DESKTOP

GEOTECHNICAL INVESTIGATION

BEYER COMMUNITY PARK

BEYER BOULEVARD AND ENRIGHT DRIVE

SAN DIEGO, CALIFORNIA

Prepared for:

Schmidt Design Group

(K2 Engineering Job No. G2017001-1)

March 22, 2017

K2 ENGINEERING, INC.
GEOTECHNICAL CONSULTANTS

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GEOTECHNICAL CONSULTANTS

March 22, 2017

Ms. Jennifer Montgomery
Schmidt Design Group
2655 Fourth Avenue
San Diego, California 92103

Transmitted via e-mail: JMontgomery@schmidtdesign.com

Subject: **Desktop – Geotechnical Investigation**
Proposed Beyer Community Park
Beyer Boulevard and Enright Drive
San Diego, California
K2 Engineering Job No. G2017001-1

Dear Ms. Montgomery:

We are pleased to present our "Desktop Geotechnical Investigation, Beyer Community Park, Beyer Boulevard and Enright Drive, San Diego, California".

The purpose of this investigation was to review available information on the geotechnical conditions that may exist at the site of the proposed Beyer Community Park and to provide an opinion regarding the geologic hazards and preliminary design considerations for the planned facility.

Please call us if you have any questions or if we can be of further service to you on this or future projects. It has been a pleasure working with you.

Respectfully submitted,

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Prior Field Explorations

Geocon
Leighton and Associates
Krooskos, Williams and Associates
San Diego Geotechnical Consultants

1.0 SUMMARY

This report presents the results of our desktop investigation performed to provide geotechnical information for the proposed Beyer Community Park. The site is located on the southwest of the intersection of Beyer Boulevard and Enright Drive in San Diego, California. The approximate location of the proposed park is presented in Plate 1, Vicinity Map.

The investigation consisted of a site reconnaissance, the review of published and unpublished reports and the examination of aerial photographs. The approximate location of the field explorations previously completed by others are presented in Plate 2, Site Plan and Geologic Map. A summary of our findings and recommendations is presented below.

- The site is underlain by river terrace deposits and the San Diego Formation on the west side and the Otay Formation is present on the east side. In general, the formational materials consist of dense to very dense sandstone and conglomerate and hard siltstone and claystone. Zones of highly fractured materials were noted in various borings. Layers of highly plastic bentonitic clay were encountered within the Otay Formation. Landslide deposits were reported beneath the southern section of the parcel. Fill soils consisting of dense silty sand were encountered in two of the borings.

- Based on the reports reviewed, the soils within the site may be classified as having a low to very high expansion potential.

- Groundwater was not reported in borings drilled at the site. Seepage between lithologic units may occur during periods of heavy rainfall or due to irrigation.

- Based on the review of available information, a strand of the potentially active La Nacion Fault is located within the site. Accordingly, there is some potential for surface rupture at the study area, structural set-backs from the fault trace will be required.

- Previously mapped landslides are located to the northeast (Moody Canyon Landslide) and to the east and south (San Ysidro Landslide). Furthermore, materials associated with the Otay Mesa

Lateral Spread (OMLS) have been identified in the upper (eastern) section of the site. The limits of the landslides are not well defined and conflicting information exists within the information reviewed. Based on our limited field reconnaissance, we were able to confirm the limits of the northern end of the San Ysidro Landslide but additional field explorations and field mapping will be required to determine its boundary and set back.

- No evidence of landsliding within the northwest portion of the parcel was noted in the pre-earthwork aerial photographs reviewed (1928 and 1953). Previous investigations, and observations at the site, indicated that this portion of the site is underlain by nearly horizontally bedded materials of the San Diego formation. The southern border of the site, however, approximately parallels the northern boundary of the San Ysidro Landslide as mapped by previous investigations.

- The proposed facilities may be supported on undisturbed formational materials or compacted fill. Foundations for the proposed facilities may consist of shallow spread footings.

- Buttress and/or stabilization fills may be required for cut slopes. Remedial grading, including but not limited to overexcavation and recompaction of unsuitable materials or alternative foundations may be required if zones of weakness are encountered.

- The on-site soils may be used as compacted fill providing oversize material, expansive clays, debris or organic matter are removed. Selective grading may be required.

- Based on the information gathered during our desk top investigation, the site is suitable for construction of the proposed park, provided the design and construction incorporate means to mitigate the potential geologic hazards encountered. Means to minimize water infiltration as well as setbacks from known landslides and faults will be required.

- Future investigations at the site should include test pits to delineate the boundaries of the existing landslides and to evaluate the stability of the proposed slopes. Test pits should extend to depths of 10 to 15 feet. The approximate location of the proposed exploratory excavations is presented in Plate 2, Site Plan and Geologic Map.

2.0 SCOPE

Our scope of work consisted of the review published and unpublished information regarding the soils and the geologic conditions at the Beyer Community Park site. The purpose of this study was to evaluate the potential geologic hazards and the reported subsurface conditions in order to provide an opinion regarding the limits of the mapped landslides and to develop preliminary foundation design recommendations. More specifically, the scope of the investigation included the following:

- Perform a visual site reconnaissance.
- Review of published and unpublished geologic studies.
- Review of previous geotechnical investigations in the vicinity of the site. Previous boring and trench logs are included in Appendix A.
- Stereoscopic analysis of available aerial photography (summarized in the report text).
- Provide a preliminary opinion of the location of the existing landslide(s).
- Develop pre-design foundation and earthwork recommendations based on the information reviewed.
- Provide recommendations for future field explorations to be completed prior to final design.
- Preparation of this comprehensive report containing the results of the field reconnaissance and document review.

Our professional services have been performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, express or implied, is made as to the professional advice included in this report. This report has been prepared for Schmidt Design Group and their design consultants to be used solely in the evaluation and preliminary design of the subject project. This report has not been prepared for use by other parties, and may not contain sufficient information for purposes of other parties or other uses

3.0 PROJECT DESCRIPTION

The proposed Beyer Community Park site is an L-shaped parcel located east of East Beyer Boulevard, south of the cul-de-sacs of Fantasy Lane and Delany Drive. The parcel and extends east of the intersection of Beyer Boulevard and Enright Drive into Moody Canyon. Single family residences are located to the north and west along Beyer Boulevard. The approximate location of the site is presented in Plate 1, Vicinity Map.

According to the information provided, we understand that the proposed park will include athletic fields, a storage/restroom building, parking and picnic areas.

4.0 INFORMATION REVIEW

Our study included the review of readily available published and unpublished documents. The documents included geotechnical reports completed for projects in the vicinity of the site; geologic and seismic publications, articles, and maps relative to the site and general vicinity; and aerial photographs taken from 1928 to 1983 and Google Imagery from 1994 through 2015. A list of the documents reviewed is presented in the reference section of this report.

4.1 REPORTS BY OTHERS

The reports reviewed included geotechnical investigations completed for the residential developments in the vicinity of the proposed park. The projects were designated as the Beyer Hills Estates, Units 1 and 2 and the Beyer Hill Park Apartments. A geotechnical report prepared for the proposed extension of Beyer Boulevard was also reviewed. These reports included exploratory borings and trenching and were performed from 1973 through 2005. The documents reviewed are listed in Section 8.0, References. The approximate location of the exploratory excavations is presented in Plate 2, Site Plan and Geologic Map.

The field explorations included 30-inch-diameter borings extending to depths of up to 90 feet and exploratory trenches extending to depths of up to 13 feet. The relevant test pits and/or borings to the current project are included in Appendix A.

According to the information contained in the boring logs, the materials beneath the proposed park include terrace deposits and dense to very dense sandstone and conglomerate associated with the San Diego Formation on the western portion of the site. The eastern portion of the site is reportedly underlain by dense to very dense, massive sandstone and hard siltstone and claystone of the Otay Formation. Landslide deposits associated with the San Ysidro Landslide were reported along the southern boundary. Highly plastic bentonitic claystone beds were noted in several of the borings. These materials have very high expansion potential, laboratory tests indicated expansion indexes of up to 468.

Groundwater and/or seepage was not encountered in the exploratory excavations within the site.

The La Nacion Fault zone was mapped as crossing the site in a northwest to southeast direction, east of the terminus of Beyer Boulevard. It was described as trending "through the center of the site in a northwest direction (N20W to N40W)." (SDGC, 1988). Vertical offsets, fractures, slicks and remolded zones associated with faulting were reported in the exploratory excavations.

Other structural features in the site vicinity include the Moody Canyon landslide to the northeast and the San Ysidro landslide to the east and south. The approximate location of the geologic features is presented in Plate 2, Site Plan and Geologic Map.

4.2 AERIAL PHOTOGRAPHIC REVIEW

A series of stereo-pairs of aerial photographs were obtained from the County of San Diego GIS Department. As listed in the reference section, aerial photographs were reviewed from 1928, 1953, 1966, 1973, 1976, 1978, and 1983 as well as Google Earth imagery from 1994 through 2015. A summary of our review is provided below.

1929 and 1953 Photograph

Beyer Boulevard and East Beyer Boulevard are visible west and northwest of the site, respectively. Moody Canyon extends west of the current alignment of East Beyer Boulevard. A hillside trending northwest to southeast is noted in the area currently occupied by single family residences. Evidence of the San Ysidro landslide (hummocky topography) is visible south and east of the site. Some dirt roads are visible but there is no evidence of grading at the site.

1966 Photograph

By 1966 the Beyer Elementary School are present. Dirt roads, one running north-south across Moody Canyon and one east-west along the southern canyon edge were noted. No visible evidence of grading was noted at the site. Site topography is as noted in the 1953 photograph.

1973 Photograph

East Beyer Boulevard has been completed and extends past Beyer Boulevard. The western end of Moody Canyon has been filled. Additional buildings for Beyer Elementary School are in place. The slope between the site and Beyer Elementary has been completed. Significant earthmoving has occurred at the site, the activity encompasses the area south of the site to the edge of the school and to the north to the current location of the San Ysidro Middle School. Temporary roads and borrow pit excavations can be seen. Available information indicates that the earthwork is related to the borrow activities undertaken as part of the I-805 Freeway, which can be seen under construction.

1976 and 1978 Photograph

The I-805 Freeway has been completed. Moody Canyon is at about its current configuration. What it appears to have been a borrow pit excavation can be seen at the location currently occupied single family residences. Improvements to Beyer Elementary School are visible.

1983 Photograph

The residences of the Beyer Hills Estates have been constructed. Beyer Boulevard is in its current configuration. No additional evidence of earthwork is evident in the photograph.

5.0 SITE CONDITONS

5.1 SITE RECONNAISSANCE

A preliminary site reconnaissance was performed January 27, 2017. The purpose of the site visit was to observe the existing site conditions including visible evidence of potential geologic hazards that may adversely impact the project. To more accurately locate and describe the previously identified features, as well as those noted during our research, we completed a subsequent site reconnaissance on March 3rd, 2017.

The reconnaissance(s) included observation of the exposed outcrops on the slopes surrounding the site, more specifically the cut slope along the western site boundary descending into the Beyer School site, the visible materials exposed on the slopes and borrow pits at the site. In general, the materials exposed included sandstone, siltstone and cobble conglomerate. The materials exposed on the slope were generally massively bedded and dipping gently to the north and northwest. Materials with significant variations in strike and dip were observed in some of the exploratory excavations. Evidence of slope failure associated with the Moody Canyon and the San Ysidro landslides was observed. An area of significant erosion which includes rills and gullies, slumping and shallow surficial slope failure were observed in the slopes southeast of the site. The approximate location of these features is presented in Plate 2, Site Plan and Geologic Map.

Looking Southwest at Beyer Park Site

5.2 EXISTING CONDITIONS

The area is currently undeveloped with numerous dirt roads crossing the site. Site topography varies from gently sloping and undulating to steep walls in the Moody Canyon area. The site is bound to the west by a 35- to 80-foot slope which descends into a parcel previously occupied by the Beyer Elementary School, to the north by the Beyer Hills Estates and to the east and south by undeveloped land.

In general, the site is composed of an upper and lower pads separated by a generally north-south trending ridge about 8 to 15 feet in height, where the La Nacion Fault has been mapped. Site topography on the western (lower) section is gently sloping and undulating, with elevations ranging from about 233 feet above mean sea level (m.s.l.) at the base of the ridge to elevations 181 to 200 feet m.s.l. along the western slope. Steeply graded and heavily eroded slopes characterize the eastern (upper) portion of the site, with elevations ranging from about 245 feet m.s.l. east of the La Nacion Fault Zone to about 285 feet m.s.l. on the eastern site boundary. Areas of significant erosion and/or slope failure were observed in the Moody Canyon and the slopes south and southeast of the site.

5.3 GEOLOGIC SETTING

The proposed Beyer Park site is located within the coastal plain portion of the Peninsular Ranges geomorphic province near the southern California batholith. The general structural trend of the province is northerly to northwesterly. The coastal plain is approximately 5 to 10 miles wide, consisting of sedimentary units which are part of the San Diego Embayment (Kennedy, 1975).

5.4 SUBSURFACE CONDITIONS

5.4.1 Geologic Materials

The site is underlain by three geologic formations and several types of surficial deposits including recent fill, alluvium, and landslide debris. The southern limits of the Otay Lateral Spread, an ancient region-wide mega-landslide, has been mapped east of the La Nacion Fault on site, however,

we observed no evidence of its presence in the borings or cut slopes on the property. The geologic formations exposed on the site are the Otay Formation, an Oligocene aged sedimentary deposit, the Pliocene San Diego Formation, and an unnamed Late Pleistocene aged river terrace deposit. The surficial deposits consist of recent fill placed during past grading operations, stream deposited alluvium, and ancient landslides. Each are discussed in more detail below. The local site geology is presented on Plate 2, Site Plan and Geologic Map.

Otay Formation: The Otay Formation is well exposed east of the La Nacion fault on the surface of the graded area and low cut slope east of the La Nacion fault. In the eastern portion of the property this unit consists of interbedded, lightly cemented, fine gray sand and gray clayey siltstone. Although not exposed on site, this unit also contains waxy bentonite beds that vary in thickness from a few inches to several feet. Bentonite is a unique type of clay best known for its pink to light gray color, critically high expansive properties, and low shear strength. Its low shear strength and the fact that the clays have often been further weakened by lateral stress relief on the deeply incised canyons in the San Ysidro/Otay area has led to the formation of the massive landslides that occur wherever there are extensive outcrops of this unit. The San Ysidro Landslide, the northern limb of which underlies (and approximately parallels the southern portion (boundary) of the property, and the large landslides in Moody Canyon along the northern boundary of the site are typical of the types of landslides that occur within the Otay Formation. The Otay Formation is overlain by Late Pleistocene River Terrace Deposits and the San Diego Formation discussed below.

San Diego Formation: The San Diego Formation as mapped by previous geotechnical firms is exposed west of the La Nacion fault and south of the cul-de-sac at the south end of Enright Drive, and in the high cut slope along the western property line. This unit consists in part of very fine light gray sandstone and minor cobble conglomerate. Interbeds of siltstone and highly cemented calcareous cemented sands were also observed. The San Diego Formation as identified by previous studies is significantly thicker on the west side of the La Nacion fault probably as a result of down-to-the-west fault movement and basin deepening during the Pliocene.

River Terrace Deposits: Late Pleistocene age river terrace deposits occur in the central portion of the property as shown on the Geologic Map, Plate 2. This unit consists of massively bedded, light reddish- brown to light orange-brown, medium to fine grained sandstone and cobble to boulder conglomerate. This unit likely originated in an ancient floodplain of the ancestral Tijuana River. The eastern limit of this unit is formed by the La Nacion Fault where the fault has juxtaposed orange brown river terrace beds and light grey sandstone of the Otay Formation. To the west, this unit is well exposed at the top of the cut slope that forms the western boundary of the proposed park property.

Looking east at Beyer School slope

5.4.2 Groundwater

Groundwater was not reported within any of the borings or test pits excavated by others at the site. However, groundwater conditions could develop and/or seepage may occur depending on annual precipitation and irrigation. Seepage may occur along lithologic changes within the on-site soils and at the interface between the fill and the less permeable formational materials.

5.5 GEOLOGIC HAZARDS

5.5.1 General

Geologic hazards that could impact the subject site include landslides and those derived from earthquakes. A strand of the La Nacion fault crosses the site, there is a low potential for fault rupture and/or displacement due to an earthquake in this fault. In addition, damage due violent shaking from earthquake waves on nearby faults may also occur. Significant landslides have been mapped in the vicinity of the site. To the northeast, the Moody Canyon landslide and to the east and south the San Ysidro landslide.

5.5.2 Faults

The numerous faults in Southern California include active, potentially active, and inactive faults. The definitions of fault activity terms used here are based on those developed for the Alquist-Priolo Special Studies Zone Act of 1972.

Active faults are those faults that have had surface displacement within Holocene time (approximately the last 11,000 years) and/or have been included within an Alquist-Priolo Special Studies Zone. Faults are considered potentially active if they show evidence of surface displacement since the beginning of Quaternary time (about two million years ago), but not since Holocene time. Inactive faults are those which have not had surface movement since the beginning of Quaternary time.

The site is not within a currently established Alquist-Priolo Earthquake Fault Zone for fault rupture hazard (formerly Special Studies Zones for fault rupture hazard).

La Nacion Fault/Sweetwater Fault Zone: The La Nacion/Sweetwater Fault Zone, is a major down-to-the-west normal fault zone present in the south bay area of San Diego. The faults in the eastern portion of the zone are referred to as the La Nacion Fault Zone and the faults in the western part of the zone are part of the Sweetwater Fault Zone. The La Nacion fault is exposed in an approximately 10 feet high cut slope in the eastern portion of the site just south of the cul-de-sac on Enright Drive. Furthermore, evidence of faulting including displacements, slicks, and materials with significant variations of strike and dip, which resemble those of the anticipated fault were reported in the boring logs completed by others (SDGC, Geocon, Krooskos). Similar bedding was observed during our site reconnaissance. Kennedy (1977) indicates that faults of the Sweetwater Fault Zone

displace Quaternary stream terrace materials younger than 125,000 years and an unnamed nearshore marine sandstone that may be correlative with the Bay Point Formation that is approximately 125 thousand years old. The Lindavista Formation of earliest Pleistocene age is the youngest formation depicted on Kennedy's published geologic map as being displaced by activity on faults within the La Nacion Fault Zone. There are, however, many strands making up the La Nacion Fault Zone and the lack of geomorphic expression of the fault throughout most of its length from near the Mexican Border to the San Diego State University area, suggests that the faults making up this wide fault zone have not been active during the Holocene.

Numerous exploratory trenches have been excavated across the main trace of the La Nacion Fault since its discovery in the early 1970's to assess its degree of activity resulting sometimes in conflicting fault activity data. The conflicts regarding the recency of fault activity are likely the result of the studies being performed on different strands of the fault. For example a study by Hart (1974) on the main trace of the fault in Poggi Canyon near Lilac Avenue in Chula Vista indicated that sediments carbon dated at 13,375 years Before Present (B.P.) were not displaced by faulting. Another more recent study by Leighton and Associates (personal communication, circa 2005) also performed in the Chula Vista area on possibly a different fault strand indicated the possibility that the fault may be active; that is it may have had displacement in the last 11,000 years. Because of the uncertainty of the age of last fault activity, current geotechnical practice calls for having structural setbacks from the fault of at least 25 feet for habitable structures (structures that will be occupied by persons for 2,000 hours per year or more).

5.5.3 Landslides and Slope Stability

According to the City of San Diego Seismic Safety Study, the site encompasses areas designated as zones of low to moderate risk for landslides (zone 53), possible landslides (zone 22) and, confirmed or highly suspected (zone 21). Evidence of San Ysidro and Moody Canyon landslides including slumping and hummocky topography can be observed to the southeast and northeast of the site, respectively.

Review of previous reports for various on-site projects and our independent analysis indicates that the extreme southern portion of the property is underlain by the San Ysidro Landslide. This approximately ¾ mile wide landslide extends from the surface of the mesa east of the site to the vicinity of the railroad tracks west of the property. The results of exploratory drilling by Accutech

Engineering in 1995 just west of Beyer Boulevard a few hundred feet north of the U.S./Mexico border suggests that the bottom of the landslide may lie below sea-level in that area.

We have reviewed borings and geotechnical data presented by several geotechnical firms including Geocon, Leighton and Associates, San Diego Geotechnical Consultants, and Southland Geotechnical. All the previous studies are in general agreement as to the location of the northern limits of the landslide as shown on Plate 2 of this report. As part of this review, we made a reconnaissance of the property and were able to confirm the location of the northern edge of the slide at least in the area east of the La Nacion Fault. The exact limits of the landslide directly south of the area proposed for the park are not known with certainty and accordingly the limits of the landslide in that area depicted on the geologic map are approximate. Additional large landslides are located on the north and south slopes of Moody Canyon directly east of the terminus of Beyer Boulevard. These landslides were investigated in detail by Geocon Inc. in 2005. San Diego Geotechnical Consultants investigated the approximately 80 feet high slope along the western boundary of the site with several borings. The results of their investigation indicated that the majority of the slope is underlain by essentially horizontally bedded sandstone, siltstone and claystone of the San Diego Formation. The southern 200 (+/-) feet of the slope is mapped as landslide debris however there is little geotechnical information to confirm that conclusion.

San Ysidro Landslide – Looking South

Moody Canyon Landslide – Looking North

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 GEOLOGY

Based on the review of available information, the potentially active La Nacion Fault crosses the site in a north-south direction, and as such, there is a possibility of surface rupture. Accordingly, structural setbacks from the mapped fault trace are recommended. The site would be subject to strong ground shaking in the event of an earthquake; however this hazard is common to Southern California, and the effects on the proposed project can be mitigated if the structures are designed and constructed in accordance with current engineering practice and building codes.

Two major landslides have been documented in the vicinity of the site, the Moody Canyon landslide to the north (off-site) and the San Ysidro landslide to the south and east. Based on available information, the limits of the San Ysidro landslide east of the La Nacion fault the northeast site boundary could be confirmed but not the southern boundary. Furthermore, the area east of the La Nacion Fault has been described as being part of the OMLS, however, we observed no evidence of this in the reviewed geotechnical reports.

Based on the information gathered during our desk top investigation, the site is suitable for construction of the proposed facilities, provided the design and construction incorporate means to mitigate the potential geologic hazards. Remedial grading, including overexcavation and recompaction, buttressing of slopes with adverse bedding and/or fractures as well as setbacks from known landslide masses will be required. Structural setbacks will be required from the mapped trace of the La Nacion fault.

Additional field explorations are recommended to confirm the landslide boundaries and to evaluate the stability of proposed. The approximate location of the landslides and of the proposed field explorations is presented in Plate 2, Site Plan and Geologic Map.

6.2 FOUNDATIONS

According to the documents reviewed, the lower portion of the site is underlain by dense to very dense river terrace deposits and the San Diego formation (sandstone, siltstone, claystone and cobble to boulder conglomerate). Materials associated with the Otay Formation and the OMLS are reportedly present beneath the upper portion east of the La Nacion Fault Zone.

Review of aerial photographs from 1928 to present, indicated that the site was significantly altered by cutting and filling into the original topography. Grading operations were completed as part of the materials mining operation undertaken during construction of I-805 in 1972 and 1973. Areas of fill were reported on the southwest corner of the site adjacent to the slope and on the upper section. These fill soils were placed in the excavated borrow pits after completion of the mining operations at the site (Krooskos, 1975).

The materials encountered at the site include silts and clays of high plasticity. Expansion indexes of 75 to 468 (SDGC, 1988) and of 0 to 63 (Geocon, 2005) were reported for materials encountered at the site. The clayey materials are classified as having a very high expansion potential.

The on-site materials minus highly expansive clays, debris or oversize materials may be used as compacted fills. Selective grading will be required.

The proposed facilities may be supported on undisturbed formational materials or compacted fill. Foundations for the proposed facilities may consist of shallow spread footings. Based on the laboratory testing performed by others the parameters noted in the table below, Preliminary Design Parameters may be used for planning purposes.

A bearing capacity of 2,000 pounds per square foot may be considered for on-site compacted fill soils. Additional testing will be required for final design.

Preliminary Foundation Design Parameters

	Compacted Fill Materials
Bearing Capacity	2,000 psf
Passive Pressure	300 psf
Frictional Capacity	0.3
Subgrade Modulus	100 pci

Remedial grading or alternative foundations may be required if zones of weakness are encountered. Field explorations including test pits to determine the fault location and subsurface conditions are recommended.

6.3 EARTHWORK

The formational materials are dense to very dense and stiff to hard. Zones of highly fractured materials were reported at several exploratory excavations and boulders were encountered in the River Terrace Deposits. The borings drilled at the site were advanced using large diameter bucket auger drilling equipment. Trench excavations were completed using a 24-inch backhoe. Refusal was not reported, but hard excavation may occur in the highly cemented zones. It is anticipated that conventional heavy duty excavation equipment could be used for the proposed excavations.

The on-site soils may be used as compacted fill providing oversize material, expansive clays, debris or organic matter are removed. Selective grading may be required.

Temporary excavations within the formational materials may be sloped back at 1 to 1. These materials are susceptible to erosion and surficial slumping when exposed. Erosion control measures will be required.

Introduction/infiltration of water into the ground is not recommended especially upslope or above existing landslides. Means to control and minimize irrigation and water infiltration into the subgrade is recommended. Overexcavation and recompaction of unsuitable materials, will be required. Adverse bedding and/or significant fractures may result in slope instability. Stabilization fills and/or buttresses may be required to stabilize slopes with adverse bedding. A typical buttress fill is presented in Plate 3, Stabilization Fill.

6.4 FIELD EXPLORATIONS

We recommend that future field investigations include geologic mapping of the exposed slopes and test pits to confirm the landslide boundaries. The test pits should extend to depths of 10 to 15 feet. Their final dimensions would be determined in the field as the investigation progresses. The locations of the proposed exploratory excavations are presented in Plate 2, Site Plan and Geologic Map.

7.0 BASIS FOR RECOMMENDATIONS

The conclusions and recommendations provided in this report are based on our understanding of the described project information and on our interpretation of the data collected during the desk top review of investigations performed by others and published geological information. No independent subsurface explorations or laboratory testing were conducted for this investigation. We have made our recommendations based on experience with similar subsurface conditions under similar loading conditions. The recommendations apply to the specific project discussed in this report; therefore, any change in the facility loads, expected traffic conditions, facility location, or site grades shall be provided to us so we may review our conclusions and recommendations and make any necessary modifications.

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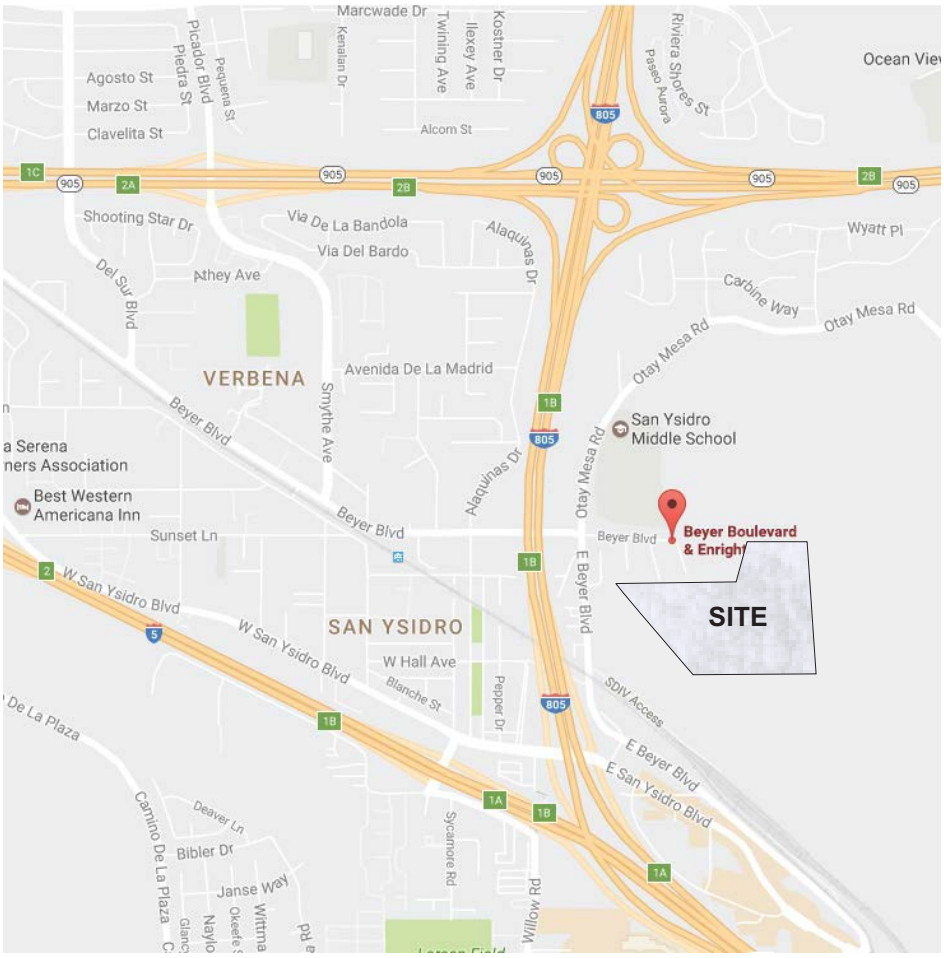
JOB G2017001-1 DATE 3/20/2017 BY SK ENGR SCK REV



VICINITY MAP

PROPOSED
BEYER COMMUNITY PARK
SAN DIEGO, CALIFORNIA

N

(NOT TO SCALE)

REFERENCE: Google Maps and Imagery (2017)

K2 ENGINEERING, INC.

SITE PLAN and GEOLOGIC MAP

PROPOSED
BEYER COMMUNITY PARK
SAN DIEGO, CALIFORNIA

REV
ENGR SCK/MH
BY
DATE 3/20/2017
JOB G2017001-1

T-12A
LB-2
Landslide Deposits (Qls)
MOODY CANYON LANDSLIDE
LB-1A
LB-3
T-11A
T-13A
MOODY CANYON
Colluvium & Landslide Deposits
Alluvium (Qal)
T-7A
B-4
LB-2A
B-13
B-7
Otay Formation (To)
Fault Setback
Fill (Qaf)
LB-4A
T-16
KB-18
T-6A
T-15
B-8
KB-19
LA NACION FAULT
B-12
B-11
KB-14
Landslide Deposits (Qls)
Otay Formation (To)
KB-1
KB-4
KB-6
River Terrace Deposits
B-10
KB-5
KB-20
KB-21
B-3
KB-16
San Diego Formation (Tsd)
B-2
B-5
B-6
KB-22
KB-17
SAN YSIDRO LANDSLIDE
KB-7
B-1
KB-11
B-9
Fill (Qaf)
KB-12
San Diego Formation (Tsd)
N
0 20 40
SCALE
Landslide Deposits (Qls)

KEY:

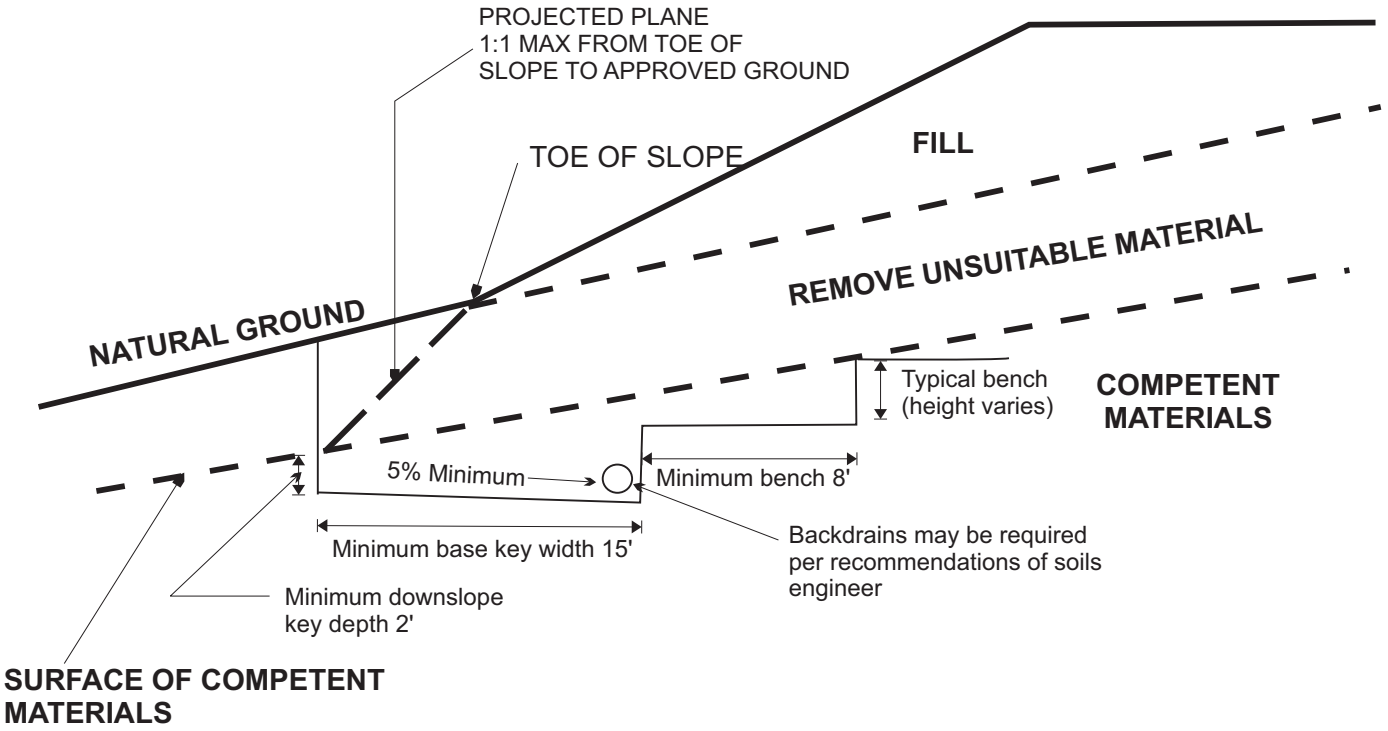
- KB-12 / LB-3 — Krooskos (1973); Leighton & Assoc. (1980)
- TP-16 / B-9 — SDGC (1986, 1987)
- T-7A / LB-4A — Geocon (2005)
- Proposed Explorations (Test Pits / Borings)
- Geologic Contact
- Landslide Limits
- Approximate Limits and Locations

REFERENCE: Topographic Survey (dated 10/6/2006) by Vertical Mapping

K2 ENGINEERING, INC

PLATE 2

JOB G2017001-1 DATE 03/20/2017 BY SCK ENGR SCK REV



FILL SLOPE KEY

K2 ENGINEERING, INC.

APPENDIX A

PRIOR

FIELD EXPLORATIONS

GEOTECHNICAL INVESTIGATION
BEYER BOULEVARD EXTENSION
OTAY MESA COMMUNITY PLAN AMENDMENT
SAN DIEGO, CALIFORNIA

By: Geocon, Inc.

January, 2005

PROJECT NO. 07254-42-01

BORING LB-1A

ELEV. (MSL.) 230' DATE COMPLETED 10-25-2004

EQUIPMENT EZ BORE 100 30" ROTARY BUCKET

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	LB1A-5				Dense to very dense, damp, light yellowish brown, Silty, fine to medium SANDSTONE	26	111.9	6.5
32	LB1A-6				-Bedding horizontal, becomes very dense			
34								
36					-2-inch thick cemented zone			
38								
40	LB1A-7			SM		30	124.1	10.6
42					-Transition to coarse grained, silty sand with subangular to subrounded fine gravel (grit), with thin cemented layers			
44								
46								
48								
50	LB1A-8					40/10"		
					BORING TERMINATED AT 51 FEET No groundwater encountered			

Figure A-1,
Log of Boring LB-1A, Page 2 of 2

07254-42-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▯ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 07254-42-01

BORING LB-2A

ELEV. (MSL.) 260' DATE COMPLETED 10-26-2004

EQUIPMENT EZ BORE 100 30" ROTARY BUCKET

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**OTAY FORMATION SILTSTONE**			
2				ML	Dense, damp, medium gray, fine, Sandy SILTSTONE; with thin interbedded silt, fine sandstone			
4	LB2A-1							
6	LB2A-2			ML-CL	Dense, damp, medium gray-brown, Clayey SILTSTONE	8	99.4	24.9
8					Very dense, damp, light gray, Silty, fine SANDSTONE; massive			
10	LB2A-3			SM		18		
12								
14					-Cemented layer 2-inches thick N65E, 11SE			
16					Hard, damp, medium brown to gray, Sandy CLAYSTONE and Clayey SILTSTONE; approx. horizontal beds			
18				CL-ML	-Very dense, Silty, very fine SANDSTONE layer approx. 2 feet thick, grading to siltstone			
20	LB2A-4				-Reddish brown coloration grading from siltstone to claystone	10	119.3	12.2
22					Very dense, damp, very light gray, slightly Silty, fine SANDSTONE; becomes friable, less cemented			
24								
26				SM				
28					-Cemented layer, N40E, 11SE 2 to 3-inches thick			

07254-42-01.GPJ

Figure A-2,
Log of Boring LB-2A, Page 1 of 2

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▯ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◣ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 07254-42-01

BORING LB-2A

ELEV. (MSL.) 260' DATE COMPLETED 10-26-2004

EQUIPMENT EZ BORE 100 30" ROTARY BUCKET

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	LB2A-5					17		
					Dense, damp, medium brown, Sandy SILTSTONE to Silty SANDSTONE			
32								
					-Very stiff, pinkish brown 4-inch thick bentonite layer; N20W, 8NE			
34								
				ML-SM				
36					-Claystone bed 1-inch thick N40W, 6SW			
38								
40					Very hard, damp, medium brown-olive, very Clayey SILTSTONE to Silty CLAYSTONE			
42	LB2A-6							
				ML-CL				
44								
46								
					-Bentonite claystone bed approx. 8-inches thick, approx. horizontal at 46½ feet			
48					Very dense, damp, light brown, very Silty, fine SANDSTONE; bedding N20E, 5SE			
50				SM				
52					-Transition to bentonitic clayey sandstone at 52½ feet			
54								
					BORING TERMINATED AT 55 FEET No groundwater encountered			

Figure A-2,
Log of Boring LB-2A, Page 2 of 2

07254-42-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▥ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◣ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 07254-42-01

BORING LB-4A

ELEV. (MSL.) 350' DATE COMPLETED 11-02-2004

EQUIPMENT EZ BORE 100 30" ROTARY BUCKET

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**LANDSLIDE DEBRIS (Older)** Dense, dry to humid, dark brown, Silty, fine SAND; numerous white calcium carbonate (caliche) lined fractures			
2					Medium dense, damp, light gray, fine, Sandy SILT; (mottled with white caliche)			
4	LB4A-1							
6	LB4A-2			ML	-Becomes medium gray-brown	3	96.5	13.8
8								
10	LB4A-3				Dense, damp, reddish brown, Gravelly to Clayey SAND; sandy bedding parting surfaces at N25E, 10NW			
12	LB4A-4			SC		10		
14								
16	LB4A-5				Becomes Sandy, coarse GRAVEL with some Silt	10		
18								
20	LB4A-6			GM		12		
22								
24								
26					-Approx. imbrication layers of gravel at N-S, 30E, likely to be block slide-rotated bedding of the Terrace Deposit Gravel. This may represent a large landslide - block within the San Ysidro Landslide complex that is older than those in Moody Canyon			
28								

Figure A-4,
Log of Boring LB-4A, Page 1 of 3

07254-42-01.GPJ

SAMPLE SYMBOLS

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

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

PROJECT NO. 07254-42-01

BORING LB-4A

ELEV. (MSL.) 350' DATE COMPLETED 11-02-2004

EQUIPMENT EZ BORE 100 30" ROTARY BUCKET

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30								
32				GM				
34	LB4A-9				-Remolded (shear) clayseam approx. 2-inches thick with pink bentonite N45W, 45SW at 35 feet (landslide failure surface)			
36	LB4A-10 LB4A-7				**OTAY FORMATION BENTONITIC MEMBER** Hard, moist, light gray to pinkish brown, very Silty CLAYSTONE to dense, Clayey SILTSTONE (this unit exhibits features of "lateral spread" ancient submarine landslides and is considered inactive when undisturbed	15	109.7	17.5
38	LB4A-8							
40					Bedding with localized polished surfaces N85W, 26N shear on bentonitic clay layer N30E, 70SE. Bedding E-W, 25N along 4-6" cemented layer			
42				CL-ML	Open fractures 1/8-inch wide N70W, 67NE with striated surfaces (striations parallel to dip)			
44					Possible "flame" structures, with sharp variations in bedding. Bedding N70E, 20NW			
46					Discontinuous steep open fractures in various directions with voids, sheared laminated siltstone bedding N70E, 15NW is sheared at N40E, 57NW, transitioning to dense, massive siltstone			
48								
50					-Gradual transition into massive horizontal beds; bottom of "lateral spread" feature (?)			
52					**OTAY FORMATION SILTSTONE** Dense, damp, light gray-olive, Clayey SILTSTONE; massive to approx. horizontal bedding			
54								
56				ML				
58								

Figure A-4,
Log of Boring LB-4A, Page 2 of 3

07254-42-01.GPJ

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
▨ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 07254-42-01

BORING LB-4A

ELEV. (MSL.) 350' DATE COMPLETED 11-02-2004

EQUIPMENT EZ BORE 100 30" ROTARY BUCKET

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60	LB4A-11			ML		35	106.9	17.9
62	LB4A-12							
64								
					BORING TERMINATED AT 65 FEET No groundwater encountered			

Figure A-4,
Log of Boring LB-4A, Page 3 of 3

07254-42-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▯ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 07254-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T- 6A ELEV. (MSL.) 350' DATE COMPLETED 10-12-2004 EQUIPMENT JD 310 24"	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				CL	**LANDSLIDE DEBRIS (Older)** Soft, humid, dark gray-olive, Gravelly, Silty CLAY; porous, irregular transition			
2								
4				GM	Medium dense, damp, medium reddish brown, Sandy, coarse GRAVEL; disturbed conglomerate of the pleistocene Lindavista Formation, with imbricated cobbles inclined (rotated) approx. 5° E			
6								
8					TRENCH TERMINATED AT 8 FEET			

Figure A-13,
Log of Trench T- 6A, Page 1 of 1

07254-42-01.GPJ

SAMPLE SYMBOLS

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

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

PROJECT NO. 07254-42-01

TRENCH T- 7A

ELEV. (MSL.) 228' DATE COMPLETED 10-12-2004

EQUIPMENT JD 310 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**LANDSLIDE DEBRIS (Older)** Stiff, humid, dark olive-brown, Sandy CLAY; weathered soil mantle			
2					Dense, damp, light gray-olive, Silty, fine SAND; fractured, rotated block of Otay Formation E to W, 40°N in Clayey SILTSTONE layer			
4				SM				
6								
8					TRENCH TERMINATED AT 8 FEET			

07254-42-01.GPJ

Figure A-14,
Log of Trench T- 7A, Page 1 of 1

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▨ ... DISTURBED OR BAG SAMPLE
- ▮ ... STANDARD PENETRATION TEST
- ▮ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▽ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 07254-42-01

TRENCH T-11A

ELEV. (MSL.) _____ DATE COMPLETED 10-15-2004

EQUIPMENT JD 310 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**UNDOCUMENTED FILL** Loose, damp, light tan to brown, Silty, fine SAND; little or no compaction, evident, porous			
2								
4				SM				
6								
8					**ALLUVIUM** Loose, moist, medium brown to reddish brown, Gravelly to Silty, fine SAND; porous			
10				SM				
12	T11-1							
14					Loose, moist, medium brown, very Gravelly, Silty, fine to medium SAND; with lenses of silt			
16				SM-GM				
18					-Becomes coarse, with 12 to 18-inch cobble-boulders			
					TRENCH TERMINATED AT 18½ FEET			

07254-42-01.GPJ

Figure A-18,
Log of Trench T-11A, Page 1 of 1

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◣ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 07254-42-01

TRENCH T-12A

ELEV. (MSL.) _____ DATE COMPLETED 10-15-2004

EQUIPMENT JD 310 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**UNDOCUMENTED FILL** Loose, damp, medium to light brown (mottled), very Gravelly, Clayey, fine SAND			
2				SC				
4								
6								
8					**ALLUVIUM** Loose to stiff, moist, dark brown, very Gravelly, Clayey, fine to medium SAND; porous, with pinhole voids			
10				SC-GC				
12					**BAY POINT FORMATION** Medium dense to dense, very moist, reddish brown, Clayey to Sandy, fine to coarse CONGLOMERATE; massive, little or no porosity, with horizontally imbricated rounded cobbles			
14	T12-1 T12-2			GC				
16								
					TRENCH TERMINATED AT 17 FEET			

07254-42-01.GPJ

Figure A-19,
Log of Trench T-12A, Page 1 of 1

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▮ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◣ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 07254-42-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T-13A ELEV. (MSL.) 216' DATE COMPLETED 10-15-2004 EQUIPMENT JD 310 24"	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SP-GP	**ALLUVIUM** Loose, dry to humid, light brown to tan, very Sandy, coarse GRAVEL; friable, poorly graded, noncohesive sand matrix, with caving			
2								
4								
6								
8								
10				SM	**OTAY FORMATION SILTSTONE** Dense, damp, light gray to tan, very Silty, fine SANDSTONE; horizontally laminated			
					TRENCH TERMINATED AT 10½ FEET (Caving)			

Figure A-20,
Log of Trench T-13A, Page 1 of 1

07254-42-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▨ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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ENGINEERING GEOLOGIC INVESTIGATION
NORTHWESTERN FLANK OF SAN YSIDRO LANDSLIDE
BEYER HILLS ESTATES – UNIT 2
SAN YSIDRO, CALIFORNIA

By: Leighton and Associates.

June, 1980

PROJECT NO. 06847-42-01

BORING LB 1

ELEV. (MSL.) 492 DATE COMPLETED 8/23/02

EQUIPMENT SOILMEC 108 TRUCK MT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2				CL	**TERRACE DEPOSIT CLAY** Stiff, damp, dark brown, very Sandy CLAY			
4								
6	LB1-1			SP	**TERRACE DEPOSIT GRAVEL** Medium dense, humid to damp, light reddish brown, Gravelly, coarse SAND, trace clay, silt, slight caving			
8								
10					Medium dense, moist, reddish brown, very Gravelly, Silty SAND, with some clay, subrounded to rounded, fine to medium size (1" to 6" diameter)			
12	LB1-2							
14								
16				SM-GM				
18								
20								
22								
24								
26								
28								

Figure A-1, Log of Boring LB 1

SOM

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◪ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 06847-42-01

BORING LB 1

ELEV. (MSL.) 492 DATE COMPLETED 8/23/02

EQUIPMENT SOILMEC 108 TRUCK MT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30								
32				SM-GM				
34								
36					Very dense, moist, light to medium red brown, Silty, Sandy, very coarse GRAVEL, 8" to 24" diameter clasts, trace clay			
38								
40	LB1-3			GM				
42					-12 inch clean sand layer; horizontal laminated bedding			
44								
46								
48	LB1-4				Dense, moist, medium reddish brown, very Silty, Sandy, medium to coarse GRAVEL			
50								
52				GM-SM				
54								
56								
58				SM	-Sharp depositional contact at 58.5 feet N55E, 5NW with undulations dipping approximately 2 degrees to SW and NW			

Figure A-2, Log of Boring LB 1

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◪ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 06847-42-01

BORING LB 1

ELEV. (MSL.) 492 DATE COMPLETED 8/23/02

EQUIPMENT SOILMEC 108 TRUCK MT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60								
	LB1-5				**SAN DIEGO FORMATION** Dense, damp, light gray to yellow-brown, Silty fine SANDSTONE with some friable (cohesionless when disturbed) sand layers -Horizontal to gently undulating laminated micaceous beds (interbedded sandy siltstone and sandstone with 1" to 3" thick alternating beds			
62								
64								
66					BORING TERMINATED AT 66 FEET			

Figure A-3, Log of Boring LB 1

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

⊠ ... DISTURBED OR BAG SAMPLE ◺ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 06847-42-01

BORING LB 6

ELEV. (MSL.) 496 DATE COMPLETED 8/30/02

EQUIPMENT SOILMEC 108 TRUCK MT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**TERRACE DEPOSIT CLAY** Stiff, moist, dark yellow brown, Sandy CLAY, with some fine gravel, massive			
8				SM	**TERRACE DEPOSIT GRAVEL** Medium dense to dense, damp, medium reddish brown, very Gravelly, Silty, medium to coarse SAND with trace clay			
12				GP-SP	Dense, damp, medium reddish brown, very Sandy coarse GRAVEL, with cobbles 6 to 8 inches, low cohesion, (when disturbed), with some sloughing			
28				SP				

Figure A-14, Log of Boring LB 6

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◣ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 06847-42-01

BORING LB 6

ELEV. (MSL.) 496 DATE COMPLETED 8/30/02

EQUIPMENT SOILMEC 108 TRUCK MT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30								
32	LB6-1			SP	Medium dense to dense, damp, light reddish brown, Gravelly coarse SAND -Sloughing and non cohesive (when disturbed), crossbedded			
34								
36								
38				GM	Very dense, damp to moist, medium brown to reddish brown, Sandy, very coarse GRAVEL -Oversize cobbles 8 to 20 inches diameter in slightly silty coarse sand matrix, with trace clay			
40								
42								
44								
46								
48								
50								
52								
54								
56								
58								

Figure A-15, Log of Boring LB 6

SOM

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◣ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

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

PROJECT NO. 06847-42-01

BORING LB 6

ELEV. (MSL.) 496 DATE COMPLETED 8/30/02

EQUIPMENT SOILMEC 108 TRUCK MT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
60								
62								
64				GM				
66								
68								
70					Becomes Clayey to Silty, with fine to medium rounded conglomerate layers, horizontally imbricated			
72	LB6-2 LB6-3			CL	-Approximately horizontal to undulating scour-deposition contact		72.8	40.5
					OTAY FORMATION Hard, moist, light olive-gray, Silty CLAYSTONE; massive, blocky			
					BORING TERMINATED AT 73 FEET			

Figure A-16, Log of Boring LB 6

SOM

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◣ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

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

ENGINEERING GEOLOGY STUDY
SAN YSIDRO PROJECT
NORTH VISTA AVENUE
SAN DIEGO, CALIFORNIA

By: Krooskos, William and Associates

1973

BORING SUMMARY SHEET

Boring No 1, 2 (30" Dia. Bucket) Elevation ____

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
		Loose, moist, brown, slightly clayey, coarse sand, gravel & cobbles (GC) S=50% G to 6"=45% C to 8"=5%					
5		Loose, moist, brown, coarse sand, gravel and cobble (GP) S=40% G to 6"=40% C to 18"=20% Bottom of Hole					

Boring No. 2 (30" Dia. Bucket)

0		Firm, moist, red-brown, clay (CL)					
5		Loose, damp, brown, clayey sand & cobbles to 18" (SC)					
		Stiff, moist, green, clay (CL) TOPSOIL----▼					
10		Dense, damp, light green-brown, fine sand (SW)					
		Med. dense, damp, light green-brown, fine to med. sand & cobbles (SW) S=7.0% G=30% under 6"					
15		Hard, damp, gray-green, fine sandy clay & clayey fine sand (CL-SC) Bottom of Hole					

LEGEND

(1) Undisturbed Sample

◎ Disturbed Sample

▽ Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure No. I

BORING SUMMARY SHEET

Boring No 3,4 Elevation ___

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
5		Loose, moist, brown, coarse sand, gravel & cobbles (GP) S=65% G=30% C=5%					
10		Dense, damp, green-brown, fine sandstone (SP) S=100%					
15		Hard, damp, light green-brown, sandy claystone & caliche lenses (CL) S & Clay=100% Bottom of Hole					

Boring No. 4

0		Loose, damp, red-brown, clayey silty sand (SC)					
5		Med. dense, damp, gray-brown, silty fine to med. sand (SM)					
10		Med. dense, damp, green-brown, med. sand (SP)					
15		Med. dense, damp, brown,-green, sandy silt & silty sand (ML-SM) S=95% G=5%					
		Loose, slightly damp, light gray-brown, med. coarse sand (SW)					
20		Loose, dry, light gray-brown, med.-coarse sand 30% gravel to 4"					
		Bottom of Hole					

LEGEND

(1) Undisturbed Sample

◎ Disturbed Sample

Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure No. II

BORING SUMMARY SHEET

Boring No 5, 6 Elevation ___

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
		Med. dense, moist, brown, coarse sand gravel & cobble (GP) S=75% G=20% C=5%					
5		Loose, damp, brown, coarse sand gravel & cobble (GP) S=60% G=35% C=5%					
		S=40% G=55% C=5%					
10		Loose, damp, brown, large cobbles sand & gravel (GP) S=35% G=35% C=30%					
		Bottom Of Hole					

Boring No. 6

0		Loose, damp, light brown, mixed clay, coarse sand, fine sand, silt, & cobble (CL-SW-ML) FILL-------					
5		Loose, damp, brown, coarse sand (SW) S=95% G=5%					
10		Loose, damp, light gray-brown, coarse sand (SW) S=95% G=5%					
		Loose, damp, brown, coarse sand (SW) S=95% G=5%					
15		Loose, damp, brown, sand & cobble (SP) S-50% G=25% C=25%					
20		Bottom of Hole					

LEGEND

(1) Undisturbed Sample

◎ Disturbed Sample

▽ Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure No. III

BORING SUMMARY SHEET

Boring No 7, 8, 9, 10 Elevation ____

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft.	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement (-) % swell (+)
		Med. dense, damp, green-brown, fine to med. sand (SW)					
5	C	Dense, damp, green-brown, sandy siltstone & fine sandstone (ML-SP)					
		Bottom of Hole					
		Boring No. 8					
0		Loose, dry, brown, silty fine sand (SM) Becomes light gray-brown					
5	C						
		ALLUVIUM					
10							
15		Large cobbles Bottom of Hole					
		Boring No. 9					
0		Med. dense, dry, brown, silty fine sand (SM) ALLUVIUM					
5		Loose, dry, brown, silty sand, gravel & cobbles (SM) S=40% G=50% C=10% BH					
		Boring No. 10					
0		Med. dense, dry, brown, silty fine sand & gravel (SM) S=75% G=25% ALLUVIUM					
5		Stiff, damp, dark brown, sandy clay, gravel & cobbles (CL) C=35% G=35% C=30% Bottom of Hole					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure IV

BORING SUMMARY SHEET

Boring No 11 Elevation ___

DEPTH IN FEET	SAMPLE NO		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
		Loose, damp, brown, coarse clayey sand gravel & cobble (SC) FILL --- S=40% G=40% C=20%					
5		Dense, damp, brown, poorly graded fine sand (SP)					
10		Firm, damp, green, clay (CL) Slip plane-Strike S35E, dip 18 S					
15		Dense, slightly damp, brown-green, fine sand (SP)					
		Firm, damp, green, clay (CL) Slip Plane-Strike N35E, dip 18S					
20		Med. dense, dry, light green-brown, med. sand (SW)					
25		Dense, slightly damp, brown, silt & sand (ML-SW)					
30		Dense, slightly damp, green-brown, silt & med. to coarse sand (ML-SW)					
35		Med. dense, dry, light green-brown, med. coarse sand (SW) S=95% G=5%					
		S=80% G=20%					
40		Boring No. 11 continued					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure No. V

BORING SUMMARY SHEET

Boring No 11 (cont'd) Elevation ___

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft.	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
45	(C)	Becomes damp					
50		Med. dense, damp, light pinkish-brown, med. coarse sand w/ some gravel (SW) Bottom of Hole					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

(SM) Unified Soil Classification

Water Table

Job No. 73-3706
Figure No. VI

BORING SUMMARY SHEET

Boring No 12 Elevation ____

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
		Med. dense, dry, light green, fine sand (SP)					
5		Dense, slightly damp, green-brown, silt & fine sand (SM)					
10		Med. dense, dry, light green-brown, med. to coarse sand (SW)					
15		Med. dense, dry, light gray-brown, med. coarse sand & rounded gravel to 3" (SW)					
20		Med. dense, dry, light gray-brown, med. to coarse sand & gravel (SW)					
		Med. dense, damp, green-brown, med. sand & gravel to 6" S=90% G=10%					
25		Med. dense, slightly damp, white, med. sand (SW)					
30		Med. dense, damp, light brown, med. sand (SW)					
35		Cobbles to 12" Bottom of Hole					

LEGEND

(1) Undisturbed Sample

(O) Disturbed Sample

Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure No. VII

BORING SUMMARY SHEET

Boring No 13 Elevation ___

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft.	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
		Dense, damp, green-brown, silt & fine sand (ML-SP)					
		Slip Plane-Strike N45W, dip 50S					
5		Dense, dry, light brown-green, silt & fine sand (ML-SP)					
10		Med. dense, dry, tan, fine sand (SP)					
15		Med. dense, slightly damp, brown, dirty silt & fine sand (SM)					
20		Med. dense, slightly damp, green-brown med. sand w/ some fines (SW)					
25		Med. dense, slightly damp, white fine sand (SP)					
30		Med. dense, dry, light gray-green, med. coarse sand & some fines (SW)					
35		Bottom of Hole					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

▽ Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure VIII

BORING SUMMARY SHEET

Boring No 14 Elevation ____

DEPTH IN FEET	SAMPLE NO		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
		Dense, dry, white, fine sand (SP)					
5		Dense, damp, dark green-brown, clayey siltstone (ML)					
10		Dense, slightly damp, light gray-brown, silt & fine sand (SM)					
15	◎	Dense, slightly damp, green-brown, fine sand (SP)					
20							
25		Bottom of Hole					

LEGEND

① Undisturbed Sample

◎ Disturbed Sample

▽ Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure No. [illegible]

BORING SUMMARY SHEET

Boring No 15 Elevation ____

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
		Med. dense, slightly damp, brown, silt & sand w/ pebbles (ML-SW)					
5		Stiff, damp, brown, sandy clay w/ caliche & pebbles (CL)					
10		Med. dense, slightly damp, brown, clayey silt, sand, gravel & a few large cobbles (ML-SC) Si=40% Sa=40% G=15% C=5%					
		Med. dense, slightly damp, gray-brown silt & fine sand, much caliche (ML-SP)					
15		Med. dense, slightly damp, dark brown silt & sand (ML-SW)					
20		Med. dense, slightly damp, brown, silty sand & gravel (SM)					
25		Med. dense, slightly damp, red-brown, silty med. sand & gravel Si & Sa=60% G=40%					
		Med. dense, slightly damp, red-brown, silty sands, gravels & cobbles to 12" B.H.					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

(SM) Unified Soil Classification

Water Table

Job No. 73-3706
Figure No. X

BORING SUMMARY SHEET

Boring No 16 Elevation ____

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft.	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
0		Dense, damp, light gray-brown, fine sand (SP)					
5		Dense, slightly damp, gray-brown, fine sandy siltstone (ML)					
10							
15		Med. dense, slightly damp, white fine sand (SP)					
		Dense, slightly damp, gray-brown, fine sandy siltstone (ML)					
20		Hard, slightly damp, red-brown, claystone (CL)					
		Dense, slightly damp, light gray-brown silty fine sandstone (SM)					
25		Material falls from bucket as sand as opposed to blocks.					
30							
35							
40		Boring No. 16 continued					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

▽ Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure No. XI

BORING SUMMARY SHEET

Boring No 16 (cont'd) Elevation ___

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
		Small amounts of claystone, continuing into silty fine sand					
		Slip Plane on bentonite approx. horizontal					
45		Med. dense, damp, white, fine clean well sorted sand (SW)					
		Hard, damp, brown, clay grading to brown , hard, siltstone (CL-ML)					
50		Med. dense, damp, tan, sandstone, (fine well sorted) (SW)					
55		Becomes dense, interbedded siltstone, claystone & fine sandstone					
		4" clay bed					
60		Some shiny parting surfaces					
		Med. dense, slightly damp, light brown, clean fine to med. sand (SW)					
65		Very dense, slightly damp, light gray-brown, sandstone (SW) B.H.					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure No. XII

BORING SUMMARY SHEET

Boring No 17 Elevation ___

DEPTH IN FEET	SAMPLE NO.	DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
0						
5						
10						
15						
20						
25						
30						
35						

Med. dense, damp, brown, green-tan, fine to med. sand (SP)

Loose, damp, brown, med. coarse, sand & gravel S=90% G=10%

Loose, damp, light gray-brown, clean fine sand (SP) Slip Plane (horiz)

Loose, damp, brown, med. coarse sand (SW)

Bottom of Hole

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

Water Table

(SM) Unified Soil Classification

Job No. 73-3706
Figure No. XIII

BORING SUMMARY SHEET

Boring No 18 Elevation ___

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft.	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft.	% settlement(−) % swell (+)
5		Dense, slightly damp, light gray-green, silty fine sand (SP)					
10							
15		Hard, moist, brown, claystone (CL) becoming clayey siltstone (ML)					
20		Dense, damp, brown, silty fine sand-stone (SW)					
25							
30							
35		N55E, 10°N ← Slip plane on 8" bentonite bed					
40		Very dense, damp, dark green-brown, clayey siltstone (ML).					
45		Very dense, damp, green-brown, fine sandstone (SW)					
50		Dense, damp, dark green-brown, clayey siltstone (ML)					
55		Dense, damp, green-brown, fine sand (SP)					
		Very hard, damp, dark brown, claystone & clayey siltstone (CL-ML) B. H.					

LEGEND

① Undisturbed Sample

◎ Disturbed Sample

Water Table

(SM) Unified Soil Classification

Job No. 74-4180
Figure No. I

BORING SUMMARY SHEET

Boring No 19 Elevation ___

DEPTH IN FEET	SAMPLE NO		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
5		Hard, damp, brown & red-brown, siltstone & claystone (ML-CL)					
10		Dense, damp, light green-brown, fine sand (SP)					
15							
20							
25		Dense, damp, pink-gray, fine sand (SP) Slip plane in bentonite-N45W,4°S					
		Hard, damp, green, very sandy claystone (CL)					
30		Dense, damp, light green-gray, clayey sandstone (SC)					
35							
40		Dense, damp, green-brown, sandstone (SW) Bottom of Hole					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

Water Table

(SM) Unified Soil Classification

Job No. 74-4180
Figure No. III

BORING SUMMARY SHEET

Boring No 20 Elevation ____

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft.	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft	% settlement(-) % swell (+)
		Very hard, damp, dark brown, claystone (CL)					
5							
10		Dense, damp, green-brown, silty fine sand (SP)					
15							
20							
25		Hard, damp, brown, claystone (CL)					
30							
35		Very dense, damp, green-brown, fine sand (SP)					
40							
45							
50		Dense, damp, light brown; silty fine sand (SP)					
55		Slip Plane- 6"shear zone N65E, 13S					
60							
65		Dense, damp, green-brown, sandy clay-stone (CL)					
70							
75							
80		Dense, damp, light brown, silty fine sand (SP)					
		Shear Zone-2'thick -- remolded clay					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

(SM) Unified Soil Classification

Water Table

Job No. 74-4180
Figure No. V

BORING SUMMARY SHEET

Boring No 21 Elevation ____

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft. kips/ft	% settlement(-) % swell (+)
5		Dense, damp, light brown, silty fine sand (SP)					
10		Dense, damp, green-brown, siltstone (ML)					
15		Dense, damp, light brown, silty fine sand (SP)					
20		horizontal bedding Slip Plane-N5E,33E					
25		bedding N15E,13E Slip Plane-N35W,22N					
30		Hard, damp, green-brown, silty claystone (CL) bedding N45E,6SE					
35		Dense, light brown, fine sand (SP)					
40		Dense, damp, green-brown, clayey-siltstone (ML)					
45		bedding N55E,7SE Dense, damp, darker green-brown, silty fine sandstone (SW)					
50		claystone					
55		Hard, pink, sandy bentonite					
60		offset bentonite bed (secondary shearing)					
65							
70		Hard, damp, dark brown, fine sandy claystone (CL)					
75		Horizontal bedding Slip Plane-in bentonite N5W,4W					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

Water Table

(SM) Unified Soil Classification

Job No. 74-4180
Figure No. II

BORING SUMMARY SHEET

Boring No 22 Elevation ____

DEPTH IN FEET	SAMPLE NO.		DRY DENSITY lbs/cu ft	IN PLACE MOISTURE, % of dry weight	SHEAR RESISTANCE kips/sq ft	DRIVE ENERGY ft kips/ft.	% settlement(-) % swell (+)
		Med. dense, damp, light brown, silty fine sand (SP)					
5							
		Med. dense, slightly damp, light gray-brown, fine sand (SP)					
10							
15							
20							
		←Slip Plane-N25W,18E					
25		Brown, bentonite & caliche over plane, 6" disturbed sand under plane					
30		Med. dense, slightly damp, light brown silty fine sand w/caliche & rounded cobbles to 6" (SP)					
35		Slip Plane- N-S,19W					
		Dense, slightly damp, light gray-brown, fine sand (SP)					
40		bedding- N55E,27N					
45		Hard, damp, gray-pink, sandy bentonite Slip Plane-N70E,3S					
50		Med. dense, slightly damp, green-brown silty sand (SM)					
55							
60		Dense, slightly damp, brown, silty clayey fine sand (SC) becoming cleaner @ 61'					
65		Clean, light gray-brown, sandstone (SW) bedding-N20W,4E					
70							
75		Dense, damp, brown, interbedded siltstone & claystone (ML-CL) Ledding N30E,4E					
80		←Slip Plane-N15E,4W in bentonite horizontal bedding Bottom of Hole @ 90'					

LEGEND

(1) Undisturbed Sample

(◎) Disturbed Sample

(SM) Unified Soil Classification

Water Table

Job No. 74-4180
Figure No. IV

GEOTECHNICAL INVESTIGATION
BEYER HILL PARK APARTMENTS
SAN YSIDRO, CALIFORNIA

By: San Diego Geotechnical Consultants, Inc.

June, 1988

DATE OBSERVED: 11-14-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 202± LOCATION: See Geotechnical Map

BORING NO. 1

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0	SM						KELLY WEIGHT (lbs.) 4113 FILL: Light gray silty fine SAND, damp to moist, medium dense to loose.	
	SM						TERRACE DEPOSIT (Qt): Light gray brown to orange brown silty fine to coarse SANDSTONE with abundant cobbles up to 24" in diameter, moist, medium dense, massive. Contact: somewhat gradational, approximately horizontal.	
5	SM/ML	5	▨		32.4	88.4	SAN DIEGO FM (Tsd): Olive gray silty fine SANDSTONE to sandy SILTSTONE with some clay, moist, very dense/hard, massive.	
	SM/ML	8/10"	▨	▨			@ 7'-8' olive gray silty CLAYSTONE, moist, hard, somewhat fractured (about 2"-4" spacing) with some orange stain in fractures. Top contact: gradational, approximately horizontal. Bottom contact: undulating, dips roughly 3° NW, some polished surfaces, 1/8" remolded seam at bottom contact.	
10							White cemented SANDSTONE to SILTSTONE, some caliche.	
15							@ 10½'-12½' light gray clayey to silty fine SANDSTONE, moist, medium dense, massive. Top contact: N54W/5N, bottom contact: irregular, undulating.	
	MH			▨			@ 13' clay seam, irregular, undulating, 1/8" to 3" thick, approximately N12E/12E	Particle Size Analysis Atterberg Limits Remolded Direct Shear
20	ML	3	▨	▨	32.3	88.3	Contact: somewhat remolded, N11W/12W Olive SILTSTONE, moist, highly fractured with abundant polished surfaces, firm to stiff. Contact: N72E/4N	Particle Size Analysis Atterberg Limits Undisturbed Direct Shear
25	SM						Gray clayey SILTSTONE with slight sand, moist, hard, massive, with spherical orange stains to ¼" diameter. @ 23' Joint: N74E, approximately vertical, 1/16" caliche infill. Contact: gradational over 18"	@ 25' Kelly Weight becomes 2981 lbs.
30		7	▨		16.0	114.9	Light gray silty fine SANDSTONE, moist, medium dense to dense, massive. @ 28'-29' becomes very silty, light olive brown, dense to very dense @ 29'-30' sandy siltstone, gradational contacts, hard	
35							@ 33'-40' Cobblezone, cobbles to 6" diameter, sand becomes somewhat friable. Bedding: roughly horizontal @ 34' Bedding: N10E/6E	
40							@ 39'-40' orange staining, fine to coarse sand @ 40' Bedding: N30E/8W	

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-2

DATE OBSERVED: 11-14-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 202± LOCATION: See Geotechnical Map

BORING NO. 1

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION KELLY WEIGHT (lbs.) 2981	SOIL-TEST
40	SM	7	▨	▨			SAN DIEGO FM (Tsd): Light gray silty fine SANDSTONE, moist, dense, massive	
45							@ 44' becomes medium grained, horizontal bedding	
							@ 47½' orange stain N63W/3S	@ 47' Kelly Weight becomes 2168 lbs.
							@ 48'-52' cobble zone, cobbles up to 4" in diameter	
50							@ 52' Bedding N34W/4SW	
		11	▨		6.3	108.0	@ 52'-54' Light gray very silty very fine SANDSTONE, moist, medium dense to dense, massive, somewhat friable.	
55							Light gray silty fine SANDSTONE, moist, medium dense, massive, friable	
							@ 56'-58' faint, micaceous cross bedding, randomly oriented, horizontal to 15° dips	
60		14	▨				@ 62'-68' slight caving/belling, occasional cobbles up to 18" in diameter, friable sand	
							@ 64'-68' becomes medium to coarse grained	
65							@ 68' bedding: E-W/7S, orange stain	
70		20	▨				@ 73'-80' hole bells out to 5' diameter, abundant cobbles to 18", friable sand.	
75								
80							TOTAL DEPTH: 80' No Water Caving/belling @ 73'-80' Geologically logged to 73' Backfilled 11-14-86	

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-3

DATE OBSERVED: 11-17-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 235± LOCATION: See Geotechnical Map

BORING NO. 2

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION (KELLY WEIGHT (lbs.) 4113)	SOIL TEST
0	ML						SAN DIEGO FM. (Tsd): Light olive gray clayey SILTSTONE with some sand, moist, hard, massive. Contact: slightly undulating N74E/3S, slightly remolded	
	SM						Light gray silty fine SANDSTONE, moist, dense, massive. Contact: N37W,5S	
5	CL/CH	3			50.1	71.4	Light olive gray silty CLAY, moist, hard, occasional random polished surfaces. Contact: gradational	Expansion Index
	SM						Light gray silty fine SANDSTONE, moist, dense, massive, somewhat friable. Contact: N27W/6S	Expansion Index Sulfate, pH
10	SM	5			10.3	105.1	Light olive gray CLAYSTONE, moist, stiff to very stiff, somewhat remolded, with slicked surfaces. @ 9½' undulating contact between dark gray clay w/slicks and light gray silty claystone - hard, with some tubular and spherical (to ¼") orange stains. Contact: gradational	Particle Size Analysis Atterberg Limits Undisturbed Direct Shear
15		4					Light gray silty fine SANDSTONE, moist, dense, massive @ 13' bedding: approximately horizontal @ 18½'-20' scattered claystone inclusions, coarse grained sand	
20		5			9.8	118.2	@ 21' 6" clay lense, stiff to very stiff, gradational contacts @ 22'-24' coarse grains with gravel, some cobbles to 4" @ 24' bedding: N34W/5S	
25								@ 25' Kelly Weight becomes 2981 lbs.
							@ 29' bedding: N5E/6W	
30		10					@ 30' grades to coarse grained sand with gravel, some pebbles, friable, caving/belling of hole to 4'-5' diameter.	
35								
40		7					TOTAL DEPTH: 40' No Water Caving/Belling @ 30'-40' Geologically logged to 24' Backfilled 11-17-86	

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-4

DATE OBSERVED: 11-18-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 267± LOCATION: See Geotechnical Map

BORING NO. 3

KELLY WEIGHT (lbs.) 4113

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0	SM						OTAY FM. (To): Light gray silty fine SANDSTONE, moist, dense, massive. Contact: undulating, approximately N42E/6SE	
	CH						Olive brown CLAYSTONE, moist, very stiff, with abundant slicked surfaces up to 8" across, in random orientation. Contact: N42W/10N	
5	SM	5	☒	☒	21.3	99.4	Light gray brown silty fine SANDSTONE, moist, very dense, massive, occasional brown claystone inclusions, occasional faint, indistinct bedding. Contact: Gradational	
	CL							
	ML							
10	SM/ML	10	☒		11.4	110.8	Medium brown silty CLAYSTONE, moist, very hard, massive, unfractured. Contact: Gradational	Sulfate, pH
							Light gray brown fine sandy SILTSTONE, moist, very hard, massive, unfractured @ 10'-10½' cemented lense @ 10½' 2" clay bed, hard, slightly softer for 1/16" at bottom contact, N25W/4E	
15		7	☒				Light gray brown silty fine SANDSTONE/ sandy SILTSTONE, moist, very dense, massive, unfractured. @ 12' occasional brown claystone inclusions up to 4" in diameter, hard. @ 14' clayey lens, 6" thick, hard, continuous around 1/3 of hole (NE side). @17½', 1" clay bed, very stiff, occasional polished surfaces, N54W/0-2NE @ 21', 4" clay bed, hard, horizontal, offset 2" by fault N57W/70SW down to south @ 23' grades to fine sandy SILTSTONE with slight clay Contact: Gradational	
20		10/9"	☒	☒				
25								@ 25' Kelly Weight becomes 2981 lbs.
	CL						Medium brown silty CLAYSTONE, moist, hard, massive, unfractured	
30		8	☒		23.5	103.2	Contact: Gradational	Expansion Index
	SM/ML						Light gray brown silty fine SANDSTONE/sandy SILTSTONE, moist, very dense, massive, unfractured, occasional hard clayey lenses up to 5" thick with gradational contacts.	
35							@ 38½'-39½' Light brown claystone bed, hard, some zones slightly bentonitic, unfractured, top contact: N10W/5E, bottom contact: N54E/5S	
40								

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-5

DATE OBSERVED: 11-18-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 267± LOCATION: See Geotechnical Map

BORING NO. 3

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
40	SM/ML	14/9"			13.1	112.2	QTAY FM. (To): Light gray brown silty fine SANDSTONE/fine sandy SILTSTONE, moist, very dense, massive. @ 43', 4" clayey lens, hard, gradational contacts	
45							@ 46'-48' becomes siltier	@ 47' Kelly Weight becomes 2168 lbs.
50		15/9"					@ 50' 6" clayey lens, hard, gradational contacts	
							@ 54½', 6" clay bed, hard, approximately horizontal	
55								
60								
65							@ 63' grades to silty fine SANDSTONE	
70		20/8"			9.6	115.7		
75							@ 73'-74' silty fine SANDSTONE/fine sandy SILTSTONE	@ 72' Kelly Weight becomes 1083 lbs.
80							@ 78'-79½', fine to medium grained SANDSTONE, somewhat friable	

KELLY WEIGHT (lbs.) 2981

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-6

DATE OBSERVED: 11-18-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 267± LOCATION: See Geotechnical Map

BORING NO. 3

DESCRIPTION

KELLY WEIGHT (lbs.) 1083

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
80	SM						OTAY FM. (To): Light gray brown silty fine SANDSTONE, moist, very dense, massive	
	SM						@ 79½'-80½' cemented sandstone	
85							Light orange brown silty fine to medium SANDSTONE with some coarse, angular, dark grains, moist, very dense, massive, may be grading into the Sweetwater Formation.	
90							TOTAL DEPTH: 90' No Water No Caving Geologically logged to 90' Backfilled 11-18-86	
95								
100								
105								
110								
115								
120								

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-7

DATE OBSERVED: 11-19-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 249± LOCATION: See Geotechnical Map

BORING NO. 4

KELLY WEIGHT (lbs.) 4113

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0	SM						OTAY FM (To): Light gray silty fine SANDSTONE, moist, dense, massive, slight caliche Contact: N55W/9E	
5	CL						Red brown silty CLAYSTONE, moist, very stiff, massive, moderately fractured (½" spacing), slight green mottling, some caliche blebs, no slicks. @ 4' grades to green, less fractured (6" spacing), hard, no caliche	
	SM						@ 5'-6' silty fine sandstone bed, gradational contacts	
10	ML	4					@ 6½', 5" mottled red zone, moderately fractured, no slicks. Contact: gradational to interfingering	Expansion Index
							Light gray to brown silty fine SANDSTONE, moist, dense, massive with occasional faint, indistinct bedding, roughly horizontal. Contact: undulating, approximately N76E/0-5N	
15							Mottled red brown to green clayey SILTSTONE, moist, hard, somewhat fractured (1"-2" spacing) near contact, less fractured below, no slicks. @ 11'-12' silty fine sandstone bed, gradational contacts	
20	ML	9					@ 12' moderately fractured (½"-2" spacing), cemented caliche nodules to 2", very stiff. @ 15½' fault: slightly remolded, large slicks on surface oriented with dip N30W/55SW. Continues to 19'. 2' silty fine sand bed is offset approximately 1½' in this area, down to SW	Particle Size Analysis Atterberg Limits Remolded Direct Shear
	SM/ML						Contact: 1/8" remolded clay seam, approximately horizontal	
25							Light gray brown silty fine SANDSTONE/fine sandy SILTSTONE, moist, very dense, massive @ 22½', 2" brown clayey zone, gradational contacts, roughly horizontal	@ 25' Kelly Weight becomes 2981 lbs.
30		10			18.8	108.6	@ 25', 2"-4" brown claystone bed, horizontal, some caliche @ 26' becomes light gray fine sandy SILTSTONE, bedding: undulating, roughly N68W/7S @ 30½', 1" claystone bed, horizontal, hard	
35							@ 33' Bedding: horizontal, 1"-3" claystone, occasionally bentonitic, occasional slick surfaces, discontinuous. @ 33' becomes light gray brown silty fine SANDSTONE. @ 35½', 4" brown claystone bed, gradational contacts, approximately horizontal	
40							@ 40' grades to medium gray fine sandy SILTSTONE	

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-8

DATE OBSERVED: 11-19-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 249± LOCATION: See Geotechnical Map

BORING NO. 4

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION KELLY WEIGHT (lbs.) 2981	SOIL TEST
40	ML	12	◿		23.2	97.3	OTAY FM. (To): Medium gray fine sandy SILTSTONE, moist, hard, massive @ 42'-43' silty fine sandstone, horizontal @ 45' discontinuous cemented sandstone, 1"-2" thick	Particle Size Analysis Atterberg Limits Undisturbed Direct Shear
45	SM						Below 45' becomes light gray brown to yellow brown silty fine to medium SANDSTONE, very dense, massive, occasional cemented lenses, occasional dark angular grains - may be grading into Sweetwater Formation (Tsw).	@ 47' Kelly Weight becomes 2168 lbs.
50								
55								
60		20	◿		5.0	111.0		
							TOTAL DEPTH: 61' No Water No Caving Geologically Logged to 59' Backfilled 11-19-86	
65								
70								
75								
80								

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-9

DATE OBSERVED: 11-19-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 237± LOCATION: See Geotechnical Map

BORING NO. 5

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0	SM						SAN DIEGO FM. (Tsd): Pale yellow green slightly silty fine SANDSTONE, moist, medium dense to dense, massive, @ 3'-6' cobbles up to 5" in diameter, friable fine to coarse sand	
10		3	▨				@10½-12' fine to coarse sand, pebbles up to 1" in diameter	Sulfate, pH
15							@ 15'-18' occasional cobbles	
20				▨				
25							@ 26'-28' cobbles to 16"	@ 25' Kelly Weight becomes 2981 lbs.
							@ 28'-31' gravelly coarse sand	
30		10	▨					
35								
40								

KELLY WEIGHT (lbs.) 4113

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-10

DATE OBSERVED: 11-19-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 237± LOCATION: See Geotechnical Map

BORING NO. 5

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)
40	SM					
45						
50						
55						
60						
65						
70						
75						
80						

DESCRIPTION

KELLY WEIGHT (lbs.) 2981

SAN DIEGO FM. (Tsd): Pale Yellow green slightly silty fine SANDSTONE, moist, dense massive.

@ 41' refusal on cobble layer

TOTAL DEPTH: 41'
No Water
No Caving
Backfilled 11-20-86

SOIL TEST

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-11

DATE OBSERVED: 11-20-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 237± LOCATION: See Geotechnical Map

BORING NO. 6

DESCRIPTION

KELLY WEIGHT (lbs.) 4113

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	SOIL TEST
0	SM						

SAN DIEGO FM. (Tsd): Light yellow brown silty fine to coarse SANDSTONE, moist, medium dense, massive

@ 2' grades to light gray green, slightly silty

@ 4'-5' becomes gravelly
@ 5'-8' cobbles to 6" in diameter, friable coarse sand

@ 8'-11' silty fine sand, top contact: channel cut, N25E/20E

@ 11'-12' cobbles to 3", friable fine sand
@ 12'-13½' white silty fine sand, friable, indistinct cross bedding dips 0-10 towards SE

@ 13½-17' Light gray green silty fine to coarse sand, some cobble stringers, friable

@ 16'-17' cross bedding: N80E/10S, N5E/7W, E-W7N

@ 17'-19' silty fine sand, faint micaceous cross bedding

@ 19'-29' fine to coarse sand, friable, faint discontinuous cross beds

@ 20' cross bed: N65W/10S
@ 21' bedding: N35W/3SW

@ 24' cross bedding N83W/11S

@ 29'-31' cobbles up to 18" in diameter, boring bells out

@ 31'-42' silty fine sand, massive, occasional cobble stringers

@ 40' orange stained cross bed N78W/10S

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-12

DATE OBSERVED: 11-20-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 237± LOCATION: See Geotechnical Map

BORING NO. 6

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
40	SM						SAN DIEGO FM. (Tsd): Light gray green silty fine SANDSTONE, moist, dense, massive @ 42' fine to coarse sand, friable @ 44'-46' cobbles to 18", friable, hole bells out @ 46' refusal on cobbles	
45								
50							TOTAL DEPTH: 46' No Water No Caving Geologically logged to 42' Backfilled 11-20-86	
55								
60								
65								
70								
75								
80								

KELLY WEIGHT (lbs.) 2981

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-13

DATE OBSERVED: 11-12-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 276± LOCATION: See Geotechnical Map

BORING NO. 7

DESCRIPTION

KELLY WEIGHT (lbs.) 4113

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0	SM						OTAY FM: (To): Light gray silty fine SANDSTONE, moist, dense, massive	
5							@ 4'-6½' fault: N5E/78E, 18" thick roughly horizontal (gradational, undulating) clay bed is offset 12", down to E, clay is very stiff to hard, highly to slightly fractured.	
							@ 6½'-10', 1/16" to 1/4" clay filled fractures in sandstone, at 1' spacing around hole. Undulating, steeply dipping, N60E/75NW, N48E/77SE, N5E/Vertical. May be continuation of fault above.	
10	CH	4	⊠	⊠	32.6	89.4	@ 10', 6"-12" clay bed N10W/13W, offset 8" by fracture N35E/70SE, down to SE. Olive brown clay, moist, stiff, with abundant slicks, caliche blebs, somewhat remolded	Expansion Index Particle Size Analysis Atterberg Limits
				⊠			@ 10'-13' shear zone, intermixed sandstone lenses (to 12" thick) and slightly remolded, highly fractured, slicked, claystone stringers to 3" thick: N15W/50E, N10W/57E, N35W/77E	Expansion Index Atterberg Limits Remolded Direct Shear
15	ML/SM						@ 13'-13½' pink bentonitic clay, remolded at bottom contact.	
							Contact: slightly undulating, N63W/5SW	
20		7	⊠		17.4	109.5	Light gray fine sandy SILTSTONE/silty SANDSTONE, damp, very dense, massive	Sulfate, pH
							@ 16½', 1" clayey siltstone bed, hard, unfractured, N7W/7E	
							@ 21½', 6" brown claystone bed, hard, unfractured, horizontal	
25								@ 25' Kelly Weight becomes 2981 lbs.
30		10/11"	⊠		11.8	118.3	@ 30', 6" clayey siltstone bed, hard to cemented, N-S/5E.	
							@ 33' grades to silty fine SANDSTONE	
35								
40								

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-14

DATE OBSERVED: 11-21-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 276± LOCATION: See Geotechnical Map

BORING NO. 7

DESCRIPTION

KELLY WEIGHT (lbs.) 2981

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
40	SM	15/10"	◢		5.0	105.1	OTAY FM. (Ts): Light gray silty fine SANDSTONE, damp, very dense, massive	
45							Contact: Gradational	
	ML						Medium gray brown clayey SILTSTONE, damp, hard, massive, unfractured	@ 47' Kelly Weight becomes 2168 lbs.
50		20/10"	◢				Contact: Gradational	
	SM						Light gray brown silty fine SANDSTONE, damp, very dense, massive	
55							Contact: Undulating, approximately horizontal	
	ML						Medium gray brown clayey SILTSTONE, damp, hard, massive unfractured.	
60				☒				
							TOTAL DEPTH: 61'	
							No Water	
							No Caving	
65							Geologically logged to 60'	
							Backfilled 11-21-86	
70								
75								
80								

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-15

DATE OBSERVED: 11-21-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 271± LOCATION: See Geotechnical Map

BORING NO. 8

KELLY WEIGHT (lbs.) 4113

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0	SM						FILL: Light gray brown silty fine SAND, moist, dense, massive, with occasional sandstone and claystone inclusions to 6".	
	CL						@ 3'-3½' abundant clay inclusions to 1" in diameter	
5	SM						OTAY FM. (To): claystone, hard, N14E/6W, also tight fractures: N75E/63S Contact: N14E/6W	
							Light gray SANDSTONE, damp, dense to very dense, massive	
10	CH				30.9	88.3	@ 6', 1" claystone bed, N5E/5W, hard @ 6½' fracture in sandstone, E-W/68S	
	SM	4					Contact: 1/8" remolded clay seam N15W/5W	Expansion Index
	SM/ML						Olive brown CLAYSTONE, moist, very stiff, highly fractured, slicks Contact: Gradational, clay becomes hard, less fractured.	
15							Light gray sandstone, dense, wide spaced fractures. @ 11½', 1" claystone bed, hard, unfractured, overlying discontinuous 2" cemented zone with discontinuous ½" remolded clay seam. Contact: Gradational to undulating	
20		8/10"					Light gray brown silty fine SANDSTONE, damp, very dense/hard, massive, unfractured. @ 18', 1" brown claystone bed, hard, unfractured, horizontal @ 21' grades to silty fine SANDSTONE	
25							@ 22' clayey bedding, horizontal	@ 25' Kelly Weight becomes 2981 lbs.
							@ 28' grades to fine sandy SILTSTONE with slight clay	
30		15/10"			12.1	114.2	@ 30½' grades to silty fine SANDSTONE/fine SILTSTONE	
							@ 33' grades to silty fine SANDSTONE	
35								
40								

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-16

DATE OBSERVED: 11-21-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 271± LOCATION: See Geotechnical Map

BORING NO. 8

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)
40	SM	10/10"	/		4.3	104.3

DESCRIPTION

KELLY WEIGHT (lbs.) 2981

OTAY FM. (To): Light gray brown silty fine SANDSTONE, damp, very dense, massive

TOTAL DEPTH: 41'
No Water
No Caving
Geologically logged to 39'
Backfilled 11-21-86

SOIL TEST

45
50
55
60
65
70
75
80

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-17

DATE OBSERVED: 12-22-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 124 ± LOCATION: See Geotechnical Map

BORING NO. 9

DESCRIPTION

KELLY WEIGHT (lbs.) 2218

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0	SM						FILL: Light brown silty fine SAND, moist, loose to medium dense.	
	SM						SAN DIEGO FM. (Tsd): Light gray green silty fine to coarse SANDSTONE with cobbles up to 18" in diameter, moist, medium dense, massive, friable.	
							@ 3' grades to fine grained sandstone, no cobbles, yellow stained bedding dips 0-2 to SW	
5							@ 8', 1" siltstone bed, hard, unfractured, N15E/2-3W	
10							@ 10', becomes less friable, medium dense to dense	
		7	X	X			@ 12'-13', abundant broken sea shells, top contact: horizontal, bottom contact: N10W/8W	
15							@ 15' cemented lens, 2" thick, NE quarter of boring, approximately horizontal	
							@ 18', 6" broken sea shell bed, N77E/2N	
20							@22'-25' abundant broken sea shells	
25							@ 25' bedding: approximately horizontal	@ 24' Kelly Weight becomes 1358 lbs.
							@ 28'-31' faint, discontinuous cross bedding	
30								
35		8						
40							TOTAL DEPTH: 36' No Water No Caving Geologically logged to 34' Backfilled 12-22-86	

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-18

DATE OBSERVED: 12-23-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 230± LOCATION: See Geotechnical Map

BORING NO. 10

DESCRIPTION

KELLY WEIGHT (lbs.) 2218

SOIL TEST

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)
0	SM					
	ML/CH					
5	SM	4				
10						
15		7				
20						
25						
30		10				
35						
40						

SAN DIEGO FM.: Light gray green silty fine SANDSTONE, damp, medium dense
Contact: irregular, undulating, 2"-4" remolded clay at contact

Light olive gray sandy to clayey SILTSTONE intermixed with olive yellow to brown clay lenses - clay is commonly remolded or slicked with fine root hairs on polished surfaces. Clay/siltstone contacts are often faults/fractures: N3W/57E, N23W/71E, N15W/73E, N10E/Vertical.
Contact: E. side of boring N10W/60E, W. side of boring - gradational.

Light gray green slightly silty fine SANDSTONE, damp, medium dense to dense, massive.
@ 5.5' friable sand, 3" thick, approximately horizontal on W. side of boring, cut off by above contact on E. side of boring.

@ 11' grades to fine to coarse sandstone with some gravel.

@ 13' grades to very silty fine sandstone.

@ 15' grades to fine to coarse sandstone, indistinct cross beds dip roughly 15° to N.

@ 17'-18' pebbles up to 3" in diameter.
@ 18' becomes light gray silty fine sandstone, bedding: N32E/12N
@ 20' fine to medium sandstone, N20E/12W offset 2" by fracture/fault N30W/70W, down to W.

@ 23'cobbles up to 4" in diameter

@ 25' to approximately 35', caving/belling of boring to 8' wide in direction of N30E.

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-19

DATE OBSERVED: 12-23-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 230 ± LOCATION: See Geotechnical Map

BORING NO. 10

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION KELLY WEIGHT (lbs.) 1358	SOIL TEST
40	SM						SAN DIEGO FM.: Light gray green fine to medium SANDSTONE with slight silt, damp, medium dense to dense, friable.	
							@ 43'-50' boring bells out	
45							@ 47'-50' cobbles to 12" diameter	
50							@ 50'-55' fine sandstone with occasional gravel sized grains	
55								
60							@ 59'-61' sandstone is olive brown	
65								
70				X			TOTAL DEPTH: 70' No Water Caving/belling @ 25'-35' and 43'-50' Geologically logged to 26' Backfilled 12-23-86	
75								
80								

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-20

DATE OBSERVED: 12-24-86 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 277± LOCATION: See Geotechnical Map

BORING NO. 11

DESCRIPTION

KELLY WEIGHT (lbs.) 2218

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0	SM						OTAY FM.(To): Light gray silty fine SANDSTONE, damp, dense to very dense, massive.	
5		10						
10		10						
15							@ 15'-18.5' scattered claystone inclusions to 1/4"	
20		3					@ 18.5' 3" olive brown clay bed, hard, with a 1/8" remolded seam in center of bed, bedding: N71E/8S @ 19.5' 3" olive brown clay bed, occasionally bentonitic, occasionally remolded with slicks, bedding: undulating, approximately N57E/5S @20'-21' pink bentonitic clay, hard, 2" remolded zone at bottom contact. Contact: approximately horizontal	
25	ML						Olive gray SILTSTONE, damp, hard, massive.	@ 24' Kelly Weight becomes 1358 lbs.
30		20					Gradational contact	
	SM						Light gray silty fine SANDSTONE, damp, very dense, massive Gradational contact	
35	ML						Olive gray clayey SILTSTONE, damp, hard, massive	
							Gradational contact	
40	SM						Light gray silty fine SANDSTONE, damp, very dense, massive	

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-21

DATE OBSERVED: 1-2-87 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 253 ± LOCATION: See Geotechnical Map

BORING NO. 12

DESCRIPTION

KELLY WEIGHT (lbs.) _____

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0	ML						OTAY FM. (to): Light gray brown fine sandy SILTSTONE, damp, hard, massive. @ 2' brown clayey siltstone, 3" thick, N27W/5W @ 2.5' brown clayey siltstone lens, approximately horizontal	
5							@ 5.5' grades to gray brown SILTSTONE, with slight clay, hard, massive, some micaceous grains	
							@ 8' red stain 1/8"-1/2" thick, approximately horizontal, occasional slicked surfaces just above this @ 8'-8.5' slight red mottling	
10	SM						Gradational contact Light gray brown silty fine SANDSTONE, damp, very dense, massive.	
							@ 11', 1" claystone bed, hard, unfractured, N70E/6S	
15							@ 14', 6" claystone bed, hard, unfractured, top contact: N45W/8SW. Bottom contact: E-W/8S	
							@ 16.5', 6" siltstone bed, N30W/0-2W	
20								
25								
30							Contact: horizontal	
	ML						Gray brown clayey SILTSONE, damp, hard, massive.	
35							Contact: approximately horizontal, offset 3" by fault/fracture N50W/62 SW, down to SW	
	SM						Light gray brown silty fine SANDSTONE, damp, very dense, massive	
40							@ 37.5', 2" siltstone bed, approximately horizontal, offset 3" by same fault/fracture as above - N50W/62SW, down to SW	

SOIL TEST

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-23

DATE OBSERVED: 1-2-87 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 253 ± LOCATION: See Geotechnical Map

BORING NO. 12

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION KELLY WEIGHT (lbs.) _____	SOIL TEST
40	SM						OTAY FM. (To): Light gray brown silty fine SANDSTONE, damp, very dense, massive @ 41', 3" claystone bed, hard, unfractured, horizontal Gradational contact	
	ML						Gray brown clayey SILTSTONE, damp, hard, massive @ 47', 1/8'-1/2' clay bed, hard, horizontal 2" clay bed @ contact, horizontal, slightly bentonitic, hard, unfractured.	
45								
50	SM						Light gray brown silty fine SANDSTONE, damp, very dense, massive @ 51.5'-52.5', siltstone bed, hard, horizontal	
55								
60							TOTAL DEPTH: 57' No Water No Caving Geologically logged to 55' Backfilled 1-2-87	
65								
70								
75								
80								

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-24

DATE OBSERVED: 1-2-87 METHOD OF DRILLING: 30" Bucket Auger

LOGGED BY: RS GROUND ELEVATION: 264 ± LOCATION: See Geotechnical Map

BORING NO. 13

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	DESCRIPTION	SOIL TEST
0	SM						KELLY WEIGHT (lbs.) _____ OTAY FM. (To): Light gray brown silty fine SANDSTONE, damp, dense, massive @ 0'-3' caliche filled fracture, 1/2' thick, N28E/70NW. Irregular contact, partly offset by fracture/fault above.	
5	ML						Gray brown fine sandy SILTSTONE, damp, hard, massive, occasionally fractured @ 6"-12" spacing, some clay @ 6', 1" claystone bed, hard, unfractured, horizontal @ 7'-8' claystone, hard, somewhat fractured (6" spacing) horizontal Undulating contact	
10	SM						Light gray brown silty fine SANDSTONE, damp, very dense, massive.	
15								
20							TOTAL DEPTH: 19' No Water No Caving Geologically logged to 17' Backfilled 1-2-86	
25								
30								
35								
40								

JOB NO.: 05-6738-001-00-00

LOG OF BORING

FIGURE: B-25

DATE OBSERVED: 01-02-87 METHOD OF DRILLING: Case Tracked Hoe 24" Bucket

LOGGED BY: PAT GROUND ELEVATION: 210± LOCATION: See Geotechnical Map

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	TEST PIT NO. 1 DESCRIPTION	SOIL TEST
0							COLLUVIUM (Qcol): Dark brown silty CLAY, moist, soft	
5							ALLUVIUM (Qal): Light brown sandy SILT with cobbles, damp, loose, some caving	
10							OTAY FM. (To): Light brown sandy SILTSTONE, damp, dense, massive	
15							TOTAL DEPTH: 12' No Water Caving at 7'-9' Backfilled 1-2-87	

LOGGED BY: PAT GROUND ELEVATION: 210± LOCATION: See Geotechnical Map

TEST PIT NO. 2

0	COLLUVIUM (Qcol): Medium brown silty CLAY with cobbles, moist, soft
5	OTAY FM. (To.): Light brown sandy SILTSTONE, moist, dense, thinly laminated cross bedding @ 3' horizontal clay bed, 2" thick, hard @ 3½' horizontal clay bed, 2" thick, hard @ 6' joint, N-S.vertical
10	TOTAL DEPTH: 8' No Water No Caving Backfilled 1-2-87
15	

JOB NO.: 05-6738-001-00-00 | LOG OF TEST PIT | FIGURE: B-26

DATE OBSERVED: 1-2-87 METHOD OF DRILLING: Case Tracked Hoe 24" Bucket

LOGGED BY: PAT GROUND ELEVATION: 212± LOCATION: See Geotechnical Map

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	TEST PIT NO. 3 DESCRIPTION	SOIL TEST
0							COLLUVIUM (Qcol): Dark brown silty CLAY with cobbles, moist, soft	
							WEATHERED BEDROCK: Light brown sandy SILTSTONE, moist, loose, caliche stringers, fractured/brecciated	
5							OTAY FM. (To): Light brown sandy SILTSTONE, moist, dense, some caliche stringers	
							@ 6' horizontal clay seam, 3" thick	
10							TOTAL DEPTH: 9' No Water No Caving Backfilled 1-2-87	
15								

LOGGED BY: PAT GROUND ELEVATION: 216± LOCATION: See Geotechnical Map

							TEST PIT NO. 4	
0							COLLUVIUM (Qcol): Dark brown sitly CLAY with cobbles, moist, soft @ 3' loose sand lens with cobbles	
5							OTAY FM. (To): Light brown sandy siltstone, moist, dense, thinly laminated @ 5½' joint, N-S/vertical @ 6' horizontal bedding	
10							TOTAL DEPTH" 7½' No Water No Caving Backfilled 1-2-87	
15								

JOB NO.: 05-6738-001-00-00 | LOG OF TEST PIT | FIGURE: B-27

DATE OBSERVED: 1-2-87 METHOD OF DRILLING: Case Tracked Hoe 24" Bucket

LOGGED BY: PAT GROUND ELEVATION: 210± LOCATION: See Geotechnical Map

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)

TEST PIT NO. 5

DESCRIPTION	SOIL TEST
0 COLLUVIUM (Qcol): Dark brown silty CLAY, moist, soft	
5 ALLUVIUM (Qal): Light brown sandy SILT with cobbles, damp, loose	
OTAY FM. (To): Light brown sandy SILTSTONE, moist, dense, thinly laminated	
10	
15 TOTAL DEPTH: 13' No Water No Caving Backfilled 1-2-87	

LOGGED BY: PAT GROUND ELEVATION: 216± LOCATION: See Geotechnical Map

TEST PIT NO. 6

0 COLLUVIUM (Qcol): Dark brown silty CLAY, moist, soft	
OTAY FM. (To): Light brown sandy SILTSTONE, top one foot is weathered-loose with caliche stringers, then becomes moist, dense, thinly laminated	
5 @ 3' horizontal clay bed, 2" thick, hard	
@ 3½' horizontal clay bed, 2" thick, hard	
@ 5' joint, N15 E/vertical	
10	
15 TOTAL DEPTH: 6' No Water No Caving Backfilled 1-2-87	

JOB NO.: 05-6738-001-00-00 | LOG OF TEST PIT | FIGURE: B-28

DATE OBSERVED: _____ METHOD OF DRILLING: _____

LOGGED BY: _____ GROUND ELEVATION: _____ LOCATION: _____

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	TEST PIT NO. 7 DESCRIPTION	SOIL TEST
0							COLLUVIUM (Qcol): Dark brown silty CLAY with cobbles, moist, soft @ 2'-4' occasional siltstone inclusions @ 4'-5' loose sand lense with cobbles	
5							OTAY FM. (To): Light brown sandy SILTSTONE, moist, dense, some caliche stringers @ 5½" joint, N3E/vertical	
10							TOTAL DEPTH: 7' No Water No Caving Backfilled 1-2-87	
15								

LOGGED BY: PAT GROUND ELEVATION: 217 ± LOCATION: See Geotechnical Map

							TEST PIT NO. 8	
0							COLLUVIUM (Qcol): Dark brown silty CLAY, moist, soft	
5							ALLUVIUM (Qal): Light brown silty SAND with cobbles, damp, loose, some caliche stringers	
10							OTAY FM. (To): Light brown sandy SILTSTONE, moist, dense, some caliche stringers	
15							TOTAL DEPTH: 9' No Water No Caving Backfilled 1-2-87	

JOB NO.: 05-6738-001-00-00 | LOG OF TEST PIT | FIGURE: B-29

DATE OBSERVED: 1-2-87 METHOD OF DRILLING: Case Tracked Hoe 24" Bucket

LOGGED BY: PAT GROUND ELEVATION: 218 ± LOCATION: See Geotechnical Map

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)

TEST PIT NO. 9

DESCRIPTION

COLLUVIUM (Qcol): Dark brown silty CLAY, moist, soft

ALLUVIUM (Qal): Medium brown silty SAND with cobbles, damp, loose

OTAY FM. (To): Light brown sandy SILTSTONE, moist, dense, some caliche stringers
@ 4½' red brown clayey SILTSTONE bed, horizontal

TOTAL DEPTH: 5'
No Water
No Caving
Backfilled 1-2-87

SOIL TEST

LOGGED BY: PAT GROUND ELEVATION: 219± LOCATION: See Geotechnical Map

TEST PIT NO. 10

COLLUVIUM (Qcol): Dark brown silty CLAY, moist, soft

ALLUVIUM (Qal): Medium brown silty SAND with cobbles, moist, dense

OTAY FM. (To): Light brown sandy SILTSTONE, moist, dense, some caliche

TOTAL DEPTH: 4'
No Water
No Caving
Backfilled 1-2-87

JOB NO.: 05-6738-001-00-00 | LOG OF TEST PIT | FIGURE: B-30

DATE OBSERVED: 1-2-87 METHOD OF DRILLING: Case Tracked Hoe 24" Bucket

LOGGED BY: PAT GROUND ELEVATION: 229 ± LOCATION: See Geotechnical Map

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	TEST PIT NO. 11 DESCRIPTION	SOIL TEST
0							COLLUVIUM (Qcol): Dark brown silty CLAY with some cobbles, moist, soft	
5								
							OTAY FM. (To): Light brown sandy SILTSTONE, moist, top one foot is weathered-loose, fractured, then becomes dense, massive	
10								
							TOTAL DEPTH: 12' No Water No Caving Backfilled 1-2-87	
15								

LOGGED BY: PAT GROUND ELEVATION: 243 ± LOCATION: See Geotechnical Map

							TEST PIT NO. 12	
0							COLLUVIUM (Qcol): Dark brown silty CLAY, moist, soft, some caliche stringers	
5								
							OTAY FM. (To): Light brown sandy SILTSTONE, moist, dense, massive, some caliche cementation	
10								
							TOTAL DEPTH: 12' No Water No Caving Backfilled 1-2-87	
15								

JOB NO.: 05-6738-001-00-00 | LOG OF TEST PIT | FIGURE: B-31

DATE OBSERVED: 1-2-87 METHOD OF DRILLING: Case Tracked Hoe 24" Bucket

LOGGED BY: PAT GROUND ELEVATION: 260± LOCATION: See Geotechnical Map

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)

TEST PIT NO. 13

DESCRIPTION

SOIL TEST

0

COLLUVIUM (Qcol): Dark brown silty CLAY, moist, soft

WEATHERED BEDROCK: Light olive-brown sandy SILTSTONE, moist, loose, some caliche stringers.

5

OTAY FM. (To): Light brown sandy SILTSTONE, moist, dense, massive, some caliche stringers.
@ 5' joint, N35W/Vertical

10

TOTAL DEPTH: 7'
No Water
No Caving
Backfilled 1-2-87

15

LOGGED BY: PAT GROUND ELEVATION: 240± LOCATION: See Geotechnical Map

TEST PIT NO. 14

0

COLLUVIUM (Qcol): Dark brown silty CLAY, moist, soft

Light olive brown sandy SILT with cobbles, moist, loose, some orange staining, some caliche stringers

5

@ 9½ dark brown clay lens

10

OTAY FM. (To): Light olive brown sandy SILTSTONE, moist, dense, massive

TOTAL DEPTH: 12'
No Water
No Caving
Backfilled 1-2-87

15

JOB NO.: 05-6738-001-00-00 | LOG OF TEST PIT | FIGURE: B-32