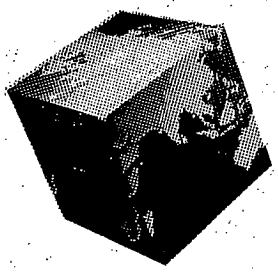

IGES

Intermountain GeoEnvironmental Services, Inc.
14881 South Concorde Park Dr. St. 2, Bluffdale, Utah 84065
Phone (801) 748-4044 | Fax (801) 784-4045
www.igesinc.com

GEOTECHNICAL INVESTIGATION
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah

IGES Job No. 00300-043

June 19, 2008

Prepared for:

Duane Hutchings c/o
LEI Consulting Engineers and Surveyors, Inc.
c/o Mr. Greg Magleby, P.E.

IGES
Intermountain GeoEnvironmental Services, Inc.
14881 South Concorde Park Dr. St. 2, Bluffdale, Utah 84065
~ T: (801) 571-6203 ~ F: (801) 501-0584

Prepared for:

Duane Hutchings c/o
LEI Consulting Engineers and Surveyors, Inc.
Attn: Mr. Greg Magleby, P.E.
3302 North Main Street
Spanish Fork, UT 84660

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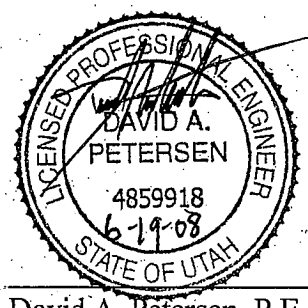

David A. Petersen, P.E.
Project Engineer

Carl Ege, P.G.
Project Geologist

Reviewed By:

Kent A. Hartley, P.E.
Associate

IGES, Inc.
14481 South Concorde Park Dr. St. 2
Bluffdale, Utah 84065
(801) 748-4044

June 19, 2008

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APPENDICES

1.0 EXECUTIVE SUMMARY

This report presents the results of a geotechnical investigation conducted for the proposed Northeast Bench subdivision located in Spanish Fork, Utah at approximately 400 North and Mapleton Slant Road. The purposes of this investigation were to assess the nature and engineering properties of the subsurface soils at the proposed site and to provide recommendations for general site grading and the design and construction of foundations and slabs-on-grade. We understand that the development will include single family homes as well as some higher density housing, a detention pond, and associated roadways.

As a part of this investigation, subsurface soil conditions were explored by excavating 29 test pits to depths between 8 and 10 feet, infiltration tests were completed in several test pits. The test pits were excavated with the aid of a rubber tired backhoe. Both disturbed and relatively "undisturbed" soil samples were obtained in the test pit explorations to assess the soil's pertinent engineering properties.

Based on the subsurface conditions encountered at the site, it is our opinion that the subject site is suitable for the proposed construction provided that the recommendations contained in this report are complied with. Results from the collapse test completed for this investigation indicate that the hydro-collapse potential for soils observed as part of this investigation are relatively low. However, some portions of the site were not explored and will require explorations, observations, and lab testing prior to development. The following sub-sections present our recommendations for general site grading, design of foundations, slabs-on-grade, lateral earth pressures, moisture protection and preliminary soil corrosion.

NOTICE: The scope of services provided within this report are limited to the assessment of the subsurface conditions for the proposed development. This executive summary is not intended to replace the report of which it is part and should not be used separately from the report. The executive summary is provided solely for purposes of overview. The executive summary omits a number of details, any one of which could be crucial to the proper application of this report.

3.0 METHODS OF STUDY

3.1 FIELD INVESTIGATION

As a part of this investigation, subsurface soil conditions were explored by excavating 29 test pits to depths between 8 and 10 feet, infiltration tests were completed in test pits (TP) TP-5, TP-6, TP-8, TP-10, TP-11, and TP-20 at various depths. The explorations were completed at locations throughout the development to maximize the coverage of the subdivision with the infiltration tests being completed near the anticipated location of proposed detention ponds. The approximate locations of the explorations are shown on the Site Exploration Map (Plates A-2). Logs of the subsurface conditions, as encountered in the explorations, were recorded at the time of our investigation by a qualified geological engineer and are presented on the enclosed Test Pit Logs (Plates A-3 through A-31). A Key to Soil Symbols and Terminology is found on Plate A-32.

The test pits were excavated with the aid of a rubber tired backhoe. Both disturbed and relatively "undisturbed" soil samples were obtained in the test pit explorations. Undisturbed samples in the test pits were obtained with a U-type hand sampler driven with a 2-lb. sledge hammer and disturbed samples were collected in bags and buckets and transported to our laboratory to evaluate engineering properties of the various soil types observed. The soils observed in the explorations were classified according to the Unified Soil Classification System (USCS). Classifications for the individual soil units are shown on the attached Test Pit Logs. Infiltration tests were also performed in test pits TP-5, TP-6, TP-8, TP-10, TP-11, TP-14 and TP-20; the results of these tests are included in Section 4.1.

3.2 LABORATORY INVESTIGATION

Representative soil samples were collected in the field and tested in the laboratory to assess the soil's pertinent engineering properties. Moisture content determinations were performed to estimate the in-place moisture. Atterberg Limit and gradation analyses were completed to aid in classifying the soils. Three compaction/CBR tests were also performed to quantify subsurface support for adjoining roadways. Two direct shear tests were performed to assess the strength parameters of the native subsurface soils. Consolidation testing was completed to aid in settlement calculations. Collapse tests were completed to analyze the hydro-collapse potential of the native soils. Chemical testing was completed to assess the sulfate attack and corrosion potential of native soils. Unconfined compression and unconsolidated undrained triaxial tests were completed to assess soil strength.

3.3 ENGINEERING ANALYSIS

Based on the proposed construction at the site, the following engineering analyses were performed:

- Bearing capacity of foundation soils
- Foundation settlement and collapse potential
- Lateral earth pressures against foundations, basement and retaining walls
- Lateral resistance against sliding
- Excavation stability
- Asphalt pavement design

Engineering analyses were performed using soil data obtained from the laboratory test results, field in-situ tests and empirical correlations from material density, depositional characteristics and classification. Appropriate factors of safety were applied to the results consistent with industry standards and the accepted standard of care.

4.0 FIELD AND LABORATORY TEST RESULTS

4.1 INFILTRATION TESTING

Infiltration tests were completed in the test pits excavated in areas of the planned detention/retention basins and at various locations throughout the subject site (Test Pits 5, 6, 8, 10, 11, 14 and 20). The tests were completed at various depths that range between 0.5 and 10 feet below existing site grade. The infiltration tests were completed in holes excavated approximately 6 to 8 inches in diameter and 9 to 12 inches deep. The tests were conducted using approximately 10 inches of water (head). Infiltration rates ranged from 0.2 to 13.5 minutes per inch (4.4 to 300 inches per hour). A summary of the infiltration test data follows:

Test No. 1 (TP-5) **Conditions: Test Depth = 4 feet, Head = 10 inches, Hole Diameter = 7 inches**				
Time Difference (minutes)	**Depth Difference (inches)**	**Percolation Rate**		**Comments**
		(min/inch)	**(in/hour)**	
10				Presoak
5.83	0.5	11.7	5.1	Intermediate Reading
6.21	0.5	12.4	4.8	Intermediate Reading
5.85	0.5	11.7	5.1	Intermediate Reading
6.75	0.5	**13.5**	**4.4**	**Final Reading**
Soil Conditions: See Test Pit Log for TP-5 on Plate A-7				

Test No. 2 (TP-5) **Conditions: Test Depth = 10 feet, Head = 10 inches, Hole Diameter = 7 inches**				
Time Difference (minutes)	**Depth Difference (inches)**	**Percolation Rate**		**Comments**
		(min/inch)	**(in/hour)**	
10				Presoak
3.18	0.5	6.4	9.4	Intermediate Reading
3.54	0.5	7.1	8.5	Intermediate Reading
3.17	0.5	6.3	9.5	Intermediate Reading
2.8	0.5	**5.6**	**10.7**	**Final Reading**
Soil Conditions: See Test Pit Log for TP-5 on Plate A-7				

Test No. 3 (TP-6) Conditions: Test Depth = 1½ feet, Head = 10 inches, Hole Diameter = 7 inches				
Time Difference (minutes)	Depth Difference (inches)	Percolation Rate		Comments
		(min/inch)	(in/hour)	
10				Presoak
1.31	0.5	2.6	22.9	Intermediate Reading
1.97	0.5	3.9	15.2	Intermediate Reading
2.04	0.5	4.1	14.7	Intermediate Reading
2.03	0.5	**4.1**	**14.8**	**Final Reading**
Soil Conditions: See Test Pit Log for TP-6 on Plate A-8				

Test No. 4 (TP-8) Conditions: Test Depth = 2½ feet, Head = 10 inches, Hole Diameter = 7 inches				
Time Difference (minutes)	Depth Difference (inches)	Percolation Rate		Comments
		(min/inch)	(in/hour)	
10				Presoak
5.5	0.5	7.0	8.6	Intermediate Reading
4.5	0.5	6.3	9.6	Intermediate Reading
4	0.5	6.5	9.2	Intermediate Reading
3	0.5	**6.4**	**9.4**	**Final Reading**
Soil Conditions: See Test Pit Log for TP-8 on Plate A-10				

Test No. 5 (TP-10) Conditions: Test Depth = 5½ feet, Head = 10 inches, Hole Diameter = 7 inches				
Time Difference (minutes)	Depth Difference (inches)	Percolation Rate		Comments
		(min/inch)	(in/hour)	
10				Presoak
0.20	1	0.2	300	Intermediate Reading
0.17	1	0.2	360	Intermediate Reading
0.27	1	0.3	225	Intermediate Reading
0.2	1	**0.2**	**300**	**Final Reading**
Soil Conditions: See Test Pit Log for TP-10 on Plate A-12				

Test No. 6 (TP-11) Conditions: Test Depth = 5½ feet, Head = 10 inches, Hole Diameter = 7 inches				
Time Difference (minutes)	Depth Difference (inches)	Percolation Rate		Comments
		(min/inch)	(in/hour)	
10				Presoak
0.86	0.5	1.7	34.9	Intermediate Reading
0.94	0.5	1.9	31.9	Intermediate Reading
0.92	0.5	1.8	32.6	Intermediate Reading
1.08	0.5	**2.2**	**27.8**	**Final Reading**
Soil Conditions: See Test Pit Log for TP-11 on Plate A-13				

Test No. 7 (TP-14) Conditions: Test Depth = ½ feet, Head = 10 inches, Hole Diameter = 7 inches				
Time Difference (minutes)	Depth Difference (inches)	Percolation Rate		Comments
		(min/inch)	(in/hour)	
10				Presoak
2.9	0.5	5.8	10.3	Intermediate Reading
3.88	0.5	7.8	7.7	Intermediate Reading
3.9	0.5	7.8	7.7	Intermediate Reading
3.73	0.5	**7.5**	**8.0**	**Final Reading**
Soil Conditions: See Test Pit Log for TP-14 on Plate A-16				

Test No. 8 (TP-20) Conditions: Test Depth = 2 feet, Head = 10 inches, Hole Diameter = 7 inches				
Time Difference (minutes)	Depth Difference (inches)	Percolation Rate		Comments
		(min/inch)	(in/hour)	
10				Presoak
3.3	0.5	6.6	9.1	Intermediate Reading
3.89	0.5	7.8	7.7	Intermediate Reading
3.68	0.5	7.4	8.2	Intermediate Reading
3.63	0.5	**7.3**	**8.3**	**Final Reading**
Soil Conditions: See Test Pit Log for TP-20 on Plate A-22				

Test No. 9 (TP-20) Conditions: Test Depth = 5 feet, Head = 10 inches, Hole Diameter = 7 inches				
Time Difference (minutes)	Depth Difference (inches)	Percolation Rate		Comments
		(min/inch)	(in/hour)	
10				Presoak
2.44	0.5	4.9	12.3	Intermediate Reading
3.08	0.5	6.2	9.7	Intermediate Reading
3.06	0.5	6.1	9.8	Intermediate Reading
3.05	0.5	**6.1**	**9.8**	**Final Reading**
Soil Conditions: See Test Pit Log for TP-20 on Plate A-22				

It should be noted that the tests were performed using clean water. Sediment collected from runoff may reduce the performance of the drain causing the predicted infiltration rate to be faster than the observed field rate. If possible, sediment should be settled out of the flow prior to entering the drainage vault.

4.2 LABORATORY TESTING

The results of the laboratory tests are presented on the attached Test Pit Logs (Plates A-3 to A-31, on the test result reports (Plates B-1 to B-8), and in the Summary of Laboratory Test Results Table (Plate B-9 located in the Appendices at the end of this report.

The subsurface soils moisture content ranged from approximately 4 to 29% percent. Atterberg limit tests performed to aid with classification indicated a plasticity index ranging from 5 to 15 and a liquid limit ranging from 24 to 34.

Results of the CBR tests indicate that the near surface fine grained soils should provide relatively fair support for roadway pavements. CBR values obtained ranged from 3.7 to 18. Moisture-density relationship tests (standard proctor) were completed in conjunction with the CBR tests, and indicated maximum dry densities (MDD) ranging from approximately 109 to 121 pcf at optimum moisture contents (OMC) ranging from 11% to 16.5%.

Collapse testing indicated that there is a relatively low collapse potential associated with native soils at the site. Chemical testing was also completed which indicates the native soils have a pH of approximately 8.5, <5 to 520 parts per million soluble sulfate and a minimum resistivity that ranges from 700 to 3,800 ohm-cm.

5.0 GENERALIZED SITE CONDITIONS

5.1 SURFACE CONDITIONS

At the time of our field investigation, the site is mostly farmland that is currently planted. There are also many fields used for grazing of horses. The site is an irregular shape and is approximately 260 acres and has a maximum topographic relief across the site of approximately 30 feet. The site has a few sections that are covered with a dense growth of mature trees, many along the northwestern boundary. A small section in the southwestern portion of the property is densely vegetated with trees and bushes and appears to have a high groundwater table. The site has a strip of land that runs in the central portion of the property from the southeast to the northwest where the vegetation notably differs from the surrounding area due to the installation of utility sewer lines.

5.2 SUBSURFACE CONDITIONS

As previously mentioned, the subsurface conditions were explored at the site by excavating 29 test pits. The subsurface conditions were logged at the time of the investigation and are included in the Test Pit Logs in Appendix A (Plates A-3 to A-31). The soil and moisture conditions encountered, during our investigation, are discussed below.

5.2.1 Soils

The soils encountered in these exploration locations consisted of Lean CLAY (CL), Silty CLAY (CL-ML), SILT (ML), Silty SAND (SM), Poorly Graded SAND with silt (SP-SM), Poorly Graded SAND (SP), Silty GRAVEL (GM), and Poorly Graded GRAVEL (GP) each with varying amounts of fines, sand, and gravel. The subsurface soil profiles observed in the test pits are presented in Appendix A. The stratification lines shown on the enclosed logs represent the approximate boundary between soil types. The actual in-situ transition may be gradual. Due to the nature and depositional characteristics of the native soils, care should be taken in interpolating subsurface conditions between and beyond the exploration locations. Please refer to the Test Pit Logs for complete details of the soil conditions observed (Plates A-3 through A-31).

5.2.2 Groundwater

Groundwater encountered in three of the test pits (TP-11, TP-12, & TP-13) excavated for this investigation at depths between 8½ and 9½ feet. It should be noted that the explorations were completed at a time when groundwater levels should be near their seasonal low. It is our experience that groundwater levels may rise several feet as a result of snowmelt, runoff, irrigation on or near the property or other activities on or off the site, or from other sources.

6.0 GEOLOGIC CONDITIONS

6.1 GEOLOGIC SETTING

The site is located at the east of Santaquin, Utah at an elevation of approximately 4,660 to 4,720 feet, within the southeast portion of the Utah Valley. This valley represents a deep, sediment-filled structural basin of Cenozoic age flanked by uplifted blocks, the Wasatch Range on the east, and the Lake Mountains, West Mountain, the Goshen Hills, and Warm Springs Mountain (the northern end of Long Ridge) to the west (Machette, 1992 and Hintze, 1980). The Wasatch Range is the easternmost expression of pronounced Basin and Range extension in north-central Utah.

The near-surface geology of the Utah Valley is dominated by lacustrine sediments, which were deposited within the last 30,000 years by Lake Bonneville (Scott and others, 1983; Hintze, 1993; Machette, 1992). As the lake receded, streams began to incise large deltas formed at the mouths of major canyons along the Wasatch Range, and the eroded material was deposited in shallow lakes and marshes in the basin and in a series of recessional deltas and alluvial fans. Sediments toward the center of the valley are predominately deep-water deposits of clay, silt, and fine grained sand. However, these deep-water deposits are in places covered by a thin post-Bonneville alluvial cover. Most surficial deposits along the Wasatch fault zone were deposited during the Bonneville Lake Cycle that was the last cycle of Lake Bonneville between approximately 32 to 10 ka (thousands of years ago) and in the Holocene (< 10 ka). Surface sediments at the project site are discussed in the stratigraphy section below.

6.2 STRATIGRAPHY

Geologic units exposed in the study area consist of Upper Pleistocene age lacustrine GRAVEL, SAND, SILT, and CLAY related to the Provo (regressive) phase of the Bonneville Lake Cycle and stream alluvium related to the Provo phase of the Bonneville lake cycle (Machette, 1992). The following paragraphs provide more detailed descriptions of geologic units found at and near the subject site.

6.2.1 Quaternary

Deltaic deposits (lpd)

Upper Pleistocene deltaic deposits consisting of pebble and cobble gravel in a matrix of sand and silt with interbedded pebbly sand beds (Machette, 1992). The unit is also poorly graded and is cemented with calcium carbonate. Exposed thickness is reported to be 10 to 12 meters.

Lacustrine sand (lps)

Upper Pleistocene lacustrine sand consists predominantly of sand with minor pebbly gravel and silt (Machette, 1992). The bedding in this unit is thick to massive and also has ripple marks and scour features on close inspection. This unit was deposited in relatively shallow water near shore during the regression of Lake Bonneville. Exposed thicknesses are reported to be < 10 meters.

Stream alluvium related to the Provo phase of the Bonneville lake cycle (alp)

Upper Pleistocene stream alluvium consists of pebble and cobble gravel in a matrix of sand, silt, and clay (Machette, 1992). The unit consists of thin to medium bedding with thin sand lenses and clasts that are subangular to rounded. Exposed thickness is typically 2 to 5 meters.

6.3 SEISMICITY AND FAULTING

There are no known active faults that pass under or immediately adjacent to the site (Black and others, 2003). The site is located approximately 2.65 miles west of the mapped location of the southern end of the Provo segment of the Wasatch fault. The Provo segment is one of the longest (70 km) and most active segments of the Wasatch fault zone (Machette, 1992). Analyses of ground shaking hazard along the Wasatch Front suggests that the Wasatch fault zone is the single greatest contributor to the seismic hazard in Utah Valley region.

Using the criteria outlined in the 2003 IBC, the maximum considered earthquake (MCE) ground motion is taken as that motion represented by an acceleration response spectrum having a 2% chance of exceedance within a 50-year period (Section 1615.2.1). This hazard was identified for

the site using the NEHRP-based software program, "Seismic Parameters" (Leyendecker et al., 2000), which correlates with the International Building Code (IBC) seismic hazard maps. This program, as with the IBC maps, is used to develop the probabilistic spectral accelerations corresponding to MCE seismic hazard level for rock-like conditions. To account for site soil effects, site coefficients (F_a and F_v) were used to attenuate the rock-based spectral acceleration values. Based on our field exploration, we believe that the soils at this site are representative of a "stiff soil" profile; best described by IBC Site Class D with F_a and F_v values of 1.00 and 1.50 respectively. From these procedures the MCE PGA was established to be 0.50g. The MCE and design response spectrum are presented in Appendix C (Plate C-1). The table below is a summary of the spectral accelerations for various periods.

MCE Seismic Response Spectral Acceleration Values [a]

Site Location: **Latitude = 40.1224° N** **Longitude = -111.6175° W**	**Site Class D Site Coefficients:** **Fa = 1.00** **Fv = 1.50**
Spectral Period (sec)	**Response Spectral Acceleration (%g)**
0.200	124.7
1.000	78.4

[a] IBC 1615.1.3 recommends scaling the MCE values by 2/3 to obtain the design spectral response acceleration values.

[b] Peak Ground Acceleration

6.4 OTHER GEOLOGIC HAZARDS

Geologic hazards can be defined as naturally occurring geologic conditions or processes that could present a danger to human life and property. These hazards must be considered before development of the site. There are several hazards in addition to seismicity and faulting that may be present at the site, and which should be considered in the design of roads and critical and essential facilities such as water tanks and structures designed for human habitation. The other geologic hazards considered significant at the subject site are liquefaction and shallow groundwater. A complete list of potential geologic hazards is included in the Summary of Geologic Hazards Table in Appendix C of this report (Plate C-2).

6.4.1 Liquefaction

Certain areas within the Intermountain seismic region also possess a potential for liquefaction during such events. Liquefaction is a phenomenon whereby loose, saturated, granular soil deposits lose a significant portion of their shear strength due to excess pore water pressure buildup resulting from dynamic loading, such as that caused by an earthquake. Among other effects, liquefaction can result in densification of such deposits causing settlements of overlying layers after an earthquake as excess pore water pressures are dissipated. The primary factors affecting liquefaction potential of a soil deposit are: (1) level and duration of seismic ground motions; (2) soil type and consistency; and (3) depth to groundwater.

Referring to the "Surface Rupture and Liquefaction Potential Special Study Area Map for Utah County, Utah" (Jarva, 1994), the subject site is located in an area designated as "moderate" for liquefaction potential. Based on the field and laboratory data collected for this site, determining the degree of liquefaction potential at the site is beyond the scope of this geotechnical investigation.

6.4.2 Shallow Groundwater Flooding

Shallow groundwater flooding is a hazard that can cause the flooding of excavated areas where the depth of excavation exceeds the depth of the local water table. Shallow groundwater flooding should be considered when designing habitable structures which require excavation that may exceed the depth to the shallow groundwater.

Although groundwater was not encountered in any of the test pits, a marshy area was observed during our geotechnical field investigation.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 GENERAL CONCLUSIONS

Based on the subsurface conditions encountered at the site, it is our opinion that the subject site is suitable for the proposed construction provided that the recommendations contained in this report are complied with. Results from the collapse test completed for this investigation indicate that the hydro-collapse potential for soils observed as part of this investigation are relatively low. However, some portions of the site were not explored and will require explorations, observations, and lab testing prior to development. The following sub-sections present our recommendations for general site grading, design of foundations, slabs-on-grade, lateral earth pressures, moisture protection and preliminary soil corrosion.

7.2 EARTHWORK

Prior to the placement of foundations, general site grading is recommended to provide proper support for foundations, exterior concrete flatwork, and concrete slabs-on-grade and asphalt pavement sections. Site grading is also recommended to provide proper drainage and moisture control on the subject property and to aid in preventing differential movement in foundation soils as a result of variations in moisture conditions.

7.2.1 General Site Preparation and Grading

Within the areas to be graded that are below proposed structures, pavement sections, and fill sections etc., all existing vegetation, topsoil, undocumented fill, frozen soils, and other miscellaneous debris should be removed. Any loose or disturbed soils beneath these areas should also be removed or compacted in place as outlined in Section 7.2.4. Topsoil should not be used as structural fill but may be used for landscaping purposes. Following the removal of unsuitable materials as described above, site grading may be conducted to bring the site to design elevations.

Based on our observations in the test pits completed for the site investigation, topsoil is typically ½ to 2 feet thick, some localized areas of topsoil were 3 to 4 feet thick. This layer should be removed prior to placement of embankments, structural fill, structures, and roadways etc.

7.2.2 Excavations

Soft, loose, or unsuitable soils beneath foundations or pavements may need to be over-excavated and replaced with structural fill. If over-excavation is required, the excavations should extend laterally a minimum of 1-foot laterally for every foot of depth of over-excavation. Excavations should extend laterally at least two feet beyond flatwork, pavements, and slabs-on-grade. If materials are encountered that are not represented in the Test Pit Logs or may present a concern, IGES should be notified so observations and further recommendations as required can be made.

7.2.3 Excavation Stability

Based on Occupational Safety and Health (OSHA) guidelines for excavation safety, trenches with vertical walls up to 5 feet in depth may be occupied. A qualified person should inspect all excavations frequently to evaluate stability. The Contractor is ultimately responsible for trench and site safety. Pertinent OSHA requirements at a minimum should be met to provide a safe work environment.

When the trench is deeper than 5 feet, we recommend a trench-shield or shoring be used to protect workers in the trench. Sloping of the sides at 1½ Horizontal to 1 Vertical (1.5H:1V) in accordance with OSHA Type C soils may be used as an alternative to shoring or shielding. The presence of fill soils, wet or saturated soils, or other loose soils in the excavation side walls may necessitate further flattening.

7.2.4 Structural Fill and Compaction

All fill placed for the support of structures, concrete flatwork or pavements, should consist of structural fill. Structural fill may consist of excavated native granular or fine-grained or imported structural fill. Topsoil may not be used as structural fill. All structural fill should be free of vegetation, debris and contain no materials larger than 4 inches nominal size. If imported structural fill is needed, it should be a relatively well-graded granular soil with a fines content (material passing the No. 200 mesh sieve) of 35% or less. In general, imported structural fill should have a liquid limit less than 35 and plasticity index less than 15 based on an Atterberg Limit's test (ASTM D-4318).

All structural fill should be placed in maximum 6-inch loose lifts if compacted by small hand-operated compaction equipment, maximum 8-inch loose lifts if compacted by light-duty rollers, and maximum 12-inch loose lifts if compacted by heavy duty compaction equipment that is

capable of efficiently compacting the entire thickness of the lift. We recommend that all structural fill be compacted on a horizontal plane, unless otherwise approved by the geotechnical engineer. Structural fill with an overall thickness of 6 feet or less should be compacted to at least 95% of the maximum dry density (MDD), as determined by ASTM D-1557 (modified proctor); structural fill that is placed in embankments exceeding 6 feet in thickness should be compacted to at least 97% of the MDD. The moisture content should be within 3% of the optimum moisture content (OMC) at the time of placement and compaction. Also, prior to placing any fill, the excavations should be observed by the geotechnical engineer to observe that any unsuitable materials or loose soils have been removed. In addition, proper grading should precede placement of fill, as described in the **General Site Preparation and Grading** subsection of this report (Section 7.2.1).

All fill soils placed for subgrade below pavement sections, footings, and exterior flat work, should be within 3% of the OMC when placed and compacted to at least 95% of the MDD as determined by ASTM D-1557. All utility trenches backfilled below pavement sections, footings, curb and gutter and sidewalks, should be backfilled with structural fill that is within 3% of the OMC when placed and compacted to at least 95% of the MDD as determined by ASTM D-1557 unless more stringent requirements apply as outlined by the city or utility companies. All other trenches, in landscape areas, should be backfilled and compacted to at least 90% of the MDD (ASTM D-1557).

We recommend that excavations around basement and garage footings be backfilled and compacted to approximately 90% of the MDD and should only be compacted with hand operated equipment to reduce the stresses on foundation walls.

7.3 FOUNDATIONS

In general, building foundations can be constructed using conventional strip and spread footings founded on competent native soils or on structural fill. An IGES representative should approve all foundation bearing soils prior to construction of footings. Any structural fill or reworked native soil required beneath the foundations should be placed and compacted in accordance with our recommendations.

Footings founded as recommended may be proportioned for a maximum net allowable bearing capacity of **1,400 pounds per square foot (psf).** All footings should be embedded at least 30

inches below final grade for frost protection and confinement. The minimum recommended footing width is 20 inches for continuous wall footings.

7.4 SETTLEMENT

Settlements of properly designed and constructed conventional foundations, founded as described above, are anticipated to be less than one inch. Differential settlements should be on the order of ½ the total settlement in 30 feet.

7.5 LATERAL RESISTANCE AND LATERAL EARTH PRESSURES

Lateral forces imposed upon conventional foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footing and the supporting soils. In determining the frictional resistance, a coefficient of friction of 0.35 for native silt or clay soils against concrete should be used. For structural fill with an internal angle of friction of 32° or greater a coefficient of friction of 0.41 should be used.

Ultimate lateral earth pressures for native silt or clay soils acting against retaining walls and buried structures may be computed from the lateral pressure coefficients or equivalent fluid densities presented in the following table:

Condition	Lateral Pressure Coefficient	Equivalent Fluid Density (pounds per cubic foot)
Active	0.41	45
At-rest	0.58	63.8
Passive	2.46	270.6

Ultimate lateral earth pressures for structural fill with an internal angle of friction of 32° acting against retaining walls and buried structures may be computed from the lateral pressure coefficients or equivalent fluid densities presented in the following table:

Condition	Lateral Pressure Coefficient	Equivalent Fluid Density (pounds per cubic foot)
Active	0.31	40
At-rest	0.47	55
Passive	3.25	400

These coefficients and densities assume level, granular backfill with no buildup of hydrostatic pressures. The force of the water should be added to the presented values if hydrostatic pressures are anticipated. Additionally, if sloping backfill is present, the additional surcharge created by the wedge of soil should be added to the presented values. If sloping backfill is present, we recommend the geotechnical engineer be consulted to provide more accurate lateral pressure parameters once the design geometry is established.

Walls and structures allowed to rotate slightly should use the active condition. If the element is constrained against rotation, the at-rest condition should be used. These values should be used with an appropriate factor of safety against overturning and sliding. A value of 1.5 is typically used.

7.6 CONCRETE SLAB-ON-GRADE CONSTRUCTION

To minimize settlement and cracking of slabs, all concrete slabs should be founded on a 6-inch layer of compacted gravel overlying suitable native soil. Loose soils beneath slab on grade construction should be removed or compacted to approximately 95% of the MDD as determined by ASTM D-1557. The gravel should consist of free draining gravel or road base with a 1-inch maximum particle size and no more than 12 percent passing the No. 200 mesh sieve.

All concrete slabs should be designed to minimize cracking as a result of shrinkage; consideration should be given to reinforcing the slab with a welded wire fabric, re-bar, or fibermesh. We recommend that concrete be tested to assess that the slump and/or air content is as specified in the plans and specifications. We recommend that concrete be placed in general accordance with the requirements of the American Concrete Institute (ACI).

7.7 MOISTURE PROTECTION AND SURFACE DRAINAGE

Moisture should not be allowed to infiltrate the soils in the vicinity of the foundations. We recommend the following recommendations be implemented at each building location and that

all buyers/owners are aware of these items so they may be maintained throughout the life of the structure.

- The ground surface within 10 feet of the entire perimeter of each house should be constructed to slope a minimum of two percent away from the home.
- Roof runoff devices be installed to direct all runoff a minimum of 10 feet away from structures and preferably day-lighted to the curb where it can be transferred to the storm drain system.
- Where possible, we also recommend that storm drain collection sumps not be located adjacent to foundations or within roadway pavements.
- We recommend irrigation around foundations be minimized by selective landscaping and that irrigation valves be constructed away from foundations.
- The homebuilder should be responsible for mechanically compacting the exterior backfill soils around the foundation. Jetting (injecting water beneath the surface) to compact backfill against foundation soils should not be allowed.

7.8 ASPHALTIC PAVEMENT

Based on soil classifications and a minimum laboratory obtained CBR value of 3.7, the near surface soils are expected to provide relatively fair pavement support. Anticipated traffic volumes were not available at the time this report was prepared. However, based on our understanding of the project development we assumed traffic in the residential areas would consist of approximately 1,000 passenger vehicles, 3 small delivery type trucks, 2 medium trucks and 1 large truck on the residential streets each day. We have assumed 1% growth over a 20-year period for approximately 122,000 equivalent single axle loads (ESALs). Based on the information obtained, we recommend the following pavement section:

Location	**Asphalt Thickness (inches)**	**Base Course Thickness (inches)**
Residential Roadways	3½	10

Asphalt has been assumed to be a high stability plant mix and base course material composed of crushed stone with a minimum CBR of 70. We recommend that the upper 12-inches of the native soils be scarified and then moisture conditioned to within 2% of the OMC and compacted to at least 95% of the MDD as determined by ASTM D-1557; otherwise the contractor should place

12 inches of structural fill in accordance with Section 7.2.4 of this report prior to placing the base course layer of the pavement section. The above pavement design is based on assumed traffic counts, if the anticipated traffic volume is significantly different than what is assumed we should be contacted to reassess the pavement design.

Construction traffic has not been accounted for in the pavement section recommended herein, the roadway may deteriorate faster than expected in some areas based on construction traffic. Increased maintenance may be required to repair localized rutting and cracking during construction. An overlay or other repairs may be required once construction has subsided. If a pavement section is required for a heavy traffic section, IGES can provide this design if traffic information is provided by the client.

7.9 PRELIMINARY SOIL CORROSION POTENTIAL

Soluble sulfate, pH, and resistivity laboratory tests were completed to assess the potential for corrosion due to the chemistry of the native soils. It was found that the existing soils have a low degree of sulfate attack with concrete. Based on these results, we recommend conventional Type I/II Cement be used in all concrete in contact with site soils.

Based on the nature of the on-site soils, the observed moisture contents and a minimum resistivity of 700 to 3,800 ohm-cm, we anticipate the on-site soils will be *corrosive* to *very corrosive* with metal used in construction. We recommend that a corrosion engineer be consulted for consideration of sacrificial thickness, cathodic protection, coatings, or other methods of reducing the effects of corrosion.

7.10 SUMP DESIGN AND CONSTRUCTION

Sumps should be designed to minimize the accumulation of fines within the site soils. Silt catching covers on the sump openings or other sediment trapping methods should be used where practical and maintenance will allow. The design life of sumps will be dramatically reduced if such silt trapping devices are not included in the design.

To minimize the potential for settlement under roadways, the sumps should be located in the mow strips of the development where possible. Other development structures should not be constructed over the sump locations.

8.0 CLOSURE

8.1 LIMITATIONS

The recommendations contained in this report are based on our limited field exploration, laboratory testing, and understanding of the proposed construction. The subsurface data used in the preparation of this report were obtained from the explorations made for this investigation. It is possible that variations in the soil and groundwater conditions could exist between the points explored. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site that are different from those described in this report, IGES, Inc. should be immediately notified so that we may make any necessary revisions to recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, we should be notified.

This report was prepared in accordance with the generally accepted standard of practice at the time the report was written. No warranty, expressed or implied, is made.

It is the Client's responsibility to see that all parties to the project including the Designer, Contractor, Subcontractors, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

8.2 ADDITIONAL SERVICES

The recommendations made in this report are based on the assumption that an adequate program of tests and observations will be made during the construction. IGES staff should be on site to see that these recommendations are implemented. These tests and observations should include, but not necessarily be limited to, the following:

- Observations and testing during site preparation, earthwork and structural fill placement.
- Consultation as may be required during construction.
- Quality control and observation of concrete placement.

We also recommend that project plans and specifications be reviewed by us to verify compatibility with our conclusions and recommendations. Additional information concerning the scope and cost of these services can be obtained from our office.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding the report or wish to discuss additional services, please do not hesitate to contact us at your convenience (801) 748-4044.

9.0 REFERENCES CITED

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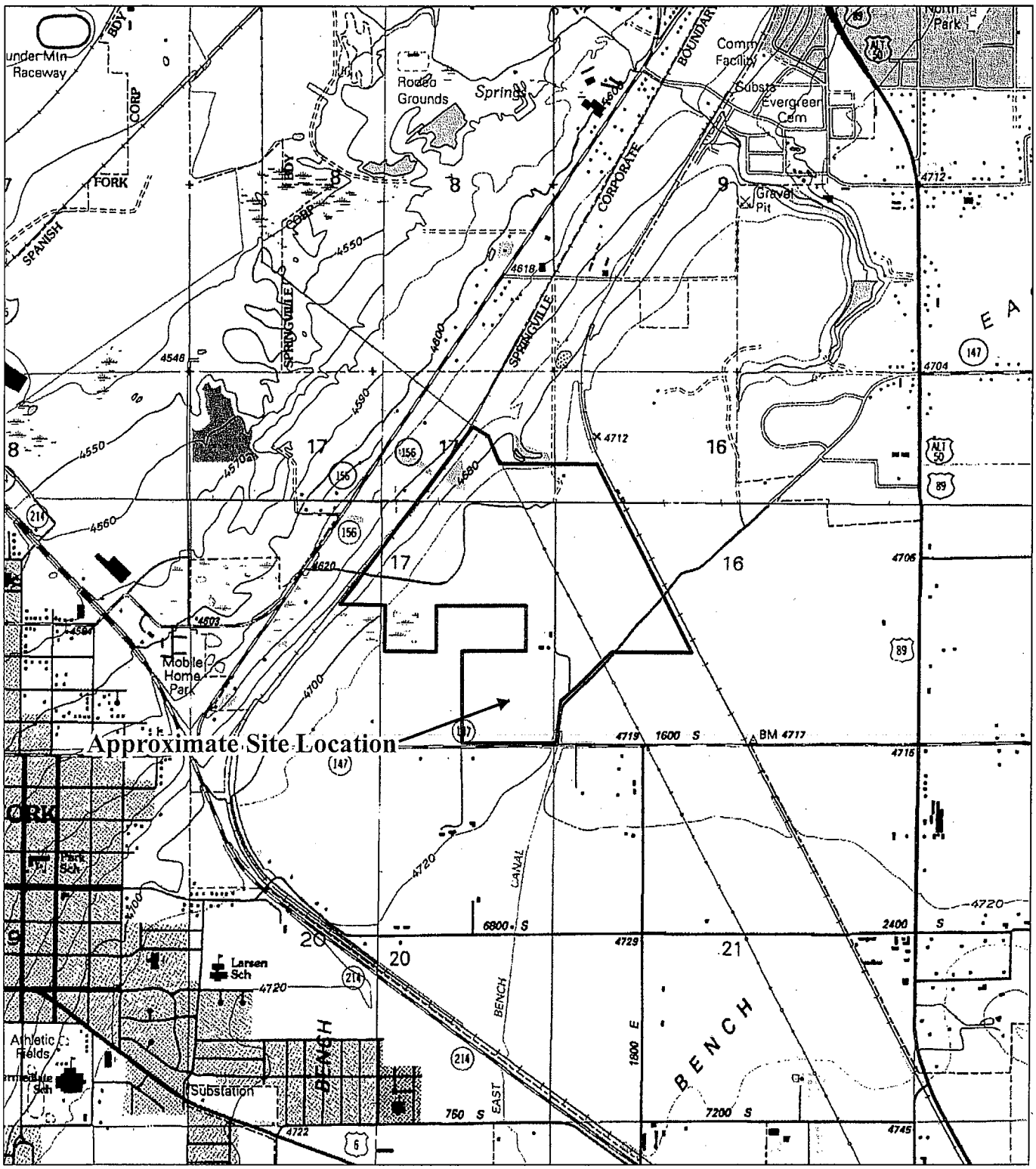


BASE MAP:
PROVO, UTAH
SPANISH FORK, UTAH
SPANISH FORK PEAK ,UTAH
SPRINGVILLE, UTAH
U.S.G.S. 7.5 MINUTE QUADRANGLE

0 1,050 2,100 4,200 Feet

1:24,000

IGES

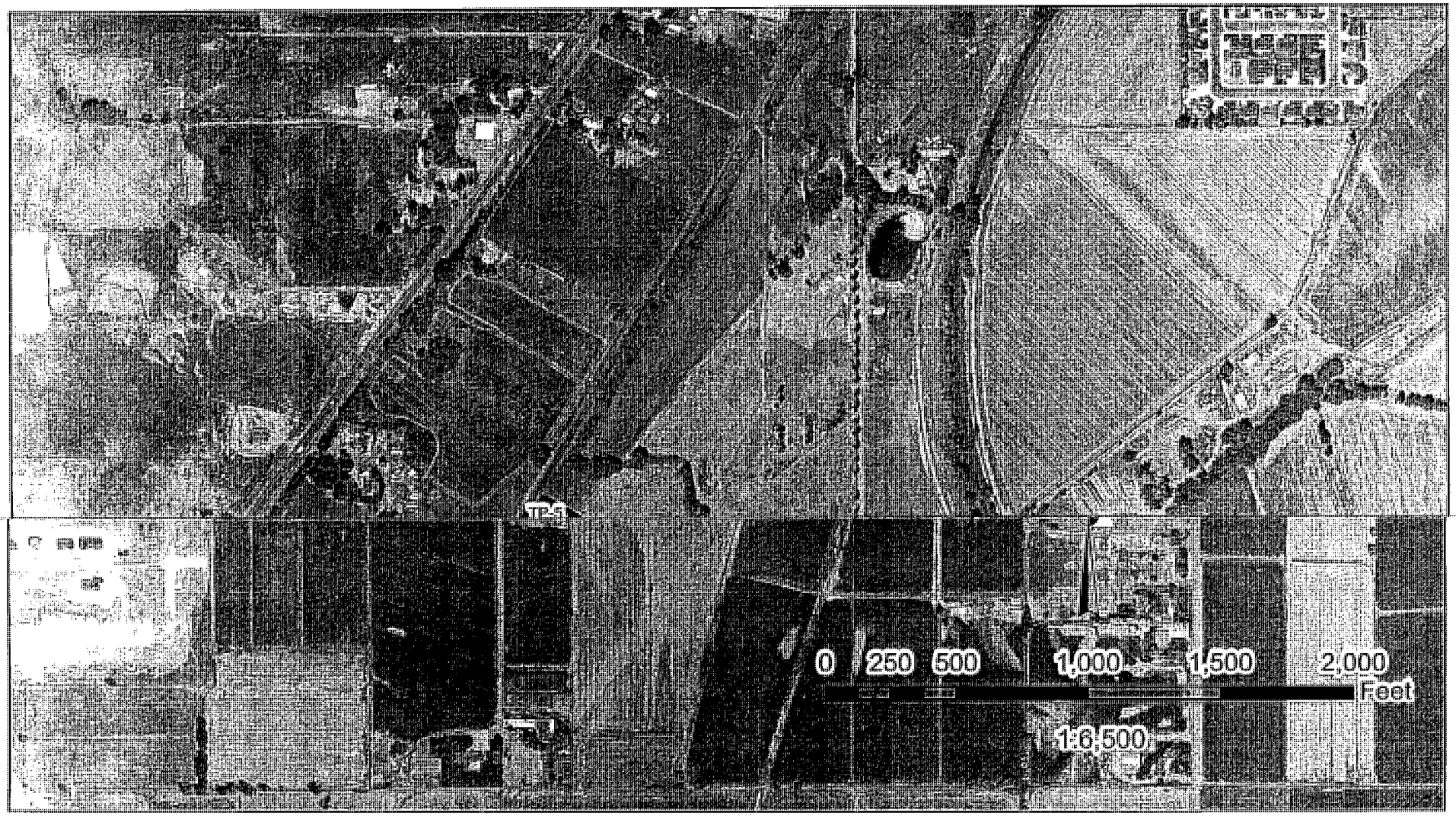
Project Number - 00300-043

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah

SITE VICINITY MAP

Plate

A - 1



IGES

Project Number 00300-043

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah

SITE EXPLORATION MAP

Plate

A - 2

DATE
STARTED: 3/21/08
COMPLETED: 3/21/08
BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO:
TP- 1
Sheet 1 of 1

DEPTH
METERS | FEET
SAMPLES | WATER LEVEL | GRAPHICAL LOG | UNIFIED SOIL CLASSIFICATION

LOCATION
NORTHING EASTING ELEVATION

MATERIAL DESCRIPTION

Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index

Moisture Content and Atterberg Limits
Plastic Limit | Moisture Content | Liquid Limit
10 20 30 40 50 60 70 80 90

0 / 0

TOPSOIL, Silty SAND, loose, slightly moist, brown, organics throughout, sand is fine-grained

CL

Sandy Lean CLAY, medium stiff, slightly moist, reddish brown, fine-grained sand, low plasticity fines, small interbedded layers of Silty SAND (SM) generally less than ½ inch thick

1

ML

Sandy SILT, medium stiff, slightly moist, tan brown, pinholes observed, some small interbedded Silty SAND (SM) lenses

84.2 | 24.1

5

2

No Groundwater Encountered

Bottom of Test Pit @ 8 Feet

3 / 10

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 3

DATE
STARTED: 3/21/08
COMPLETED: 3/21/08
BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP- 2
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Silty SAND, loose, slightly moist, brown, organics throughout, sand is fine-grained						
					CL	Sandy Lean CLAY, medium stiff, slightly moist, reddish brown, fine-grained sand, low plasticity fines, small interbedded layers of Silty SAND (SM) generally less than ½ inch thick						
1								23.4		30	11	
	5											
2												
						No Groundwater Encountered						
3						Bottom of Test Pit @ 9 Feet						
	10											

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 4

DATE
STARTED: 3/21/08
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BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP- 4
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Silty SAND, loose, slightly moist, brown, organics throughout, sand is fine-grained					
					CL	Sandy Lean CLAY, medium stiff, slightly moist, reddish brown, some pinholes observed	107.8	19.1			
1					ML	SILT, medium stiff to stiff, slightly moist, tan with orange streaks, interbedded CLAY (CL) lenses generally less than ¼ inch thick occurring approximately every 4 inches					
5						Lean CLAY (CL) lense approximately 6 inches thick		14.9	98.5	34	15
2											
						No Groundwater Encountered					
3	10					Bottom of Test Pit @ 9 Feet					

Moisture Content and Atterberg Limits
Plastic Limit | Moisture Content | Liquid Limit
10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 6

DATE
STARTED: 3/21/08
COMPLETED: 3/21/08
BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO:
TP- 5
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Sandy Lean CLAY, soft, moist, dark brown, low plasticity fines					
					CL	Sandy Lean CLAY, medium stiff, slightly moist, brown, some pinholes observed, low plasticity fines	101.6	18.2			
1						medium stiff, slightly moist, tan-brown with orange streaks					
						Inflitration Test Performed @ 4 feet - Inflitration rate 13.5 min/inch (4.4 inch/hr)					
2	5										
3	10					Inflitration Test Performed @ 10 feet - Inflitration rate 5.6 min/inch (10.7 inch/hr)					
						No Groundwater Encountered					
						Bottom of Test Pit @ 10.5 Feet					

Moisture Content and Atterberg Limits

Plastic Limit — Moisture Content — Liquid Limit

10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 6/5/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 7

DATE
STARTED: 3/21/08
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BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP- 6
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Silty SAND, medium dense, slightly moist, dark brown, organics throughout, sand is fine-grained					
						Inflitration Test Performed @ 1½ feet - Inflitration rate 4.1 min/inch (14.8 inch/hr)		13.1	41.1		
					SM	Silty SAND, medium dense, slightly moist, tan with orange streaks, pinholes observed throughout					
1							97.6	13.4			
	5										
2											
						No Groundwater Encountered					
						Bottom of Test Pit @ 8 Feet					
3	10										

Moisture Content and Atterberg Limits
Plastic Limit | Moisture Content | Liquid Limit
10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 8

DATE
STARTED: 3/21/08
COMPLETED: 3/21/08
BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP- 7
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Silty SAND, medium dense, slightly moist, dark brown, organics throughout, sand is fine-grained						
					SM	Silty SAND, medium dense, slightly moist, brown, trace gravel present, becomes dense at bottom of layer						
1						medium dense, slightly moist, tan, fine-grained sand, occasional small lense of Sandy Lean CLAY (CL) generally less than ½ inch thick		14.6	40.3			●
	5											
2												
3	10					No Groundwater Encountered Bottom of Test Pit @ 9 Feet						

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 9

DATE
STARTED: 3/21/08
COMPLETED: 3/21/08
BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO:
TP- 8
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Silty SAND, medium dense, slightly moist, brown, organics throughout, sand is fine-grained, small gravel lense at bottom of layer					
					ML	Sandy SILT, medium stiff, slightly moist, tan, pinholes observed Inflitration Test Performed @ 2½ feet - Inflitration rate 6.4 min/inch (9.4 inch/hr)	95.9	16.3			
1					SM	Silty SAND, medium dense, slightly moist, tan, sand is fine-grained					
	5										
2											
3	10					No Groundwater Encountered Bottom of Test Pit @ 9 Feet					

Moisture Content and Atterberg Limits

Plastic Limit — Moisture Content — Liquid Limit

10 20 30 40 50 60 70 80 90

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 10

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

DATE
STARTED: 3/21/08
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BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP- 9
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Silty SAND, medium dense, slightly moist, dark brown, organics throughout, sand is fine-grained, small gravel lense at bottom of layer, some wire observed in upper portions					
					SM	Silty SAND, medium dense, slightly moist, brown, a few pinholes observed		11.1	27.3		
1						Medium dense, slightly moist, tan, fines content decreases with depth					
	5										
2											
						No Groundwater Encountered					
3	10					Bottom of Test Pit @ 9 Feet					

Moisture Content and Atterberg Limits
Plastic Limit Moisture Content Liquid Limit
10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 11

DATE
STARTED: 3/21/08
COMPLETED: 3/21/08
BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO:
TP-10
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Lean CLAY, medium stiff, slightly moist, dark brown, organics throughout						
					CL	Sandy Lean CLAY, medium stiff, slightly moist, brown		18.3		27	10	
1												
	5				SP	Poorly Graded SAND, loose, slightly moist, tan, fine- to medium-grained sand Inflitration Test Performed @ 5½ feet - Inflitration rate 0.1 min/inch (514 inch/hr)		4.8	2.3			
2												
3	10					No Groundwater Encountered Bottom of Test Pit @ 8 Feet						

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 12

DATE
STARTED: 3/21/08
COMPLETED: 3/21/08
BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-11
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Silty SAND with gravel, medium dense, slightly moist, dark brown, gravel ranges from ¼ to 4 inches in diameter, poorly sorted						
1					SM	Silty SAND, loose to medium dense, moist, tan Inflitration Test Performed @ 4 feet - Inflitration rate 2.2 min/inch (27.8 inch/hr)		29.0	22.7			●
2	5		▼			Groundwater Encountered at 8½ feet Bottom of Test Pit @ 9 Feet						
3	10											

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- ▼ - MEASURED
- ▽ - ESTIMATED

NOTES:

Plate
A - 13

DATE
STARTED: 3/21/08
COMPLETED: 3/21/08
BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-12
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Silty SAND with gravel, medium dense, slightly moist, dark brown, gravel ranges from ¼ to 4 inches in diameter, poorly sorted					
					SP-SM	Poorly Graded SAND with silt, loose to medium dense, slightly moist, tan-brown, some small red Lean CLAY lenses that appear to be discontinuous throughout layer		9.6	10.0		
1					SM	Silty SAND, medium dense, moist, tan	89.6	14.5			
2	5					medium dense, wet, tan					
						Groundwater Encountered at 8½ feet					
3	10					Bottom of Test Pit @ 9 Feet					

Moisture Content and Atterberg Limits
Plastic Limit — Moisture Content — Liquid Limit
10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES: –

Plate
A - 14

DATE	
STARTED:	3/21/08
COMPLETED:	3/21/08
BACKFILLED:	3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-13
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Silty SAND with gravel, medium dense, slightly moist, dark brown, gravel ranges from ¼ to 4 inches in diameter, poorly sorted						
					SM	Silty SAND, medium dense, slightly moist, tan with orange streaks, small interbedded Sandy Lean CLAY lense approximately ½-inch thick that occur approximately every 12 inches						
1												
	5					medium dense, moist, tan						
2												
			▼			medium, dense, wet, tan						
3	10					Groundwater Encountered at 9½ feet Bottom of Test Pit @ 10 Feet						

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- ▼ - MEASURED
- ▽ - ESTIMATED

NOTES:

Plate
A - 15

DATE
STARTED: 3/21/08
COMPLETED: 3/21/08
BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-14
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Lean CLAY, medium stiff, slightly moist, dark brown, a few pinholes observed						
						Infiltration Test Performed @ ½ feet - Inflitration rate 7.5 min/inch (8.0 inch/hr)						
					SM	Silty SAND, medium dense, slightly moist, tan with orange streaks						
						Small lense of Clayey SAND at 2 feet and at 2½ feet, approximately 2 inches thick						
1							104.7	11.3				●
	5											
2												
						No Groundwater Encountered						
						Bottom of Test Pit @ 8 Feet						
3	10											

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 16

DATE	
STARTED:	3/21/08
COMPLETED:	3/21/08
BACKFILLED:	3/21/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-15
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Lean CLAY, medium stiff, slightly moist, dark brown, organics throughout						
					CL	Lean CLAY, medium stiff, slightly moist, tan with orange streaks, some pinholes observed	87.2	25.6				
1												
					SP-SM	Poorly Graded SAND with silt, medium dense, slightly moist, tan		5.1	11.5			
2	5											
						No Groundwater Encountered						
3	10					Bottom of Test Pit @ 8 Feet						

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 17

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO:
TP-16
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Sandy Lean CLAY, medium stiff, slightly moist, dark brown					
					CL	Sandy Lean CLAY, medium stiff, slightly moist, tan, pinholes observed, low plasticity fines	100.6	18.5			
1					SM	Silty SAND, medium dense, slightly moist, tan-brown					
	5										
2											
						No Groundwater Encountered					
						Bottom of Test Pit @ 8 Feet					
3	10										

Moisture Content and Atterberg Limits
Plastic Limit | Moisture Content | Liquid Limit
10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 18

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-17
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Sandy Lean CLAY, medium stiff, slightly moist, dark brown					
					CL	Sandy Lean CLAY, medium stiff, slightly moist, tan		24.0		31	11
					SM	Silty SAND, medium dense, slightly moist, tan-brown					
1	5						90.0	23.6			
2											
						No Groundwater Encountered					
3	10					Bottom of Test Pit @ 9 Feet					

Moisture Content and Atterberg Limits
Plastic Limit | Moisture Content | Liquid Limit
10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 19

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-18
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Sandy Lean CLAY, medium stiff, slightly moist, dark brown						
					CL	Sandy Lean CLAY, medium stiff, slightly moist, tan	96.1	18.6		29	12	
1					SM	Silty SAND, medium dense, slightly moist, tan-brown						
	5											
2												
						No Groundwater Encountered						
						Bottom of Test Pit @ 8 Feet						
3	10											

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 20

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO:
TP-19
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Sandy Lean CLAY, medium stiff, slightly moist, dark brown, organics throughout	97.6	16.9			
1					CL	Sandy Lean CLAY, medium stiff, slightly moist, tan, pinholes observed		19.5		27	11
5					SM	Silty SAND, medium dense, slightly moist, tan-brown					
2						No Groundwater Encountered Bottom of Test Pit @ 8 Feet					
3	10										

Moisture Content and Atterberg Limits
Plastic Limit | Moisture Content | Liquid Limit
10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 21

DATE	
STARTED:	3/24/08
COMPLETED:	3/24/08
BACKFILLED:	3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-20
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Sandy Lean CLAY, medium stiff, slightly moist, dark brown, organics throughout						
					CL	Sandy Lean CLAY, medium stiff, slightly moist, tan, pinholes observed Inflitration Test Performed @ 2 feet - Inflitration rate 7.3 min/inch (8.3 inch/hr)						
1												
	5				SM	Silty SAND, medium dense, slightly moist, tan-brown Inflitration Test Performed @ 5 feet - Inflitration rate 6.1 min/inch (9.8 inch/hr)						
2												
						No Groundwater Encountered Bottom of Test Pit @ 9 Feet						
3	10											

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 22

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-21
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Sandy Lean CLAY, medium stiff, slightly moist, dark brown, pinholes observed, sand is fine-grained					
					CL	Sandy Lean CLAY, medium stiff, slightly moist, tan, pinholes throughout, low plasticity fines	92.5	14.5		27	9
1					SP	Poorly Graded SAND, loose, slightly moist, tan-brown, trace gravel mainly found in small lenses					
	5							4.1	4.6		
2											
3	10					No Groundwater Encountered Bottom of Test Pit @ 8 Feet					

Moisture Content and Atterberg Limits
Plastic Limit | Moisture Content | Liquid Limit
10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 23

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO:
TP-22
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

METERS	FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Sandy Lean CLAY, medium stiff, slightly moist, dark brown, some pinholes observed					
					CL	Sandy Lean CLAY, medium stiff, slightly moist, tan, pinholes observed					
1					CL	Lean CLAY, medium stiff, slightly moist, grayish green, some plasticity in fines	91.0	27.1			
					SM	Silty SAND, medium dense to loose, slightly moist, tan-brown					
	5										
2											
						No Groundwater Encountered					
						Bottom of Test Pit @ 8 Feet					
3	10										

Moisture Content and Atterberg Limits

Plastic Limit | Moisture Content | Liquid Limit

10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 24

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-23
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Silty SAND with gravel, medium dense, slightly moist, dark brown					
					SM	Silty SAND with gravel, medium dense, slightly moist, reddish brown, gravel ranges from ¼ to 1 inch in diameter, sub-rounded clasts		8.9	18.2		
1											
	5				GP	Poorly Graded GRAVEL with sand, dense to medium dense, slightly moist, tan matrix, partial cementation		4.3	2.8		
2					SM	Silty SAND, medium dense, moist, tan	89.8	11.8			
						No Groundwater Encountered					
3	10					Bottom of Test Pit @ 8 Feet					

Moisture Content and Atterberg Limits
Plastic Limit — Moisture Content — Liquid Limit
10 20 30 40 50 60 70 80 90

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 25

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-24
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Sandy Lean CLAY, medium stiff, slightly moist, dark brown, pinholes observed, sand is fine-grained						
1					CL	Lean CLAY, medium stiff, slightly moist, tan, pinholes observed	88.4	27.8				
	5				GM	Silty GRAVEL with sand, dense, slightly moist, tan matrix, partial cementation, gravel ranges from ¼ to 2 inches in diameter with majority being approximately ½-inch						
2						No Groundwater Encountered Bottom of Test Pit @ 8 Feet						
3	10											

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 26

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO:
TP-25
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Sandy Lean CLAY, medium dense, slightly moist, dark brown, pinholes observed						
					CL	Lean CLAY, medium stiff, slightly moist, tan-brown, pinholes observed						
1		X					86.6	24.4		33	12	●
	5					Dense, slightly moist, grayish-brown, pinholes observed						
		X					97.2	22.8				●
2												
3	10					No Groundwater Encountered Bottom of Test Pit @ 9 Feet						

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 27

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-26
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Sandy Lean CLAY, medium dense, slightly moist, dark brown, pinholes observed						
					SM	Silty SAND with gravel, medium dense, slightly moist, tan-brown, gravel ranges from ¼ to 3 inches is diameter, sub-rounded clasts, sand is fine-grained		10.1	24.1			●
1					GM	Silty GRAVEL with sand, medium dense, slightly moist, tan matrix, gravel ranges from ¼ to 4 inches in diameter but is mostly ½-inch in diameter						
	5				SM	Silty SAND, medium dense, slightly moist, tan						
					CL	Sandy Lean CLAY, medium stiff, slightly moist, tan						
2					SM	Silty SAND, medium dense, slightly moist, tan						
						No Groundwater Encountered						
						Bottom of Test Pit @ 8.5 Feet						
3	10											

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 28

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah
Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-27
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Sandy Lean CLAY, medium dense, slightly moist, dark brown, pinholes observed					
					SM	Silty SAND with gravel, medium dense, slightly moist, tan-brown, gravel ranges from ¼ to 3 inches is diameter, sub-rounded clasts, sand is fine-grained					
1					GM	Silty GRAVEL with sand, medium dense, slightly moist, tan matrix, gravel ranges from ¼ to 4 inches in diameter but is mostly ½-inch in diameter					
					SP	Poorly Graded SAND, medium dense, slightly moist, tan		5.3	2.4		
	5				CL	Sandy Lean CLAY, medium stiff, slightly moist, tan					
2					SP	Poorly Graded SAND, medium dense, slightly moist, tan					
						No Groundwater Encountered					
						Bottom of Test Pit @ 8.5 Feet					
3	10										

Moisture Content and Atterberg Limits
Plastic Limit | Moisture Content | Liquid Limit
10 20 30 40 50 60 70 80 90

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 29

DATE
STARTED: 3/24/08
COMPLETED: 3/24/08
BACKFILLED: 3/24/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
Spanish Fork, Utah Project Number 00300-043

IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-28
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index
0	0					TOPSOIL, Sandy Lean CLAY, medium dense, slightly moist, dark brown, pinholes observed					
					CL	Sandy Lean CLAY, medium stiff, slightly moist, tan-brown, pinholes observed	95.8	14.7 18.9		26	11
1					SM	Silty SAND with gravel, medium dense, slightly moist, tan-brown, gravel ranges from ¼ to 3 inches is diameter, sub-rounded clasts, sand is fine-grained					
5					GM	Silty GRAVEL with sand, medium dense, slightly moist, tan matrix, gravel ranges from ¼ to 4 inches in diameter but is mostly ½-inch in diameter					
					CL	Lean CLAY, medium stiff, slightly moist, grayish brown	92.3	26.5			
2											
						No Groundwater Encountered					
3	10					Bottom of Test Pit @ 9 Feet					

Moisture Content and Atterberg Limits
Plastic Limit Moisture Content Liquid Limit
10 20 30 40 50 60 70 80 90

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 30

DATE
STARTED: 3/25/08
COMPLETED: 3/25/08
BACKFILLED: 3/25/08

Geotechnical Investigation
Proposed Northeast Bench Subdivision
400 North Mapleton Slant Road
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IGES Rep: BMJ
Rig Type: Case DC-580L Backhoe

TEST PIT NO: TP-29
Sheet 1 of 1

LOCATION
NORTHING EASTING ELEVATION

DEPTH METERS	DEPTH FEET	SAMPLES	WATER LEVEL	GRAPHICAL LOG	UNIFIED SOIL CLASSIFICATION	MATERIAL DESCRIPTION	Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit; 10 20 30 40 50 60 70 80 90)
0	0					TOPSOIL, Silty SAND with gravel, medium dense, slightly moist, dark brown						
					SM	Silty SAND with gravel, medium dense, slightly moist, brown, gravel ranges from ¼ to 1 inch in diameter, sand is fine-grained						
1						Medium dense, slightly moist, tan, gravel ranges from ¼ to 2 inches in diameter						
						Occasional thin lenses of Sandy Lean CLAY						
	5						91.0	9.3				●
2												
3	10					No Groundwater Encountered Bottom of Test Pit @ 9 Feet						

LOG OF TEST PITS (A) - (4 LINE HEADER) 00300-043.GPJ IGES.GDT 5/7/08

IGES

SAMPLE TYPE
- GRAB SAMPLE
- 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
- MEASURED
- ESTIMATED

NOTES:

Plate
A - 31

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
			SC	CLAYEY SANDS SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

LOG KEY SYMBOLS

BORING SAMPLE LOCATION

TEST-PIT SAMPLE LOCATION

WATER LEVEL (level after completion)

WATER LEVEL (level where first encountered)

CEMENTATION

DESCRIPTION	DESCRIPTION
WEAKELY	CRUMBLES OR BREAKS WITH HANDLING OR SLIGHT FINGER PRESSURE
MODERATELY	CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE
STRONGLY	WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE

OTHER TESTS KEY

C	CONSOLIDATION	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	DS	DIRECT SHEAR
UC	UNCONFINED COMPRESSION	T	TRIAXIAL
S	SOLUBILITY	R	RESISTIVITY
O	ORGANIC CONTENT	RV	R-VALUE
CBR	CALIFORNIA BEARING RATIO	SU	SOLUBLE SULFATES
COMP	MOISTURE/DENSITY RELATIONSHIP	PM	PERMEABILITY
CI	CALIFORNIA IMPACT	-200	% FINER THAN #200
COL	COLLAPSE POTENTIAL	Gs	SPECIFIC GRAVITY
SS	SHRINK SWELL	SL	SWELL LOAD

MODIFIERS

DESCRIPTION	%
TRACE	<5
SOME	5 - 12
WITH	>12

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
DRY	ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISIBLE FREE WATER, USUALLY SOIL BELOW WATER TABLE

STRATIFICATION

DESCRIPTION	THICKNESS	DESCRIPTION	THICKNESS
SEAM	1/16 - 1/2"	OCCASIONAL	ONE OR LESS PER FOOT OF THICKNESS
LAYER	1/2 - 12"	FREQUENT	MORE THAN ONE PER FOOT OF THICKNESS

GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil conditions between individual sample locations.
3. Logs represent general soil conditions observed at the point of exploration on the date indicated.
4. In general, Unified Soil Classification designations presented on the logs were evaluated by visual methods only. Therefore, actual designations (based on laboratory tests) may vary.

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT (blows/ft)	MODIFIED CA. SAMPLER (blows/ft)	CALIFORNIA SAMPLER (blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
VERY LOOSE	<4	<4	<5	0 - 15	EASILY PENETRATED WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND
LOOSE	4 - 10	5 - 12	5 - 15	15 - 35	DIFFICULT TO PENETRATE WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND
MEDIUM DENSE	10 - 30	12 - 35	15 - 40	35 - 65	EASILY PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
DENSE	30 - 50	35 - 60	40 - 70	65 - 85	DIFFICULT TO PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
VERY DENSE	>50	>60	>70	85 - 100	PENETRATED ONLY A FEW INCHES WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER

CONSISTENCY - FINE-GRAINED SOIL

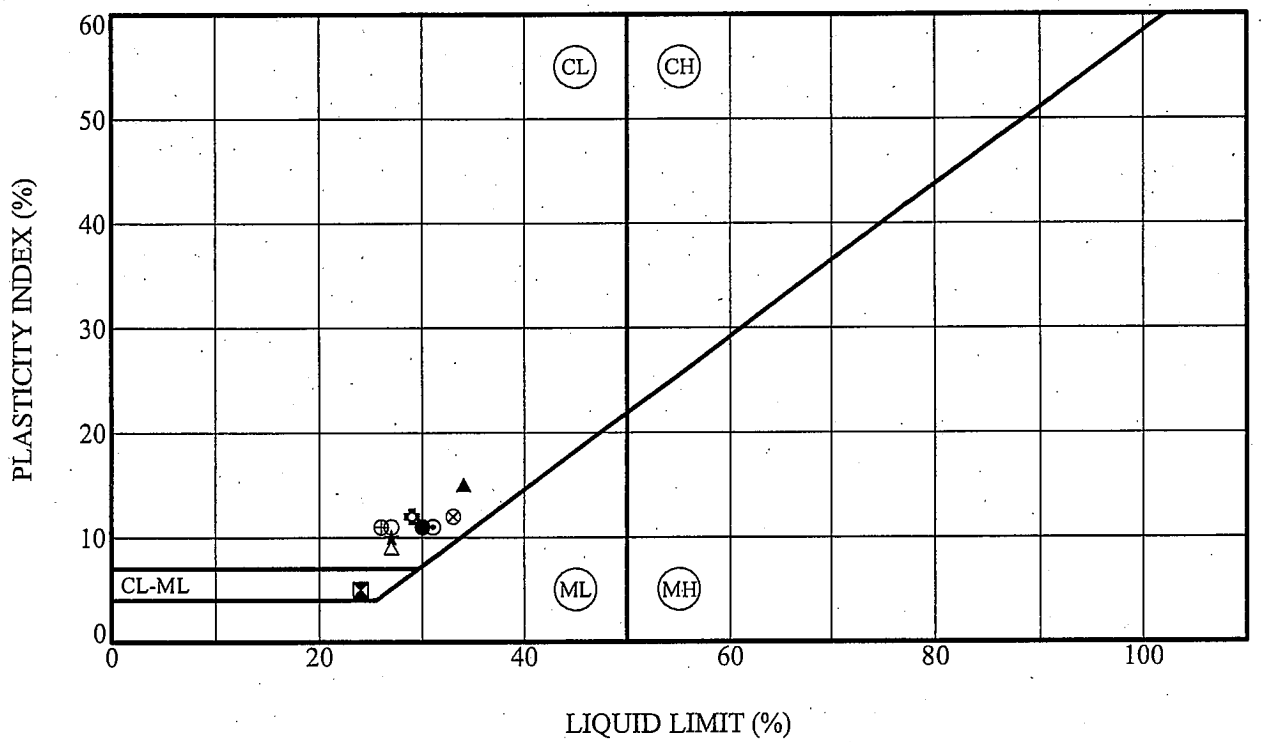
CONSISTENCY	SPT (blows/ft)	TORVANE UNTRAINED SHEAR STRENGTH (tsf)	POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf)	FIELD TEST
VERY SOFT	<2	<0.125	<0.25	EASILY PENETRATED SEVERAL INCHES BY THUMB. EXUDES BETWEEN THUMB AND FINGERS WHEN SQUEEZED BY HAND.
SOFT	2 - 4	0.125 - 0.25	0.25 - 0.5	EASILY PENETRATED ONE INCH BY THUMB. MOLDED BY LIGHT FINGER PRESSURE.
MEDIUM STIFF	4 - 8	0.25 - 0.5	0.5 - 1.0	PENETRATED OVER 1/2 INCH BY THUMB WITH MODERATE EFFORT. MOLDED BY STRONG FINGER PRESSURE.
STIFF	8 - 15	0.5 - 1.0	1.0 - 2.0	INDENTED ABOUT 1/2 INCH BY THUMB BUT PENETRATED ONLY WITH GREAT EFFORT.
VERY STIFF	15 - 30	1.0 - 2.0	2.0 - 4.0	READILY INDENTED BY THUMBNAIL.
HARD	>30	>2.0	>4.0	INDENTED WITH DIFFICULTY BY THUMBNAIL.

IGES

Key to Soil Symbols and Terminology

Plate A-32

Project Number 00300-043



Sample Location		Depth (ft)	LL (%)	PL (%)	PI (%)	Classification
●	TP- 2	4.0	30	19	11	Sandy Lean CLAY (CL)
⊠	TP- 3	1.0	24	19	5	Silty CLAY with sand (CL-ML)
▲	TP- 4	5.0	34	19	15	Lean CLAY (CL)
★	TP-10	3.0	27	17	10	Sandy Lean CLAY (CL)
⊙	TP-17	1.0	31	20	11	Sandy Lean CLAY (CL)
✿	TP-18	0.5	29	17	12	Sandy Lean CLAY (CL)
○	TP-19	4.0	27	16	11	Sandy Lean CLAY (CL)
△	TP-21	1.0	27	18	9	Sandy Lean CLAY (CL)
⊗	TP-25	3.0	33	21	12	Lean CLAY (CL)
⊕	TP-28	2.5	26	15	11	Sandy Lean CLAY (CL)

B_ATTERBERG - (USCS) 00300-043.GPJ IGES.GDT 5/7/08

IGES

ATTERBERG LIMITS' RESULTS

Geotechnical Investigation
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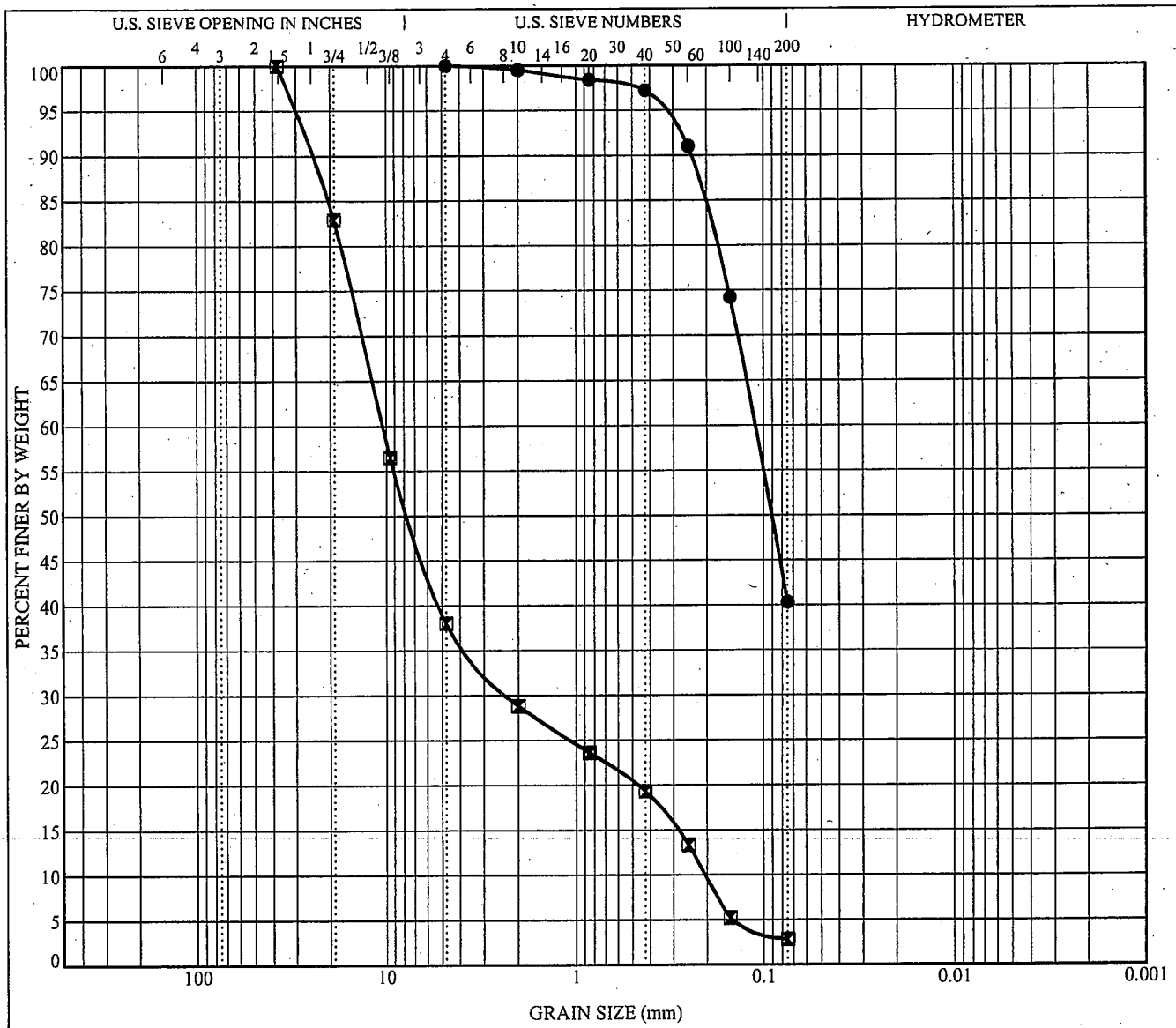
Plate
B - 1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample Location	Depth	Classification	LL	PL	PI	Cc	Cu
●	TP- 7	4.0	Silty SAND (SM)					
⊠	TP-23	4.0	Poorly Graded GRAVEL with sand (GP)				2.36	51.43

	Sample Loctaion	Depth	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	TP- 7	4.0	4.75	0.112			0.0	59.7	40.3	
⊠	TP-23	4.0	38.1	10.442	2.239	0.203	62.0	35.2	2.8	

IGES

GRAIN SIZE DISTRIBUTION

Geotechnical Investigation
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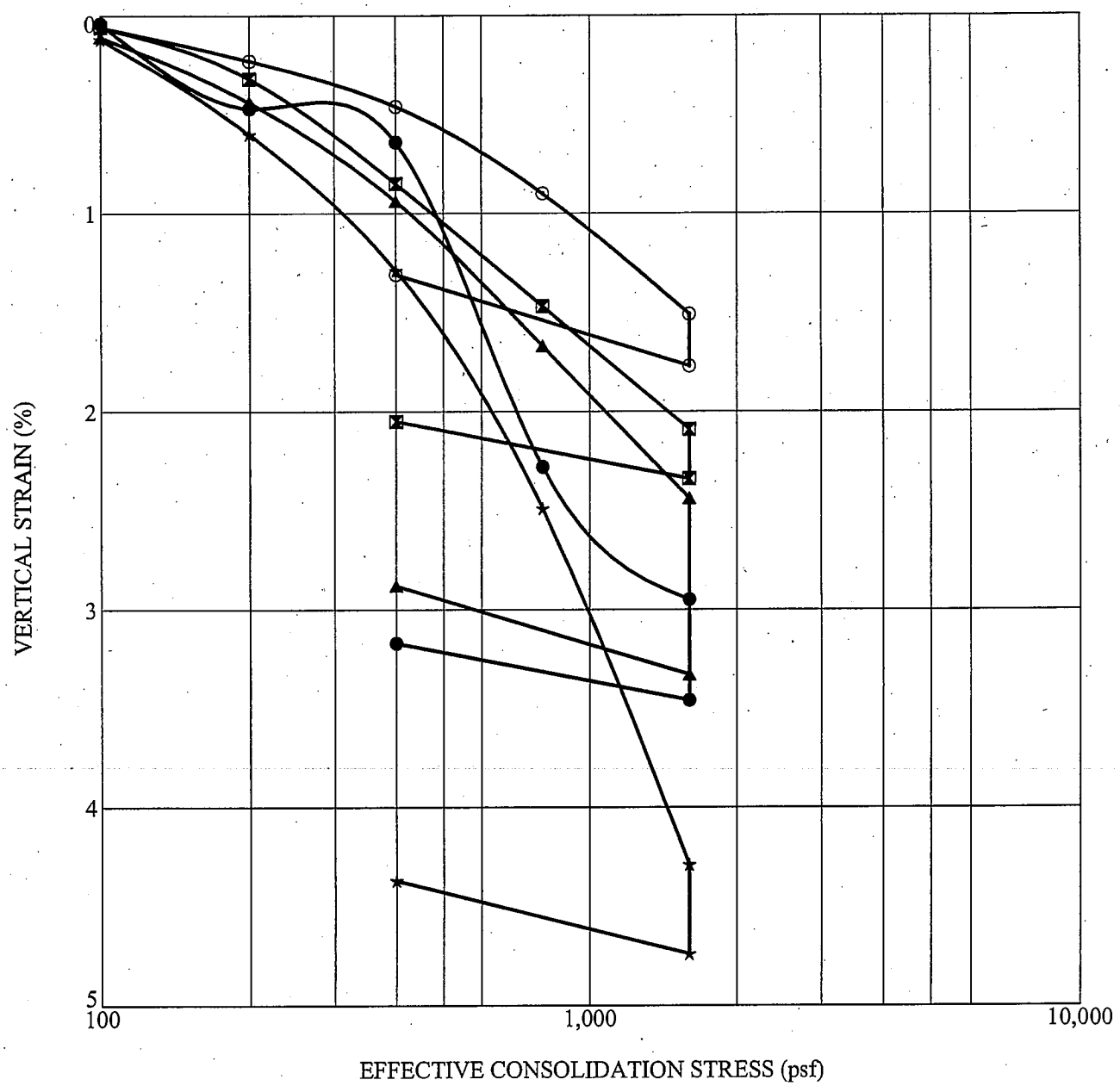
Plate B - 2

B_GSD 00300-043.GPJ IGES.GDT 5/7/08



	Sample Location	Depth (ft)	Classification	γ_d (pcf)	MC (%)	Inundation Load (psf)	Swell (%)	Collapse (%)
●	TP- 1	3.0	Sandy SILT (ML)	84	24	1600	0.00	0.51
⊠	TP- 4	1.0	Sandy Lean CLAY (CL)	108	19	1600	0.00	0.25
▲	TP- 6	3.0	Silty SAND (SM)	98	13	1600	0.00	0.89
★	TP-19	2.0	Sandy Lean CLAY (CL)	98	17	1600	0.00	0.45
⊙	TP-24	3.0	Lean CLAY (CL)	88	28	1600	0.00	0.26

B_SWELL/COLLAPSE 00300-043.GPJ IGES.GDT 5/7/08

IGES

1-D SWELL/COLLAPSE TEST

Geotechnical Investigation
Proposed Northeast Bench Subdivision
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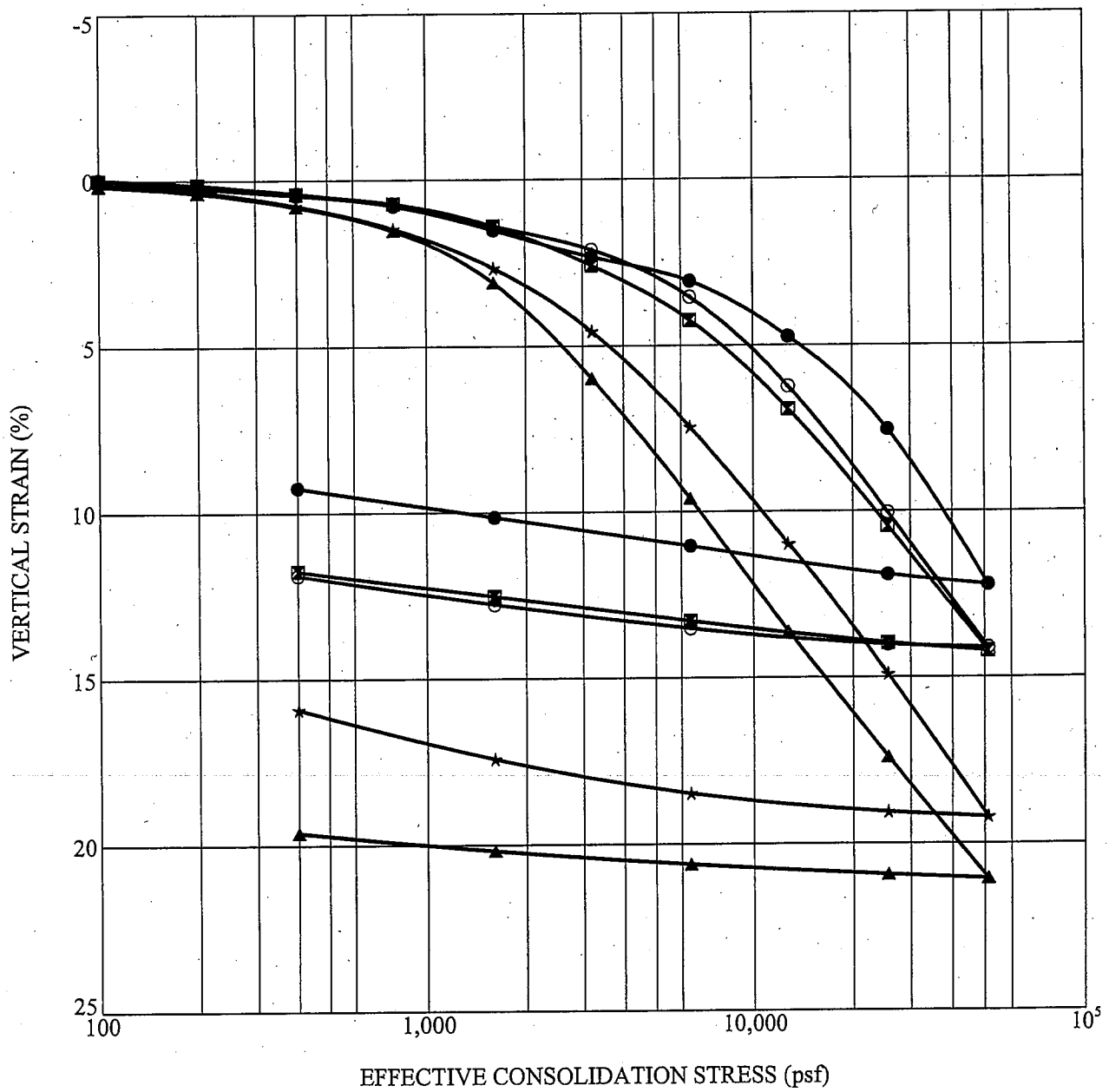
Plate

B - 3



	Sample Location	Depth (ft)	Classification	γ_d (pcf)	MC (%)	C'_c	C'_r	OCR
●	TP- 3	4.0	Sandy Lean CLAY (CL)	98	26	0.130	0.020	8.0
⊠	TP- 5	2.0	Sandy Lean CLAY (CL)	102	18	0.120	0.010	8.0
▲	TP- 8	2.5	Sandy SILT (ML)	96	16	0.130	0.010	5.0
★	TP-15	3.0	Lean CLAY (CL)	87	26	0.130	0.020	7.0
⊙	TP-16	2.0	Sandy Lean CLAY (CL)	101	19	0.130	0.010	8.0

B_CONSOL 00300-043.GPJ IGES.GDT 5/7/08

IGES

1-D CONSOLIDATION TEST

Geotechnical Investigation
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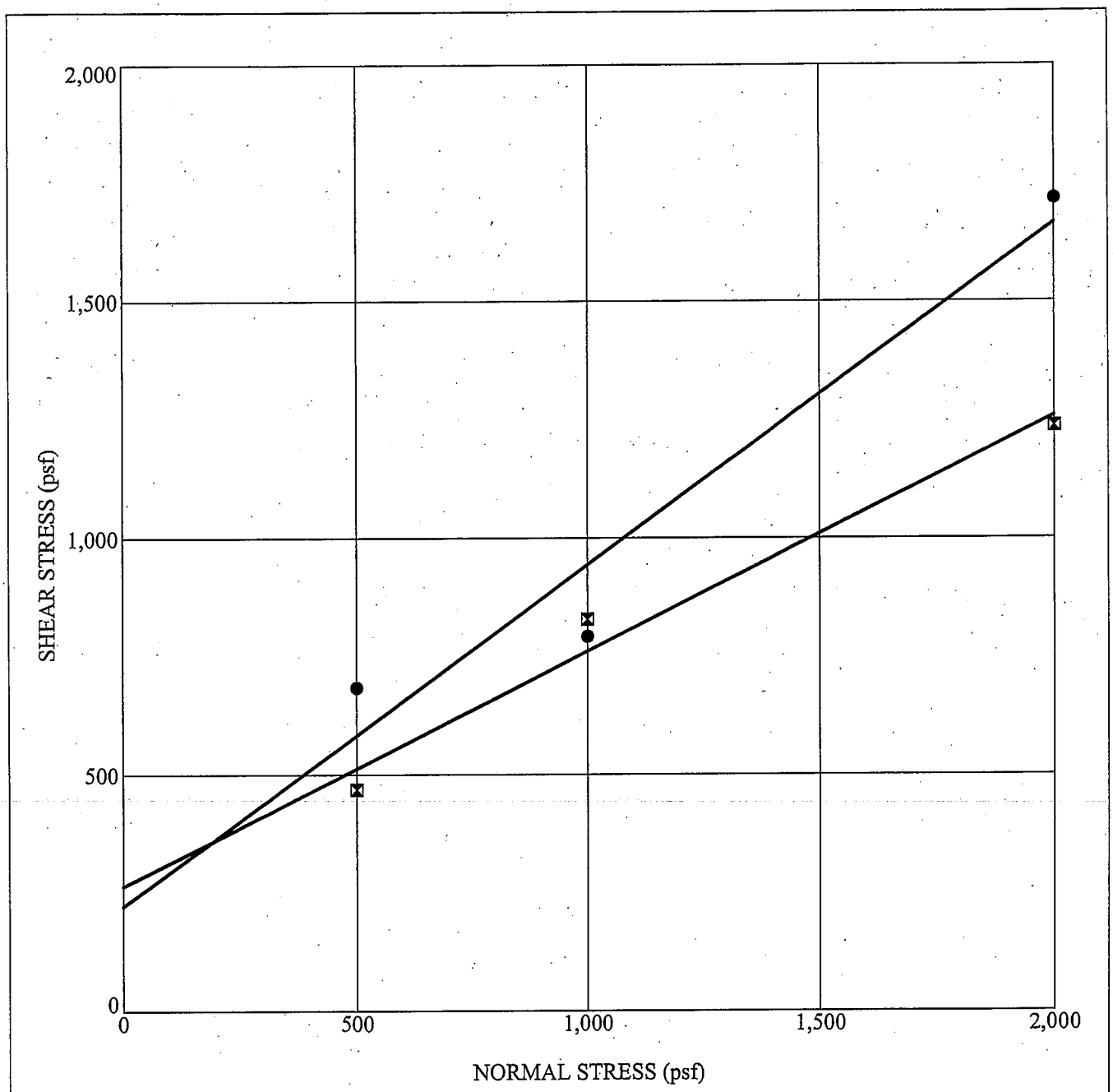
Plate

B - 4



	Sample Location	Depth (ft)	Classification	γ_d (pcf)	MC (%)	c (psf)	ϕ (deg)
●	TP-14	2.5	Silty SAND (SM)	105	11	222	36
⊠	TP-28	6.0	Lean CLAY (CL)	92	27	264	26

B_DIRECT_SHEAR 00300-043.GPJ IGES.GDT 5/7/08

IGES

DIRECT SHEAR TEST

Geotechnical Investigation
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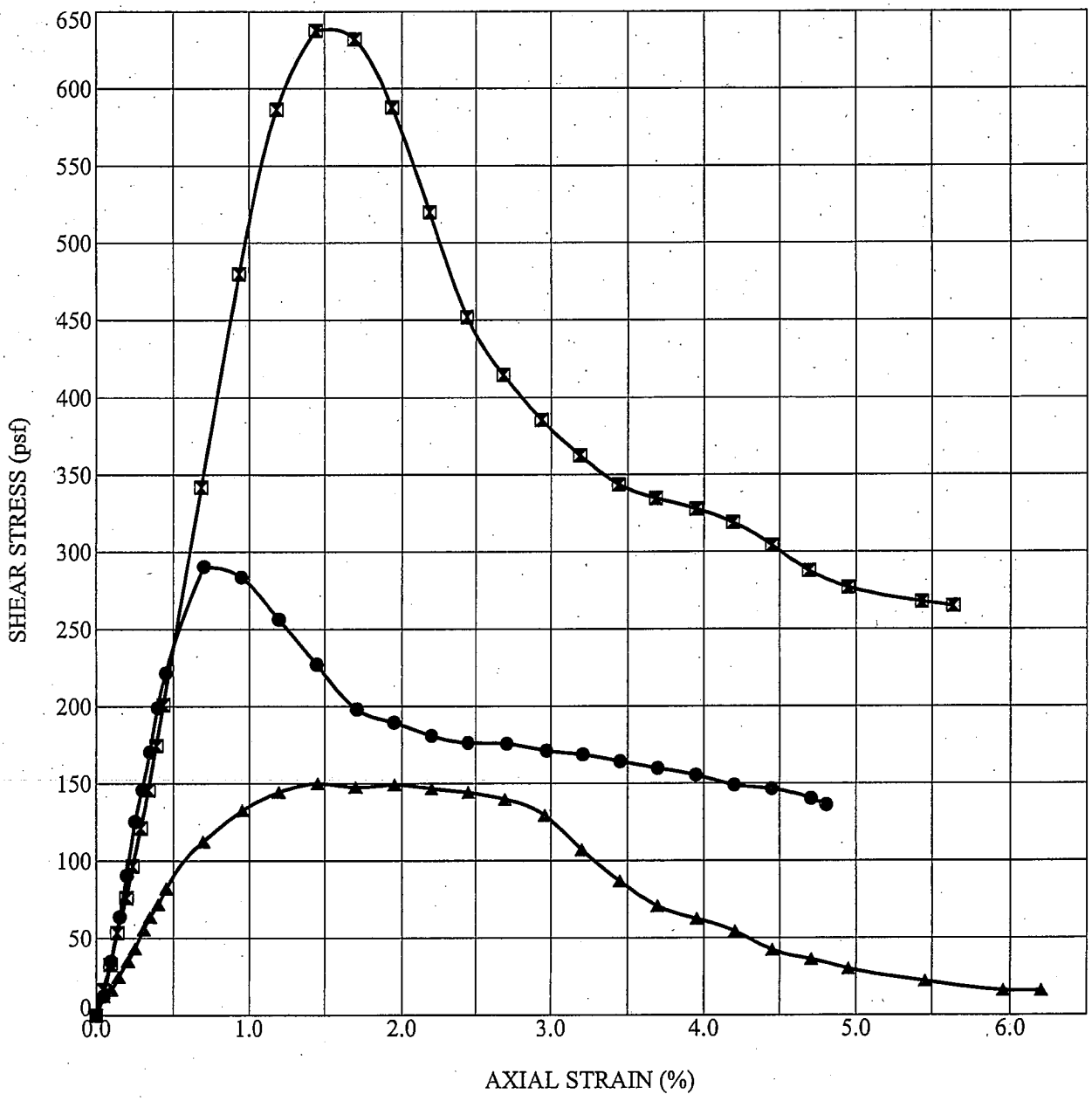
Plate

B - 5



*SHEAR STRESS is equal to one half of the DEVIATOR STRESS

	Sample Location	Depth (ft)	Classification	γ_d (pcf)	MC (%)	Max. Shear Stress (psf)
●	TP-17	4.0	Silty SAND (SM)	90	24	290
⊠	TP-22	3.5	Lean CLAY (CL)	91	27	638
▲	TP-29	4.0	Silty SAND with gravel (SM)	91	9	150

B_UNCONFINED 00300-043.GPJ IGES.GDT 5/7/08

IGES

UNCONFINED COMPRESSION TEST

Geotechnical Investigation
Proposed Northeast Bench Subdivision
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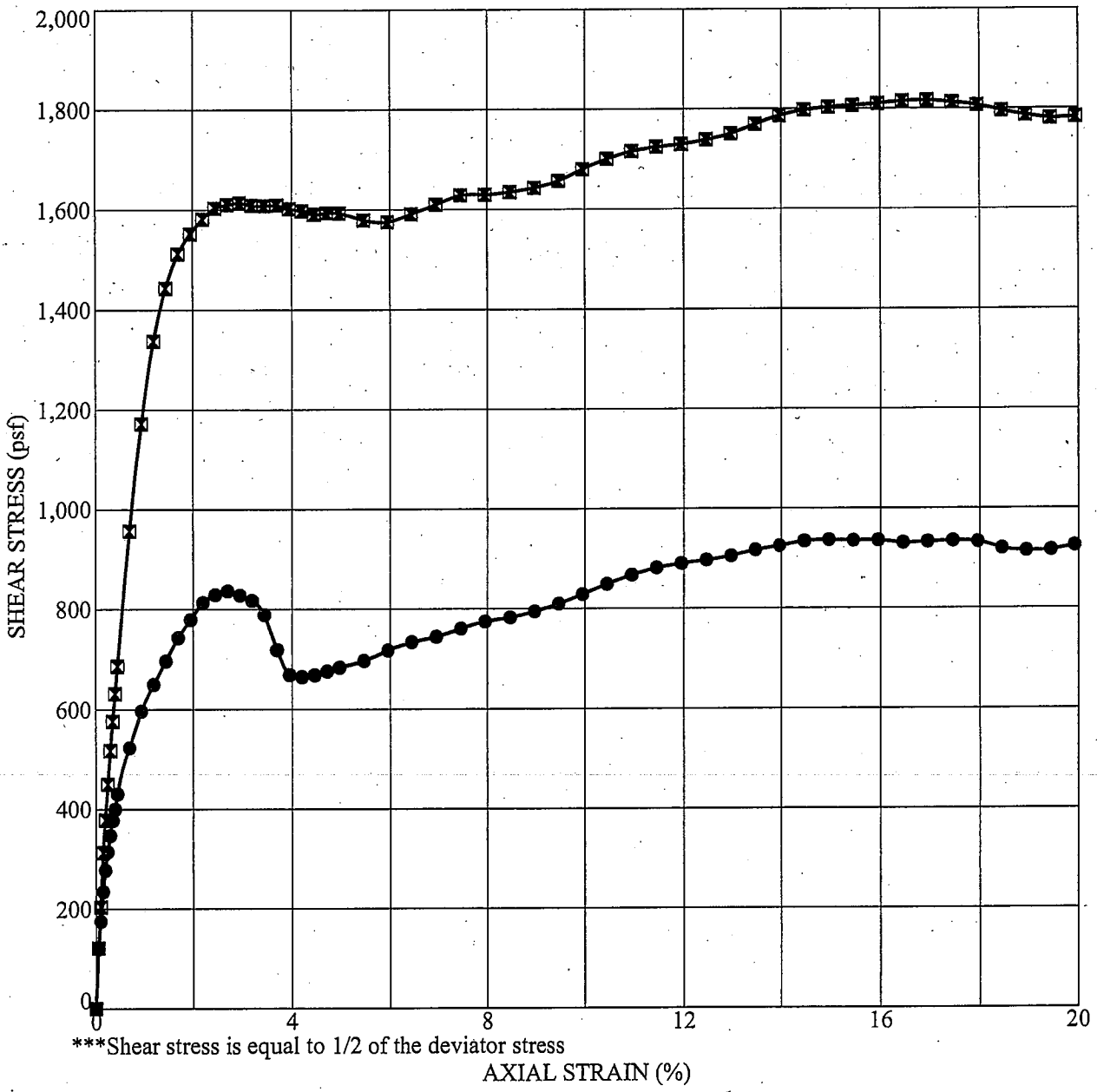
Plate

B - 6



	Sample Location	Depth (ft)	Classification	γ_d (pcf)	MC (%)	Maximum Shear Stress (psf)
●	TP-12	3.0	Silty SAND (SM)	90	15	936
⊠	TP-25	5.5	Lean CLAY (CL)	97	23	1803

TRIAX (PLATE B-) 00300-043.GPJ IGES.GDT 5/7/08

IGES

UU TRIAXIAL TEST

Geotechnical Investigation
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Plate

B - 7

Source of Material: TP-21 0.5 ft.

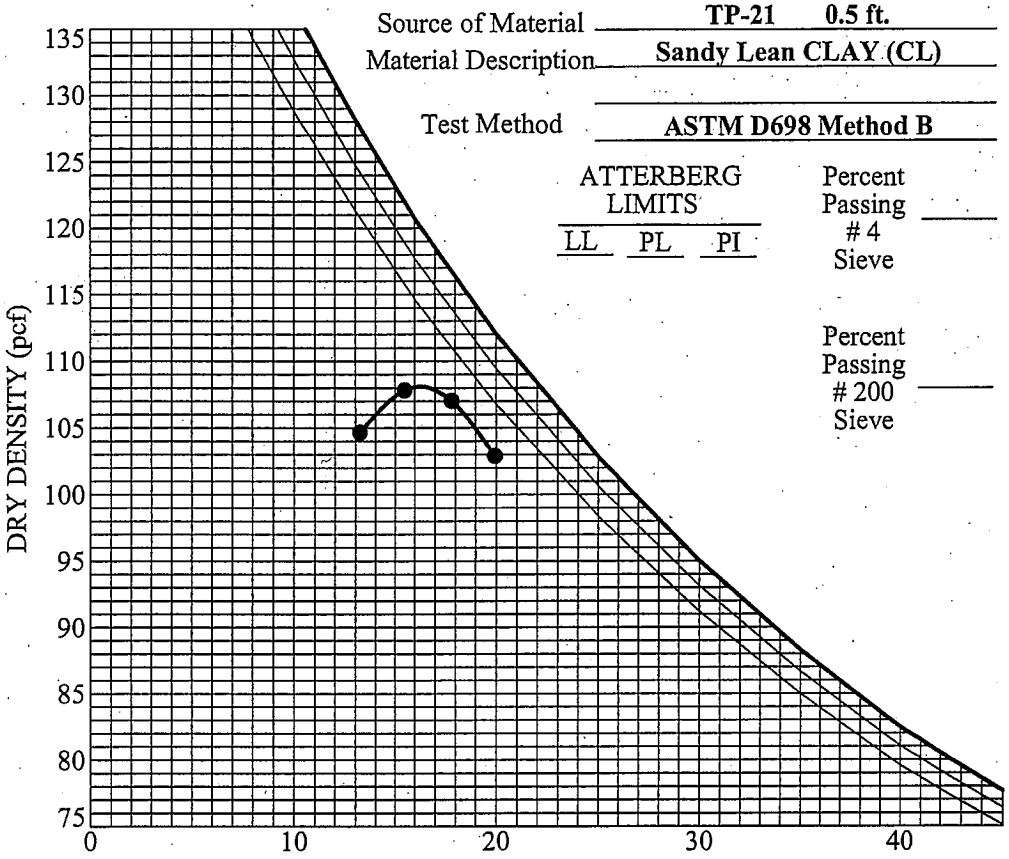
Material Description: Sandy Lean CLAY (CL)

Test Method: ASTM D698 Method B

ATTERBERG LIMITS: LL ____ PL ____ PI ____

Percent Passing # 4 Sieve: ____

Percent Passing # 200 Sieve: ____

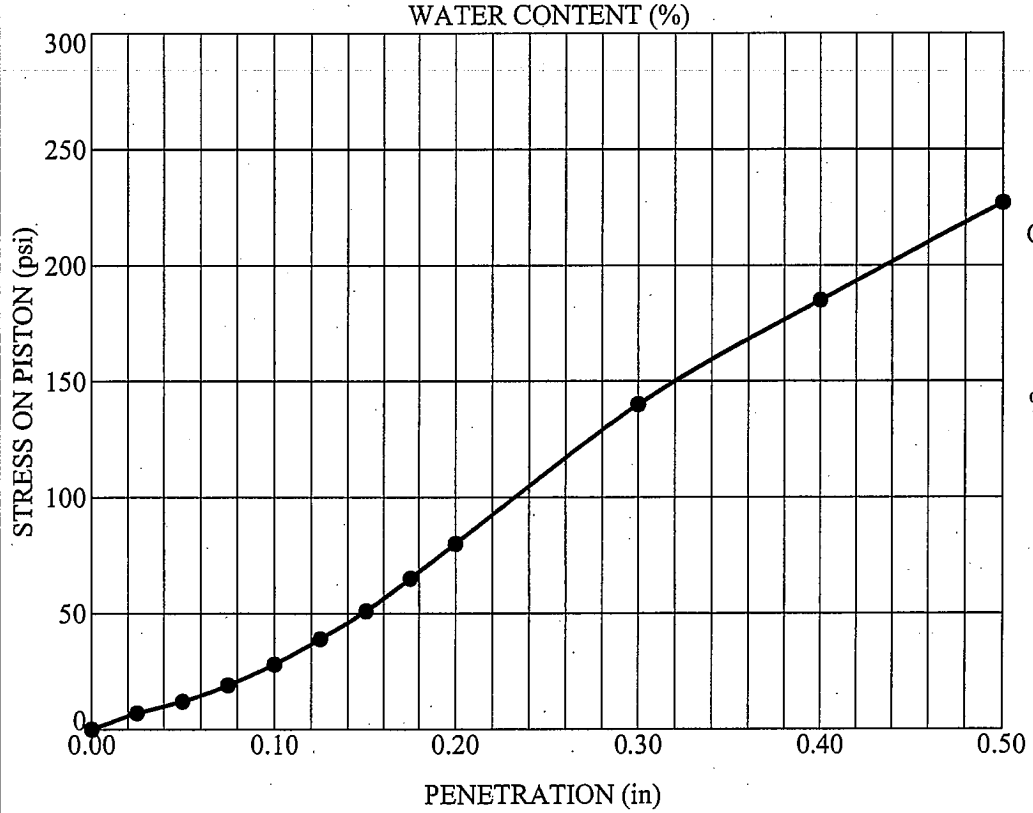


TEST RESULTS

Maximum Dry Density	108.8 (pcf)
Optimum Water Content	16.5 (%)
Percent Rock	____ (%)
Corrected Maximum Dry Density	____ (pcf)
Corrected Optimum Water Content	____ (%)

Curves of 100% Saturation for Specific Gravity Equal to:

2.60, 2.70, 2.80



Dry Density	108.8 (pcf)
Relative Compaction	100 (%)
Surcharge	50 (psf)
% Standard CBR	5.00
Swell	0.98 (%)

B_COMPACTION SPLIT 00300-043.GPJ IGES.GDT 5/7/08

IGES

COMPACTION AND CBR TEST

Geotechnical Investigation
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Plate

B - 8a

Source of Material: TP-28 2.0 ft.

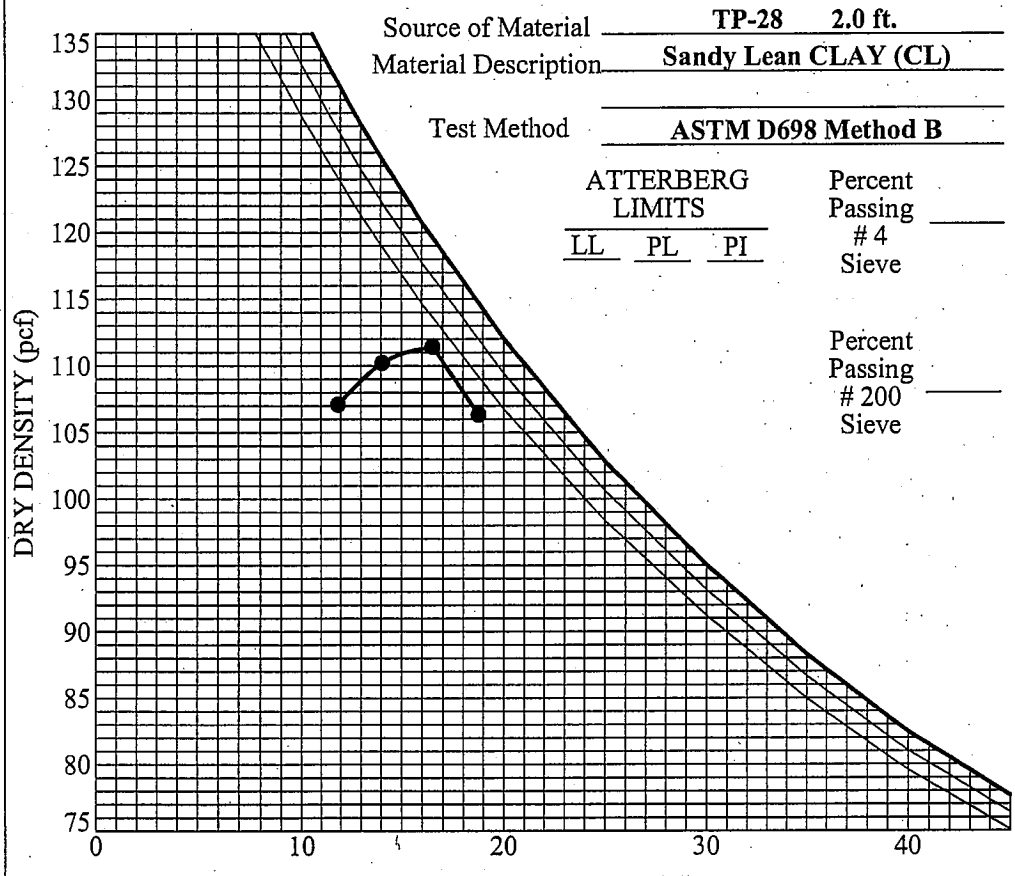
Material Description: Sandy Lean CLAY (CL)

Test Method: ASTM D698 Method B

ATTERBERG LIMITS: LL ____ PL ____ PI ____

Percent Passing #4 Sieve: ____

Percent Passing #200 Sieve: ____

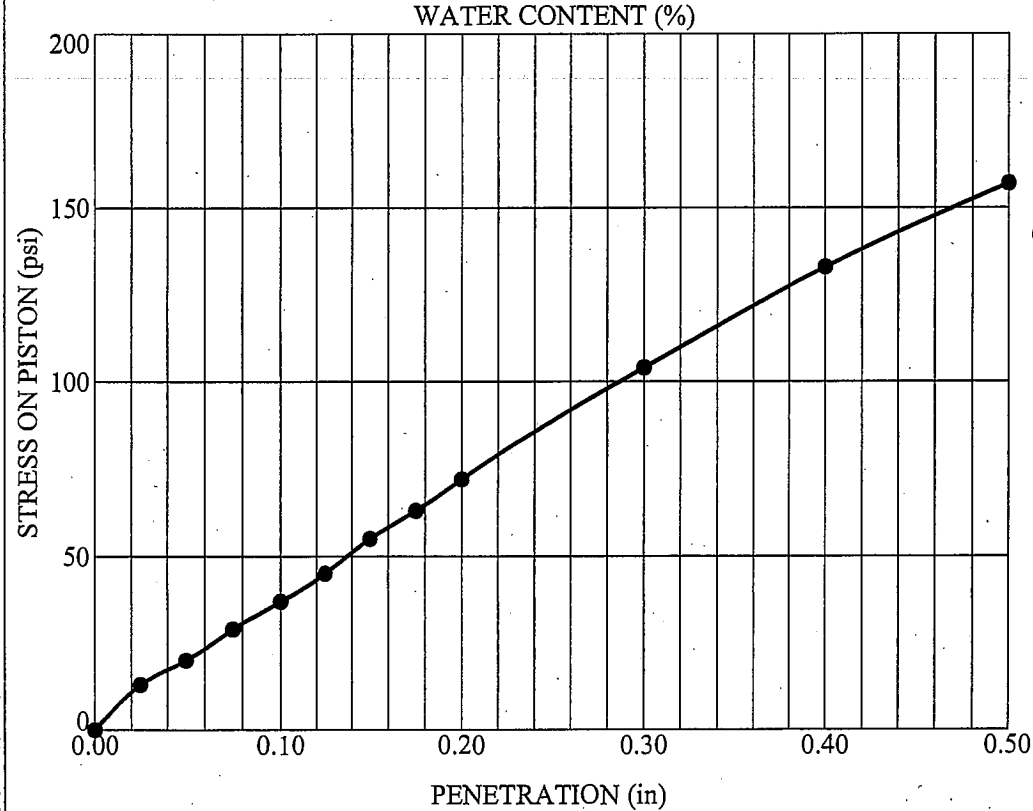


TEST RESULTS

Maximum Dry Density	112.5 (pcf)
Optimum Water Content	15.8 (%)
Percent Rock	____ (%)
Corrected Maximum Dry Density	____ (pcf)
Corrected Optimum Water Content	____ (%)

Curves of 100% Saturation for Specific Gravity Equal to:

2.60, 2.70, 2.80



Dry Density	112.5 (pcf)
Relative Compaction	100 (%)
Surcharge	50 (psf)
% Standard CBR	3.70
Swell	0.11 (%)

B_COMPACTION SPLIT 00300-043.GPJ IGES.GDT 5/7/08

IGES

COMPACTION AND CBR TEST

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Plate B - 8b

Spanish Fork Subdivision 43

SAMPLE LOCATION				GRADATION (%)			ATTERBERG LIMITS	
Point No.	Depth (ft)	NATURAL DRY DENSITY (pcf)	NATURAL MOISTURE CONTENT %	Gravel ≥#4	Sand	Silt and Clay <#200	Liquid Limit	Plasticity Index
TP-1	3	84.2	24.1					
TP-2	4		23.4				30	11
TP-3	1		18.7				24	5
	4	97.5	26.3					
TP-4	1	107.8	19.1					
	5		14.9				34	15
TP-5	2	101.6	18.2					
TP-6	1		13.1					
	3	97.6	13.4					
TP-7	4		14.6	0	59.7	40.3		
TP-8	2.5	95.9	16.3					
TP-9	2		11.1					
TP-10	3		18.3				27	10
	7		4.8					
TP-11	6		29					
TP-12	2		9.6					
	3	89.6	14.5					
TP-14	2.5	104.7	11.3					
TP-15	3	87.2	25.6					
	5		5.1					
TP-16	2	100.6	18.5					
TP-17	1		24				31	11
	4	90	23.6					
TP-18	0.5	96.1	18.6				29	12
TP-19	2	97.6	16.9					
	4		19.5				27	11
TP-21	0.5							
	1	92.5	14.5				27	9
	5		4.1					
TP-22	3.5	91	27.1					
TP-23	2		8.9					
	4		4.3	62	35.2	2.8		)
	6	89.8	11.8					
TP-24	3	88.4	27.8					
TP-25	3	86.6	24.4				33	11
	5.5	97.2	22.8					
TP-26	1		10.1					
TP-27	4		5.3					
TP-28	2		14.7					
	2.5	95.8	18.9				26	11
	6	92.3	26.5					
TP-29	0.5							
	4	91	9.3					

SUMMARY OF GEOLOGIC HAZARDS

Northeast Bench Subdivision, Spanish Fork, Utah **Project Number 00300-043**

Hazard	Hazard Rating*				Further Study Recommended**
	Not Assessed	Probable	Possible	Unlikely	
Earthquake					
Ground Shaking		X			See Geotechnical Report
Surface Faulting				X	
Tectonic Subsidence				X	
Liquefaction	X		X		See Geotechnical Report
Slope Stability				X	
Flooding (Including Seiche)				X	
Slope Failure					
Rock Fall				X	
Landslide				X	
Debris Flow				X	
Avalanche				X	
Problem Soils					
Collapsible			X		
Soluble				X	
Expansive				X	
Organic				X	
Piping				X	
Non-Engineered Fill			X		See Geotechnical Report
Erosion				X	
Active Sand Dune				X	
Mine Subsidence				X	
Shallow Bedrock				X	
Shallow Groundwater			X		See Geotechnical Report
Flooding					
Streams			X		See Geotechnical Report
Alluvial Fans				X	
Lakes				X	
Dam Failure				X	
Canals/Ditches			X		
Radon	X				

* Hazard Rating :
Not assessed - report does not consider this hazard and no inference is made as to the presence or absence of the hazard at the site
Probable -Evidence is strong that the hazard exists and mitigation measures should be taken
Possible - hazard may exist, but the evidence is equivocal, based only on theoretical studies, or was not observed and furthes study is necessary as noted
Unlikely - no evidence was found to indicate that the hazard is present, hazard not known or suspected to be present

Further Study :
E - geotechnical/engineering, H - hydrologic, A - Avalanche, G - Additional detailed geologic hazard study out of the scope of this study

Plate
C-2