AGEC
Applied GeoTech

THE CHURCH OF **JESUS CHRIST** OF LATTER-DAY SAINTS	Geotechnical Evaluation Report

PROPOSED SEMINARY BUILDING
WEST POINT JUNIOR HIGH SCHOOL

4500 WEST AND 920 SOUTH

WEST POINT, UTAH

Prepared For:

The Church of Jesus Christ of Latter-day Saints
Utah North PM Office
435 North Wall Avenue, Suite D
Ogden, Utah 84404

Attention: Brian Childs

AGEC Applied GeoTech Project No. 1230670	**Applied Geotechnical Engineering Consultants, Inc.** January 2, 2024	PROFESSIONAL ENGINEER 1/2/2024 No. 177892 JAY R. MCQUIVEY STATE OF UTAH

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EXECUTIVE SUMMARY

1. Approximately 1 foot of topsoil overlying sandy silt and silty sand was encountered in the borings. The silt and sand extend to a depth of approximately 12½ feet below the ground surface. Clay was encountered below the silt and sand and extends to the full depth of the borings, approximately 15½ feet.

   CPT soundings encountered predominantly sandy silt and silty sand to a depth of approximately 12½ feet underlain by clay to a depth of approximately 16 feet. Predominantly sand with some silt and clay layers was encountered to a depth of approximately 31 feet. Predominantly clay was encountered below a depth of approximately 31 feet to the maximum depth explored, approximately 50 feet.

2. Subsurface water was encountered at a depth of approximately 4½ feet based on measurements taken on December 21, 2023.

3. In our professional opinion, the site is suitable for the proposed development. However, the silt and sand below the subsurface water level, extending from depths of approximately 4½ to 12½ feet below the ground surface, is potentially susceptible to liquefaction. Due to the relatively shallow depth of subsurface water and soil susceptible to liquefaction, it is our professional opinion that loss of foundation support is a potential risk if footings are supported too close to the liquefiable soil. There is a potential for liquefaction-induced settlement on the order of 1 to 1½ inches. Ground improvement such as aggregate piers extending to a depth of approximately 12 feet may be used to mitigate the liquefaction hazard at this site.

4. The proposed building may be supported on spread footings bearing on soil improved using aggregate piers or on compacted structural fill extending down to the improved soil. Where aggregate piers are used, the allowable bearing pressure would be determined by the aggregate pier designer.

5. The upper soil generally consists of sandy silt and silty sand. Construction equipment access difficulties may be encountered for rubber-tired construction equipment when the upper soil is very moist to wet or where excavation extends down to the very moist to wet soil. Placement of approximately 1½ to 2 feet of granular borrow may be needed to provide construction equipment access over the upper natural soil where it is very moist to wet.

6. Geotechnical information related to foundations, subgrade preparation, seismicity and liquefaction and materials is included in the report.

INTRODUCTION

This report presents the results of a geotechnical investigation for the proposed seminary building near a new junior high school under construction in West Point, Utah. The site is at approximately 4500 West and 920 South as shown on Figure 1. The report is prepared for The Church of Jesus Christ of Latter-day Saints.

AUTHORIZATION

Notice to proceed was given by email from Brian Childs of The Church of Jesus Christ of Latter-day Saints with an agreement dated November 17, 2023.

PROJECT DESCRIPTION, PURPOSE OF EVALUATION, AND SCOPE OF WORK

This report has been prepared to provide geotechnical design information for the proposed seminary building. The report presents the subsurface conditions encountered at the site, laboratory test results and recommendations for foundation support and pavement. The study was conducted in general accordance with the scope of services outlined in our proposal dated August 25, 2023.

Field exploration was conducted to obtain information on the subsurface conditions. Samples obtained from the field investigation were tested in the laboratory to determine physical and engineering characteristics of the on-site soil. Information obtained from the field and laboratory was used to define conditions at the site for our engineering analysis and to develop recommendations for the proposed foundations and pavement.

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.

Figures 1, 2 and 3 are included with the report and present the site location, locations of the borings and cone penetration test, logs of subsurface conditions encountered in the borings, legend and notes of borings and the results of laboratory testing. The results of the CPT are included in the appendix. Laboratory test results are summarized on Table I.

DESIGN CRITERIA

We understand that the seminary building will be a single-story, wood-frame structure with a slab-on-grade floor.

We understand that wall loads will be between 2,000 and 4,000 pounds per lineal foot and column loads will be between 10,000 and 60,000 pounds.

We understand that paved parking and drive areas are planned. We have assumed the following traffic conditions for the pavement analysis:

Pavement Area	Equivalent Single 18 kip Axle Loads
Parking	6 per week
Drive Lanes	15 per week

A 40-year pavement life is assumed for the pavement design.

If the proposed construction or design criteria are different from those described above, we should be notified so that we can reevaluate the recommendations given.

SITE CONDITIONS

The site is located at approximately latitude 41.1007 degrees north and longitude 112.1114 degrees west.

The site consists of a vacant lot south of a junior high school, which is under construction to the north. It appears that the site was previously part of a larger cultivated field.

The site is relatively flat with a gentle slope down to the west. The site has an approximate elevation of 4,230 feet based on the survey provided.

Vegetation at the site generally consists of brush and weeds. Portions of the site have been cleared of vegetation.

The site is surrounded by undeveloped fields to the south, east and west and by the junior high school site to the north. There are houses in the distance to the east and west. The site is bordered on the south by 920 South Street, which is a two-lane asphalt-paved road.

FIELD STUDY

Two borings were drilled and cone penetration test (CPT) soundings obtained on December 7, 2023. The approximate locations of the borings and CPT are shown on Figure 2. The borings were logged and soil samples obtained by a geologist from AGEC. Logs of the subsurface conditions encountered in the borings are graphically shown on Figure 3. The results of the CPT are included in the appendix.

SUBSURFACE WATER AND SUBSURFACE SOIL CONDITIONS

Approximately 1 foot of topsoil overlying sandy silt and silty sand was encountered in the borings. The silt and sand extend to a depth of approximately 12½ feet below the ground surface. Clay was encountered below the silt and sand and extends to the full depth of the borings, approximately 15½ feet.

CPT soundings encountered predominantly sandy silt and silty sand to a depth of approximately 12½ feet underlain by clay to a depth of approximately 16 feet. Predominantly sand with some silt and clay layers was encountered to a depth of approximately 31 feet. Predominantly clay was encountered below a depth of approximately 31 feet to the maximum depth explored, approximately 50 feet.

Subsurface water was encountered at a depth of approximately 4½ feet based on measurements taken on December 21, 2023. Fluctuations in the subsurface water level will occur over time. An evaluation of the fluctuations in the subsurface water level is beyond the scope of this report.

A description of the soil encountered in the borings follows:

> Topsoil - The topsoil consists of silty sand to sandy silt. It is wet, dark brown and contains roots.
>
> Lean Clay - The clay is very soft, wet and dark gray.
>
> Sandy Silt and Silty Sand - The silt and sand are interlayered. The interlayered soil is medium dense, slightly moist to wet and brown to dark gray.

LABORATORY TESTING

A. General

A laboratory testing program was conducted to determine engineering characteristics of the subsurface soil. Results of the laboratory tests are summarized on Table I and are included on the boring logs.

B. Gradation Analysis

Two samples of clay were tested in the laboratory for percent passing the No. 200 sieve. The samples of clay tested were found to have 99 percent passing the No. 200 sieve.

Four samples of the interlayered soil were tested in the laboratory for percent passing the No. 200 sieve. Samples tested were found to have 8 to 37 percent passing the No. 200 sieve.

C. Natural In-Place Moisture and Density Tests

Samples of clay tested in the laboratory were found to have natural moisture contents of 59 to 63 percent and natural dry densities of 64 to 65 pounds per cubic foot (pcf).

Samples of the interlayered soil tested in the laboratory were found to have natural moisture contents of 17 to 28 percent and natural dry densities of 91 to 109 pcf.

D. Consolidation Tests

One consolidation test was conducted on a sample of the upper interlayered soil. The test results indicate that the soil will compress a small amount with the addition of light to moderate loads. Results of the consolidation test are presented on Figure 4.

Two consolidation tests were conducted on samples of the lean clay from a depth of 14 feet. The test results indicate that the soil will compress a moderate amount with the addition of light to moderate loads. Results of the consolidation tests are presented on Figures 5 and 6.

E. Chemical Tests

One sample of the natural soil was tested in the laboratory for water soluble sulfate content. The sample tested was found to have less than 0.1 percent water soluble sulfates. The test results indicate that the sample tested has a negligible sulfate attack potential on concrete. No special cement type is required for concrete placed in contact with the natural soil based on the results of this test.

F. Topsoil

A sample of topsoil obtained from Boring B-3 was submitted to a subcontract laboratory for topsoil evaluation. Topsoil testing was not completed by the time of this report and the results will be provided when they become available.

FINDINGS AND RESULTS

Approximately 1 foot of topsoil overlying sandy silt and silty sand was encountered in the borings. The silt and sand extend to a depth of approximately 12½ feet below the ground surface. Clay was encountered below the silt and sand and extends to the full depth of the borings, approximately 15½ feet.

CPT soundings encountered predominantly sandy silt and silty sand to a depth of approximately 12½ feet underlain by clay to a depth of approximately 16 feet. Predominantly sand with some silt and clay layers was encountered to a depth of approximately 31 feet. Predominantly clay was encountered below a depth of approximately 31 feet to the maximum depth explored, approximately 50 feet.

Subsurface water was encountered at a depth of approximately 4½ feet based on measurements taken on December 21, 2023.

Logs of the borings are presented on Figure 3. The elevations of the borings as indicated on the logs were provided by a surveyor who was working at the site at the time of our field study.

The soils are identified by visual and laboratory classifications based on the Unified Soil Classification System. A chart for the Unified Soil Classification System is included in the appendix.

RECOMMENDATIONS AND CONCLUSIONS

A. General

In our professional opinion, the site is suitable for the proposed development. However, the sand and silt below the subsurface water level, extending from depths of approximately 4½ to 12½ feet below the ground surface, is potentially susceptible to liquefaction. Due to the relatively shallow depth of subsurface water and soil susceptible to liquefaction, it is our professional opinion that loss of foundation support is a potential risk if footings are supported too close to the liquefiable soil. There is a potential for liquefaction-induced settlement on the order of 1 to 1½ inches. Ground improvement such as aggregate piers extending to a depth of approximately 12 feet may be used to mitigate the liquefaction hazard at this site.

The proposed building may be supported on spread footings bearing on soil improved using aggregate piers or on compacted structural fill extending down to the improved soil. Where aggregate piers are used, the allowable bearing pressure would be determined by the aggregate pier designer.

B. Temporary Excavations

Temporary unretained excavations in the natural soil may be sloped at 1½ horizontal to 1 vertical or flatter. The temporary excavation slopes indicated assume that the excavation is dewatered. Flatter slopes may be needed if there is water seepage into the excavation.

C. Utility Trenches

Utility trenches that do not extend below the original free water level may be backfilled with the natural soil exclusive of organics, debris and other deleterious material or may be backfilled with imported fill meeting project specifications. Utility trenches that extend below the original free water level should be backfilled with free-draining gravel.

Utility trench backfill should be compacted to at least 90 percent of the maximum dry density as determined by ASTM D 1557, except below the building area where it should be compacted to at least 95 percent of the maximum dry density as determined by ASTM D 1557 and should meet the material recommendations given for structural fill.

D. Site Grading

We anticipate that the main floor elevation will be within approximately 2 feet of existing grade.

If the site is raised on the order of 3 feet or more above the original grade, the site grading fill should be placed at least 2 to 4 months prior to construction of elements of the building that are sensitive to differential settlement. The settlement due to the load of the fill should be monitored to determine when the significant portion of the settlement has occurred and construction may proceed.

1. <u>Subgrade Preparation</u>

   Prior to placing grading fill or base course, the topsoil, organics, unsuitable fill, debris and other deleterious materials should be removed.

The upper soil generally consists of sandy silt and silty sand. Construction equipment access difficulties may be encountered for rubber-tired construction equipment when the upper soil is very moist to wet or where excavation extends down to the very moist to wet soil. Placement of approximately 1½ to 2 feet of granular borrow may be needed to provide construction equipment access over the upper natural soil where it is very moist to wet. Consideration may be given to placing a support fabric below the granular borrow.

2. Excavation

We anticipate that excavation at the site can be accomplished with typical excavation equipment. Care should be taken to avoid disturbing the natural soil to remain below building foundations.

Excavations that extend below the water level should be dewatered. The water level should be maintained below the base of the excavation during initial fill and concrete placement. Free-draining gravel with less than 5 percent passing the No. 200 sieve should be used for fill or backfill below the original water level. A filter fabric should be placed between the natural soil and free-draining gravel.

3. Cut and Fill Slopes

Permanent, unretained cut and fill slopes may be constructed at 2 horizontal to 1 vertical or flatter. Cut and fill slopes should be protected from erosion by revegetation or other methods. Surface drainage should be directed away from cut and fill slopes.

4. Materials

Listed below are materials recommended for imported structural fill:

Fill to Support	Recommendations
Footings	Non-expansive granular soil Passing No. 200 Sieve $<$ 35% Liquid Limit $<$ 30% Maximum size 4 inches
Floor Slab (Upper 4 inches)	Sand and/or Gravel Passing No. 200 Sieve $<$ 5% Maximum size 2 inches
Slab Support	Non-expansive granular soil Passing No. 200 Sieve $<$ 50% Liquid Limit $<$ 30% Maximum size 6 inches

The natural soil with a relatively high silt or clay content and not meeting the recommendations given above for imported structural fill is not recommended for use as structural fill below the proposed building area. The natural sand that meets the recommendations given above for imported structural fill may considered for use as structural fill within the proposed building area or as site grading fill or backfill. Soil used as structural fill, site grading fill or backfill should be free of topsoil, organics, debris and other deleterious materials.

The use of onsite soil as fill will likely require moisture conditioning (wetting or drying of the soil) to facilitate compaction. Drying of the soil may not be practical during cold or wet times of the year.

Free-draining gravel with less than 5 percent passing the No. 200 sieve should be used as fill below the original free water level.

5. 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 Slabs	≥ 90%
Pavement	
Base Course	≥ 95%
Fill placed below Base Course	≥ 90%
Landscaping	≥ 85%
Retaining Wall Backfill	85 - 90%

The moisture of the soil should be adjusted to within 2 percent of the optimum moisture content to facilitate compaction.

Fill materials placed for the project should be frequently tested for compaction. Full-time observation and testing should be provided for fill placed below the proposed building area. Fill should be placed in thin enough lifts to allow for proper compaction.

6. Drainage

The ground surface surrounding the proposed building should be sloped away from the building in all directions. Roof downspouts and drains should discharge beyond the limits of backfill.

E. Foundations

1. Bearing Material

We anticipate that ground improvement measures such as aggregate piers will be used to mitigate the liquefaction hazard. Spread footings may bear on the improved soil or on compacted structural fill that extends down to the improved soil. The allowable bearing pressure and anticipated settlement for spread footings supported on the improved soil would be determined by the specialty contractor designing the aggregate pier system.

2. Frost Depth

Exterior footings and footings beneath unheated areas should be placed at least 30 inches below grade for frost protection.

3. Foundation Base

The base of foundation excavations should be cleared of loose or deleterious material prior to structural fill or concrete placement.

4. Construction Observation

A representative of the geotechnical engineer should observe footing excavations prior to structural fill or concrete placement.

F. Interior Concrete Slabs on Grade

1. Slab Support

Concrete slabs may be supported on the undisturbed natural soil or on compacted structural fill that extends down to the undisturbed natural soil.

The topsoil, unsuitable fill, organics, debris and other deleterious materials should be removed from below proposed slabs.

2. Underslab Sand and/or Gravel

A 4-inch layer of free-draining sand and/or gravel (less than 5 percent passing the No. 200 sieve) should be placed below the concrete slabs for ease of construction and to promote even curing of the slab concrete.

3. Vapor Barrier

A vapor barrier should be placed under the concrete floor slab if the floor will receive an impermeable floor covering. The barrier will reduce the amount of water vapor passing from below the slab to the floor covering.

4. Cement Type

The natural soil tested in the laboratory was found to have a negligible sulfate attack potential on concrete. No special cement type is required for concrete placed in contact with the natural soil.

G. Exterior Concrete Slabs-on-Grade (Sidewalks, Curbs, Gutters, Misc.)

1. Slab Support

Exterior concrete slabs may be supported on the undisturbed natural soil or on properly compacted fill extending down to the undisturbed natural soil.

2. Concrete Type

The results of a water soluble content test conducted on the natural soil indicate that there is negligible water soluble sulfates in the natural soil. No special cement type is required for concrete placed in contact with the natural soil.

H. Sliding Resistance of Soils

Lateral resistance for footings placed on compacted structural fill or the natural sand is controlled by sliding resistance between the footing and foundation soil. A friction coefficient of 0.45 may be used in design for ultimate lateral resistance. The passive resistance of the soil adjacent footings may also be considered in design for lateral resistance of footings.

I. Lateral Earth Pressures

The following equivalent fluid weights are given for design of subgrade walls and 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 and the at-rest condition is where the wall does not move. The following values assume a horizontal surface adjacent the top and bottom of the wall.

Soil Type	Active	At-Rest	Passive
Clay & Silt	50 pcf	65 pcf	250 pcf
Sand & Gravel	40 pcf	55 pcf	300 pcf

Under seismic conditions, the equivalent fluid weight should be increased by 34 pcf for the active condition, increased by 19 pcf for the at-rest condition and decreased by 34 pcf for the passive condition. This assumes a peak horizontal ground acceleration of 0.56g for a 2 percent probability of exceedance in a 50-year period.

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

J. Seismicity Hazard Concerns, Liquefaction, Seismicity and Faulting

1. Building Code Parameters

Listed below is a summary of the site parameters that may be used with the 2021 International Building Code:

Description	Value[1]
Site Class	F[2]
S_s - MCE_R ground motion (period = 0.2s)	0.94g
S_1 - MCE_R ground motion (period = 1.0s)	0.33g
F_a - Site amplification factor at 0.2s	1.23[3]
PGA - MCE_G peak ground acceleration	0.41g
PGA_M - Site modified peak ground acceleration	0.56g

[1]Values obtained from information provided by the Applied Technology Council at https://hazards.atcouncil.org

[2]Site Class F was selected based on a potential for liquefaction-induced settlement and potential for loss of foundation support to occur for foundations supported near the soil layers susceptible to liquefaction. Site Class E would be selected based on conditions encountered to a depth of approximately 50 feet where the liquefaction hazard is mitigated. It was assumed that conditions similar to the upper 50 feet continue to a depth of 100 feet.

[3]As per section 20.3.1 of ASCE 7-16, an exception for performing a site response analysis is given for structures having fundamental periods of vibration less than 0.5 seconds. In our professional opinion, the value of Fa given in Table 11.4-1 for Site Class E may be used if the exception indicated in 20.3.1 of ASCE 7-16 is appropriate or if the liquefaction hazard is mitigated using ground improvement such as aggregate piers.

2. Faulting

There are no mapped active faults extending near or through the site. The closest mapped faults considered to be active are the Wasatch Fault, located approximately 10½ miles east of the site, and the Great Salt Lake faults, located approximately 10½ miles west-southwest of the site (UGS, 2023).

3. Liquefaction

The site is located within an area mapped as have a "high" liquefaction potential (Anderson and others, 1994). The soil type most susceptible to liquefaction during a large magnitude earthquake is loose, clean sand. The liquefaction potential tends to decrease with an increase in fines content and density.

A site-specific evaluation of the liquefaction potential was conducted based on the CPT. The sand and silt below the subsurface water level, extending from depths of approximately 4½ to 12 feet below the ground surface, is potentially susceptible to liquefaction. Due to the relatively shallow depth of subsurface water and soil susceptible to liquefaction, it is our professional opinion that loss of foundation support is a potential risk if footings are supported too close to the liquefiable soil. Our analysis indicates there is a potential for liquefaction-induced settlement on the order of 1 to 1½ inches. Ground improvement such as aggregate piers may be used to mitigate the liquefaction hazard at this site.

K. Pavement

Based on the subsurface soil conditions encountered, laboratory test results and the anticipated traffic described in the Proposed Construction section of the report, the following pavement support recommendations are given:

1. Subgrade Support

The near surface soil consists of silt and silty sand. A CBR of 3 percent was assumed for the subgrade soil.

2. Pavement Thickness

The pavement thicknesses calculated are based on the subsurface soil conditions, traffic conditions given, a design life of 40 years and methods presented by AASHTO.

a) Parking Areas

A pavement section consisting of 3 inches of asphaltic concrete overlying 9 inches of base course is recommended. The base course thickness may be reduced to 6 inches where at least 6 inches of granular borrow is provided. Alternatively, a pavement section consisting of 5 inches of Portland cement concrete may be used.

b) Drive Lanes

A pavement section consisting of 3 inches of asphaltic concrete overlying 12 inches of base course is recommended. The base course thickness may be reduced to 6 inches where at least 7 inches of granular borrow is provided. Alternatively, a pavement section consisting of 5 inches of Portland cement may be used.

c) Trash Enclosure Approach Slab

A Portland cement concrete section consisting of 6½ inches of Portland cement concrete overlying 4 inches of base course is recommended.

3. Maintenance

Routine maintenance for pavements should be anticipated. Asphaltic concrete pavements are typically designed for a design life of 20 years. The pavement sections given above are based on the requested design traffic over a 40-year period. The pavement surface will experience wear and deterioration over time and will likely require placement of surface treatments and/or milling/overlay during the requested design life.

4. Pavement Materials and Construction

The pavement materials should meet project material and compaction specifications.

5. Jointing

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. 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.

6. Testing

Pavement materials should be tested for conformance with project specifications. Compaction testing and concrete testing should be performed in accordance with project specifications.

L. Preconstruction Meeting

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

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 information obtained from the borings drilled and CPT soundings at the approximate locations indicated on Figure 2 and the data obtained from laboratory testing. Variations in the subsurface conditions may not become evident until additional exploration or excavation is conducted. If the proposed construction, subsurface conditions or groundwater level is found to be significantly different from what is described above, we should be notified to reevaluate the recommendations given.

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

PROFESSIONAL ENGINEER
1/2/2024
No. 177892
JAY R.
MCQUIVEY
STATE OF UTAH

Jay R. McQuivey, P.E.

Reviewed by Douglas R. Hawkes, P.E., P.G.

JRM/bw

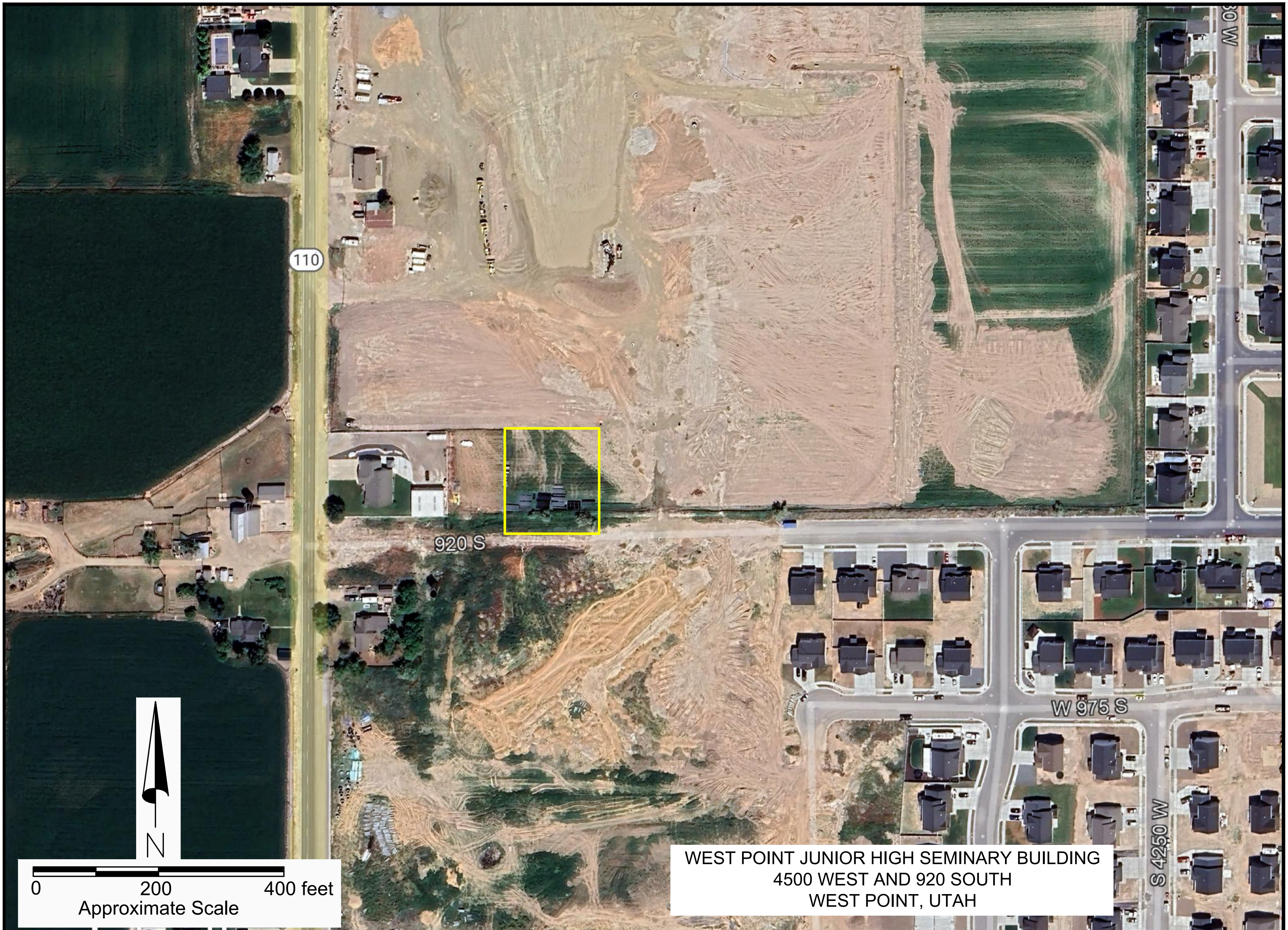
REFERENCES

American Society of Civil Engineers, 2017; Minimum design loads and associated criteria for buildings and other structures: ASCE/SEI 7-16, Reston, Virginia.

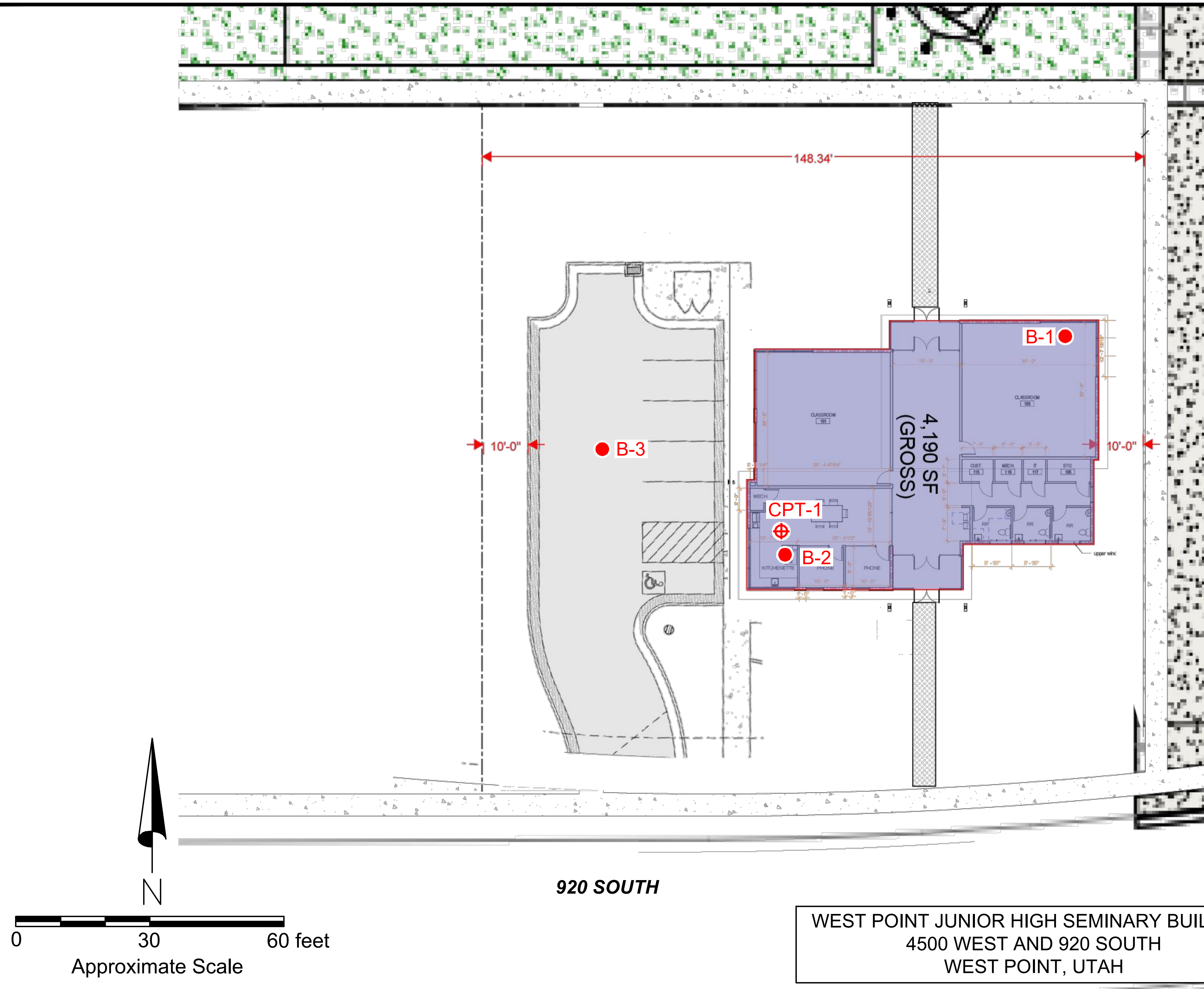
Anderson, L.R., Keaton, J.R., Aubrey, K. and Ellis, S., 1994; Liquefaction Potential Map for Davis County, Utah; Utah Geological Survey Contract Report 94-7.

International Code Council, 2020; 2021 International Building Code, Falls Church, Virginia. City, Utah.

Utah Geological Survey, 2023; Utah Quaternary Fault and Fold Database, http://geology.utah.gov/apps/qfaults accessed December 28, 2023.

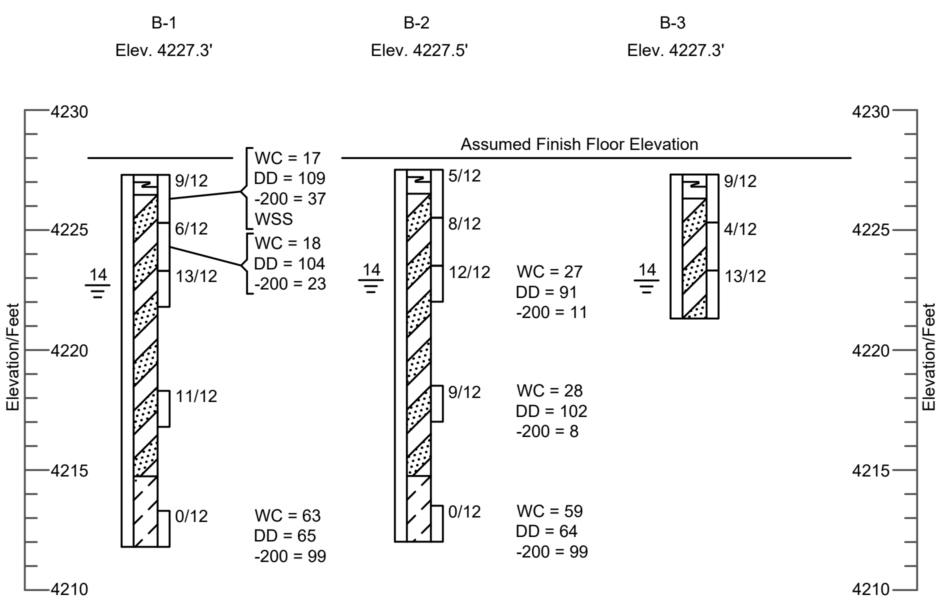


1230670	AGEC	Site Location	Figure 1



WEST POINT JUNIOR HIGH SEMINARY BUILDING
4500 WEST AND 920 SOUTH
WEST POINT, UTAH

1230670	AGEC	Exploratory Boring and CPT Locations	Figure 2



Approximate Vertical Scale 1" = 8'

LEGEND:

Topsoil; silty sand to sandy silt, wet, dark brown, roots.

Lean Clay (CL); very soft, wet, dark gray.

Sandy Silt and Silty Sand (ML/SM); interlayered, medium dense, slightly moist to wet, brown to dark gray.

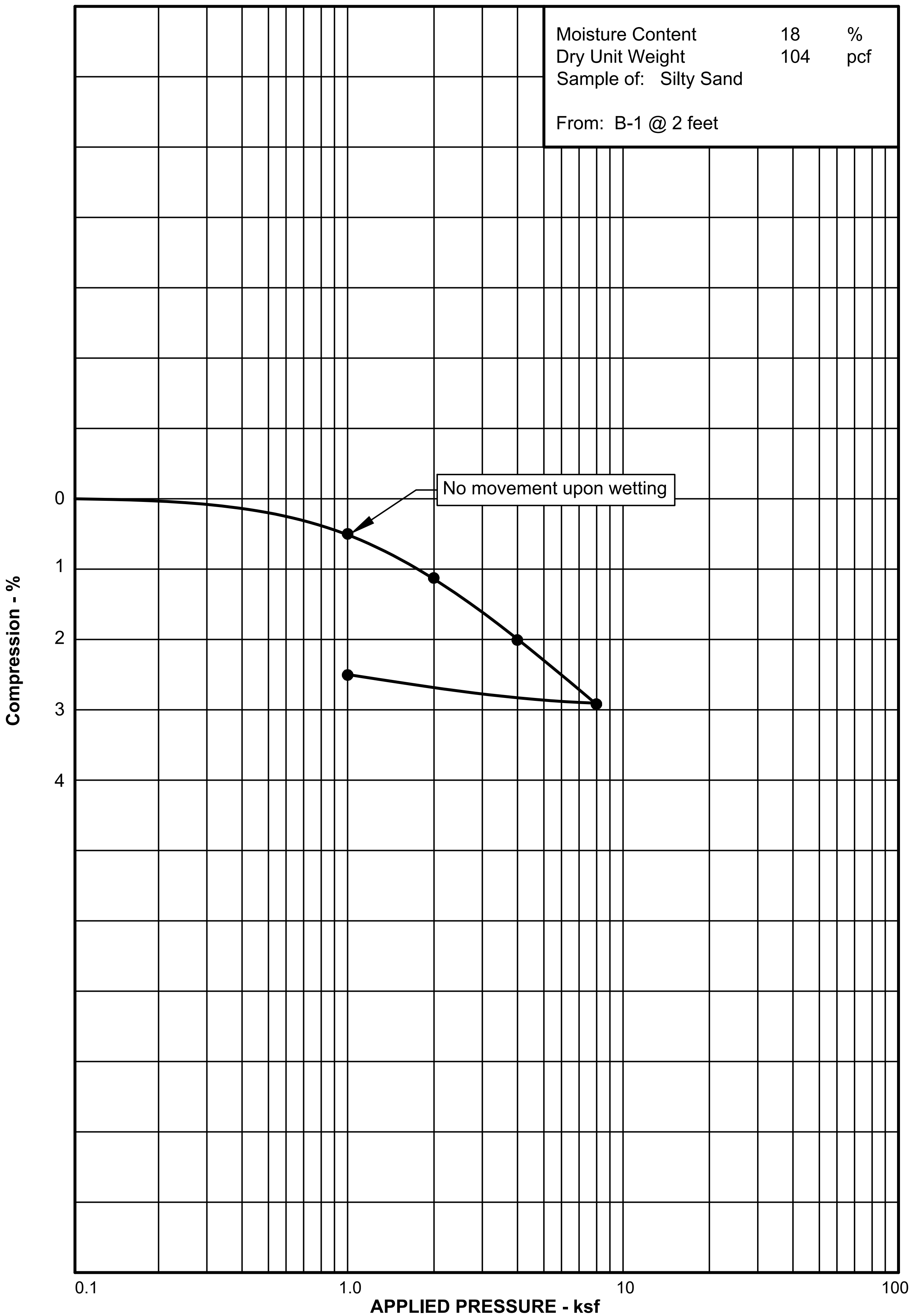
10/12 California Drive sample taken. The symbol 10/12 indicates that 10 blows from a 140 pound automatic hammer falling 30 inches were required to drive the sampler 12 inches.

Indicates slotted 1½ inch PVC pipe installed in the boring to the depth shown.

14 Indicates the depth to free water and the number of days after drilling the measurement was taken.

NOTES:

1. The borings were drilled on December 7, 2023 with direct push.
2. The locations of the borings were measured approximately by pacing from features shown on the site plan provided.
3. The elevations of the borings were provided by the surveyor on site at the time of our field study.
4. The boring locations and elevations should be considered accurate only to the degree implied by the method used.
5. The lines between materials shown on the boring logs represent the approximate boundaries between material types 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 will occur with time.
7. WC = Water Content (%);
   DD = Dry Density (pcf);
   -200 = Percent Passing the No. 200 Sieve;
   WSS = Water Soluble Sulfates (%).


Moisture Content 18 %
Dry Unit Weight 104 pcf
Sample of: Silty Sand
From: B-1 @ 2 feet
No movement upon wetting
0
1
2
3
4
Compression - %
0.1
1.0
10
100
APPLIED PRESSURE - ksf

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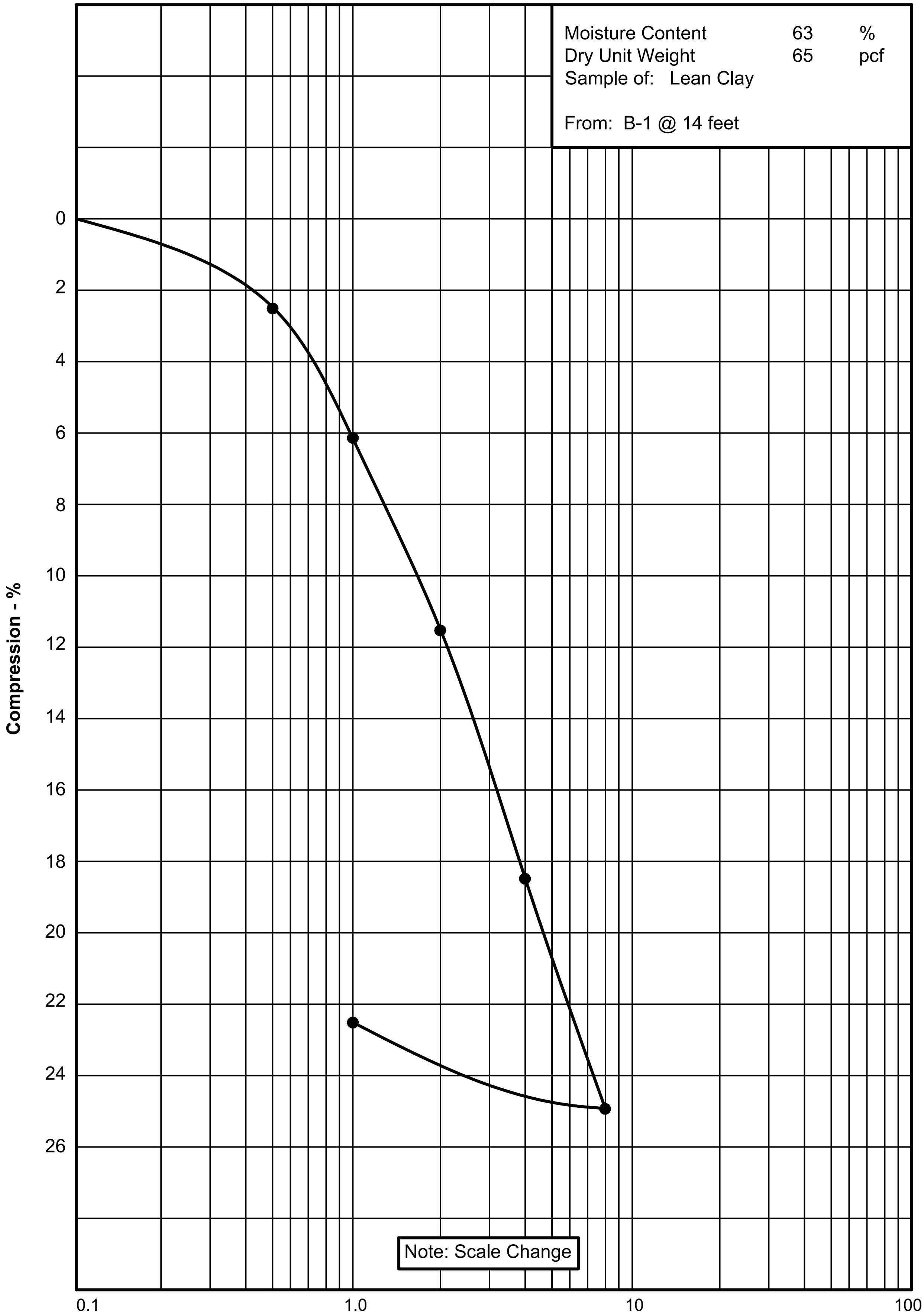
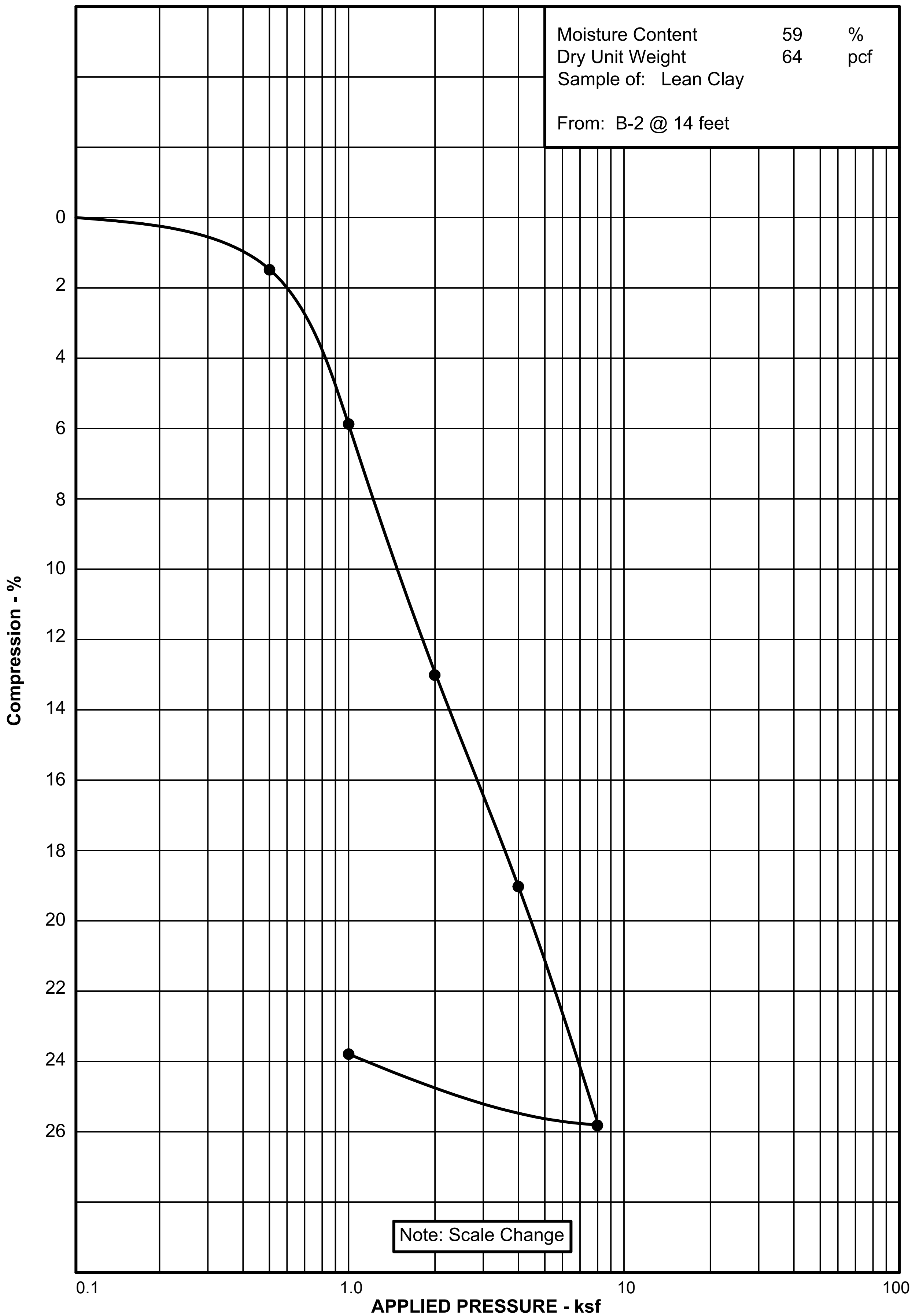


Project No. 1230670 **CONSOLIDATION TEST RESULTS** **Figure 5**

Applied Geotechnical Engineering Consultants, Inc.



Project No. 1230670 **CONSOLIDATION TEST RESULTS** **Figure 6**

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

TABLE I

SUMMARY OF LABORATORY TEST RESULTS

PROJECT NUMBER: 1230670

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (PSF)	WATER SOLUBLE SULFATE (%)	SAMPLE CLASSIFICATION
BORING	DEPTH (FEET)			GRAVEL (%)	SAND (%)	SILT/ CLAY (%)	LIQUID LIMIT (%)	PLASTICITY INDEX			
B-1	0	17	109			37					Silty Sand
	2	18	104			23					Silty Sand
	14	63	65			99					Lean Clay
B-2	4	27	91			11					Poorly Graded Sand with Silt
	9	28	102			8					Poorly Graded Sand with Silt
	14	59	64			99					Lean Clay

APPENDIX

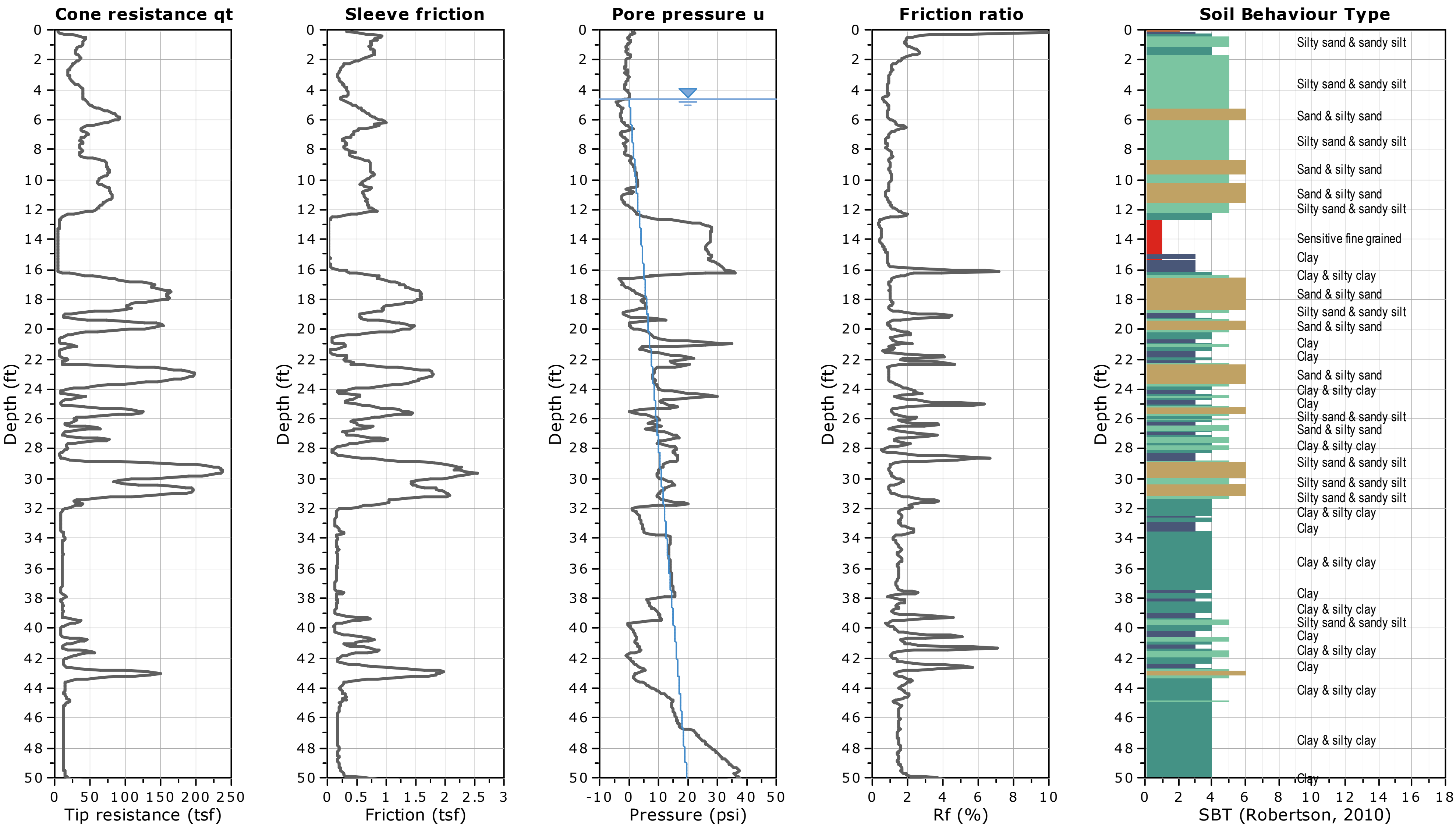
CONE PENETRATION TEST RESULT
AND
UNIFIED SOIL CLASSIFICATION SYSTEM CHART

600 West Sandy Parkway
Sandy, UT 84070

AGEC Applied GeoTech

CPT: CPT-1
Total depth: 50.26 ft, Date: 12/7/2023
Surface Elevation: 4227.50 ft
Cone Type: Nova
Cone Operator: Nathan Salazar and Jason Staker

Project: 1230670
Location: West Point Jr. Seminary



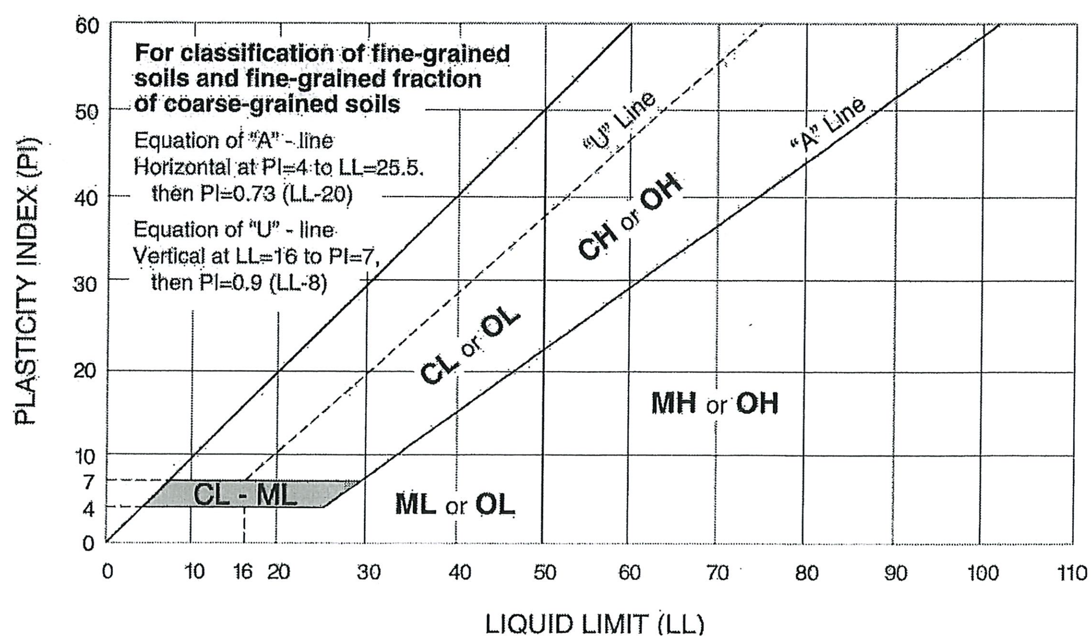
UNIFIED SOIL CLASSIFICATION SYSTEM

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

[A] Based on the material passing the 3-inch (75-mm) sieve
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10} \quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



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