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

PROPOSED SENIOR SEMINARY BUILDING
TAYLOR HIGH SCHOOL

2200 SOUTH 4300 WEST

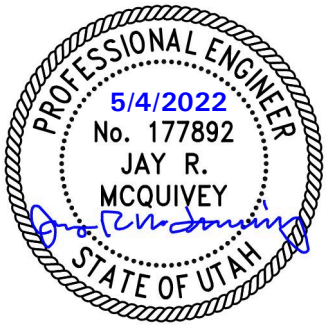
OGDEN, UTAH

PROPERTY NUMBER 501982021010101

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. 1220210	**Applied Geotechnical Engineering Consultants, Inc.** May 4, 2022	

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EXECUTIVE SUMMARY

1. Approximately 1½ feet of topsoil overlying sand was encountered in the borings. The sand extends to a depth of approximately 13 feet below the ground surface. Clay was encountered below the sand to the maximum depth of the borings, approximately 20½ feet.

   CPT soundings encountered predominantly sand to a depth of approximately 13 feet underlain by clay that extends to a depth of approximately 31 feet. Interlayered clay and sand was encountered from approximately 31 to 42 feet. Sand was encountered from approximately 42 to 46 feet underlain by clay, silt and sand layers to the full depth investigated, approximately 50½ feet.

2. Subsurface water was encountered at a depth of approximately 3½ feet based on measurements taken on April 28, 2022.

3. In our professional opinion, the site is suitable for the proposed development. However, the sand below the subsurface water level, extending from depths of approximately 3½ to 13 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 1½ inches. Ground improvement such as aggregate piers may be used to mitigate the liquefaction hazard at this site.

4. The proposed building may be supported on spread footings bearing on undisturbed natural sand or on compacted structural fill extending down to the undisturbed natural sand. Footings may be designed using an allowable net bearing pressure of 1,500 pounds per square foot. Where aggregate piers are used, higher bearing pressures can likely be used but would be determined by the aggregate pier designer

5. The upper natural soil generally consists of clayey sand with some clay layers. Construction equipment access difficulties may be encountered for rubber-tired construction equipment where the subgrade soil has a high clay content and is very moist to wet. Placement of approximately 1 to 2 feet of granular borrow may be needed to provide construction equipment access where the upper soil has a high clay content and 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 senior seminary building for a future Taylor High School to be located at 2200 South 4300 West in Ogden, Utah. The report is prepared for The Church of Jesus Christ of Latter-day Saints.

AUTHORIZATION

Our services are provided in accordance with an agreement dated March 24, 2022 between AGEC and The Church of Jesus Christ of Latter-day Saints authorized by Brian Childs.

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. The study was conducted in general accordance with the scope of services outlined in our proposal dated March 16, 2022.

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.

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 and 2 are included with the report and present the 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 also 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 no new paved parking is planned for the seminary building but the existing church parking lot to the east will be used.

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.

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 41.2282 degrees north and longitude 112.0852 degrees west.

The site consists of a landscaped field to the west of a church building and parking lot. There are no permanent structures or pavement on the site.

The site is relatively flat. The site has an approximate elevation of 4,235 feet based on the USGS 7½ minute quadrangle map.

Vegetation at the site generally consists of grass. There are trees along the east side of the site adjacent to the parking lot.

There are cultivated fields to the north and west and a continuation of the grass covered field to the south. There is a pavilion and 2200 South Street in the distance to the south. The site is bordered on the east by an asphalt-paved parking lot and church meetinghouse. There is a shed adjacent the northeast corner of the site. In the distance to the east is 4300 West Street.

FIELD STUDY

Two borings were drilled and cone penetration test (CPT) soundings obtained on April 11, 2022. The approximate locations of the borings and CPT are shown on Figure 1. The borings were logged and soil samples obtained by an engineer from AGEC. Logs of the subsurface conditions encountered in the borings are graphically shown on Figure 2. The results of the CPT are included in the appendix.

SUBSURFACE WATER AND SUBSURFACE SOIL CONDITIONS

Approximately 1½ feet of topsoil overlying sand was encountered in the borings. The sand extends to a depth of approximately 13 feet below the ground surface. Clay was encountered below the sand to the maximum depth of the borings, approximately 20½ feet.

CPT soundings encountered predominantly sand to a depth of approximately 13 feet underlain by clay that extends to a depth of approximately 31 feet. Interlayered clay and sand was encountered from approximately 31 to 42 feet. Sand was encountered from approximately 42 to 46 feet underlain by clay, silt and sand layers to the full depth investigated, approximately 50½ feet.

Subsurface water was encountered at a depth of approximately 3½ feet based on measurements taken on April 28, 2022. 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 clayey to silty sand. It is moist, dark brown and contains roots.

Lean Clay - The clay contains thin silty sand layers. It is very soft to medium stiff, wet and gray.

Clayey Sand - The clayey sand contains occasional lean clay layers. It is medium dense, moist to wet and brown.

Poorly-graded Sand with Silt - The sand contains small to moderate amounts of silt. It is loose to medium dense, wet and grayish brown.

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 98 percent passing the No. 200 sieve.

Three samples of the sand were tested in the laboratory for percent passing the No. 200 sieve. A sample of the upper clayey sand was found to have 32 percent passing the No. 200 sieve. Samples of the sand from depths of approximately 4 and 9 feet were found to have 17 and 5 percent passing the No. 200 sieve, respectively.

C. Atterberg Test

A sample of the clay was found to have a liquid limit of 37 and plasticity index of 20.

D. Natural In-Place Moisture and Density Tests

Samples of clay tested in the laboratory were found to have natural moisture contents of 24 to 32 percent and natural dry densities of 89 to 102 pounds per cubic foot (pcf).

Samples of sand tested in the laboratory were found to have natural moisture contents of 15 to 25 percent and natural dry densities of 102 to 117 pcf.

E. Consolidation Test

Two consolidation tests were conducted on samples of the natural lean clay. The test results indicate that the clay will compress a small to moderate amount with the addition of light to moderate loads. Results of the consolidation tests are presented on Figures 3 and 4.

F. Unconfined Compressive Strength Test

A sample of the clay tested in the laboratory was found to have an unconfined compressive strength of 795 pounds per square foot (psf).

G. 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.

H. Topsoil

A sample of topsoil obtained from Boring B-1 was submitted to a subcontract laboratory for topsoil evaluation. The results of the topsoil testing are presented in the appendix.

FINDINGS AND RESULTS

Based on the borings drilled, approximately 1½ feet of topsoil overlying sand was encountered at the site. The sand extends to a depth of approximately 13 feet below the ground surface. Clay was encountered below the sand to the maximum depth of the borings, approximately 20½ feet.

CPT soundings encountered predominantly sand to a depth of approximately 13 feet underlain by clay that extends to a depth of approximately 31 feet. Interlayered clay and sand was encountered from approximately 31 to 42 feet. Sand was encountered from approximately 42 to 46 feet underlain by clay, silt and sand layers to the full depth investigated, approximately 50½ feet.

Subsurface water was encountered at a depth of approximately 3½ feet based on measurements taken on April 28, 2022.

Logs of the borings are presented on Figure 2. The elevations of the borings are indicated on the logs and reference a benchmark with an assumed elevation of 100 feet. The benchmark is the floor level of the church building east of the site as shown on Figure 1.

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 below the subsurface water level, extending from depths of approximately 3½ to 13 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 1½ inches. Ground improvement such as aggregate piers may be used to mitigate the liquefaction hazard at this site.

The proposed building may be supported on spread footings bearing on undisturbed natural sand or on compacted structural fill extending down to the undisturbed natural sand. Footings may be designed using an allowable net bearing pressure of 1,500 psf. Where aggregate piers are used, higher bearing pressures can likely be used but would be determined by the aggregate pier designer.

B. Temporary Excavations

Temporary 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 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. Subgrade Preparation

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

The upper natural soil generally consists of clayey sand with some clay layers. Construction equipment access difficulties may be encountered for rubber-tired construction equipment where the subgrade soil has a high clay content and is very moist to wet. Placement of approximately 1 to 2 feet of granular borrow may be needed to provide construction equipment access where the upper soil has a high clay content and 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 sand meeting the recommendations given above for imported structural fill may be used as structural fill within the proposed building area above the original free water level, if the topsoil, organics, debris and other deleterious materials are removed or it may be used in landscape areas.

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

The proposed seminary building may be supported on spread footings bearing on the undisturbed natural sand or on compacted structural fill extending down to undisturbed natural sand. Compacted structural fill should extend down to the undisturbed natural soil and out away from the edge of the footings at least a distance equal to the depth of structural fill placed beneath the footings.

Unsuitable fill, topsoil, debris and other deleterious materials should be removed from below proposed foundation areas.

We anticipate that ground improvement measures such as aggregate piers may be considered to mitigate the liquefaction hazard. Spread footings may bear on 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. Bearing Pressures

Spread footings bearing on the undisturbed natural sand or on compacted structural fill extending down to the undisturbed natural sand may be designed using an allowable net bearing pressure of 1,500 psf.

3. Settlement

We estimate that total and differential settlement will be less than ¾ inch and ½ inch, respectively. Care should be taken to avoid disturbance of the natural soil to remain below foundations to maintain settlement within tolerable limits.

4. Temporary Loading Conditions

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

5. Minimum Footing Width and Embedment

Spread footings should have a minimum width of 1½ feet and a minimum depth of embedment of 10 inches.

6. Frost Depth

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

7. Foundation Base

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

8. 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 sand or on compacted structural fill that extends down to the undisturbed natural sand.

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 36 pcf for the active condition, increased by 21 pcf for the at-rest condition and decreased by 36 pcf for the passive condition. This assumes a peak horizontal ground acceleration of 0.60g 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 2018 International Building Code:

Description	Value[1]
Site Class	F[2]
S_s - MCE_R ground motion (period = 0.2s)	1.13g
S_1 - MCE_R ground motion (period = 1.0s)	0.40g
F_a - Site amplification factor at 0.2s	1.2[3]
PGA - MCE_G peak ground acceleration	0.50g
PGA_M - Site modified peak ground acceleration	0.60g

[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 fault considered to be active is the Wasatch Fault located approximately 7½ miles east of the site (UGS, 2022).

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 below the subsurface water level, extending from depths of approximately 3½ to 13 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 1½ inches. Ground improvement such as aggregate piers may be used to mitigate the liquefaction hazard at this site.

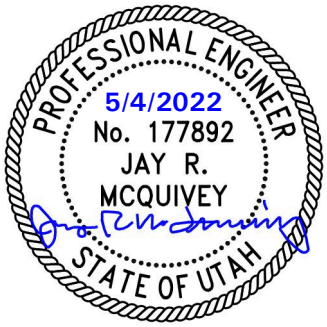
K. Preconstruction Meeting

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 1 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.



Jay R. McQuivey, P.E.

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

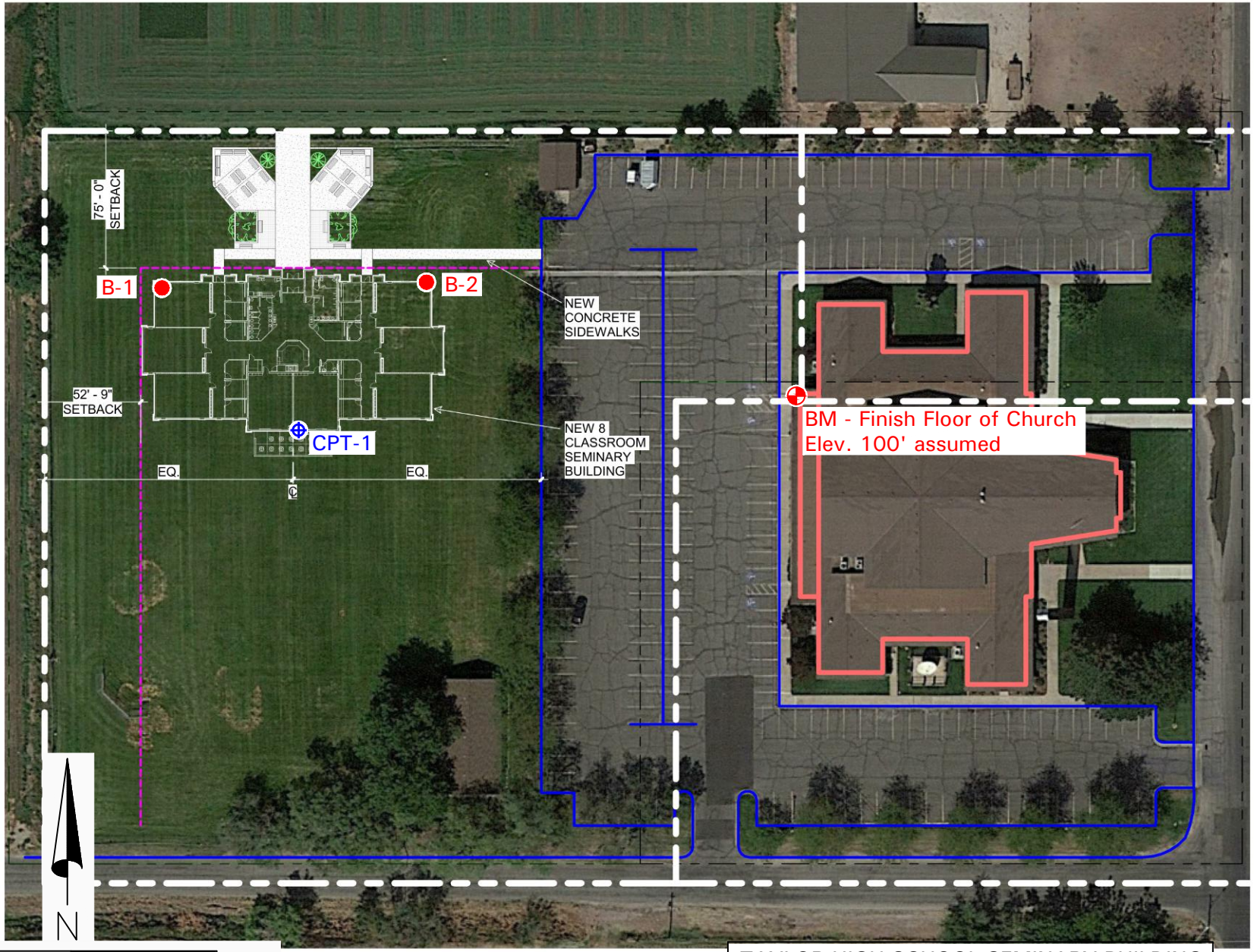
JRM/bw

REFERENCES

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

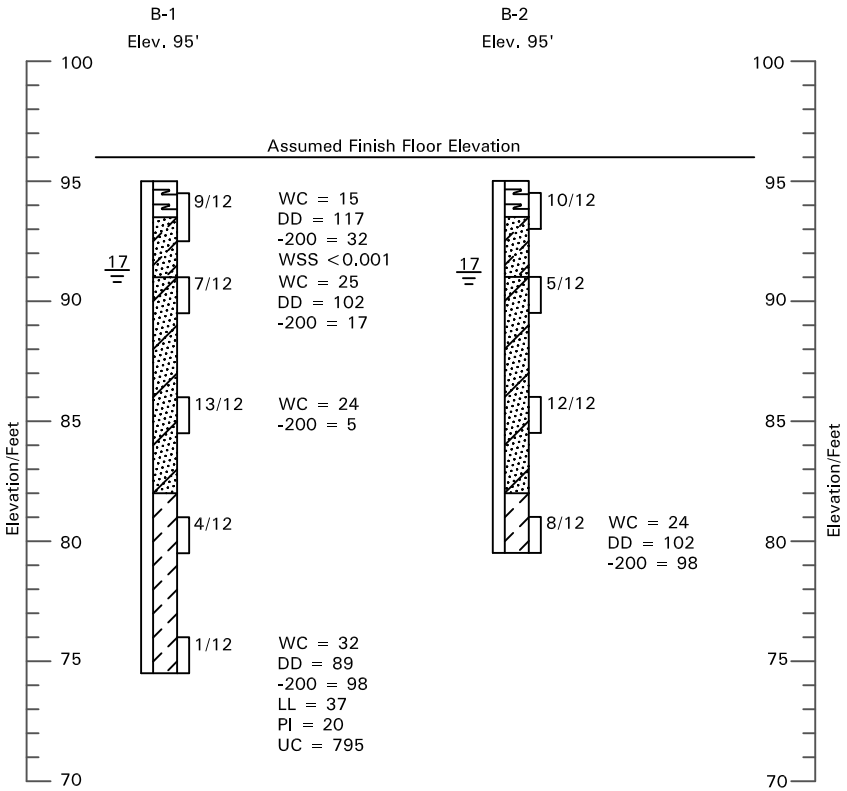
Anderson, L.R., Keaton, J.R., and Bay, J., 1994; Liquefaction Potential Map for Weber County, Utah; Utah Geological Survey Contract Report 94-1.

Utah Geological Survey, 2022; Utah Quaternary Fault and Fold Database, http://geology.utah.gov/apps/qfaults accessed April, 29, 2022.



TAYLOR HIGH SCHOOL SEMINARY BUILDING
2200 SOUTH 4300 WEST
OGDEN, UTAH

1220210	AGEC	Exploratory Boring and CPT Locations	Figure 1



Approximate Vertical Scale 1" = 8'

LEGEND:

Topsoil; clayey to silty sand, moist, dark brown, roots.

Lean Clay (CL); thin silty sand layers, very soft to medium stiff, wet, gray.

Clayey Sand (SC); occasional lean clay layers, medium dense, moist to wet, brown.

Poorly-graded Sand with Silt (SP-SM); small to moderate amount of silt, loose to medium dense, wet, grayish brown.

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.

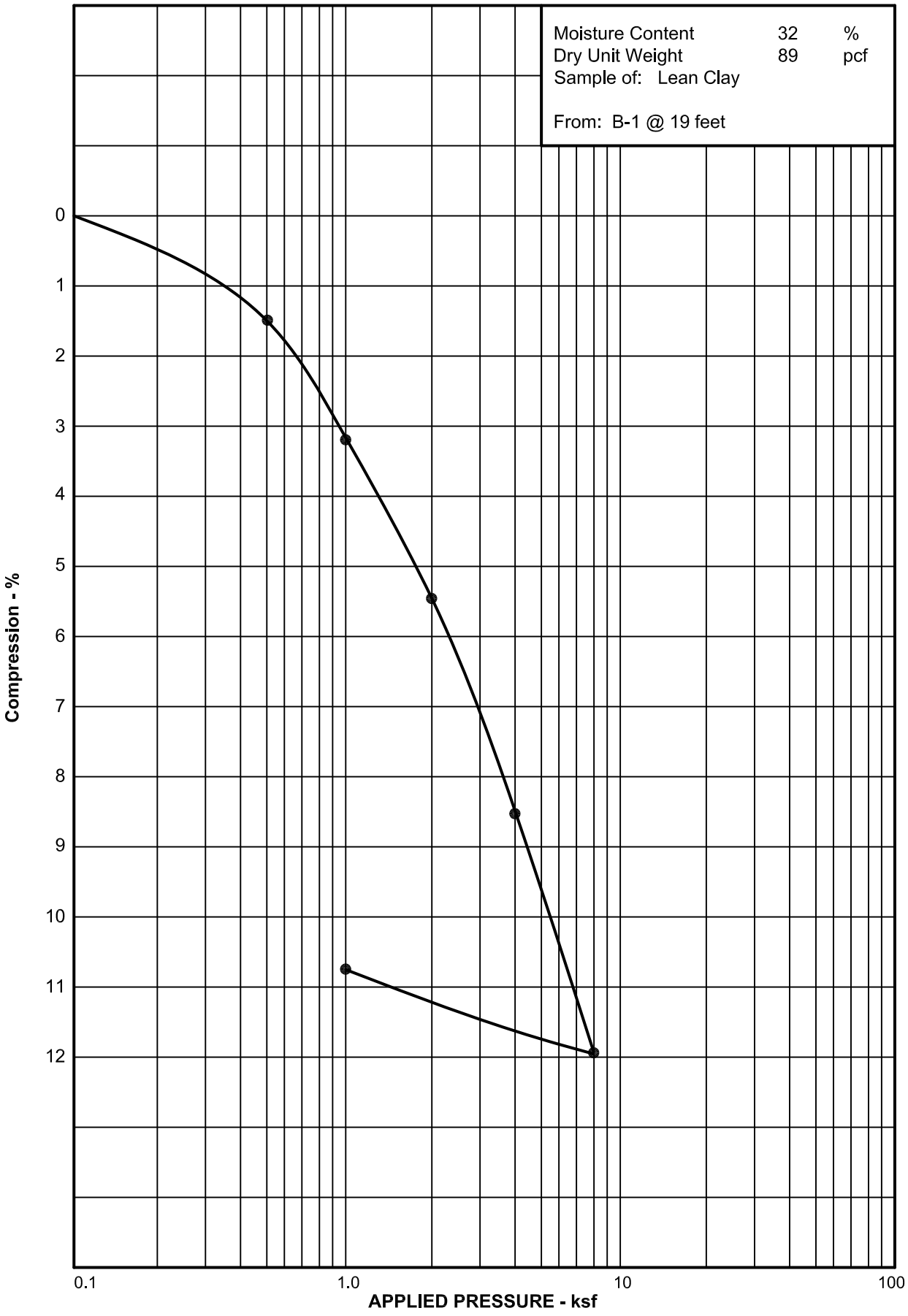
Indicates slotted 1½ inch PVC pipe installed in the boring to the depth shown.

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

NOTES:

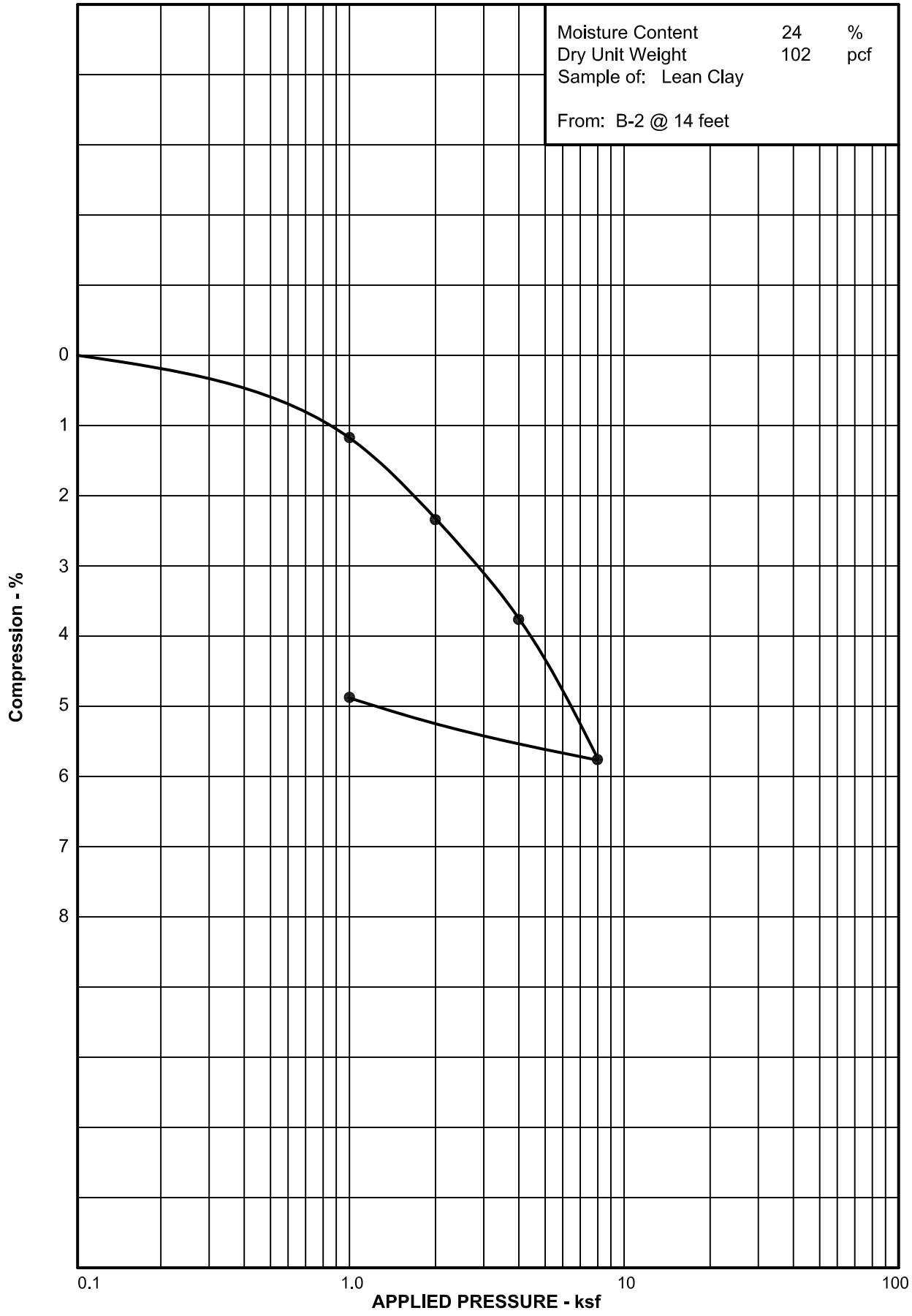
1. The borings were drilled on April 11, 2022 with direct push.
2. The locations of the borings were measured approximately by pacing from features shown on the site plan provided.
3. The elevations of the borings were measured by automatic level and refer to the benchmark shown on Figure 1.
4. The boring 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;
   LL = Liquid Limit (%);
   PI = Plasticity Index (%);
   UC = Unconfined Compressive Strength (psf);
   WSS = Water Soluble Sulfates (%).

Applied Geotechnical Engineering Consultants, Inc.



Project No. 1220210 **CONSOLIDATION TEST RESULTS** **Figure 3**

Applied Geotechnical Engineering Consultants, Inc.



Project No. 1220210 **CONSOLIDATION TEST RESULTS** **Figure 4**

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

TABLE I
SUMMARY OF LABORATORY TEST RESULTS

PROJECT NUMBER: 1220210

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	½	15	117			32				<0.001	Clayey Sand
	4	25	102			17					Silty Sand
	9	24				5					Poorly-graded Sand with Silt
	19	32	89			98	37	20	795		Lean Clay
B-2	14	24	102			98					Lean Clay

APPENDIX

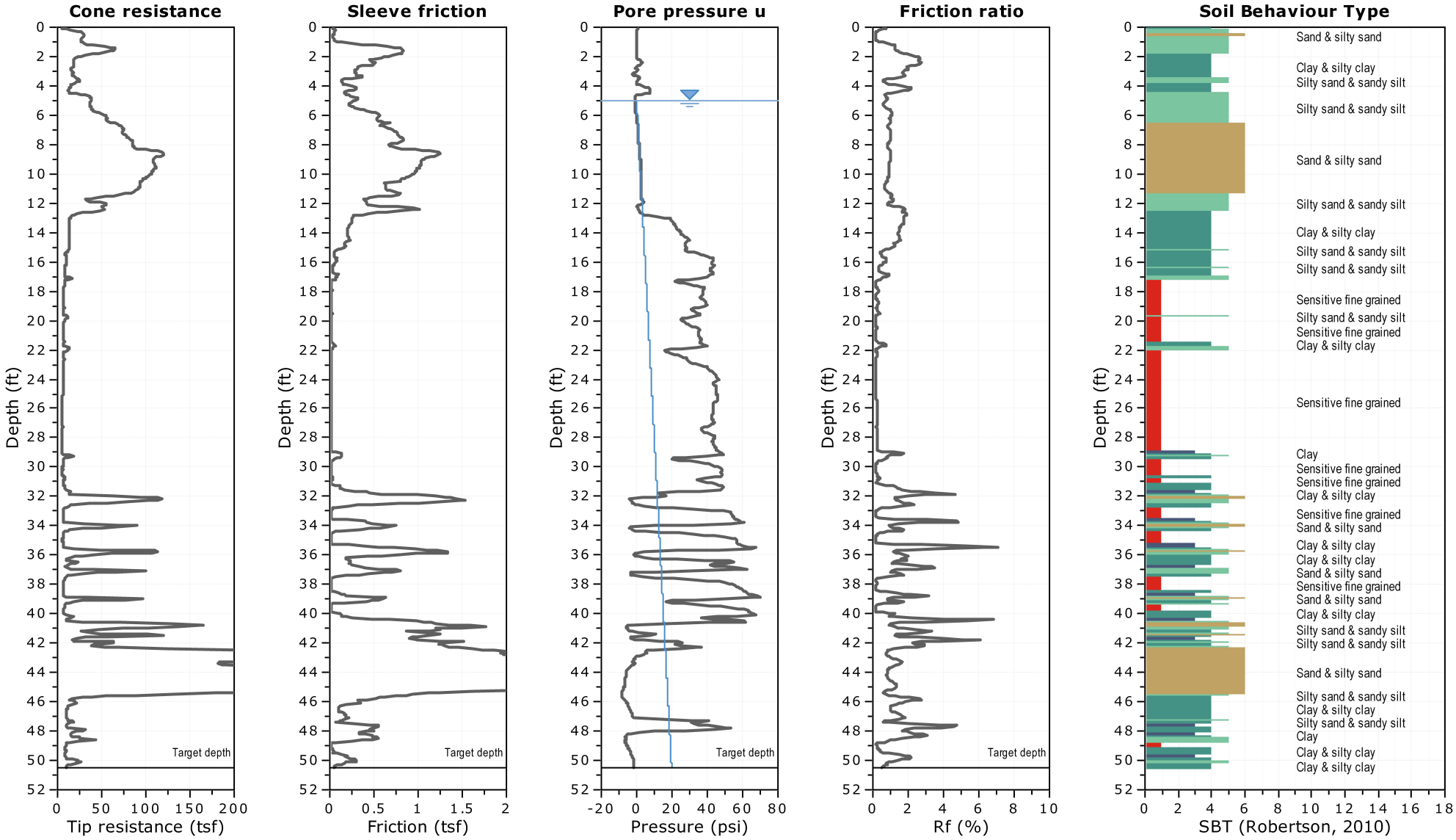
CONE PENETRATION TEST RESULT
UNIFIED SOIL CLASSIFICATION SYSTEM CHART
AND
TOPSOIL TESTING REPORT

Applied GeoTech

600 W. Sandy Parkway
Sandy, UT 84070

Project: **1220210**
Location: **Taylor High Senior Seminary Building**

CPT: CPT-1
Total depth: 50.46 ft, Date: 4/11/2022
Surface Elevation: 95.00 ft
Coords: X:0.00, Y:0.00
Cone Type: Nova
Cone Operator: Dale Stott and Derek Wolfe



UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	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.

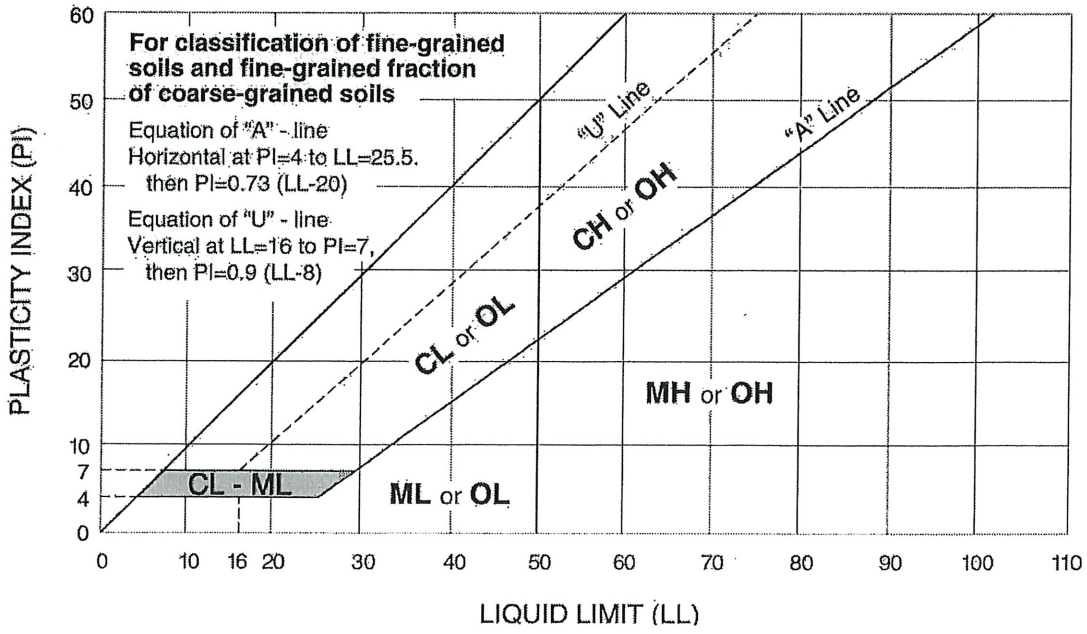
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[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.



AGEC

Topsoil Testing Report

Project	Name **Taylor High School Seminary**		Property Number :**501982021010101**
	Site Street Address, City, State/Province **2200 S 4300 W, Ogden, Utah**		
Person Submitting Test	Name **Katrina Black AGEC kblack@agecinc.com**	Date Requested **22 Apr 2022**	Phone **801 566 6399**
	Address, City, State/Province **600 W Sandy Pkwy Sandy UT 84070**		Cel 801 839 6414
Soil Testing Laboratory	Name **QA Consulting and Testing, LLC**	Date Submitted **3 May 2022**	Cel 801 372 7177
	Address, City, State/Province **645 South 240 East Salem, UT 84653** **vonisaman@comcast.net**		Cel 801 372 7177

General

1. Owner will pay for pre-bid testing and one (1) final topsoil test.

Landscape Architect Instructions

1. Landscape Architect shall determine by investigation quality and quantity of topsoil on site before landscape design. Add physical and fertility recommendations from laboratory recommendations to relevant Church specifications.

Contractor Instructions

1. Test installed topsoil. Installed topsoil shall comply with Project Specifications.
2. If installed topsoil does not comply, Contractor will enhance and test at no cost to Owner until installed topsoil complies with Project Specifications.
3.

Testing Instructions

1. Collect at least two (2) samples of on-site topsoil and each anticipated topsoil source. If site soil profile or borrow pit are not uniform, additional samples shall be taken. Uniform composite samples may also be used if properly acquired and documented.
2. Submit required soil samples to soil testing laboratory along with all required (for this report and laboratory) information.

Soil Testing Laboratory Instructions

1. This report must be completely filled out and provide soil interpretation and amendment, fertilizer, and soil conditioner recommendations for use by Landscape Architect. These recommendations should consider lawn areas, tree and shrub areas, and native plant areas.
2. Provide appropriate times for fertilizing.
3. Return completed Topsoil Testing Report to person submitting the test.

SOIL SAMPLE LOG		
Soil Sample No.	Description of location where sample was taken	History of use of the soil
B-1	4-6”	Vacant

Existing Conditions Test Report

(“Acceptable Levels” refers to the allowable soil specifications prior to being amended)

SOIL TEST DATA												
Sample No.	pH(1)	EC(1) Mmhos/cm	SAR(1)	**% Sand**	% Silt	% Clay	Text(2) Class	%(3) OM	**NO3-N(4) ppm**	**P(5) ppm**	**K(5) ppm**	Fe(5) ppm
B-1	7.5	0.5	1.9	**68**	17	15	Sandy Loam	1.5	**3**	**3**	**42**	14
Acceptable Level(s)	5.5 - 8.4	<3.0	<6.0	15-**60**	10-60	5-30	(2)	>1.0	**>20**	**>11**	**>130**	>10

(1) Saturated soil paste 1:1 soil:water method (please Indicate)
(2)Hydrometer method (Acceptable soil- Sand:15-60 %, Silt:10-60 %, Clay-5-30 %)
(3)Potassium dichromate method (Walkey-Black).
(4)Chromotropic acid method (5)AB-DTPA method.
Other methods: NO3-N, P, K, and Fe, then note.

Continued next page.

ROCKS (Coarse Fragments)		
Sample No.	Percent > 1/4 inch (6.4 mm)	Rocks Present ≥ 1.5 inch (38 mm) Indicate as present or not present
B-1	0.1	Not Present
Acceptable Level	≤ 5.0 percent	< 1.5 inch (38 mm)

Landscape Area Description
Lawn Areas: Receive 5 inch (125 mm) topsoil plus recommended amendments and fertilizers.

Shrub/Tree Areas: Unless otherwise indicated, plant pits are to be backfilled with three (3) parts native soil and one part compost or other recommended amendments. Additionally, contractor will add recommended fertilizer.

INFILTRATION RATE	
Documented Infiltration rate of test sample(s) based on texture at 90 percent relative density (to nearest 1/10th of an inch)	
Sample No.	Rate
B-1	2.1 Inches/Hour

Native Grass/Shrub/Tree Areas: Planting to receive minimum recommended amendments and fertilizers for establishment.

Interpretation Summary of Test Results:

Taylor High School Seminary

% Sand, Nitrate Nitrogen, Phosphorus and Potassium do not meet Acceptable Levels.

Soil Amendments, Fertilizer and Soil Conditioner – Recommendations:

Lawn Areas: Amendments: Apply an organic material (compost, etc.) at 7.5 cu yds/1000 sq ft for every 5" of topsoil depth. Incorporate well. See the Compost Quality Guidelines for Landscaping, attached. Or, apply a similar product at label rate following manufacturer's recommendation for soil preparation and turf maintenance. No additional organic material is recommended for organic matter content ≥5%. Fertilizer: Apply an NPK fertilizer at label rate. Incorporate well. Conditioner: None.

Shrub/Tree Areas: Amendments: See **Landscape Area Description** above. Fertilizer: Apply an NPK fertilizer at label rate. Conditioner: None.

Native Grass/Shrub/Tree Areas: Amendments: None. Conditioners: None. Fertilizer: Apply an NPK fertilizer at ½ label rate, or per nurseryman's recommendation.

Scarify the subsoil at least 6" before applying topsoil.

Long Term (5 Year) Fertilizer and Soil Conditioner – Recommendations:

Lawn Areas: Amendments: None. Conditioner: None. Fertilizer: Continue with above recommendation.

Shrub/Tree Areas: Amendments: None. Conditioner: None. Fertilizer: As a top dress, continue with above recommendation.

Native Grass/Shrub/Tree Areas: Amendments: None. Conditioner: None. Fertilizer: Top dress every other year with 1/2 label rate of an NPK fertilizer, or per nurseryman's recommendation.

Continued next page.

COMPOST QUALITY GUIDELINES FOR LANDSCAPING*

Category	pH**	Soluble Salts** dS/m or mmho/cm	Sodium Adsorption Ratio** (SAR)	Carbon:Nitrogen Ratio*** (C:N)	% Moisture****	≥98% Coarse Material Passing (dry wt basis)
Ideal	6 to 8	≤5	<10	≤20:1	25 to 35	3/8" (9.5 mm)
Acceptable	5-6, 8-9	≤10	≤20	21:1 to 30:1	<25, >35	3/4" (19 mm)
Suspect	<5, >9	>10	>20	<10:1, >30:1	<20, >50	<98% 3/4"

for composts with biosolid feedstocks, biosolids must meet EPA 503 Class A standards

*Von Isaman MPS, President of QA Consulting and Testing LLC, Dr. Rich Koenig, USU Cooperative Extension Soils Specialist, and Dr. Teresa Cerny, USU Cooperative Extension Horticulturalist, 3 March 2003.
** 1:5 Compost:Water Slurry on Coarse Material passing 3/8" (9.5 mm)
*** on Coarse Material passing 3/8" (9.5 mm)
**** on total sample

Acceptable level Soluble Salts and/or SAR composts then do not exceed 3 cu yds/1000 sq ft for every 3 inches of soil depth.

End.

AgecTaylorHighSchoolSeminaryLdsReport22.506