Applied GeoTech

GEOTECHNICAL INVESTIGATION

MITCHELL HOLLOW TRAIL

APPROXIMATELY 9600 to 10090 NORTH, 6530 WEST

HIGHLAND, UTAH

PREPARED FOR:

CONSOR ENGINEERING
986 WEST 9000 SOUTH
WEST JORDAN, UTAH 84088

ATTENTION: ROBERT HASLAM
EMAIL: ROBERT.HASLAM@CONSORENG.COM

PROJECT NO. 1250128 **SEPTEMBER 22, 2025**

TABLE OF CONTENTS

EXECUTIVE SUMMARY. . . . . Page 1

SCOPE. . . . . Page 2

SITE CONDITIONS. . . . . Page 2

FIELD STUDY.. . . . . Page 3

SUBSURFACE CONDITIONS.. . . . . Page 3

SUBSURFACE WATER. . . . . Page 5

PROPOSED CONSTRUCTION. . . . . Page 6

RECOMMENDATIONS. . . . . Page 6

A. Site Grading. . . . . Page 7
B. Shallow Foundations. . . . . Page 10
C. Deep Foundations. . . . . Page 11
D. Lateral Earth Pressures.. . . . . Page 11
E. Seismic Design Considerations . . . . Page 13
F. Water Soluble Sulfates.. . . . . Page 14
G. Pavement.. . . . . Page 14
H. Retaining Walls. . . . . Page 16
I. Continuing Services. . . . . Page 17

LIMITATIONS.. . . . . Page 18

REFERENCES. . . . . Page 19

FIGURES

VICINITY MAP	FIGURE 1
TEST PIT TP-1 & TP-2 LOCATIONS	FIGURE 2
TEST PIT TP-3 & TP-4 LOCATIONS	FIGURE 3
TEST PIT LOGS	FIGURE 4
TEST PIT LEGEND AND NOTES	FIGURE 5
GRADATION TEST RESULTS	FIGURES 6-8
DIRECT SHEAR RESULTS	FIGURES 9-10
MOISTURE/DENSITY RELATIONSHIP RESULTS	FIGURE 11
SUMMARY OF LABORATORY TEST RESULTS	TABLE I

EXECUTIVE SUMMARY

1. The subsurface soils encountered in Test Pits TP-1 and TP-2 consist of approximately 1 to 2 feet of topsoil overlying gravel with some sand, extending to the maximum depth investigated of approximately 10 feet. Subsurface soils encountered in the Test Pits TP-3 and TP-4 consist of approximately 1 foot of topsoil overlying clay, sand and gravel, extending to a depth of approximately 5 feet. Natural sand was encountered below that depth, extending to the maximum depth investigated of approximately 10½ feet.

2. Subsurface water was measured at a depth of approximately 2 feet below the ground surface in Test Pits TP-1 and TP-2, when measured on August 21, 2025. Subsurface water was not encountered in Test Pits TP-3 and TP-4.

3. The proposed improvements may be supported on spread footings bearing on the natural soil, or on compacted structural fill extending down to the natural soil. The footings may be designed using a net allowable bearing pressure of 1,500 pounds per square foot (psf). If footings bear on natural sand or gravel, or on at least 2 feet of structural fill extending down to the natural soil, footings may be designed using an allowable net bearing pressure of 2,500 psf.

   Alternatively, the boardwalks may be supported on a deep foundation system, such as micropiles. Helical piers may not be practical for the site, due to the presence of gravel and cobbles up to approximately ½ foot in size.

4. The upper soil in some areas has a high clay content and could be easily disturbed by construction equipment traffic when it is very moist to wet. Placement of approximately 1 to 2 feet of granular borrow consisting predominantly of gravel with less than 15 percent passing the No. 200 sieve may be needed to provide limited access for rubber-tired equipment and to facilitate placement and compaction of structural fill and site grading fill when the subgrade is very moist to wet. Consideration may be given to placing a support fabric between the natural soil and granular borrow.

5. Geotechnical information related to foundations, subgrade preparation, excavation slopes, materials and retaining wall design is included in the report.

SCOPE

This report presents the results of a geotechnical investigation for the proposed Mitchell Hollow Trail to be constructed between approximately 9600 and 10090 North, 6530 West in Highland, Utah. The location of the proposed trail alignment is shown on Figures 1 through 3. The report presents the subsurface conditions encountered, laboratory test results and recommendations for the proposed improvements. The study was conducted in general accordance with our proposal dated February 24, 2025.

A field exploration program was conducted to obtain information on the subsurface conditions and samples for laboratory testing. Samples obtained during the field investigation were tested in the laboratory to determine physical and engineering characteristics of the on-site soil and to define conditions at the site for our engineering analysis. Results of the field exploration and laboratory tests were analyzed to develop recommendations for proposed improvements.

This report has been prepared to summarize the data obtained during the study and to present our conclusions and recommendations, based on the proposed construction and the subsurface conditions encountered. Design parameters and a discussion of geotechnical engineering considerations related to construction are included in the report.

SITE CONDITIONS

The proposed trail alignment extends through the Mitchell Hollow drainage, which is approximately 30 to 40 feet lower in elevation than the surrounding area. A small creek flows through the bottom of the drainage. Vegetation at the site consists of grasses, shrubs and trees. Several fences run through the drainage, and portions have been used for animal grazing. The area adjacent to the drainage consists of one- to two-story, single-family residences with basements and undeveloped farm fields.

FIELD STUDY

The test pits were excavated on June 19, 2025 at the approximate locations shown on Figures 2 and 3.

The test pits were excavated using a mini excavator. The test pits were logged and soil samples obtained by a engineer from AGEC. Logs of the test pits are presented on Figure 4 with legend and notes on Figure 5.

The test pits were backfilled without significant compaction. The test pit backfill should be removed and replaced with properly compacted fill where it would support proposed improvements.

SUBSURFACE CONDITIONS

The subsurface soils encountered in Test Pits TP-1 and TP-2 consists of approximately 1 to 2 feet of topsoil overlying gravel with some sand, extending to the maximum depth investigated of approximately 10 feet. Subsurface soils encountered in Test Pits TP-3 and TP-4 consist of approximately 1 foot of topsoil overlying clay, sand and gravel, extending to a depth of approximately 5 feet. Natural sand was encountered below that depth, extending to the maximum depth investigated of approximately 10½ feet.

A description of the soil encountered in the test pits follows:

> Topsoil - The topsoil ranges from silty sand to poorly graded gravel with sand. It is slightly moist to moist and brown.

Sandy Silty Clay - The sandy silty clay is soft to medium stiff, moist and brown.

Laboratory tests performed on a sample of the sandy silty clay indicate it has a natural moisture content of 17 percent and a natural dry density of 99 pounds per cubic foot (pcf).

Clayey Sand with Gravel - The clayey sand with gravel is medium dense to dense, wet and brown.

Laboratory tests performed on a sample of the sand indicate it has a natural moisture content of 14 percent and a natural dry density of 113 pcf. Results of a gradation test performed on a sample of the sand are shown on Figure 6.

Poorly Graded Sand with Silt and Gravel - The poorly graded sand with silt and gravel is loose to dense, slightly moist and brown.

Results of gradation testing performed on a sample of the sand are shown on Figure 8. A drained direct shear test performed on a remolded sample of the sand indicates it has a friction angle of 48 degrees. Results of the test are shown on Figure 10. A modified Proctor test performed on a sample of the sand indicates it has a maximum dry density of 130.6 pounds per cubic foot and optimum moisture content of 10.1 percent. Results of the Proctor test are shown on Figure 11.

Interlayered Silty Clay with Sand and Silty Clayey Sand - The interlayered soil contains occasional gravel. It is stiff, dense, slightly moist to moist and brown.

Results of laboratory tests performed on samples of the interlayered soil indicate it has natural moisture contents ranging from 7 to 11 percent and natural dry densities of 93 to 105 pcf.

Results of gradation tests performed on samples of the interlayered soil are shown on Figure 7. A drained direct shear test performed on a remolded sample of the clay indicates it has a friction angle of 34 degrees. Results of the test are shown on Figure 9.

Siltly Gravel with Sand - The silty gravel with sand contains cobbles up to approximately ½ foot in size. It is medium dense to dense, moist to wet and brown.

Poorly Graded Gravel with Silt and Sand - The poorly graded gravel with silt and sand contains cobbles up to approximately ½ foot in size. It is dense, slightly moist to wet and brown.

Laboratory tests conducted on a sample of the gravel indicate it has a natural moisture content of 9 percent The results of a gradation test on the gravel are presented on Figure 6.

A summary of the laboratory test results is presented on Table I and test results are included on the logs of the test pits.

SUBSURFACE WATER

Subsurface water was measured at a depth of approximately 2 feet below the ground surface in Test Pits TP-1 and TP-2, when measured on August 21, 2025, 63 days after excavation. Subsurface water was not encountered in Test Pits TP-3 and TP-4. Fluctuations in the depth of water can be expected over time.

PROPOSED CONSTRUCTION

We understand approximately three-quarters of a mile of pedestrian trail is proposed to be constructed between approximately 9600 and 10090 North and at approximately 6530 West, in Highland, Utah.

We understand that segmented block retaining walls with mechanically stabilized earth (MSE) up to approximately 8 feet in height are proposed to be constructed along portions of the trail.

We also understand that several Permatrack precast concrete boardwalk systems are proposed to be constructed over wetland areas for portions of the trail. We understand that the boardwalk is anticipated to be approximately 12 feet wide and supported on concrete footings or piers at approximately 10- to 20-foot spacings. We understand column loadings from the boardwalks could range between approximately 21 to 42 kips.

We have assumed traffic on the trail pavement will consist predominantly of pedestrian traffic, with several maintenance vehicles per week.

If the proposed construction, column loads or traffic is significantly different from what is described above, we should be notified so that we can reevaluate the recommendations given.

RECOMMENDATIONS

Based on the subsurface conditions encountered, laboratory test results and the proposed construction, the following recommendations are given:

A. Site Grading

1. Topsoil and Unsuitable Fill

   Approximately 1 to 2 feet of topsoil was encountered in the test pits. Fill is likely to be encountered in areas of the proposed trail alignment. Topsoil, unsuitable fill, debris and other deleterious materials should be removed from below proposed footings, retaining walls and other settlement-sensitive improvements.

2. Subgrade Preparation

   The upper soil in some areas has a high clay content and could be easily disturbed by construction equipment traffic when it is very moist to wet. Placement of approximately 1 to 2 feet of granular borrow consisting predominantly of gravel with less than 15 percent passing the No. 200 sieve may be needed to provide limited access for rubber-tired equipment and to facilitate placement and compaction of structural fill and site grading fill when the subgrade is very moist to wet. Consideration may be given to placing a support fabric between the natural soil and granular borrow.

3. Excavation

   Excavation at the site can be accomplished with typical excavation equipment. Consideration should be given to using excavation equipment with a flat cutting edge when excavating for building foundations in the clay and sand, to reduce disturbance of the bearing soil.

   In areas of fine-grained soil where excavations extend to very moist to wet soil near or below the groundwater level, excavation equipment will likely need to be supported from outside and above excavations, or supported on granular fill. If excavations will extend below the water level, care should be taken to dewater the excavations. The water level should be maintained below the base of the excavation during placement of fill and concrete. Free-draining gravel with less than 5 percent passing the No. 200 sieve should be used for fill and backfill below the original water level. Consideration could be given to using a support fabric above the subgrade prior to placement of free-draining gravel.

4. Cut and Fill Slopes

Temporary unretained excavation slopes above the water level may be constructed at 1½ horizontal to 1 vertical or flatter.

Permanent unretained cut and fill slopes may be constructed at 2 horizontal to 1 vertical or flatter, with a maximum height of 10 feet. Slopes should be protected from erosion by revegetation or other methods. Surface drainage should be directed away from cut and fill slopes.

5. Materials

Materials used as fill for the project are anticipated to consist of imported fill and the on-site soil. Recommendations for these materials are shown below:

a. Imported Fill

Structural fill placed below footings should consist of non-expansive granular soil. The fill should have less than 35 percent passing the No. 200 Sieve, a liquid limit no greater than 30% and a maximum particle size of less than 4 inches.

Structural fill placed below the water level should consist of free-draining gravel with less than 5 percent passing the No. 200 sieve.

b. On-Site Soil

Much of the on-site soil may be suitable for structural fill beneath footings and retaining walls, if it meets the criteria given above. The on-site soil may be used as site grading fill and utility trench backfill outside proposed settlement-sensitive improvements.

The use of the on-site soil for retaining wall backfill will depend on whether it meets specifications set by the retaining wall designer.

Depending on the moisture content of the soil at the time of construction, the soil may require wetting or drying prior to use as fill. Drying of the soil may not be practical during cold or wet times of the year.

6. Compaction

Compaction of materials placed at the site should equal or exceed the minimum densities as indicated below when compared to the maximum dry density as determined by ASTM D 1557.

Fill To Support	Compaction Criteria
Foundations	≥ 95%
Concrete Flatwork	≥ 90%
Pavement	
Base Course	≥ 95%
Fill placed below Base Course	≥ 90%
Landscaping	≥ 85%
Retaining Wall Backfill	85 - 90%

To facilitate the compaction process, the fill should be compacted at a moisture content within 2 percent of optimum. Fill should be placed in thin enough lifts to allow for proper compaction and be frequently tested for compaction.

If free-draining gravel is used as structural fill, it should be placed in lifts and adequately densified. We recommend full-time observation and testing during gravel placement.

7. Drainage

The collection and diversion of drainage away from the pavement surface is important to the performance of the pavement section. Proper surface drainage should be provided.

8. Construction Observation

An engineer from AGEC should observe excavations for footings prior to structural fill placement.

B. Shallow Foundations

1. Bearing Material

Footings for the proposed improvements may be supported on the undisturbed natural soil, or on compacted structural fill extending down to the undisturbed natural soil. Structural fill placed to support footings should extend out away from the edge of the footings a distance at least equal to the depth of fill placed beneath the footings.

Prior to placing structural fill, unsuitable fill, organics, topsoil, debris and other deleterious materials should be removed from areas of the proposed footings.

2. Bearing Pressure

Footings constructed as described above may be designed using a net allowable bearing pressure of 1,500 pounds per square foot (psf). If footings bear on natural sand or gravel, or on at least 2 feet of structural fill extending down to the natural soil, footings may be designed using an allowable net bearing pressure 2,500 psf.

3. Temporary Loading Conditions

The bearing pressure indicated above may be increased by one-half for temporary loading conditions such as for wind and seismic loads.

4. Settlement

We estimate that total and differential settlement will be less than 1 inch and ¾ inch, respectively, for footings designed and constructed as described above.

5. Minimum Footing Width and Embedment

Spread footings should have a width of at least 2 feet and a depth of embedment of at least 2½ feet, for adequate bearing capacity and frost protection, respectively.

C. Deep Foundations

As an alternative to shallow foundations, the boardwalks may be supported on a deep foundation system. We understand consideration is being given to supporting the boardwalk on helical piers. Use of helical piers may not be practical due to the presence of gravel and cobble up to approximately 6 inches in size. Consideration could be given to use of micropiles.

D. Lateral Earth Pressures

1. Lateral Resistance for Footings

Lateral resistance for spread footings is controlled by sliding resistance between the footing and the foundation soil. A friction value of 0.30 may be used in the design for ultimate lateral resistance. If the footings bear on natural sand or gravel, or on at least 2 feet of structural fill, a friction value of 0.45 may be used.

2. Retaining Structures

The following lateral earth pressures are given for design of retaining structures. The active condition is where the wall moves away from the soil. The passive condition is where the wall moves into the soil. The at-rest condition is where the wall does not move.

The values listed are equivalent fluid weights and assume a horizontal surface adjacent the top and bottom of the wall.

Backfill Type	Active	At-Rest	Passive
Clay/Silt	40 pcf	55 pcf	250 pcf
Sand/Gravel	35 pcf	50 pcf	300 pcf

3. Seismic Conditions

Under seismic conditions, equivalent fluid weights should be increased by 40 pcf and 25 pcf for the active and at-rest conditions, respectively. Equivalent fluid weights should be decreased by 40 pcf for the passive condition.

These values assume a peak ground acceleration of 0.66g, representing a 2 percent probability of exceedance in a 50-year period (ICC, 2021).

4. Safety Factors

The values recommended above assume mobilization of the soil to achieve ultimate soil strength. Conventional safety factors used for structural analysis for such items as overturning and sliding resistance should be used in design.

E. Seismic Design Considerations

1. Building Code Parameters

Listed below is a summary of the mapped seismic parameters that may be used with the 2021 International Building Code.

Description	Value[3]
Site Class	Default D[1]
S_s - MCE_R ground motion (period = 0.2s)	1.32g
S_1 - MCE_R ground motion (period = 1.0s)	0.49g
F_a - Site amplification factor at 0.2s	1.20
F_v - Site amplification factor at 1.0s	1.82[2]
PGA - MCE_G peak ground acceleration	0.60g
PGA_M - Site modified peak ground acceleration	0.66g

[1] Site Class Default D is recommended based on the test pit logs and our understanding of the geology of the area.

[2] See requirements for site-specific ground motions in ASCE 7-16 §11.4.8. F_v is used only to calculate T_s, determine the seismic design category and determine linear interpolation for intermediate values of S_1 when taking the exceptions under Items 1 and 2 within §11.4.8.

[3] Values obtained using the ASCE Hazard Tool at https://ascehazardtool.org.

2. Faulting

There are no mapped active faults extending through the trail alignment. The closest mapped active fault is the Provo Segment of the Wasatch Fault, located approximately 1¾ miles to the northeast of the site (Utah Geological Survey, 2025).

3. Liquefaction

Research indicates that soil which consists of loose, clean sand is most susceptible to liquefaction during a large magnitude earthquake event. In order for liquefaction to occur, the soil must be saturated. Liquefaction-susceptibility of soil tends to decrease with an increase in fines content and density.

The site is located in an area mapped as having a “very low” potential for liquefaction (Anderson et al, 1994). However, saturated, liquefaction-susceptible soil, as described above, is often encountered adjacent to rivers and streams, and could be a hazard at the site.

A site-specific evaluation of the liquefaction potential is outside of this scope of this report.

F. Water Soluble Sulfates

A sample of the natural soil was tested in the laboratory for water soluble sulfate content. Results of the tests indicate there is less than 0.1 percent water soluble sulfate in the sample tested. Based on the results of the test and published literature, the natural soil at the site has a negligible sulfate attack potential on concrete. Sulfate resistant cement is not needed for concrete placed in contact with the natural soil. Other conditions may dictate the type of cement to be used in concrete for the project.

G. Pavement

Based on the subsoil conditions encountered, laboratory test results and the assumed traffic as indicated in the Proposed Construction section of the report, the following pavement support recommendations are given:

1. <u>Subgrade Support</u>
   The near surface soil consists of clay, sand and gravel. We have assumed a California Bearing Ratio (CBR) value of 3, representing a clay subgrade.

2. Pavement Thicknesses

Based on the subsurface conditions encountered, the assumed traffic as described in the proposed construction section, a design life of 20 years for flexible pavement and 30 years for rigid pavement, and methods presented by AASHTO, we recommend a flexible pavement section consisting of at least 3 inches of asphaltic concrete overlying 6 inches of base course. Alternatively, 5 inches of Portland Cement could be used.

Approximately 1 to 2 feet of granular borrow will likely be needed to facilitate pavement construction when the subgrade consists of very moist to wet clay as discussed in the Subgrade Preparation section of the report.

3. Pavement Material

a. Flexible Pavement (Asphaltic Concrete)

The pavement materials should meet the specifications for the applicable jurisdiction. The use of other materials may result in different pavement material thicknesses.

b. Rigid Pavement (Portland Cement Concrete)

The rigid pavement thicknesses given above assume that a concrete shoulder or curb will be placed at the edge of the pavement and that the pavement will have aggregate interlock joints.

The pavement materials should meet the specifications for the applicable jurisdiction. The pavement thicknesses indicated above assume that the concrete will have a 28-day compressive strength of 5,000 pounds per square inch. Concrete should be air entrained with approximately 6 percent air. Maximum allowable slump will depend on the method of placement but should not exceed 4 inches.

4. <u>Jointing</u>

Joints for concrete pavement should be laid out in a square or rectangular pattern. Joint spacings should not exceed 30 times the thickness of the slab or 15 feet, whichever is smallest. The joint spacings indicated should accommodate the contraction of the concrete and under these conditions steel reinforcing will not be required. The depth of joints should be approximately one-fourth of the slab thickness.

H. Retaining Walls

We understand several retaining walls, up to approximately 8 feet in height are proposed to be constructed adjacent to the trail. We understand the walls are proposed to consist of segmental block retaining walls, with mechanically stabilized earth (MSE).

Retaining walls may be designed using soil strength parameters provided below:

Soil Type	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
Clay	110	90	30
Sand	110	0	36
Gravel	130	0	38

We recommend that AGEC reviews retaining wall designs to verify recommendations from this report have been followed and to verify global stability conditions.

I. Continuing Services

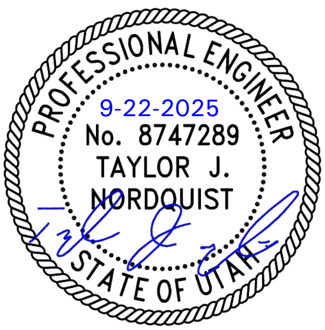
A preconstruction meeting should be held with representatives of the owner, project architect, geotechnical engineer, general contractor, earthwork contractor and other members of the design team to review construction plans, specifications, methods and schedule.

The geotechnical engineer should observe the excavation, earthwork and foundation phases of the work to determine that subsurface conditions are consistent with those used in the analysis and design. During site grading and placement of structural fill, the work should be observed and tested to confirm that the proper density has been achieved.

LIMITATIONS

This report has been prepared in accordance with generally accepted soil and foundation engineering practices in the area for the use of the client for design purposes. The conclusions and recommendations included within the report are based on the proposed construction, the information obtained from the test pits excavated, laboratory test results and our experience in the area. Variations in the subsurface conditions may not become evident until additional exploration or excavation is conducted. If the subsurface conditions, proposed construction or groundwater level is found to be significantly different from what is described above, we should be notified to reevaluate our recommendations.

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.



Taylor J. Nordquist P.E.

Reviewed by Jay R. McQuivey, P.E.

TJN/rs

REFERENCES

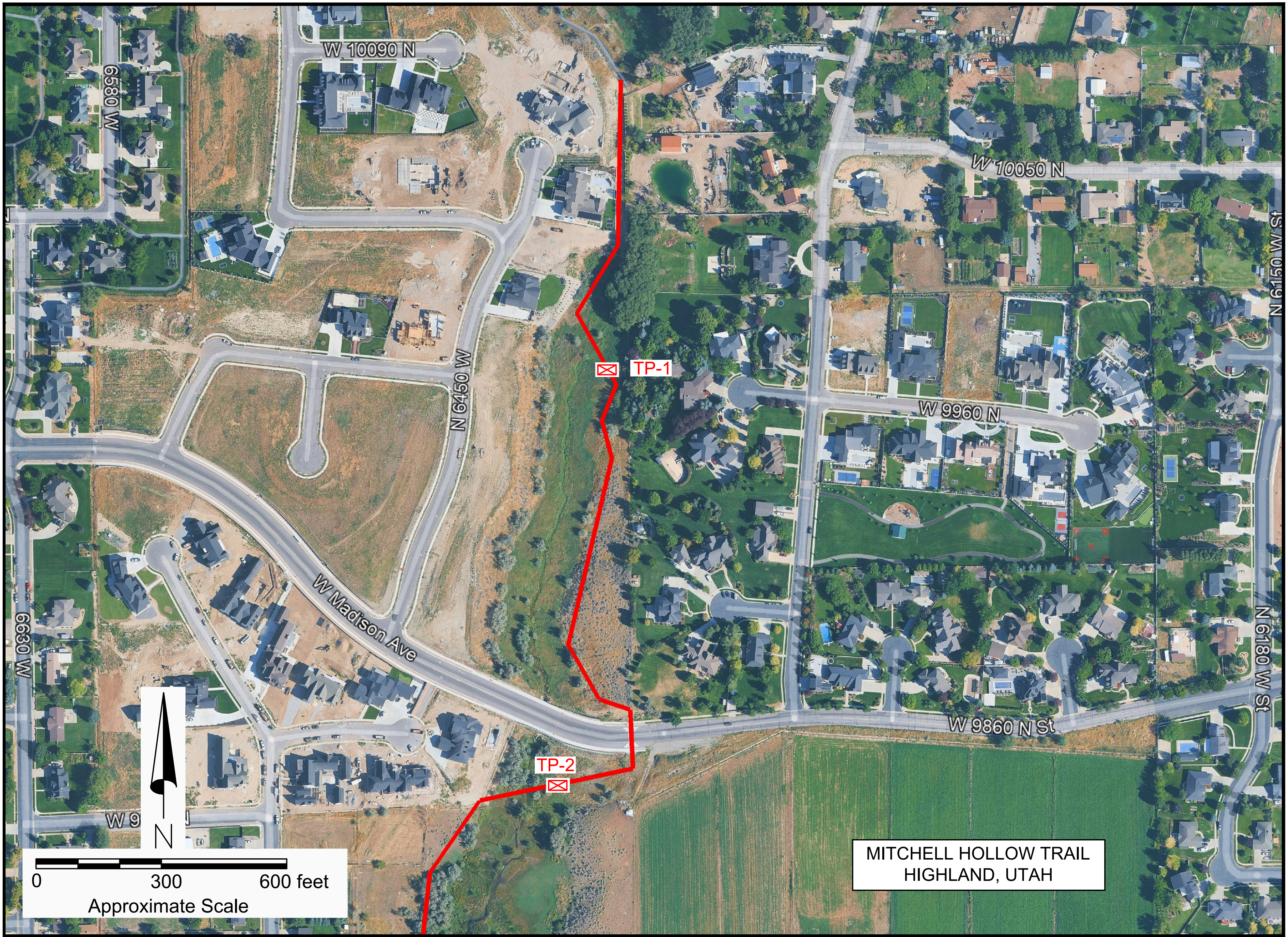
Anderson, L. R., Keaton, J. R. and Bischoff, J. E., 1994; Liquefaction Potential Map for Utah County, Utah Geological Survey Contract Report 94-8.

American Society of Civil Engineers (ASCE), 2017 "Minimum Design Loads and Associated Criteria for Buildings and Other Structures, Provisions" ASCE / SEI 7-16, American Society of Civil Engineers, Reston, Virginia.

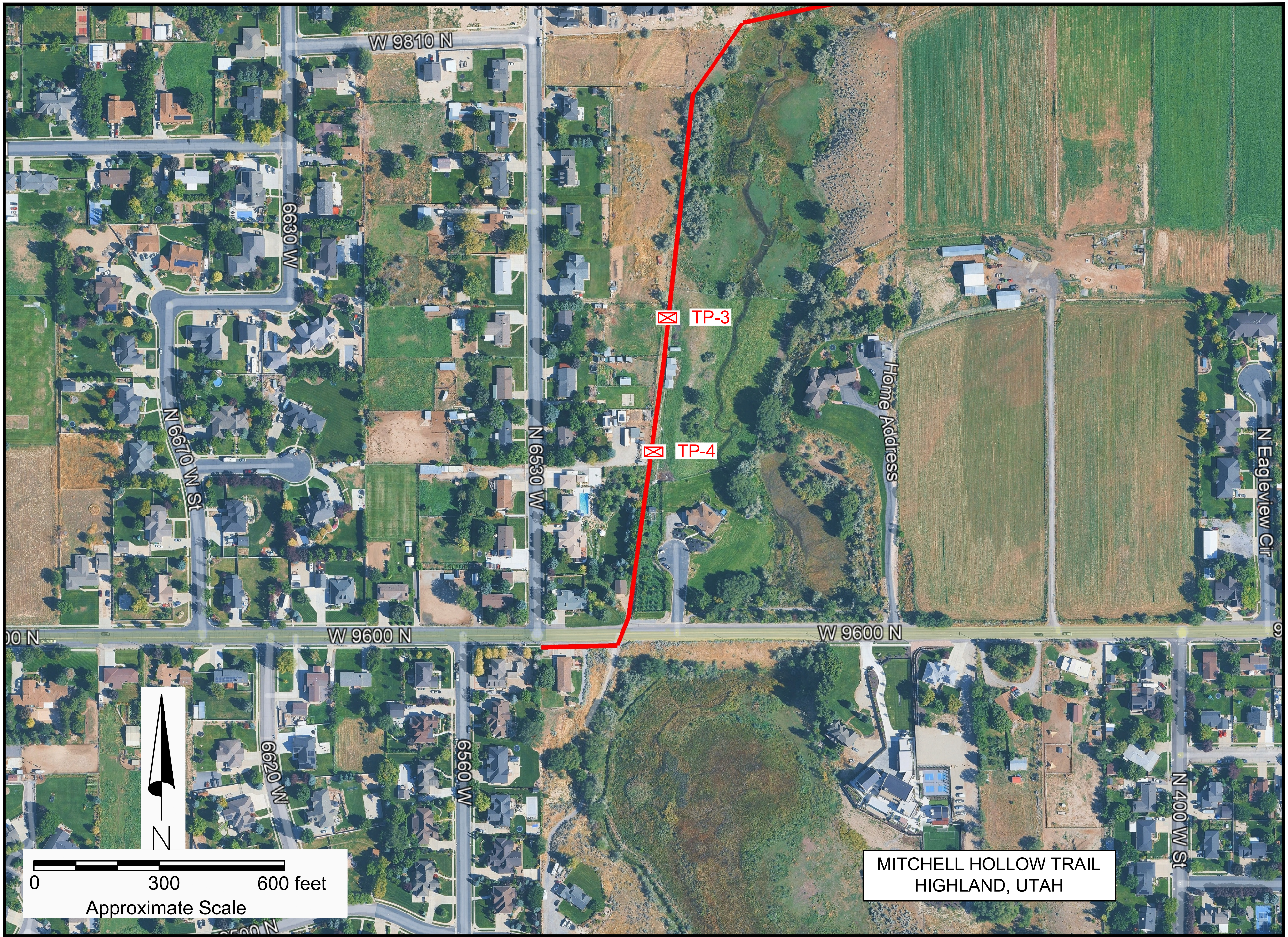
International Code Council Inc. (ICC), 2021; International Building Code. Falls Church, Virginia.

Utah Geological Survey, 2025; Utah Geologic Hazards Portal. Https://geology.utah.gov/apps/hazards. Accessed September 8, 2025.

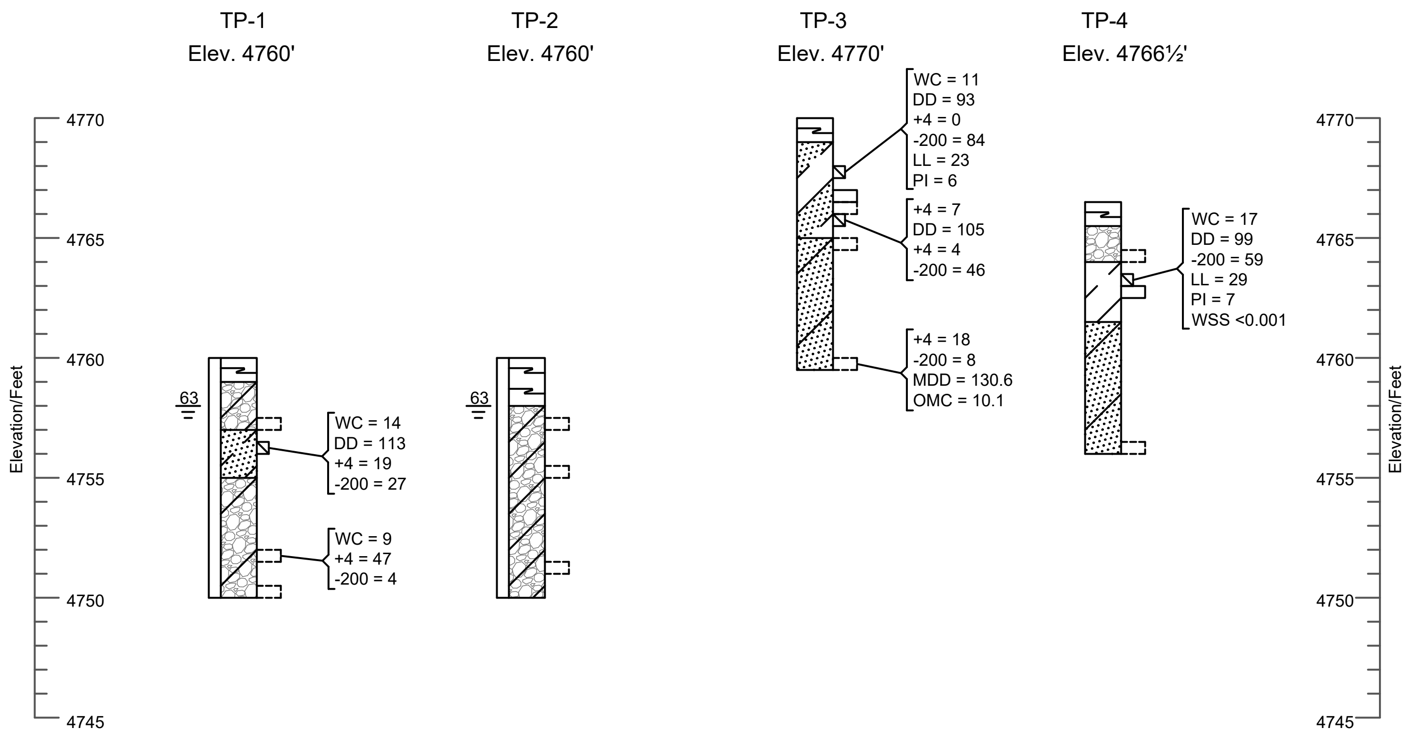
1250128	AGEC	Vicinity Map	Figure 1



1250128	AGEC	Test Pit TP-1 & TP-2 Locations	Figure 2



1250128	AGEC	Test Pit TP-3 & TP-4 Locations	Figure 3



Approximate Vertical Scale 1" = 8'

See Figure 5 for Legend and Notes

1250128	AGEC	Test Pit Logs	Figure 4

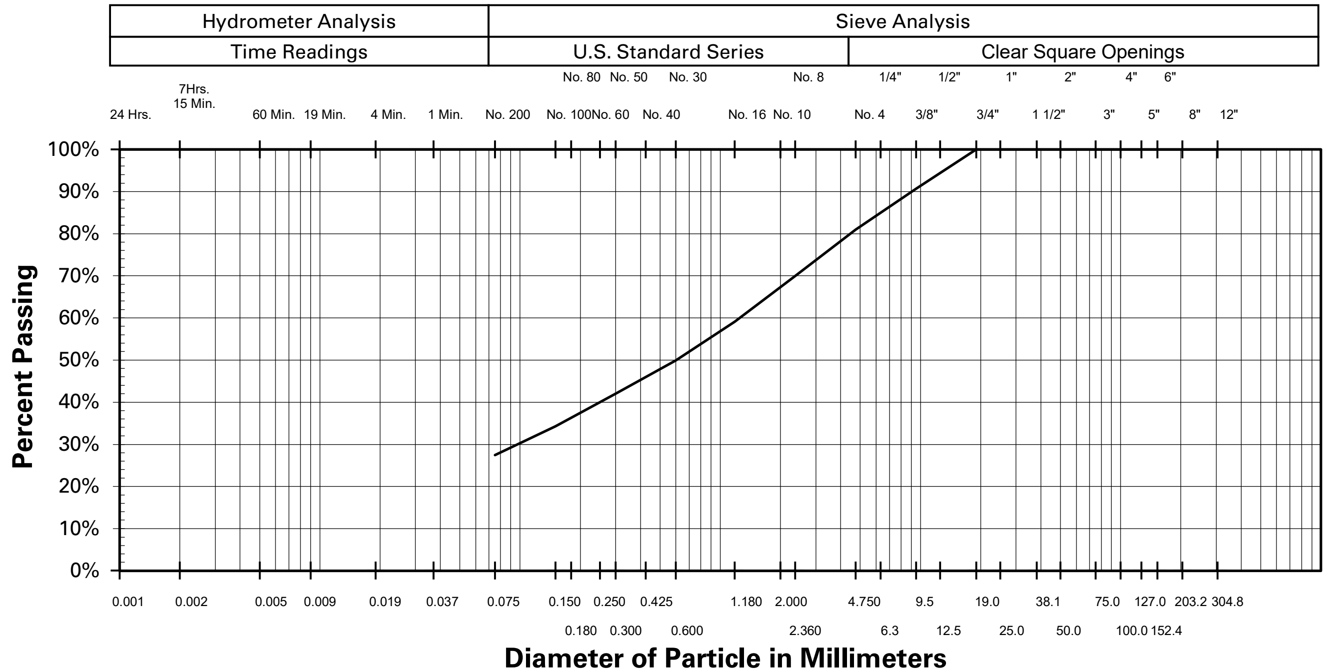
LEGEND:

- Topsoil; silty sand to poorly graded gravel with sand, slightly moist to moist, brown.
- Sandy Silty Clay (CL-ML); soft to medium stiff, moist, brown.
- Clayey Sand with Gravel (SC); medium dense to dense, wet, brown.
- Poorly Graded Sand with Silt and Gravel (SP-SM); loose to dense, slightly moist, brown.
- Interlayered Silty Clay with Sand and Silty Clayey Sand (CL-ML/SC-SM); occasional gravel layers, stiff, dense, slightly moist to moist, brown.
- Silty Gravel with Sand (GM); cobbles up to approximately ½ foot in size, medium dense to dense, moist to wet, brown.
- Poorly Graded Gravel with Silt (GP-GM); cobbles up to approximately ½ foot in size, dense, slightly moist to wet, brown.
- Indicates relatively undisturbed hand drive sample taken.
- Indicates disturbed sample taken.
- Indicates relatively undisturbed block sample taken.
- Indicates slotted 1½-inch PVC pipe installed in the test pit to the depth shown.
- 63 — Indicates the depth to free water and the number of days after excavation the measurement was taken.

NOTES :

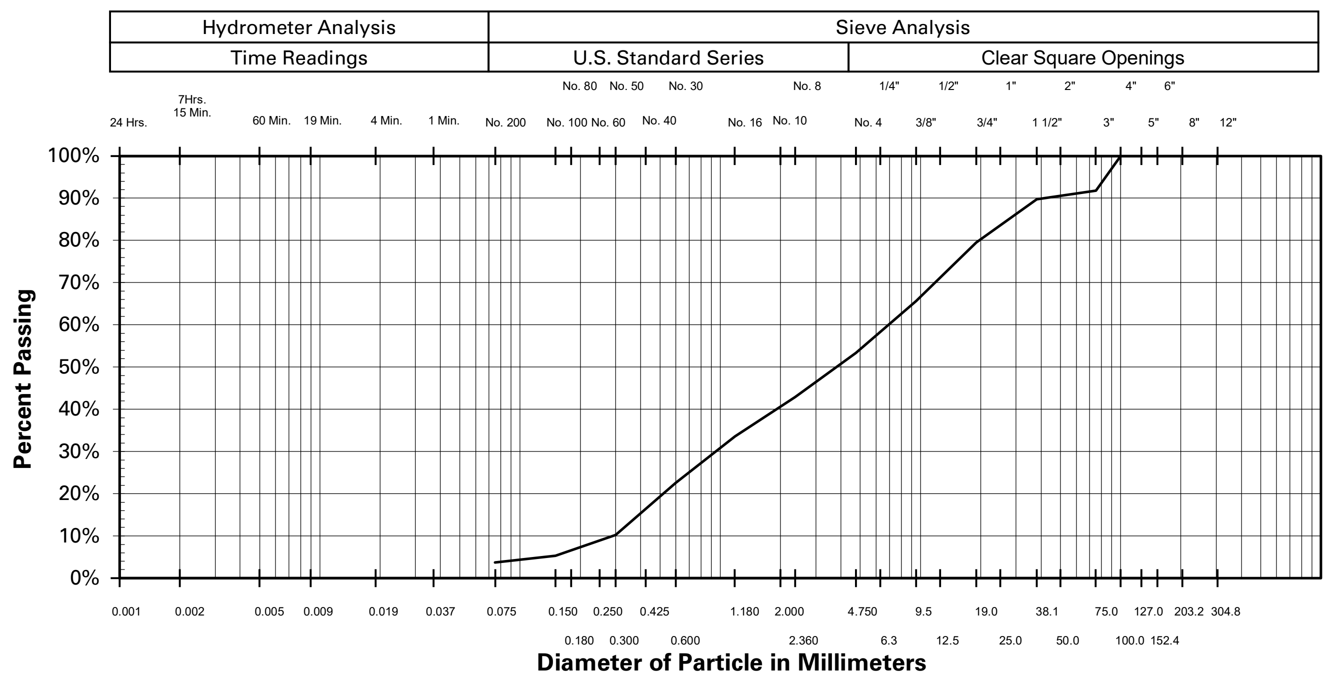
1. The test pits were excavated on June 19, 2025 with a mini excavator.
2. The locations of the test pits were measured using hand GPS
3. The elevations of the test pits were determined by interpolating between contours shown on the site plan provided.
4. The test pit locations and elevations should be considered accurate only to the degree implied by the method used.
5. The lines between materials shown on the test pit log represent the approximate boundaries between materials and the transitions may be gradual.
6. The water level readings shown on the logs were made at the time and under the conditions indicated. Fluctuations in the water level will occur with time.
7. WC = Water Content (%);
   DD = Dry Density (pcf);
   +4 = Percent Retained on the No. 4 Sieve;
   -200 = Percent Passing the No. 200 Sieve;
   LL = Liquid Limit (%);
   PI = Plasticity Index (%);
   WSS = Water Soluble Sulfates (%);
   MDD = Maximum Dry Density (ASTM D-1557; pcf);
   OMC = Optimum Moisture Content (ASTM D-1557; %).

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.



Clay to Silt	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

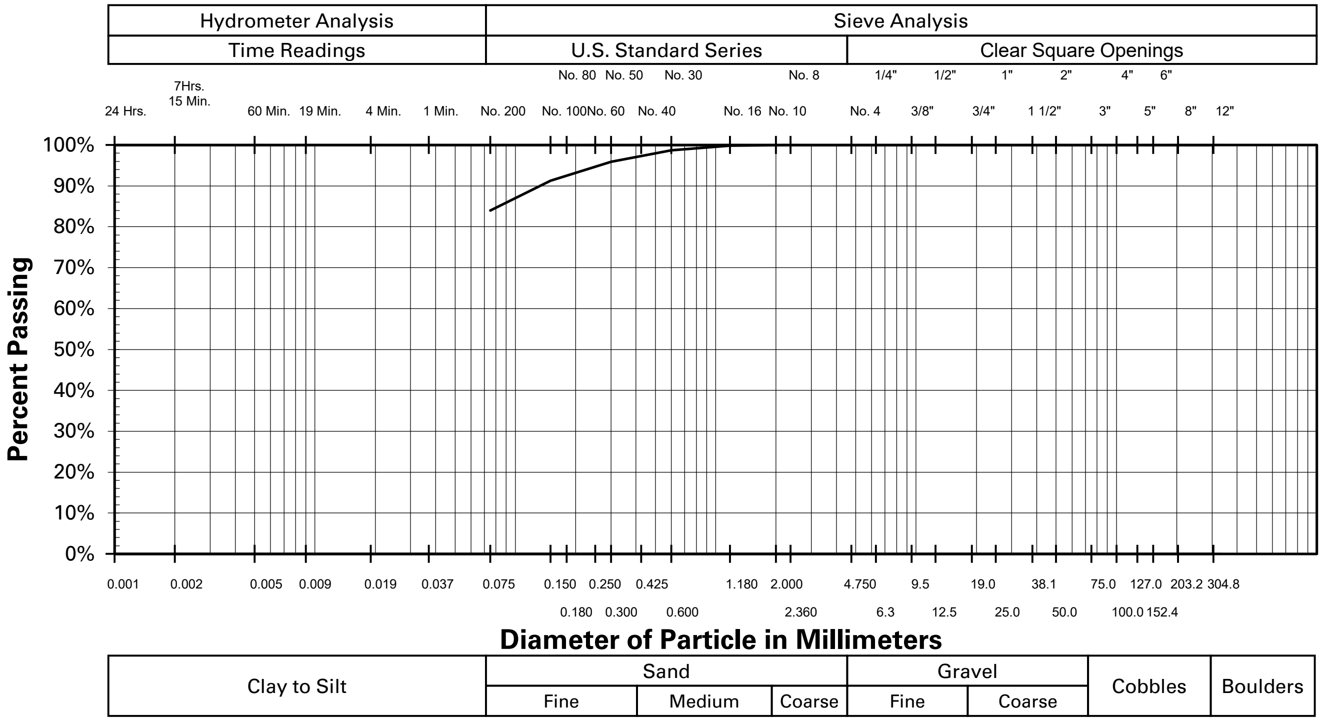
Gravel	19%	Liquid Limit	-
Sand	54%	Plasticity Index	-
Silt and Clay	27%	Sample Location	TP-1 @ 3½ feet
Sample Description	Clayey Sand with Gravel (SC)		



Clay to Silt	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

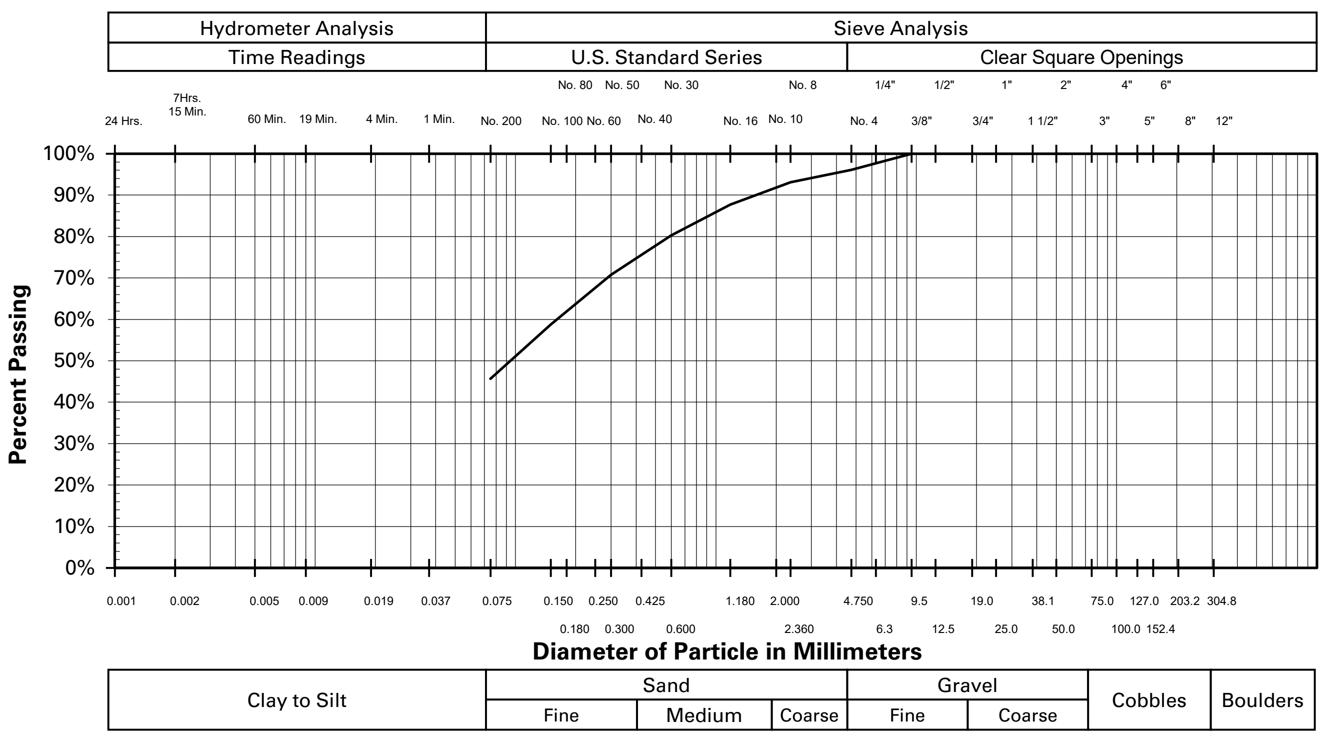
Gravel	47%	Liquid Limit	-
Sand	49%	Plasticity Index	-
Silt and Clay	4%	Sample Location	TP-1 @ 8 feet
Sample Description	Poorly Graded Sand with Gravel (SP)		

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.



Gravel	0%	Liquid Limit	23%
Sand	16%	Plasticity Index	6%
Silt and Clay	84%	Sample Location	TP-3 @ 2 feet

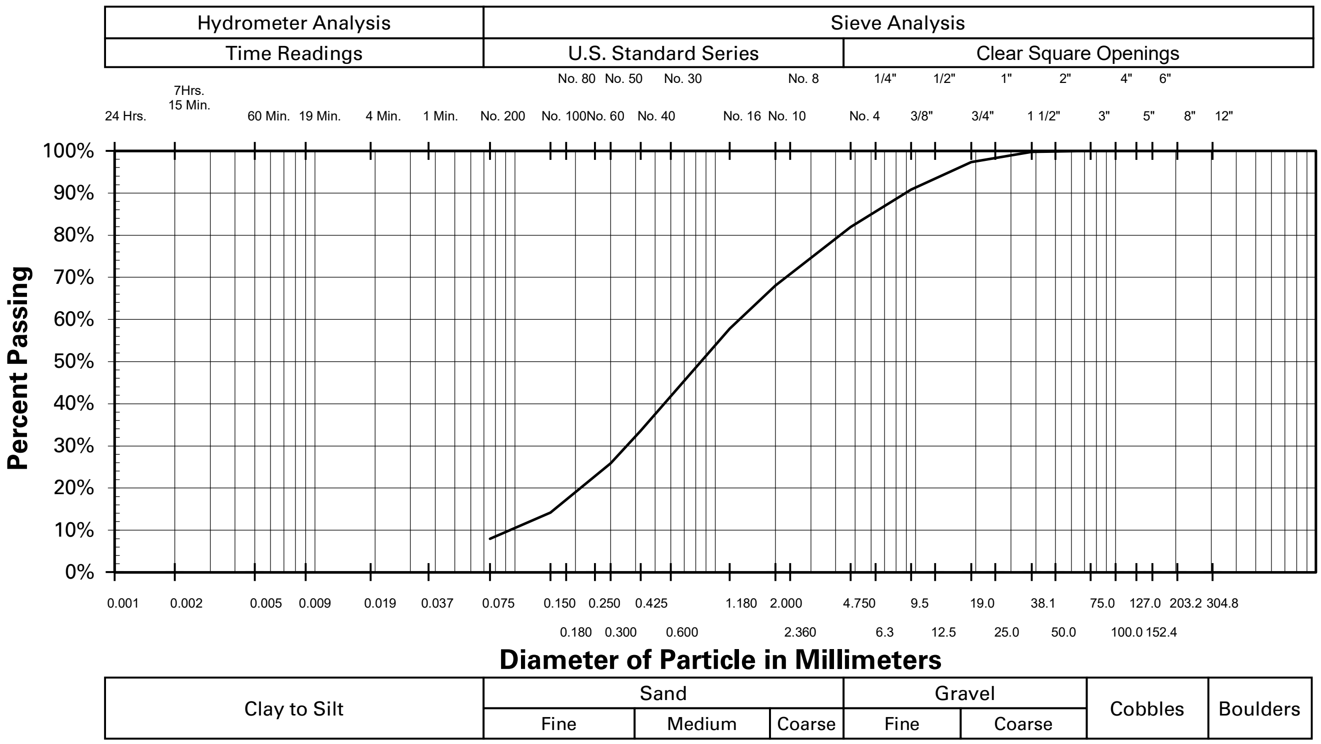
Sample Description Silty Clay with Sand (CL-ML)



Gravel	4%	Liquid Limit	-
Sand	50%	Plasticity Index	-
Silt and Clay	46%	Sample Location	TP-3 @ 4 feet

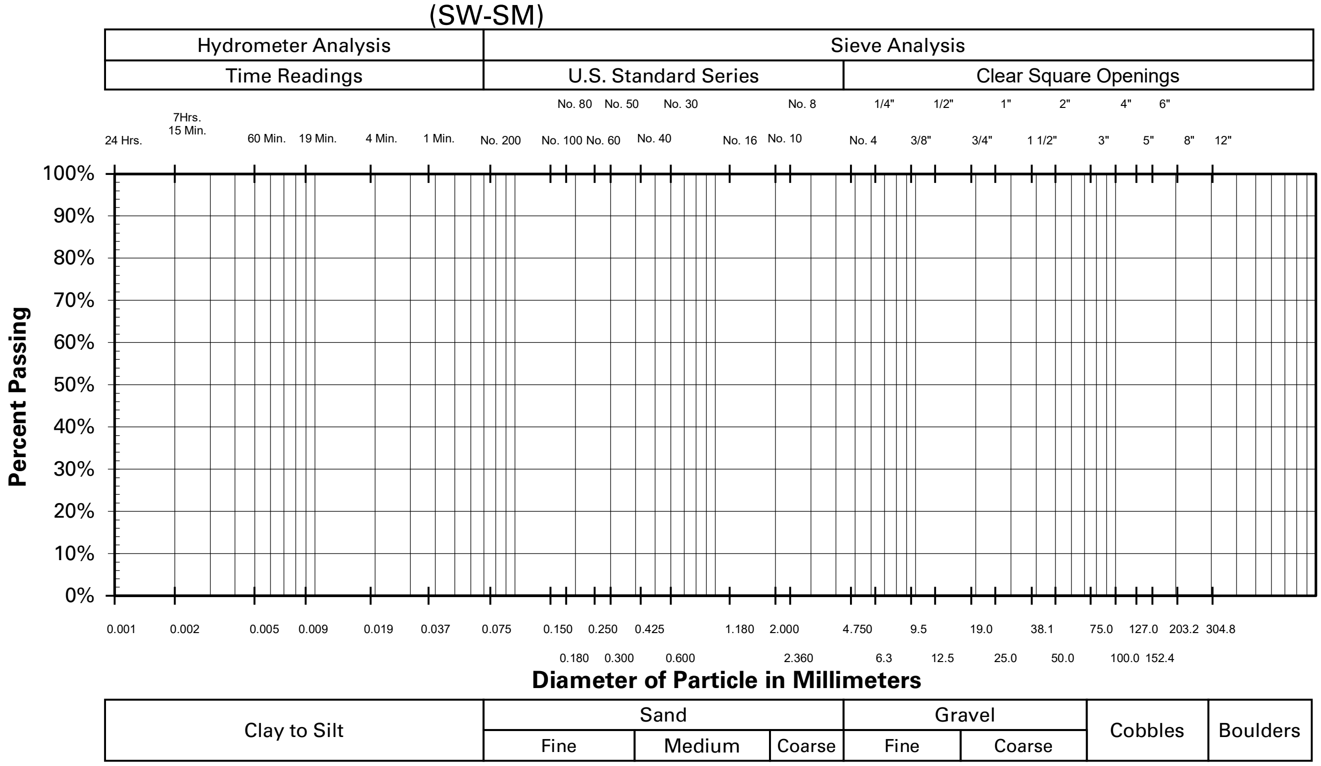
Sample Description Silty Clayey Sand (SC-SM)

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.



Gravel	18%	Liquid Limit	-
Sand	74%	Plasticity Index	-
Silt and Clay	8%	Sample Location	TP-3 @ 10'

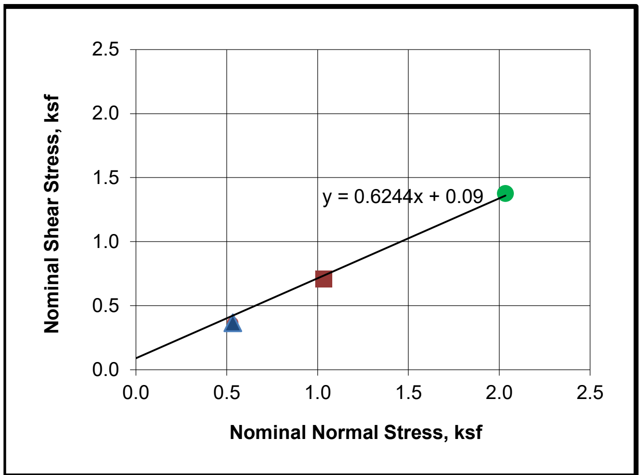
Sample Description: Well-Graded Sand with Silt and Gravel (SW-SM)

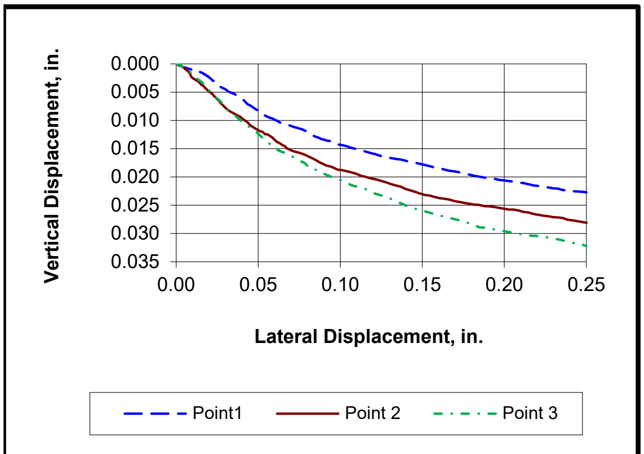


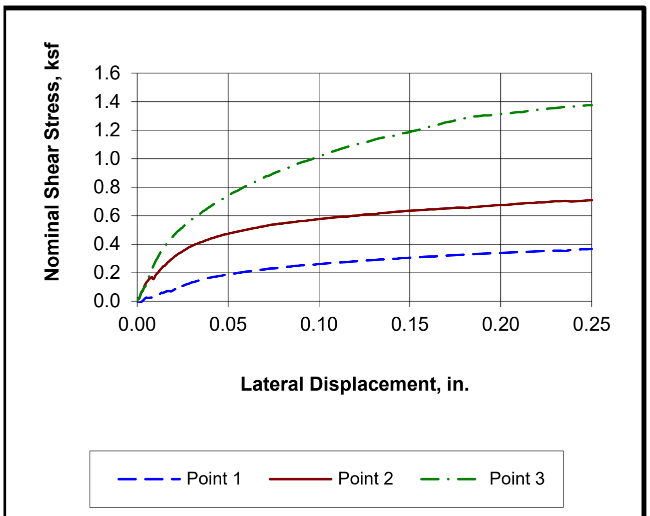
Gravel	-	Liquid Limit	-
Sand	-	Plasticity Index	-
Silt and Clay	-	Sample Location	

Sample Description

Applied Geotechnical Engineering Consultants, Inc.







c = 0 psf   ϕ = 34 °

Strength values based on linear regression line through peak shear stresses and forced through zero.

Project and Sample Information

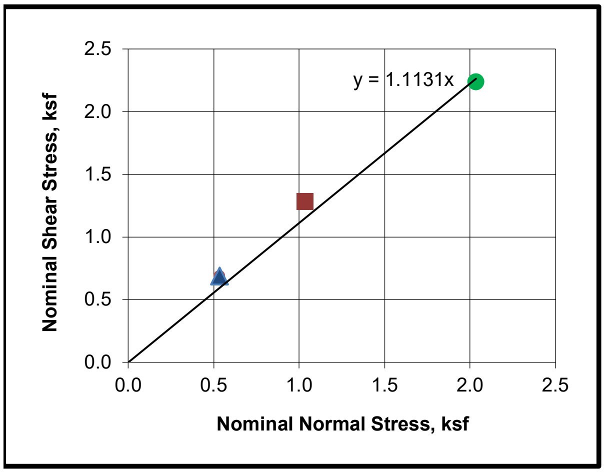
Project Number	1250016
Project Name	Mitchell Hollow Trail
Sample Identification	TP-3 at 2'
Sample Description	Silty Clay with Sand

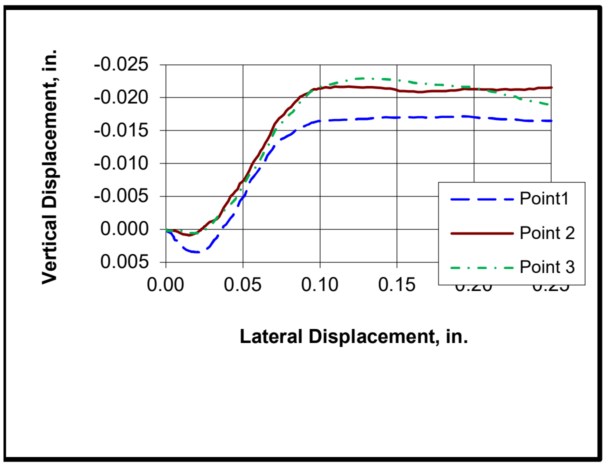
Test No. (Symbol)	1 (▲)	2 (■)	3 (●)
Test Type	Consolidated Drained Wetted		
Sample Type	Remolded		
Length, in.	1.00	1.00	1.00
Diameter, in.	2.42	2.42	2.42
Dry Density, pcf	93	94	93
Moisture Content, %	11	11	11
Consol. Load, ksf	0.534	1.034	2.034
Normal Load, ksf	0.534	1.034	2.034
Peak Shear Stress, ksf	0.37	0.71	1.38
Lateral Displacement, in	0.250	0.250	0.250
Relative Lateral Displacement, %	10.33	10.33	10.33
Rate of Strain, in/min	0.001	0.001	0.001
Gap Width, in	0.075	0.075	0.075

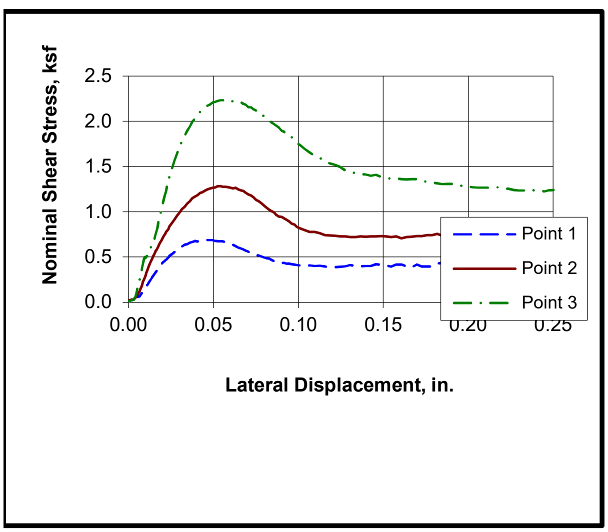
Each sample point was wetted and loaded and allowed to compress and soak overnight.
After the soak period, each sample point was sheared.
Each sample point consisted of -#10 sieve material that was remolded to approximately the insitu moisture content and dry density.

Direct Shear Sample Properties	
Dry Density, pcf	See Above
Moisture Content, %	See Above
Liquid Limit, %	23
Plasticity Index, %	6
Percent Gravel, >4.750mm	0
Percent Coarse Sand, 2.000mm-4.750mm	0
Percent Medium Sand, 0.425mm-2.000mm	3
Percent Fine Sand, 0.075mm-0.425mm	13
Percent Silt and Clay, <0.075mm	84

Applied Geotechnical Engineering Consultants, Inc.







c = 0 psf   ϕ = 48 º

Strength values based on linear regression line
through peak shear stresses and forced through zero.

Project and Sample Information

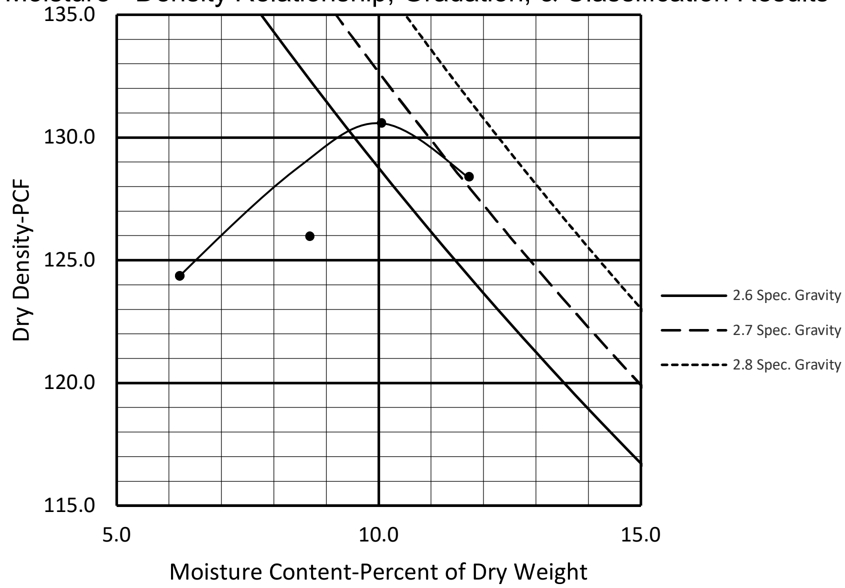
Project Number	1250128		
Project Name	Mitchell Hollow Trail		
Sample Identification	TP-3 at 10'		
Sample Description	Well-Graded Sand with Silt		
Test No. (Symbol)	1 (▲)	2 (■)	3 (●)
Test Type	Consolidated Drained Wetted		
Sample Type	Remolded		
Length, in.	1.00	1.00	1.00
Diameter, in.	2.42	2.42	2.42
Dry Density, pcf	120	120	120
Moisture Content, %	11	11	11
Consol. Load, ksf	0.534	1.034	2.034
Normal Load, ksf	0.534	1.034	2.034
Peak Shear Stress, ksf	0.69	1.29	2.24
Lateral Displacement, in	0.045	0.054	0.057
Relative Lateral Displacement, %	1.86	2.23	2.36
Rate of Strain, in/min	0.001	0.001	0.001
Gap Width, in	0.075	0.075	0.075

Each sample point was wetted and loaded
and allowed to compress and soak for at least 1 hour.
After the soak period, each sample point was sheared.
Each sample point consisted of material passing the #10 sieve, densely remolded to a moisture content of 11%, which appears to be close to the optimum moisture content that would be determined per ASTM D-1557.

Direct Shear Sample Properties	
Dry Density, pcf	120.4
Moisture Content, %	11
Liquid Limit, %	Non-Plastic
Plasticity Index, %	
Percent Gravel, >4.750mm	0
Percent Coarse Sand, 2.000mm-4.750mm	0
Percent Medium Sand, 0.425mm-2.000mm	50
Percent Fine Sand, 0.075mm-0.425mm	38
Percent Silt and Clay, <0.075mm	12

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, Inc.

Moisture - Density Relationship, Gradation, & Classification Results



SAMPLE IDENTIFICATION

Project Name: Mitchell Hollow Trail

Project No. 1250128
Sample No. 19025

Sample Location: TP-3 at 10'

Date Sampled: 06/20/25
Sampled By: AGEC

PROCTOR RESULTS

Maximum Dry Density (Corrected) 130.6 pcf
Optimum Moisture 10.1 %
Rock Correction *6.2 pcf*

Final Based on Microwave Oven Moisture Contents

VISUAL-MANUAL DESCRIPTION (ASTM D2488)

Poorly Graded Sand with Silt and Gravel (SP-SM)

TESTING INFORMATION

Date Tested: 06/26/25
Tested By: AC/BK
Reviewed By: KBB
Test Procedure: ASTM D1557 A
Specific Gravity: Assumed 2.7
Moisture Curing: Not Used

ATTERBERG DATA

Plasticity Determined by ASTM D 2488

GRADATION RESULTS

Sieve Designation	Sieve Opening Size (mm)	Percent Passing (%)	Project Specification (%)
4"	100	100	-
3"	76.2	100	-
1 1/2"	38.1	100	-
3/4"	19.1	97	-
3/8"	9.52	91	-
#4	4.76	82	-
#10	2	68	-
#16	1.19	58	-
#40	0.42	34	-
#50	0.297	26	-
#100	0.149	14	-
#200	0.074	8	-

GRAVEL	SAND	SILT & CLAY
18%	74%	8%

Figure 11

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

TABLE I
SUMMARY OF LABORATORY TEST RESULTS

PROJECT NUMBER:1250128

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION			ATTERBERG LIMITS		WATER SOLUBLE SULFATE (%)	MODIFIED PROCTOR		SAMPLE CLASSIFICATION
TEST PIT	DEPTH (FEET)			GRAVEL (%)	SAND (%)	SILT/ CLAY (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)		MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	
TP-1	3½	14	113	19	54	27						Clayey Sand with Gravel (SC)
	8	9		47	49	4						Poorly Graded Sand with Gravel (SP)
TP-3	2	11	93	0	16	84	23	6				Silty Clay with Sand (CL-ML)
	4	7	105	4	50	46						Silty, Clayey Sand (SC-SM)
	10			18	74	8				130.6	10.1	Well-graded Sand with Silt and Gravel (SW-SM)
TP-4	3	17	99			59	29	7	<0.001			Sandy Silty Clay (CL-ML)