       0.      0.     0.0     0.0   1591.7
        Failure Surface Specified By 14 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        773.104      311.443
            2        783.099      311.142
            3        793.092      311.514
            4        803.038      312.558
            5        812.890      314.269
            6        822.605      316.640
            7        832.138      319.660
            8        841.446      323.314
            9        850.487      327.587
           10        859.220      332.459
           11        867.605      337.908
           12        875.604      343.910
           13        883.181      350.436
           14        887.809      355.000
        Circle Center At X =   782.634 ; Y =   459.161 ; and Radius =   148.025
               Factor of Safety
              ***    1.853   ***
        Failure Surface Specified By 14 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        773.448      311.493
            2        783.440      311.086
            3        793.435      311.395
            4        803.383      312.416
            5        813.233      314.145
            6        822.933      316.573
            7        832.436      319.687
            8        841.692      323.472
            9        850.654      327.908
           10        859.277      332.973
           11        867.516      338.640
           12        875.329      344.882
           13        882.676      351.665
           14        885.807      355.000
        Circle Center At X =   784.188 ; Y =   450.594 ; and Radius =   139.515
               Factor of Safety
              ***    1.853   ***
        Failure Surface Specified By 14 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        773.448      311.493
            2        783.448      311.351
            3        793.434      311.873
            4        803.364      313.057
            5        813.193      314.897
            6        822.878      317.385
            7        832.378      320.510
            8        841.649      324.258
            9        850.650      328.613
           10        859.343      333.556
           11        867.689      339.064
           12        875.652      345.115
           13        883.195      351.680
           14        886.534      355.000
        Circle Center At X =   780.650 ; Y =   461.495 ; and Radius =   150.176
               Factor of Safety
              ***    1.855   ***
        Failure Surface Specified By 14 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        773.104      311.443
            2        783.102      311.247
            3        793.092      311.689
            4        803.034      312.767
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            5        812.886      314.477
            6        822.610      316.811
            7        832.165      319.761
            8        841.512      323.315
            9        850.614      327.458
           10        859.433      332.172
           11        867.933      337.439
           12        876.080      343.238
           13        883.841      349.545
           14        889.741      355.000
        Circle Center At X =   781.219 ; Y =   467.657 ; and Radius =   156.425
               Factor of Safety
              ***    1.855   ***
        Failure Surface Specified By 14 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        773.104      311.443
            2        783.097      311.087
            3        793.093      311.383
            4        803.048      312.329
            5        812.920      313.921
            6        822.668      316.153
            7        832.250      319.015
            8        841.625      322.495
            9        850.753      326.578
           10        859.597      331.246
           11        868.117      336.481
           12        876.278      342.260
           13        884.046      348.558
           14        891.011      355.000
        Circle Center At X =   783.572 ; Y =   464.471 ; and Radius =   153.386
               Factor of Safety
              ***    1.856   ***
        Failure Surface Specified By 14 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        773.104      311.443
            2        783.081      310.777
            3        793.081      310.870
            4        803.045      311.722
            5        812.915      313.327
            6        822.635      315.677
            7        832.148      318.758
            8        841.401      322.552
            9        850.339      327.038
           10        858.910      332.188
           11        867.066      337.975
           12        874.759      344.363
           13        881.945      351.318
           14        885.213      355.000
        Circle Center At X =   786.909 ; Y =   441.964 ; and Radius =   131.249
               Factor of Safety
              ***    1.858   ***
        Failure Surface Specified By 15 Coordinate Points
          Point      X-Surf      Y-Surf
           No.        (ft)        (ft)
            1        772.414      311.345
            2        782.395      310.728
            3        792.395      310.802
            4        802.365      311.565
            5        812.260      313.016
            6        822.030      315.146
            7        831.630      317.945
            8        841.014      321.401
            9        850.137      325.496
           10        858.956      330.211
           11        867.428      335.524
           12        875.513      341.409
           13        883.172      347.838
           14        890.370      354.780
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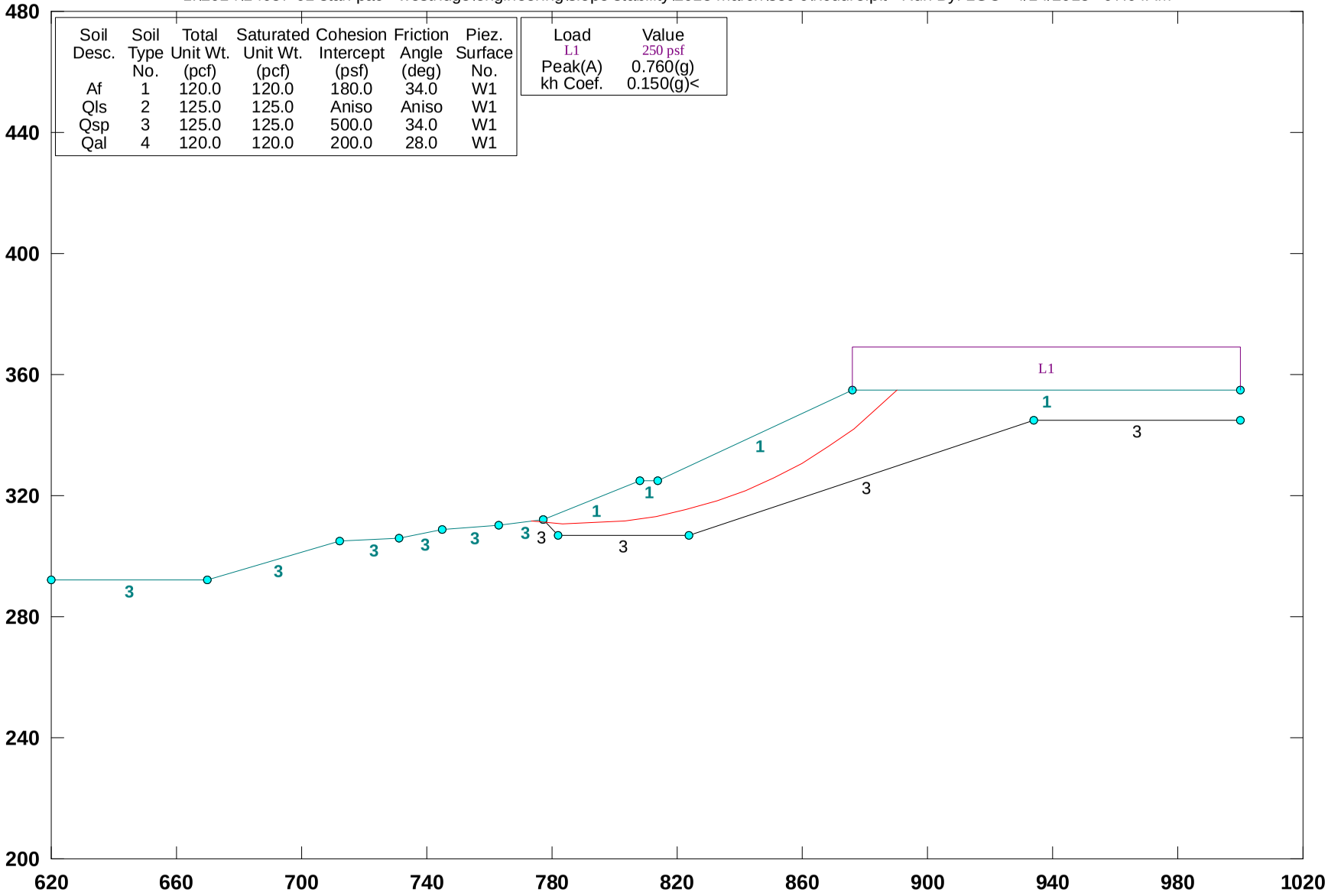
   15        890.568      355.000
Circle Center At X =   786.329 ; Y =   455.437 ; and Radius =   144.762
       Factor of Safety
      ***    1.859   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        773.448      311.493
    2        783.435      310.983
    3        793.433      311.225
    4        803.383      312.217
    5        813.231      313.955
    6        822.921      316.427
    7        832.397      319.621
    8        841.606      323.518
    9        850.497      328.097
   10        859.018      333.330
   11        867.122      339.189
   12        874.762      345.641
   13        881.896      352.648
   14        883.956      355.000
Circle Center At X =   785.272 ; Y =   443.558 ; and Radius =   132.593
       Factor of Safety
      ***    1.860   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        772.414      311.345
    2        782.380      310.524
    3        792.380      310.465
    4        802.355      311.167
    5        812.248      312.626
    6        822.002      314.834
    7        831.559      317.777
    8        840.864      321.440
    9        849.863      325.800
   10        858.504      330.833
   11        866.737      336.509
   12        874.515      342.795
   13        881.791      349.655
   14        886.659      355.000
Circle Center At X =   788.196 ; Y =   441.360 ; and Radius =   130.970
       Factor of Safety
      ***    1.860   ***
          **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 6-6'/3/13 Design - Upper Slope - Rotational - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 6\x6dure.plt Run By: LGC 4/14/2015 07:04AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qls	2	125.0	125.0	Aniso	Aniso	W1
Qsp	3	125.0	125.0	500.0	34.0	W1
Qal	4	120.0	120.0	200.0	28.0	W1

Load	Value
L1	250 psf
Peak(A)	0.760(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.56

Factor Of Safety Is Calculated By The Modified Bishop Method

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                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
             (All Rights Reserved-Unauthorized Use Prohibited)
 ******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
 ******************************************************************************
 Analysis Run Date:        4/14/2015
 Time of Run:              07:04AM
 Run By:                   LGC
 Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6dure.in
 Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6dure.OUT
 Unit System:              English
 Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6dure.PLT
 PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 6-6'/3/13 Design
                       - Upper Slope - Rotational - Seismic
 BOUNDARY COORDINATES
    10 Top   Boundaries
    14 Total Boundaries
 Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
    No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
     1        620.00     292.00     670.00     292.00        3
     2        670.00     292.00     712.00     305.00        3
     3        712.00     305.00     731.00     306.00        3
     4        731.00     306.00     745.00     309.00        3
     5        745.00     309.00     763.00     310.00        3
     6        763.00     310.00     777.00     312.00        3
     7        777.00     312.00     808.00     325.00        1
     8        808.00     325.00     814.00     325.00        1
     9        814.00     325.00     876.00     355.00        1
    10        876.00     355.00    1000.00     355.00        1
    11        777.00     312.00     782.00     307.00        3
    12        782.00     307.00     824.00     307.00        3
    13        824.00     307.00     934.00     345.00        3
    14        934.00     345.00    1000.00     345.00        3
 User Specified Y-Origin =       200.00(ft)
 Default X-Plus Value = 0.00(ft)
 Default Y-Plus Value = 0.00(ft)
ISOTROPIC SOIL PARAMETERS
  4 Type(s) of Soil
 Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
 Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
  No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
   1   120.0    120.0     180.0     34.0    0.00       0.0      1
   2   125.0    125.0     200.0     24.0    0.00       0.0      1
   3   125.0    125.0     500.0     34.0    0.00       0.0      1
   4   120.0    120.0     200.0     28.0    0.00       0.0      1
ANISOTROPIC STRENGTH PARAMETERS
     1 soil type(s)
 Soil Type  2 Is Anisotropic
 Number Of Direction Ranges Specified =  3
 Direction    Counterclockwise     Cohesion     Friction
   Range       Direction Limit    Intercept      Angle
    No.            (deg)            (psf)        (deg)
     1              2.0             500.00        34.00
     2             13.0             200.00        27.00
     3             90.0             500.00        34.00
 ANISOTROPIC SOIL NOTES:
    (1) An input value of 0.01 for C and/or Phi will cause Aniso
        C and/or Phi to be ignored in that range.
    (2) An input value of 0.02 for Phi will set both Phi and
```



```
        C equal to zero, with no water weight in the tension crack.
    (3) An input value of 0.03 for Phi will set both Phi and
        C equal to zero, with water weight in the tension crack.
 BOUNDARY LOAD(S)
     1 Load(s) Specified
  Load        X-Left      X-Right     Intensity     Deflection
   No.         (ft)         (ft)        (psf)          (deg)
    1         876.00      1000.00       250.0           0.0
  NOTE - Intensity Is Specified As A Uniformly Distributed
         Force Acting On A Horizontally Projected Surface.
  Specified Peak Ground Acceleration Coefficient (A) =   0.760(g)
  Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
  Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
  Specified Seismic Pore-Pressure Factor =   0.000
  Trial Failure Surface Specified By 14 Coordinate Points
    Point      X-Surf      Y-Surf
     No.        (ft)        (ft)
      1        773.448     311.493
      2        783.429     310.876
      3        793.429     310.961
      4        803.398     311.749
      5        813.287     313.235
      6        823.047     315.412
      7        832.630     318.269
      8        841.989     321.792
      9        851.078     325.964
     10        859.850     330.764
     11        868.264     336.168
     12        876.278     342.149
     13        883.852     348.679
     14        890.219     355.000
DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)
   Angle/Segment No.   Deflection(Deg)   Segment Length(ft)
          1                 4.02              10.00
          2                 4.03              10.00
          3                 4.03              10.00
          4                 4.03              10.00
          5                 4.03              10.00
          6                 4.03              10.00
          7                 4.03              10.00
          8                 4.03              10.00
          9                 4.02              10.00
         10                 4.02              10.00
         11                 4.03              10.00
  Circle Center At X =   787.228(ft) ; Y =   452.964(ft); and Radius =   142.141(ft)
  * * Factor Of Safety Is Calculated By The Modified Bishop Method * *
  Factor Of Safety For The Preceding Specified Surface =  1.555
      ***Table 1 - Individual Data on the   18 Slices***
                        Water  Water     Tie     Tie     Earthquake
                        Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
 1      3.6     161.4     0.0     0.0      0.0     0.0    24.2     0.0      0.0
 2      0.8      86.3     0.0     0.0      0.0     0.0    12.9     0.0      0.0
 3      5.7    1669.0     0.0     0.0      0.0     0.0   250.4     0.0      0.0
 4     10.0    7049.2     0.0     0.0      0.0     0.0  1057.4     0.0      0.0
 5     10.0   11514.0     0.0     0.0      0.0     0.0  1727.1     0.0      0.0
 6      4.6    6593.9     0.0     0.0      0.0     0.0   989.1     0.0      0.0
 7      5.3    7716.3     0.0     0.0      0.0     0.0  1157.4     0.0      0.0
 8      0.7     999.7     0.0     0.0      0.0     0.0   150.0     0.0      0.0
 9      9.0   13880.7     0.0     0.0      0.0     0.0  2082.1     0.0      0.0
10      9.6   17083.3     0.0     0.0      0.0     0.0  2562.5     0.0      0.0
11      9.4   18248.1     0.0     0.0      0.0     0.0  2737.2     0.0      0.0
12      9.1   18393.3     0.0     0.0      0.0     0.0  2759.0     0.0      0.0
13      8.8   17578.2     0.0     0.0      0.0     0.0  2636.7     0.0      0.0
14      8.4   15907.8     0.0     0.0      0.0     0.0  2386.2     0.0      0.0
15      7.7   13064.8     0.0     0.0      0.0     0.0  1959.7     0.0      0.0
16      0.3     432.2     0.0     0.0      0.0     0.0    64.8     0.0     69.5
17      7.6    8712.5     0.0     0.0      0.0     0.0  1306.9     0.0   1893.5
18      6.4    2414.7     0.0     0.0      0.0     0.0   362.2     0.0   1591.8
```

Table 2 - Base Stress Data on the 18 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	-3.53	775.22	3.56	545.25	3.98
2	-3.53	777.39	0.78	590.98	9.74
3	-3.53	780.60	5.67	389.54	25.56
4	0.49	788.43	10.00	653.06	109.54
5	4.52	798.41	10.00	927.25	257.06
6	8.55	805.70	4.65	1076.30	411.80
7	8.55	810.64	5.35	1093.16	419.29
8	12.57	813.64	0.73	1026.51	489.89
9	12.57	818.52	9.27	1107.71	535.14
10	16.60	827.84	10.00	1224.11	720.27
11	20.63	837.31	10.00	1285.27	883.39
12	24.66	846.53	10.00	1288.44	1001.61
13	28.69	855.46	10.00	1237.82	1059.69
14	32.71	864.06	10.00	1138.14	1047.21
15	36.73	872.13	9.65	996.51	962.17
16	36.73	876.14	0.35	1055.48	1006.24
17	40.77	880.07	10.00	818.43	787.10
18	44.79	887.04	8.97	422.49	342.82

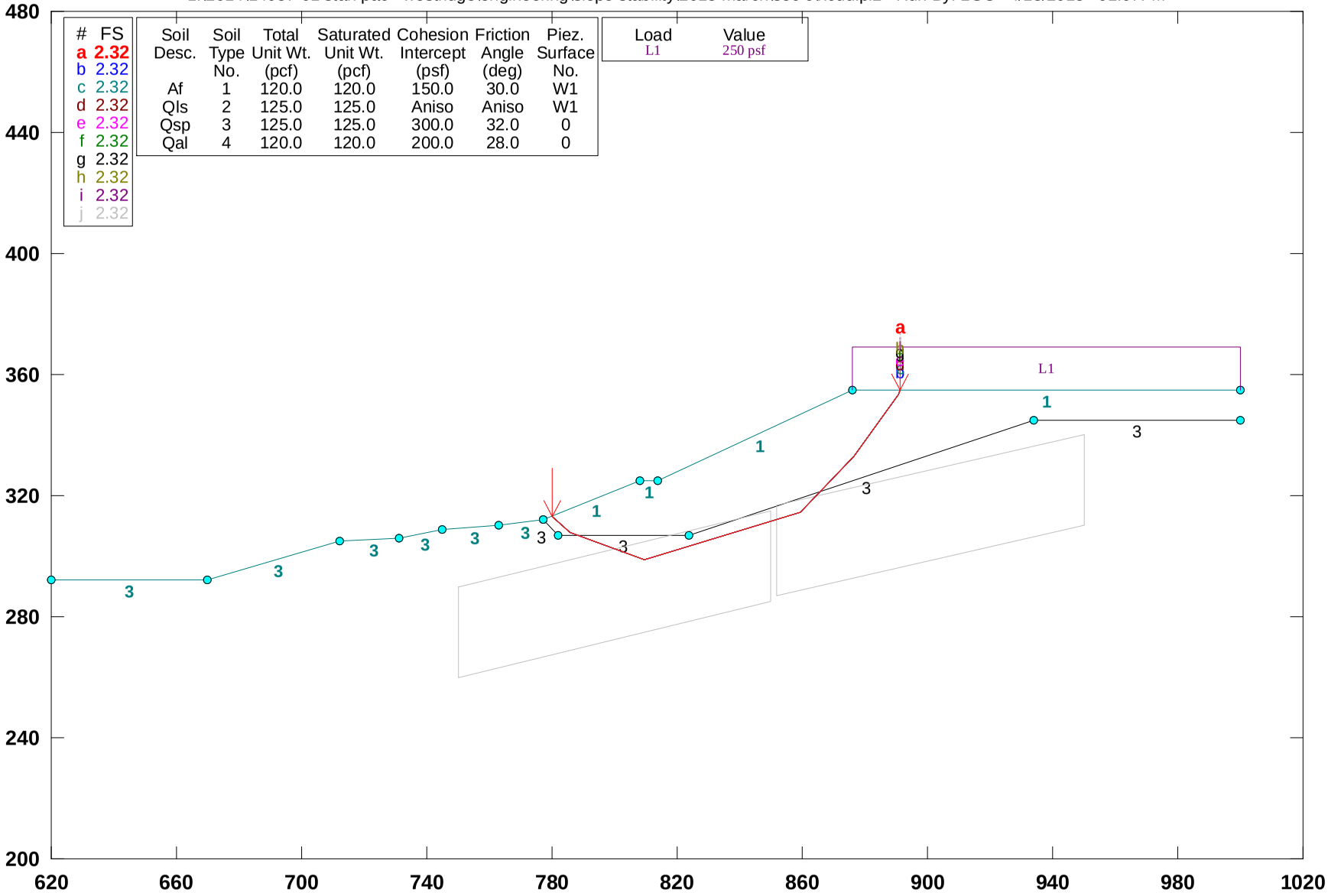
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 125967.10 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 976.70(psf)
Sum of the Driving Forces = 81014.35 (lbs)
Average Mobilized Shear Stress = 628.15(psf)
Total length of the failure surface = 128.97(ft)
CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.4091(g)
Calculated Newmark Seismic Displacement = 0.255(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

**** END OF GSTABL7 OUTPUT ****

Westridge/14057-01/Sec 6-6'/3/13 Design - Upper Slope - Block - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 6\x6du.pl2 Run By: LGC 4/13/2015 01:07PM



#	FS
a	2.32
b	2.32
c	2.32
d	2.32
e	2.32
f	2.32
g	2.32
h	2.32
i	2.32
j	2.32

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	150.0	30.0	W1
Qls	2	125.0	125.0	Aniso	Aniso	W1
Qsp	3	125.0	125.0	300.0	32.0	0
Qal	4	120.0	120.0	200.0	28.0	0

Load	Value
L1	250 psf

GSTABL7 v.2 FSmin=2.32

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                          SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        4/13/2015
    Time of Run:              01:07PM
    Run By:                   LGC
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6du.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6du.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6du.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 6-6'/3/13 Design
                          - Upper Slope - Block - Static
    BOUNDARY COORDINATES
       10 Top   Boundaries
       14 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        620.00     292.00     670.00     292.00        3
        2        670.00     292.00     712.00     305.00        3
        3        712.00     305.00     731.00     306.00        3
        4        731.00     306.00     745.00     309.00        3
        5        745.00     309.00     763.00     310.00        3
        6        763.00     310.00     777.00     312.00        3
        7        777.00     312.00     808.00     325.00        1
        8        808.00     325.00     814.00     325.00        1
        9        814.00     325.00     876.00     355.00        1
       10        876.00     355.00    1000.00     355.00        1
       11        777.00     312.00     782.00     307.00        3
       12        782.00     307.00     824.00     307.00        3
       13        824.00     307.00     934.00     345.00        3
       14        934.00     345.00    1000.00     345.00        3
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      0
      4   120.0    120.0     200.0     28.0    0.00       0.0      0
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept      Angle
       No.            (deg)            (psf)        (deg)
        1              2.0             300.00        32.00
        2             13.0             200.00        27.00
        3             90.0             300.00        32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
```



```
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)         (ft)        (psf)         (deg)
      1         876.00      1000.00       250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Janbus Empirical Coef is being used for the case of  c & phi both > 0
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Sliding Block Surfaces, Has Been
    Specified.
    9999 Trial Surfaces Have Been Generated.
    2 Boxes Specified For Generation Of Central Block Base
    Length Of Line Segments For Active And Passive Portions Of
    Sliding Block Is  25.0
    Box         X-Left      Y-Left     X-Right     Y-Right      Height
    No.          (ft)        (ft)        (ft)        (ft)        (ft)
     1          750.00      275.00      850.00      300.00      30.00
     2          852.00      302.00      950.00      325.00      30.00
    Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Evaluated. They Are
           Ordered - Most Critical First.
           * * Safety Factors Are Calculated By The Simplified Janbu Method * *
           Total Number of Trial Surfaces Attempted =  9999
           Number of Trial Failure Surfaces is Greater Than 5000.
           Statistical Data on FS Values are Not Generated.
           To Generate Stastical Data, Reduce Number of Trial
           Failure Surfaces to 5000 or less.
           Failure Surface Specified By  7 Coordinate Points
             Point       X-Surf       Y-Surf
              No.         (ft)         (ft)
               1        779.932      313.229
               2        785.875      307.611
               3        809.320      298.932
               4        859.363      314.691
               5        876.567      332.830
               6        890.564      353.544
               7        891.090      355.000
                  Factor of Safety
                 ***    2.315   ***
                Individual data on the    12  slices
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      5.9    2892.1     0.0     0.0       0.      0.     0.0     0.0     0.0
  2      1.7    1736.3     0.0     0.0       0.      0.     0.0     0.0     0.0
  3     20.5   43374.7     0.0     0.0       0.      0.     0.0     0.0     0.0
  4      1.3    4142.3     0.0     0.0       0.      0.     0.0     0.0     0.0
  5      4.7   14397.2     0.0     0.0       0.      0.     0.0     0.0     0.0
  6     10.0   30777.7     0.0     0.0       0.      0.     0.0     0.0     0.0
  7     35.4  124920.9     0.0     0.0       0.      0.     0.0     0.0     0.0
  8      6.4   23390.7     0.0     0.0       0.      0.     0.0     0.0     0.0
  9     10.3   31610.4     0.0     0.0       0.      0.     0.0     0.0     0.0
 10      0.6    1528.8     0.0     0.0       0.      0.     0.0     0.0   141.8
 11     14.0   19841.7     0.0     0.0       0.      0.     0.0     0.0  3499.2
 12      0.5      45.9     0.0     0.0       0.      0.     0.0     0.0   131.4
           Failure Surface Specified By  7 Coordinate Points
             Point       X-Surf       Y-Surf
              No.         (ft)         (ft)
               1        779.932      313.229
               2        785.875      307.611
               3        809.320      298.932
               4        859.363      314.691
               5        876.567      332.830
               6        890.564      353.544
               7        891.090      355.000
```

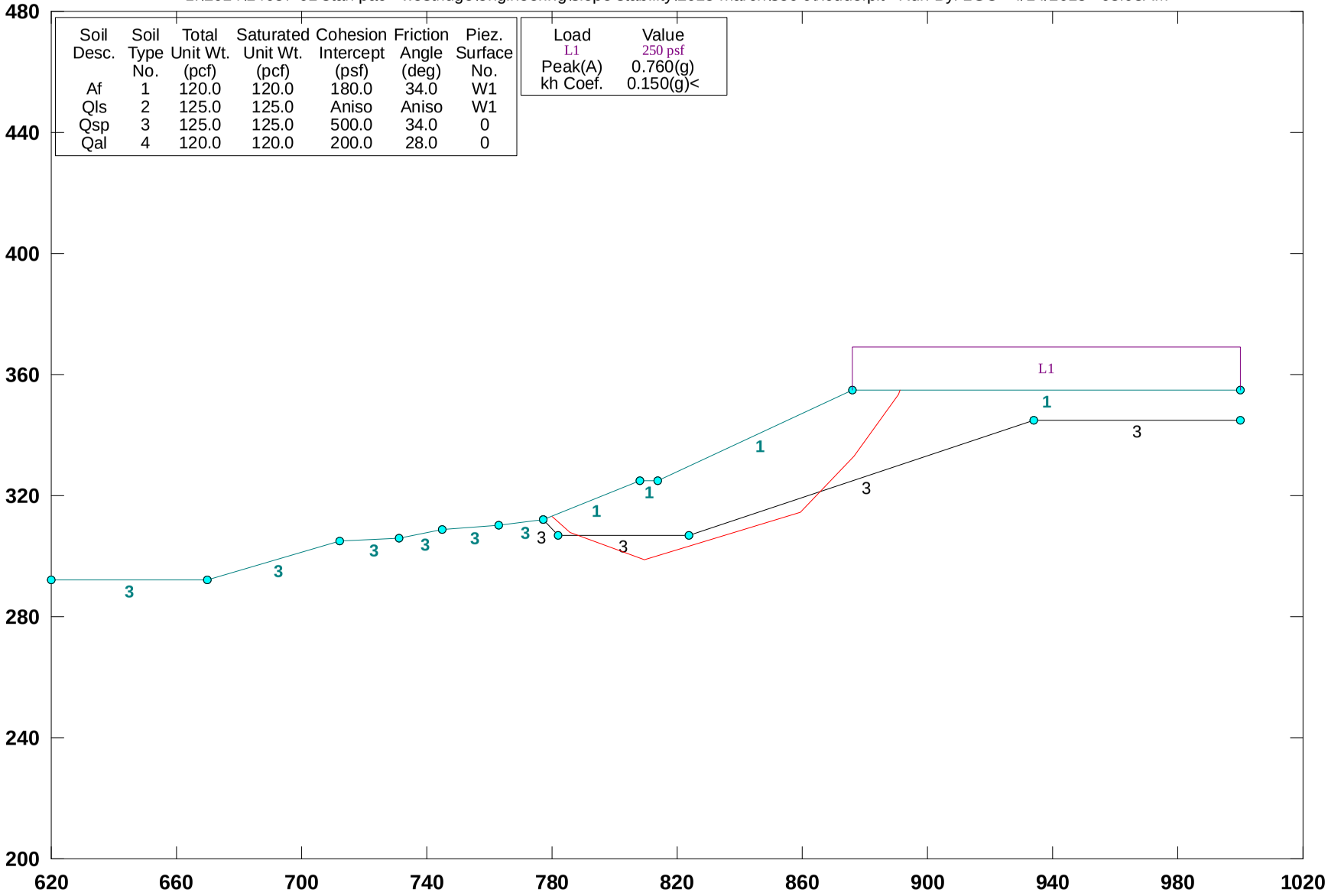
```
       Factor of Safety
      ***    2.315   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        779.932     313.229
    2        785.875     307.611
    3        809.320     298.932
    4        859.363     314.691
    5        876.567     332.830
    6        890.564     353.544
    7        891.090     355.000
       Factor of Safety
      ***    2.315   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        779.932     313.229
    2        785.875     307.611
    3        809.320     298.932
    4        859.363     314.691
    5        876.567     332.830
    6        890.564     353.544
    7        891.090     355.000
       Factor of Safety
      ***    2.315   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        779.932     313.229
    2        785.875     307.611
    3        809.320     298.932
    4        859.363     314.691
    5        876.567     332.830
    6        890.564     353.544
    7        891.090     355.000
       Factor of Safety
      ***    2.315   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        779.932     313.229
    2        785.875     307.611
    3        809.320     298.932
    4        859.363     314.691
    5        876.567     332.830
    6        890.564     353.544
    7        891.090     355.000
       Factor of Safety
      ***    2.315   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        779.932     313.229
    2        785.875     307.611
    3        809.320     298.932
    4        859.363     314.691
    5        876.567     332.830
    6        890.564     353.544
    7        891.090     355.000
       Factor of Safety
      ***    2.315   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        779.932     313.229
    2        785.875     307.611
    3        809.320     298.932
    4        859.363     314.691
    5        876.567     332.830
```



```
    6        890.564     353.544
    7        891.090     355.000
       Factor of Safety
      ***    2.315   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        779.932     313.229
    2        785.875     307.611
    3        809.320     298.932
    4        859.363     314.691
    5        876.567     332.830
    6        890.564     353.544
    7        891.090     355.000
       Factor of Safety
      ***    2.315   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        779.932     313.229
    2        785.875     307.611
    3        809.320     298.932
    4        859.363     314.691
    5        876.567     332.830
    6        890.564     353.544
    7        891.090     355.000
       Factor of Safety
      ***    2.315   ***
          **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 6-6'/3/13 Design - Upper Slope - Block - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 6\x6due.plt Run By: LGC 4/14/2015 08:03AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qls	2	125.0	125.0	Aniso	Aniso	W1
Qsp	3	125.0	125.0	500.0	34.0	0
Qal	4	120.0	120.0	200.0	28.0	0

Load	Value
L1	250 psf
Peak(A)	0.760(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.93

Factor Of Safety Is Calculated By The Simplified Janbu Method

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                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
          Modified Bishop, Simplified Janbu, or GLE Method of Slices.
          (Includes Spencer & Morgenstern-Price Type Analysis)
          Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
          Nonlinear Undrained Shear Strength, Curved Phi Envelope,
          Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
          Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        4/14/2015
    Time of Run:              08:03AM
    Run By:                   LGC
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6due.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6due.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 6\x6due.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 6-6'/3/13 Design
                          - Upper Slope - Block - Seismic
    BOUNDARY COORDINATES
       10 Top   Boundaries
       14 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        620.00     292.00     670.00     292.00        3
        2        670.00     292.00     712.00     305.00        3
        3        712.00     305.00     731.00     306.00        3
        4        731.00     306.00     745.00     309.00        3
        5        745.00     309.00     763.00     310.00        3
        6        763.00     310.00     777.00     312.00        3
        7        777.00     312.00     808.00     325.00        1
        8        808.00     325.00     814.00     325.00        1
        9        814.00     325.00     876.00     355.00        1
       10        876.00     355.00    1000.00     355.00        1
       11        777.00     312.00     782.00     307.00        3
       12        782.00     307.00     824.00     307.00        3
       13        824.00     307.00     934.00     345.00        3
       14        934.00     345.00    1000.00     345.00        3
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     500.0     34.0    0.00       0.0      0
      4   120.0    120.0     200.0     28.0    0.00       0.0      0
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
      No.            (deg)            (psf)         (deg)
       1              2.0             500.00         34.00
       2             13.0             200.00         27.00
       3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
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           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)         (ft)        (psf)          (deg)
      1         876.00      1000.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.760(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
    Trial Failure Surface Specified By  7 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1        779.932     313.230
        2        785.875     307.611
        3        809.320     298.932
        4        859.363     314.691
        5        876.567     332.830
        6        890.564     353.544
        7        891.090     355.000
    Janbu's Empirical Coefficient (fo) =  1.077
    * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.931
          ***Table 1 - Individual Data on the   12 Slices***
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver     Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      5.9    2892.1     0.0     0.0      0.0     0.0   433.8     0.0      0.0
  2      1.7    1735.6     0.0     0.0      0.0     0.0   260.3     0.0      0.0
  3     20.5   43376.1     0.0     0.0      0.0     0.0  6506.4     0.0      0.0
  4      1.3    4142.1     0.0     0.0      0.0     0.0   621.3     0.0      0.0
  5      4.7   14397.5     0.0     0.0      0.0     0.0  2159.6     0.0      0.0
  6     10.0   30777.8     0.0     0.0      0.0     0.0  4616.7     0.0      0.0
  7     35.4  124919.2     0.0     0.0      0.0     0.0 18737.9     0.0      0.0
  8      6.4   23388.7     0.0     0.0      0.0     0.0  3508.3     0.0      0.0
  9     10.3   31612.3     0.0     0.0      0.0     0.0  4741.8     0.0      0.0
 10      0.6    1528.8     0.0     0.0      0.0     0.0   229.3     0.0    141.8
 11     14.0   19841.5     0.0     0.0      0.0     0.0  2976.2     0.0   3499.3
 12      0.5      46.0     0.0     0.0      0.0     0.0     6.9     0.0    131.5
          ***Table 2 - Base Stress Data on the   12 Slices***
Slice   Alpha     X-Coord.      Base          Available             Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
  *                  (ft)        (ft)           (psf)                 (psf)
  1     -43.39      782.90        8.18          1044.33               -281.28
  2     -20.31      786.70        1.76          1089.04               -217.12
  3     -20.31      797.76       21.83          2362.41               -437.46
  4     -20.31      808.66        1.41          3204.51               -647.96
  5      17.48      811.66        4.91          2432.16               1364.20
  6      17.48      819.00       10.48          2433.05               1364.82
  7      17.48      841.68       37.07          2722.73               1566.45
  8      46.52      862.55        9.28          3155.53               3036.55
  9      46.52      870.87       14.90          2399.67               2555.22
 10      46.52      876.28        0.82          2301.66               2416.01
 11      55.95      883.57       25.00          1536.25               1500.74
 12      70.14      890.83        1.55           609.82                321.74
    Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
    Soil Nail, and Applied Forces if applicable) =  308736.12 (lbs)
    Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
    Soil Nail, and Applied Forces if applicable) =   2250.40(psf)
    Sum of the Driving Forces =   172180.03 (lbs)
    Average Mobilized Shear Stress =    1255.03(psf)
    Total length of the failure surface =     137.19(ft)
           *** SEISMIC SLOPE DISPLACEMENT DATA ***
    (Note: kv is set = zero for displacement calculations)
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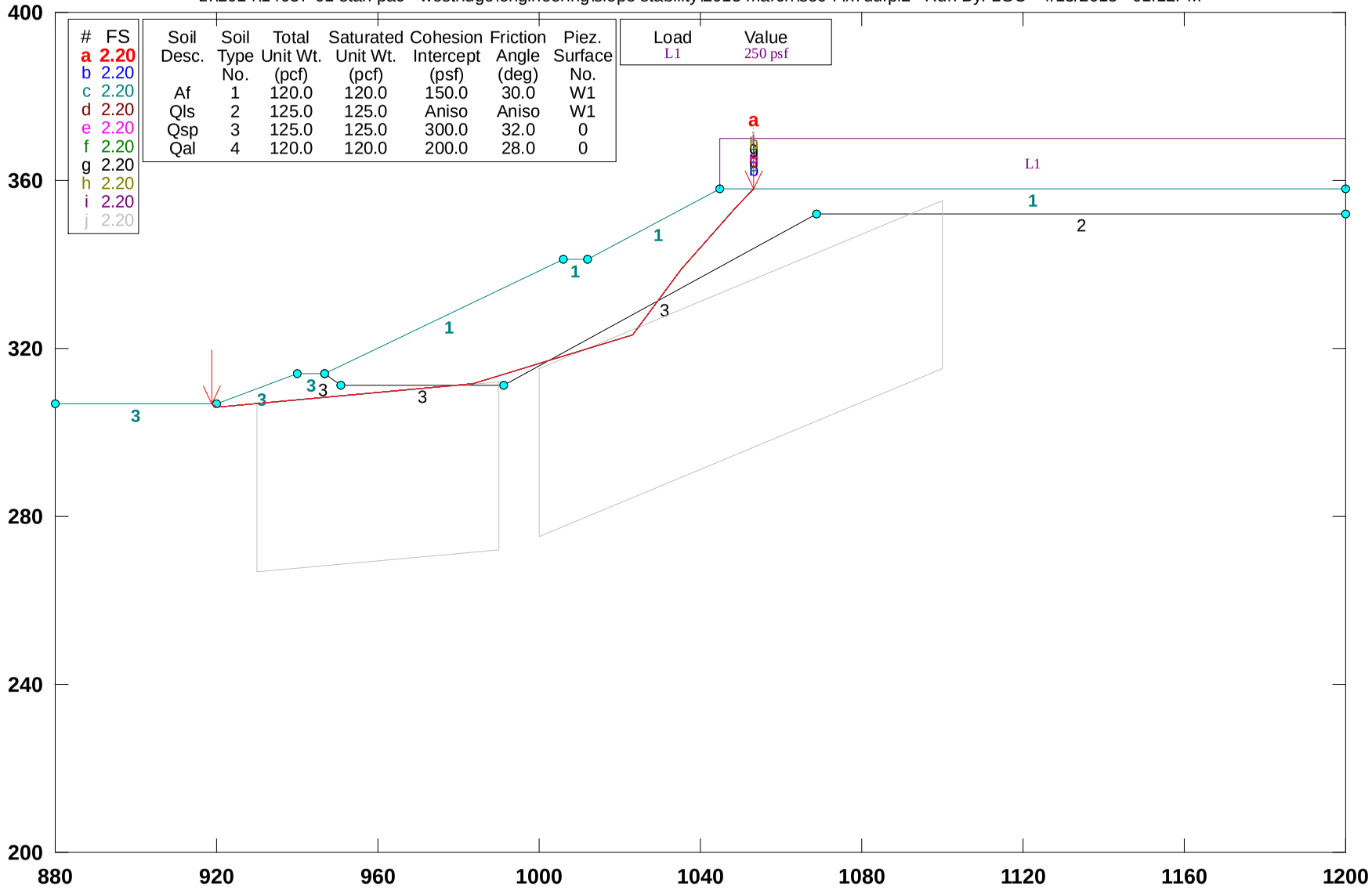
Seismic Yield Coefficient (ky) =  0.6300(g)
Calculated Newmark Seismic Displacement =   0.107(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
              **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 7-7'/ 3/13 Design - Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 7\x7du.pl2 Run By: LGC 4/13/2015 01:12PM



GSTABL7 v.2 FSmin=2.20

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                           SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        4/13/2015
    Time of Run:              01:12PM
    Run By:                   LGC
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 7\x7du.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 7\x7du.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 7\x7du.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 7-7'/ 3/13
                          Design - Upper Slope - Static
    BOUNDARY COORDINATES
        7 Top   Boundaries
       17 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        880.00     307.00     920.00     307.00        3
        2        920.00     307.00     940.00     314.00        3
        3        940.00     314.00     947.00     314.00        3
        4        947.00     314.00    1006.00     341.00        1
        5       1006.00     341.00    1012.00     341.00        1
        6       1012.00     341.00    1045.00     358.00        1
        7       1045.00     358.00    1200.00     358.00        1
        8        947.00     314.00     951.00     311.00        3
        9        951.00     311.00     991.00     311.00        3
       10        991.00     311.00    1069.00     352.00        3
       11       1069.00     352.00    1200.00     352.00        2
       12          0.00     196.00     176.00     220.00        3
       13        176.00     220.00     192.00     224.00        2
       14        192.00     224.00     207.00     234.00        2
       15        176.00     220.00     331.00     230.00        3
       16        331.00     230.00     373.00     236.00        3
       17        373.00     236.00     474.00     259.00        3
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      0
      4   120.0    120.0     200.0     28.0    0.00       0.0      0
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              0.0             300.00         32.00
        2             12.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
```



```
        (1) An input value of 0.01 for C and/or Phi will cause Aniso
            C and/or Phi to be ignored in that range.
        (2) An input value of 0.02 for Phi will set both Phi and
            C equal to zero, with no water weight in the tension crack.
        (3) An input value of 0.03 for Phi will set both Phi and
            C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
         1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)         (ft)        (psf)         (deg)
       1        1045.00      1200.00       250.0          0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     Janbus Empirical Coef is being used for the case of  c & phi both > 0
     A Critical Failure Surface Searching Method, Using A Random
     Technique For Generating Sliding Block Surfaces, Has Been
     Specified.
     9999 Trial Surfaces Have Been Generated.
     3 Boxes Specified For Generation Of Central Block Base
     Length Of Line Segments For Active And Passive Portions Of
     Sliding Block Is  20.0
     Box        X-Left     Y-Left    X-Right    Y-Right      Height
     No.         (ft)       (ft)       (ft)       (ft)        (ft)
      1         920.00     306.00     920.00     306.00       0.00
      2         930.00     287.00     990.00     292.00      40.00
      3        1000.00     295.00    1100.00     335.00      40.00
     Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Evaluated. They Are
           Ordered - Most Critical First.
           * * Safety Factors Are Calculated By The Simplified Janbu Method * *
           Total Number of Trial Surfaces Attempted =  9999
           Number of Trial Failure Surfaces is Greater Than 5000.
           Statistical Data on FS Values are Not Generated.
           To Generate Stastical Data, Reduce Number of Trial
           Failure Surfaces to 5000 or less.
           Failure Surface Specified By  7 Coordinate Points
             Point      X-Surf      Y-Surf
              No.        (ft)        (ft)
               1        918.882     307.000
               2        920.000     306.000
               3        983.771     311.478
               4       1023.163     323.071
               5       1035.369     338.915
               6       1048.969     353.579
               7       1053.238     358.000
                 Factor of Safety
                ***     2.202   ***
                Individual data on the    15  slices
                           Water  Water     Tie     Tie     Earthquake
                           Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      1.1      69.9     0.0     0.0       0.      0.     0.0     0.0      0.0
  2     20.0    9102.2     0.0     0.0       0.      0.     0.0     0.0      0.0
  3      7.0    5233.5     0.0     0.0       0.      0.     0.0     0.0      0.0
  4      4.0    3163.6     0.0     0.0       0.      0.     0.0     0.0      0.0
  5     27.2   40056.8     0.0     0.0       0.      0.     0.0     0.0      0.0
  6      5.6   12239.4     0.0     0.0       0.      0.     0.0     0.0      0.0
  7     18.5   46291.3     0.0     0.0       0.      0.     0.0     0.0      0.0
  8      3.7   10172.6     0.0     0.0       0.      0.     0.0     0.0      0.0
  9      6.0   15956.4     0.0     0.0       0.      0.     0.0     0.0      0.0
 10     11.2   30265.9     0.0     0.0       0.      0.     0.0     0.0      0.0
 11      6.3   16022.3     0.0     0.0       0.      0.     0.0     0.0      0.0
 12      5.9   11738.6     0.0     0.0       0.      0.     0.0     0.0      0.0
 13      9.6   13189.4     0.0     0.0       0.      0.     0.0     0.0      0.0
 14      4.0    3124.3     0.0     0.0       0.      0.     0.0     0.0    992.2
 15      4.3    1132.5     0.0     0.0       0.      0.     0.0     0.0   1067.4
           Failure Surface Specified By  7 Coordinate Points
             Point      X-Surf      Y-Surf
              No.        (ft)        (ft)
```

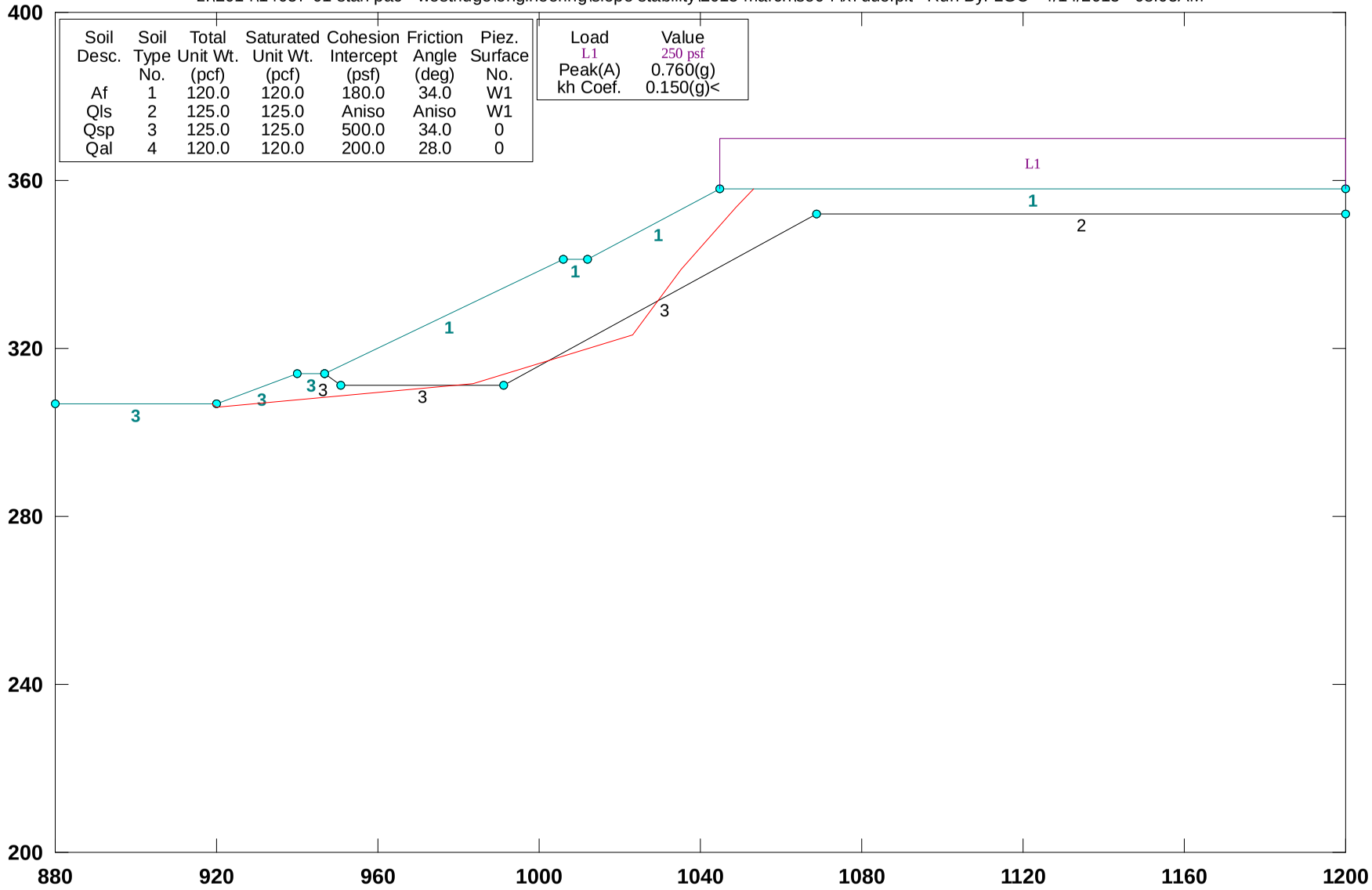
```
     1        918.882      307.000
     2        920.000      306.000
     3        983.771      311.478
     4       1023.163      323.071
     5       1035.369      338.915
     6       1048.969      353.579
     7       1053.238      358.000
        Factor of Safety
       ***    2.202   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        918.882      307.000
     2        920.000      306.000
     3        983.771      311.478
     4       1023.163      323.071
     5       1035.369      338.915
     6       1048.969      353.579
     7       1053.238      358.000
        Factor of Safety
       ***    2.202   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        918.882      307.000
     2        920.000      306.000
     3        983.771      311.478
     4       1023.163      323.071
     5       1035.369      338.915
     6       1048.969      353.579
     7       1053.238      358.000
        Factor of Safety
       ***    2.202   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        918.882      307.000
     2        920.000      306.000
     3        983.771      311.478
     4       1023.163      323.071
     5       1035.369      338.915
     6       1048.969      353.579
     7       1053.238      358.000
        Factor of Safety
       ***    2.202   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        918.882      307.000
     2        920.000      306.000
     3        983.771      311.478
     4       1023.163      323.071
     5       1035.369      338.915
     6       1048.969      353.579
     7       1053.238      358.000
        Factor of Safety
       ***    2.202   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        918.882      307.000
     2        920.000      306.000
     3        983.771      311.478
     4       1023.163      323.071
     5       1035.369      338.915
     6       1048.969      353.579
     7       1053.238      358.000
        Factor of Safety
       ***    2.202   ***
Failure Surface Specified By  7 Coordinate Points
```



```
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        918.882      307.000
     2        920.000      306.000
     3        983.771      311.478
     4       1023.163      323.071
     5       1035.369      338.915
     6       1048.969      353.579
     7       1053.238      358.000
        Factor of Safety
       ***    2.202   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        918.882      307.000
     2        920.000      306.000
     3        983.771      311.478
     4       1023.163      323.071
     5       1035.369      338.915
     6       1048.969      353.579
     7       1053.238      358.000
        Factor of Safety
       ***    2.202   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        918.882      307.000
     2        920.000      306.000
     3        983.771      311.478
     4       1023.163      323.071
     5       1035.369      338.915
     6       1048.969      353.579
     7       1053.238      358.000
        Factor of Safety
       ***    2.202   ***
            **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 7-7'/ 3/13 Design - Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 7\x7due.plt Run By: LGC 4/14/2015 08:05AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qls	2	125.0	125.0	Aniso	Aniso	W1
Qsp	3	125.0	125.0	500.0	34.0	0
Qal	4	120.0	120.0	200.0	28.0	0

Load	Value
L1	250 psf
Peak(A)	0.760(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.89

Factor Of Safety Is Calculated By The Simplified Janbu Method

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
          Modified Bishop, Simplified Janbu, or GLE Method of Slices.
          (Includes Spencer & Morgenstern-Price Type Analysis)
          Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
          Nonlinear Undrained Shear Strength, Curved Phi Envelope,
          Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
          Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        4/14/2015
    Time of Run:              08:05AM
    Run By:                   LGC
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 7\x7due.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 7\x7due.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 7\x7due.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 7-7'/ 3/13
                          Design - Upper Slope - Seismic
    BOUNDARY COORDINATES
        7 Top   Boundaries
       17 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        880.00     307.00     920.00     307.00        3
        2        920.00     307.00     940.00     314.00        3
        3        940.00     314.00     947.00     314.00        3
        4        947.00     314.00    1006.00     341.00        1
        5       1006.00     341.00    1012.00     341.00        1
        6       1012.00     341.00    1045.00     358.00        1
        7       1045.00     358.00    1200.00     358.00        1
        8        947.00     314.00     951.00     311.00        3
        9        951.00     311.00     991.00     311.00        3
       10        991.00     311.00    1069.00     352.00        3
       11       1069.00     352.00    1200.00     352.00        2
       12          0.00     196.00     176.00     220.00        3
       13        176.00     220.00     192.00     224.00        2
       14        192.00     224.00     207.00     234.00        2
       15        176.00     220.00     331.00     230.00        3
       16        331.00     230.00     373.00     236.00        3
       17        373.00     236.00     474.00     259.00        3
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     500.0     34.0    0.00       0.0      0
      4   120.0    120.0     200.0     28.0    0.00       0.0      0
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept      Angle
       No.            (deg)            (psf)         (deg)
        1              0.0             500.00         34.00
        2             12.0             200.00         27.00
        3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
```

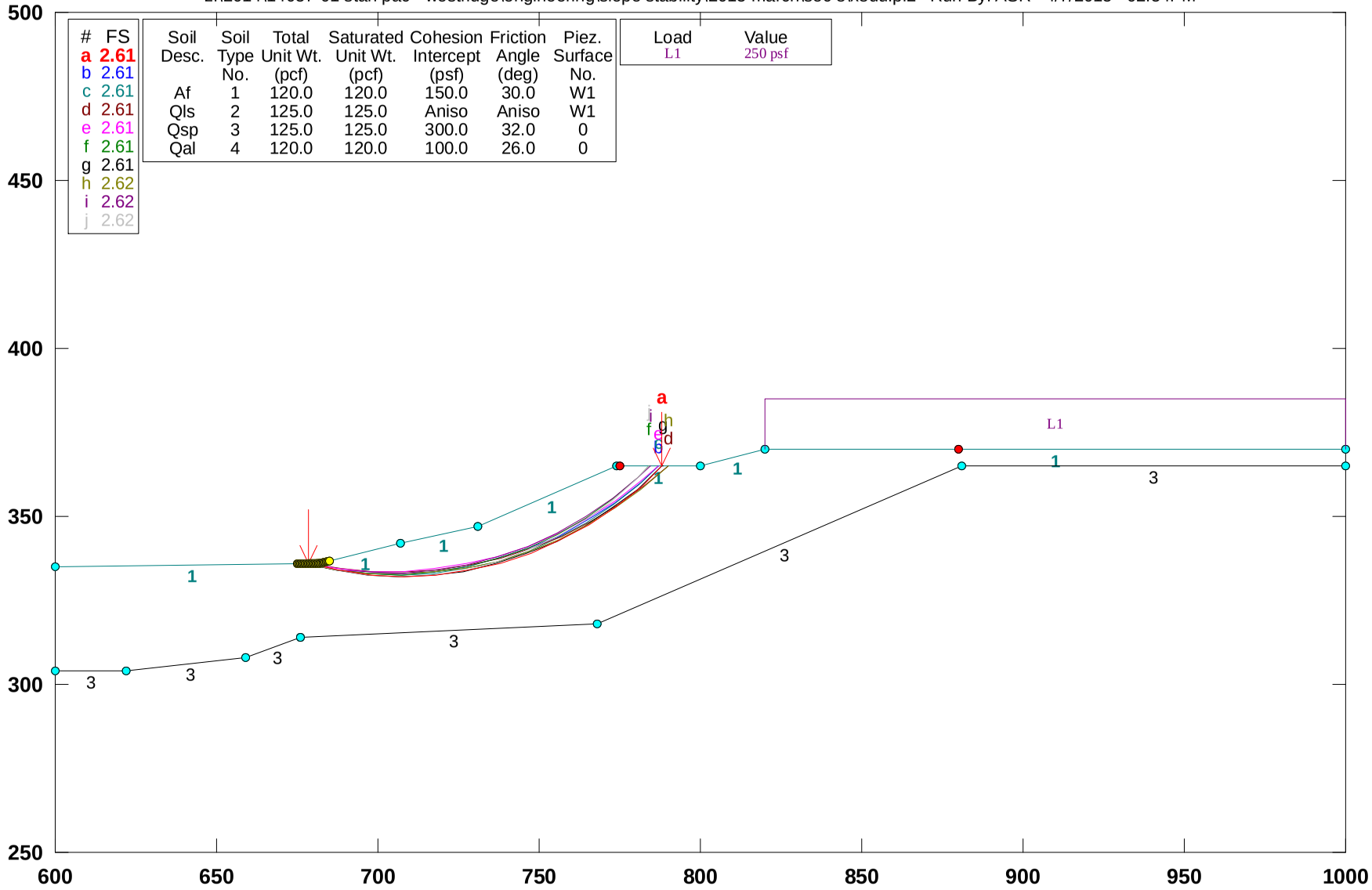


```
        (1) An input value of 0.01 for C and/or Phi will cause Aniso
            C and/or Phi to be ignored in that range.
        (2) An input value of 0.02 for Phi will set both Phi and
            C equal to zero, with no water weight in the tension crack.
        (3) An input value of 0.03 for Phi will set both Phi and
            C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
         1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)         (ft)        (psf)          (deg)
       1        1045.00      1200.00       250.0           0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     Specified Peak Ground Acceleration Coefficient (A) =   0.760(g)
     Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
     Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
     Specified Seismic Pore-Pressure Factor =   0.000
     Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
     Trial Failure Surface Specified By  7 Coordinate Points
       Point      X-Surf      Y-Surf
        No.        (ft)        (ft)
         1        918.882     307.000
         2        920.000     306.000
         3        983.771     311.478
         4       1023.163     323.071
         5       1035.369     338.915
         6       1048.969     353.579
         7       1053.238     358.000
     Janbu's Empirical Coefficient (fo) =  1.060
     * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
     Factor Of Safety For The Preceding Specified Surface =  1.892
          ***Table 1 - Individual Data on the   15 Slices***
                            Water  Water     Tie      Tie     Earthquake
                            Force  Force    Force    Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      1.1      69.9     0.0     0.0      0.0     0.0    10.5     0.0      0.0
  2     20.0    9102.5     0.0     0.0      0.0     0.0  1365.4     0.0      0.0
  3      7.0    5233.7     0.0     0.0      0.0     0.0   785.0     0.0      0.0
  4      4.0    3163.8     0.0     0.0      0.0     0.0   474.6     0.0      0.0
  5     27.2   40068.4     0.0     0.0      0.0     0.0  6010.3     0.0      0.0
  6      5.6   12229.8     0.0     0.0      0.0     0.0  1834.5     0.0      0.0
  7     18.5   46286.8     0.0     0.0      0.0     0.0  6943.0     0.0      0.0
  8      3.7   10177.7     0.0     0.0      0.0     0.0  1526.7     0.0      0.0
  9      6.0   15956.7     0.0     0.0      0.0     0.0  2393.5     0.0      0.0
 10     11.2   30266.7     0.0     0.0      0.0     0.0  4540.0     0.0      0.0
 11      6.3   16023.1     0.0     0.0      0.0     0.0  2403.5     0.0      0.0
 12      5.9   11738.6     0.0     0.0      0.0     0.0  1760.8     0.0      0.0
 13      9.6   13189.0     0.0     0.0      0.0     0.0  1978.4     0.0      0.0
 14      4.0    3124.9     0.0     0.0      0.0     0.0   468.7     0.0    992.3
 15      4.3    1132.4     0.0     0.0      0.0     0.0   169.9     0.0   1067.2
          ***Table 2 - Base Stress Data on the   15 Slices***
Slice   Alpha     X-Coord.      Base          Available              Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
  *                 (ft)        (ft)           (psf)                  (psf)
  1     -41.81      919.44        1.50          1067.98                -34.68
  2       4.91      930.00       20.07           785.89                106.97
  3       4.91      943.50        7.03           978.05                175.73
  4       4.91      949.00        4.01          1006.48                185.90
  5       4.91      964.60       27.31          1454.34                346.15
  6       4.91      980.99        5.59          1618.99                516.57
  7      16.40      993.02       19.28          1762.67               1066.90
  8      16.40     1004.13        3.90          2204.56               1160.67
  9      16.40     1009.00        6.25          2164.03               1133.52
 10      16.40     1017.58       11.64          2197.06               1155.64
 11      52.39     1026.29       10.26          2494.02               2261.96
 12      52.39     1032.40        9.74          1693.22               1744.60
 13      47.16     1040.18       14.16          1172.40               1143.78
 14      47.16     1046.98        5.84           934.41                840.85
 15      46.00     1051.10        6.15           554.68                398.31
```

```
Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) =  224492.95 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) =   1470.02(psf)
Sum of the Driving Forces =   125792.45 (lbs)
Average Mobilized Shear Stress =     823.71(psf)
Total length of the failure surface =     152.71(ft)
       *** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.5601(g)
Calculated Newmark Seismic Displacement =   0.136(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
              **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 8-8'/3/13- Design- Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 8\x8du.pl2 Run By: ASR 4/7/2015 02:54PM



GSTABL7 v.2 FSmin=2.61

Safety Factors Are Calculated By The Modified Bishop Method

```
                                   ***  GSTABL7  ***
                    ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                          SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        4/7/2015
    Time of Run:              02:54PM
    Run By:                   ASR
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8du.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8du.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8du.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 8-8'/3/13- Design
                           - Upper Slope - Static
    BOUNDARY COORDINATES
        7 Top   Boundaries
       13 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        600.00     335.00     682.00     336.00         1
        2        682.00     336.00     707.00     342.00         1
        3        707.00     342.00     731.00     347.00         1
        4        731.00     347.00     774.00     365.00         1
        5        774.00     365.00     800.00     365.00         1
        6        800.00     365.00     820.00     370.00         1
        7        820.00     370.00    1000.00     370.00         1
        8        676.00     314.00     768.00     318.00         3
        9        768.00     318.00     881.00     365.00         3
       10        881.00     365.00    1000.00     365.00         3
       11        600.00     304.00     622.00     304.00         3
       12        622.00     304.00     659.00     308.00         3
       13        659.00     308.00     676.00     314.00         3
    User Specified Y-Origin =       250.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      0
      4   120.0    120.0     100.0     26.0    0.00       0.0      0
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              0.0             300.00         32.00
        2             12.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
```



```
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
        1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)         (ft)        (psf)         (deg)
       1         820.00      1000.00       250.0          0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     A Critical Failure Surface Searching Method, Using A Random
     Technique For Generating Circular Surfaces, Has Been Specified.
    15000 Trial Surfaces Have Been Generated.
      500 Surface(s) Initiate(s) From Each Of    30 Points Equally Spaced
     Along The Ground Surface Between  X = 675.00(ft)
                                  and  X = 685.00(ft)
     Each Surface Terminates Between   X = 775.00(ft)
                                  and   X = 880.00(ft)
     Unless Further Limitations Were Imposed, The Minimum Elevation
     At Which A Surface Extends Is  Y =      0.00(ft)
     10.00(ft) Line Segments Define Each Trial Failure Surface.
     Following Are Displayed The Ten Most Critical Of The Trial
            Failure Surfaces Evaluated. They Are
            Ordered - Most Critical First.
            * * Safety Factors Are Calculated By The Modified Bishop Method * *
            Total Number of Trial Surfaces Attempted =     0
            Number of Trial Surfaces With Valid FS =    0
            Statistical Data On All Valid FS Values:
               FS Max =   0.000   FS Min = 500.000   FS Ave =  NaN
               Standard Deviation =    0.000   Coefficient of Variation =  NaN    %
            Failure Surface Specified By 13 Coordinate Points
              Point       X-Surf      Y-Surf
               No.         (ft)        (ft)
                1        678.448      335.957
                2        688.217      333.818
                3        698.135      332.538
                4        708.126      332.127
                5        718.116      332.587
                6        728.027      333.915
                7        737.785      336.101
                8        747.316      339.129
                9        756.547      342.974
               10        765.408      347.609
               11        773.832      352.998
               12        781.754      359.100
               13        788.170      365.000
            Circle Center At X =   707.847 ; Y =   446.862 ; and Radius =   114.735
                   Factor of Safety
                  ***    2.606   ***
                 Individual data on the    16  slices
                            Water  Water     Tie     Tie     Earthquake
                            Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm    Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      3.6     174.9     0.0     0.0       0.      0.     0.0     0.0     0.0
  2      6.2    1676.7     0.0     0.0       0.      0.     0.0     0.0     0.0
  3      9.9    6550.6     0.0     0.0       0.      0.     0.0     0.0     0.0
  4      8.9    9128.2     0.0     0.0       0.      0.     0.0     0.0     0.0
  5      1.1    1347.2     0.0     0.0       0.      0.     0.0     0.0     0.0
  6     10.0   13088.5     0.0     0.0       0.      0.     0.0     0.0     0.0
  7      9.9   14388.4     0.0     0.0       0.      0.     0.0     0.0     0.0
  8      3.0    4438.6     0.0     0.0       0.      0.     0.0     0.0     0.0
  9      6.8   10649.7     0.0     0.0       0.      0.     0.0     0.0     0.0
 10      9.5   16263.7     0.0     0.0       0.      0.     0.0     0.0     0.0
 11      9.2   16295.0     0.0     0.0       0.      0.     0.0     0.0     0.0
 12      8.9   15159.4     0.0     0.0       0.      0.     0.0     0.0     0.0
 13      8.4   13001.9     0.0     0.0       0.      0.     0.0     0.0     0.0
 14      0.2     240.5     0.0     0.0       0.      0.     0.0     0.0     0.0
 15      7.8    8268.0     0.0     0.0       0.      0.     0.0     0.0     0.0
 16      6.4    2271.0     0.0     0.0       0.      0.     0.0     0.0     0.0
            Failure Surface Specified By 13 Coordinate Points
```

```
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       677.759      335.948
    2       687.595      334.147
    3       697.546      333.156
    4       707.544      332.982
    5       717.524      333.627
    6       727.417      335.087
    7       737.157      337.351
    8       746.679      340.405
    9       755.920      344.227
   10       764.817      348.793
   11       773.310      354.071
   12       781.343      360.027
   13       787.015      365.000
Circle Center At X =   704.661 ; Y =   455.065 ; and Radius =   122.116
       Factor of Safety
      ***    2.608   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       677.414      335.944
    2       687.209      333.931
    3       697.140      332.759
    4       707.135      332.439
    5       717.121      332.971
    6       727.025      334.352
    7       736.776      336.573
    8       746.301      339.616
    9       755.533      343.460
   10       764.403      348.077
   11       772.848      353.433
   12       780.806      359.489
   13       786.892      365.000
Circle Center At X =   705.894 ; Y =   449.667 ; and Radius =   117.235
       Factor of Safety
      ***    2.609   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       678.448      335.957
    2       688.315      334.326
    3       698.277      333.455
    4       708.276      333.347
    5       718.255      334.004
    6       728.154      335.422
    7       737.915      337.592
    8       747.482      340.502
    9       756.799      344.135
   10       765.811      348.469
   11       774.466      353.479
   12       782.712      359.137
   13       789.995      365.000
Circle Center At X =   704.682 ; Y =   464.038 ; and Radius =   130.740
       Factor of Safety
      ***    2.612   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       677.759      335.948
    2       687.632      334.363
    3       697.599      333.551
    4       707.599      333.519
    5       717.571      334.266
    6       727.455      335.787
    7       737.190      338.073
    8       746.717      341.111
    9       755.979      344.883
   10       764.919      349.364
   11       773.482      354.528
```

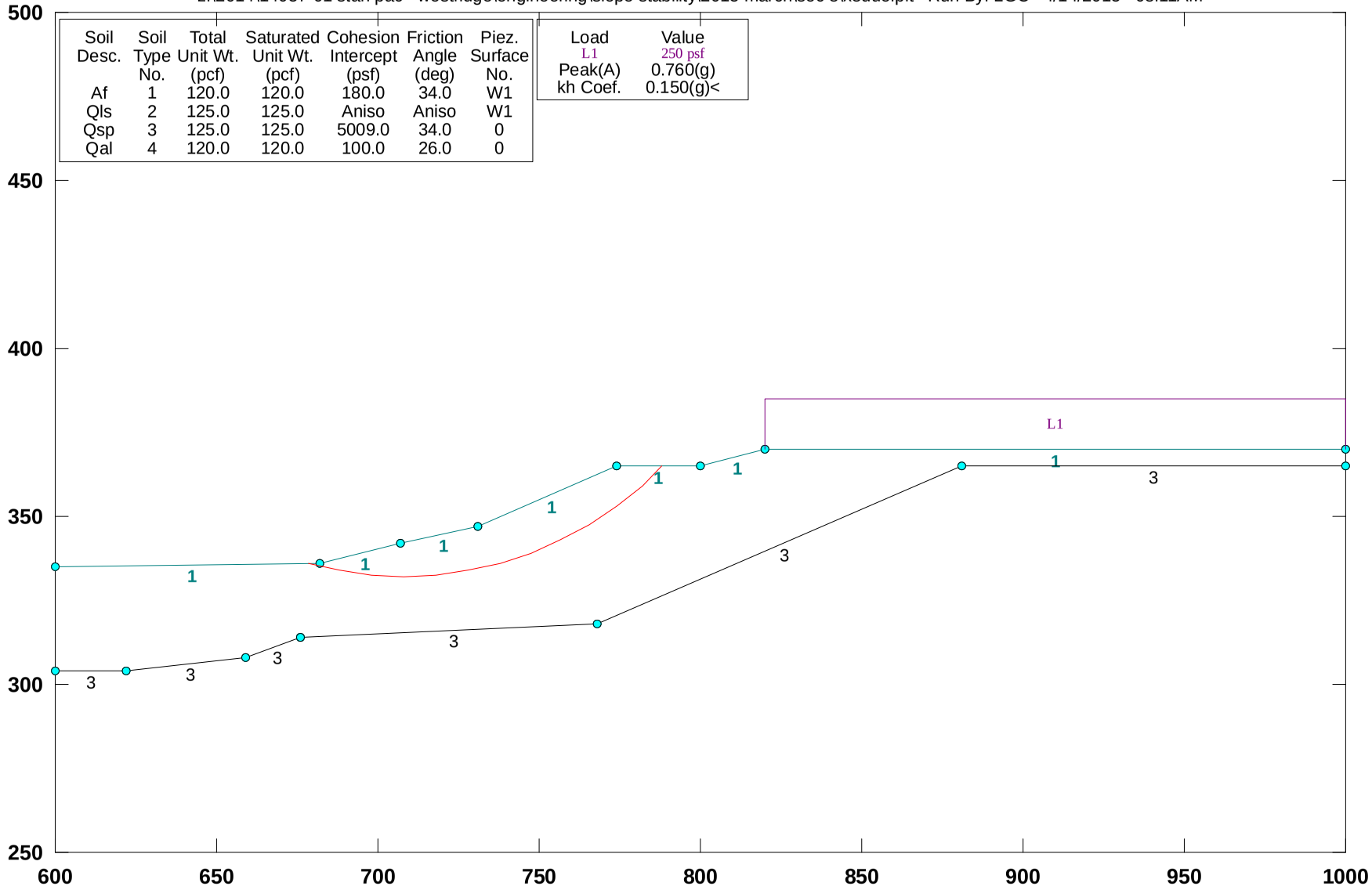


```
   12       781.618      360.343
   13       787.162      365.000
Circle Center At X =   703.016 ; Y =   461.701 ; and Radius =   128.264
       Factor of Safety
      ***    2.612   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       677.759      335.948
    2       687.563      333.978
    3       697.502      332.880
    4       707.500      332.664
    5       717.478      333.329
    6       727.358      334.873
    7       737.064      337.282
    8       746.519      340.537
    9       755.650      344.614
   10       764.386      349.480
   11       772.659      355.098
   12       780.404      361.424
   13       784.069      365.000
Circle Center At X =   704.954 ; Y =   445.899 ; and Radius =   113.264
       Factor of Safety
      ***    2.613   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       677.069      335.940
    2       686.838      333.801
    3       696.753      332.505
    4       706.743      332.060
    5       716.735      332.469
    6       726.655      333.731
    7       736.431      335.835
    8       745.992      338.766
    9       755.267      342.503
   10       764.190      347.019
   11       772.694      352.280
   12       780.718      358.248
   13       788.203      364.880
   14       788.317      365.000
Circle Center At X =   706.950 ; Y =   449.019 ; and Radius =   116.960
       Factor of Safety
      ***    2.614   ***
Failure Surface Specified By 14 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       677.414      335.944
    2       687.242      334.098
    3       697.185      333.035
    4       707.182      332.762
    5       717.168      333.280
    6       727.083      334.585
    7       736.863      336.670
    8       746.448      339.522
    9       755.777      343.123
   10       764.792      347.450
   11       773.437      352.477
   12       781.658      358.171
   13       789.402      364.497
   14       789.928      365.000
Circle Center At X =   705.639 ; Y =   459.020 ; and Radius =   126.271
       Factor of Safety
      ***    2.615   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1       677.759      335.948
    2       687.603      334.191
    3       697.560      333.269
```

```
     4        707.560      333.189
     5        717.531      333.952
     6        727.402      335.552
     7        737.103      337.978
     8        746.566      341.213
     9        755.722      345.234
    10        764.506      350.012
    11        772.858      355.513
    12        780.715      361.698
    13        784.252      365.000
Circle Center At X =   703.506 ; Y =   451.708 ; and Radius =   118.589
       Factor of Safety
      ***    2.615   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        677.759      335.948
     2        687.519      333.770
     3        697.438      332.500
     4        707.432      332.148
     5        717.415      332.718
     6        727.304      334.204
     7        737.014      336.595
     8        746.463      339.869
     9        755.570      343.999
    10        764.259      348.950
    11        772.454      354.680
    12        780.088      361.140
    13        783.878      365.000
Circle Center At X =   706.247 ; Y =   440.653 ; and Radius =   108.511
       Factor of Safety
      ***    2.615   ***
          **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 8-8'/3/13- Design- Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 8\x8due.plt Run By: LGC 4/14/2015 08:11AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qls	2	125.0	125.0	Aniso	Aniso	W1
Qsp	3	125.0	125.0	5009.0	34.0	0
Qal	4	120.0	120.0	100.0	26.0	0

Load	Value
L1	250 psf
Peak(A)	0.760(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.88

Factor Of Safety Is Calculated By The Simplified Janbu Method

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        4/14/2015
    Time of Run:              08:11AM
    Run By:                   LGC
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8due.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8due.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8due.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 8-8'/3/13- Design
                          - Upper Slope - Seismic
    BOUNDARY COORDINATES
        7 Top   Boundaries
       13 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        600.00     335.00     682.00     336.00        1
        2        682.00     336.00     707.00     342.00        1
        3        707.00     342.00     731.00     347.00        1
        4        731.00     347.00     774.00     365.00        1
        5        774.00     365.00     800.00     365.00        1
        6        800.00     365.00     820.00     370.00        1
        7        820.00     370.00    1000.00     370.00        1
        8        676.00     314.00     768.00     318.00        3
        9        768.00     318.00     881.00     365.00        3
       10        881.00     365.00    1000.00     365.00        3
       11        600.00     304.00     622.00     304.00        3
       12        622.00     304.00     659.00     308.00        3
       13        659.00     308.00     676.00     314.00        3
    User Specified Y-Origin =       250.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0    5009.0     34.0    0.00       0.0      0
      4   120.0    120.0     100.0     26.0    0.00       0.0      0
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              0.0             500.00         34.00
        2             12.0             200.00         27.00
        3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
```

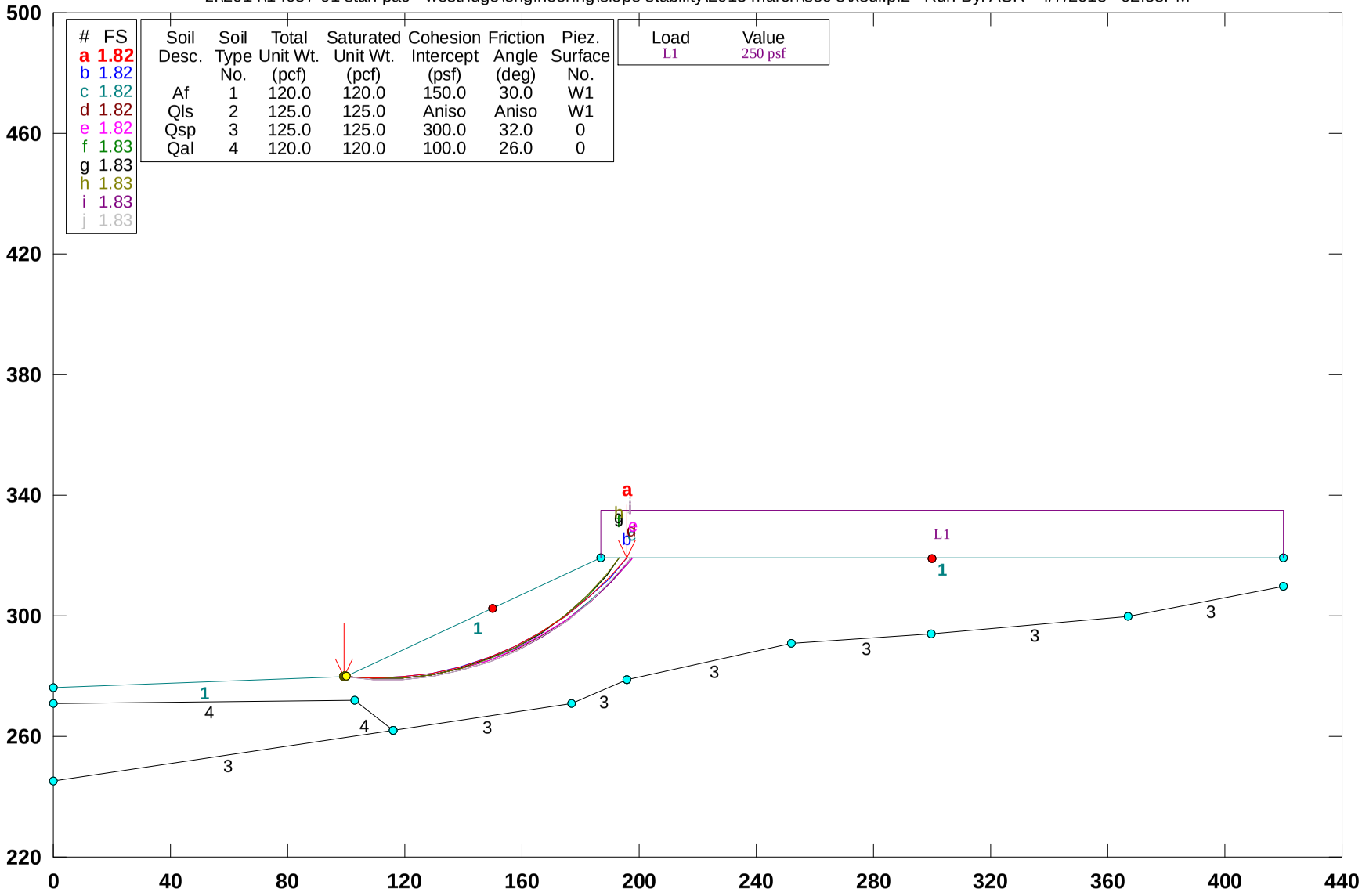


```
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)        (ft)        (psf)          (deg)
      1         820.00      1000.00       250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.760(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Trial Failure Surface Specified By 13 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1        678.448     335.957
        2        688.217     333.818
        3        698.135     332.538
        4        708.126     332.127
        5        718.116     332.587
        6        728.027     333.915
        7        737.785     336.101
        8        747.316     339.129
        9        756.547     342.974
       10        765.408     347.609
       11        773.832     352.998
       12        781.754     359.100
       13        788.170     365.000
   * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.883
         ***Table 1 - Individual Data on the   16 Slices***
                            Water  Water     Tie      Tie     Earthquake
                            Force  Force    Force    Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      3.6     175.0     0.0     0.0      0.0     0.0    26.2     0.0     0.0
  2      6.2    1676.7     0.0     0.0      0.0     0.0   251.5     0.0     0.0
  3      9.9    6550.9     0.0     0.0      0.0     0.0   982.6     0.0     0.0
  4      8.9    9128.0     0.0     0.0      0.0     0.0  1369.2     0.0     0.0
  5      1.1    1346.7     0.0     0.0      0.0     0.0   202.0     0.0     0.0
  6     10.0   13088.7     0.0     0.0      0.0     0.0  1963.3     0.0     0.0
  7      9.9   14387.6     0.0     0.0      0.0     0.0  2158.1     0.0     0.0
  8      3.0    4438.9     0.0     0.0      0.0     0.0   665.8     0.0     0.0
  9      6.8   10649.1     0.0     0.0      0.0     0.0  1597.4     0.0     0.0
 10      9.5   16263.7     0.0     0.0      0.0     0.0  2439.6     0.0     0.0
 11      9.2   16295.2     0.0     0.0      0.0     0.0  2444.3     0.0     0.0
 12      8.9   15160.0     0.0     0.0      0.0     0.0  2274.0     0.0     0.0
 13      8.4   13003.0     0.0     0.0      0.0     0.0  1950.5     0.0     0.0
 14      0.2     239.9     0.0     0.0      0.0     0.0    36.0     0.0     0.0
 15      7.8    8268.6     0.0     0.0      0.0     0.0  1240.3     0.0     0.0
 16      6.4    2271.2     0.0     0.0      0.0     0.0   340.7     0.0     0.0
         ***Table 2 - Base Stress Data on the   16 Slices***
Slice   Alpha     X-Coord.      Base          Available             Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
  *                  (ft)        (ft)           (psf)                 (psf)
  1     -12.35      680.22        3.64          236.85                 -3.32
  2     -12.35      685.11        6.36          402.02                -18.16
  3      -7.35      693.18       10.00          661.29                 13.72
  4      -2.36      702.57        8.87          888.35                112.00
  5      -2.36      707.56        1.13         1002.36                130.09
  6       2.64      713.12       10.00         1047.58                256.58
  7       7.63      723.07       10.00         1115.95                408.61
  8      12.63      729.51        3.05         1126.13                544.94
  9      12.63      734.39        6.95         1175.03                572.83
 10      17.63      742.55       10.00         1253.83                760.63
 11      22.61      751.93       10.00         1292.02                923.19
 12      27.61      760.98       10.00         1267.86               1020.38
 13      32.61      769.62       10.00         1179.33               1026.84
 14      37.61      773.92        0.21         1131.09               1041.28
```

```
15      37.61      777.88        9.79            889.60               777.44
16      42.60      784.96        8.72            427.93               278.70
   Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
   Soil Nail, and Applied Forces if applicable) =  114866.97 (lbs)
   Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
   Soil Nail, and Applied Forces if applicable) =    967.57(psf)
   Sum of the Driving Forces =    61015.16 (lbs)
   Average Mobilized Shear Stress =     513.96(psf)
   Total length of the failure surface =     118.72(ft)
          *** SEISMIC SLOPE DISPLACEMENT DATA ***
   (Note: kv is set = zero for displacement calculations)
   Seismic Yield Coefficient (ky) =  0.4929(g)
   Calculated Newmark Seismic Displacement =   0.175(ft)
   Non-Symmetrical Sliding Resistance Has Been Specified
   for Downhill Sliding.
                 **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 8-8'/3/13 Design - Lower Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 8\x8dl.pl2 Run By: ASR 4/7/2015 02:58PM



#	FS
a	1.82
b	1.82
c	1.82
d	1.82
e	1.82
f	1.83
g	1.83
h	1.83
i	1.83
j	1.83

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	150.0	30.0	W1
Qls	2	125.0	125.0	Aniso	Aniso	W1
Qsp	3	125.0	125.0	300.0	32.0	0
Qal	4	120.0	120.0	100.0	26.0	0

Load	Value
L1	250 psf

GSTABL7 v.2 FSmin=1.82

Safety Factors Are Calculated By The Modified Bishop Method

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
     ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
          Modified Bishop, Simplified Janbu, or GLE Method of Slices.
          (Includes Spencer & Morgenstern-Price Type Analysis)
          Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
          Nonlinear Undrained Shear Strength, Curved Phi Envelope,
          Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
          Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        4/13/2015
    Time of Run:              02:12PM
    Run By:                   LGC
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8dl.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8dl.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8dl.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 8-8'/3/13 Design
                          - Lower Slope - Static
    BOUNDARY COORDINATES
        3 Top   Boundaries
       12 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     276.00     100.00     280.00        1
        2       100.00     280.00     187.00     319.00        1
        3       187.00     319.00     420.00     319.00        1
        4         0.00     271.00     103.00     272.00        4
        5       103.00     272.00     116.00     262.00        4
        6       196.00     279.00     252.00     291.00        3
        7       252.00     291.00     300.00     294.00        3
        8       300.00     294.00     367.00     300.00        3
        9       367.00     300.00     420.00     310.00        3
       10         0.00     245.00     116.00     262.00        3
       11       116.00     262.00     177.00     271.00        3
       12       177.00     271.00     196.00     279.00        3
    User Specified Y-Origin =       220.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     300.0     32.0    0.00       0.0      0
      4   120.0    120.0     200.0     28.0    0.00       0.0      0
   ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              0.0             300.00         32.00
        2             12.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
```



```
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)         (ft)        (psf)         (deg)
      1         187.00       420.00       250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Circular Surfaces, Has Been Specified.
   15000 Trial Surfaces Have Been Generated.
      500 Surface(s) Initiate(s) From Each Of    30 Points Equally Spaced
    Along The Ground Surface Between  X =  99.00(ft)
                                   and  X = 100.00(ft)
    Each Surface Terminates Between   X = 150.00(ft)
                                   and   X = 300.00(ft)
    Unless Further Limitations Were Imposed, The Minimum Elevation
    At Which A Surface Extends Is  Y =      0.00(ft)
    10.00(ft) Line Segments Define Each Trial Failure Surface.
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Evaluated. They Are
          Ordered - Most Critical First.
          * * Safety Factors Are Calculated By The Modified Bishop Method * *
          Total Number of Trial Surfaces Attempted =     0
          Number of Trial Surfaces With Valid FS =    0
          Statistical Data On All Valid FS Values:
             FS Max =   0.000   FS Min = 500.000   FS Ave =  NaN
             Standard Deviation =    0.000   Coefficient of Variation =  NaN    %
          Failure Surface Specified By 12 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1         99.207      279.968
              2        109.192      279.416
              3        119.186      279.753
              4        129.111      280.978
              5        138.887      283.081
              6        148.438      286.046
              7        157.687      289.847
              8        166.561      294.457
              9        174.990      299.837
             10        182.908      305.946
             11        190.250      312.734
             12        195.920      319.000
          Circle Center At X =   110.430 ; Y =   391.495 ; and Radius =   112.090
                Factor of Safety
             ***    1.816   ***
            Individual data on the     0  slices
                      Water  Water     Tie     Tie     Earthquake
                      Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor      Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
          Failure Surface Specified By 12 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1         99.103      279.964
              2        109.088      279.412
              3        119.083      279.747
              4        129.008      280.967
              5        138.786      283.062
              6        148.339      286.017
              7        157.593      289.806
              8        166.475      294.402
              9        174.914      299.767
             10        182.844      305.860
             11        190.202      312.631
             12        195.995      319.000
          Circle Center At X =   110.342 ; Y =   391.835 ; and Radius =   112.434
                Factor of Safety
             ***    1.816   ***
          Failure Surface Specified By 13 Coordinate Points
            Point      X-Surf      Y-Surf
```

```
   No.        (ft)        (ft)
    1         99.345      279.974
    2        109.320      279.275
    3        119.318      279.472
    4        129.259      280.561
    5        139.062      282.535
    6        148.650      285.378
    7        157.944      289.067
    8        166.872      293.573
    9        175.361      298.858
   10        183.343      304.882
   11        190.755      311.595
   12        197.536      318.944
   13        197.579      319.000
Circle Center At X =   112.128 ; Y =   390.954 ; and Radius =   111.714
       Factor of Safety
      ***    1.822   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         99.207      279.968
    2        109.182      279.270
    3        119.181      279.463
    4        129.122      280.546
    5        138.927      282.510
    6        148.518      285.340
    7        157.819      289.014
    8        166.756      293.501
    9        175.257      298.767
   10        183.255      304.769
   11        190.687      311.460
   12        197.493      318.786
   13        197.659      319.000
Circle Center At X =   112.019 ; Y =   391.366 ; and Radius =   112.132
       Factor of Safety
      ***    1.822   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         99.069      279.963
    2        109.045      279.264
    3        119.043      279.454
    4        128.985      280.530
    5        138.792      282.485
    6        148.387      285.302
    7        157.694      288.960
    8        166.639      293.430
    9        175.153      298.676
   10        183.167      304.657
   11        190.619      311.325
   12        197.449      318.629
   13        197.739      319.000
Circle Center At X =   111.911 ; Y =   391.779 ; and Radius =   112.551
       Factor of Safety
      ***    1.822   ***
Failure Surface Specified By 12 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         99.000      279.960
    2        108.960      279.072
    3        118.960      279.175
    4        128.900      280.268
    5        138.683      282.341
    6        148.212      285.373
    7        157.394      289.334
    8        166.138      294.186
    9        174.359      299.880
   10        181.975      306.361
   11        188.911      313.564
   12        193.193      319.000
```



```
Circle Center At X =   112.963 ; Y =   379.422 ; and Radius =   100.437
       Factor of Safety
      ***    1.828   ***
Failure Surface Specified By 12 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         99.103      279.964
    2        109.064      279.076
    3        119.063      279.182
    4        129.003      280.281
    5        138.784      282.362
    6        148.310      285.404
    7        157.486      289.378
    8        166.222      294.244
    9        174.432      299.954
   10        182.033      306.452
   11        188.952      313.672
   12        193.125      319.000
Circle Center At X =   113.043 ; Y =   379.136 ; and Radius =   100.147
       Factor of Safety
      ***    1.828   ***
Failure Surface Specified By 12 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         99.241      279.970
    2        109.202      279.081
    3        119.201      279.191
    4        129.140      280.297
    5        138.919      282.389
    6        148.440      285.446
    7        157.609      289.437
    8        166.334      294.322
    9        174.529      300.054
   10        182.111      306.574
   11        189.005      313.817
   12        193.034      319.000
Circle Center At X =   113.150 ; Y =   378.757 ; and Radius =    99.762
       Factor of Safety
      ***    1.828   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         99.276      279.971
    2        109.232      279.034
    3        119.232      279.041
    4        129.187      279.993
    5        139.007      281.880
    6        148.605      284.686
    7        157.896      288.385
    8        166.795      292.946
    9        175.224      298.326
   10        183.108      304.478
   11        190.376      311.347
   12        196.962      318.872
   13        197.055      319.000
Circle Center At X =   114.155 ; Y =   384.711 ; and Radius =   105.791
       Factor of Safety
      ***    1.829   ***
Failure Surface Specified By 13 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         99.138      279.966
    2        109.094      279.029
    3        119.094      279.032
    4        129.049      279.977
    5        138.871      281.854
    6        148.474      284.647
    7        157.770      288.331
    8        166.679      292.873
    9        175.122      298.233
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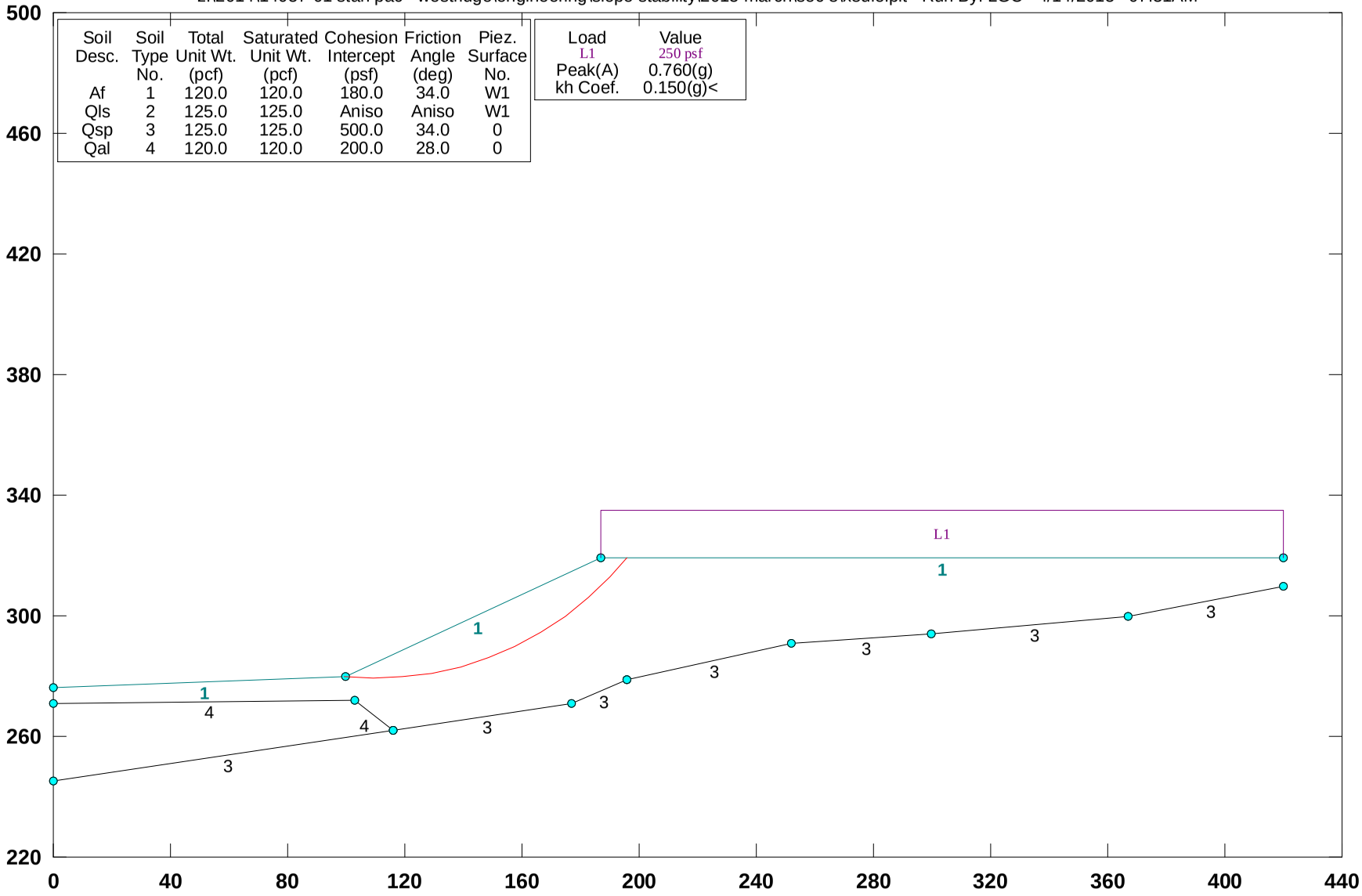
   10        183.022      304.363
   11        190.311      311.210
   12        196.923      318.712
   13        197.132      319.000
Circle Center At X =   114.053 ; Y =   385.088 ; and Radius =   106.176
       Factor of Safety
      ***    1.829   ***
          **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 8-8'/3/13 Design - Lower Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 8\x8dle.plt Run By: LGC 4/14/2015 07:31AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qls	2	125.0	125.0	Aniso	Aniso	W1
Qsp	3	125.0	125.0	500.0	34.0	0
Qal	4	120.0	120.0	200.0	28.0	0

Load	Value
L1	250 psf
Peak(A)	0.760(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.53

Factor Of Safety Is Calculated By The Modified Bishop Method

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                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
         ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                           SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        4/14/2015
    Time of Run:              07:31AM
    Run By:                   LGC
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8dle.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8dle.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 8\x8dle.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 8-8'/3/13 Design
                          - Lower Slope - Seismic
    BOUNDARY COORDINATES
        3 Top   Boundaries
       12 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     276.00     100.00     280.00        1
        2       100.00     280.00     187.00     319.00        1
        3       187.00     319.00     420.00     319.00        1
        4         0.00     271.00     103.00     272.00        4
        5       103.00     272.00     116.00     262.00        4
        6       196.00     279.00     252.00     291.00        3
        7       252.00     291.00     300.00     294.00        3
        8       300.00     294.00     367.00     300.00        3
        9       367.00     300.00     420.00     310.00        3
       10         0.00     245.00     116.00     262.00        3
       11       116.00     262.00     177.00     271.00        3
       12       177.00     271.00     196.00     279.00        3
    User Specified Y-Origin =       220.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     4 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     200.0     24.0    0.00       0.0      1
      3   125.0    125.0     500.0     34.0    0.00       0.0      0
      4   120.0    120.0     200.0     28.0    0.00       0.0      0
   ANISOTROPIC STRENGTH PARAMETERS
       1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept      Angle
       No.            (deg)            (psf)         (deg)
        1              0.0             500.00         34.00
        2             12.0             200.00         27.00
        3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
```



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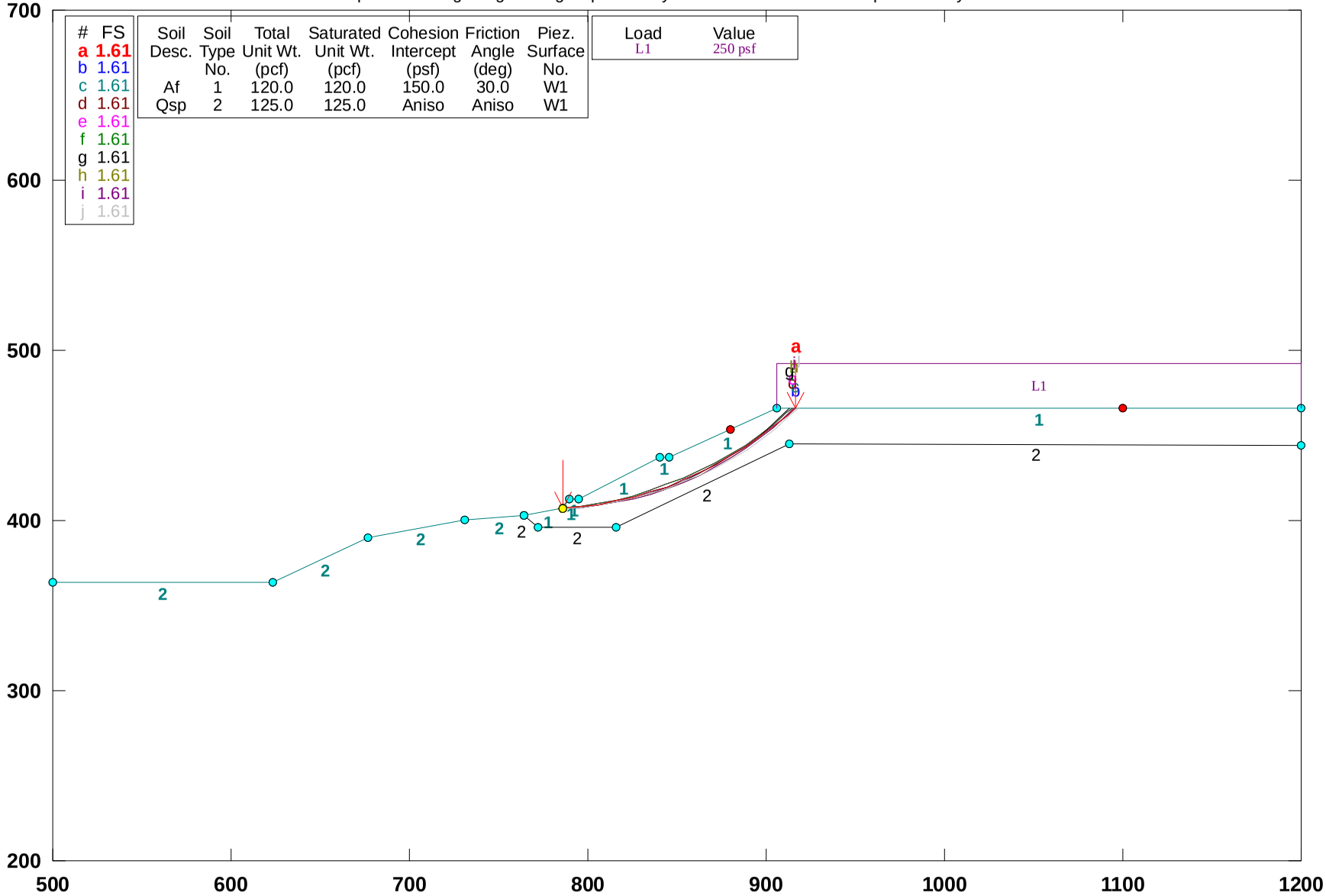
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load         X-Left      X-Right     Intensity     Deflection
     No.          (ft)        (ft)        (psf)          (deg)
     1          187.00      420.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.760(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Trial Failure Surface Specified By 12 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1         99.207     279.968
        2        109.192     279.416
        3        119.186     279.753
        4        129.111     280.978
        5        138.887     283.081
        6        148.438     286.046
        7        157.687     289.847
        8        166.561     294.457
        9        174.990     299.837
       10        182.908     305.946
       11        190.250     312.734
       12        195.920     319.000
 DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)
     Angle/Segment No.   Deflection(Deg)   Segment Length(ft)
            1                 5.10               10.00
            2                 5.11               10.00
            3                 5.10               10.00
            4                 5.11               10.00
            5                 5.09               10.00
            6                 5.11               10.00
            7                 5.10               10.00
            8                 5.10               10.00
            9                 5.10               10.00
    Circle Center At X =   110.429(ft) ; Y =   391.496(ft); and Radius =   112.091(ft)
    * * Factor Of Safety Is Calculated By The Modified Bishop Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.528
         ***Table 1 - Individual Data on the   13 Slices***
                            Water  Water     Tie     Tie     Earthquake
                            Force  Force    Force   Force       Force   Surcharge
 Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
  No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
   1      0.8       3.6     0.0     0.0      0.0     0.0     0.5     0.0     0.0
   2      9.2    2636.3     0.0     0.0      0.0     0.0   395.4     0.0     0.0
   3     10.0    8126.4     0.0     0.0      0.0     0.0  1219.0     0.0     0.0
   4      9.9   12457.5     0.0     0.0      0.0     0.0  1868.6     0.0     0.0
   5      9.8   15498.6     0.0     0.0      0.0     0.0  2324.8     0.0     0.0
   6      9.6   17202.5     0.0     0.0      0.0     0.0  2580.4     0.0     0.0
   7      9.2   17580.7     0.0     0.0      0.0     0.0  2637.1     0.0     0.0
   8      8.9   16715.1     0.0     0.0      0.0     0.0  2507.3     0.0     0.0
   9      8.4   14747.3     0.0     0.0      0.0     0.0  2212.1     0.0     0.0
  10      7.9   11876.5     0.0     0.0      0.0     0.0  1781.5     0.0     0.0
  11      4.1    5030.8     0.0     0.0      0.0     0.0   754.6     0.0     0.0
  12      3.2    3029.7     0.0     0.0      0.0     0.0   454.4     0.0   812.5
  13      5.7    2131.7     0.0     0.0      0.0     0.0   319.8     0.0  1417.5
         ***Table 2 - Base Stress Data on the   13 Slices***
 Slice   Alpha     X-Coord.      Base          Available            Mobilized
  No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
   *                 (ft)        (ft)           (psf)                (psf)
   1      -3.17       99.60        0.79           187.64                0.43
   2      -3.17      104.60        9.21           382.80               26.62
   3       1.93      114.19       10.00           717.78              145.53
   4       7.04      124.15       10.00           973.57              329.33
   5      12.14      134.00       10.00          1140.99              539.55
   6      17.25      143.66       10.00          1226.75              739.14
   7      22.34      153.06       10.00          1237.59              893.58
```

8	27.45	162.12	10.00	1179.91	975.51
9	32.55	170.78	10.00	1061.12	965.55
10	37.65	178.95	10.00	888.94	856.53
11	42.75	184.95	5.57	716.73	706.06
12	42.75	188.62	4.43	694.11	661.12
13	47.86	193.08	8.45	404.75	336.28

```
   Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
   Soil Nail, and Applied Forces if applicable) =   98390.69 (lbs)
   Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
   Soil Nail, and Applied Forces if applicable) =    907.24(psf)
   Sum of the Driving Forces =    64395.62 (lbs)
   Average Mobilized Shear Stress =     593.78(psf)
   Total length of the failure surface =     108.45(ft)
   CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
            Method. This Method Is Valid Only If The Failure Surface
            Approximates A Circular Arc.
          *** SEISMIC SLOPE DISPLACEMENT DATA ***
   (Note: kv is set = zero for displacement calculations)
   Seismic Yield Coefficient (ky) =  0.4010(g)
   Calculated Newmark Seismic Displacement =   0.265(ft)
   Non-Symmetrical Sliding Resistance Has Been Specified
   for Downhill Sliding.
                 **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 9-9'/ 3/13 Design- Upper Slope - Rotational - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 9\x9dexrf.pl2 Run By: ASR 4/7/2015 03:05PM



GSTABL7 v.2 FSmin=1.61

Safety Factors Are Calculated By The Modified Bishop Method

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        4/7/2015
    Time of Run:              03:05PM
    Run By:                   ASR
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dexrf.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dexrf.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dexrf.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 9-9'/ 3/13 Design
                          - Upper Slope - Rotational - Static
    BOUNDARY COORDINATES
       11 Top   Boundaries
       15 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        500.00     364.00     623.00     364.00        2
        2        623.00     364.00     677.00     390.00        2
        3        677.00     390.00     731.00     400.00        2
        4        731.00     400.00     764.00     403.00        2
        5        764.00     403.00     786.00     407.00        1
        6        786.00     407.00     790.00     413.00        1
        7        790.00     413.00     795.00     413.00        1
        8        795.00     413.00     840.00     437.00        1
        9        840.00     437.00     846.00     437.00        1
       10        846.00     437.00     906.00     466.00        1
       11        906.00     466.00    1200.00     466.00        1
       12        764.00     403.00     772.00     396.00        2
       13        772.00     396.00     816.00     396.00        2
       14        816.00     396.00     913.00     445.00        2
       15        913.00     445.00    1200.00     444.00        2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     2 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     300.0     32.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1             -4.0             300.00         32.00
        2             10.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
```



```
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
        1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)         (ft)        (psf)         (deg)
       1         906.00      1200.00       250.0          0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     A Critical Failure Surface Searching Method, Using A Random
     Technique For Generating Circular Surfaces, Has Been Specified.
    15000 Trial Surfaces Have Been Generated.
      500 Surface(s) Initiate(s) From Each Of    30 Points Equally Spaced
     Along The Ground Surface Between  X = 786.00(ft)
                                   and  X = 786.00(ft)
     Each Surface Terminates Between   X = 880.00(ft)
                                   and   X =1100.00(ft)
     Unless Further Limitations Were Imposed, The Minimum Elevation
     At Which A Surface Extends Is  Y =      0.00(ft)
     10.00(ft) Line Segments Define Each Trial Failure Surface.
     Following Are Displayed The Ten Most Critical Of The Trial
            Failure Surfaces Evaluated. They Are
            Ordered - Most Critical First.
            * * Safety Factors Are Calculated By The Modified Bishop Method * *
            Total Number of Trial Surfaces Attempted =    0
            Number of Trial Surfaces With Valid FS =    0
            Statistical Data On All Valid FS Values:
               FS Max =   0.000   FS Min = 500.000   FS Ave =  NaN
               Standard Deviation =    0.000   Coefficient of Variation =  NaN    %
            Failure Surface Specified By 16 Coordinate Points
              Point       X-Surf       Y-Surf
               No.         (ft)         (ft)
                1        786.000      407.000
                2        795.949      408.008
                3        805.839      409.489
                4        815.647      411.440
                5        825.351      413.855
                6        834.929      416.729
                7        844.359      420.056
                8        853.620      423.829
                9        862.691      428.038
               10        871.551      432.674
               11        880.181      437.727
               12        888.560      443.185
               13        896.670      449.036
               14        904.491      455.267
               15        912.008      461.862
               16        916.293      466.000
            Circle Center At X =   769.921 ; Y =   615.875 ; and Radius =   209.493
                  Factor of Safety
                 ***    1.611   ***
                 Individual data on the     0  slices
                              Water  Water     Tie     Tie     Earthquake
                              Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
            Failure Surface Specified By 16 Coordinate Points
              Point       X-Surf       Y-Surf
               No.         (ft)         (ft)
                1        786.000      407.000
                2        795.949      408.008
                3        805.839      409.489
                4        815.647      411.440
                5        825.351      413.855
                6        834.929      416.729
                7        844.359      420.056
                8        853.620      423.829
                9        862.691      428.038
               10        871.551      432.674
               11        880.181      437.727
```

```
   12        888.560      443.185
   13        896.670      449.036
   14        904.491      455.267
   15        912.008      461.862
   16        916.293      466.000
Circle Center At X =   769.921 ; Y =   615.875 ; and Radius =   209.493
       Factor of Safety
      ***    1.611   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        786.000      407.000
    2        795.949      408.008
    3        805.839      409.489
    4        815.647      411.440
    5        825.351      413.855
    6        834.929      416.729
    7        844.359      420.056
    8        853.620      423.829
    9        862.691      428.038
   10        871.551      432.674
   11        880.181      437.727
   12        888.560      443.185
   13        896.670      449.036
   14        904.491      455.267
   15        912.008      461.862
   16        916.293      466.000
Circle Center At X =   769.921 ; Y =   615.875 ; and Radius =   209.493
       Factor of Safety
      ***    1.611   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        786.000      407.000
    2        795.926      408.218
    3        805.785      409.891
    4        815.557      412.014
    5        825.221      414.583
    6        834.757      417.594
    7        844.145      421.038
    8        853.365      424.910
    9        862.398      429.201
   10        871.224      433.902
   11        879.825      439.003
   12        888.183      444.494
   13        896.280      450.362
   14        904.099      456.596
   15        911.624      463.182
   16        914.560      466.000
Circle Center At X =   764.562 ; Y =   623.279 ; and Radius =   217.339
       Factor of Safety
      ***    1.612   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        786.000      407.000
    2        795.926      408.218
    3        805.785      409.891
    4        815.557      412.014
    5        825.221      414.583
    6        834.757      417.594
    7        844.145      421.038
    8        853.365      424.910
    9        862.398      429.201
   10        871.224      433.902
   11        879.825      439.003
   12        888.183      444.494
   13        896.280      450.362
   14        904.099      456.596
   15        911.624      463.182
```



```
   16        914.560      466.000
Circle Center At X =   764.562 ; Y =   623.279 ; and Radius =   217.339
       Factor of Safety
      ***    1.612   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        786.000      407.000
    2        795.926      408.218
    3        805.785      409.891
    4        815.557      412.014
    5        825.221      414.583
    6        834.757      417.594
    7        844.145      421.038
    8        853.365      424.910
    9        862.398      429.201
   10        871.224      433.902
   11        879.825      439.003
   12        888.183      444.494
   13        896.280      450.362
   14        904.099      456.596
   15        911.624      463.182
   16        914.560      466.000
Circle Center At X =   764.562 ; Y =   623.279 ; and Radius =   217.339
       Factor of Safety
      ***    1.612   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        786.000      407.000
    2        795.968      407.799
    3        805.880      409.123
    4        815.708      410.968
    5        825.426      413.328
    6        835.005      416.198
    7        844.420      419.569
    8        853.643      423.433
    9        862.651      427.777
   10        871.416      432.590
   11        879.915      437.859
   12        888.125      443.569
   13        896.022      449.704
   14        903.584      456.247
   15        910.791      463.180
   16        913.428      466.000
Circle Center At X =   775.948 ; Y =   595.821 ; and Radius =   189.088
       Factor of Safety
      ***    1.613   ***
Failure Surface Specified By 16 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1        786.000      407.000
    2        795.976      407.690
    3        805.902      408.904
    4        815.751      410.637
    5        825.495      412.885
    6        835.108      415.641
    7        844.562      418.899
    8        853.832      422.649
    9        862.893      426.880
   10        871.719      431.582
   11        880.286      436.740
   12        888.570      442.341
   13        896.548      448.370
   14        904.199      454.810
   15        911.501      461.642
   16        915.693      466.000
Circle Center At X =   777.947 ; Y =   596.747 ; and Radius =   189.918
       Factor of Safety
      ***    1.613   ***
```

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	786.000	407.000
2	795.977	407.681
3	805.904	408.887
4	815.754	410.613
5	825.499	412.856
6	835.113	415.608
7	844.568	418.864
8	853.839	422.612
9	862.899	426.844
10	871.725	431.546
11	880.290	436.707
12	888.572	442.312
13	896.547	448.345
14	904.193	454.789
15	911.490	461.627
16	915.689	466.000

Circle Center At X = 778.157 ; Y = 596.274 ; and Radius = 189.437

Factor of Safety

*** 1.613 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	786.000	407.000
2	795.968	407.805
3	805.883	409.099
4	815.724	410.878
5	825.465	413.138
6	835.083	415.875
7	844.556	419.080
8	853.859	422.747
9	862.971	426.867
10	871.870	431.429
11	880.534	436.423
12	888.941	441.837
13	897.073	447.657
14	904.909	453.869
15	912.431	460.459
16	918.160	466.000

Circle Center At X = 774.674 ; Y = 609.890 ; and Radius = 203.206

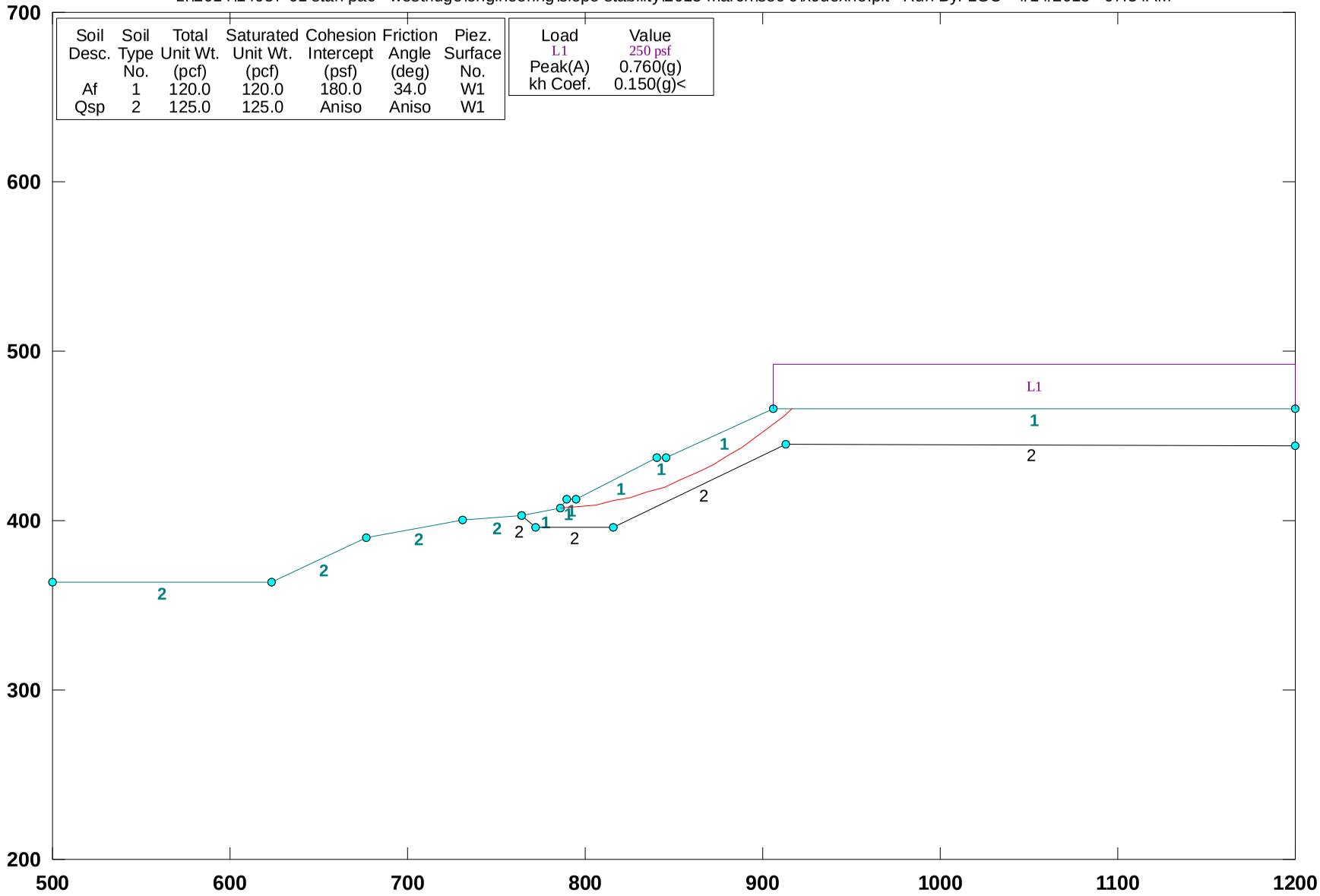
Factor of Safety

*** 1.614 ***

**** END OF GSTABL7 OUTPUT ****

Westridge/14057-01/Sec 9-9'/ 3/13 Design- Upper Slope - Rotational - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 9\x9dexrfe.plt Run By: LGC 4/14/2015 07:34AM



GSTABL7 v.2 FSmin=1.36

Factor Of Safety Is Calculated By The Modified Bishop Method

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
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    Analysis Run Date:        4/14/2015
    Time of Run:              07:34AM
    Run By:                   LGC
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dexrfe.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dexrfe.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dexrfe.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 9-9'/ 3/13 Design
                          - Upper Slope - Rotational - Seismic
    BOUNDARY COORDINATES
       11 Top   Boundaries
       15 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        500.00     364.00     623.00     364.00        2
        2        623.00     364.00     677.00     390.00        2
        3        677.00     390.00     731.00     400.00        2
        4        731.00     400.00     764.00     403.00        2
        5        764.00     403.00     786.00     407.00        1
        6        786.00     407.00     790.00     413.00        1
        7        790.00     413.00     795.00     413.00        1
        8        795.00     413.00     840.00     437.00        1
        9        840.00     437.00     846.00     437.00        1
       10        846.00     437.00     906.00     466.00        1
       11        906.00     466.00    1200.00     466.00        1
       12        764.00     403.00     772.00     396.00        2
       13        772.00     396.00     816.00     396.00        2
       14        816.00     396.00     913.00     445.00        2
       15        913.00     445.00    1200.00     444.00        2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     2 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     500.0     34.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
      No.            (deg)            (psf)         (deg)
       1             -4.0             500.00         34.00
       2             10.0             200.00         27.00
       3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
```



```
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)        (ft)        (psf)          (deg)
      1         906.00      1200.00       250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.760(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Trial Failure Surface Specified By 16 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1        786.000     407.000
        2        795.949     408.008
        3        805.839     409.489
        4        815.647     411.440
        5        825.351     413.855
        6        834.929     416.729
        7        844.359     420.056
        8        853.620     423.829
        9        862.691     428.038
       10        871.551     432.674
       11        880.181     437.727
       12        888.560     443.185
       13        896.670     449.036
       14        904.491     455.267
       15        912.008     461.862
       16        916.293     466.000
DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)
    Angle/Segment No.   Deflection(Deg)   Segment Length(ft)
            1                2.73               10.00
            2                2.73               10.00
            3                2.72               10.00
            4                2.73               10.00
            5                2.73               10.00
            6                2.73               10.00
            7                2.73               10.00
            8                2.73               10.00
            9                2.73               10.00
           10                2.73               10.00
           11                2.73               10.00
           12                2.74               10.00
           13                2.72               10.00
   Circle Center At X =   769.919(ft) ; Y =   615.879(ft); and Radius =   209.497(ft)
   * * Factor Of Safety Is Calculated By The Modified Bishop Method * *
   Factor Of Safety For The Preceding Specified Surface =  1.359
        ***Table 1 - Individual Data on the   20 Slices***
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1      4.0    1342.7     0.0    0.0      0.0     0.0   201.4     0.0     0.0
  2      5.0    3204.9     0.0    0.0      0.0     0.0   480.7     0.0     0.0
  3      0.9     602.8     0.0    0.0      0.0     0.0    90.4     0.0     0.0
  4      9.9    8776.4     0.0    0.0      0.0     0.0  1316.5     0.0     0.0
  5      9.8   12866.3     0.0    0.0      0.0     0.0  1929.9     0.0     0.0
  6      9.7   16246.8     0.0    0.0      0.0     0.0  2437.0     0.0     0.0
  7      9.6   18906.3     0.0    0.0      0.0     0.0  2836.0     0.0     0.0
  8      5.1   10968.1     0.0    0.0      0.0     0.0  1645.2     0.0     0.0
  9      4.4    9265.2     0.0    0.0      0.0     0.0  1389.8     0.0     0.0
 10      1.6    3270.9     0.0    0.0      0.0     0.0   490.6     0.0     0.0
 11      7.6   15146.8     0.0    0.0      0.0     0.0  2272.0     0.0     0.0
 12      9.1   18441.3     0.0    0.0      0.0     0.0  2766.2     0.0     0.0
 13      8.9   17917.5     0.0    0.0      0.0     0.0  2687.6     0.0     0.0
 14      8.6   16812.7     0.0    0.0      0.0     0.0  2521.9     0.0     0.0
 15      8.4   15172.5     0.0    0.0      0.0     0.0  2275.9     0.0     0.0
```

16	8.1	13060.4	0.0	0.0	0.0	0.0	1959.1	0.0	0.0
17	7.8	10538.8	0.0	0.0	0.0	0.0	1580.8	0.0	0.0
18	1.5	1757.6	0.0	0.0	0.0	0.0	263.6	0.0	0.0
19	6.0	4883.4	0.0	0.0	0.0	0.0	732.5	0.0	1502.0
20	4.3	1063.9	0.0	0.0	0.0	0.0	159.6	0.0	1071.3

Table 2 - Base Stress Data on the 20 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	5.79	788.00	4.02	386.97	83.17
2	5.79	792.50	5.03	583.03	158.23
3	5.79	795.47	0.95	579.31	156.81
4	8.52	800.89	10.00	724.71	257.84
5	11.25	810.74	10.00	969.17	435.26
6	13.98	820.50	10.00	1165.37	620.73
7	16.70	830.14	10.00	1315.55	803.87
8	19.43	837.46	5.38	1394.72	953.99
9	19.43	842.18	4.62	1373.28	937.74
10	22.17	845.18	1.77	1268.06	941.87
11	22.17	849.81	8.23	1265.03	939.35
12	24.89	858.16	10.00	1260.94	1015.95
13	27.62	867.12	10.00	1225.78	1058.06
14	30.35	875.87	10.00	1157.70	1057.31
15	33.08	884.37	10.00	1059.06	1010.64
16	35.81	892.61	10.00	932.43	916.71
17	38.54	900.58	10.00	780.38	776.12
18	41.26	905.25	2.01	672.76	673.11
19	41.26	909.00	7.99	624.85	594.31
20	44.00	914.15	5.96	348.90	268.13

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 145941.08 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 999.89(psf)
Sum of the Driving Forces = 107364.94 (lbs)
Average Mobilized Shear Stress = 735.59(psf)
Total length of the failure surface = 145.96(ft)
CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

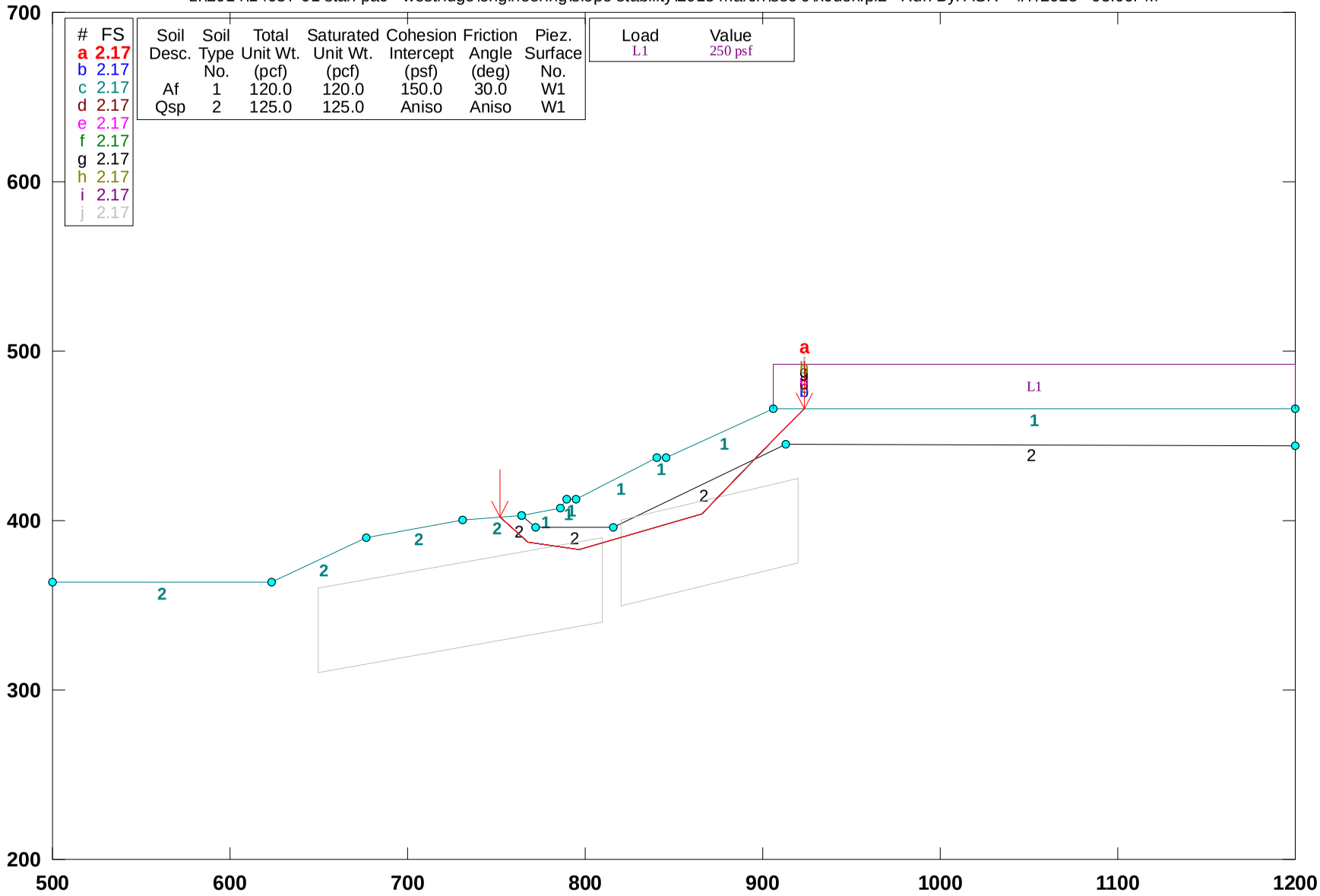
*** SEISMIC SLOPE DISPLACEMENT DATA ***

(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3215(g)
Calculated Newmark Seismic Displacement = 0.412(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

**** END OF GSTABL7 OUTPUT ****

Westridge/14057-01/Sec 9-9'/ 3/13 Design- Upper Slope - Block - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 9\x9dex.pl2 Run By: ASR 4/7/2015 03:06PM



GSTABL7 v.2 FSmin=2.17

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
         ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                           SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        4/7/2015
    Time of Run:              03:06PM
    Run By:                   ASR
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ility\2015 March\Sec 9\x9dex.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dex.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dex.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 9-9'/ 3/13 Design
                          - Upper Slope - Block - Static
    BOUNDARY COORDINATES
       11 Top   Boundaries
       15 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        500.00     364.00     623.00     364.00        2
        2        623.00     364.00     677.00     390.00        2
        3        677.00     390.00     731.00     400.00        2
        4        731.00     400.00     764.00     403.00        2
        5        764.00     403.00     786.00     407.00        1
        6        786.00     407.00     790.00     413.00        1
        7        790.00     413.00     795.00     413.00        1
        8        795.00     413.00     840.00     437.00        1
        9        840.00     437.00     846.00     437.00        1
       10        846.00     437.00     906.00     466.00        1
       11        906.00     466.00    1200.00     466.00        1
       12        764.00     403.00     772.00     396.00        2
       13        772.00     396.00     816.00     396.00        2
       14        816.00     396.00     913.00     445.00        2
       15        913.00     445.00    1200.00     444.00        2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     2 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     300.0     32.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1             -4.0             300.00         32.00
        2             10.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
```



```
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
    BOUNDARY LOAD(S)
        1 Load(s) Specified
     Load        X-Left      X-Right     Intensity     Deflection
      No.         (ft)         (ft)        (psf)         (deg)
       1         906.00      1200.00       250.0          0.0
     NOTE - Intensity Is Specified As A Uniformly Distributed
            Force Acting On A Horizontally Projected Surface.
     Janbus Empirical Coef is being used for the case of  c & phi both > 0
     A Critical Failure Surface Searching Method, Using A Random
     Technique For Generating Sliding Block Surfaces, Has Been
     Specified.
     9999 Trial Surfaces Have Been Generated.
     2 Boxes Specified For Generation Of Central Block Base
     Length Of Line Segments For Active And Passive Portions Of
     Sliding Block Is  30.0
     Box        X-Left     Y-Left    X-Right    Y-Right      Height
     No.         (ft)       (ft)       (ft)       (ft)        (ft)
      1         650.00     335.00     810.00     365.00      50.00
      2         820.00     375.00     920.00     400.00      50.00
     Following Are Displayed The Ten Most Critical Of The Trial
            Failure Surfaces Evaluated. They Are
            Ordered - Most Critical First.
            * * Safety Factors Are Calculated By The Simplified Janbu Method * *
            Total Number of Trial Surfaces Attempted =  9999
            Number of Trial Failure Surfaces is Greater Than 5000.
            Statistical Data on FS Values are Not Generated.
            To Generate Stastical Data, Reduce Number of Trial
            Failure Surfaces to 5000 or less.
            Failure Surface Specified By  7 Coordinate Points
              Point       X-Surf      Y-Surf
               No.         (ft)        (ft)
                1        752.382     401.944
                2        767.354     387.146
                3        797.061     382.957
                4        865.380     403.481
                5        885.563     425.676
                6        905.858     447.769
                7        923.076     466.000
                   Factor of Safety
                 ***    2.165   ***
                Individual data on the    16  slices
                           Water  Water     Tie     Tie     Earthquake
                           Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver     Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1     11.6    9104.8     0.0     0.0       0.      0.     0.0     0.0      0.0
  2      3.4    6050.9     0.0     0.0       0.      0.     0.0     0.0      0.0
  3      4.6    9856.6     0.0     0.0       0.      0.     0.0     0.0      0.0
  4     14.0   34710.7     0.0     0.0       0.      0.     0.0     0.0      0.0
  5      4.0   12602.9     0.0     0.0       0.      0.     0.0     0.0      0.0
  6      5.0   17950.2     0.0     0.0       0.      0.     0.0     0.0      0.0
  7      2.1    7661.5     0.0     0.0       0.      0.     0.0     0.0      0.0
  8     18.9   76757.1     0.0     0.0       0.      0.     0.0     0.0      0.0
  9     24.0  111621.9     0.0     0.0       0.      0.     0.0     0.0      0.0
 10      6.0   29361.1     0.0     0.0       0.      0.     0.0     0.0      0.0
 11     19.4   97112.5     0.0     0.0       0.      0.     0.0     0.0      0.0
 12     20.2   89961.7     0.0     0.0       0.      0.     0.0     0.0      0.0
 13      9.4   31157.1     0.0     0.0       0.      0.     0.0     0.0      0.0
 14     10.9   28160.1     0.0     0.0       0.      0.     0.0     0.0      0.0
 15      0.1     309.5     0.0     0.0       0.      0.     0.0     0.0      0.0
 16     17.1   18524.4     0.0     0.0       0.      0.     0.0     0.0   4269.1
            Failure Surface Specified By  7 Coordinate Points
              Point       X-Surf      Y-Surf
               No.         (ft)        (ft)
                1        752.382     401.944
                2        767.354     387.146
                3        797.061     382.957
                4        865.380     403.481
```

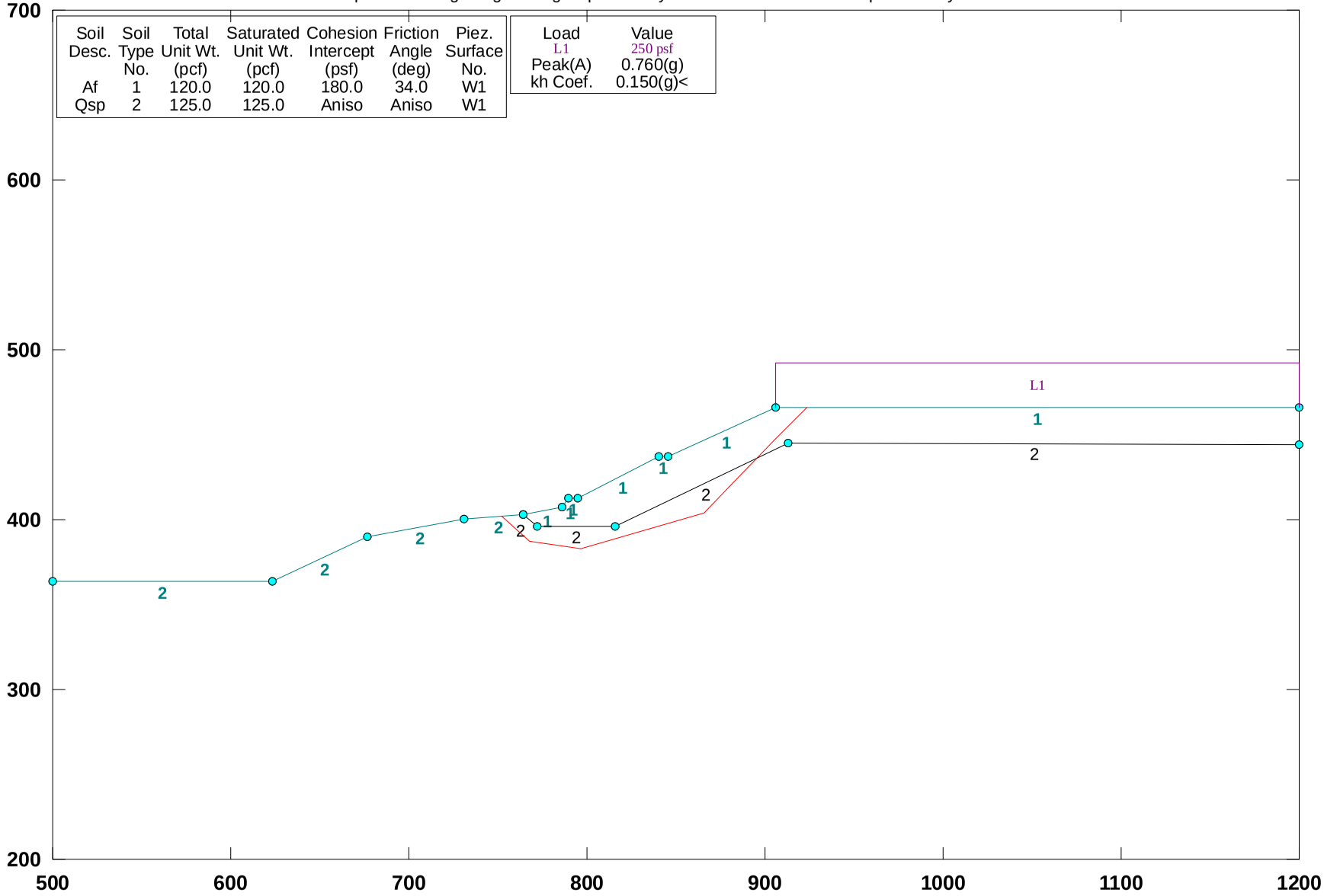
```
     5        885.563      425.676
     6        905.858      447.769
     7        923.076      466.000
        Factor of Safety
       ***    2.165   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        752.382      401.944
     2        767.354      387.146
     3        797.061      382.957
     4        865.380      403.481
     5        885.563      425.676
     6        905.858      447.769
     7        923.076      466.000
        Factor of Safety
       ***    2.165   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        752.382      401.944
     2        767.354      387.146
     3        797.061      382.957
     4        865.380      403.481
     5        885.563      425.676
     6        905.858      447.769
     7        923.076      466.000
        Factor of Safety
       ***    2.165   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        752.382      401.944
     2        767.354      387.146
     3        797.061      382.957
     4        865.380      403.481
     5        885.563      425.676
     6        905.858      447.769
     7        923.076      466.000
        Factor of Safety
       ***    2.165   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        752.382      401.944
     2        767.354      387.146
     3        797.061      382.957
     4        865.380      403.481
     5        885.563      425.676
     6        905.858      447.769
     7        923.076      466.000
        Factor of Safety
       ***    2.165   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        752.382      401.944
     2        767.354      387.146
     3        797.061      382.957
     4        865.380      403.481
     5        885.563      425.676
     6        905.858      447.769
     7        923.076      466.000
        Factor of Safety
       ***    2.165   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        752.382      401.944
     2        767.354      387.146
```



```
     3        797.061      382.957
     4        865.380      403.481
     5        885.563      425.676
     6        905.858      447.769
     7        923.076      466.000
        Factor of Safety
       ***    2.165   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        752.382      401.944
     2        767.354      387.146
     3        797.061      382.957
     4        865.380      403.481
     5        885.563      425.676
     6        905.858      447.769
     7        923.076      466.000
        Factor of Safety
       ***    2.165   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        752.382      401.944
     2        767.354      387.146
     3        797.061      382.957
     4        865.380      403.481
     5        885.563      425.676
     6        905.858      447.769
     7        923.076      466.000
        Factor of Safety
       ***    2.165   ***
            **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 9-9'/ 3/13 Design- Upper Slope - Block - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 march\sec 9\x9dexe.plt Run By: LGC 4/14/2015 07:36AM



GSTABL7 v.2 FSmin=1.82

Factor Of Safety Is Calculated By The Simplified Janbu Method

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        4/14/2015
    Time of Run:              07:36AM
    Run By:                   LGC
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dexe.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dexe.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 March\Sec 9\x9dexe.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 9-9'/ 3/13 Design
                          - Upper Slope - Block - Seismic
    BOUNDARY COORDINATES
       11 Top   Boundaries
       15 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1        500.00     364.00     623.00     364.00        2
        2        623.00     364.00     677.00     390.00        2
        3        677.00     390.00     731.00     400.00        2
        4        731.00     400.00     764.00     403.00        2
        5        764.00     403.00     786.00     407.00        1
        6        786.00     407.00     790.00     413.00        1
        7        790.00     413.00     795.00     413.00        1
        8        795.00     413.00     840.00     437.00        1
        9        840.00     437.00     846.00     437.00        1
       10        846.00     437.00     906.00     466.00        1
       11        906.00     466.00    1200.00     466.00        1
       12        764.00     403.00     772.00     396.00        2
       13        772.00     396.00     816.00     396.00        2
       14        816.00     396.00     913.00     445.00        2
       15        913.00     445.00    1200.00     444.00        2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     2 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     500.0     34.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1             -4.0             500.00         34.00
        2             10.0             200.00         27.00
        3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
```

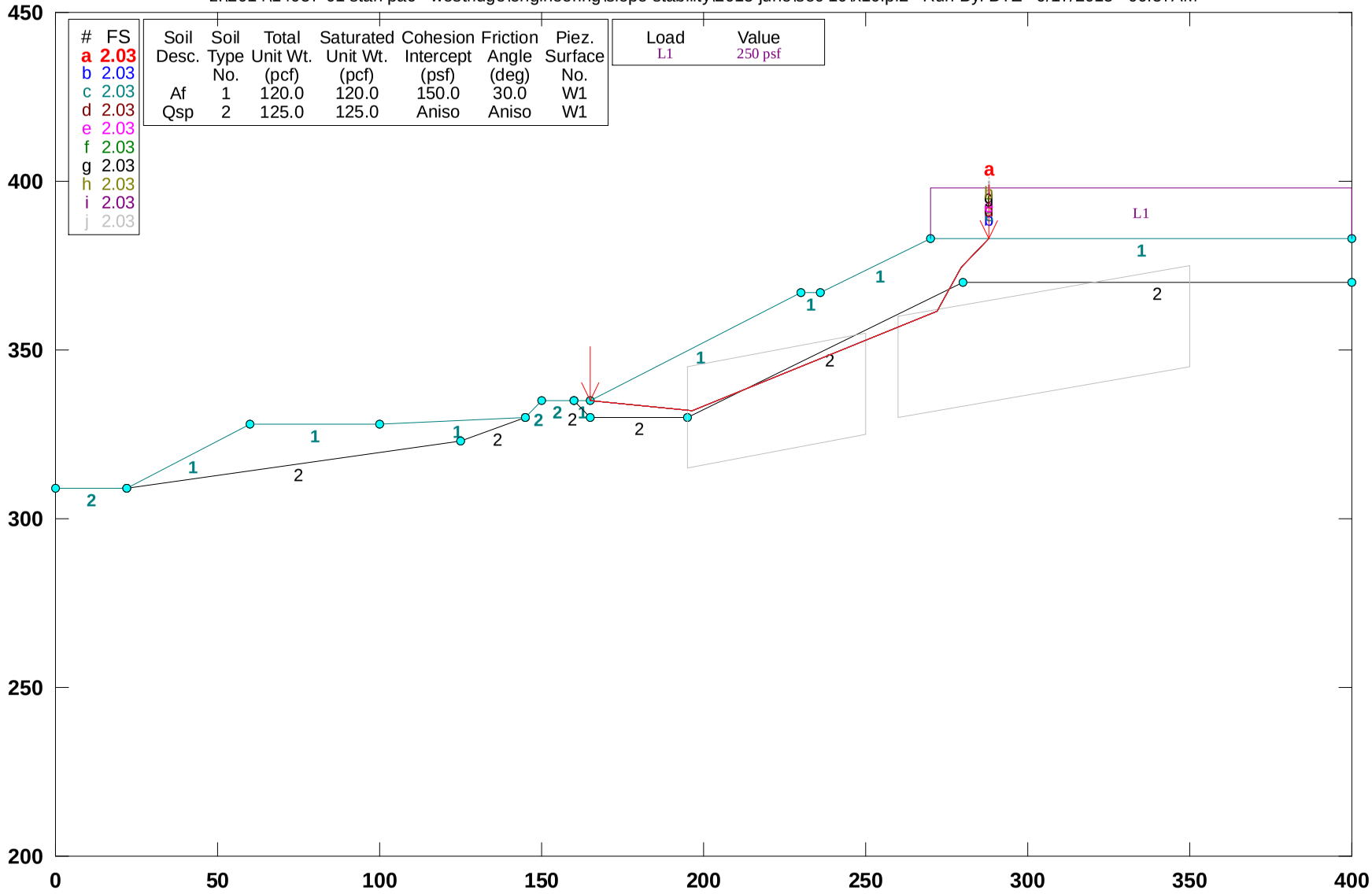


```
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)        (ft)        (psf)          (deg)
      1         906.00      1200.00       250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.760(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
    Trial Failure Surface Specified By  7 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1        752.382     401.944
        2        767.354     387.146
        3        797.061     382.957
        4        865.380     403.481
        5        885.563     425.676
        6        905.858     447.769
        7        923.076     466.000
    Janbu's Empirical Coefficient (fo) =  1.074
    * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.822
         ***Table 1 - Individual Data on the   16 Slices***
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1     11.6    9104.9     0.0     0.0      0.0     0.0  1365.7     0.0      0.0
  2      3.4    6050.0     0.0     0.0      0.0     0.0   907.5     0.0      0.0
  3      4.6    9857.5     0.0     0.0      0.0     0.0  1478.6     0.0      0.0
  4     14.0   34710.2     0.0     0.0      0.0     0.0  5206.5     0.0      0.0
  5      4.0   12602.7     0.0     0.0      0.0     0.0  1890.4     0.0      0.0
  6      5.0   17949.9     0.0     0.0      0.0     0.0  2692.5     0.0      0.0
  7      2.1    7663.1     0.0     0.0      0.0     0.0  1149.5     0.0      0.0
  8     18.9   76754.8     0.0     0.0      0.0     0.0 11513.2     0.0      0.0
  9     24.0  111621.0     0.0     0.0      0.0     0.0 16743.1     0.0      0.0
 10      6.0   29360.9     0.0     0.0      0.0     0.0  4404.1     0.0      0.0
 11     19.4   97113.6     0.0     0.0      0.0     0.0 14567.0     0.0      0.0
 12     20.2   89960.6     0.0     0.0      0.0     0.0 13494.1     0.0      0.0
 13      9.4   31158.9     0.0     0.0      0.0     0.0  4673.8     0.0      0.0
 14     10.9   28159.4     0.0     0.0      0.0     0.0  4223.9     0.0      0.0
 15      0.1     308.9     0.0     0.0      0.0     0.0    46.3     0.0      0.0
 16     17.1   18524.7     0.0     0.0      0.0     0.0  2778.7     0.0   4269.0
         ***Table 2 - Base Stress Data on the   16 Slices***
Slice   Alpha     X-Coord.      Base          Available             Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
  *                 (ft)        (ft)           (psf)                 (psf)
  1     -44.66     758.19       16.34          2280.60               -467.29
  2     -44.66     765.68        4.72          3806.20              -1075.56
  3      -8.03     769.68        4.69          2057.63                 18.88
  4      -8.03     779.00       14.14          2314.62                 22.06
  5      -8.03     788.00        4.04          2797.12                 28.04
  6      -8.03     792.50        5.05          3112.86                 31.95
  7      -8.03     796.03        2.08          3204.99                 33.09
  8      16.72     806.53       19.78          3038.48               1748.22
  9      16.72     828.00       25.06          3417.59               2006.24
 10      16.72     843.00        6.26          3571.35               2110.90
 11      16.72     855.69       20.24          3645.85               2161.60
 12      47.72     875.47       30.00          3704.11               3747.49
 13      47.43     890.25       13.84          2891.30               2787.81
 14      47.43     900.39       16.16          2020.64               2158.81
 15      46.64     905.93        0.21          1723.04               1804.92
 16      46.64     914.54       24.87          1130.40               1082.18
    Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
    Soil Nail, and Applied Forces if applicable) =  581949.75 (lbs)
```

```
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) =   2805.08(psf)
Sum of the Driving Forces =   343032.72 (lbs)
Average Mobilized Shear Stress =    1653.47(psf)
Total length of the failure surface =     207.46(ft)
       *** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) =  0.6530(g)
Calculated Newmark Seismic Displacement =   0.100(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.
              **** END OF GSTABL7 OUTPUT ****
```

Westridge/ 14057-01 / Sec 10-10' / 6/11 Design - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 10\x10.pl2 Run By: BTZ 6/17/2015 06:57AM



GSTABL7 v.2 FSmin=2.03

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                           SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        6/17/2015
    Time of Run:              06:57AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 10\x10.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 10\x10.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 10\x10.PLT
    PROBLEM DESCRIPTION:  Westridge/ 14057-01 / Sec 10-10' / 6/11
                          Design - Static
    BOUNDARY COORDINATES
       11 Top   Boundaries
       17 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     309.00      22.00     309.00         2
        2        22.00     309.00      60.00     328.00         1
        3        60.00     328.00     100.00     328.00         1
        4       100.00     328.00     145.00     330.00         1
        5       145.00     330.00     150.00     335.00         2
        6       150.00     335.00     160.00     335.00         2
        7       160.00     335.00     165.00     335.00         1
        8       165.00     335.00     230.00     367.00         1
        9       230.00     367.00     236.00     367.00         1
       10       236.00     367.00     270.00     383.00         1
       11       270.00     383.00     400.00     383.00         1
       12       160.00     335.00     165.00     330.00         2
       13       165.00     330.00     195.00     330.00         2
       14       195.00     330.00     280.00     370.00         2
       15       280.00     370.00     400.00     370.00         2
       16        22.00     309.00     125.00     323.00         2
       17       125.00     323.00     145.00     330.00         2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     2 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     300.0     32.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
      No.            (deg)            (psf)         (deg)
       1             -4.0             300.00         32.00
       2              4.0             200.00         27.00
       3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
```



```
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)         (ft)        (psf)          (deg)
      1         270.00       400.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Janbus Empirical Coef is being used for the case of  c & phi both > 0
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Sliding Block Surfaces, Has Been
    Specified.
    9999 Trial Surfaces Have Been Generated.
    3 Boxes Specified For Generation Of Central Block Base
    Length Of Line Segments For Active And Passive Portions Of
    Sliding Block Is  15.0
    Box        X-Left     Y-Left    X-Right    Y-Right      Height
    No.         (ft)       (ft)       (ft)       (ft)        (ft)
     1         165.00     335.00     165.00     335.00       0.00
     2         195.00     330.00     250.00     340.00      30.00
     3         260.00     345.00     350.00     360.00      30.00
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Evaluated. They Are
          Ordered - Most Critical First.
          * * Safety Factors Are Calculated By The Simplified Janbu Method * *
          Total Number of Trial Surfaces Attempted =  9999
          Number of Trial Failure Surfaces is Greater Than 5000.
          Statistical Data on FS Values are Not Generated.
          To Generate Stastical Data, Reduce Number of Trial
          Failure Surfaces to 5000 or less.
          Failure Surface Specified By  5 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1        165.000     335.000
              2        196.702     332.241
              3        271.882     361.612
              4        279.612     374.467
              5        288.146     383.000
                 Factor of Safety
                ***    2.032   ***
               Individual data on the     9  slices
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1     31.7   34934.1     0.0     0.0       0.      0.     0.0     0.0     0.0
  2     18.0   41703.5     0.0     0.0       0.      0.     0.0     0.0     0.0
  3     15.3   38490.0     0.0     0.0       0.      0.     0.0     0.0     0.0
  4      6.0   14860.0     0.0     0.0       0.      0.     0.0     0.0     0.0
  5     34.0   85238.7     0.0     0.0       0.      0.     0.0     0.0     0.0
  6      1.9    4954.7     0.0     0.0       0.      0.     0.0     0.0   470.4
  7      3.8    8412.2     0.0     0.0       0.      0.     0.0     0.0   957.8
  8      3.9    5510.4     0.0     0.0       0.      0.     0.0     0.0   974.9
  9      8.5    4369.1     0.0     0.0       0.      0.     0.0     0.0  2133.3
          Failure Surface Specified By  5 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
              1        165.000     335.000
              2        196.702     332.241
              3        271.882     361.612
              4        279.612     374.467
              5        288.146     383.000
                 Factor of Safety
                ***    2.032   ***
          Failure Surface Specified By  5 Coordinate Points
            Point      X-Surf      Y-Surf
             No.        (ft)        (ft)
```

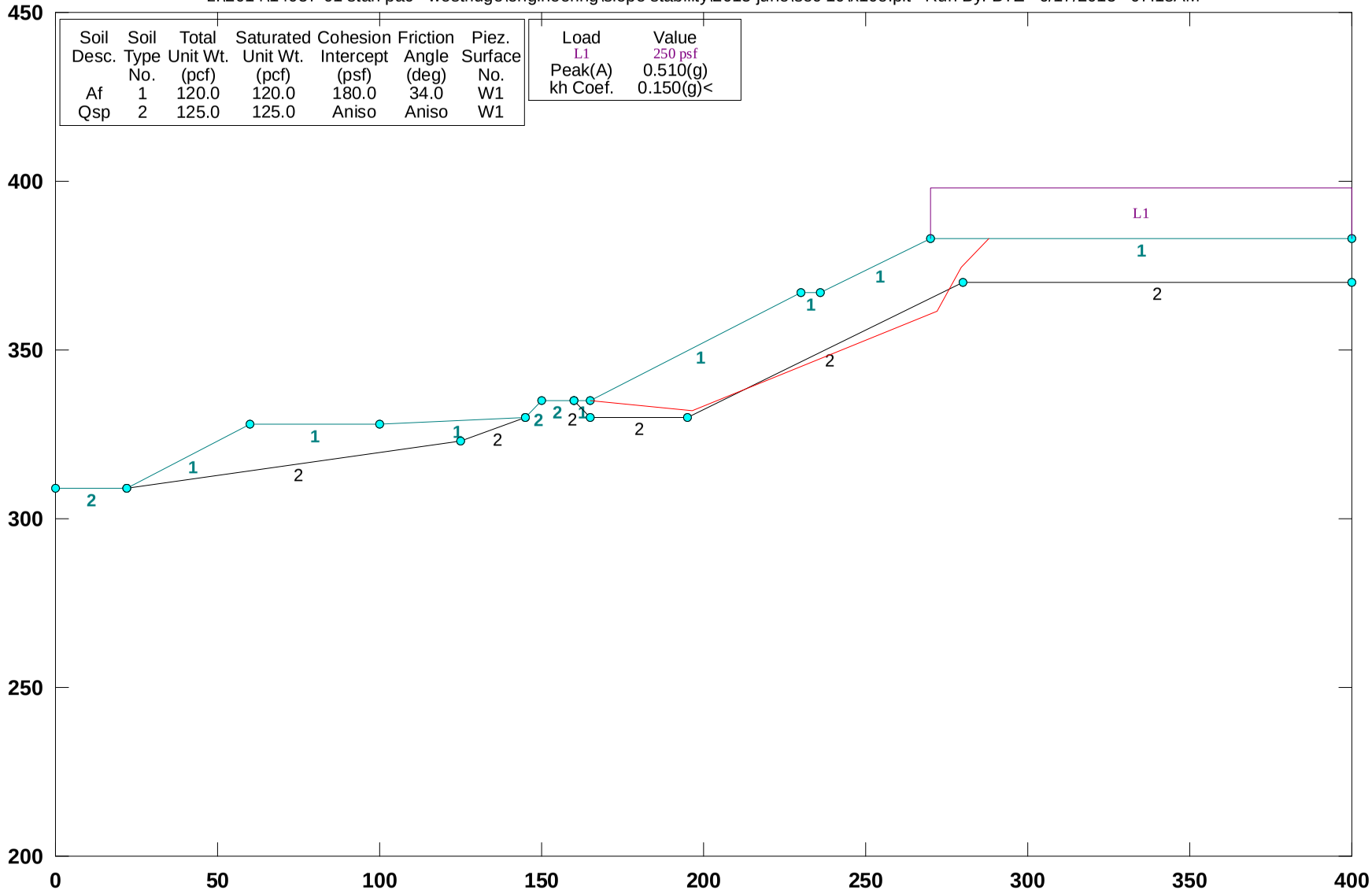
```
     1        165.000      335.000
     2        196.702      332.241
     3        271.882      361.612
     4        279.612      374.467
     5        288.146      383.000
        Factor of Safety
       ***    2.032   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        165.000      335.000
     2        196.702      332.241
     3        271.882      361.612
     4        279.612      374.467
     5        288.146      383.000
        Factor of Safety
       ***    2.032   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        165.000      335.000
     2        196.702      332.241
     3        271.882      361.612
     4        279.612      374.467
     5        288.146      383.000
        Factor of Safety
       ***    2.032   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        165.000      335.000
     2        196.702      332.241
     3        271.882      361.612
     4        279.612      374.467
     5        288.146      383.000
        Factor of Safety
       ***    2.032   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        165.000      335.000
     2        196.702      332.241
     3        271.882      361.612
     4        279.612      374.467
     5        288.146      383.000
        Factor of Safety
       ***    2.032   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        165.000      335.000
     2        196.702      332.241
     3        271.882      361.612
     4        279.612      374.467
     5        288.146      383.000
        Factor of Safety
       ***    2.032   ***
Failure Surface Specified By  5 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
```



```
     1        165.000      335.000
     2        196.702      332.241
     3        271.882      361.612
     4        279.612      374.467
     5        288.146      383.000
        Factor of Safety
       ***    2.032   ***
          **** END OF GSTABL7 OUTPUT ****
```

Westridge/ 14057-01 / Sec 10-10' / 6/11 Design - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 10\x10e.plt Run By: BTZ 6/17/2015 07:18AM



GSTABL7 v.2 FSmin=1.70

Factor Of Safety Is Calculated By The Simplified Janbu Method

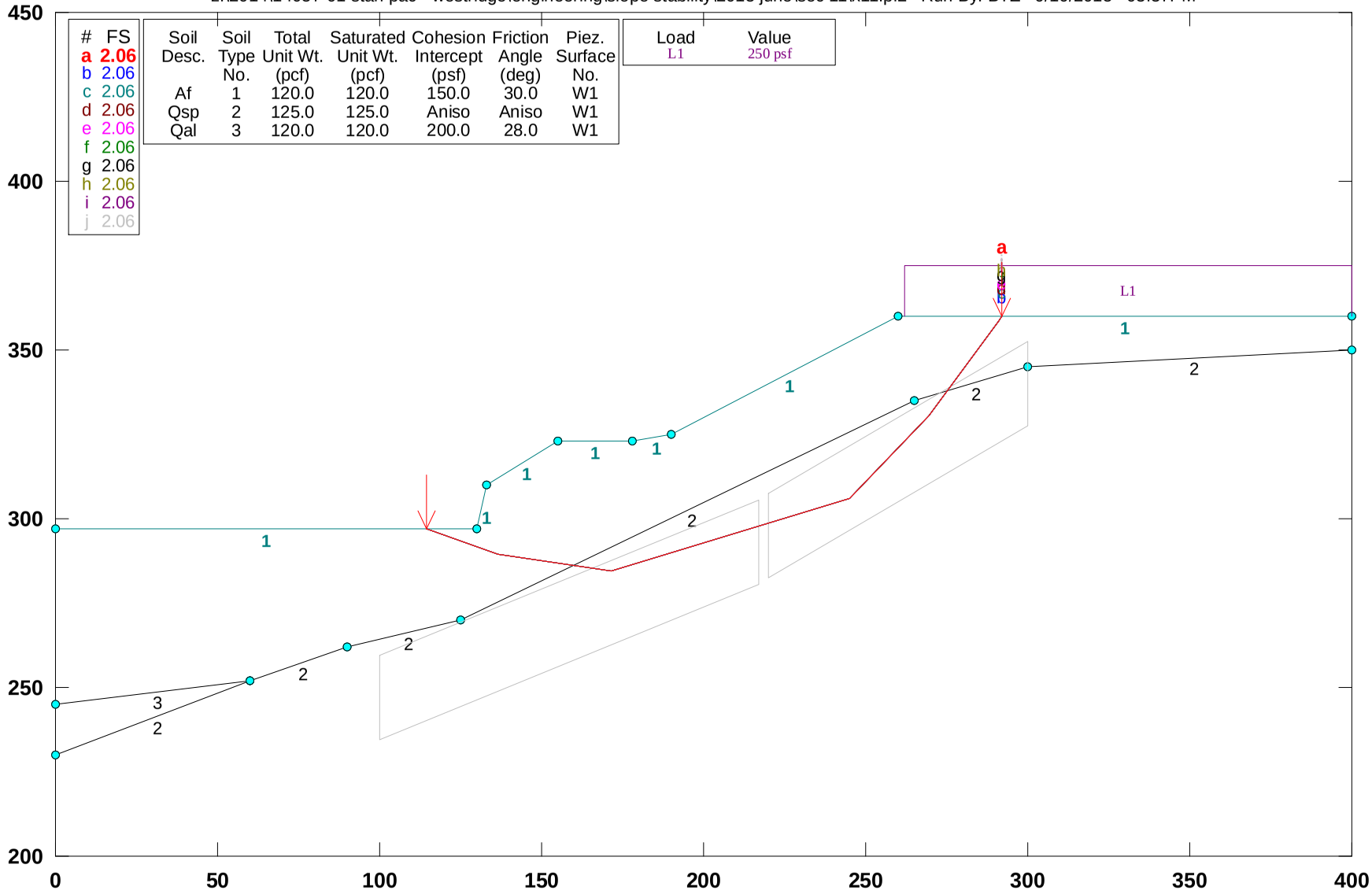
```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
         ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                           SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        6/17/2015
    Time of Run:              07:18AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 10\x10e.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 10\x10e.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 10\x10e.PLT
    PROBLEM DESCRIPTION:  Westridge/ 14057-01 / Sec 10-10' / 6/11
                          Design - Seismic
    BOUNDARY COORDINATES
       11 Top   Boundaries
       17 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     309.00      22.00     309.00         2
        2        22.00     309.00      60.00     328.00         1
        3        60.00     328.00     100.00     328.00         1
        4       100.00     328.00     145.00     330.00         1
        5       145.00     330.00     150.00     335.00         2
        6       150.00     335.00     160.00     335.00         2
        7       160.00     335.00     165.00     335.00         1
        8       165.00     335.00     230.00     367.00         1
        9       230.00     367.00     236.00     367.00         1
       10       236.00     367.00     270.00     383.00         1
       11       270.00     383.00     400.00     383.00         1
       12       160.00     335.00     165.00     330.00         2
       13       165.00     330.00     195.00     330.00         2
       14       195.00     330.00     280.00     370.00         2
       15       280.00     370.00     400.00     370.00         2
       16        22.00     309.00     125.00     323.00         2
       17       125.00     323.00     145.00     330.00         2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     2 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     500.0     34.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept      Angle
      No.            (deg)            (psf)         (deg)
       1             -4.0             500.00         34.00
       2              4.0             200.00         27.00
       3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
```



```
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)        (ft)        (psf)          (deg)
      1         270.00      400.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.510(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
    Trial Failure Surface Specified By  5 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1       165.000     335.000
        2       196.702     332.241
        3       271.882     361.612
        4       279.612     374.467
        5       288.146     383.000
    Janbu's Empirical Coefficient (fo) =  1.045
    * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
    Factor Of Safety For The Preceding Specified Surface =  1.697
         ***Table 1 - Individual Data on the    9 Slices***
                            Water  Water     Tie     Tie     Earthquake
                            Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1     31.7   34934.5     0.0     0.0      0.0     0.0  5240.2     0.0      0.0
  2     18.0   41697.0     0.0     0.0      0.0     0.0  6254.6     0.0      0.0
  3     15.3   38497.3     0.0     0.0      0.0     0.0  5774.6     0.0      0.0
  4      6.0   14860.1     0.0     0.0      0.0     0.0  2229.0     0.0      0.0
  5     34.0   85240.0     0.0     0.0      0.0     0.0 12786.0     0.0      0.0
  6      1.9    4955.5     0.0     0.0      0.0     0.0   743.3     0.0    470.5
  7      3.8    8411.3     0.0     0.0      0.0     0.0  1261.7     0.0    957.7
  8      3.9    5509.9     0.0     0.0      0.0     0.0   826.5     0.0    974.8
  9      8.5    4369.2     0.0     0.0      0.0     0.0   655.4     0.0   2133.5
         ***Table 2 - Base Stress Data on the    9 Slices***
Slice   Alpha     X-Coord.      Base          Available              Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength          Shear Stress
  *                 (ft)        (ft)           (psf)                  (psf)
  1      -4.97      180.85       31.82           959.97                 69.13
  2      21.34      205.71       19.35          1617.68               1165.26
  3      21.34      222.36       16.40          2044.26               1269.05
  4      21.34      233.00        6.44          2017.16               1247.28
  5      21.34      253.00       36.50          2036.20               1262.57
  6      21.34      270.94        2.02          2271.94               1417.04
  7      58.98      273.80        7.43          2511.68               2265.71
  8      58.98      277.66        7.57          1520.94               1534.43
  9      45.00      283.88       12.07           702.31                593.08
    Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
    Soil Nail, and Applied Forces if applicable) =  224338.91 (lbs)
    Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
    Soil Nail, and Applied Forces if applicable) =   1606.97(psf)
    Sum of the Driving Forces =   138153.91 (lbs)
    Average Mobilized Shear Stress =     989.61(psf)
    Total length of the failure surface =     139.60(ft)
           *** SEISMIC SLOPE DISPLACEMENT DATA ***
    (Note: kv is set = zero for displacement calculations)
    Seismic Yield Coefficient (ky) =  0.4626(g)
    Calculated Newmark Seismic Displacement =   0.060(ft)
    Non-Symmetrical Sliding Resistance Has Been Specified
    for Downhill Sliding.
                  **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 11-11' / 6/11 Design - Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 11\x11.pl2 Run By: BTZ 6/16/2015 03:37PM



#	FS
a	2.06
b	2.06
c	2.06
d	2.06
e	2.06
f	2.06
g	2.06
h	2.06
i	2.06
j	2.06

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	150.0	30.0	W1
Qsp	2	125.0	125.0	Aniso	Aniso	W1
Qal	3	120.0	120.0	200.0	28.0	W1

Load	Value
L1	250 psf

GSTABL7 v.2 FSmin=2.06

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
              (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
*******************************************************************************
    Analysis Run Date:        6/16/2015
    Time of Run:              03:37PM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 11\x11.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 11\x11.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 11\x11.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 11-11' /
                          6/11 Design - Upper Slope - Static
    BOUNDARY COORDINATES
        7 Top   Boundaries
       14 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     297.00     130.00     297.00         1
        2       130.00     297.00     133.25     310.00         1
        3       133.25     310.00     155.00     323.00         1
        4       155.00     323.00     178.00     323.00         1
        5       178.00     323.00     190.00     325.00         1
        6       190.00     325.00     260.00     360.00         1
        7       260.00     360.00     400.00     360.00         1
        8         0.00     245.00      60.00     252.00         3
        9        60.00     252.00      90.00     262.00         2
       10        90.00     262.00     125.00     270.00         2
       11       125.00     270.00     265.00     335.00         2
       12       265.00     335.00     300.00     345.00         2
       13       300.00     345.00     400.00     350.00         2
       14         0.00     230.00      60.00     252.00         2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     3 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     300.0     32.0    0.00       0.0      1
      3   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
       No.            (deg)            (psf)         (deg)
        1              5.0             300.00         32.00
        2             20.0             200.00         27.00
        3             90.0             300.00         32.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
```



```
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)        (ft)        (psf)          (deg)
      1         262.00      400.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Janbus Empirical Coef is being used for the case of  c & phi both > 0
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Sliding Block Surfaces, Has Been
    Specified.
    9999 Trial Surfaces Have Been Generated.
    2 Boxes Specified For Generation Of Central Block Base
    Length Of Line Segments For Active And Passive Portions Of
    Sliding Block Is  35.0
    Box        X-Left     Y-Left    X-Right    Y-Right      Height
    No.         (ft)       (ft)       (ft)       (ft)        (ft)
     1         100.00     247.00     217.00     293.00      25.00
     2         220.00     295.00     300.00     340.00      25.00
    Following Are Displayed The Ten Most Critical Of The Trial
           Failure Surfaces Evaluated. They Are
           Ordered - Most Critical First.
           * * Safety Factors Are Calculated By The Simplified Janbu Method * *
           Total Number of Trial Surfaces Attempted =  9999
           Number of Trial Failure Surfaces is Greater Than 5000.
           Statistical Data on FS Values are Not Generated.
           To Generate Stastical Data, Reduce Number of Trial
           Failure Surfaces to 5000 or less.
           Failure Surface Specified By  7 Coordinate Points
             Point      X-Surf      Y-Surf
              No.        (ft)        (ft)
               1        114.712     297.000
               2        136.750     289.515
               3        171.375     284.411
               4        245.015     305.761
               5        269.580     330.692
               6        290.932     358.424
               7        292.207     360.000
                  Factor of Safety
                ***    2.060   ***
                Individual data on the    16  slices
                           Water  Water     Tie     Tie     Earthquake
                           Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight      Top    Bot     Norm     Tan     Hor     Ver     Load
 No.    (ft)    (lbs)     (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1     15.3    4763.0     0.0     0.0       0.      0.     0.0     0.0      0.0
  2      3.2    4775.4     0.0     0.0       0.      0.     0.0     0.0      0.0
  3      3.5    8792.2     0.0     0.0       0.      0.     0.0     0.0      0.0
  4     18.3   64335.1     0.0     0.0       0.      0.     0.0     0.0      0.0
  5      4.7   20752.7     0.0     0.0       0.      0.     0.0     0.0      0.0
  6     11.6   52912.0     0.0     0.0       0.      0.     0.0     0.0      0.0
  7      6.6   30167.7     0.0     0.0       0.      0.     0.0     0.0      0.0
  8     12.0   52296.5     0.0     0.0       0.      0.     0.0     0.0      0.0
  9     55.0  274629.7     0.0     0.0       0.      0.     0.0     0.0      0.0
 10     15.0   78310.6     0.0     0.0       0.      0.     0.0     0.0      0.0
 11      2.0    9235.5     0.0     0.0       0.      0.     0.0     0.0      0.0
 12      3.0   12919.2     0.0     0.0       0.      0.     0.0     0.0    750.0
 13      4.6   17553.5     0.0     0.0       0.      0.     0.0     0.0   1145.1
 14      5.5   17181.9     0.0     0.0       0.      0.     0.0     0.0   1386.1
 15     15.8   22462.2     0.0     0.0       0.      0.     0.0     0.0   3951.9
 16      1.3     120.5     0.0     0.0       0.      0.     0.0     0.0    318.7
           Failure Surface Specified By  7 Coordinate Points
             Point      X-Surf      Y-Surf
              No.        (ft)        (ft)
               1        114.712     297.000
               2        136.750     289.515
               3        171.375     284.411
               4        245.015     305.761
```

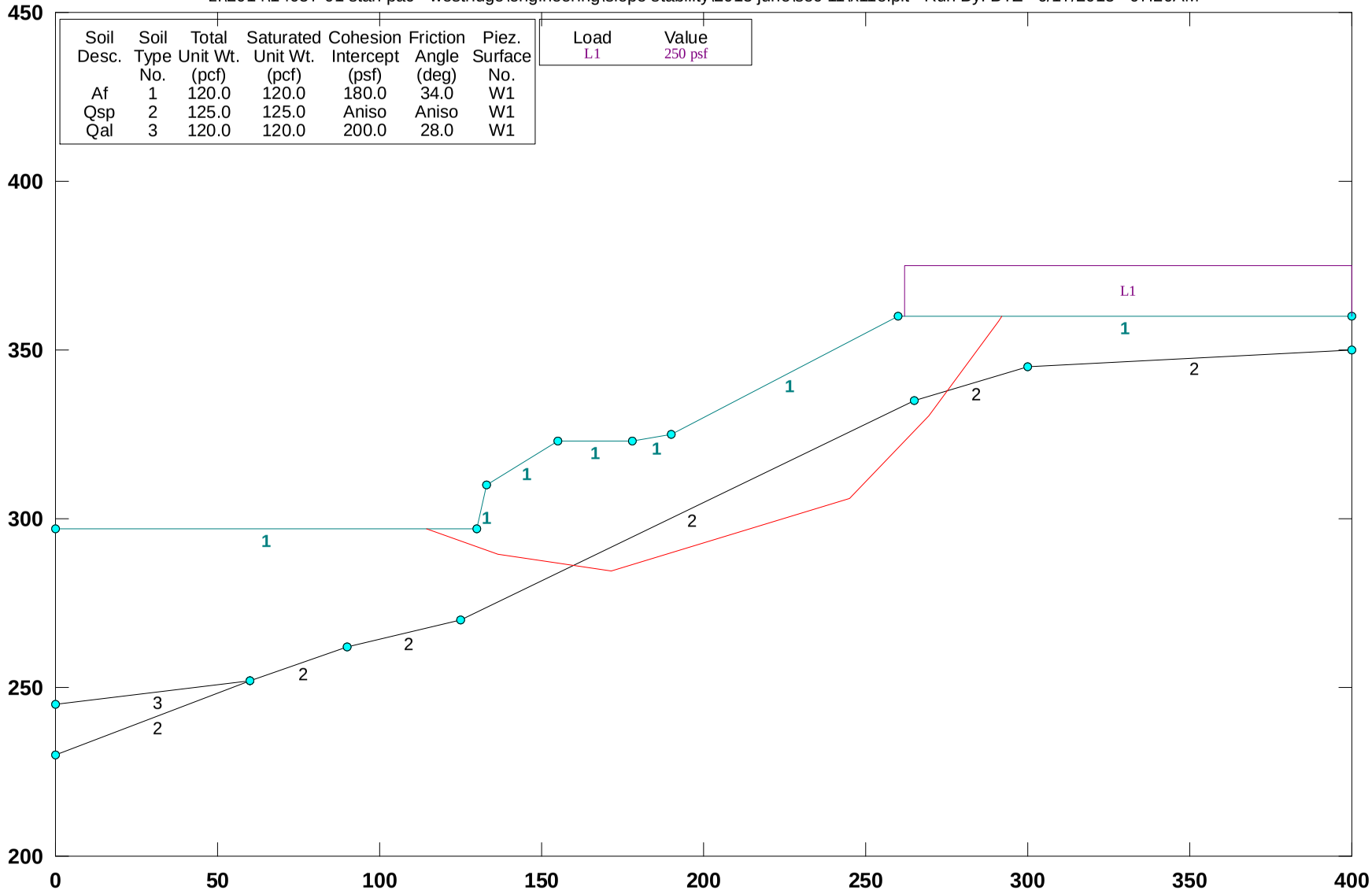
```
     5        269.580      330.692
     6        290.932      358.424
     7        292.207      360.000
        Factor of Safety
       ***    2.060   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        114.712      297.000
     2        136.750      289.515
     3        171.375      284.411
     4        245.015      305.761
     5        269.580      330.692
     6        290.932      358.424
     7        292.207      360.000
        Factor of Safety
       ***    2.060   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        114.712      297.000
     2        136.750      289.515
     3        171.375      284.411
     4        245.015      305.761
     5        269.580      330.692
     6        290.932      358.424
     7        292.207      360.000
        Factor of Safety
       ***    2.060   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        114.712      297.000
     2        136.750      289.515
     3        171.375      284.411
     4        245.015      305.761
     5        269.580      330.692
     6        290.932      358.424
     7        292.207      360.000
        Factor of Safety
       ***    2.060   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        114.712      297.000
     2        136.750      289.515
     3        171.375      284.411
     4        245.015      305.761
     5        269.580      330.692
     6        290.932      358.424
     7        292.207      360.000
        Factor of Safety
       ***    2.060   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        114.712      297.000
     2        136.750      289.515
     3        171.375      284.411
     4        245.015      305.761
     5        269.580      330.692
     6        290.932      358.424
     7        292.207      360.000
        Factor of Safety
       ***    2.060   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        114.712      297.000
     2        136.750      289.515
```



```
     3        171.375      284.411
     4        245.015      305.761
     5        269.580      330.692
     6        290.932      358.424
     7        292.207      360.000
        Factor of Safety
       ***    2.060   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        114.712      297.000
     2        136.750      289.515
     3        171.375      284.411
     4        245.015      305.761
     5        269.580      330.692
     6        290.932      358.424
     7        292.207      360.000
        Factor of Safety
       ***    2.060   ***
Failure Surface Specified By  7 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
     1        114.712      297.000
     2        136.750      289.515
     3        171.375      284.411
     4        245.015      305.761
     5        269.580      330.692
     6        290.932      358.424
     7        292.207      360.000
        Factor of Safety
       ***    2.060   ***
            **** END OF GSTABL7 OUTPUT ****
```

Westridge/14057-01/Sec 11-11' / 6/11 Design - Upper Slope - Seismic

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 11\x11e.plt Run By: BTZ 6/17/2015 07:20AM



GSTABL7 v.2 FSmin=2.25

Factor Of Safety Is Calculated By The Simplified Janbu Method

```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
         ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                          SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        6/17/2015
    Time of Run:              07:20AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 11\x11e.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 11\x11e.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 11\x11e.PLT
    PROBLEM DESCRIPTION:  Westridge/14057-01/Sec 11-11' /
                          6/11 Design - Upper Slope - Seismic
    BOUNDARY COORDINATES
        7 Top   Boundaries
       14 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     297.00     130.00     297.00         1
        2       130.00     297.00     133.25     310.00         1
        3       133.25     310.00     155.00     323.00         1
        4       155.00     323.00     178.00     323.00         1
        5       178.00     323.00     190.00     325.00         1
        6       190.00     325.00     260.00     360.00         1
        7       260.00     360.00     400.00     360.00         1
        8         0.00     245.00      60.00     252.00         3
        9        60.00     252.00      90.00     262.00         2
       10        90.00     262.00     125.00     270.00         2
       11       125.00     270.00     265.00     335.00         2
       12       265.00     335.00     300.00     345.00         2
       13       300.00     345.00     400.00     350.00         2
       14         0.00     230.00      60.00     252.00         2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     3 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     500.0     34.0    0.00       0.0      1
      3   120.0    120.0     200.0     28.0    0.00       0.0      1
   ANISOTROPIC STRENGTH PARAMETERS
        1 soil type(s)
    Soil Type  2 Is Anisotropic
    Number Of Direction Ranges Specified =  3
    Direction    Counterclockwise     Cohesion     Friction
      Range       Direction Limit    Intercept       Angle
      No.            (deg)            (psf)         (deg)
       1              5.0             500.00         34.00
       2             20.0             200.00         27.00
       3             90.0             500.00         34.00
    ANISOTROPIC SOIL NOTES:
       (1) An input value of 0.01 for C and/or Phi will cause Aniso
           C and/or Phi to be ignored in that range.
       (2) An input value of 0.02 for Phi will set both Phi and
           C equal to zero, with no water weight in the tension crack.
```



```
       (3) An input value of 0.03 for Phi will set both Phi and
           C equal to zero, with water weight in the tension crack.
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)        (ft)        (psf)          (deg)
      1         262.00      400.00       250.0           0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Janbu's Empirical Coef. is being used for the case of  c & phi both > 0
    Trial Failure Surface Specified By  7 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1       114.712     297.000
        2       136.750     289.515
        3       171.375     284.411
        4       245.015     305.761
        5       269.580     330.692
        6       290.932     358.424
        7       292.207     360.000
    Janbu's Empirical Coefficient (fo) =  1.069
    * * Factor Of Safety Is Calculated By The Simplified Janbu Method * *
    Factor Of Safety For The Preceding Specified Surface =  2.249
         ***Table 1 - Individual Data on the   16 Slices***
                              Water  Water     Tie     Tie     Earthquake
                              Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)   (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
  1     15.3    4762.9     0.0     0.0      0.0     0.0     0.0     0.0      0.0
  2      3.2    4775.3     0.0     0.0      0.0     0.0     0.0     0.0      0.0
  3      3.5    8793.4     0.0     0.0      0.0     0.0     0.0     0.0      0.0
  4     18.2   64333.6     0.0     0.0      0.0     0.0     0.0     0.0      0.0
  5      4.7   20752.2     0.0     0.0      0.0     0.0     0.0     0.0      0.0
  6     11.6   52910.9     0.0     0.0      0.0     0.0     0.0     0.0      0.0
  7      6.6   30169.7     0.0     0.0      0.0     0.0     0.0     0.0      0.0
  8     12.0   52296.6     0.0     0.0      0.0     0.0     0.0     0.0      0.0
  9     55.0  274632.7     0.0     0.0      0.0     0.0     0.0     0.0      0.0
 10     15.0   78308.7     0.0     0.0      0.0     0.0     0.0     0.0      0.0
 11      2.0    9235.4     0.0     0.0      0.0     0.0     0.0     0.0      0.0
 12      3.0   12919.0     0.0     0.0      0.0     0.0     0.0     0.0    750.0
 13      4.6   17551.8     0.0     0.0      0.0     0.0     0.0     0.0   1145.0
 14      5.5   17180.7     0.0     0.0      0.0     0.0     0.0     0.0   1386.0
 15     15.8   22463.3     0.0     0.0      0.0     0.0     0.0     0.0   3952.0
 16      1.3     120.6     0.0     0.0      0.0     0.0     0.0     0.0    318.7
         ***Table 2 - Base Stress Data on the   16 Slices***
Slice   Alpha     X-Coord.      Base         Available             Mobilized
 No.    (deg)    Slice Cntr     Leng.      Shear Strength         Shear Stress
  *                  (ft)       (ft)           (psf)                 (psf)
  1     -18.76      122.36      16.15           458.75               -100.19
  2     -18.76      131.62       3.43          1377.02               -472.53
  3     -18.76      135.00       3.70          2204.32               -807.98
  4      -8.39      145.88      18.45          2704.94               -514.08
  5      -8.39      157.37       4.79          3316.81               -639.17
  6      -8.39      165.55      11.77          3771.24               -662.88
  7      16.17      174.69       6.90          2462.41               1268.07
  8      16.17      184.00      12.49          2364.90               1213.53
  9      16.17      217.51      57.28          2680.47               1390.05
 10      45.42      252.51      21.35          4396.50               3722.42
 11      45.42      261.00       2.85          3948.45               3289.26
 12      45.42      263.50       4.27          3903.24               3245.55
 13      45.42      267.29       6.53          3553.97               2907.88
 14      52.41      272.35       9.09          3254.68               2653.56
 15      52.41      283.03      25.91          1541.99               1324.02
 16      51.03      291.57       2.03           478.38                267.88
    Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
    Soil Nail, and Applied Forces if applicable) =  541988.44 (lbs)
    Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
    Soil Nail, and Applied Forces if applicable) =   2618.65(psf)
    Sum of the Driving Forces =   257625.64 (lbs)
    Average Mobilized Shear Stress =    1244.73(psf)
```

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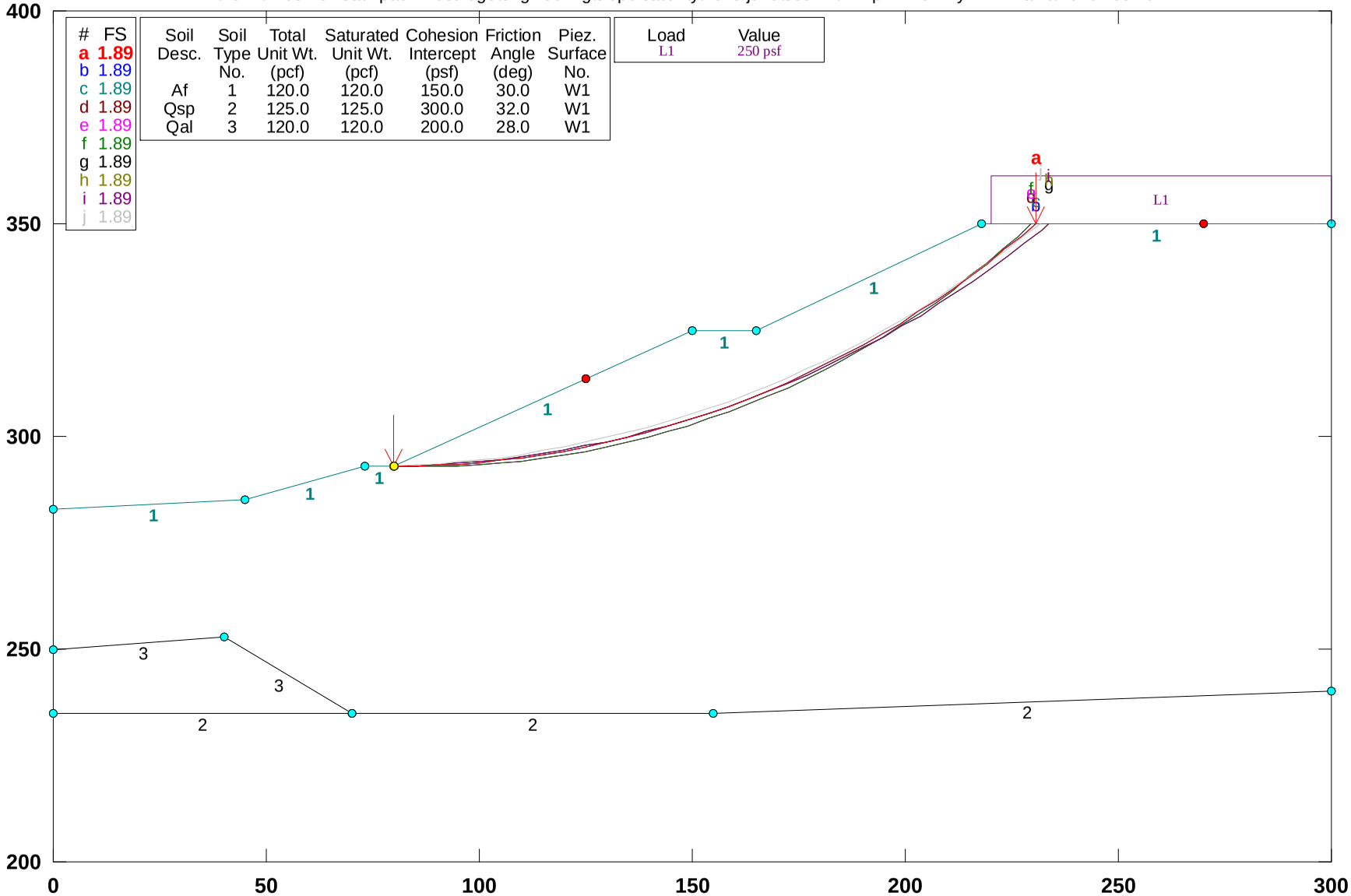
Total length of the failure surface =     206.97(ft)
              **** END OF GSTABL7 OUTPUT ****
```

Westridge /14057-01/Sec 12'-12" / 6/11 Design - Upper Slope - Static

z:\2014\14057-01 stan pac - westridge\engineering\slope stability\2015 june\sec 12\x12.pl2 Run By: BTZ 6/16/2015 03:19PM



GSTABL7 v.2 FSmin=1.89

Safety Factors Are Calculated By The Modified Bishop Method

```
                    ***  GSTABL7  ***
          ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
   ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
            (All Rights Reserved-Unauthorized Use Prohibited)
*******************************************************************************
                     SLOPE STABILITY ANALYSIS SYSTEM
        Modified Bishop, Simplified Janbu, or GLE Method of Slices.
        (Includes Spencer & Morgenstern-Price Type Analysis)
        Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
        Nonlinear Undrained Shear Strength, Curved Phi Envelope,
        Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
        Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
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    Time of Run:              03:19PM
    Run By:                   BTZ
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ility\2015 June\Sec 12\x12.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 12\x12.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 12\x12.PLT
    PROBLEM DESCRIPTION:  Westridge /14057-01/Sec 12'-12" /
                          6/11 Design - Upper Slope - Static
    BOUNDARY COORDINATES
        7 Top   Boundaries
       12 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     283.00      45.00     285.00        1
        2        45.00     285.00      73.00     293.00        1
        3        73.00     293.00      80.00     293.00        1
        4        80.00     293.00     150.00     325.00        1
        5       150.00     325.00     165.00     325.00        1
        6       165.00     325.00     218.00     350.00        1
        7       218.00     350.00     300.00     350.00        1
        8         0.00     250.00      40.00     253.00        3
        9        40.00     253.00      70.00     235.00        3
       10        70.00     235.00     155.00     235.00        2
       11       155.00     235.00     300.00     240.00        2
       12         0.00     235.00      70.00     235.00        2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     3 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     150.0     30.0    0.00       0.0      1
      2   125.0    125.0     300.0     32.0    0.00       0.0      1
      3   120.0    120.0     200.0     28.0    0.00       0.0      1
   BOUNDARY LOAD(S)
       1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)         (ft)        (psf)         (deg)
      1        220.00       300.00       250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    A Critical Failure Surface Searching Method, Using A Random
    Technique For Generating Circular Surfaces, Has Been Specified.
   15000 Trial Surfaces Have Been Generated.
     500 Surface(s) Initiate(s) From Each Of    30 Points Equally Spaced
    Along The Ground Surface Between  X =  80.00(ft)
                                  and  X =  80.00(ft)
    Each Surface Terminates Between   X = 125.00(ft)
                                  and   X = 270.00(ft)
    Unless Further Limitations Were Imposed, The Minimum Elevation
    At Which A Surface Extends Is  Y =      0.00(ft)
```



```
     5.00(ft) Line Segments Define Each Trial Failure Surface.
    Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Evaluated. They Are
          Ordered - Most Critical First.
          * * Safety Factors Are Calculated By The Modified Bishop Method * *
          Total Number of Trial Surfaces Attempted =     0
          Number of Trial Surfaces With Valid FS =    0
          Statistical Data On All Valid FS Values:
             FS Max =   0.000   FS Min = 500.000   FS Ave =  NaN
             Standard Deviation =    0.000   Coefficient of Variation =  NaN    %
          Failure Surface Specified By 34 Coordinate Points
            Point       X-Surf       Y-Surf
             No.         (ft)         (ft)
              1         80.000       293.000
              2         85.000       293.056
              3         89.997       293.222
              4         94.989       293.498
              5         99.974       293.883
              6        104.950       294.378
              7        109.913       294.983
              8        114.862       295.696
              9        119.794       296.518
             10        124.707       297.449
             11        129.598       298.487
             12        134.465       299.632
             13        139.305       300.885
             14        144.117       302.243
             15        148.898       303.707
             16        153.646       305.276
             17        158.357       306.949
             18        163.031       308.725
             19        167.665       310.604
             20        172.256       312.583
             21        176.803       314.664
             22        181.303       316.844
             23        185.753       319.122
             24        190.153       321.498
             25        194.499       323.970
             26        198.790       326.537
             27        203.023       329.198
             28        207.197       331.951
             29        211.309       334.795
             30        215.358       337.729
             31        219.341       340.752
             32        223.256       343.861
             33        227.103       347.056
             34        230.493       350.000
          Circle Center At X =     79.963 ; Y =   520.264 ; and Radius =   227.264
                 Factor of Safety
                ***    1.887   ***
               Individual data on the     0  slices
                            Water  Water     Tie     Tie     Earthquake
                            Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver    Load
 No.    (ft)    (lbs)    (lbs)  (lbs)    (lbs)   (lbs)   (lbs)   (lbs)   (lbs)
          Failure Surface Specified By 34 Coordinate Points
            Point       X-Surf       Y-Surf
             No.         (ft)         (ft)
              1         80.000       293.000
              2         85.000       293.056
              3         89.997       293.222
              4         94.989       293.498
              5         99.974       293.883
              6        104.950       294.378
              7        109.913       294.983
              8        114.862       295.696
              9        119.794       296.518
             10        124.707       297.449
             11        129.598       298.487
             12        134.465       299.632
```

13	139.305	300.885
14	144.117	302.243
15	148.898	303.707
16	153.646	305.276
17	158.357	306.949
18	163.031	308.725
19	167.665	310.604
20	172.256	312.583
21	176.803	314.664
22	181.303	316.844
23	185.753	319.122
24	190.153	321.498
25	194.499	323.970
26	198.790	326.537
27	203.023	329.198
28	207.197	331.951
29	211.309	334.795
30	215.358	337.729
31	219.341	340.752
32	223.256	343.861
33	227.103	347.056
34	230.493	350.000

Circle Center At X = 79.963 ; Y = 520.264 ; and Radius = 227.264

Factor of Safety

*** 1.887 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.000	293.000
2	85.000	293.056
3	89.997	293.222
4	94.989	293.498
5	99.974	293.883
6	104.950	294.378
7	109.913	294.983
8	114.862	295.696
9	119.794	296.518
10	124.707	297.449
11	129.598	298.487
12	134.465	299.632
13	139.305	300.885
14	144.117	302.243
15	148.898	303.707
16	153.646	305.276
17	158.357	306.949
18	163.031	308.725
19	167.665	310.604
20	172.256	312.583
21	176.803	314.664
22	181.303	316.844
23	185.753	319.122
24	190.153	321.498
25	194.499	323.970
26	198.790	326.537
27	203.023	329.198
28	207.197	331.951
29	211.309	334.795
30	215.358	337.729
31	219.341	340.752
32	223.256	343.861
33	227.103	347.056
34	230.493	350.000

Circle Center At X = 79.963 ; Y = 520.264 ; and Radius = 227.264

Factor of Safety

*** 1.887 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.000	293.000
2	84.999	292.900

3	89.999	292.921
4	94.997	293.063
5	99.990	293.325
6	104.975	293.708
7	109.950	294.211
8	114.911	294.834
9	119.856	295.577
10	124.781	296.439
11	129.684	297.420
12	134.561	298.518
13	139.411	299.735
14	144.230	301.068
15	149.016	302.517
16	153.765	304.081
17	158.475	305.759
18	163.143	307.551
19	167.766	309.454
20	172.342	311.469
21	176.868	313.594
22	181.342	315.828
23	185.760	318.168
24	190.120	320.615
25	194.420	323.167
26	198.657	325.821
27	202.829	328.577
28	206.933	331.433
29	210.967	334.388
30	214.928	337.439
31	218.815	340.584
32	222.624	343.823
33	226.354	347.153
34	229.393	350.000

Circle Center At X = 86.640 ; Y = 499.872 ; and Radius = 206.979

Factor of Safety

*** 1.889 ***

Failure Surface Specified By 34 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.000	293.000
2	84.999	292.900
3	89.999	292.921
4	94.997	293.063
5	99.990	293.325
6	104.975	293.708
7	109.950	294.211
8	114.911	294.834
9	119.856	295.577
10	124.781	296.439
11	129.684	297.420
12	134.561	298.518
13	139.411	299.735
14	144.230	301.068
15	149.016	302.517
16	153.765	304.081
17	158.475	305.759
18	163.143	307.551
19	167.766	309.454
20	172.342	311.469
21	176.868	313.594
22	181.342	315.828
23	185.760	318.168
24	190.120	320.615
25	194.420	323.167
26	198.657	325.821
27	202.829	328.577
28	206.933	331.433
29	210.967	334.388
30	214.928	337.439
31	218.815	340.584
32	222.624	343.823

```
   33        226.354      347.153
   34        229.393      350.000
Circle Center At X =    86.640 ; Y =   499.872 ; and Radius =   206.979
       Factor of Safety
      ***    1.889   ***
Failure Surface Specified By 34 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         80.000      293.000
    2         84.999      292.900
    3         89.999      292.921
    4         94.997      293.063
    5         99.990      293.325
    6        104.975      293.708
    7        109.950      294.211
    8        114.911      294.834
    9        119.856      295.577
   10        124.781      296.439
   11        129.684      297.420
   12        134.561      298.518
   13        139.411      299.735
   14        144.230      301.068
   15        149.016      302.517
   16        153.765      304.081
   17        158.475      305.759
   18        163.143      307.551
   19        167.766      309.454
   20        172.342      311.469
   21        176.868      313.594
   22        181.342      315.828
   23        185.760      318.168
   24        190.120      320.615
   25        194.420      323.167
   26        198.657      325.821
   27        202.829      328.577
   28        206.933      331.433
   29        210.967      334.388
   30        214.928      337.439
   31        218.815      340.584
   32        222.624      343.823
   33        226.354      347.153
   34        229.393      350.000
Circle Center At X =    86.640 ; Y =   499.872 ; and Radius =   206.979
       Factor of Safety
      ***    1.889   ***
Failure Surface Specified By 35 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         80.000      293.000
    2         84.999      293.119
    3         89.994      293.339
    4         94.983      293.662
    5         99.965      294.087
    6        104.937      294.614
    7        109.898      295.242
    8        114.844      295.972
    9        119.775      296.803
   10        124.687      297.734
   11        129.580      298.766
   12        134.450      299.897
   13        139.296      301.128
   14        144.116      302.458
   15        148.908      303.886
   16        153.669      305.411
   17        158.399      307.034
   18        163.094      308.753
   19        167.753      310.568
   20        172.374      312.478
   21        176.955      314.482
   22        181.494      316.579
```



```
   23        185.989      318.768
   24        190.438      321.049
   25        194.840      323.421
   26        199.192      325.882
   27        203.493      328.431
   28        207.742      331.068
   29        211.935      333.791
   30        216.072      336.600
   31        220.150      339.492
   32        224.168      342.468
   33        228.125      345.525
   34        232.018      348.662
   35        233.611      350.000
Circle Center At X =    76.700 ; Y =   537.433 ; and Radius =   244.455
       Factor of Safety
      ***    1.890   ***
Failure Surface Specified By 35 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         80.000      293.000
    2         84.999      293.119
    3         89.994      293.339
    4         94.983      293.662
    5         99.965      294.087
    6        104.937      294.614
    7        109.898      295.242
    8        114.844      295.972
    9        119.775      296.803
   10        124.687      297.734
   11        129.580      298.766
   12        134.450      299.897
   13        139.296      301.128
   14        144.116      302.458
   15        148.908      303.886
   16        153.669      305.411
   17        158.399      307.034
   18        163.094      308.753
   19        167.753      310.568
   20        172.374      312.478
   21        176.955      314.482
   22        181.494      316.579
   23        185.989      318.768
   24        190.438      321.049
   25        194.840      323.421
   26        199.192      325.882
   27        203.493      328.431
   28        207.742      331.068
   29        211.935      333.791
   30        216.072      336.600
   31        220.150      339.492
   32        224.168      342.468
   33        228.125      345.525
   34        232.018      348.662
   35        233.611      350.000
Circle Center At X =    76.700 ; Y =   537.433 ; and Radius =   244.455
       Factor of Safety
      ***    1.890   ***
Failure Surface Specified By 35 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         80.000      293.000
    2         84.999      293.119
    3         89.994      293.339
    4         94.983      293.662
    5         99.965      294.087
    6        104.937      294.614
    7        109.898      295.242
    8        114.844      295.972
    9        119.775      296.803
   10        124.687      297.734
```

```
   11        129.580      298.766
   12        134.450      299.897
   13        139.296      301.128
   14        144.116      302.458
   15        148.908      303.886
   16        153.669      305.411
   17        158.399      307.034
   18        163.094      308.753
   19        167.753      310.568
   20        172.374      312.478
   21        176.955      314.482
   22        181.494      316.579
   23        185.989      318.768
   24        190.438      321.049
   25        194.840      323.421
   26        199.192      325.882
   27        203.493      328.431
   28        207.742      331.068
   29        211.935      333.791
   30        216.072      336.600
   31        220.150      339.492
   32        224.168      342.468
   33        228.125      345.525
   34        232.018      348.662
   35        233.611      350.000
Circle Center At X =    76.700 ; Y =   537.433 ; and Radius =   244.455
       Factor of Safety
      ***    1.890   ***
Failure Surface Specified By 34 Coordinate Points
  Point      X-Surf      Y-Surf
   No.        (ft)        (ft)
    1         80.000      293.000
    2         84.995      293.215
    3         89.986      293.528
    4         94.969      293.941
    5         99.942      294.451
    6        104.905      295.061
    7        109.855      295.768
    8        114.790      296.573
    9        119.707      297.476
   10        124.606      298.476
   11        129.485      299.572
   12        134.340      300.765
   13        139.171      302.054
   14        143.976      303.439
   15        148.752      304.918
   16        153.498      306.491
   17        158.212      308.158
   18        162.892      309.918
   19        167.536      311.770
   20        172.143      313.714
   21        176.710      315.749
   22        181.236      317.874
   23        185.719      320.088
   24        190.158      322.390
   25        194.550      324.779
   26        198.894      327.255
   27        203.188      329.817
   28        207.430      332.463
   29        211.619      335.193
   30        215.754      338.005
   31        219.832      340.898
   32        223.851      343.871
   33        227.812      346.924
   34        231.644      350.000
Circle Center At X =    71.653 ; Y =   545.423 ; and Radius =   252.561
       Factor of Safety
      ***    1.891   ***
          **** END OF GSTABL7 OUTPUT ****
```

Westridge /14057-01/Sec 12'-12" / 6/11 Design - Upper Slope - Seismic

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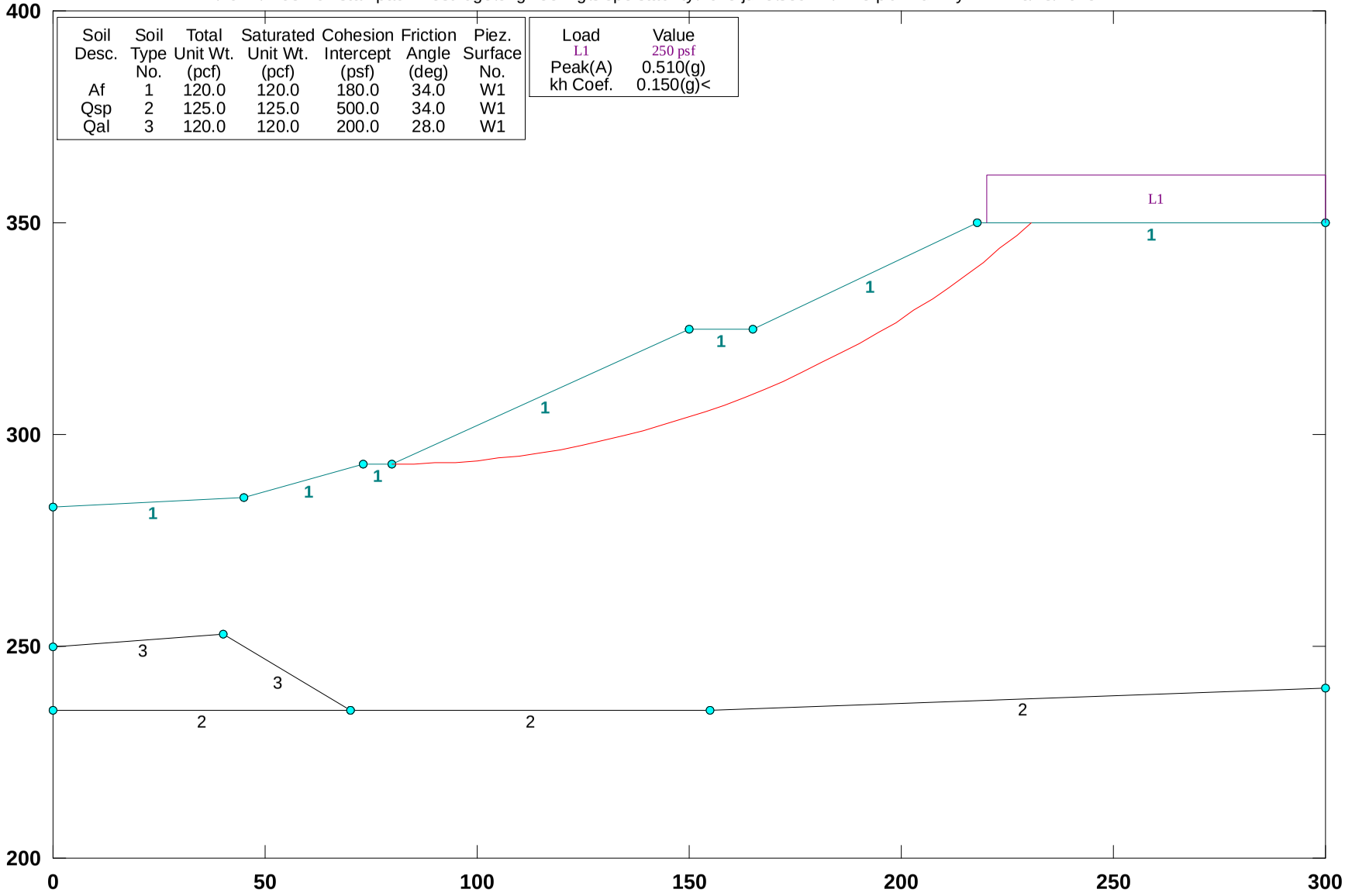


Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Af	1	120.0	120.0	180.0	34.0	W1
Qsp	2	125.0	125.0	500.0	34.0	W1
Qal	3	120.0	120.0	200.0	28.0	W1

Load	Value
L1	250 psf
Peak(A)	0.510(g)
kh Coef.	0.150(g)<

GSTABL7 v.2 FSmin=1.53

Factor Of Safety Is Calculated By The Modified Bishop Method

```
                                   ***  GSTABL7  ***
                  ** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **
        ** Original Version 1.0, January 1996; Current Ver. 2.005.3, Feb. 2013 **
                     (All Rights Reserved-Unauthorized Use Prohibited)
    ******************************************************************************
                           SLOPE STABILITY ANALYSIS SYSTEM
            Modified Bishop, Simplified Janbu, or GLE Method of Slices.
            (Includes Spencer & Morgenstern-Price Type Analysis)
            Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
            Nonlinear Undrained Shear Strength, Curved Phi Envelope,
            Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
            Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
    ******************************************************************************
    Analysis Run Date:        6/18/2015
    Time of Run:              11:17AM
    Run By:                   BTZ
    Input Data Filename:      Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 12\x12e.in
    Output Filename:          Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 12\x12e.OUT
    Unit System:              English
    Plotted Output Filename:  Z:\2014\14057-01 Stan Pac - Westridge\Engineering\Slope Stab
ility\2015 June\Sec 12\x12e.PLT
    PROBLEM DESCRIPTION:  Westridge /14057-01/Sec 12'-12" /
                          6/11 Design - Upper Slope - Seismic
    BOUNDARY COORDINATES
        7 Top   Boundaries
       12 Total Boundaries
    Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
       No.        (ft)       (ft)       (ft)       (ft)     Below Bnd
        1         0.00     283.00      45.00     285.00        1
        2        45.00     285.00      73.00     293.00        1
        3        73.00     293.00      80.00     293.00        1
        4        80.00     293.00     150.00     325.00        1
        5       150.00     325.00     165.00     325.00        1
        6       165.00     325.00     218.00     350.00        1
        7       218.00     350.00     300.00     350.00        1
        8         0.00     250.00      40.00     253.00        3
        9        40.00     253.00      70.00     235.00        3
       10        70.00     235.00     155.00     235.00        2
       11       155.00     235.00     300.00     240.00        2
       12         0.00     235.00      70.00     235.00        2
    User Specified Y-Origin =       200.00(ft)
    Default X-Plus Value = 0.00(ft)
    Default Y-Plus Value = 0.00(ft)
   ISOTROPIC SOIL PARAMETERS
     3 Type(s) of Soil
    Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
    Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
     No.  (pcf)    (pcf)     (psf)     (deg)    Param.   (psf)     No.
      1   120.0    120.0     180.0     34.0    0.00       0.0      1
      2   125.0    125.0     500.0     34.0    0.00       0.0      1
      3   120.0    120.0     200.0     28.0    0.00       0.0      1
   BOUNDARY LOAD(S)
        1 Load(s) Specified
    Load        X-Left      X-Right     Intensity     Deflection
     No.         (ft)         (ft)        (psf)         (deg)
      1        220.00       300.00       250.0          0.0
    NOTE - Intensity Is Specified As A Uniformly Distributed
           Force Acting On A Horizontally Projected Surface.
    Specified Peak Ground Acceleration Coefficient (A) =   0.510(g)
    Specified Horizontal Earthquake Coefficient (kh) =   0.150(g)
    Specified Vertical Earthquake Coefficient (kv) =   0.000(g)
    Specified Seismic Pore-Pressure Factor =   0.000
    Trial Failure Surface Specified By 34 Coordinate Points
      Point      X-Surf      Y-Surf
       No.        (ft)        (ft)
        1        80.000      293.000
        2        85.000      293.056
        3        89.997      293.222
```



```
        4        94.989      293.498
        5        99.974      293.883
        6       104.950      294.378
        7       109.913      294.983
        8       114.862      295.696
        9       119.794      296.518
       10       124.707      297.449
       11       129.598      298.487
       12       134.465      299.632
       13       139.305      300.885
       14       144.117      302.243
       15       148.898      303.707
       16       153.646      305.276
       17       158.357      306.949
       18       163.031      308.725
       19       167.665      310.604
       20       172.256      312.583
       21       176.803      314.664
       22       181.303      316.844
       23       185.753      319.122
       24       190.153      321.498
       25       194.499      323.970
       26       198.790      326.537
       27       203.023      329.198
       28       207.197      331.951
       29       211.309      334.795
       30       215.358      337.729
       31       219.341      340.752
       32       223.256      343.861
       33       227.103      347.056
       34       230.493      350.000
DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)
    Angle/Segment No.   Deflection(Deg)   Segment Length(ft)
            1                 1.26               5.00
            2                 1.26               5.00
            3                 1.25               5.00
            4                 1.27               5.00
            5                 1.27               5.00
            6                 1.25               5.00
            7                 1.26               5.00
            8                 1.27               5.00
            9                 1.25               5.00
           10                 1.26               5.00
           11                 1.27               5.00
           12                 1.25               5.00
           13                 1.27               5.00
           14                 1.26               5.00
           15                 1.26               5.00
           16                 1.25               5.00
           17                 1.27               5.00
           18                 1.25               5.00
           19                 1.27               5.00
           20                 1.26               5.00
           21                 1.26               5.00
           22                 1.26               5.00
           23                 1.26               5.00
           24                 1.26               5.00
           25                 1.27               5.00
           26                 1.25               5.00
           27                 1.26               5.00
           28                 1.26               5.00
           29                 1.27               5.00
           30                 1.26               5.00
           31                 1.26               5.00
   Circle Center At X =    79.962(ft) ; Y =   520.268(ft); and Radius =   227.268(ft)
   * * Factor Of Safety Is Calculated By The Modified Bishop Method * *
   Factor Of Safety For The Preceding Specified Surface =  1.533
        ***Table 1 - Individual Data on the   37 Slices***
                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
```

Slice No.	Width (ft)	Weight (lbs)	Top (lbs)	Bot (lbs)	Norm (lbs)	Tan (lbs)	Hor (lbs)	Ver (lbs)	Load (lbs)
1	5.0	668.9	0.0	0.0	0.0	0.0	100.3	0.0	0.0
2	5.0	1972.1	0.0	0.0	0.0	0.0	295.8	0.0	0.0
3	5.0	3205.5	0.0	0.0	0.0	0.0	480.8	0.0	0.0
4	5.0	4367.5	0.0	0.0	0.0	0.0	655.1	0.0	0.0
5	5.0	5456.4	0.0	0.0	0.0	0.0	818.5	0.0	0.0
6	5.0	6467.6	0.0	0.0	0.0	0.0	970.1	0.0	0.0
7	4.9	7403.5	0.0	0.0	0.0	0.0	1110.5	0.0	0.0
8	4.9	8260.4	0.0	0.0	0.0	0.0	1239.1	0.0	0.0
9	4.9	9038.6	0.0	0.0	0.0	0.0	1355.8	0.0	0.0
10	4.9	9735.5	0.0	0.0	0.0	0.0	1460.3	0.0	0.0
11	4.9	10352.9	0.0	0.0	0.0	0.0	1552.9	0.0	0.0
12	4.8	10887.7	0.0	0.0	0.0	0.0	1633.2	0.0	0.0
13	4.8	11344.8	0.0	0.0	0.0	0.0	1701.7	0.0	0.0
14	4.8	11720.2	0.0	0.0	0.0	0.0	1758.0	0.0	0.0
15	1.1	2758.4	0.0	0.0	0.0	0.0	413.8	0.0	0.0
16	3.6	8893.2	0.0	0.0	0.0	0.0	1334.0	0.0	0.0
17	4.7	10677.5	0.0	0.0	0.0	0.0	1601.6	0.0	0.0
18	4.7	9626.4	0.0	0.0	0.0	0.0	1444.0	0.0	0.0
19	2.0	3751.1	0.0	0.0	0.0	0.0	562.7	0.0	0.0
20	2.7	4977.7	0.0	0.0	0.0	0.0	746.6	0.0	0.0
21	4.6	8675.0	0.0	0.0	0.0	0.0	1301.2	0.0	0.0
22	4.5	8660.2	0.0	0.0	0.0	0.0	1299.0	0.0	0.0
23	4.5	8572.4	0.0	0.0	0.0	0.0	1285.9	0.0	0.0
24	4.4	8414.0	0.0	0.0	0.0	0.0	1262.1	0.0	0.0
25	4.4	8192.9	0.0	0.0	0.0	0.0	1228.9	0.0	0.0
26	4.3	7903.9	0.0	0.0	0.0	0.0	1185.6	0.0	0.0
27	4.3	7555.5	0.0	0.0	0.0	0.0	1133.3	0.0	0.0
28	4.2	7146.8	0.0	0.0	0.0	0.0	1072.0	0.0	0.0
29	4.2	6684.4	0.0	0.0	0.0	0.0	1002.7	0.0	0.0
30	4.1	6168.5	0.0	0.0	0.0	0.0	925.3	0.0	0.0
31	4.0	5605.5	0.0	0.0	0.0	0.0	840.8	0.0	0.0
32	2.6	3375.0	0.0	0.0	0.0	0.0	506.2	0.0	0.0
33	1.3	1570.1	0.0	0.0	0.0	0.0	235.5	0.0	0.0
34	0.7	710.6	0.0	0.0	0.0	0.0	106.6	0.0	0.0
35	3.3	2903.8	0.0	0.0	0.0	0.0	435.6	0.0	814.0
36	3.8	2096.5	0.0	0.0	0.0	0.0	314.5	0.0	961.8
37	3.4	598.8	0.0	0.0	0.0	0.0	89.8	0.0	847.5

Table 2 - Base Stress Data on the 37 Slices

Slice No. *	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress (psf)
1	0.64	82.50	5.00	268.91	21.51
2	1.90	87.50	5.00	439.78	71.80
3	3.16	92.49	5.00	598.56	130.28
4	4.42	97.48	5.00	745.62	195.80
5	5.68	102.46	5.00	881.06	267.60
6	6.95	107.43	5.00	1005.08	344.50
7	8.20	112.39	5.00	1118.14	424.89
8	9.46	117.33	5.00	1220.22	508.43
9	10.73	122.25	5.00	1311.54	593.78
10	11.98	127.15	5.00	1392.55	679.26
11	13.24	132.03	5.00	1463.29	764.43
12	14.51	136.89	5.00	1523.74	848.54
13	15.76	141.71	5.00	1574.67	929.12
14	17.03	146.51	5.00	1615.77	1006.68
15	18.29	149.45	1.16	1631.14	1067.87
16	18.29	151.82	3.84	1593.51	1041.01
17	19.55	156.00	5.00	1477.83	1003.33
18	20.81	160.69	5.00	1344.39	942.90
19	22.07	164.02	2.12	1243.18	899.57
20	22.07	166.33	2.88	1221.82	882.13
21	23.32	169.96	5.00	1222.61	916.88
22	24.59	174.53	5.00	1219.13	947.85
23	25.85	179.05	5.00	1207.50	969.89
24	27.11	183.53	5.00	1187.78	982.92
25	28.37	187.95	5.00	1160.24	986.34
26	29.63	192.33	5.00	1125.09	979.80
27	30.89	196.64	5.00	1082.65	962.92

28	32.15	200.91	5.00	1033.03	935.61
29	33.41	205.11	5.00	976.70	897.56
30	34.67	209.25	5.00	913.74	848.94
31	35.93	213.33	5.00	844.51	789.69
32	37.20	216.68	3.32	780.84	733.18
33	37.20	218.67	1.68	726.94	672.27
34	38.45	219.67	0.84	672.39	621.86
35	38.45	221.63	4.16	704.11	636.40
36	39.71	225.18	5.00	524.52	438.48
37	40.97	228.80	4.49	338.43	226.25

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 175320.19 (lbs)
Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 1065.84(psf)
Sum of the Driving Forces = 114381.75 (lbs)
Average Mobilized Shear Stress = 695.37(psf)
Total length of the failure surface = 164.49(ft)
CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.
*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3830(g)
Calculated Newmark Seismic Displacement = 0.088(ft)
Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

**** END OF GSTABL7 OUTPUT ****

* Received 7-27-2015 from Hunsaker

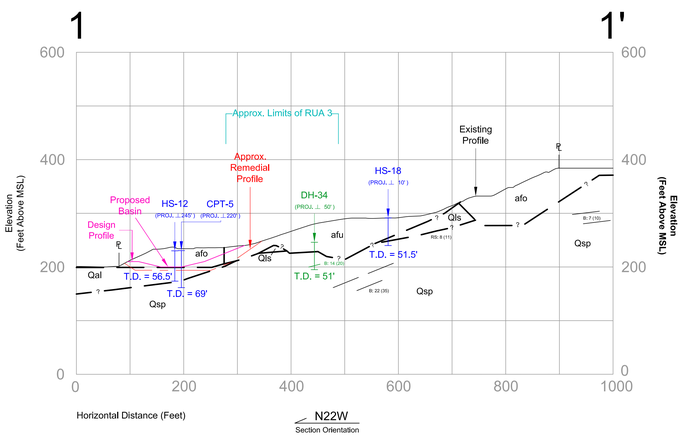
LGC Geotechnical, Inc.
131 Calle Iglesia, Ste. 200
San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

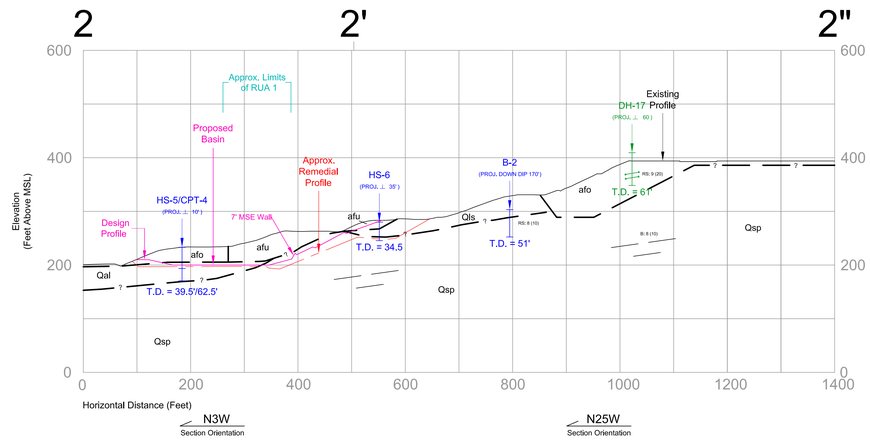
Geotechnical Map

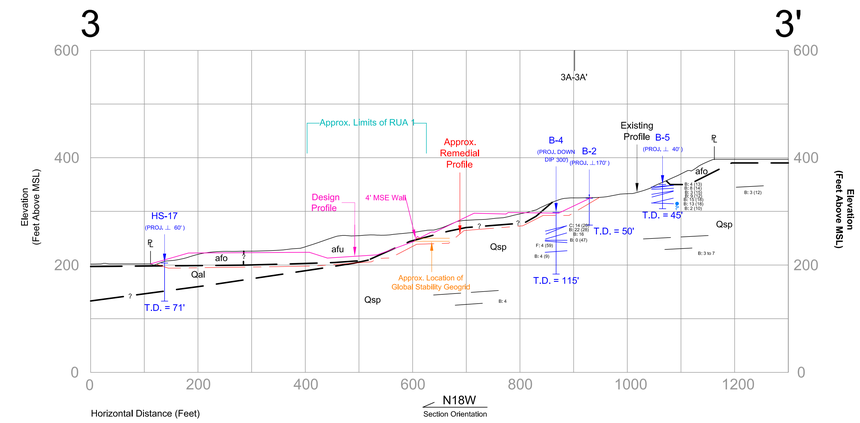
CLIENT:
Standard Pacific Homes
15360 Barranca Parkway
Irvine, CA 92618

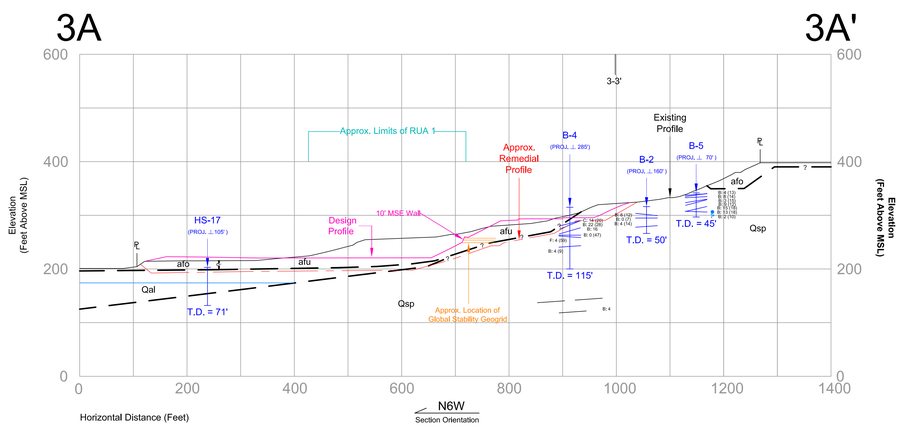
PROJECT NAME	Westridge - VTTM 17845
PROJECT NO.	14057-01
ENG. / GEOL.	DJB / KTM
SCALE	1" = 100'
DATE	August 2015

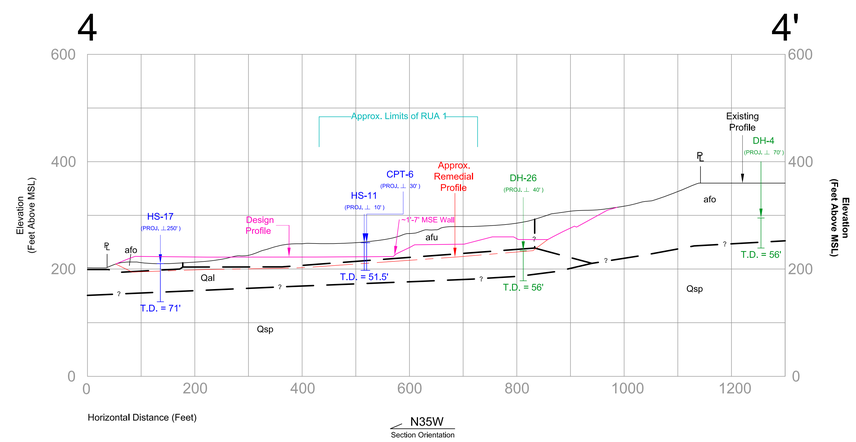
Sheet 1 of 3

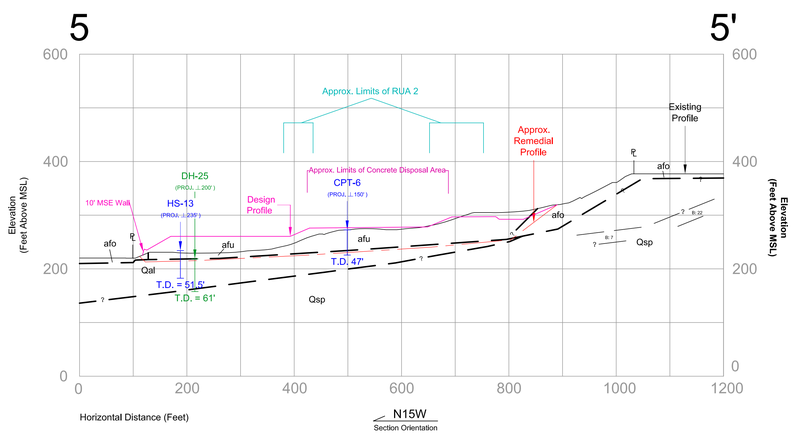


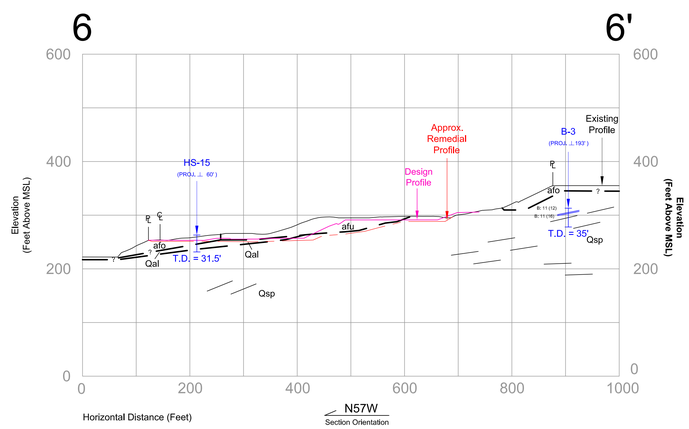


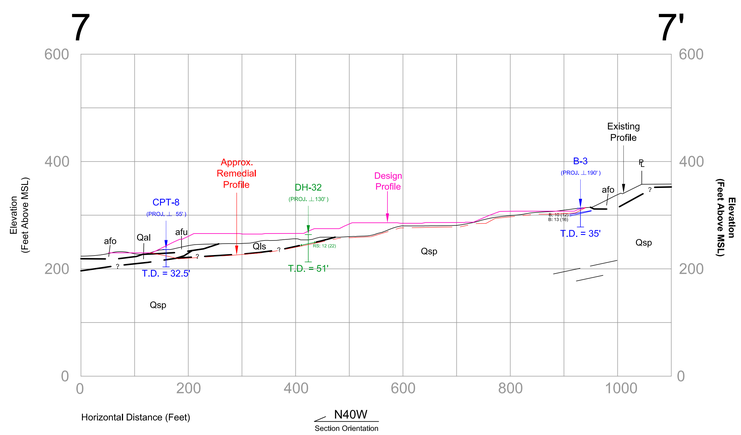












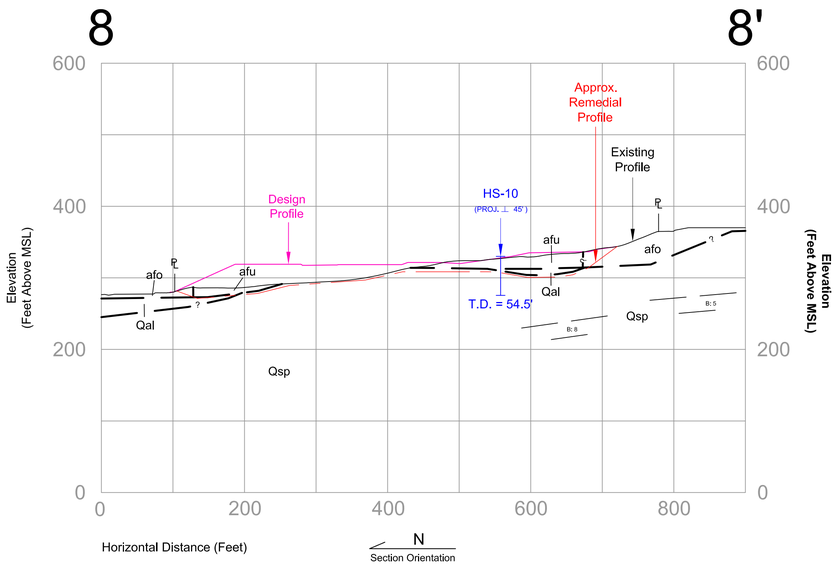
LGC Geotechnical, Inc.

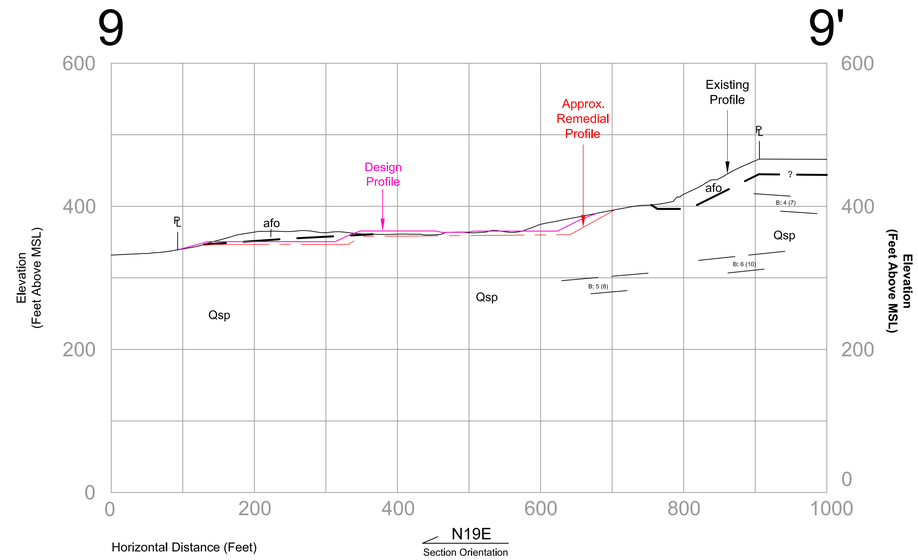
LGC Geotechnical, Inc.
131 Calle Iglesia, Ste. 200
San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

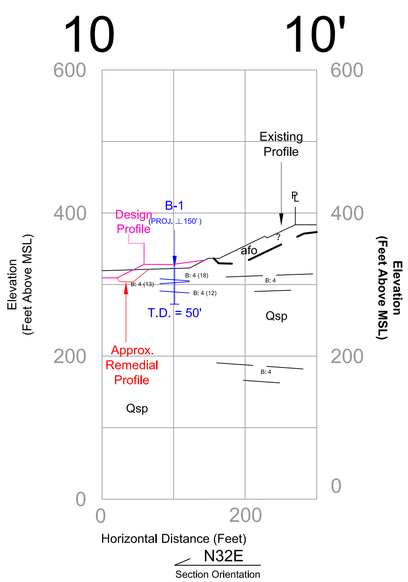
Geotechnical Cross-Sections 1-1' through 7-7'

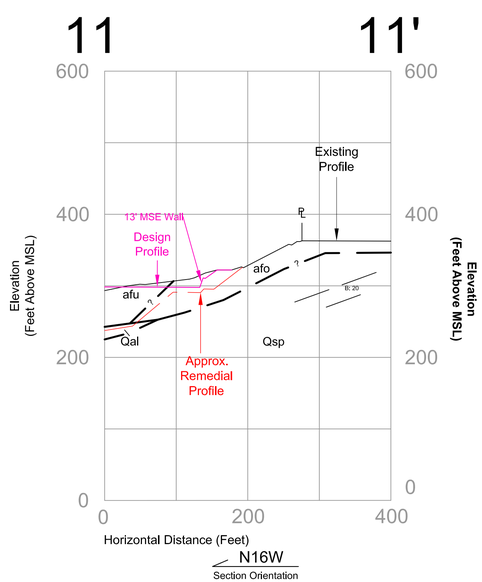
PROJECT NAME	Westridge - VTTM 17845
PROJECT NO.	14057-01
ENG. / GEOL.	DJB / KTM
SCALE	1" = 100'
DATE	August 2015

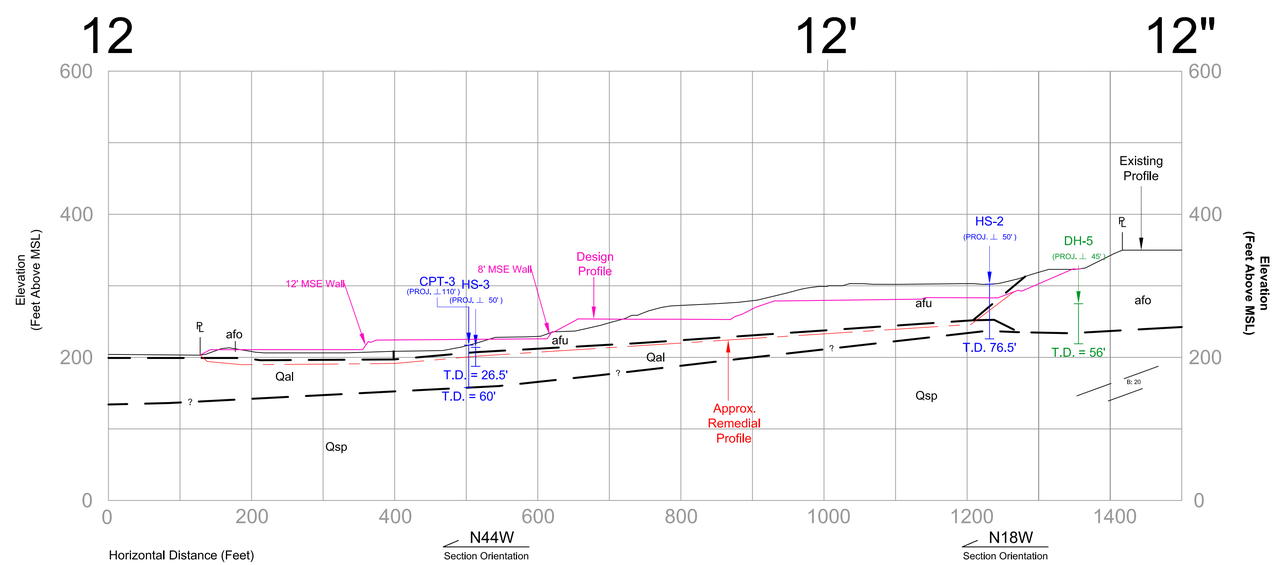
SHEET 2 of 3











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Geotechnical Cross-Sections
8-8' through 12-12'-12"

PROJECT NAME	Westridge - VTTM 17845
PROJECT NO.	14057-01
ENG. / GEOL.	DJB / KTM
SCALE	1" = 100'
DATE	August 2015

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