

**GEOTECHNICAL STUDY
CASCADES AT SOLDIER
HOLLOW SUBDIVISION
856 SOUTH STRINGTOWN ROAD
MIDWAY, UTAH**

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Y² JOB NUMBER: 06G-13

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TABLE OF CONTENTS
Y² JOB NUMBER: 06G-13

1.0	INTRODUCTION	1
2.0	PROPOSED CONSTRUCTION	1
3.0	CONCLUSIONS	2
4.0	SITE CONDITIONS	3
5.0	FIELD INVESTIGATION	3
6.0	LABORATORY TESTING	3
7.0	SUBSURFACE CONDITIONS	4
8.0	SITE GRADING	4
8.1	<u>General Site Grading</u>	4
8.2	<u>Excavations</u>	4
8.3	<u>Structural Fill</u>	5
8.4	<u>Backfill</u>	5
8.5	<u>Fill Placement and Compaction</u>	5
8.6	<u>Stabilization</u>	7
9.0	SEISMIC CONSIDERATIONS	8
9.1	<u>Faulting</u>	8
9.2	<u>Seismic Design Criteria</u>	8
9.3	<u>Liquefaction</u>	8
10.0	FOUNDATIONS	9
10.1	<u>Footing Design</u>	9
10.2	<u>Estimated Settlement</u>	10
11.0	LATERAL EARTH PRESSURES	10
12.0	FLOOR SLABS	11
13.0	SURFACE DRAINAGE	12
14.0	PAVEMENT SECTION DESIGN	12
15.0	SOIL PERCOLATION	13
16.0	GENERAL CONDITIONS	13

TABLE OF CONTENTS CONTINUED
Y² JOB NUMBER: 06G-13

TABLES

TABLE 1: STRUCTURAL FILL COMPACTION 6
TABLE 2: LATERAL EARTH PRESSURES 11

FIGURES

FIGURE 1 : VICINITY MAP
FIGURE 2 : SITE PLAN SHOWING LOCATION OF TEST PITS
FIGURE 3: POCKET GPS TEST PIT COORDINATES
FIGURES 4 THRU 23 : TEST PIT LOGS

LABORATORY RESULTS

CONSOLIDATION TEST RESULTS (5 pages)
GRAIN SIZE DISTRIBUTIONS (4 pages)
ATTERBERG LIMITS TESTS
SUMMARY OF LABORATORY TESTING

APPENDIX A

PERCOLATION TEST RESULTS

1.0 INTRODUCTION

This report presents the results of a geotechnical investigation for the proposed subdivision to be located at approximately 856 South Stringtown Road in Midway, Utah. The general location of the site, with respect to existing roadways, is shown on Figure No. 1, *Vicinity Map*, at the end of this report.

This investigation was done to assist in evaluating the subsurface conditions and engineering characteristics of the foundation soils and in developing our opinions and recommendations concerning appropriate foundation types, floor slabs, and pavements. This report presents the results of our geotechnical investigation including field exploration, laboratory testing, engineering analysis, and our opinions and recommendations. Data from the study is summarized on Figures 4 thru 23 and in the Laboratory Results.

2.0 PROPOSED CONSTRUCTION

We understand that the proposed development will consist of a single family home subdivision. It is anticipated that these buildings will consist of single and multi-story structures both with and without basements. We estimate that the maximum loads for the proposed structures will not exceed 4 kips per linear foot for bearing walls, 50 kips for columns, and 150 to 200 pounds per square foot for floor slabs. If structural loads are significantly greater than those discussed herein or if the project is substantially different than described above, our office should be notified so that we may review our recommendations, and if necessary, make modifications.

In addition to the structures described above it is anticipated that utilities will be constructed to service the buildings, that exterior concrete flatwork will be placed in the form of curb and gutter, and sidewalks, and that asphalt concrete paved roads will be constructed.

3.0 CONCLUSIONS

The following is a brief summary of our findings and conclusions:

1. The subject site is suitable for the proposed construction provided the recommendations presented in this report are followed.
2. Based upon the 20 test pits excavated for this investigation, this site is covered with 18 to 26 inches of topsoil. The native soils below the topsoil generally consist of areas of stiff lean clay (CL), lean clay with sand (CL), sandy silty clay (CL-ML), sandy lean clay (CL), sandy lean clay with gravel (CL), and medium dense to dense clayey sand (SC), silty gravel with sand (GM), silty sand with gravel (SM), silt with sand (ML), poorly graded gravel with silt and sand (GP-GM) and poorly graded gravel with clay and sand (GP-GC) which extended to the maximum depth investigated (10 ft). Water was not encountered in any of our test pits at the time of this investigation.
3. Conventional strip and spread footings are recommended for supporting the proposed structures. Footings founded on the undisturbed native soils may be designed using a maximum bearing capacity of 2,000 psf. More detailed information pertaining to the construction of foundations is provided in Section 10.0, Foundations of this report.
4. The native soils in the top 4 feet at this site classified as A-4, A-6, and A-7-5 materials according to the AASHTO M-145. Therefore, residential pavements should consist of 3 inches of asphalt and 11 inches of untreated aggregate base placed directly on the native subgrade or 3 inches of asphalt, 6 inches of untreated aggregate base and 8 inches of granular borrow placed directly on the native subgrade material. Additional pavement recommendations are stated in Section 14.0 of this report.
5. Percolation testing was performed for the storm water sumps to be located throughout this subdivision. Percolation rates varied from 3.6 to 40.0 minutes per inch of drop depending on the location throughout the subdivision with an average of 13.4 minutes per inch. The percolation test results are attached at the end of this report.
6. This investigation was performed with test pits. Section 10.0 of this report provides specific requirements for placement of structures near test pit locations.

4.0 SITE CONDITIONS

The site is an irregular shaped parcel of land located at approximately 856 South Stringtown Road in Midway, Utah. The site located at the base of the foothills for the Wasatch Mountain Range with a downward grade to the east at 3 to 6 percent. The site is currently an alfalfa field which is irrigated with above ground sprinklers. At the time of our investigation the site was covered with 14 to 24 inches of snow, however, no standing or surface water was noticed on the site at the time of our investigation. The site is surrounded to the north, west, and south by fields with occasional houses, and to the east by houses, a dairy farm, and Stringtown Road.

5.0 FIELD INVESTIGATION

The field investigation consisted of excavating 20 test pits to depths between 9 ½ and 10 feet below current site grades at the approximate locations shown on Figure 2, at the end of this report. Percolation tests were performed in 13 of the test pits. The soils encountered at the site were continuously logged by qualified member of our geotechnical staff. Both disturbed and relatively undisturbed samples were obtained and returned to our laboratory for testing.

6.0 LABORATORY TESTING

The samples obtained during the field investigation were sealed and returned to our laboratory where samples were selected for laboratory testing. Laboratory tests included natural moisture and density determinations, Atterberg Limits tests, grain size distribution analyses, and consolidation tests. The results of these tests are shown at the end of this report.

Samples will be retained in our laboratory for 30 days following the date of this report at which time they will be disposed of unless a written request for additional holding time is received prior to the disposal date.

7.0 SUBSURFACE CONDITIONS

Based upon the 20 test pits excavated for this investigation, this site is covered with 18 to 26 inches of topsoil. The native soils below the topsoil generally consist of areas of stiff lean clay (CL), lean clay with sand (CL), sandy silty clay (CL-ML), sandy lean clay (CL), sandy lean clay with gravel (CL), and medium dense to dense clayey sand (SC), silty gravel with sand (GM), silty sand with gravel (SM), silt with sand (ML), poorly graded gravel with silt and sand (GP-GM) and poorly graded gravel with clay and sand (GP-GC) which extended to the maximum depth investigated (10 ft). Water was not encountered in any of our test pits at the time of this investigation.

Graphical representations of the soil conditions encountered are shown on the Test Pit Logs, Figures 4 thru 23. The stratification lines shown on the logs represent the approximate boundaries between soil units; the actual transition may be gradual.

8.0 SITE GRADING

8.1 General Site Grading

Prior to construction unsuitable soils and vegetation should be removed from below areas which will ultimately support structural loads. This includes areas below foundations, floor slabs, exterior concrete flatwork, and asphaltic concrete paved roads. Unsuitable soils consist of topsoil, organic soils, undocumented fill, soft, loose or disturbed native soils, and any other deleterious materials. Topsoil was encountered to a maximum depth of 24 inches at the test pit locations. The topsoil, any uncontrolled fill, and any other unsuitable soils should be completely removed.

8.2 Excavations

Due to the nature of the soils at this site temporary construction slopes for excavations into the native soils less than five feet in depth may be near vertical. Excavations deeper than five feet should be sloped at 0.5:1.0 (horizontal:vertical). If unstable conditions or groundwater seepage are

encountered, flatter slopes or shoring and bracing may be required. All excavations should meet applicable OSHA¹ Health and Safety Standards for type B soils.

8.3 Structural Fill

If fill is needed, all fill placed below the buildings, pavements, and concrete flatwork should be compacted structural fill. All other fills should be considered as backfill. Structural fill below any building should consist of the native gravel soils or imported structural material. Structural fill below pavements and concrete flatwork may consist of all native soils or imported structural material. The native clay and silt soils contain too many fines and are too cohesive for use as structural fill below buildings and should not be used. Imported structural fill material should consist of well-graded sandy gravels with a maximum particle size of 3 inches and 5 to 15 percent fines (materials passing the No. 200 sieve). The liquid limit of the fines should not exceed 35 and the plasticity index should be below 15. Clean gravel ranging from pea gravel to 6 inches with less than 5 percent fines and sand combined may also be used as structural fill as long as the gravel is wrapped with a separator fabric such as Mirafi 140N. All fill soils should be free from topsoils, highly organic material, frozen soil, and other deleterious materials.

8.4 Backfill

The native soils may be used as backfill in utility trenches and against outside foundation walls. Backfill, not under structural elements, should be placed in lift heights suitable to the compaction equipment used and compacted to at least 90 percent of the maximum dry density (ASTM D 1557).

8.5 Fill Placement and Compaction

The thickness of each lift should be appropriate for the compaction equipment that is used. We recommend a maximum lift thickness of 6 inches for hand operated equipment, 8 inches for most “trench compactors”, and 12 inches for larger rollers, unless it can be demonstrated by in-place

¹ Occupational Safety and Health Administration

density tests that the required compaction can be obtained throughout a thicker lift. The full thickness of each lift of structural fill placed should be compacted to least the percentages of the maximum dry density indicated in Table 1 below, as determined by ASTM D-1557:

TABLE 1: STRUCTURAL FILL COMPACTION

Structural fill	Percent of Maximum Dry Density
Below foundations, flatwork, and pavements:	95%
For fills thicker than 6 feet:	98%
In landscape areas not supporting structural loads:	90%

Generally, placing and compacting fill at a moisture content within 2% of the optimum moisture content, as determined by ASTM D-1557, will facilitate compaction. The further the moisture content is from the optimum, the more difficult it will generally be to achieve the required compaction.

Clean gravel fill used as structural fill may be placed in loose lifts up to 2 feet thick. The gravel will need to be compacted with at least 4 passes of a heavy vibratory plate or slow moving vibratory smooth drum compactor. Typically, the gravel will settle 1 to 3 inches when properly compacted, depending on the size and shape of the gravel. Gravel compaction should be verified by either an engineer from Y² Geotechnical or a materials testing technician trained in proper gravel placement techniques.

We recommend that fill be tested frequently during placement. Early testing is recommended to demonstrate that placement and compaction methods are achieving the required compaction for the entire depth of fill. It is the contractor's responsibility to ensure that fill materials and compaction efforts are consistent so that tested areas are representative of the entire fill.

8.6 Stabilization

The native soils at the site may be susceptible to rutting and pumping. The likelihood of rutting and/or pumping, and the depth of disturbance, is proportional to the moisture content in the soil, the load applied to the ground surface, and the frequency of the load. Consequently, rutting and pumping can be minimized by avoiding concentrated traffic, minimizing the load applied to the ground surface by using lighter equipment and/or partial loads, by working in dry times of the year, or by providing a working surface for equipment.

The soil in any obvious soft spots should be removed and replaced with granular material. If rutting occurs traffic should be stopped in the area of concern and the soil should be removed and replaced with granular material. In areas where pumping occurs the soil should either be allowed to sit until pore pressures dissipate (several hours to several days) and the soil firms up, or be removed and replaced with granular material. Typically, we recommend removal to a minimum depth of 18 inches. Depending on the amount of unstable soil, removal and replacement to a greater depth may be required.

For granular material, we recommend using angular well-graded gravel, such as pit run, or crushed rock with a maximum particle size of six inches. We suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor. A finer granular material such as sand, gravelly sand, sandy gravel or road base may also be used. The more angular and coarse the material, the thinner the lift that will be required. We recommend that the fines content (percent passing the no. 200 sieve) be less than 15%, the liquid limit be less than 35, and the plastic index less than 15.

Using a geosynthetic fabric such as Mirafi 600x, or an approved equivalent, will also reduce the amount of material required and avoid mixing of the granular material and the subgrade. If a fabric is used, following removal of disturbed soils and water, the fabric should be placed over the bottom

and up the sides of the excavation. The fabric should be placed in accordance with the manufacturer's recommendations, including proper overlaps. The granular material should be placed over the fabric in compacted lifts. Again, we suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor.

9.0 SEISMIC CONSIDERATIONS

9.1 Faulting

Based on published data, no active faults are known to traverse the site and no faulting was indicated during our field investigation. The nearest known active fault is the Wasatch Fault located about 14½ miles west of the property².

9.2 Seismic Design Criteria

The residential structures should be designed in accordance with IRC building code. Based on section R301.2.2 of the IRC this site is classified as a Seismic Design Category D₂.

9.3 Liquefaction

Liquefaction is a phenomenon where soils lose their intergranular strength due to an increase of pore pressures during a dynamic event such as an earthquake. The potential for liquefaction is based on several factors, including 1) the grain size distribution of the soil, 2) the plasticity of the fine fraction of the soil (material passing the No. 200 sieve), 3) relative density of the soil, 4) earthquake strength (magnitude) and duration, and 5) overburden pressures. In addition, the soils must be near saturation for liquefaction to occur.

Due to the type of subsurface investigation conducted for this project, we are unable to perform a liquefaction analysis for this site. It is possible, although unlikely, that there are deeper sands on this

² Hecker, Suzanne, Utah Geologic Survey, "Quaternary Faults and Fold, Utah Bulletin 127, 1993

site which are susceptible to liquefaction and significant settlement in excess of one inch could be expected during a strong seismic event. To adequately evaluate the liquefaction potential at the site, a boring at least 30 feet deep would need to be drilled. Y² Geotechnical would be happy to provide this additional service upon request.

10.0 FOUNDATIONS

10.1 Footing Design

The native soils at this site are capable of supporting the proposed structures if the recommendations presented in this report are followed. The recommendations presented below should be utilized during design and construction of this project:

1. Conventional strip and spread footings are recommended for supporting the proposed structures. Footings founded on the undisturbed native soils may be designed using a maximum bearing capacity of 2,000 psf. A one-third increase is allowed for short term transient loads such as wind and seismic events. Footings should be uniformly loaded.
2. Continuous and spot footings should have minimum widths of 18 and 36 inches, respectively.
3. Exterior footings should be placed below frost depth which is determined by local building codes. Generally 36 inches is adequate in this area. Interior footings, not subject to frost, should extend at least 18 inches below the lowest adjacent final grade.
4. Foundation walls on continuous footings should be well reinforced both top and bottom. We suggest a minimum amount of steel equivalent to that required for a simply supported span of 12 feet.
5. This investigation was preformed with test pits. If a structure is constructed over an uncompacted test pits significant amounts of differential settlement may occur. Test pits typically disturb an area 10 to 20 feet long and 3 to 6 feet wide extending to the depths indicated in the logs. Test pit locations were selected, based the anticipated structure locations, indicated on the attached site plan. If a structure is to be placed within 25 feet of a test pit location, Y² Geotechnical should be contacted to verify the structure is not placed over an uncompacted test pit. If a test pit is encountered within

the building pad, the disturbed test pit soils should be completely removed and properly placed and compacted structural fill should be used to return the test pit location to design grade. Approximate test pit locations are shown on Figure 2, with approximate Pocket GPS coordinates listed on Figure 3, at the end of this report.

6. Footing excavations should be observed by the geotechnical engineer prior to placement of structural fill and construction of footings to evaluate whether suitable bearing soils have been exposed and verify that excavation bottoms are free of loose or disturbed soils.

10.2 Estimated Settlement

If footings are designed and constructed in accordance with the recommendations presented above, the risk of total settlement exceeding 1 inch and differential settlement exceeding 0.5 inch for a 25-foot span will be low. Additional settlement should be expected during a strong seismic event.

11.0 LATERAL EARTH PRESSURES

Resistance to lateral loads (including those due to wind or seismic loads) on foundations may be achieved by frictional resistance between the foundations and underlying soils, and by passive earth pressures of backfill soils placed against the sides of foundations. Retaining walls and below grade walls acting as soil retaining structures and should be designed to resist pressures induced by the backfill soils.

The lateral pressures imposed on a retaining structure are dependant on the rigidity of the structure and its ability to resist rotation. Retaining walls which are free to rotate at least 0.2 percent of the wall height, develop an active lateral soil pressure condition. Structures that are not allowed to rotate or move laterally, develop an at-rest lateral earth pressure condition. Lateral pressures applied to structures may be computed by multiplying the vertical depth of backfill material by the appropriate equivalent fluid density. Any surcharge loads in excess of the soil weight applied to the backfill should be multiplied by the appropriate lateral pressure coefficient and added to the soil pressure. The lateral pressures presented in Table 2, *Lateral Earth Pressures* below, are based on drained,

horizontally placed soils as backfill material. For computing lateral forces we recommend the following equivalent fluid densities:

TABLE 2: LATERAL EARTH PRESSURES

Condition	Static Lateral Pressure Coefficient	Static Equivalent Fluid Pressure (pcf)
Active	0.36	44
At-Rest	0.53	65
Passive	2.77	338

The friction acting along the base of foundations may be computed by using a coefficient of friction of 0.35 for contact with the native soils. These values may be increased by one-third for transient wind and seismic loads.

The values presented above are based on drained conditions and are ultimate, therefore, an appropriate factor of safety (minimum of 2.0) should be applied to these values for design purposes.

12.0 FLOOR SLABS

The native soils below floor slabs should be proof rolled and a minimum 4 inch thick layer of free-draining gravel or imported structural fill should be placed immediately below the floor slab to help distribute floor loads, break the rise of capillary water, and aid in the concrete curing process. For slab design, we recommend a modulus of subgrade reaction of 200 psi/in be used. To help control normal shrinkage and stress cracking, the floor slabs should have adequate reinforcement for the anticipated floor loads with the reinforcement continuous through interior floor joints and frequent crack control joints.

Special precautions should be taken during placement and curing of concrete slabs and flatwork. Excessive slump (high water-cement ratios) of the concrete and/or improper finishing and curing procedures used during hot or cold weather conditions may lead to excessive shrinkage, cracking, spalling, or curling of slabs. We recommend all concrete placement and curing operations be performed in accordance with American Concrete Institute (ACI) codes and columns.

13.0 SURFACE DRAINAGE

Wetting of the foundation soils may cause some degree of volume change within the soil and should be prevented after construction. We recommend that the following precautions be taken at this site:

1. The ground surface should be graded to drain away from the structures in all directions. We recommend a minimum fall of 6 inches in the first 10 feet.
2. Roof runoff should be collected in rain gutters with down spouts designed to discharge well outside of the backfill limits.
3. Sprinkler heads, should be aimed away and kept at least 12 inches from foundation walls.
4. Provide adequate compaction of foundation backfill i.e. a minimum of 90% of ASTM D 1557. Water consolidation methods should not be used.
5. Other precautions which may become evident during design and construction should be taken.

14.0 PAVEMENT SECTION DESIGN

We understand that a flexible pavement is desired for the roads within this development. Unless a more stringent local code is required, we recommend new pavement sections placed directly on the undisturbed native soils consist of 3 inches of asphaltic concrete over 11 inches of untreated aggregate road base or 3 inches of asphaltic concrete over 6 inches of untreated aggregate road base on 8 inches of granular sub-base. The pavement design recommendations were developed using visual and laboratory classification of the on-site soils up to 4 feet in depth, A-4, A-6, and A-7-5 material under AASHTO M-145, an assumed California Bearing Ratio (CBR) of 3 for the supporting native soil, assumed traffic for the residential roadways of 500 vehicles per day with 1

percent being heavier vehicles such as delivery trucks (36,000 equivalent 18-kip loading), the site grading recommendations presented in this report, and the following assumptions:

1. The subgrade is proof rolled to a firm non-yielding condition and soft areas are removed and replaced with structural fill
2. Grading fills below the pavements and granular borrow meet imported structural fill material and placement requirements as defined in Sections 8.3 and 8.5 of this report, respectively;
3. Asphaltic concrete and aggregate base meet UDOT specification requirements;
4. Aggregate base is compacted to at least 95 percent of maximum dry density (ASTM D 1557);
5. Asphaltic concrete is compacted to at least 95 percent of the laboratory Marshal mix design density (ASTM D 1559);
6. Pavement design life of 20 years.

15.0 SOIL PERCOLATION

We understand that the storm drain system for this subdivision will remove water with underground sumps. To facilitate the design of the sumps, percolation testing was performed in 13 of the 20 test pits which were stationed near the proposed sump locations. The percolation tests were performed in 12 to 14 inch deep hand augured holes at 4½ to 5½ feet below existing site grade within the selected test pits. The percolation holes were filled with water and the amount of drop over a 20 minute period was recorded. Percolation rates varied from 3.6 to 40.0 minutes per inch of drop depending on the location throughout the subdivision with an average of 13.4 minutes per inch. The percolation test results are attached in Appendix A.

16.0 GENERAL CONDITIONS

The exploratory data presented in this report was collected to provide geotechnical design recommendations for this project only. Test pits were widely spaced and may not be indicative of

subsurface conditions between the test pits or outside the study area and thus have limited value in depicting subsurface conditions for contractor bidding. If it is necessary to define subsurface conditions in sufficient detail to allow accurate bidding we recommend an additional study be conducted which is designed for that purpose.

A copy of this report should be provided to all builders prior to construction to insure that the builder is aware of the geotechnical recommendation for this development.

Variations from the conditions portrayed in the test pits often occur which are sometimes sufficient to require modifications in the design. If during construction, conditions are found to be different than those presented in this report, please advise us so that the appropriate modifications can be made. An experienced geotechnical engineer or technician should observe fill placement and conduct testing as required to confirm the use of proper structural fill materials and placement procedures.

The geotechnical investigation as presented in this report was conducted within the limits prescribed by our client, with the usual thoroughness and competence of the engineering profession in the area. This report is valid only for the location and project described in the report. No other warranty or representation, either expressed or implied, is intended in our proposals, contracts or reports.

Geotechnical Investigation
Cascades at Soldier Hollow Subdivision
Midway, Utah
March 4, 2006

Page 15

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please call.

Respectfully;
Y² GEOTECHNICAL, P.C.
Not Official Unless Stamped and Dated

R. Jay Yahne, P.E.
Principal Geotechnical Engineer

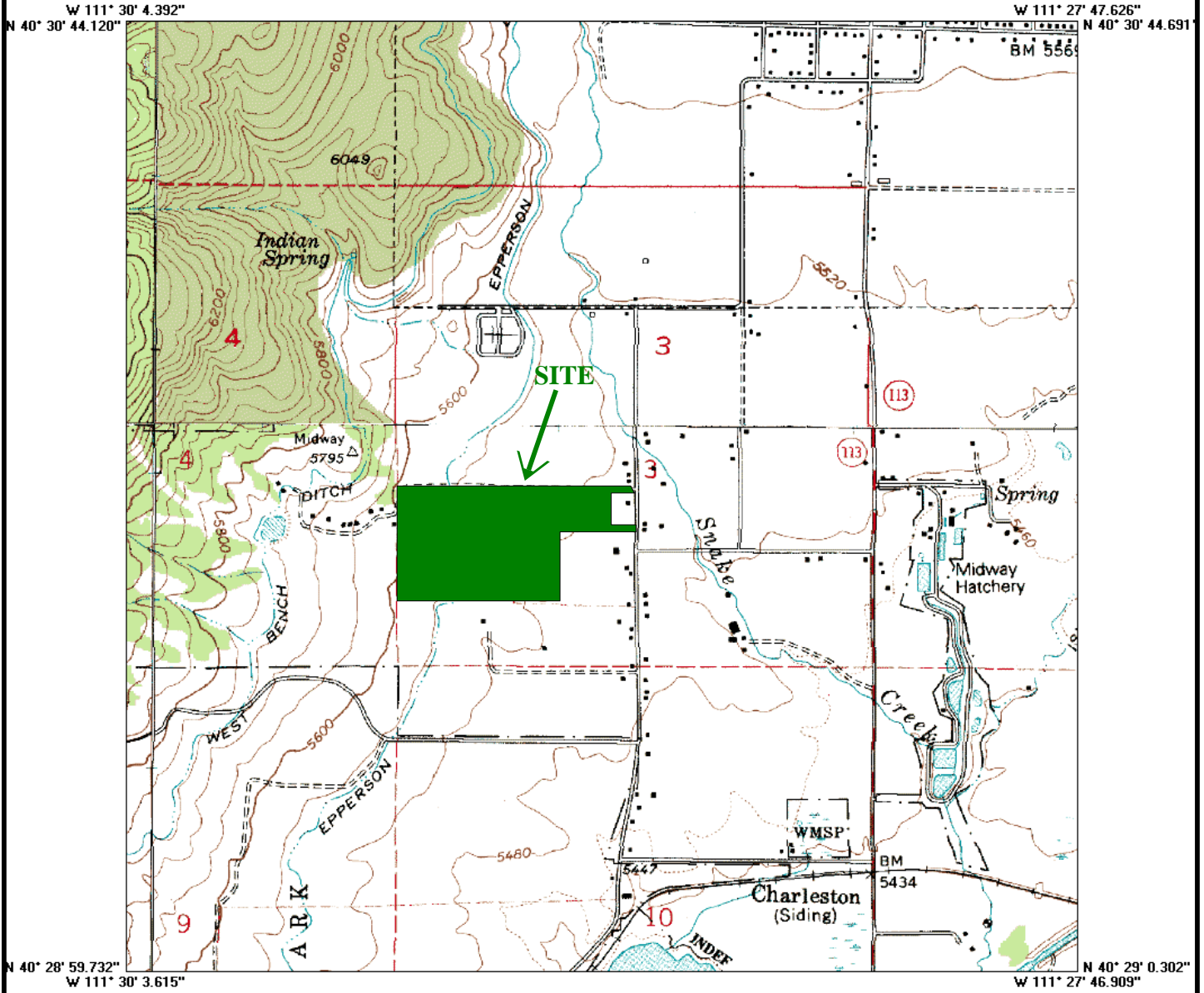
Reviewed by,

Lori S. Yahne, P.E.
Principal Geotechnical Engineer

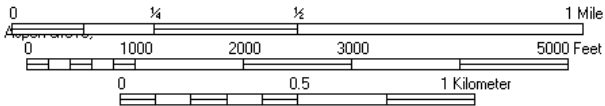
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06E-4

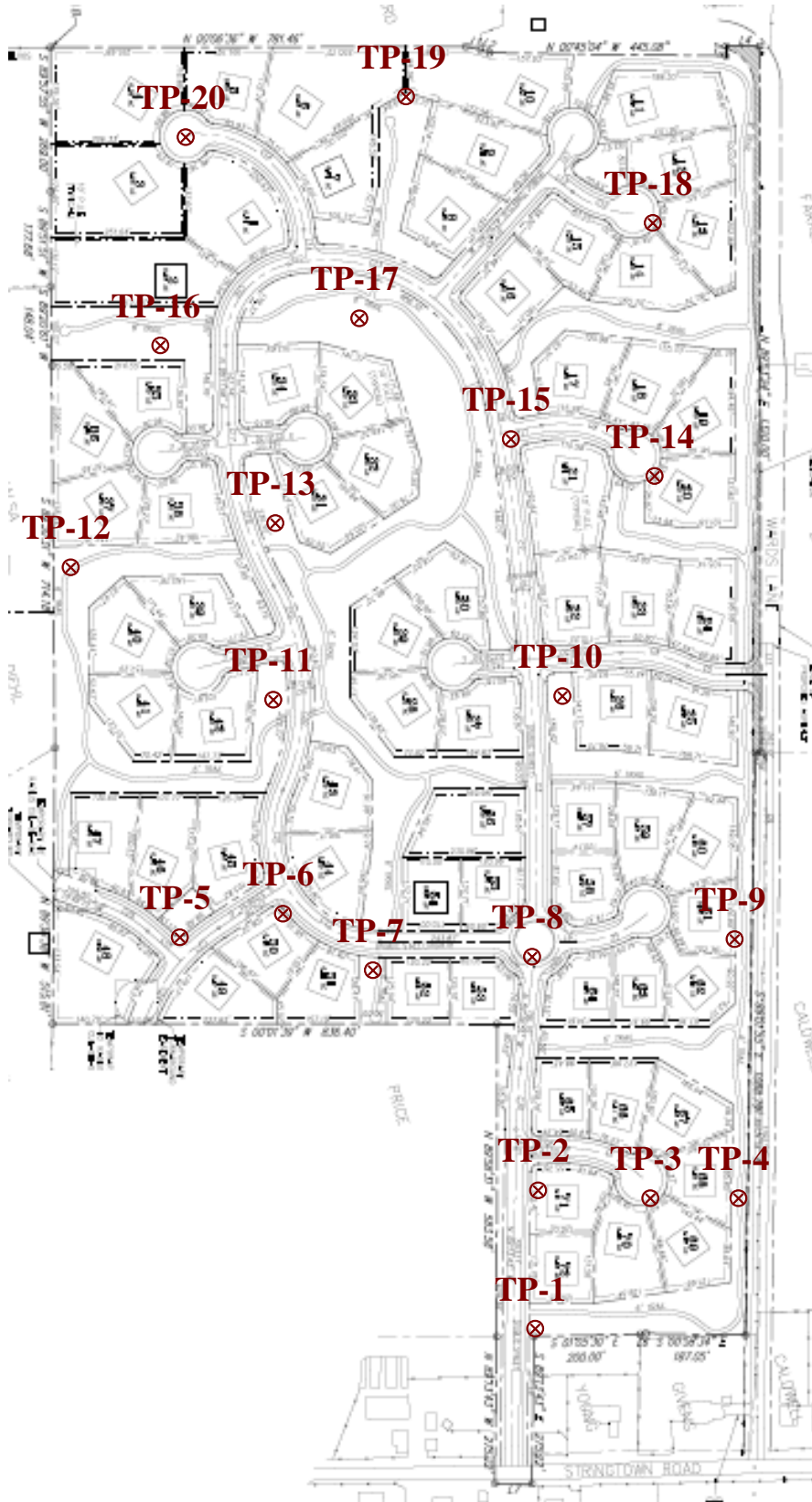


1927 North American Datum; 1,000-meter UTM grid zone 12
Generated by BigTopo (www.igage.com)
Map compiled from USGS Quads: Brighton; UT Heber City; UT
UT Charleston; UT



06E-4

06E-4.IT3'



SITE PLAN SHOWING TEST PIT LOCATIONS

FIGURE 3: POCKET GPS TEST PIT COORDINATES

Test Pit ID	Northing	Easting
TP-01	40.49707°	-111.48238°
TP-02	40.49706°	-111.48296°
TP-03	40.49750°	-111.48311°
TP-04	40.49798°	-111.48313°
TP-05	40.49532°	-111.48507°
TP-06	40.49566°	-111.48534°
TP-07	40.49625°	-111.48504°
TP-08	40.49703°	-111.48500°
TP-09	40.49799°	-111.48500°
TP-10	40.49695°	-111.48671°
TP-11	40.49569°	-111.48675°
TP-12	40.49454°	-111.48751°
TP-13	40.49563°	-111.48840°
TP-14	40.49736°	-111.48827°
TP-15	40.49648°	-111.48833°
TP-16	40.49500°	-111.48903°
TP-17	40.49608°	-111.48926°
TP-18	40.49738°	-111.49003°
TP-19	40.49620°	-111.49043°
TP-20	40.49516°	-111.49040°

Project No. 06G-13

LOG OF TEST PIT NO. TP-01

Figure 4

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Undisturbed Sample
 ✎ Grab Sample

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
0 - 1	[Dotted Pattern]		24" Topsoil - clay with organics, moist, brown.						
1 - 3	[Diagonal Hatching]		Clayey Sand (SC) - crumbly, stiff, moist, brown.						
3 - 4	[Diagonal Hatching]	[Black Box]	Lean Clay with Sand (CL) - stiff, moist, red.	18.4	35	16	0.3	53.7	46.0
4 - 7	[Diagonal Hatching]	[Hand Icon]	With some gravel, minor to moderate pinholes below 7 feet.						
7 - 10	[Diagonal Hatching]	[Hand Icon]	End of test pit at 10 feet. Piezometer installed.						
10 - 14	[Blank]								

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/14/06	FINISHED	2/14/06
None 2/14/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		








Project No. 06G-13

LOG OF TEST PIT NO. TP-02

Figure 5

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
0 - 1			24" Topsoil - clay with organics, moist, brown.							
1 - 3			Clayey Sand (SC) - crumbly, stiff, moist, brown.							
3 - 4										
4 - 6			Lean Clay with Sand (CL) - with minor to moderate pinholes, some gravel, medium stiff, moist, red.							
6 - 7				15.5	98	31	12	4.1	22.9	73.0
7 - 9										
9 - 10										
10 - 14			End of test pit at 10 feet.							

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/14/06	FINISHED	2/14/06
None 2/14/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13

LOG OF TEST PIT NO. TP-03

Figure 6

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet | Graphic Log | Sample Type | Undisturbed Sample | Grab Sample | SOIL DESCRIPTION | Moisture Content, % | Liquid Limit, % | Plasticity Index, % | Gravel, % | Sand, % | Fines, %

1			24" Topsoil - clay with organics, moist, brown.								
2			Lean Clay (CL) - stiff, moist, red brown.								
3											
4											
5											
6			Silty Gravel with Sand (GM) - with occasional clay seams and layers, medium dense, moist, red.								
7											
8											
9			Sandy Lean Clay with Gravel (CL) - with moderate pinholes, stiff moist, red brown.								
10											
10			End of test pit at 10 feet.		16.4	30	11	19.7	20.5	59.8	
11											
12											
13											
14											

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/14/06	FINISHED	2/14/06
None 2/14/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13

LOG OF TEST PIT NO. TP-04

Figure 7

PROJECT

Cascades at Solder Hollow Subdivision

CLIENT

Wasatch Mtn. Development

LOCATION

**865 S. Stringtown Rd.
Midway, UT**

Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
0 - 1		Grab Sample	24" Topsoil - clay with organics, moist, brown.						
1 - 2		Grab Sample	Lean Clay (CL) - stiff, moist, brown to red brown.						
2 - 5		Grab Sample	Silty Gravel with Sand (GM) - medium dense, moist, red brown.	14.8	NP	NP	46.1	27.4	26.5
5 - 8			Silty Sand with Gravel (SM) - moderately cemented with moderate pinholes, medium dense, moist, red brown.						
8 - 10		Grab Sample	End of test pit at 10 feet.						

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS

None 2/14/06

STARTED

2/14/06

FINISHED

2/14/06

EXCAVATION CO.

Eagle Dvlp.

EQUIP.

Backhoe

EXCAVATION TYPE

Backhoe

LOGGED BY

R. Jay Yahne, P.E.

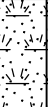




Project No. 06G-13

LOG OF TEST PIT NO. TP-05

Figure 8

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
0 - 1.8			18" Topsoil - clay with organics, moist, brown.						
1.8 - 9.5		 	Lean Clay with Sand (CL) - stiff, moist, red brown. With minor to moderate pinholes below 6 feet. Brown below 7.5 feet.	16.7	37	17	0.3	16.4	83.3
9.5 - 10			End of test pit at 9.5 feet. Piezometer installed.						

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/14/06	FINISHED	2/14/06
None 2/14/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	Ron Yahne		

Project No. 06G-13

LOG OF TEST PIT NO. TP-06

Figure 9

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet | Graphic Log | Sample Type | Undisturbed Sample | Grab Sample | SOIL DESCRIPTION | Moisture Content, % | Dry Density, pcf | Liquid Limit, % | Plasticity Index, % | Gravel, % | Sand, % | Fines, %

1					18" Topsoil - clay with organics, moist, brown.							
2					Sandy Lean Clay (CL) - stiff, moist, red brown.							
4						21.9	105	46	24	0.0	40.1	59.9
7												
8					Yellow red with some gravel below 8 feet.							
10					End of test pit at 10 feet.							

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/14/06	FINISHED	2/14/06
None 2/14/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	Ron Yahne		


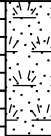




Project No. 06G-13

LOG OF TEST PIT NO. TP-07

Figure 10

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
		 Grab Sample							
0 - 1.8			18" Topsoil - clay with organics, moist, brown.						
1.8 - 8.0		  	Lean Clay with Sand (CL) - crumbly, medium stiff, moist, red brown.						
8.0 - 10.0			Stiff below 7 feet. With moderate pinholes below 8 feet.	18.4	31	9	4.6	18.4	77.0
10.0 - 14.0			End of test pit at 10 feet.						

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/14/06	FINISHED	2/14/06
None 2/14/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13

LOG OF TEST PIT NO. TP-08

Figure 11

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Undisturbed Sample
 M Grab Sample

SOIL DESCRIPTION

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
0 - 1.8			18" Topsoil - clay with organics, moist, brown.						
1.8 - 5.5			Lean Clay with Sand (CL) - stiff, moist, red brown.						
5.5 - 6.0									
6.0 - 6.5			Silt with Sand (ML) - medium dense, moist, brown.						
6.5 - 6.6									
6.6 - 8.5			Poorly Graded Gravel with Silt and Sand (GP-GM) - dense, moist, brown.	4.7	NP	NP	80.6	14.0	5.2
8.5 - 9.0									
9.0 - 10.0									
10.0 - 14.0			End of test pit at 10 feet.						

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/15/06	FINISHED	2/15/06
None 2/15/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13


LOG OF TEST PIT NO. TP-09










Figure 12

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
---------------	-------------	-------------	------------------	---------------------	-----------------	---------------------	-----------	---------	----------

 Grab Sample

0 - 1			24" Topsoil - clay with organics, moist, brown.						
1 - 2			Lean Clay with Sand (CL) - stiff, moist, brown.	16.0	30	10	0.2	26.9	72.9
2 - 4			Red brown with minor pinholes below 4 feet.						
4 - 5									
5 - 7			Silt with Sand (ML) - with moderate pinholes, medium dense, moist, brown.						
7 - 10			End of test pit at 10 feet.						

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/15/06	FINISHED	2/15/06
None 2/15/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13

LOG OF TEST PIT NO. TP-10

Figure 13

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
---------------	-------------	-------------	------------------	---------------------	-----------------	---------------------	-----------	---------	----------

Grab Sample Undisturbed Sample

1			22" Topsoil - clay with organics, moist, brown.						
2			Lean Clay (CL) - stiff, moist, brown.						
3									
4									
5									
6			With minor to moderate pinholes below 6 feet.	17.0	35	14	0.2	14.0	85.8
7									
8									
9									
10			End of test pit at 10 feet.						
11									
12									
13									
14									

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/15/06	FINISHED	2/15/06
None 2/15/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		





Project No. 06G-13

LOG OF TEST PIT NO. TP-11

Figure 14

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
0 - 1			26" Topsoil - clay with organics, moist, brown.							
1 - 8			Lean Clay (CL) - stiff, moist, brown.							
4			With moderate pinholes below 5 feet.							
8			Lean Clay with Sand (CL) - with moderate pinholes, stiff, moist, brown.	21.0	103	31	11	2.3	18.9	78.8
10			End of test pit at 10 feet.							

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/15/06	FINISHED	2/15/06
None 2/15/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		


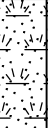




Project No. 06G-13

LOG OF TEST PIT NO. TP-12

Figure 15

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
		 Grab Sample							
0 - 1.8			18" Topsoil - clay with organics, moist, brown.						
1.8 - 10.0		  	Sandy Lean Clay (CL) - stiff, moist, red brown. With minor to moderate pinholes below 5.5 feet. With some gravel below 6 feet.	21.2	35	12	0.4	39.3	60.3
10.0			End of test pit at 10 feet.						

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/16/06	FINISHED	2/16/06
None 2/16/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13

LOG OF TEST PIT NO. TP-13

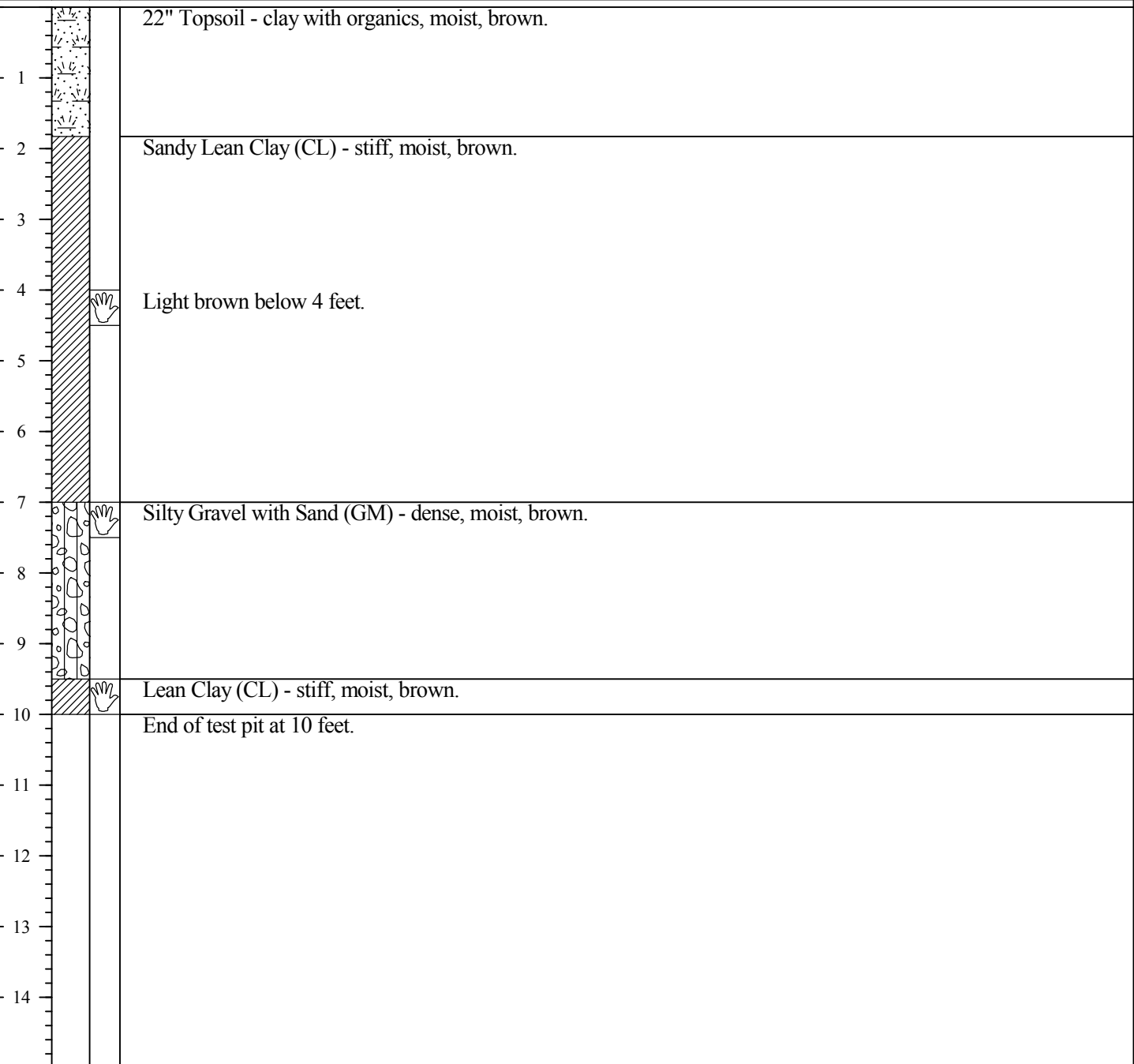
Figure 16

PROJECT Cascades at Solder Hollow Subdivision	CLIENT Wasatch Mtn. Development
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LOCATION 865 S. Stringtown Rd. Midway, UT	Surface Elev.:
---	----------------

Depth in Feet	Graphic Log	Sample Type	Grab Sample
---------------	-------------	-------------	-------------

SOIL DESCRIPTION



LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/16/06	FINISHED	2/16/06
None 2/16/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13

LOG OF TEST PIT NO. TP-14

Figure 17

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
0		Grab Sample	18" Topsoil - clay with organics, moist, brown.						
1			Lean Clay with Sand (CL) - stiff, moist, red brown.						
2									
3		Grab Sample							
4									
5			With gravel below 5 feet.						
6		Grab Sample							
7									
8									
9		Grab Sample	Sandy Silty Clay (CL-ML) - stiff, moist, brown.	19.5	26	6	11.2	28.5	60.3
10			End of test pit at 10 feet.						
11									
12									
13									
14									

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/16/06	FINISHED	2/16/06
None 2/16/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		



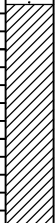
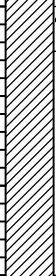




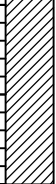
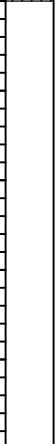
Project No. 06G-13

LOG OF TEST PIT NO. TP-15

Figure 18

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
		 Grab Sample							
0 - 1.8			18" Topsoil - clay with organics, moist, brown.						
1.8 - 4.0			Lean Clay with Sand (CL) - stiff, moist, red brown.						
4.0 - 7.0		 		20.4	34	12	1.3	18.8	79.9
7.0 - 8.0									
8.0 - 10.0			With gravel below 8 feet.						
10.0 - 14.0			End of test pit at 10 feet. Piezometer installed.						

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/16/06	FINISHED	2/16/06
None 2/16/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13

LOG OF TEST PIT NO. TP-16

Figure 19

PROJECT

Cascades at Solder Hollow Subdivision

CLIENT

Wasatch Mtn. Development

LOCATION

**865 S. Stringtown Rd.
Midway, UT**

Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %

1		■	18" Topsoil - clay with organics, moist, brown.							
2		■	Lean Clay with Sand (CL) - stiff, moist, red brown.							
3		■								
4		■	Silt with Sand (ML) - with moderate pinholes, stiff moist, light brown.							
5		■								
6		■		20.0	87	NP	NP	0.3	23.2	76.5
7		■								
8		■								
9		■	Lean Clay with Sand (CL) - with gravel, with minor pinholes, stiff, moist, brown.							
10		■	End of test pit at 10 feet. Piezometer installed.							
11		■								
12		■								
13		■								
14		■								

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

<p>Y² Geotechnical, P.C. Geotechnical & Environmental Services</p>	WATER LEVELS	STARTED	2/16/06	FINISHED	2/16/06	
	None	2/16/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
			EXCAVATION TYPE	Backhoe		
			LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13

LOG OF TEST PIT NO. TP-17

Figure 20

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
		Grab Sample							
0 - 1			24" Topsoil - clay with organics, moist, brown.						
1 - 10		Grab Sample	Sandy Lean Clay (CL) - stiff, moist, red brown. With minor to moderate pinholes below 4 feet.	23.1	30	9	7.6	34.7	57.7
10 - 14			End of test pit at 10 feet.						

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/15/06	FINISHED	2/15/06
None 2/15/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13

LOG OF TEST PIT NO. TP-18

Figure 21

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
		Grab Sample							
1			21" Topsoil - clay with organics, moist, brown.						
2		Grab Sample	Lean Clay with Sand (CL) - with gravel, stiff, moist, red brown.						
3			Poorly Graded Gravel with Clay and Sand (GP-GC) - dense, moist, red brown.						
4									
5		Grab Sample		5.9	31	10	75.3	16.6	7.4
6									
7			Silt with Sand (ML) - with minor to moderate pinholes, medium dense, moist, brown.						
8		Grab Sample							
9									
10			End of test pit at 10 feet.						
11									
12									
13									
14									

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

Y² Geotechnical, P.C.
Geotechnical & Environmental Services

WATER LEVELS	STARTED	2/16/06	FINISHED	2/16/06
None 2/16/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

Project No. 06G-13

LOG OF TEST PIT NO. TP-19

Figure 22

PROJECT **Cascades at Solder Hollow Subdivision** CLIENT **Wasatch Mtn. Development**

LOCATION **865 S. Stringtown Rd. Midway, UT** Surface Elev.:

Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Dry Density, pcf	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %

1			24" Topsoil - clay with organics, moist, brown.							
2			Lean Clay (CL) - stiff, moist, red brown.							
3				19.5	102	33	12	0.3	10.4	89.3
4										
5										
6			With some gravel below 6 feet.							
7			Silt with Sand (ML) - moderately cemented with minor to moderate pinholes, dense, moist, brown.							
8										
9										
10			End of test pit at 10 feet.							
11										
12										
13										
14										

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

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WATER LEVELS	STARTED	2/15/06	FINISHED	2/15/06
None 2/15/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe
	EXCAVATION TYPE	Backhoe		
	LOGGED BY	R. Jay Yahne, P.E.		

PROJECT Cascades at Solder Hollow Subdivision	CLIENT Wasatch Mtn. Development
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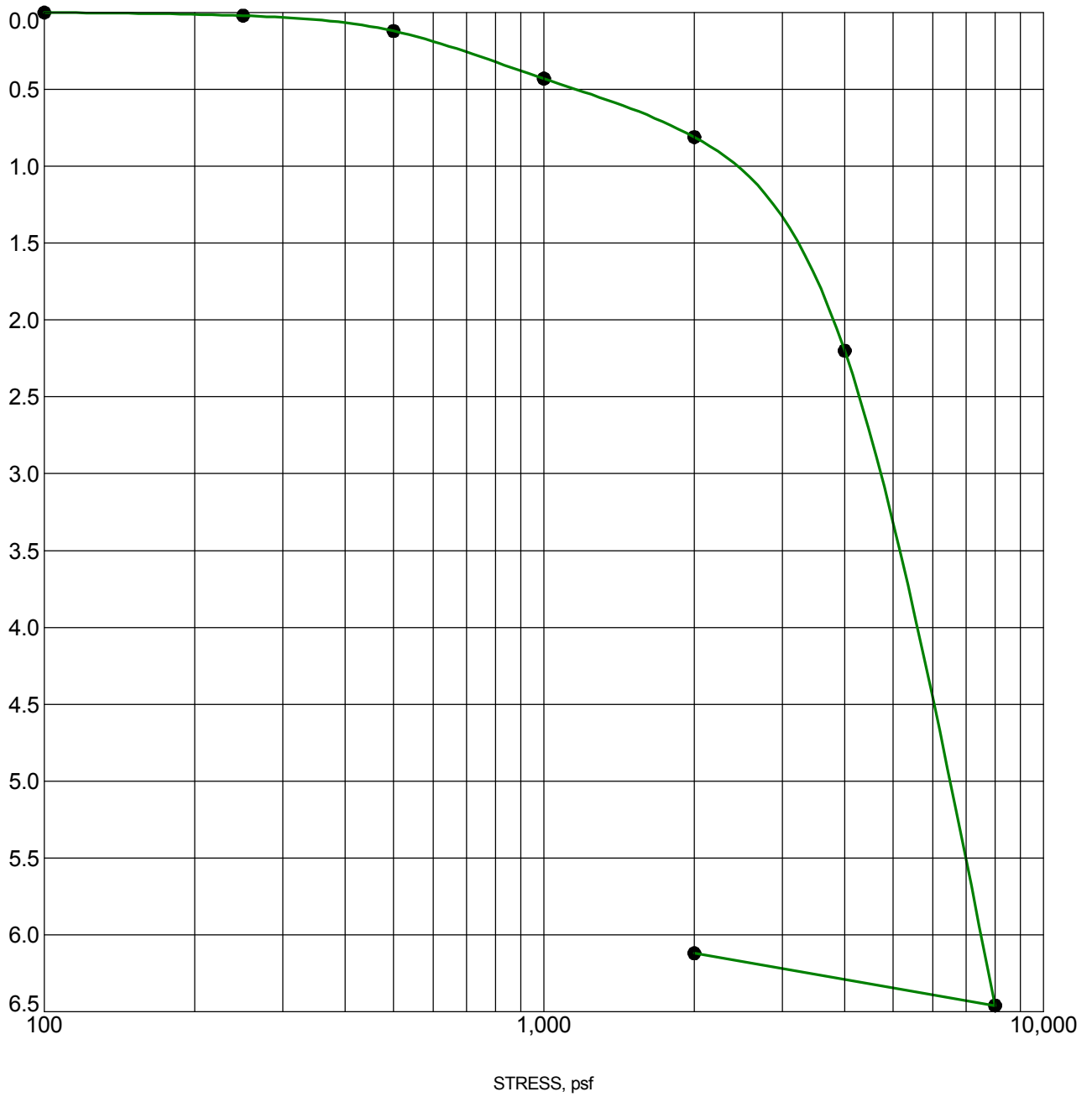
LOCATION 865 S. Stringtown Rd. Midway, UT	Surface Elev.:
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Depth in Feet	Graphic Log	Sample Type	SOIL DESCRIPTION	Moisture Content, %	Liquid Limit, %	Plasticity Index, %	Gravel, %	Sand, %	Fines, %
0			18" Topsoil - clay with organics, moist, brown.						
1			Lean Clay with Sand (CL) - stiff, moist, red brown.						
2									
3									
4		■	Silt with Sand (ML) - with moderate pinholes, dense, moist, brown.						
5									
6			End of test pit at 10 feet.						
7									
8									
9				21.1	31	8	1.3	16.5	82.2
10									
11									
12									
13									
14									

LOG OF BOREHOLE/TEST PIT 06G-13 GINT.GPJ Y2.GEOTECH.GDT 3/4/06

<b style="font-size: 1.2em;">Y² Geotechnical, P.C. Geotechnical & Environmental Services	WATER LEVELS	STARTED	2/15/06	FINISHED	2/15/06	
	None 2/15/06	EXCAVATION CO.	Eagle Dvlp.	EQUIP.	Backhoe	
		EXCAVATION TYPE	Backhoe			
		LOGGED BY	R. Jay Yahne, P.E.			

STRAIN, %



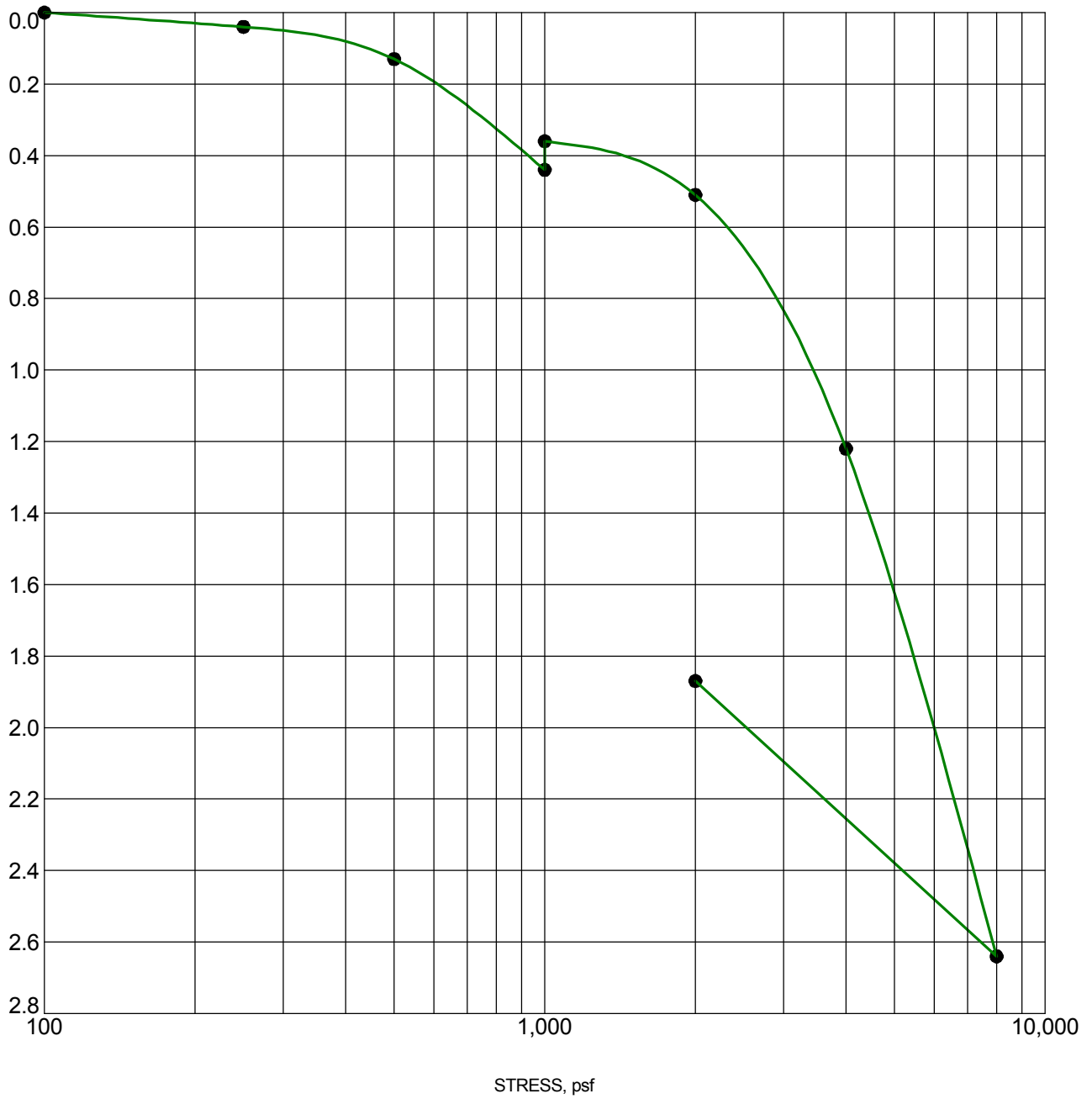
Specimen Identification	Classification	γ_d	MC%
● TP-02 6.0	LEAN CLAY with SAND(CL)	98	15

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CONSOLIDATION TEST

Project: Cascades at Solder Hollow Subdivision
 Location: 865 S. Stringtown Rd. Midway, UT
 Number: 06G-13

STRAIN, %



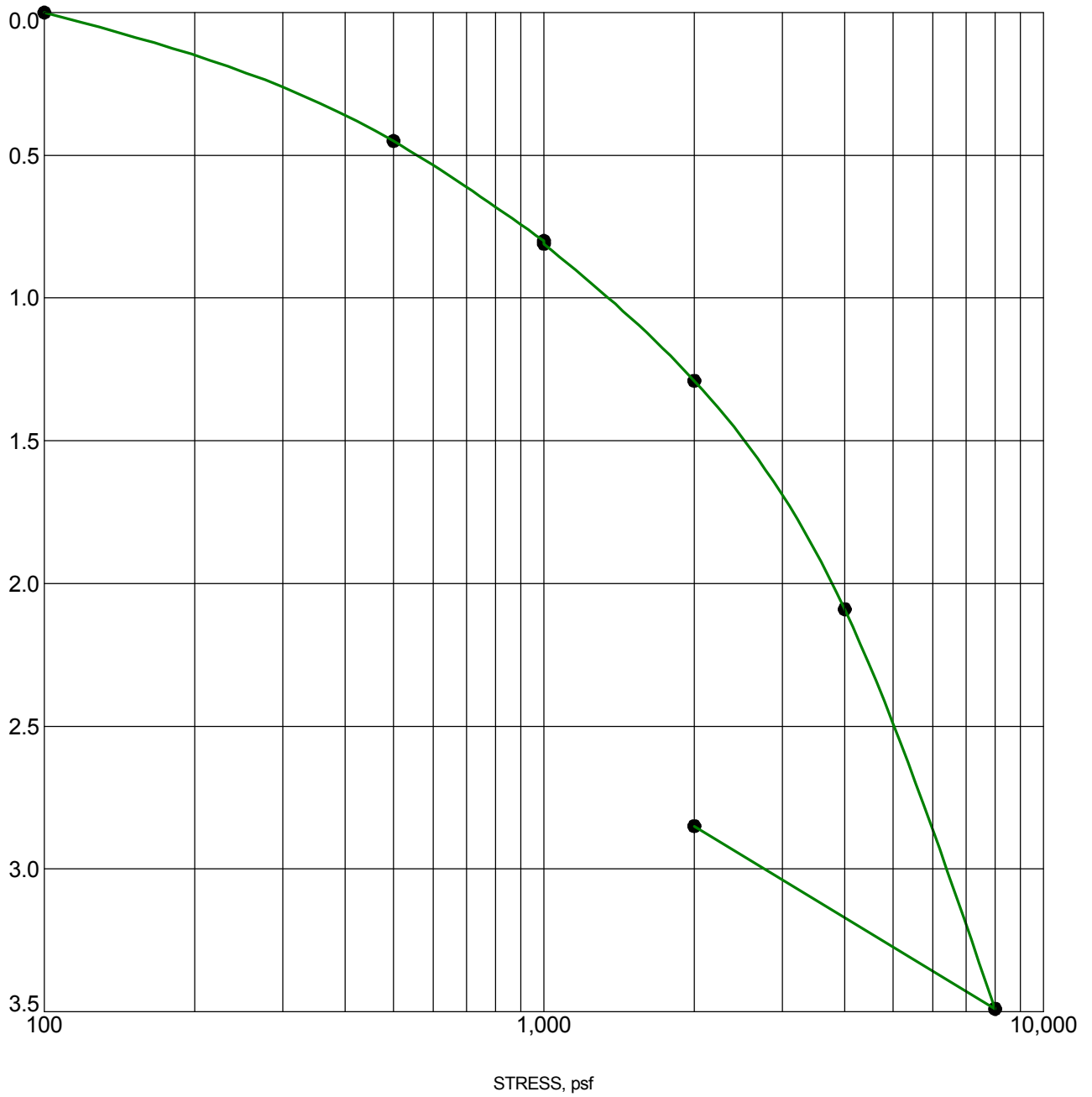
Specimen Identification	Classification	γ_d	MC%
● TP-06 4.0	SANDY LEAN CLAY(CL)	105	22

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CONSOLIDATION TEST

Project: Cascades at Solder Hollow Subdivision
Location: 865 S. Stringtown Rd. Midway, UT
Number: 06G-13

STRAIN, %



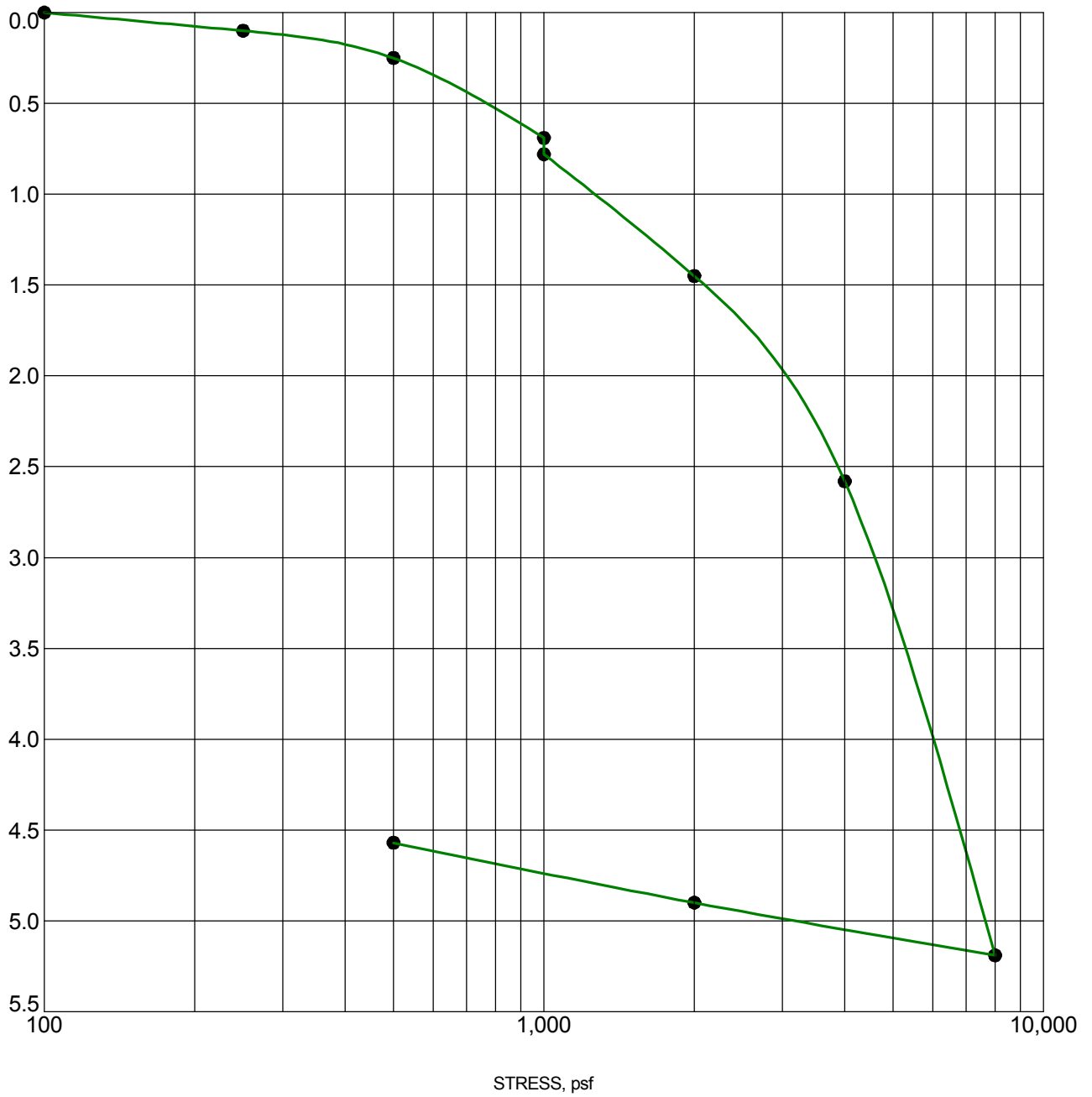
Specimen Identification	Classification	γ_d	MC%
● TP-11 8.0	LEAN CLAY with SAND(CL)	103	21

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CONSOLIDATION TEST

Project: Cascades at Solder Hollow Subdivision
Location: 865 S. Stringtown Rd. Midway, UT
Number: 06G-13

STRAIN, %



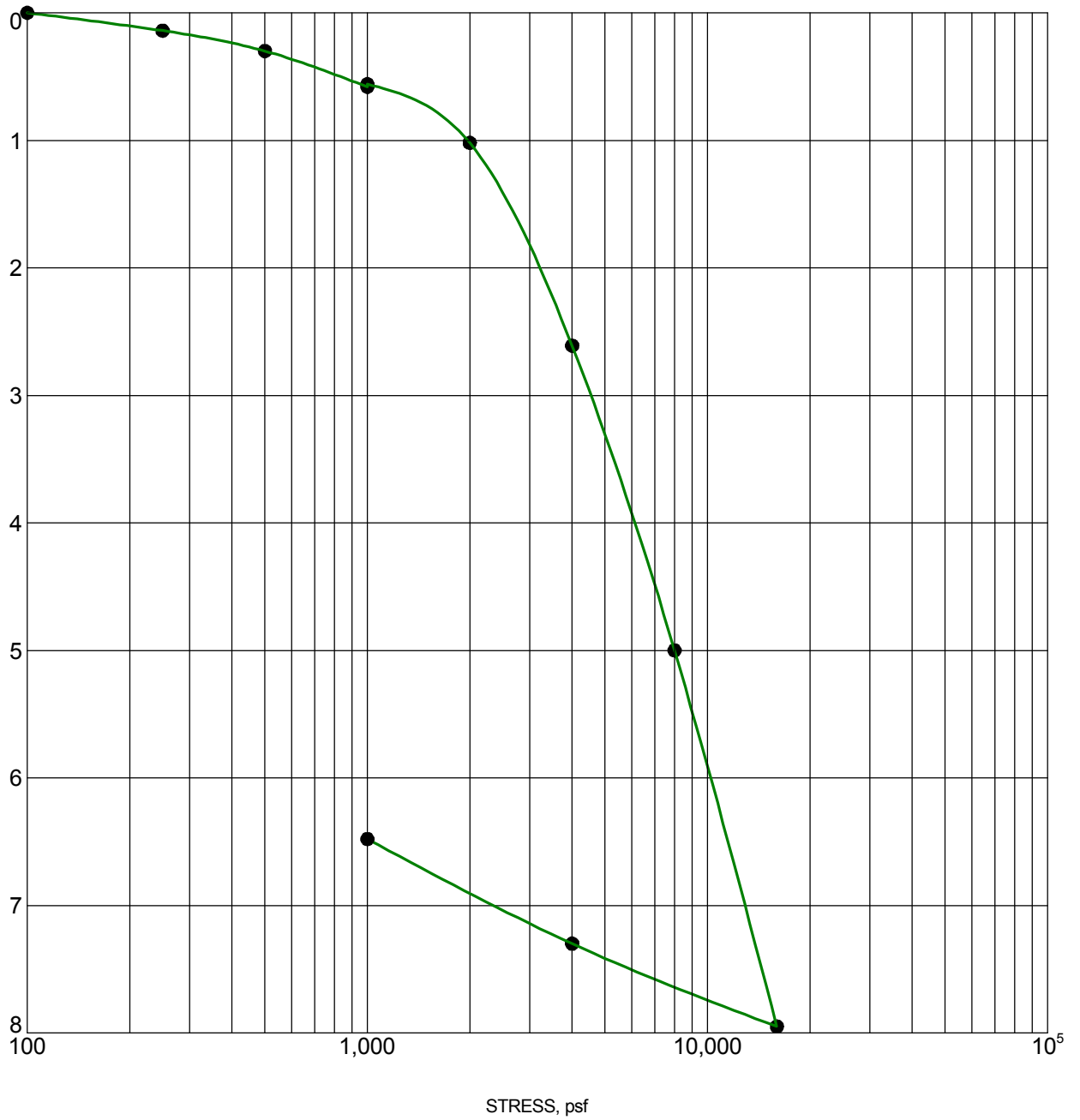
Specimen Identification	Classification	γ_d	MC%
● TP-16 5.5	SILT with SAND(ML)	87	20

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CONSOLIDATION TEST

Project: Cascades at Solder Hollow Subdivision
 Location: 865 S. Stringtown Rd. Midway, UT
 Number: 06G-13

STRAIN, %

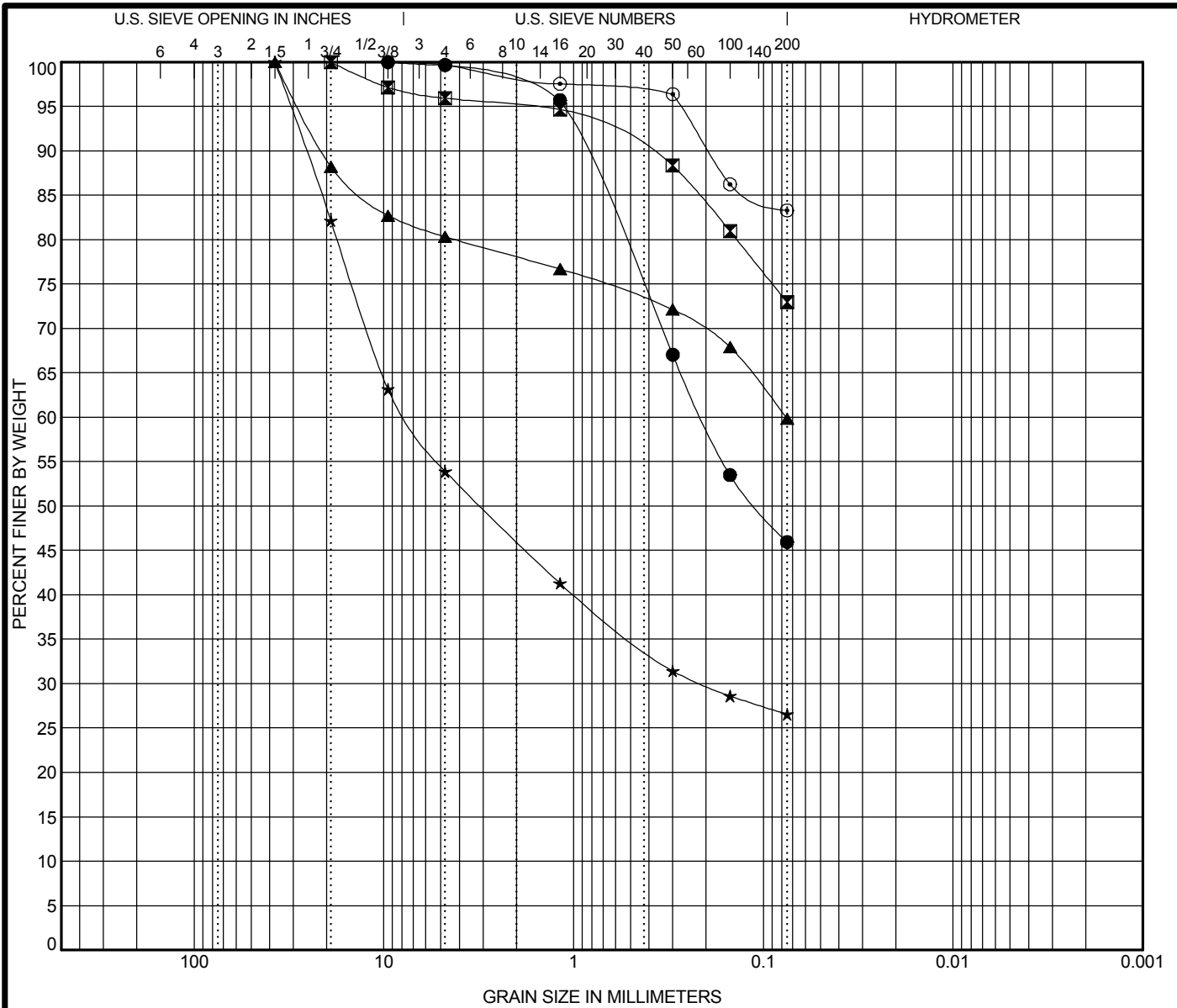


Specimen Identification	Classification	γ_d	MC%
● TP-19 3.0	LEAN CLAY(CL)	102	19

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CONSOLIDATION TEST

Project: Cascades at Solder Hollow Subdivision
 Location: 865 S. Stringtown Rd. Midway, UT
 Number: 06G-13



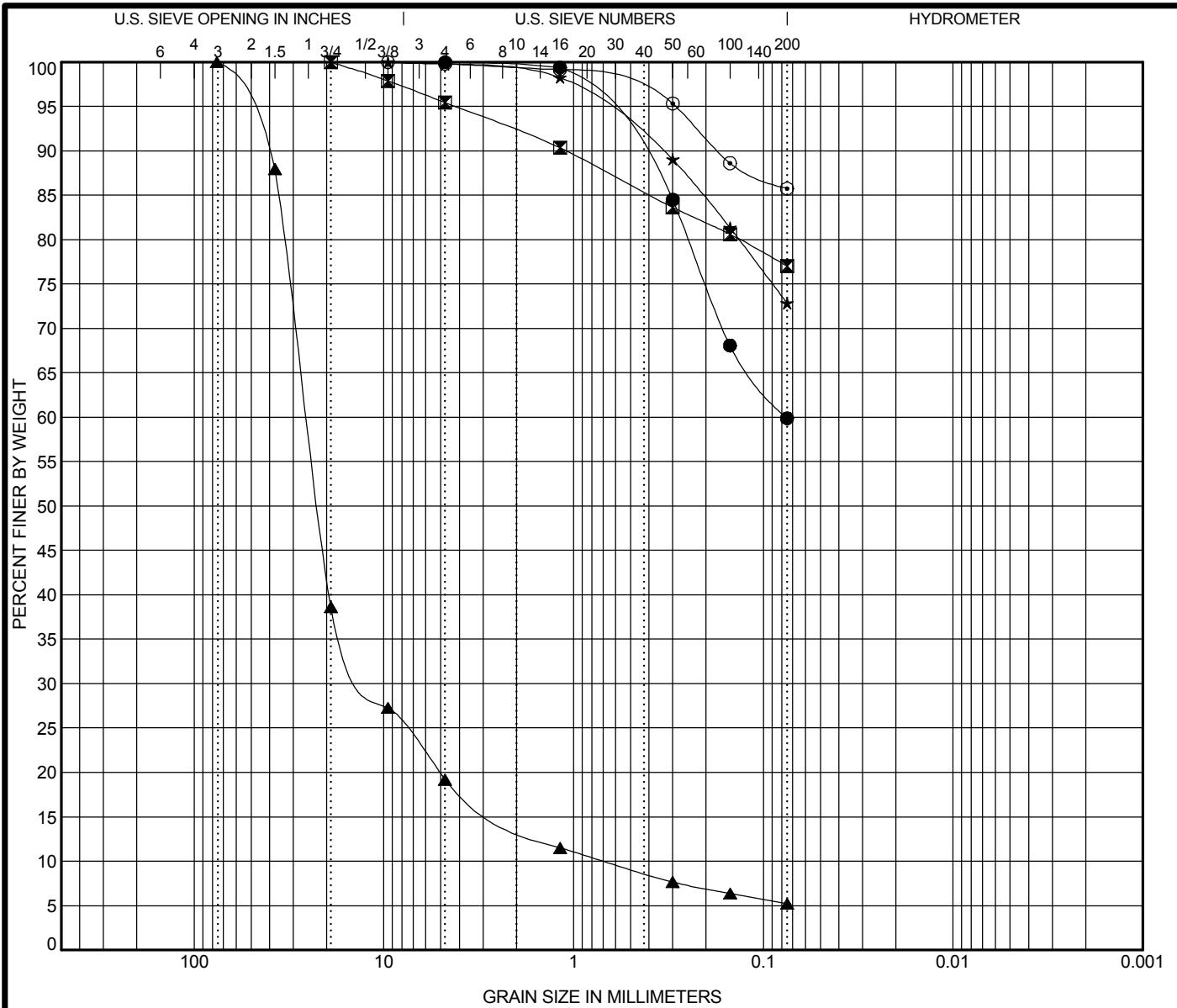
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification		LL	PL	PI	Cc	Cu	
● TP-01 3.5	CLAYEY SAND(SC)		35	19	16			
■ TP-02 6.0	LEAN CLAY with SAND(CL)		31	19	12			
▲ TP-03 9.5	SANDY LEAN CLAY with GRAVEL(CL)		30	19	11			
★ TP-04 5.0	SILTY GRAVEL with SAND(GM)		NP	NP	NP			
○ TP-05 6.0	LEAN CLAY with SAND(CL)		37	20	17			
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP-01 3.5	9.5	0.21			0.3	53.7	46.0	
■ TP-02 6.0	19				4.1	23.0	73.0	
▲ TP-03 9.5	37.5	0.08			19.7	20.5	59.8	
★ TP-04 5.0	37.5	7.5	0.21		46.1	27.3	26.5	
○ TP-05 6.0	9.5				0.3	16.4	83.3	

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GRAIN SIZE DISTRIBUTION

Project: Cascades at Solder Hollow Subdivision
Location: 865 S. Stringtown Rd. Midway, UT
Number: 06G-13



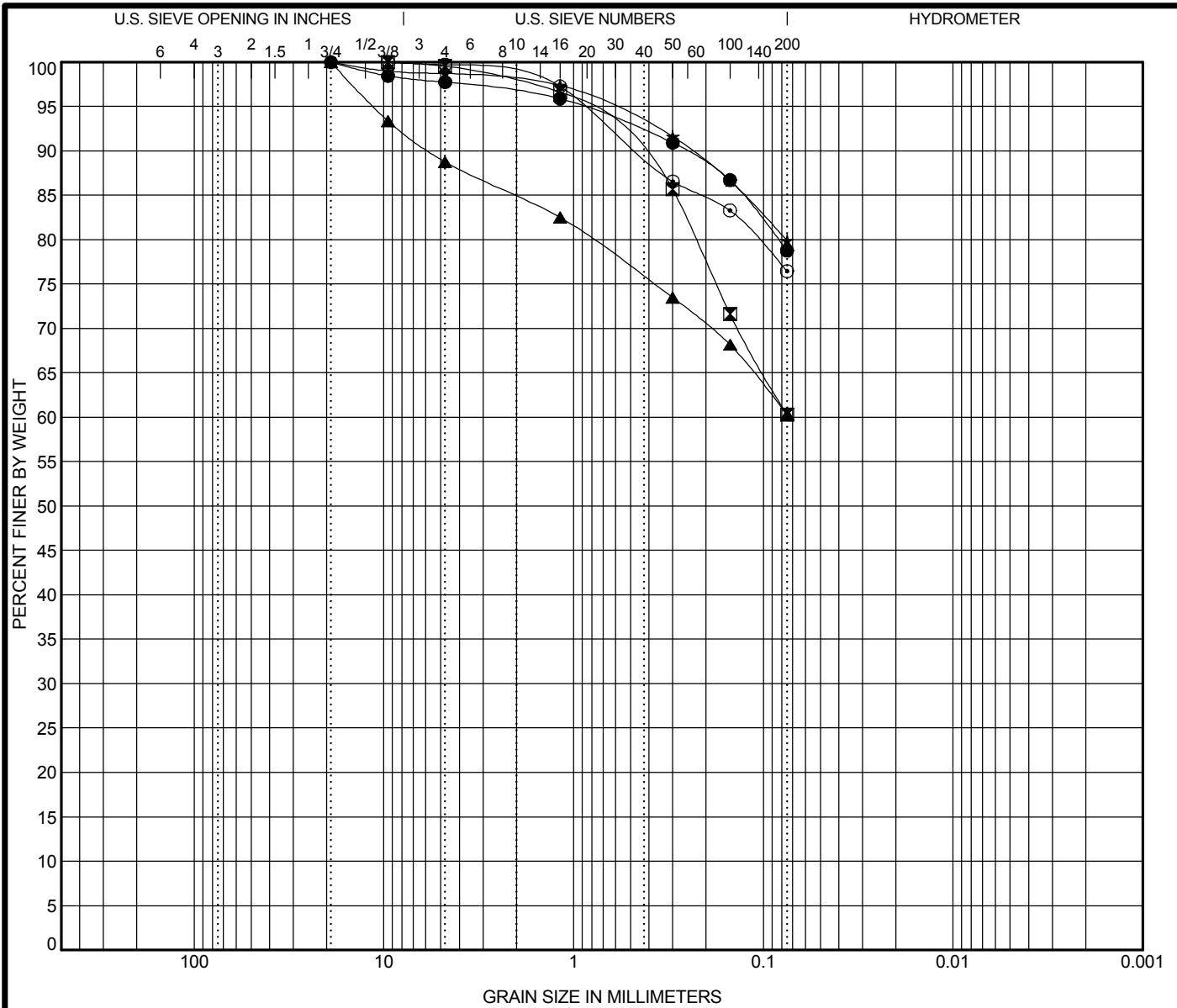
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification		LL	PL	PI	Cc	Cu	
● TP-06 4.0	SANDY LEAN CLAY(CL)		46	22	24			
☒ TP-07 8.0	LEAN CLAY with SAND(CL)		31	22	9			
▲ TP-08 6.5	POORLY GRADED GRAVEL with SILT(GP-GM)		NP	NP	NP	7.1	36.8	
★ TP-09 2.0	LEAN CLAY with SAND(CL)		30	20	10			
◎ TP-10 6.0	LEAN CLAY(CL)		35	21	14			
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP-06 4.0	4.75	0.08			0.0	40.1	59.9	
☒ TP-07 8.0	19				4.6	18.4	77.0	
▲ TP-08 6.5	76	25.51	11.22	0.69	80.6	14.0	5.2	
★ TP-09 2.0	9.5				0.2	26.9	72.9	
◎ TP-10 6.0	9.5				0.2	14.1	85.8	

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GRAIN SIZE DISTRIBUTION

Project: Cascades at Solder Hollow Subdivision
Location: 865 S. Stringtown Rd. Midway, UT
Number: 06G-13



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

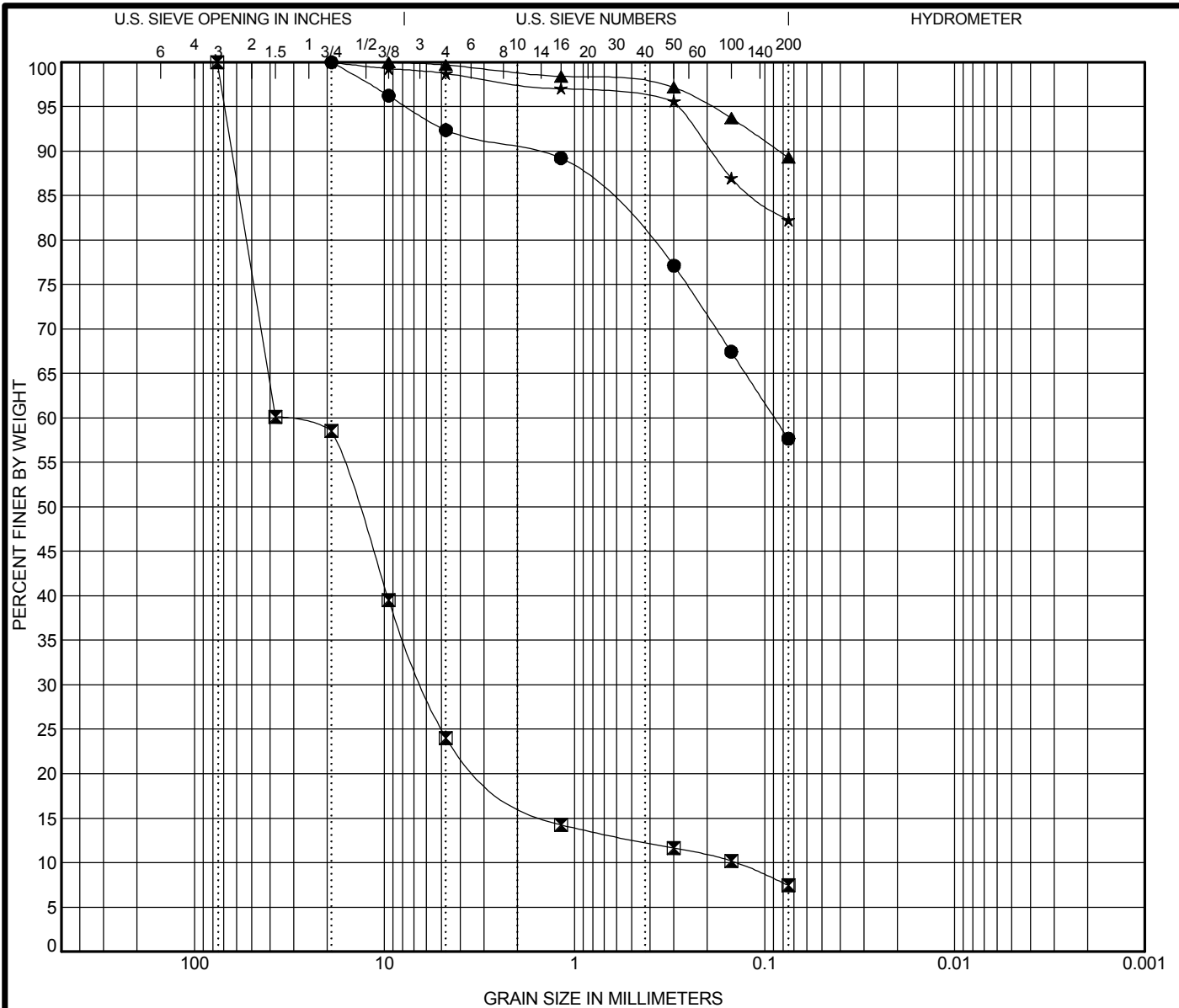
Specimen Identification	Classification		LL	PL	PI	Cc	Cu	
● TP-11 8.0	LEAN CLAY with SAND(CL)		31	20	11			
☒ TP-12 3.0	SANDY LEAN CLAY(CL)		35	23	12			
▲ TP-14 9.0	SANDY SILTY CLAY(CL-ML)		26	20	6			
★ TP-15 4.0	LEAN CLAY with SAND(CL)		34	22	12			
⊙ TP-16 5.5	SILT with SAND(ML)		NP	NP	NP			
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP-11 8.0	19				2.3	19.0	78.8	
☒ TP-12 3.0	9.5				0.4	39.2	60.3	
▲ TP-14 9.0	19				11.2	28.4	60.3	
★ TP-15 4.0	19				1.3	18.8	79.9	
⊙ TP-16 5.5	9.5				0.3	23.3	76.5	

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GRAIN SIZE DISTRIBUTION

Project: Cascades at Solder Hollow Subdivision
Location: 865 S. Stringtown Rd. Midway, UT
Number: 06G-13

U.S. GRAIN SIZE 06G-13 GINT.GPJ Y2 GEOTECH.GDT 3/4/06



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● TP-17 2.5	SANDY LEAN CLAY(CL)	30	21	9		
☒ TP-18 5.0	POORLY GRADED GRAVEL with CLAY and SAND(GP-GC)	31	21	10	7.7	246.3
▲ TP-19 3.0	LEAN CLAY(CL)	33	21	12		
★ TP-20 8.0	SILT with SAND(ML)	31	23	8		

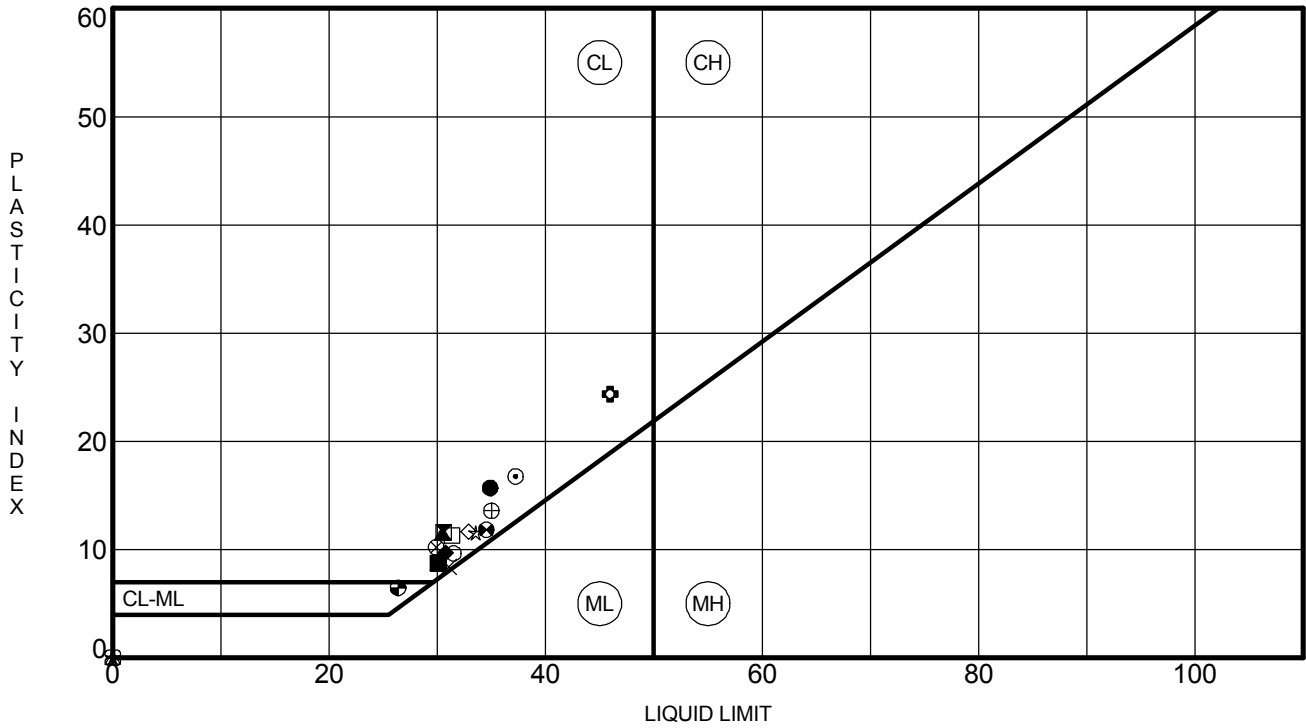
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP-17 2.5	19	0.09			7.6	34.7	57.7	
☒ TP-18 5.0	76	35.15	6.21	0.14	75.2	16.6	7.4	
▲ TP-19 3.0	9.5				0.3	10.4	89.3	
★ TP-20 8.0	19				1.3	16.5	82.2	

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GRAIN SIZE DISTRIBUTION

Project: Cascades at Solder Hollow Subdivision
Location: 865 S. Stringtown Rd. Midway, UT
Number: 06G-13

U.S. GRAIN SIZE 06G-13.GINT.GPJ Y2 GEOTECH.GDT 3/4/08



Specimen Identification	LL	PL	PI	Fines	Classification	
● TP-01	3.5	35	19	16	46	CLAYEY SAND(SC)
⊠ TP-02	6.0	31	19	12	73	LEAN CLAY with SAND(CL)
▲ TP-03	9.5	30	19	11	60	SANDY LEAN CLAY with GRAVEL(CL)
★ TP-04	5.0	NP	NP	NP	27	SILTY GRAVEL with SAND(GM)
⊙ TP-05	6.0	37	20	17	83	LEAN CLAY with SAND(CL)
⊕ TP-06	4.0	46	22	24	60	SANDY LEAN CLAY(CL)
○ TP-07	8.0	31	22	9	77	LEAN CLAY with SAND(CL)
△ TP-08	6.5	NP	NP	NP	5	POORLY GRADED GRAVEL with SILT(GP-GM)
⊗ TP-09	2.0	30	20	10	73	LEAN CLAY with SAND(CL)
⊕ TP-10	6.0	35	21	14	86	LEAN CLAY(CL)
□ TP-11	8.0	31	20	11	79	LEAN CLAY with SAND(CL)
⊕ TP-12	3.0	35	23	12	60	SANDY LEAN CLAY(CL)
⊕ TP-14	9.0	26	20	6	60	SANDY SILTY CLAY(CL-ML)
★ TP-15	4.0	34	22	12	80	LEAN CLAY with SAND(CL)
⊗ TP-16	5.5	NP	NP	NP	76	SILT with SAND(ML)
■ TP-17	2.5	30	21	9	58	SANDY LEAN CLAY(CL)
◆ TP-18	5.0	31	21	10	7	POORLY GRADED GRAVEL with CLAY and SAND(GP-GC)
◇ TP-19	3.0	33	21	12	89	LEAN CLAY(CL)
⊗ TP-20	8.0	31	23	8	82	SILT with SAND(ML)

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ATTERBERG LIMITS' RESULTS

Project: Cascades at Solder Hollow Subdivision
Location: 865 S. Stringtown Rd. Midway, UT
Number: 06G-13

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
TP-01	3.5	35	19	16	9.5	46	SC	18.4			
TP-02	6.0	31	19	12	19	73	CL	15.5	98.2		
TP-03	9.5	30	19	11	37.5	60	CL	16.4			
TP-04	5.0	NP	NP	NP	37.5	27	GM	14.8			
TP-05	6.0	37	20	17	9.5	83	CL	16.7			
TP-06	4.0	46	22	24	4.75	60	CL	21.9	105.1		
TP-07	8.0	31	22	9	19	77	CL	18.4			
TP-08	6.5	NP	NP	NP	76	5	GP-GM	4.7			
TP-09	2.0	30	20	10	9.5	73	CL	16.0			
TP-10	6.0	35	21	14	9.5	86	CL	17.0			
TP-11	8.0	31	20	11	19	79	CL	21.0	102.7		
TP-12	3.0	35	23	12	9.5	60	CL	21.2			
TP-14	9.0	26	20	6	19	60	CL-ML	19.5			
TP-15	4.0	34	22	12	19	80	CL	20.4			
TP-16	5.5	NP	NP	NP	9.5	77	ML	20.0	86.7		
TP-17	2.5	30	21	9	19	58	CL	23.1			
TP-18	5.0	31	21	10	76	7	GP-GC	5.9			
TP-19	3.0	33	21	12	9.5	89	CL	19.5	101.8		
TP-20	8.0	31	23	8	19	82	ML	21.1			

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Summary of Laboratory Results

Project: Cascades at Solder Hollow Subdivision

Location: 865 S. Stringtown Rd. Midway, UT

Number: 06G-13

APPENDIX A
PERCOLATION TEST RESULTS

TEST PIT TP-1 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-1 (FIGURE 4) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: Ron Yahne

Performed on: February 14, 2006

Bottom Elevation of Percolation Test: 5'2"

Amount of Saturation Time: 0 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	7.25	2.76
20	7.00	2.86
20	6.75	2.97
20	5.50	3.64
20	5.50	3.64
Final stabilized percolation rate		3.64

TEST PIT TP-2 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-2 (FIGURE 5) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: Ron Yahne

Performed on: February 14, 2006

Bottom Elevation of Percolation Test: 5'

Amount of Saturation Time: 0 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	2.65	7.62
20	2.13	9.41
20	2.00	10.00
20	1.75	11.43
20	1.75	11.43
Final stabilized percolation rate		11.43

TEST PIT TP-3 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-3 (FIGURE 6) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: Ron Yahne

Performed on: February 14, 2006

Bottom Elevation of Percolation Test: 5'

Amount of Saturation Time: 0 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	4.75	4.21
20	4.75	4.21
20	4.625	4.32
20	4.625	4.32
Final stabilized percolation rate		4.32

TEST PIT TP-4 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-4 (FIGURE 7) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: Ron Yahne

Performed on: February 14, 2006

Bottom Elevation of Percolation Test: 5'6"

Amount of Saturation Time: 0 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	3	6.67
20	2.625	7.62
20	2.5	8.00
20	2.5	8.00
Final stabilized percolation rate		8.00

TEST PIT TP-6 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-6 (FIGURE 9) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: Ron Yahne

Performed on: February 14, 2006

Bottom Elevation of Percolation Test: 4'6"

Amount of Saturation Time: 0 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	1.5	13.33
20	1	20.00
20	0.75	26.67
20	0.5	40.00
20	0.5	40.00
Final stabilized percolation rate		40.00

TEST PIT TP-8 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-8 (FIGURE 11) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: R. Jay Yahne

Performed on: February 15, 2006

Bottom Elevation of Percolation Test: 5'

Amount of Saturation Time: 0 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	5.25	3.81
20	4.5	4.44
20	4.0	5.00
20	4.0	5.00
Final stabilized percolation rate		5.00

TEST PIT TP-9 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-9 (FIGURE 12) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: R. Jay Yahne

Performed on: February 15, 2006

Bottom Elevation of Percolation Test: 5'

Amount of Saturation Time: 0 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	2.50	8.00
20	2.00	10.00
20	2.00	10.00
20	2.00	10.00
Final stabilized percolation rate		10.00

TEST PIT TP-10 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-10 (FIGURE 13) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: R. Jay Yahne

Performed on: February 15, 2006

Bottom Elevation of Percolation Test: 5'3"

Amount of Saturation Time: 30 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	0.75	26.67
20	0.75	26.67
Final stabilized percolation rate		26.67

TEST PIT TP-11 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-11 (FIGURE 14) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: R. Jay Yahne

Performed on: February 15, 2006

Bottom Elevation of Percolation Test: 5'

Amount of Saturation Time: 45 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	1.125	17.78
20	1.125	17.78
20	1.125	17.78
Final stabilized percolation rate		17.78

TEST PIT TP-13 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-13 (FIGURE 16) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: R. Jay Yahne

Performed on: February 16, 2006

Bottom Elevation of Percolation Test: 4'8"

Amount of Saturation Time: 30 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	2.00	10.00
20	1.75	11.43
20	1.75	11.43
Final stabilized percolation rate		11.43

TEST PIT TP-14 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-14 (FIGURE 17) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: R. Jay Yahne

Performed on: February 16, 2006

Bottom Elevation of Percolation Test: 5'3"

Amount of Saturation Time: 0 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	2.50	8.00
20	2.25	8.89
20	2.00	10.00
20	1.875	10.67
20	1.25	16.00
20	1.25	16.00
Final stabilized percolation rate		16.00

TEST PIT TP-17 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-17 (FIGURE 20) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: R. Jay Yahne

Performed on: February 16, 2006

Bottom Elevation of Percolation Test: 5'5"

Amount of Saturation Time: 0 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	3.125	6.40
20	1.50	13.33
20	1.25	16.00
20	1.00	20.00
20	1.00	20.00
Final stabilized percolation rate		20.00

TEST PIT TP-18 PERCOLATION TEST RESULTS

SEE TEST PIT LOG TP-18 (FIGURE 21) FOR SOIL LAYERS

Location: Cascades at Solder Hollow

Lot Size: 62 Acres

Percolation Tests performed by: R. Jay Yahne

Performed on: February 16, 2006

Bottom Elevation of Percolation Test: 4'5"

Amount of Saturation Time: 0 min

Elapsed time since last measurement (min)	Change in Water level (inch)	Rate (min/inch)
20	3.25	6.15
20	2.50	8.00
20	1.50	13.33
20	1.625	12.31
20	1.625	12.31
Final stabilized percolation rate		12.31